Partners in Progress
PEANUTS

Peanut Research at OSU 2008

Supported by the

Oklahoma Peanut Commission

and the

National Peanut Board

Oklahoma State University
Division of Agricultural Sciences
and Natural Resources
Oklahoma Agricultural Experiment Station
Oklahoma Cooperative Extension Service

In cooperation with
U.S. Department of Agriculture -
Agricultural Research Service

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Partners in Progress PEANUTS

Foreword

We have had a long standing partnership with the Oklahoma Peanut Commission and the peanut producers of this state. There have been good times and bad times in terms of state budget restraints, shifts in peanut production locations in the state, and changes in the federal peanut program. Together, we have survived and are looking forward to a brighter future.

Our *Partners in Progress Peanut Report* serves as a means to highlight significant accomplishments in research and Extension programs that have been supported in partnership with the Oklahoma Peanut Commission and the National Peanut Board. With all of the work that has been accomplished, it is important to recognize that much more research and Extension programming needs to be done to keep our peanut producers competitive and in business. Therefore, our work must be focused to solve meaningful issue-based problems facing the peanut producers in the state.

This report is one means of being accountable for the funds we have received and communicating the latest results of our programs to peanut producers as rapidly as possible.

Clarence Watson,
Associate Director
Oklahoma Agricultural Experiment Station
Division of Agricultural Sciences and Natural Resources
Oklahoma State University

Oklahoma State University Division of Agricultural Sciences and Natural Resources Mission Statement

The Mission of the Oklahoma State University Division of Agricultural Sciences and Natural Resources is to discover, develop, disseminate, and preserve knowledge needed to enhance the productivity, profitability, and sustainability of agriculture; conserve and improve natural resources; improve the health and well-being of all segments of our society; and to instill in its students the intellectual curiosity, discernment, knowledge, and skills needed for their individual development and contribution to society.

2008 Crop — One for the Books!

U.S. farmers produced a record 2.5 million tons in 2008, the largest peanut crop in history. Oklahoma producers helped lead the way with a record 3,500 pound per acre average yield. Acreage was up slightly in Oklahoma, adding to the 25% national increase, as farmers optioned for a crop with lower fertilizer requirements.

Ideal growing and harvest conditions nationwide helped produce a historical crop far larger than the domestic and world markets may handle before the 2009 crop planting decisions by farmers are made. USDA estimates ending stocks in excess of 700,000 tons, about double the normal needs to meet consumer demand before the next harvest.

With the carryover in mind, the Trade will no doubt be looking for fewer peanuts overall, but perhaps favorably toward the Spanish, Virginia and high oleic runners grown in the Southwest.

Thus, peanuts continue to be an "opportunity" option for Oklahoma farmers as they consider their annual mix of crops. Years of research have proven the value of using peanuts in a scheduled rotation program to improve production and overall farm profit potential.

This year's version of the Peanut Partners in Progress report will prove a valuable tool in planning for 2009. Contained within are the results of the ongoing peanut research and Extension efforts in the areas of peanut breeding and variety development, reduced tillage and production practices, weed control and pest management, and soilborne pathogens and disease management.

These scientific investigations are led by the state's Peanut Improvement Team and funded in part by the Oklahoma Peanut Commission in cooperation with the National Peanut Board. Each of the primary investigators reporting within, have earned the respect and appreciation from Oklahoma's peanut farmers.

The Commission salutes the Team's dedication to improve the profitability of producers; and acknowledges the investments made by the Oklahoma State University's Division of Agricultural Sciences and Natural Resources, the Oklahoma Agricultural Experiment Station, the Oklahoma Cooperative Extension Service, the USDA-Agricultural Research Service at The Center for Peanut Improvement and the support of Oklahoma's peanut producers.

Mike Kubicek,
Executive Secretary
Oklahoma Peanut Commission

Documentation for Release of a High Oleic Runner Peanut Cultivar (tested as TX 994313)

H. A. Melouk and K. D. Chenault, USDA-ARS
C. B. Godsey, Department of Plant and Soil Sciences
J. P. Damicone, Department of Entomology and Plant Pathology

2008 progress made possible through OPC and NPB support

- Data for the last several years has shown that TX 994313 high oleic breeding line exhibited superior grade over Tamrun 96 and Tamrun OL02 under Oklahoma conditions.

Although the peanut acreage diminished in 2008 to 18,000 acres, the peanut crop remains a viable agricultural commodity in western and southwestern Oklahoma with an annual estimated value of $14 million. Production of peanut is adversely affected by soilborne pathogens, especially *Sclerotinia minor*, the causal agent of Sclerotinia blight disease. Besides Sclerotinia blight management, other important factors to consider for profitable peanut production in Oklahoma and the Southwest are to improve yield, grade, and oil quality (high oleic/linoleic ratio), and investigate avenues to reduce production inputs (i.e. reduce water consumption).

Research has been directed to chemical management of *S. minor* on several hosts, including peanut (4,7,9,10,14,15,23,24) and biological antagonists (1,2). Chemical management of Sclerotinia blight adds substantial cost to peanut production. Planting Sclerotinia-resistant cultivars is the most efficient and cost effective form of disease management available to growers. Efforts by peanut breeders and plant pathologists in the last 25 years were fruitful in developing several cultivars with resistance to Sclerotinia blight. Morphological and physiological resistance to Sclerotinia blight were identified in peanut as early as 1982 (8). Southwest peanut improvement efforts in the last 20 years were successful in developing and releasing six Sclerotinia-resistant peanuts representing the Spanish and runner market type peanuts. Tamspan 90, a Spanish peanut, was released in 1990 (22); Southwest Runner, a Sclerotinia-resistant runner-type peanut, was released in 1995 (11). More recently, Tamrun 98, a runner peanut with moderate resistance was released in 1998 (18). Olin, a Sclerotinia-resistant Spanish peanut cultivar with high-oleic acid, was released in 2001 (20). Also, four high oleic-peanut cultivars (Tamrun OL01, Tamrun OL02, Tamrun OL07, and Tamnut OL06) with moderate Sclerotinia resistance were recently released (5,6,19,21). Therefore, our long-range objectives of the peanut improvement program at Stillwater are:

- to continue improving disease resistance (i.e. Sclerotinia blight, etc.);
- to improve yield, grade, and oil quality (high oleic/linoleic ratio); and
- to investigate avenues to reduce production inputs (i.e. reduce water consumption).

Sclerotinia blight

Sclerotinia blight of peanut (*Arachis hypogaea* L.), caused by *S. minor,* was first reported in the United States in 1971 (15) and in Oklahoma in 1972 (25). The disease also was found in Texas in 1981 and in Louisiana in 1982. Annual losses from Sclerotinia blight in Virginia have been estimated at 4% to 6% (16). Currently, about 40% of peanut fields in Oklahoma experience some losses due to Sclerotinia blight, with the highest concentration of the disease occurring in Caddo County. Typical symptoms of Sclerotinia blight include flagging, wilting, and necrosis of one or more stems. Necrotic areas may occur on stems at or near the soil surface. Infected areas are usually covered with white, fluffy mycelium during periods of high humidity. All plant parts below ground, including pegs and pods, are subject to attack by the fungus. Sclerotia are produced externally on affected plant stems and internally in stem pith cavities. The sclerotia eventually reach the soil where they remain on the soil surface or are buried during farming operations that disturb the soil surfaces (25). The aggressiveness of *S. minor* under favorable conditions and the ability of its sclerotia to withstand adverse environmental conditions have contributed to the establishment of *S. minor* as an important pathogen on peanut (13,17). *S. minor* is disseminated locally or to geographically separate areas by several means that include seed and debris (3,26), and weed hosts (10).

Research progress in Oklahoma since 2002

Other factors of importance to profitable peanut production, besides resistance to Sclerotinia blight, have been addressed by Oklahoma researchers since 2002. These include improving yield, grade, oil quality (high oleic/linoleic ratio), and investigating avenues to reduce production inputs (i.e. reduce water consumption).

Results of field studies in Oklahoma at the Caddo Research Station near Ft. Cobb, under dry land and irrigation growing conditions conducted in 2002 are shown in Tables A and B.

Table A: Yield, leaf spot, and Sclerotinia intensity in irrigated plots, Ft. Cobb, 2002.

Entry	*Yield (lbs/A)*	*LS Defoliation (%)*	*Sclerotinia Intensity (1-5)*
Tamrun 96	2,972	10.9	1.3
TX 994313	2,931	6.9	1.6
SW Runner	2,916	22.5	1.0
Tamrun OL01	2,819	9.1	1.9
Tamrun OL02	2,804	13.4	1.8
Okrun	2,320	5.6	2.1
Florunner	2,142	4.7	2.6
LSD (0.05)	285	3.7	0.4

Table B: Yield value and weight of peanut kernels in dry land (rain-fed) plots, Ft. Cobb, 2002.

Entry	*Yield value (TSMK[1] x Yield/100)*	*Kernel Weight (g/100 kernels)*
Tamrun 96	469	46.2
TX 994313	705	44.3
SW Runner	507	32.4
Tamrun OL01	771	53.6
Tamrun OL02	418	48.7
Okrun	773	38.3
Florunner	596	38.9
LSD (0.05)	251	5.5

[1] TSMK = Total sound mature kernels.

The irrigated plot study identified a high oleic peanut breeding entry (TX 994313) as a potential breeding line for advancement in our selection program based on:

- its moderate resistance to Sclerotinia blight, when compared with Okrun and Florunner, and

- its acceptable resistance to leaf spot as compared with the susceptible Southwest Runner.

The dry land (rain-fed) plot study in 2002 has identified a high oleic peanut breeding entry (TX 994313) as a potential breeding line for advancement in the Oklahoma peanut improvement program based on:

- its comparable yield with Okrun, Tamrun OL01, and better than Tamrun OL02 under dry land growing conditions and its probability to yield under reduced irrigation regime; and
- its smaller kernel size than Tamrun OL01, but comparable with Okrun, Tamrun 96, and Tamrun OL02.

Selection procedure

Bulk selections of kernels from healthy plants of TX 994313 were made from the irrigated plot study in 2002 for further advancement in the breeding program. Seed increase of TX 994313 was accomplished at the Caddo Research Station in 2003. From 2004 through 2007, research efforts were directed to determine the field performance of TX 994313. Field performance data are presented in Tables 1 though 26. Data from field plots planted in Oklahoma and Texas in 2008 are being incorporated into this document for possible cultivar release in 2009.

Field performance of TX 994313, a high oleic/linoleic ratio runner-type peanut, 2002 to 2007

Table 1. Advanced Runner Peanut Performance Trial, Caddo County, irrigated, 2002.

Entry	*Yield (lbs/A)*	*% Sclerotinia Blight Incidence*	*Sclerotinia Blight Intensity (1 – 5)*
Tamrun 96	2,972	42	1.3
TX 994313	2,931	50	1.6
Southwest Runner	2,916	5	1.0
Tamrun OL01	2,819	54	1.9
Tamrun OL02	2,804	53	1.8
Okrun	2,320	56	2.1
Florunner	2,142	58	2.6
LSD 0.05	285	6	0.4

Source: Dashiell and Melouk. Partners in Progress P-994.
Non-managed plots.

Table 2. Advanced Runner Peanut Performance Trial, Caddo County, dry land, 2002.

Entry	*Yield (lbs/A)*	*% TSMK*[1]	*100 Seed Weight (g)*
Okrun	1,516	51	38
Tamrun OL01	1,339	58	54
TX 994313	1,306	54	44
Florunner	1,339	44	39
Tamrun 96	855	55	46
Tamrun OL02	807	52	49
LSD 0.05	394	7	6

[1] TSMK = Total sound mature kernels.
Source: Dashiell and Melouk. Partners in Progress P-994.
Non-managed plots.
Sclerotinia blight did not develop under dry land production.

Table 3. Advanced Runner Peanut Performance Trial, four locations, 2004.

	Yield (lbs/A)			
Entry	*Caddo High Sclerotinia*	*Caddo Low Sclerotinia*	*Grady No Sclerotinia*	*Beckham No Sclerotinia*
Okrun	3,122	4,202	3,530	4,193
Tamrun 96	3,799	4,937	4,719	4,247
Tamrun OL02	2,844	4,465	3,648	3,848
TX 994313	3,799	5,118	4,011	3,993
LSD 0.05	447	472	NS	NS

Source: Melouk and Damicone. Partners in Progress P-1009.
Non-managed plots.

Table 4. Advanced Runner Peanut Performance Trial, percent Sclerotinia blight incidence, Caddo County, 2004.

Entry	*Caddo High Sclerotinia*	*Caddo Low Sclerotinia*
Okrun	83	32
Tamrun 96	65	12
Tamrun OL02	63	23
TX 994313	53	5
LSD 0.05	21	14

Source: Melouk and Damicone.
Partners in Progress P-1009.
Non-managed plots.

Table 5. Seed Quality from Advance Runner Peanut Performance Trials, four locations, 2004.

Entry	*Location*	*% TSMK*[1]	*Seeds/oz*	*100 Seed Weight (g)*
Okrun	Grady	79	42	59
	Caddo HD*	70	41	57
	Caddo LD**	76	40	59
	Beckham	79	40	63
Tamrun OL02	Grady	75	38	61
	Caddo HD*	61	39	57
	Caddo LD**	68	38	61
	Beckham	77	39	62
Tamrun 96	Grady	76	43	58
	Caddo HD*	66	40	59
	Caddo LD**	69	40	61
	Beckham	76	41	61
TX 994313	Grady	78	38	63
	Caddo HD*	69	38	63
	Caddo LD**	76	38	65
	Beckham	79	38	65

[1] TSMK = Total sound mature kernels.
* HD = High Sclerotinia incidence
**LD = Low Sclerotinia incidence.
Source: Melouk and Damicone. Partners in Progress P-1009.
Non-managed plots.

Summary of 2004 (4 tests)

Non-managed plots (4)

	Yield (lbs/A)	% TSMK[1]	100 Seed Weight (g)	Sclerotinia (%) Ft. Cobb
Okrun	3762	76	59	*83 ; 32
Tamrun 96	4426	70	60	65 ; 12
Tamrun OL02	3701	72	60	63 ; 23
TX 994313	4230	76 **(+4)	64	53 ; 5

[1] TSMK = Total sound mature kernels.
* LSD (0.05): High disease= 21; Low disease= 14
** Advantage over Tamrun OL02.

Table 6. Advanced Runner Peanut Performance Trials at three locations, 2005.

Entry	*Location*	*Yield (lbs/A)*	*% Sclerotinia Incidence*
Okrun	Caddo MD*	3,303	55
	Grady	2,822	0
	Beckham	3,276	0
	Average	3,134	--
Tamrun 96	Caddo MD*	3,802	21
	Grady	3,648	0
	Beckham	3,385	0
	Average	3,612	--
Tamrun OL02	Caddo MD*	3,812	68
	Grady	2,977	0
	Beckham	3,303	0
	Average	3,364	--
TX 994313	Caddo MD*	3,521	36
	Grady	3,478	0
	Beckham	3,639	0
	Average	3,546	16

* MD = Medium Sclerotinia blight.
** LSD 0.05 for Caddo HD = 454; Grady = 863; and Beckham = 471.
Source: Melouk and Damicone. Partners in Progress P-1013.
Non-managed plots.

Table 7. Seed Quality from Advance Runner Peanut Performance Trials, three locations, 2005.

Entry	*Location*	*% TSMK*[1]	*Seeds/oz*	*100 Seed Weight (g)*
Okrun	Caddo MD*	74	44	57
	Grady	68	39	61
	Beckham	70	45	53
Tamrun 96	Caddo MD*	75	45	57
	Grady	68	40	58
	Beckham	73	43	56
Tamrun OL02	Caddo MD*	74	43	54
	Grady	67	37	62
	Beckham	71	44	56
TX 994313	Caddo MD*	76	41	60
	Grady	67	37	60
	Beckham	73	42	57

[1] TSMK = Total sound mature kernels.
* MD = Medium Sclerotinia Blight.
Source: Melouk and Damicone. Partners in Progress P-1013.
Non-managed plots.

Table 8. Advanced Runner Peanut Performance Trial, Caddo County (low Sclerotinia incidence), 2005.

Entry	*Yield (lbs/A)*	*% TSMK*[1]
Okrun	3,585	71
Tamrun OL02	3,576	68
TX 994313	3,167	72
Tamrun 96	3,276	73
LSD 0.05	NS	

[1] TSMK = Total sound mature kernels.
Source: Greenhagen, Nickels, and Medlin.
Partners in Progress P-1013.
Managed plots.

Table 9. Advanced Runner Peanut Performance Trial, Tillman County, 2005.

Entry	*Yield (lbs/A)*	*% TSMK*[1]
Tamrun OL02	6,189	71
TX 994313	6,062	75
Tamrun 96	5,572	67
Okrun	5,500	71
LSD 0.05	744	3

[1] TSMK = Total sound mature kernels.
Source: Greenhagen, Nickels, and Medlin.
Partners in Progress P-1013.
Managed plots.

Summary of 2005 (5 tests)

Non-managed plots (3)

	Yield (lbs/A)	% TSMK[1]	100 Seed Weight (g)	Sclerotinia (%) Ft. Cobb
Okrun	3,134	71	57	55; 0; 0
Tamrun 96	3,612	72	57	21; 0; 0
Tamrun OL02	3,364	71	57	68; 0; 0
TX 994313	3,546	72 **(+1)	59	36; 0; 0

[1] TSMK = Total sound mature kernels.
** Advantage over Tamrun OL02.

Managed plots (2)

	Yield (lbs/A)	% TSMK[1]	100 Seed Weight (g)	Sclerotinia (%) Ft. Cobb
Okrun	4,543	71	---	---
Tamrun 96	4,424	70	---	---
Tamrun OL02	4,883	70	---	---
TX 994313	4,614	74 **(+4)	---	---

[1] TSMK = Total sound mature kernels.
** Advantage over Tamrun OL02.

Table 10. Advanced Runner Peanut Performance Trial, Major County, 2006.

Entry	*Yield (lbs/A)*	*% TSMK*[1]
Tamrun 96	5,490	74
Tamrun OL02	5,372	72
ARSOK-R1 (TX 994313)	4,728	78
Okrun	4,669	73
LSD 0.05	NS	2

[1] TSMK = Total sound mature kernels.
Source: Godsey, Greenhagen, and Nickels.
Partners in Progress P-1017.
Managed plots.

Table 11. Advanced Runner Peanut Performance Trial, Caddo County (low Sclerotinia incidence), 2006.

Entry	*Yield (lbs/A)*	*% TSMK*[1]
ARSOK-R1 (TX 994313)	4,737	69
Tamrun OL02	4,283	67
Tamrun 96	4,125	70
Okrun	3,766	68
LSD 0.05	NS	1

[1] TSMK = Total sound mature kernels.
Source: Godsey, Greenhagen, and Nickels.
Partners in Progress P-1017.
Managed plots.

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Table 12. Advanced Runner Peanut Performance Trial, Beckham County, 2006.

Entry	*Yield (lbs/A)*	*% TSMK*[1]
Tamrun OL02	5,322	68
ARSOK-R1 (TX 994313)	5,273	75
Tamrun 96	5,250	71
Okrun	4,910	71
LSD 0.05	417	--

[1] TSMK = Total sound mature kernels.
Source: Godsey, Greenhagen, and Nickels.
Partners in Progress P-1017.
Managed plots.

Table 13. Advanced Runner Peanut Performance Trials, Caddo County (high sclerotinia incidence), 2006.

Entry	*Yield (lbs/A)*	*% Sclerotinia Incidence*
Okrun	3,497	73
Tamrun 96	3,969	60
Tamrun OL02	3,896	70
ARSOK-R1 (TX 994313)	3,666	57
LSD 0.05	NS	12

Source: Melouk and Damicone.
Partners in Progress P-1017.
Non-managed plots.

Table 14. Seed Quality from Advance Runner Peanut Performance Trials, Caddo County (high Sclerotinia incidence), 2006.

Entry	*% TSMK*[1]	*Seeds/oz*	*100 Seed Weight (g)*
Okrun	60	44	54
Tamrun 96	57	41	55
Tamrun OL02	59	40	59
ARSOK-R1 (TX 994313)	63	39	56

[1] TSMK = Total sound mature kernels.
Source: Melouk and Damicone.
Partners in Progress P-1017.
Non-managed plots.

Table 15. Uniform Peanut Performance Peanut Trial (UPPT), Caddo County, 2006.

Entry	*% TSMK*[1]	*Seeds/oz*	*100 Seed Weight (g)*
ARSOK-R1 (TX 994313)	5,058	72	62
Florunner	4,271	69	55
LSD 0.05	533	2	8

[1] TSMK = Total sound mature kernels.
Source: Godsey, Greenhagen, and Nickels.
Partners in Progress P-1017.
Managed plots.

Table 16. Response of peanut cultivars to fungicide programs for control of Sclerotinia blight, Caddo County, 2006.

Entry	*Yield (lbs/A)*	*% Sclerotinia Incidence*	*TSMK*[1]
Tamrun OL02	2,875	52	62
Flavorunner 458	2,323	63	62
ARSOK-R1 (TX 994313)	2,555	48	66
LSD 0.05	259	--	--

[1] TSMK = Total sound mature kernels.
Source: Damicone and Pierce. Partners in Progress P-1017.
Untreated control check plots.

Summary of 2006 (6 tests)

Untreated check plots (1)

	Yield (lbs/A)	*% TSMK*[1]	*100 Seed Weight*	*% Sclerotinia Ft. Cobb*
Tamrun OL02	2,875	62	----	52
Flavorrunner 458	2,323	62	----	63
ARSOK-R1 (TX 994313)	2,555	66 **(+4)	----	48
LSD 0.05	259			

[1] TSMK = Total sound mature kernels.
** Advantage over Tamrun OL07 and Flavorrunner 458.

Non-managed plots (1)

	Yield (lbs/A)	*% TSMK*[1]	*100 Seed Weight*	*% Sclerotinia Ft. Cobb*
Okrun	3,497	60	54	73
Tamrun 96	3,969	57	55	60
Tamrun OL02	3,896	59	59	70
ARSOK-R1 (TX 994313)	3,666	63 **(+4)	56	57
	NS			
LSD 0.05				12

[1] TSMK = Total sound mature kernels.
** Advantage over Tamrun OL02.

Summary of 2006 (6 tests) (Continued)

Managed plots (1) UPPT

	Yield (lbs/A)	*%TSMK[1]*	*100 Seed Weight (g)*	*% Sclerotinia*
Florunner	4,271	69	55	---
ARSOK-R1 (TX 994313)	5,058	73	62	---
LSD 0.05	533			

[1] TSMK = Total sound mature kernels.

Managed plots (3)

	Yield (lbs/A)	*%TSMK[1]*	*100 Seed Weight (g)*	*% Sclerotinia*
Okrun	4,448	71	---	---
Tamrun 96	4,955	72	---	---
Tamrun OL02	4,992	69	---	---
ARSOK-R1 (TX 994313)	4,913	74 **(+5)	---	---

[1] TSMK = Total sound mature kernels.
** Advantage over Tamrun OL02.

Table 17. Response of peanut cultivars to fungicide programs for control of Sclerotinia blight, Caddo County, 2007.

Entry	*Yield (lbs/A)*	*% Sclerotinia Incidence*	*%TSMK[1]*
Tamrun OL02	3,345	43	69
Flavorunner 458	2,737	60	70
ARSOK-R1 (TX 994313)	4,145	45	73
Tamrun OL07	3,724	35	71

[1] TSMK = Total sound mature kernels.
Source: Damicone. Partners in Progress P-1019.
Untreated control check plots.

Table 18. Advanced Runner Peanut Performance Trials, Caddo County (high Sclerotinia incidence, location 1), 2007.

Entry	*Yield (lbs/A)*	*% Sclerotinia Incidence*
Okrun	2,299	45
Tamrun 96	2,565	21
Tamrun OL02	2,662	31
ARSOK-R1 (TX 994 313)	3,013	31
Tamrun OL07	2,662	28
LSD 0.05	344	14

Source: Melouk.
Non-managed plots.

Table 19. Advanced Runner Peanut Performance Trials, Caddo County (high Sclerotinia incidence, location 2), 2007.

Entry	*Yield (lbs/A)*	*% Sclerotinia Incidence*
Okrun	2,130	67
Tamrun 96	2,335	33
Tamrun OL02	2,311	44
ARSOK-R1 (TX 994313)	2,650	44
Tamrun OL07	2,565	32
LSD 0.05	372	20

Source: Melouk.
Non-managed plots.

Table 20. Seed Quality from the Advanced Runner Peanut Performance Trial, Caddo County (high Sclerotinia incidence, location 1), 2007.

Entry	*% TSMK[1]*	*Seeds/oz*	*100 Seed Weight (g)*
Okrun	70	42	55
Tamrun 96	67	41	58
Tamrun OL02	69	38	63
ARSOK-R1 (TX 994313)	71	38	64
Tamrun OL07	64	38	62

[1] TSMK = Total sound mature kernels.
Source: Melouk.
Non-managed plots.

Table 21. Seed Quality from the Advanced Runner Peanut Performance Trial, Caddo County (high Sclerotinia incidence, location 2), 2007.

Entry	*%TSMK[1]*	*Seeds/oz*	*100 Seed Weight (g)*
Okrun	67	39	60
Tamrun 96	70	42	55
Tamrun OL02	69	37	62
ARSOK-R1 (TX 994313)	75	38	67
Tamrun OL07	68	38	64

[1] TSMK = Total sound mature kernels.
Source: Melouk.
Non-managed plots.

Table 22. Advanced Runner Peanut Performance Trials, Caddo County (managed Sclerotinia), 2007.

Entry	*Yield (lbs/A)*	*% TSMK*[1]
Flavorunner 458	2,355	69
Tamrun 96	2,600	68
Tamrun OL02	2,323	68
ARSOK-R1 (TX 994313)	2,831	72
Tamrun OL07	2,278	68
LSD 0.05	374	2

[1] TSMK = Total sound mature kernels.
Source: Godsey, Vaughan, and Heister.
Partners in Progress P-1019.

Table 23. Advanced Runner Peanut Performance Trials, Tillman County, 2007.

Entry	*Yield (lbs/A)*	*% TSMK*[1]
Flavorunner 458	3,757	74
Tamrun 96	4,305	73
Tamrun OL02	4,447	72
ARSOK-R1 (TX 994313)	5,060	77
Tamrun OL07	4,069	72
LSD 0.05	964	3

[1] TSMK = Total sound mature kernels.
Source: Godsey, Vaughan, and Heister.
Partners in Progress P-1019.

Table 24. Advanced Runner Peanut Performance Trials, Beckham County, 2007.

Entry	*Yield (lbs/A)*	*% TSMK*[1]
Flavorunner 458	4,443	74
Tamrun 96	5,250	71
Tamrun OL02	3,147	71
ARSOK-R (TX 994313)	5,229	77
Tamrun OL07	5,838	74
LSD 0.05	1,825	2

[1] TSMK = Total sound mature kernels.
Source: Godsey, Vaughan, and Heister.
Partners in Progress P-1019.

Table 25. Uniform Peanut Performance Trials, selected locations, 2007.

Stephenville, Texas (C. E. Simpson)

Entry	*Yield (lbs/A)*	*% TSMK*[1]	*100 Seed Weight (g)*
Florunner	3,717 a-e[2]	76	54
Tamrun OL07*	4,285 ab	76	62
Tamrun OL02*	3,825 a-d	75	56
ARSOK-R1 (TX 994313)	3,042 ef	79	58

Brownfield, Texas (Mark Burow)

Entry	*Yield (lbs/A)*	*% TSMK*[1]	*100 Seed Weight (g)*
Florunner	5,798 ab	76	75
Tamrun OL07*	4,687 d	75	81
ARSOK-R1 (TX 994313)	6,040 a	79	82

Pearsall, Texas (Mike Baring)

Entry	*Yield (lbs/A)*	*% TSMK*[1]	*100 Seed Weight (g)*
Florunner	4,988 b-e	75	57
Tamrun OL07*	6,225 a	73	71
Tamrun OL02*	5,641 ab	69	60
ARSOK-R1 (TX 994313)	5,752 ab	77	62

Ft. Cobb, Okla. (Kelly Chenault)

Entry	*Yield (lbs/A)*	*% TSMK*[1]	*100 Seed Weight (g)*
Florunner	2,964 b	73	57
Tamrun OL07*	2,626 b-f	68	65
Okrun*	2,795	70	--
ARSOK-R1 (TX 994313)	3,424 a	71	66

[1] TSMK = Total sound mature kernels.
[2] Values in a column followed by the same letter are not significantly different at P=0.005.
*= local option.
Source: UPPT 2007.

Table 26. Pod yield of 2007 UPPT entries averaged across 10 test locations, 2007.

Entry	*SE (3)**	*SW(4)**	*VC(3)**	*Mean*
Florunner	2,579	4,367	4,352	3,826
ARSOK-R1 (TX994313)	2,965	4,564	4,703	4,126

* Number of locations in the region.

Summary of 2007 (10 tests)

Non-managed plots (2)

	Yield (lbs/A)	*% TSMK[1]*	*100 Seed Weight*	*% Sclerotinia*
Okrun	2,215	69	58	56
Tamrun 96	2,450	69	57	27
Tamrun OL02	2,487	69	63	38
ARSOK-R1 (TX 994313)	2,832	73 **(+7)	66	38
Tamrun OL07	2,614	66	63	30
	LSD 0.05			LSD 0.05
	358			17

[1] TSMK = Total sound mature kernels.

Untreated check plots (1)

	Yield (lbs/A)	*% TSMK[1]*	*100 Seed Weight*	*% Sclerotinia*
Flavorrunner 458	2,737	70	---	60
Tamrun OL02	3,345	69	---	43
ARSOK-R1 (TX 994313)	4,145	73 **(+2)	---	45
Tamrun OL07	3,724	71	---	35

[1] TSMK = Total sound mature kernels.
** Advantage over Tamrun OL07.

Summary of 2007 (10 tests) (Continued)

Managed plots (3)

	Yield (lbs/A)	*% TSMK*[1]	*100 Seed Weight*	*% Sclerotinia*
Flavorrunner 458	3,518	70	---	---
Tamrun 96	4,052	71	---	---
Tamrun OL02	3,306	70	---	---
ARSOK-R1 (TX 994313)	4,373	75 **(+4)	---	---
Tamrun OL07	4,061	71	---	---

[1] TSMK = Total sound mature kernels.

Managed plots (4) UPPT

	Yield (lbs/A)	*% TSMK*[1]	*100 Seed Weight*	*% Sclerotinia*
Okrun (KC)	2,795	70	---	---
Florunner	4,367	75	61	---
Tamrun OL02	4,733	72	58	---
ARSOK-R1 (TX 994313)	4,565	77 **(+4)	67	---
Tamrun OL07	4,456	73	69	---

[1] TSMK = Total sound mature kernels.
** Advantage over Tamrun OL07.

Field performance evaluation of three peanut genotypes in Oklahoma in 2006 and 2007

Peanut entries (Tamrun 96, Tamrun OL02, and TX 994313) were among peanut lines included in four tests in 2006 and 2007. Plots were planted during May and harvested in late September to mid October to attain a growing season of 155 days. Plots were arranged in a complete, randomized block design with four replications and irrigated as needed to ensure good growth. Standard agronomic practices were followed to manage foliar diseases, according to peanut production guidelines for Oklahoma. In 2006, plots were planted at two locations in Caddo County and one location in each of Beckham and Major counties. In 2007, plots were planted at two locations in Caddo County and one location in each of Beckham and Tillman counties. Mean yield or grade for each entry was considered a random individual event. Analysis of variance was performed on the data, and the least significant difference, or LSD, at the 0.05 level was used for mean separation among entries or treatments. There was no entry by year interaction for yield and grade, and therefore, data from the two years were combined for analysis. Data are presented in Table 27.

Table 27. Mean yield and grade of three peanut entries in Oklahoma, 2006 and 2007.

Entry	*Yield (lbs/A)*	*Grade (TSMK[1] &SS[2])*
Tamrun 96	4,194	68.9
Tamrun OL02	3,931	68.3
TX 994313	4,317	72.8
LSD (0.05)	619	3.7

[1] TSMK = Total sound mature kernels.
[2] SS = Sound splits.

Yields of 4,194 lbs/A for Tamrun 96; 3,931 lbs/A for Tamrun OL02; and 4,317 lbs/A for TX 994313 were not significant (LSD 0.05 = 619). Grades of 68.9, 68.3, and 72.8 for Tamrun 96, Tamrun OL02, and TX 994313, respectively, were significant (LSD 0.05 = 3.7). These data showed the high oleic advanced peanut breeding line TX 994313 exhibited superior grade over Tamrun 96 and Tamrun OL02 under Oklahoma conditions.

Chemical composition, blanching, and flavor

Total fat, fatty acid profile, sugar content, blanching, and roasting flavor were determined on kernels of TX 994313, Tamrun OL07, and Okrun from a crop produced in three Oklahoma locations in 2007 (Table 28). These tests were conducted by J. Leek Associates, Inc., Edenton, N.C.

Table 28. Total fat, fatty acid profile, sugar content, blanching, and roasting flavor.

Lot	**Blanching Data % Atox	UN - W	UN - S	RN- W	RN – S	B - W	B - S	Flavor RP	Kernel Composition % Fat	Sugar	Moisture
1	0.0	0.7	0.0	4.7	0.0	84.4	10.2	5.4	47.6	4.9	6.4
2	0.0	2.5	0.0	8.2	1.5	76.0	11.8	6.2	46.0	4.8	6.8
3	0.7	0.0	0.0	3.5	0.0	88.4	8.0	6.0	47.4	4.5	5.2
4	0.0	0.0	0.0	7.4	0.5	87.1	5.0	5.6	47.2	4.3	5.3
5	0.0	1.5	0.0	3.9	0.4	86.8	7.4	6.0	46.2	3.7	4.9
6	0.0	1.5	0.0	5.3	0.0	88.9	7.4	6.0	46.5	3.6	4.9
7	0.9	0.0	0.0	7.8	0.0	82.5	9.7	6.2	45.6	3.8	4.8
8	0.0	4.3	0.0	0.0	16.1	61.3	18.3	6.2	44.9	5.5	5.5
9	0.0	0.3	0.0	2.3	0.0	89.2	8.2	6.6	49.0	4.2	5.6
10	0.0	2.8	0.0	4.0	0.9	80.4	11.9	6.4	45.8	4.7	6.1
11	0.0	0.0	0.0	4.9	0.0	89.1	6.1	6.4	45.7	4.7	5.9
12	0.0	2.0	0.0	3.9	0.0	85.9	8.2	5.8	47.7	4.4	5.7
13	0.0	0.7	0.0	6.2	0.0	89.1	3.9	6.0	48.4	4.5	5.5
14	0.0	0.0	0.0	7.4	0.0	89.2	3.4	6.0	47.4	4.4	5.6
15	3.2	0.5	0.0	10.1	0.0	73.7	15.6	6.4	48.1	5.4	5.3
16	0.0	0.0	0.0	7.1	0.0	70.7	21.7	6.0	47.1	5.2	5.4

Lot	Oil Chemistry - FAC Profile 16:0	18:0	18:1	18:2	18:3	20:0	20:1	22:0	22:1	24:0	O/L ratio
1	6.86	2.21	82.46	4.55	ND	0.85	1.72	1.06	ND	0.29	18.12
2	5.80	1.54	85.15	3.71	ND	0.70	1.68	1.02	ND	0.41	22.95
3	5.21	2.31	85.54	3.53	ND	0.86	1.39	0.80	ND	0.36	24.23
4	4.36	2.19	86.24	3.52	ND	0.87	1.71	0.88	ND	0.24	24.50
5	8.86	1.75	50.29	36.41	ND	0.76	1.02	0.74	ND	0.17	1.38
6	9.70	1.43	51.44	34.44	ND	0.80	1.06	0.88	ND	0.25	1.49
7	9.65	1.38	48.56	37.92	ND	0.69	0.96	0.65	ND	0.19	1.28
8	7.47	1.88	84.10	4.59	ND	0.80	0.68	0.47	ND	ND	18.32
9	6.13	1.34	84.63	4.33	ND	0.77	1.78	0.77	ND	0.26	19.55
10	6.31	1.49	84.72	4.50	ND	0.59	1.65	0.40	ND	0.32	18.83
11	4.03	1.25	87.81	3.66	ND	0.71	1.46	0.70	ND	0.37	23.99
12	6.19	1.03	86.00	3.48	ND	0.77	1.45	0.75	ND	0.33	24.71
13	5.57	1.48	86.38	3.96	ND	0.72	1.26	0.44	ND	0.20	21.81
14	5.52	1.28	85.88	4.56	ND	0.72	1.16	0.57	ND	0.32	18.83
15	6.30	1.54	85.18	3.72	ND	0.83	1.62	0.50	ND	0.31	22.90
16	5.38	1.51	84.79	4.10	ND	0.84	1.90	0.86	ND	0.62	20.68

** UN-W = unblanched wholes; UN-S = unblanched splits; RN-W = red nose wholes; RN-S = red nose splits; B-W = blanched wholes; and B-S = blanches splits.

ND = not detected.

TX 994313 (Lots: 1, 3, 9, 11, 13, and 15)
Tamrun OL07 (Lots: 2, 4, 10, 12, and 16)
Okrun (Lots: 5, 6, and 7)

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Integrated Management of Peanut Diseases

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2008 progress made possible through OPC and NPB support

- For a second year, Tamrun OL07 had the best resistance to Sclerotinia blight among high oleic runner varieties while the breeding line ARSOK-R1 had the best yield and grade.
- Control of Sclerotinia blight with single applications of Endura® and Omega® made on demand was variable compared with previous years.
- The fungicides Abound® and Provost® provided the best disease control and highest yield in southwestern Oklahoma where southern blight and Rhicoctonia pod rot were severe.
- Reduced fungicide programs made according to the calendar or the weather-based advisory program continued to provide good leaf spot control.
- The experimental fungicides Topguard and Punch+LEM17 provided excellent control of early leaf spot that was similar to the best registered fungicides (Headline® and Provost®).

Seven field trials were completed in 2008 that addressed the management of important peanut diseases in Oklahoma. The management strategies that were evaluated included chemical control and disease-resistant varieties. Efforts were made to develop and demonstrate a range of input levels for the fungicide programs. The diseases studied included early leaf spot, southern blight, Sclerotinia blight, and pod rot. Cooperation and assistance in these studies was provided by Chad Godsey, Plant and Soil Sciences; Matt Elliot and Kelly Seuhs, Entomology and Plant Pathology; and Hassan Melouk and Kelly Chenault, USDA-ARS in Stillwater. Appreciation is expressed to Gale Thompson, a peanut farmer in Beckham County, who hosted the on-farm trials at Erick. The excellent cooperation of Bobby Weidenmaier and the farm crew at the Caddo Research Station is greatly appreciated.

The field studies in 2008 served several purposes. The first was to identify and refine better strategies for managing diseases. The second was to use the trials' sites as demonstrations to show growers firsthand the benefits of disease management in peanut production. Trial sites at the Caddo Research Station and Beckham County were showcased during annual fall field tours. Results from 2008 are summarized in this report. In interpreting the results, small differences in treatment values should not be overemphasized. Least significant differences, or LSD, values are shown at the bottom of most tables. Unless two values differ by at least the LSD value shown, little confidence can be placed in the superiority of one treatment or variety over another.

In 2008, weather conditions generally favored both crop and disease development. Warm weather in May generally favored rapid emergence and stand establishment, although rainfall was below normal (30-year average) and pre-irrigation was required in some areas. At the Caddo Research Station in Ft. Cobb, rainfall was about 1 inch below normal from June through September, but was 3 inches above normal in August. At Erick, rainfall was more than 3 inches below normal from June through September, but was more than 3 inches above normal during August. Average monthly temperature was below normal from July through September. Average monthly temperatures were from 3 F to 5 F below normal each month. Disease pressure increased as a result of the rains in August. Southern blight appeared in mid August and was a problem in new areas. Sclerotinia blight appeared in late August and increased in problem fields under the cool fall temperatures. Early leaf spot was a problem statewide and was most severe where peanuts were cropped after peanuts. Pod rot was a problem mostly on Virginia-type varieties. Cool temperatures in the fall slowed peanut maturity and a statewide freeze in late October halted peanut progress. Yields were excellent and grades were generally good despite the early fall. Some growers reported below average grades, but grades in the research trials were about average.

Sclerotinia Blight

Sclerotinia blight remains a destructive disease in Oklahoma. It occurs in all areas of the state except in far southwestern production areas. Industry preferences have resulted in the loss of Tamrun 96 and Tamrun OL01 as high yielding runner varieties with moderate resistance to Sclerotinia blight. Trials on management of Sclerotinia blight were conducted at the Caddo Research Station. The trials focused on evaluating new fungicides, developing effective reduced fungicide programs for Omega® and Endura®, and determining the yield responses of high oleic varieties and a promising breeding line (ARSOK-R1) to fungicide programs.

The three trials involving control of Sclerotinia blight were in close proximity at the Caddo Research Station in a field with history of Sclerotinia blight and continuously cropped to peanuts. Rainfall was more than 3 inches above normal (30-year average) and average daily temperature was almost 5 F below normal in August. The cool wet conditions favored disease development and both Sclerotinia blight and southern blight appeared in August. Temperatures continued below normal in September and October, which favored the continued development of Sclerotinia blight that reached moderately severe levels compared to previous trials at this site. Either plant yellowing and/or dieback late in the season made rating plots difficult. Some of the affected plants tested positive for tomato spotted wilt virus, or TSWV, but others did not. Because plots were not rated after digging, ratings for Sclerotinia blight might be inflated compared to actual levels.

Evaluation of fungicides

The objective of this study was to evaluate the experimental fungicide LEM17 for control of Sclerotinia blight on the variety Tamrun OL02. The experimental fungicide was compared to the registered fungicides Omega® and Endura®. Two preventive applications of each fungicide were made on a four-week interval beginning 65 days after planting.

Final incidence of Sclerotinia blight reached 80% in the untreated check at harvest time (Table 1). Levels of southern blight were less than 3% and did not differ among treatments (data not shown). All of the treatments except the low rate of LEM17 (9.6 fl oz) reduced Sclerotinia blight compared to the untreated check. Endura® and Omega® treatments generally provided better disease control

Table 1. Effect of fungicides for control of Sclerotinia blight on runner-type peanuts (Tamrun OL02) at the Caddo Research Station, Ft. Cobb, 2008.

Treatment and rate/A (timing)[1]	*Sclerotinia Blight (%)*	*Yield (lbs/A)*	*Crop Value ($/A)*[2]
Omega® 4F 1.5 pt (1,2)	45.0 cd[3]	4,472 a	756 a
Omega® 4F 1 pt (1,2)	45.0 cd	4,312 ab	729 ab
Endura® 70WG 8 oz (1,2)	46.0 cd	4,305 ab	728 ab
Endura® 70WG 10 oz (1,2)	38.0 d	4,334 ab	733 ab
LEM17 1.67F 9.6 fl oz (1,2)	70.0 ab	3,790 bc	641 bc
LEM17 1.67F 16.8 fl oz (1,2)	57.5 bc	3,477 c	588 c
LEM17 1.67F 24 fl oz (1,2)	58.5 bc	3,855 abc	652 abc
Check	82.5 a	3,615 c	611 c
LSD (P=0.05)[4]	14.0	639	108

[1] Numbers 1 and 2 refer to the preventive application dates of 1=July 23 and 2=Aug 25.
[2] Loan rate value based on an average grade of 69% TSMK, total sound mature kernels.
[3] Values in a column followed by the same letter are not significantly different at P=0.05.
[4] Fisher's least significant difference (LSD).

than LEM17. Plot yields were negatively affected by Sclerotinia blight, but not southern blight. Yields were greater than the untreated check for the Omega® and Endura® treatments. Disease control with LEM17, even at the high rate, was not sufficient to increase yield compared to the check. Increases in crop value ranged from $117 to $145 and were generally sufficient to offset the costs of Omega® and Endura® treatments. LEM17 has an effect on Sclerotinia blight, but may require a higher rate or more frequent applications to be effective.

Timing of fungicide applications

A fungicide application for Sclerotinia blight lasts about three weeks, and two applications are recommended to provide full-season protection. Because the fungicides Omega® and Endura® are expensive, reduced application programs are needed that use a single well-timed application. The objective of this study was to identify efficient use patterns for the registered fungicides Omega® and Endura® for the control of Sclerotinia blight. Reduced application programs consisted of single applications made on demand (first sign of disease) or according to the calendar (65 days after planting). Reduced application programs were compared to preventive applications made according to the calendar (65 days and 95 days after planting) in order to provide full-season protection. In addition, Omega® was applied at a reduced rate in a tank mix with Tilt®/Bravo® on a 14-day schedule to be effective against both foliar disease and Sclerotinia blight.

Sclerotinia blight reached 70% in the untreated check at harvest time (Table 2). Southern blight also developed, but only reached a 3% level or less and did not differ among treatments (data not shown). All of the fungicide programs except the single preventive application of Endura® reduced Sclerotinia blight compared to the untreated check. The best disease control was achieved with Endura® applied twice on a preventive schedule at 8 oz/A or 10 oz/A, or once on demand at 13.3 oz/A. Levels of disease were similar for the various Omega® programs. Plot yields were negatively associated with the level of Sclerotinia blight, but not southern blight. Yields were greater than the untreated check for all of the fungicide programs except for the single preventive application of Endura®, and for all of the

Table 2. Effect of fungicide programs on control of Sclerotinia blight on runner-type peanuts (Tamrun OL02) at the Caddo Research Station, Ft. Cobb, 2008.

Treatment and rate/A (timing)[1]	*Sclerotinia Blight (%)*	*Yield (lbs/A)*	*Crop Value ($/A)*[2]
Omega® 4F 1.5 pt (P1)	40.2 cd[3]	4,058 bcd	686 bcd
Omega® 4F 2 pt (P1)	56.2 b	3,942 cd	667 cd
Omega® 4F 1.5 pt (D1)	49.7 bc	3,935 cd	666 cd
Omega® 4F 2 pt (D1)	45.0 bcd	3,913 cd	662 cd
Omega® 4F 0.5 pt + Tilt®/Bravo® 4.3SE 1.5 pt (14-day)	54.5 b	4,167 abc	705 abc
Omega® 4F 1.5 pt (P1+P2)	43.5 bcd	4,523 ab	765 ab
Endura® 70WG 10 oz (P1)	69.7 a	3,376 e	571 e
Endura® 70WG 8 oz (P1+P2)	33.0 de	4,334 abc	733 abc
Endura® 70WG 10 oz (P1+P2)	22.5 e	4,610 a	780 a
Endura® 70WG 10 oz (D1)	40.0 cd	4,153 abc	702 abc
Endura® 70WG 13.3 oz (D1)	32.2 de	4,262 abc	721 abc
Check	70.2 a	3,652 de	618 de
LSD (P=0.05)[4]	13.0	477	81

[1] P refers to preventive applications on P1=July 23 and P2=Aug. 22. D1 refers to the demand application made after symptoms first appeared on Aug. 22. Applications on the 14-day schedule were on July 23, Aug. 6, and Aug. 22.
[2] Loan rate value based on an average grade of 69% TSMK, total sound mature kernels.
[3] Values in a column followed by the same letter are not significantly different a P=0.05.
[4] Fisher's least significant difference (LSD).

single application programs with Omega®. Single demand applications of Omega® at 1.5 pt/A and 2.0 pt/A were less effective than in previous trials. Yield responses ranged from 260 lbs/A for the demand application of Omega® at 2 pt/A to 960 lbs/A for the two preventive applications of Endura® at 10 oz/A. Despite the high cost of the treatments ($5/oz for Endura® and $45/pt for Omega®), the most favorable, net returns (crop value less chemicals costs) resulted from full-season preventive programs with Endura® and Omega®.

Variety response to fungicide programs

Two fungicides are now registered for use on peanuts that are highly effective in the control of Sclerotinia blight. However, the high cost of both Omega® and Endura® has limited their usage. Peanut cultivars have different reactions to Sclerotinia blight and may require specific levels of fungicide input for optimum control of Sclerotinia blight. Previous research has shown that economic returns from the fungicides are mostly positive for susceptible varieties such as Okrun and break-even for moderately resistant cultivars such as Tamrun 96 and Tamrun OL01. Economic returns are almost always negative for resistant varieties such as Tamspan 90 and Southwest Runner. However, Tamrun 96 and Tamrun OL01 are no longer available and runner varieties now consist of entirely high oleic types.

The objective of this study was to evaluate the disease and yield responses of high oleic runner varieties (Tamrun OL02, Flavorunner 458, Tamrun OL07), a promising runner breeding line (ARSOK-R1), and a susceptible check variety (Okrun) to low, moderate, and high levels of input of the fungicides Omega® and Endura® for control of Sclerotinia blight. Fungicide programs consisted of two preventive applications of Omega® at 1.5 pt/A. This treatment is excessively expensive ($135/A), but was included as a benchmark to measure yield loss from

Sclerotinia blight. The other treatments were single applications of Omega® at 1.5 pt/A ($67/A) and 2 pt/A ($90/A), and Endura® at 10 oz/A ($50/A) made on demand. Demand applications were made at the first appearance of disease.

The varieties responded similarly to the fungicide programs indicating that none of the entries had a high level of resistance to Sclerotinia blight. Averaged over fungicide treatments, Tamrun OL07 had the lowest level of disease, about 50% less than for the other entries, while Flavorunner 458 was most susceptible (Table 3). Fungicide

Table 3. Responses of runner-type peanut varieties and a breeding line to fungicide programs for control of Sclerotinia blight, Caddo Research Station, 2008.

Treatment and Rate/A (timing)[1]	*Tamrun OL02*	*Flavorunner 458*	*ARSOK-R1*	*Tamrun OL07*	*Okrun*	*Average*[2]
			Sclerotinia Blight (%) – Oct. 24			
Omega® 4F 1.5 pt (P1, P2)	33.0	41.7	40.0	11.7	32.7	31.8 c[3]
Omega® 4F 1.5 pt (D1)	43.7	47.5	36.7	18.0	48.0	38.6 bc
Omega® 4F 2 pt (D1)	46.5	48.0	40.0	22.0	35.2	38.3 bc
Endura® 70WG 10 oz (D1)	44.7	57.2	44.5	16.5	55.5	43.7 b
Check	67.8	74.5	65.0	49.7	75.7	66.6 a
Average[4]	46.9 b[5]	53.8 a	45.2 b	23.6 c	49.4 ab	
LSD (P=0.05)[6]						7.0
			Yield (lbs/A)			
Omega® 4F 1.5 pt (P1, P2)	4,918	3,730	5,327	5,327	5,082	4,877 a[3]
Omega® 4F 1.5 pt (D1)	4,456	3,594	5,082	4,746	4,283	4,432 b
Omega® 4F 2 pt (D1)	4,419	3,603	5,218	4,792	4,846	4,532 ab
Endura® 70WG 10 oz (D1)	4,202	3,648	4,982	4,701	4,274	4,405 b
Check	2,496	1,624	3,467	3,467	1,924	2,595 c
Average[4]	4,098 b[5]	3,240 c	4,815 a	4,606 a	4,082 b	
LSD (P=0.05)[6]						412
			Crop Value ($/A)[7]			
Omega® 4F 1.5 pt (P1, P2)	844	649	975	936	881	857 a[3]
Omega® 4F 1.5 pt (D1)	764	625	930	834	742	779 b
Omega® 4F 2 pt (D1)	758	627	954	842	840	797 ab
Endura® 70WG 10 oz (D1)	721	635	912	826	741	774 b
Check	428	283	634	609	333	547 c
Average[4]	703 c[5]	564 d	881 a	809 b	707 c	
LSD (P=0.05)[6]						72
			Grade (%TSMK)[8]			
Average[4]	70.0 b[5]	71.5 b	75.4 a	71.9 b	70.9 b	71.9

1 Preventive timings (P) correspond to the application dates of P1=July 23 and P2=Aug. 22. The demand timing (D) corresponds to the application date of D1=Aug. 22.
2 Averaged over varieties.
3 Values in a column followed by the same letter are not statistically different at P=0.05.
4 Averaged over fungicide treatments.
5 Values in a row followed by the same letter are not statistically different at P=0.05 (Sclerotinia blight LSD=4.7, yield LSD=314, crop value LSD=55, grade LSD=2.2).
6 Fisher's least significant difference (LSD).
7 Loan rate value based on the average grade (% total sound mature kernels) of each variety.
8 From four replicate samples, each bulked over treatments by block. TSMK=Total sound mature kernels.

treatments reduced Sclerotinia blight for all entries. The preventive program with Omega® provided the best control while the demand programs with Omega® and Endura® were intermediate in effectiveness. Averaged over fungicide treatments, ARSOK-R1 and Tamrun OL07 had the highest yields while Flavorunner 458 had the lowest yield. In untreated plots, yields of ARSOK-R1 and Tamrun OL07 were 1,000 lbs/A better than Tamrun OL02; 1,500 lbs/A better than Okrun, and 1,800 lbs/A better than Flavorunner 458. Fungicide programs increased yields of all varieties. Averaged over varieties, yield responses ranged from 1,810 lbs/A for the Endura® program to 2,282 lbs/A for the preventive Omega® program. Crop value responses were similar to yield responses except that ARSOK-R1, which had the best grade by 3% total sound mature kernals, or TSMK, had the highest crop value. Net returns (crop value minus treatment costs) were similar for all fungicide programs, ranging from $160/A higher than the check for the demand application of Omega® at 2 pt/A to $177/A higher than the check for the Endura® program. Generally, the best economic strategy was to plant ARSOK-R1 and to use a fungicide program for Sclerotinia blight.

Southern Blight, Limb Rot, and Pod Rot

Southern blight, limb rot, and pod rot are damaging soilborne diseases that are widely distributed in Oklahoma. A moderate level of resistance to these diseases occurs in Tamspan 90, but on runner and Virginia varieties effective management relies on the use of fungicide programs that control both foliar and soilborne diseases. Fungicide programs are recommended in fields with a history of damage from southern blight and limb rot. Folicur®, Abound®, and Moncut® have provided good to excellent control of these diseases. Headline® is also registered for use on southern blight and limb rot, but control of southern blight has not been comparable to the other products and data on limb rot control with Headline® is limited. Except for Moncut®, which must be tank-mixed with another fungicide, these fungicides are also effective against foliar diseases. Pod rot is caused by *Rhizoctonia*, which also causes limb rot, *Pythium*, or both fungi in combination. Pod rot control has relied on planting partially resistant varieties and avoiding highly susceptible varieties such as Virginia types. While OSU data on pod rot control with fungicides has been inconclusive, Abound® is being used by growers to control this disease. Research is needed to assess the benefits and economic returns from using these fungicides

Evaluation of fungicide programs

The objective of this study was to evaluate fungicide programs with experimental and registered fungicides on control of soilborne diseases (southern blight, limb rot, and pod rot) and foliar diseases. The trial was conducted in a field with a history of pod rot previously planted to cotton and planted to the Virginia variety Jupiter. Full-season fungicide programs consisted of six applications on a 14-day schedule. The experimental fungicide LEM17 and the registered fungicides Abound®, Headline®, and Evito® were applied twice at 65 and 95 days after planting. The registered fungicide Provost® was applied four times at mid season on a 14-day schedule. The remaining applications in the six-spray programs were chlorothalonil (Echo® or Bravo®). Fungicide programs were compared to an untreated check and a full-season Bravo® program for control of only leaf spot.

Early leaf spot appeared in August, but did not reach high levels. Defoliation from early leaf spot was less than 10% in the untreated check (data not shown). All fungicide programs gave a high level of leaf spot control (Table 4). Southern blight and pod rot reached high levels, but level of disease among plots of the same treatment was variable and numeric differences among treatments were not significant. *Rhizoctonia*, but not *Pythium* was recovered from the rotted pods. Plot yields were negatively correlated with pod rot, but not with levels of leaf spot or southern blight. Yields for fungicide programs with Provost®, Evito®, and Abound®; but not LEM17 and Headline®, were greater than both the untreated check and the full-season program with Bravo®. Increases in crop value above the untreated check for the effective treatments (Provost®, Evito®, and Abound®) ranged from $236/A for Abound® at 18.5 fl oz to $322/A for Abound® at 12.3 fl oz. Economic returns for the Provost®, Evito®, and Abound® treatments were sufficient to offset the cost of the fungicide programs.

Foliar Diseases

Foliar diseases are widespread across all production areas of Oklahoma and can be damaging when severe. Where early leaf spot is not controlled, yield losses have averaged from 500 lbs/A to 700 lbs/A. However, losses exceeding 1,000 lbs/A are possible in years when weather favors severe disease development and vines become completely defoliated. Foliar diseases can be effectively controlled

Table 4. Effect of fungicide programs on control of soilborne and foliar diseases of Virginia-type peanuts (Jupiter) at the Thompson Farm, Erick, 2008.

Treatment and Rate/A (timing)[1]	*Early Leaf Spot (%)*	*Southern Blight (%)*	*Pod Rot (%)*	*Yield (lbs/A)*	*Crop Value ($/A)*[2]
Check	64.9 a[3]	14.7 a	50.9 a	3,594 d	698 d
Bravo® 6F 1.5 pt (1-6)	0.0 b	26.2 a	19.7 a	3,349 d	650 d
Echo® 6F 1.5 pt (1,6) Provost® 3.6F 8 fl oz (2-5)	0.0 b	2.2 a	45.0 a	5,155 ab	1,001 ab
Echo® 6F 1.5 pt (1,6) Provost® 3.6F 10.7 fl oz (2-5)	0.1 b	6.2 a	40.6 a	5,091 ab	988 ab
Bravo® 6F 1.5 pt (1,3,5,6) Evito® 4F 5.7 fl oz (2,4)[4]	0.1 b	14.4 a	12.8 a	4,819 abc	935 abc
Bravo® 6F 1.5 pt (1,3,5,6) LEM17 1.67F 16.8 fl oz (2,4)	0.2 b	11.2 a	36.6 a	4,148 bcd	805 bcd
Bravo® 6F 1.5 pt (1,3,5,6) LEM17 1.67F 24 fl oz (2,4)	1.1 b	13.7 a	31.2 a	3,929 cd	763 cd
Bravo® 6F 1.5 pt (1,3,5,6) Abound® 2.08F 18.5 fl oz (2,4)	1.1 b	12.8 a	24.7 a	4,810 abc	934 abc
Bravo® 6F 1.5 pt (1,3,5,6) Abound® 2.08F 12.3 fl oz (2,4)	1.1 b	8.1 a	32.5 a	5,254 a	1,020 a
Bravo® 6F 1.5 pt (1,3,5,6) Headline® 2.08E 15 fl oz (2,4)	0.0 b	10.0 a	58.7 a	3,739 d	726 d
LSD (P=0.05)[5]	5.3	NS	NS	1,016	197

[1] Numbers 1 to 6 correspond to the spray dates of 1=July 2, 2=July 16, 3=July 30, 4=Aug. 11, 5=Aug. 27, and 6=Sept. 10.
[2] Crop value based on an average grade of 75% total sound mature kernels and 47% extra large kernels.
[3] Values in a column followed by the same letter are not significantly different a P=0.05.
[4] The adjuvant Induce was added at 0.06% of the total spray volume.
[5] Fisher's least significant difference (LSD); NS=treatment effect not significant at P=0.05.

where a full-season fungicide program that consists of six sprays per season is used. However, reduced fungicide programs that are effective and utilize fewer sprays per season are needed to reduce the costs of peanut production. The objectives of the research on foliar diseases were to identify new fungicides and to develop effective reduced application programs.

Evaluations of fungicides on Spanish-type peanuts

The experimental fungicide Topguard was evaluated at various rates in comparison to the registered fungicides Bravo®, Folicur®, Headline®, and Provost®. Fungicides were applied on a full-season, 14-day schedule that totaled six sprays. Topguard, Folicur®, and Provost® were applied as a block of four mid-season sprays (sprays 2 to 5). The remaining applications were chlorothalonil as Bravo® or Echo®. Headline® was applied in alternation with Bravo®.

Early leaf spot appeared in August and reached an incidence of more than 80% in the untreated check at harvest time (Table 5). All treatments reduced leaf spot incidence and defoliation compared to the untreated check. The Folicur® and Headline® treatments had a higher incidence of leaf spot compared to Provost® and the Topguard treatments at 14 fl oz/A and 28 fl oz/A. Topguard at 14 fl oz and 28 fl oz and Provost® gave the best disease control. All treatments generally gave excellent disease control with little or no defoliation. Sclerotinia blight reached

Table 5. Effect of fungicides on control of early leaf spot on Spanish-type peanuts (Tamspan 90) at the Caddo Research Station, Ft. Cobb, 2008.

Treatment and Rate/A (timing)[1]	*(%) Early Leaf Spot*	*(%) Defoliation*	*(%) Sclerotinia Blight*	*Yield (lbs/A)*	*Crop Value ($/A)*[2]
Check	81.2 a[3]	57.5 a	0.7 d	2,882 b	480 b
Bravo® 6F 1.5 pt (1-6)	4.1 bc	0.0 b	10.0 ab	3,369 a	561 a
Bravo® 6F 1.5 pt (1,6) Topguard 1.04F 7 fl oz (2-5)	4.7 bc	0.0 b	8.2 abc	3,477 a	579 a
Bravo® 6F 1.5 pt (1,6) Topguard 1.04F 10 fl oz (2-5).	4.8 bc	0.0 b	8.0 abc	3,507 a	584 a
Bravo® 6F 1.5 pt (1,6) Topguard 1.04F 14 fl oz (2-5)	1.0 c	0.0 b	5.2 bcd	3,521 a	587 a
Bravo® 6F 1.5 pt (1,6) Topguard 1.04F 28 fl oz (2-5)	0.0 c	0.0 b	6.0 abc	3,528 a	588 a
Bravo® 6F 1.5 pt (1,6) Bravo® 6F 0.75 pt + Topguard 1.04F 28 fl oz (2-5)	0.4 c	0.0 b	6.5 abc	3,543 a	590 a
Bravo® 6F 1.5 pt (1,6) Folicur® 3.6F 7.2 fl oz (2-5)	12.5 b	0.8 b	4.0 cd	3,543 a	590 a
Bravo® 6F 1.5 pt (1,3,5) Headline® 2.08E 6 fl oz (2,4,6)	12.5 b	0.0 b	10.5 a	3,768 a	628 a
Echo® 6F 1.5 pt (1,6) Provost® 3.6F 8 fl oz (2-5)	0.9 c	0.0 b	5.0 bcd	3,557 a	593 a
LSD (P=0.05)[4]	10.3	11.0	5.1	442	74

[1] Numbers 1 to 6 correspond to the calendar-based spray dates of 1=July 9, 2=July 23, 3=Aug. 6, 4=Aug. 22, 5=Sept. 3, and 6=Sept 17.
[2] Loan rate value based on an average grade of 68% total sound mature kernels.
[3] Values in a column followed by the same letter are not significantly different at P=0.05.
[4] Fisher's least significant difference (LSD); NS=treatment effect not significant at P=0.05.

moderate levels on the resistant cultivar Tamspan 90. The untreated check had the lowest incidence of Sclerotinia blight and the Bravo® and Headline® treatments had the highest. Plot yields were negatively correlated with leaf spot and defoliation, but not Sclerotinia blight. Yields were greater than the untreated control for all of the treatments. Yield responses ranged from 480 lbs/A to 880 lbs/A and did not differ among fungicide treatments. Increases in crop value for the registered fungicides ranged from $81/A for the full-season Bravo® program to $148/A for the Headline® program and generally were sufficient to offset the cost of the fungicide programs.

Evaluation of full-season and reduced fungicide programs on Spanish-type peanuts

Fungicide programs were evaluated for control of early leaf spot on the variety Tamspan 90 at the Caddo Research Station. Calendar fungicide programs were applied on 14-day intervals beginning July 9 for the full-season program or beginning August 6 for the reduced program; or were applied according to the weather-based advisory program (http://agweather.mesonet.org/). Experimental fungicides evaluated as full-season programs were Bravo®-Punch and Punch+LEM17. Experimental fungicides were compared to full-season programs with the registered fungicides Bravo®, Tilt®/Bravo®, Echo®-Folicur®, and Bravo®-Headline®. A Tilt®/Bravo®-Headline® treatment was also applied in a reduced, three-spray program and according to the advisory program.

Early leaf spot appeared in August and reached an incidence of nearly 100% in the untreated check by harvest. All fungicide programs reduced leaf spot and defoliation compared to the untreated check (Table 6). Full-season programs of Punch-LEM17, Bravo®-Headline®, and Bravo-Punch gave the best control. Of the reduced programs, the Headline®-Tilt®/Bravo® calendar and advisory programs, but not the Tilt®/Bravo® advisory program gave disease control that was similar to the full-season Bravo program. Sclerotinia blight reached moderate levels on the resistant cultivar Tamspan 90. Except for the Punch-LEM17 program, fungicide programs that provided the best control of leaf spot generally had highest levels of Sclerotinia blight. Correlation analysis revealed that yields were negatively associated with leaf spot and defoliation, but not Sclerotinia blight. Yields were greater than the untreated control only for the full-season Bravo®, Punch-LEM17, and Headline®-Bravo® programs; and for the reduced calendar program with Headline®-Tilt®/Bravo®. Numeric increases in crop value ranged from $38/A for the full-season Bravo®-Punch treatment to $149/A for the reduced calendar program with Headline®-Tilt®/Bravo®. Increases in crop value above the untreated check were generally sufficient to offset the costs of the fungicide programs.

Evaluation of fungicides and full and reduced fungicide programs on Virginia-type peanuts

In previous trials in the area, excellent control of early leaf spot followed a reduced calendar program consisting of three applications made on 14-day intervals beginning around August 1. Good control has also been achieved by making applications when recommended by the weather-based early leaf spot advisory program (http://agweather.mesonet.org). The objective of this study was to compare reduced fungicide programs made according to the weather-based early leaf spot advisory program and the three-application calendar program to full-season calendar programs that included registered (Bravo®, Headline®, Absolute®, and Tilt®/Bravo®) and experimental (Topguard, LEM17, and Punch) fungicides.

Weather conditions favored leaf spot development since the advisory

Table 6. Effect of fungicide programs on control of early leaf spot on Spanish-type peanuts (Tamspan 90) at the Caddo Research Station, Ft. Cobb, 2008.

Treatment and Rate/A (timing)[1]	*Early Leaf Spot(%)*	*Defoliation (%)*	*Sclerotinia Blight (%)*	*Yield (lbs/A)*	*Crop Value ($/A)*[2]
Check	92.1 a[3]	74.6 a	0.0 e	3,238 d	539 d
Bravo® 6F 1.5 pt (1-6)	12.1 de	0.0 c	9.0 bcd	3,811 abc	635 abc
Tilt®/Bravo® 4.3SE 1.5 pt (1-6)	15.8 cd	1.2 c	10.2 abc	3,543 bcd	590 bcd
Punch 3.3E 4 fl oz + LEM17 1.67F 16.8 fl oz(1-6)	2.7 f	0.0 c	4.0 de	4,037 ab	673 ab
Echo® 6F 1.5 pt (1,6) Folicur® 3.6F 7.2 fl oz (2-5)	22.5 c	4.6 c	4.2 de	3,782 abcd	630 abcd
Bravo® 6F 1.5 pt (1,3,5) Headline® 2.08E 6 fl oz (2,4,6)	6.0 ef	0.0 c	15.7 a	3,935 abc	656 abc
Bravo® 6F 1.5 pt (1,3,5) Punch 3.3E 4 fl oz (2,4,6)	3.7 f	0.0 c	9.5 bcd	3,456 cd	576 cd
Headline® 2.08E 6 fl oz (3,4) Tilt®/Bravo® 4.3SE 1.5 pt(5)	5.4 cd	2.5 c	3.0 e	4,131 a	688 a
Tilt®/Bravo® 4.3SE 1.5 pt (A1, A2, A3)	46.2 b	12.1 b	5.0 cde	3,659 abcd	610 abcd
Headline® 2.08E 6 fl oz (A1,A3) Tilt®/Bravo® 4.3SE 1.5 pt (A2)	15.8 cd	1.7 c	12.5 ab	3,579 abcd	596 abcd
LSD (P=0.05)[4]	7.2	5.1	5.9	555	92

[1] Numbers 1 to 6 correspond to the calendar-based spray dates of 1=July 9, 2=July 23, 3=Aug. 6, 4=Aug. 22, 5=Sept. 3, and 6= Sept. 17. A1 to A3 correspond to the advisory based spray dates of July 9, Aug. 12, and Sept. 3.
[2] Loan rate value based on an average grade of 68% total sound mature kernels.
[3] Values in a column followed by the same letter are not significantly different at P=0.05.
[4] Fisher's least significant difference (LSD), NS=treatment effect not significant at P=0.05.

program recommended four fungicide applications. However, leaf spot did not appear until August. The field had been previously cropped to cotton, which may explain the late appearance of low leaf spot pressure at this site. All of the fungicide programs provided excellent leaf spot control compared to the untreated check, which had only 60% leaf spot and 10% defoliation at harvest (Table 7). Southern blight also appeared in August and reached 10% in some plots. Severe pod rot was evident in some plots after digging the trial. *Rhizoctonia* but not *Pythium* was cultured from representative diseased pods. There was considerable variability in the levels of both southern blight and pod rot among plots of the same treatment. As a result of the variability, levels of pod rot, and southern blight did not differ among treatments. Yields and grades were high despite the presence of the soilborne diseases. Yield and crop values did not differ among treatments, apparently because leaf spot pressure was not sufficient to reduce yields.

Table 7. Effect of fungicide programs on control of early leaf spot and soilborne diseases on Virginia-type peanuts (Jupiter) at the Thompson Farm, Erick, 2008.

Treatment and Rate/A (timing)[1]	*Early Leaf Spot (%)*	*Southern Blight (%)*	*Pod Rot (%)*	*Yield (lb/A)*	*Crop Value ($/A)*[2]
Check	63.3 a[3]	11.2 a	10.0 a	4,547 a	885 a
Bravo® 720 1.5 pt (1-6)	0.0 c	9.6 a	24.1 a	3,748 a	730 a
Bravo® 6F 1.5 pt (1,3,5) Headline® 2.08E 6 fl oz (2,4,6)	0.0 c	12.5 a	11.6 a	4,755 a	926 a
Bravo® 6F 1.5 pt (1,6) Topguard 1.04F 14 fl oz (2-5)	0.6 c	5.9 a	10.3 a	4,864 a	947 a
Bravo® 6F 1.5 pt (1,6) Topguard 1.04F 28 fl oz (2-5)	0.8 c	6.2 a	24.1 a	4,229 a	823 a
Punch 3.3E 4 fl oz + LEM17 1.67F 16.8 fl oz (1-6)	0.0 c	5.9 a	10.0 a	5,254 a	1,023 a
Absolute® 4.36F 3.5 fl oz (3,5) Bravo® 6F 1.5 pt (4)	0.8 c	9.7 a	21.6 a	4,547 a	885 a
Absolute® 4.36F 3.5 fl oz (A1,A4) Bravo® 6F 1.5 pt (A2,A3)	3.1 c	5.0 a	20.9 a	5,046 a	982 a
Headline® 2.08E 6 fl oz (3,5) Tilt®/Bravo® 4.3SE 1.5 pt (4)	8.1 b	7.8 a	7.5 a	4,710 a	917 a
Headline® 2.08E 6 fl oz (A1,A3) Tilt®/Bravo® 4.3SE 1.5 pt (A2,A4)	3.7 bc	5.3 a	9.4 a	4,846 a	943 a
LSD (P=0.05)[4]	4.4	NS	NS	NS	NS

[1] Application numbers 1 to 6 correspond to the calendar spray dates of 1=July 2, 2=July 16, 3=July 30, 4=Aug. 11, 5=Aug. 27, and 6=Sept. 10. Applications numbers A1 to A4 correspond to spray dates for the Early Leaf Spot Advisory Program of A1=July 2, A2=July 16, A3=Aug. 11, and A4=Aug. 27.
[2] Crop value based on an average grade of 75% total sound mature kernels and 50% extra large kernels.
[3] Values in a column followed by the same letter are not significantly different at P=0.05.
[4] Fisher's least significant difference (LSD), NS=treatment effect not significant at P=0.05.

Peanut Variety Tests

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2008 progress made possible through OPC and NPB support

- Evaluated current peanut cultivars and breeding lines at three locations in southwest Oklahoma.
- ARSOK-R1 and Tamrun OL07 performed well at most locations. Grades of ARSOK-R1 were excellent at all three locations.

Variety Tests

All variety tests were conducted under an extensive pest management program. The objective was to prevent as much outside influence from pest pressures (weed, disease, and insect) on yield and grade as possible. Variety X location interaction was significant so the results were presented by county (Tables 1 - 3). Since the varieties and advanced lines response differed by location, growers may find the data for the county closest to their location to be the most useful in selecting a variety or varieties to grow. All test plots were planted using two 36-inch rows that were 20 feet long. Plots were seeded at a rate of eight seeds per row foot (139,392 seeds/A). At planting, liquid inoculant formulation was applied with the seed. Tests were conducted using randomized, complete block design with five replications. The entire plot was dug and then thrashed three to four days later. Peanuts were placed in a drier until moisture reached 10%.

Interpreting data

Details of establishment and management of each test are listed in footnotes below the tables. Least significant differences, or LSD, are listed at the bottom of all but the Performance Summary tables. Differences between varieties are significant only if they are equal to or greater than the LSD value. If a given variety out yields another variety by as much or more than the LSD value, then we are 95% sure the yield difference is real, with only a 5% probability the difference is due to chance alone. For example, if variety X is 500 lbs/A higher in yield than variety Y, then this difference is statistically significant if the LSD is 500 or less. If the LSD is 500 or greater, then we are less confident that variety X really is higher yielding than variety Y under the conditions of the test.

The coefficient of variation, or CV value, listed at the bottom of each table is used as a measure of the precision of the experiment. Lower CV values will generally relate to lower experimental error in the trial. Uncontrollable or immeasurable variations in soil fertility, soil drainage, and other environmental factors contribute to greater experimental error and higher CV values.

Results reported here should be representative of what might occur throughout the state but would be most applicable under environmental and management conditions similar to those of the tests. The relative yields of all peanut varieties are affected by crop management and by environmental factors including soil type, summer conditions, soil moisture conditions, diseases, and insects.

Beckham County

Good growing conditions were observed at Erick throughout the growing season. Early season precipitation was above normal, which delayed planting in some cases, but the trial was planted on time. Average yield for the runner test was 5,740 lbs/A with an average grade of 76% (Table 1).

In the Spanish test ARSOK-S1, Tamnut 06, AT 98-99-14, and Spanco were the top yield performers. Average yield and grade for the Spanish test were 5,391 lbs/A and 71% total sound mature kernels, or TSMK, respectively. ARSOK-S1 is an experimental variety that has not been released at this time. Tamnut 06 was released from Texas A&M in the spring of 2007.

Average yield and grade in the Virginia test was 5,189 lbs/A and 72% TSMK, respectively. All four varieties have been consistent performers during the last three years.

Caddo County

Overall, growing conditions were good during the season at Ft. Cobb. Early season weed competition and herbicide application reduced above ground biomass initially. Average yield for the runner test was 3,490 lbs/A with an average grade of 70% TSMK (Table 2). Tamrun 96, ARSOK-R1, and Southwest Runner were at the top of the yield list. ARSOK-R1 has performed well during the last two years at Ft. Cobb.

Average yield and grade for the Spanish test were 3,267 lbs/A and 69% TSMK, respectively.

Yields and grades were extremely low for the Virginia test. Average yield and grade in the Virginia test was 2,995 lbs/A and 67% TSMK, respectively. Despite low yields in 2008, all four varieties have been consistent performers during the last two years.

Hydro, Okla.

This was the first year for a test location near Hydro. Good growing conditions were observed throughout the growing season. Early season precipitation was above normal, which delayed planting in some cases, but the trial was planted on time. Yields were excellent at this location. However, grades were low due to a cool August and September, which slowed maturity. Average yield for the runner test was 6,280 lbs/A with an average grade of 64% TSMK (Table 3). Tamrun OL07 performed very well at this location but grade was lower than some other varieties.

Average yield and grade for the Spanish test were 5,435 lbs/A and 68% TSMK, respectively. The cool weather in the fall did not seem to hurt the maturity of the Spanish lines compared to the Runner lines.

Average yield and grade in the Virginia test was 5,716 lbs/A and 64% TSMK, respectively. No differences were

Additional information on the Web

A copy of this publication, as well as a variety of information on peanut and soybean management can be found at:

www.peanut.okstate.edu/

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Table 1. Peanut yields and grades from Beckham County variety tests, 2008.

Variety or Line	*Yield (lbs/A)*	*Grade (% TSMK)*[2]
Runner[1]		
Tamrun 96	6,331	76
ARSOK-R1	5,928	79
SW Runner	5,899	74
Tamrun OL07	5,710	76
Tamrun OL02	5,463	74
Flavorunner 458	5,107	78
CV	10.3	3.1
LSD 0.05	781	3
Spanish[1]		
AT 98-99-14	6,141	73
Tamnut 06	5,961	71
ARSOK-S1	5,619	73
Spanco	5,616	69
GA 04S	5,147	65
Tamspan 90	5,140	72
OLin	4,828	71
Pronto	4,672	73
CV	7.2	8.5
LSD 0.05	502	7.8
Virginia[1]		
Gregory	5,173	70
Brantley	4,599	71
Perry	5,514	78
Jupiter	5,470	69
CV	14.6	11.6
LSD 0.05	NS	NS

[1] Market type.
[2] TSMK = Total sound mature kernels.

Table 2. Peanut yields and grades from Caddo County variety tests, 2008.

Variety or Line	*Yield (lbs/A)*	*Grade (% TSMK)*[2]
Runner[1]		
Tamrun 96	3,757	68
ARSOK-R1	3,764	74
SW Runner	3,812	71
Tamrun OL07	3,416	68
Tamrun OL02	3,311	68
Flavorunner 458	2,882	69
CV	7.6	3.4
LSD 0.05	352	3
Spanish[1]		
Tamnut 06	3,608	69
Spanco	3,539	67
ARSOK-S1	3,420	69
OLin	3,325	70
Tamspan 90	3,278	67
AT 98-99-14	3,224	65
Pronto	3,184	66
GA 04S	2,556	62
CV	11.3	3.1
LSD 0.05	477	2.7
Virginia[1]		
Perry	3,386	68
Jupiter	3,122	67
Brantley	2,820	66
Gregory	2,653	68
CV	31	4.5
LSD 0.05	NS	NS

[1] Market type.
[2] TSMK = Total sound mature kernels.

observed among varieties at this location.

Table 3. Peanut yields and grades from Hydro variety tests, 2008.

Variety or Line	*Yield (lbs/A)*	*Grade (% TSMK)*[2]
Runner[1]		
Tamrun OL07	7,402	61
Flavorunner 458	6,360	66
ARSOK-R1	6,309	65
Tamrun 96	6,229	66
SW Runner	6,040	65
Tamrun OL02	5,340	59
CV	17.6	5.2
LSD 0.05	1,456	4
Spanish[1]		
Tamnut 06	5,981	65
OLin	5,961	70
AT 98-99-14	5,833	68
ARSOK-S1	5,612	68
GA 04S	5,271	66
Tamspan 90	5,122	67
Spanco	4,879	70
Pronto	4,824	71
CV	12.9	2.1
LSD 0.05	907	2
Virginia[1]		
Jupiter	6,236	63
Perry	5,902	65
Gregory	5,485	61
Brantley	5,242	66
CV	7.7	5.9
LSD 0.05	NS	NS

[1] Market type.
[2] TSMK = Total sound mature kernels.

Partners in Progress PEANUTS

Double-Crop Variety Tests

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Introduction

In most years, producers have an opportunity to plant a double-crop after wheat harvest in early to mid June. If Spanish peanut varieties get planted by June 15, enough growing season should be left to harvest a fully mature peanut crop. The objective of this study is to determine the yield and grade of double-crop peanut.

Methods

In 2008, one location at Ft. Cobb was conducted to determine yield and grade of commercially available peanut varieties. Spanish, runner, and Virginia peanut varieties were included. Plots were seeded at a rate of five seeds per row foot June 20, 2008. Tests were conducted using a randomized, complete block design with five replications. The entire plot was dug and then thrashed three or four days later. Peanuts were placed in a drier until moisture reached 10%.

Interpreting Data

Details of establishment and management of each test are listed in footnotes below Table 1. Least significant differences, or LSD, are listed at the bottom of all of the tables, with the exception of the Performance Summary tables. Differences among varieties are significant only if they are equal to or greater than the LSD value. If a given variety out yields another variety by as much or more than the LSD value, then we are 95% sure the yield difference is real, with only a 5% probability the difference is due to chance alone. For example, if variety X is 500 lbs/A higher in yield than variety Y, then this difference is statistically significant if the LSD is 500 or less. If the LSD is 500 or greater, then we are less confident that variety X really is higher yielding than variety Y, under the conditions of the test.

The coefficient of variation, or CV value, listed at the bottom of each table is used as a measure of the precision of the experiment. Lower CV values will generally relate to lower experimental error in the trial. Uncontrollable or immeasurable variations in soil fertility, soil drainage, and other environmental factors contribute to greater experimental error and higher CV values.

Results

In 2008, no significant differences were observed among any of the market types. Average yields for Spanish, runner, and Virginia were 1,620 lbs/A; 2,400 lbs/A; and 2,503 lbs/A, respectively. These yields are a little lower than expected but was probably caused by deer pressure on and around plots. With reduced inputs by planting late, even a ton and a half yield may be profitable. Grades were low for all varieties. Low grades were most likely a result of the cooler-than -normal temperatures in late August and September that slowed maturity.

Table 1. Peanut yields and grades from Caddo County double-crop variety tests, 2008.

Variety or Line	*Yield (lbs/A)*	*Grade (% TSMK)*[2]
	- - - - 2008 - - - -	
Runner[1]		
Tamrun 96	1,899	57
ARSOK-R1	2,915	55
Tamrun OL02	2,185	55
Flavorunner 458	2,360	48
CV	26	7
LSD 0.05	NS	NS
Spanish[1]		
Tamnut 06	1,372	55
Spanco	1,423	56
ARSOK-S1	1,242	59
OLin	1,369	59
Tamspan 90	1,840	57
AT 98-99-14	2,541	58
Pronto	1,550	60
CV	35	7.1
LSD 0.05	760	NS
Virginia[1]		
Perry	2,029	53
Jupiter	2,704	54
Brantley	2,414	53
Gregory	2,864	48
CV	31	6.8
LSD 0.05	NS	NS

[1] Market type.
[2] TSMK = Total sound mature kernels.

The Effects of Reduced Tillage Practices on Peanut Production and Pest Management

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2008 progress made possible through OPC and NPB support

- No consistent differences were observed with insect populations in 2008 when comparing tillage treatments.
- Peanut yields and grades were similar among no-till, strip-till, and conventional tillage treatments.

Introduction

In 2008, the long-term tillage study at the Ft. Cobb Research Station was continued. The objectives were to assist Oklahoma growers in developing management strategies for conventional and conservation tillage practices in peanut production. Originally, plots were 76 feet wide by 130 feet long, to be representative of what growers would experience in adopting reduced tillage practices. Changes were made for the 2007 growing season. Large plots, which measured 76 feet by 130 feet, were split to evaluate three different rotations, while maintaining the objectives of the original study. Each tillage plot was split into three sub-plots, which measured 40 feet by 50 feet. Main plots were tillage and sub-plots became crop rotation. Crop rotations evaluated were a three-year corn, corn, then peanut rotation; and a three-year switchgrass, switchgrass, then peanut rotation. Including crop rotation as a variable in this study will provide beneficial data of how crop rotation affects weeds, diseases, and insects in reduced and conventional tillage systems. Most importantly, we will be able to evaluate the economic profitability of these rotations.

Materials and Methods

An outline of field operations is presented in Table 1.

Arthropod monitoring and weed populations

Once damage became apparent, thrips populations were monitored on three separate occasions. Ten quadrifoliate leaves were pulled from each plot and placed in 70% ethyl alcohol, or ETOH, for transportation to the laboratory. Leaves were carefully separated and rinsed in an ETOH solution, then the liquid was strained for larvae and adults.

Peanut volunteer plants and weed counts were taken shortly after planting. Volunteer counts were taken on two separate occasions throughout the trial,

Table 1. Summary of field operations in 2008.

Date	*Description*
March 10	Tilled conventional corn plots.
March 14	Triple K® on conventional corn plots.
March 25	Applied 220 lbs 34-0-0 on the switchgrass and corn plots. Applied 100 lbs 18-46-0 on the peanut plots.
March 26	Triple K® on conventional corn plots and then planted all corn plot.
March 27	Applied 100 lbs 18-46-0 on corn plots.
April 14	Tilled conventional peanut plots; sprayed glyphosate at 1 qt. on no-till and strip-tilled corn and peanut plots.
May 5	Tilled conventional peanut plots.
May 13	Spayed Prowl® 3.3 on conventional peanut plots and incorporated with Triple K®.
May 16	Ran strip-till and then planted all peanut plots with Tamrun OL02; Sprayed Prowl® H_20 at 1 qt. + glyphosate at 1 qt. on the no-till and strip-tilled peanut plots.
May 16	Sprayed 1.5pt. 2,4,D on the Switchgrass plots and Glyphosate at 1qt on corn plots.
May 30	Applied 300 lbs 34-0-0 on corn plots.
June 16	Sprayed Cobra at 12.5 oz. + Poast Plus at 1.5 pt. + Basagran at 2 pt. + Butyrac® 200 at 8 oz. on peanut plots
July 9	Sprayed Cobra at 12.5 oz. + Outlook at 20 oz. + Poast Plus at 1.5 pt. + Butyrac® 200 at 1 pt. + Dynamic at 6 oz. on peanut plots.
Aug. 29	Harvested corn plots.
Oct. 17	Swathed switchgrass.
Oct. 29	Dug peanut plots.
Oct. 21	Baled switchgrass lots.
Oct. 24	Thrashed peanut plots.
Fungicide Applications	
July 2	Bravo® 1.5 pt/A
July 30	Abound® 18.5 oz/A
Aug. 25	Bravo® 1.5 pt/A

once before a field implement with sweeps was run through the plots and once afterward by taking an average of five quadrates per plot. Weed counts also were taken twice. Weed assessments were made by taking the total number of weeds found in a 90-square-foot area within each replication. Weed assessments were made before and after herbicide application.

Plot design and analysis

The plot design was a randomized, complete block with four replications of each treatment. An analysis of variance was conducted on the data and a least significant difference, or LSD, (P=0.05) test was generated to compare differences among the three tillage treatments in reference to insect and disease pressure, as well as yield and grade.

Results and Discussion

The information found in Table 2 presents results from monitoring insect populations encountered in the tillage test at Ft. Cobb. Thrips were the main problem noticed throughout the season. No insecticides were applied throughout this test. A large number of larvae were present at the first sampling. A significantly higher number of thrips larvae were found in conventional till plots. This trend of higher larvae and adult thrips in conventional till plots was observed during all three sampling dates (Table 2).

Table 2. Mean number of thrips/10 quadrifoliate leaves.

Treatment	*1st Sample Date 6-13-2008**			*2nd Sample Date 6-22-2008**			*3rd Sample Date 7-2-2008**		
	Larvae	*Adult*	*Total*	*Larvae*	*Adult*	*Total*	*Larvae*	*Adult*	*Total*
Strip-till	20.0 b	10.0 a	30.0 b	2.0 a	6.8 b	8.8 b	.5 b	2.5 a	3.0 b
No-till	27.3 b	7.8 a	35.0 b	4.0 a	7.0 b	11.0 b	1.0 b	3.5 a	4.5 b
Conventional till	85.7 a	11.5 a	97.2 a	7.0 a	14.3 a	21.3 a	5.3 a	6.0 a	11.3 a

*Means, within columns, followed by the same letter are not significantly different (ANOVA, LSD: P=0.05).

No significant differences in peanut yields or grades were identified among tillage treatments (Table 3). This follows previous years' data. Tillage does not appear to have an effect on peanut yield or peanut grade after four years. Corn grain yields were determined for each plot. Average corn-grain yield was 123 bu/A (Table 4). Switchgrass was swathed and harvested after dormancy and the estimated yield was 5.8 tons/A. Corn and switchgrass plots will be planted to peanuts in 2009.

While certain trends appear to be evident from year to year that may relate to tillage effects on arthropods, weeds, and diseases, no consistent differences seem to indicate minor impacts from reduced tillage practices in peanuts.

Table 3. Peanut yield and grade from the Long-term tillage study, Ft. Cobb, 2008.

Tillage	*Yield (lbs/A)*	*Grade (% TSMK)[1]*
No-till	2989 a	72 a
Strip-till	3095 a	69 a
Conventional till	3641 a	70 a

[1] TSMK = Total sound mature kernels.
* Means, within columns, followed by the same letter are not significantly different (ANOVA, LSD: P=0.05).

Table 4. Corn grain yields, 2008.

Treatment	*Average (bu/A)*
Strip-till	122.7
No-till	120.5
Conventional till	126.5

Twin-Row and Single-Row Variety Comparisons

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2008 progress made possible through OPC and NPB support

- Yields of ARSOK-R1, AT 98-99-14, Jupiter, Tamnut 06, and Tamrun OL02 were increased from twin-row planting by an average of 1,238 lbs/A.
- No significant yield increases were observed at Ft. Cobb.

Introduction

Research in row configuration has been conducted at various times during the past two decades to help create solutions for various problems. In Oklahoma, peanuts are typically planted in 36-inch rows. However, some producers have started planting in a twin-row planting configuration. Twin-rows are usually centered on 36 inches and a row is planted 3.75 inches to either side of the row center. Twin-row planting has grown in popularity during the last 10 to 15 years. Popularity for twin-row planting has been mostly in the Southeast peanut production region, where researchers have observed a reduction in tomato spotted wilt virus with twin-row compared to single-row.

Very little research has been conducted to compare differences among varieties in regards to row configuration. The objectives of this research were to:

- determine the effect of row configuration on peanut yield and grade, and
- determine if differences exist among varieties when planted in twin-row and single-row configurations.

Methods

In 2008, studies were conducted at Stillwater and Ft. Cobb to investigate agronomic advantages to twin-row planting. The experimental design was a split-plot design with row configuration (twin-row and single-row) as the main plot and variety as the sub-plot. Varieties included in the study were ARSOK-R1, Tamrun OL07, Tamrun OL02, Jupiter, Spanco, AT 98-99-14, and Tamnut 06.

Plots were strip-tilled seven days before planting on May 14, 2008. The single-row peanuts were planted in rows spaced at 36 inches, while the twin-row treatment was planted on 36-inch centers and the spacing between the twin-rows was 7.5 inches. Single-row treatments and the twin-row treatments were planted at the same density of 4.8 seeds per row foot. This provided the same number of seeds per acre. All plots received the same herbicide and fungicide applications.

Results

At Ft. Cobb, no significant differences were observed between row configurations (Table 1). Numerically, twin-rows appeared to have an advantage, but the difference was not significant. At this location, yield was relatively low, which may have contributed to the lack of differences. Grades for Jupiter, Spanco, Tamnut 06, and Tamrun OL02 were greater in single-row when compared with grades from the twin-row treatments. The reason for this is unclear. Another year of data will indicate if this is a trend or just a function of the year.

At Stillwater, peanut yields were excellent and averaged 4,600 lbs/A when averaged across varieties. Row configuration for twin-rows had a significantly higher yield in five out of the seven varieties. The two varieties that did not respond to twin-row planting were Spanco and Tamrun OL07. Twin-row increased peanut yield by an average of 1,238 lbs/A with the five varieties that responded favorably to twin-row. No differences were observed in grade among treatments.

Results in 2008 were similar to 2007 where Tamspan 90 responded to the twin-row planting configuration. Twin-row planted Tampsan 90 increased yield by 671 lbs/A and TSMK by 4% compared to single-row. In 2007, no significant yield increase was observed with Tamrun OL02. However, numerically a 560 lbs/A increase

Table 1. Twin-row and single-row variety comparison, Ft. Cobb, 2008.

	Single-Row[1]		*Twin-Row*[2]	
Variety	*Yield (lbs/A)*	*TSMK*[3] *(%)*	*Yield (lbs/A)*	*TSMK*[3] *(%)*
Tamrun OL02	3,784A[4]	69a	3,939A	62b
Tamrun OL07	3,371A	66a	3,630A	67a
ARSOK-R1	3,562A	73a	3,762A	74a
AT 98-99-14	2,541A	69a	2,854A	67a
Tamnut 06	2,582A	69a	2,183A	64b
Spanco	2,968A	71a	2,850A	66b
Jupiter	2,999A	67a	3,076A	62b

1 Single-row was planted on 36-inch rows at a density of 4.8 seeds/foot.
2 Twin-row was planted on 36-inch centers with a between row spacing of 7.5 inches. Seeding density was 2.4 seeds/foot.
3 TSMK = Total sound mature kernels.
4 Differences in uppercase and lowercase letters within the same row are significantly different (P≤ 0.05).

Table 2. Twin-row and single-row variety comparison at Stillwater, 2008.

	Single Row[1]		*Twin Row*[2]	
Variety	*Yield (lbs/A)*	*TSMK*[3] *(%)*	*Yield (lbs/A)*	*TSMK*[3] *(%)*
Tamrun OL02	3,267B[4]	58a	5,019A	56a
Tamrun OL07	4,501A	55a	4,669A	59a
ARSOK-R1	4,184B	58a	5,300A	57a
AT 98-99-14	4,392B	55a	5,245A	57a
Tamnut 06	3,571B	59a	4,901A	60a
Spanco	2,868A	59a	2,999A	57a
Jupiter	2,927B	48a	4,066A	52a

1 Single row was planted on 36-inch rows at a density of 4.8 seeds/foot.
2 Twin-row was planted on 36-inch centers with a between row spacing of 7.5 inches. Seeding density was 2.4 seeds/foot.
3 TSMK = Total sound mature kernels.
4 Differences in uppercase and lowercase letters within the same row are significantly different (P≤ 0.05).

was observed compared to single-row. No differences were observed in percent TSMK. This study will be continued in 2009 to include more varieties and different seeding rates. Currently, it appears under high yielding environments, twin-row will increase yields. However, different varieties may respond differently to row configuration.

OKLAHOMA STATE UNIVERSITY

RESEARCH