Partners in Progress
PEANUTS

Peanut Research at OSU 2009

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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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.

All for One, One for All

Since 1965, producers have been collectively supporting peanut research and Extension efforts via Oklahoma Peanut Commission approved projects with Oklahoma State University; aimed at improving profit potential and sustainability for one of Oklahoma's top commodities. This partnership among producers, OPC and OSU was expanded a decade ago to include support from the National Peanut Board.

Each year the results of on-going and innovative new peanut investigations are published for producer review in the *Partners in Progress* report. Within these pages are timely and valuable tips for producers…lessons learned… from seasoned scientists dedicated to the improvement of Oklahoma peanuts.

The OPC salutes OSU members of the Peanut Improvement Team and Dr. Chad Godsey – Plant and Soil Sciences and Dr. John Damicone – Entomology and Plant Pathology as lead investigators of projects reported within. They, along with their cited colleagues, have provided evaluations of reduced tillage practices and crop rotation studies; evaluation of advanced breeding lines and current peanut varieties across Oklahoma; findings relating to low-input and peanut cropping systems; and integrated management of peanut diseases.

The OPC also recognizes the untiring efforts by Dr. Hassan Melouk and Dr. Kelly Chamberlin, USDA-ARS Center for Peanut Improvement for on-going disease evaluations, breeding and selecting for variety improvement.

Paramount to the future of peanuts in Oklahoma are the investments and commitments made annually by the OSU Division of Agricultural Sciences and Natural Resources, the Oklahoma Agricultural Experiment Station, the Oklahoma Cooperative Extension Service, the USDA-ARS Center for Peanut Improvement and the "All for One, One for All" support of Oklahoma's peanut producers.

Mike Kubicek,
Executive Secretary
Oklahoma Peanut Commission

Partners in Progress
PEANUTS

Integrated Management of Peanut Diseases

J. P. Damicone
Department of Entomology and Plant Pathology

2009 progress made possible through OPC and NPB support

- Under extreme pressure from Sclerotinia blight, none of the varieties including Tamrun OL07, ARSOK-R1 and Tamnut OL06 had good resistance or yields without fungicide treatment.
- Unlike previous years, single applications of either Omega® or Endura® made on demand were less effective than two applications applied preventively for control of Sclerotinia blight.
- Three different experimental fungicides reduced Sclerotinia blight and increased yield compared to the untreated check, but they were less effective than Endura® or Omega®.
- Reduced fungicide programs made according to the calendar or the weather-based advisory program continued to provide good leaf spot control.
- Several experimental fungicides provided excellent control of early leaf spot and/or web blotch.

Six field trials were completed in 2009 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, OSU Plant and Soil Sciences; Tyler Pierson and Kelly Seuhs, OSU Entomology and Plant Pathology; and Hassan Melouk and Kelly Chenault, USDA-ARS in Stillwater. Appreciation is expressed to Brian Silk, a peanut farmer in Beckham County, who hosted the on-farm trials at Sayre. The excellent cooperation of Bobby Weidenmaier and the farm crew at the Caddo Research Station is greatly appreciated.

The field studies in 2009 served several purposes. The first was to identify and refine better strategies for managing diseases. The second was to use the trial 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 2009 are summarized in this report. In interpreting the results, small differences in treatment values should not be overemphasized. Least significant differences (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.

Weather conditions were variable in 2009. Hot and dry weather in late June and early July was not favorable for the peanut crop or disease development. From

late July through harvest, temperatures statewide were below normal (30-year average). Rainfall was above normal from July through October at Ft. Cobb and was near normal at Sayre. Leaf spot and Sclerotinia blight did not appear until late August. Early leaf pressure was generally moderate and most damaging on Spanish varieties. Late leaf spot was severe in Beckham County on the variety Jupiter. Southern blight was not a problem at any of the trial sites. Sclerotinia blight became severe in October when average daily temperature was 8 F below normal, and rainy days were frequent. Pod rot was a problem in isolated fields of Virginia-type varieties. Where diseases were controlled, yields were above average, but the cool temperatures in the fall slowed peanut maturity resulting in below average grades.

Sclerotinia Blight

Sclerotinia blight remains a destructive disease in Oklahoma. It occurs in all areas of the state except in far southwestern production areas. The best runner cultivars with resistance to Sclerotinia blight (Tamrun 96 and Tamrun OL01) are no longer available. Field trials at the Caddo Research Station were focused on evaluating new fungicides, developing effective reduced fungicide programs with registered fungicides, and determining the disease and yield responses of new, high O/L varieties and breeding lines to fungicide programs. The three trials involving control of Sclerotinia blight were conducted at the Caddo Research Station in a field with history of Sclerotinia blight and continuously cropped to peanuts. The cool, wet weather in October resulted in extreme disease pressure.

Evaluation of fungicides

The objective of this study was to evaluate the experimental fungicides DPX-LEM17, DPX-YT669 and DPX-Q8Y78 for control of Sclerotinia blight on the variety Tamrun OL02. The experimental fungicides were 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 except for a tank mixture of Tilt®/Bravo® + Omega® that was applied on a 14-day schedule.

Sclerotinia blight appeared in late August and cool, wet weather during October favored severe disease development. Sclerotinia blight exceeded 90 percent in the untreated check by harvest. All of the treatments reduced levels of disease and increased yields compared to the untreated check (Table 1). The best disease control and yields were from the registered fungicides Omega® and Endura®. The experimental fungicides all gave an intermediate level of disease control and yield increase. Increases in crop value compared to the untreated check ranged from $200/A for the experimental fungicides to more than $300 for Omega® and Endura®. Given the cost of the registered fungicides ($4.15/oz for Endura®, $45/pt for Omega®), the treatment consisting of two applications of Endura® at 8 oz/A gave the best return (crop value minus fungicide cost).

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 Omega® and Endura®. 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

Table 1. Effect of fungicides for control of Sclerotinia blight on runner-type peanuts (Tamrun OL02) at the Caddo Research Station, Ft. Cobb, 2009.

Treatment and rate/A (timing)[1]	Sclerotinia blight (%)		Yield (lb/A)	Value ($/A)[2]
	Oct 7	Oct 26		
Omega® 4F 1.5 pts (1,3)	9.7 d[3]	32.5 e	4,370 a	$756 a
Omega® 4F 1.0 pt (1,3)	11.2 d	39.5 de	4,037 a	$698 a
Endura® 70WG 8 oz (1,3)	18.7 d	51.2 cd	4,160 a	$719 a
Endura® 70WG 10 oz (1,3)	16.0 d	43.0 de	4,058 a	$702 a
DPX-LEM17 1.67F 16 fl oz (1,3)	43.0 bc	70.0 b	3,252 b	$563 b
DPX-LEM17 1.67F 24 fl oz (1,3)	36.7 c	70.2 b	3,223 b	$558 b
DPX-YT669 2.08F 18.3 fl oz (1,3)	53.0 b	72.0 b	3,122 b	$540 b
DPX-Q8Y78 240F 24 fl oz (1,3)	41.2 c	61.7 bc	3,441 b	$595 b
Tilt®/Bravo® 4.3SE 1.5 pts + Omega® 4F 0.5 pt (1-4)	9.7 d	32.7 e	4,102 a	$709 a
check	75.7 a	90.5 a	2,149 c	$372 c
LSD (*P*=0.05)[4]	10.2	12.0	552	95

[1] 1 to 4 correspond to the spray dates of 1=July 31, 2=Aug. 13, 3=Aug. 28, and 4=Sept. 10.
[2] Loan rate value based on an average grade of 70 percent TSMK (total sound mature kernels).
[3] Values in a column followed by the same letter are not statistically different at *P*=0.05.
[4] LSD=least significant difference.

after planting) to provide full-season protection.

Pressure from Sclerotinia blight was severe, reaching more than 90 percent in untreated plots (Table 2). All of the fungicide programs reduced Sclerotinia blight compared to the untreated check. The best disease control was achieved with two applications of either Omega® or Endura®. Single applications, applied either preventively or on demand, generally provided an intermediate level of control. Yields were greater than the untreated check for all of the fungicide programs, but were greatest for programs consisting of two applications of Omega® or Endura®. Increases in crop value ranged from $80/A for the single preventive application of Endura® to $320/A for two preventive applications of Omega® at 1.5 pts/A. Based on the cost of the fungicides ($4.15/oz for Endura® and $45/pt for Omega®), the most favorable return/A (crop value minus chemicals costs) resulted from the preventive program of two applications of Endura® at 8 oz/A.

Variety response to fungicide programs

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 effectiveness because adequate rates and applications are not always feasible. Peanut varieties have different reactions to Sclerotinia blight and use of partially resistant varieties may reduce the cost or preclude the need for a fungicide program. 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.

Table 2. Effect of fungicide application timing on control of Sclerotinia blight on runner-type peanuts (Tamrun OL 02) at the Caddo Research Station, Ft. Cobb, 2009.

Treatment and rate/A (timing)[1]	Sclerotinia blight (%)		Yield (lbs/A)	Value ($/A)[2]
	Oct 7	Oct 26		
Omega® 4F 1.5 pts (P1)	47.0 b[3]	79.2 b	3,340 cd	$584 cd
Omega® 4F 2 pts (P1)	44.2 bc	68.7 c	3,216 cd	$563 cd
Omega® 4F 1.5 pts (D1)	37.7 bcd	61.7 c	3,209 cd	$562 cd
Omega® 4F 2 pts (D1)	27.5 d	64.5 c	3,666 bc	$642 bc
Omega® 4F 1.5 pts (P1+P2)	8.5 e	30.0 d	4,501 a	$788 a
Endura® 70WG 10 oz (P1)	37.2 bcd	65.2 c	3,114 de	$545 de
Endura® 70WG 8 oz (P1+P2)	14.5 e	35.0 d	4,145 ab	$725 ab
Endura® 70WG 10 oz (P1+P2)	12.7 e	31.2 d	4,029 ab	$705 ab
Endura® 70WG 10 oz (D1)	34.5 cd	63.2 c	3,267 cd	$572 cd
check	65.2 a	91.7 a	2,650 e	$464 e
LSD (*P*=0.05)[4]	11.3	8.6	482	84

[1] P1 and P2 refer to preventive applications on July 31 and Aug. 28, respectively. D1 refers to the demand application made after symptoms first appeared on Aug 13.
[2] Loan rate value based on an average grade of 72 percent TSMK (total sound mature kernels).
[3] Values in a column followed by the same letter are not statistically different according to Fisher's least significant difference test.
[4] LSD=least significant difference.

However, Tamrun 96 and Tamrun OL01 are no longer available, and runner varieties now consist of entirely high O/L types.

The objective of this study was to evaluate the disease and yield responses of high O/L varieties (Tamrun OL02, FlavorRunner 458, Tamrun OL07 and Tamnut OL06) and a runner breeding line (ARSOK-R1) to low, moderate and high levels of fungicide input for control of Sclerotinia blight. The high-input treatment consisted of two preventive applications of Omega® at 1.5 pts/A. While prohibitively expensive ($135/A), this treatment was included as a benchmark to measure yield loss from Sclerotinia blight. The other treatments were single applications of Omega® at 1.5 pts ($67/A) and 2 pts/A ($90/A), and Endura® at 10 oz/A ($41/A) made on demand. Demand applications were made at the first appearance of disease.

Levels of Sclerotinia blight were severe in this trial, and none of the varieties produced adequate (more than 3,000 lbs/A) yields without fungicide treatment (Table 3). Tamnut OL06 had the lowest disease incidence and highest yield among the varieties without fungicide treatment. FlavorRunner 458 was the most susceptible variety. Among runner varieties, Tamrun OL07 had the lowest level of Sclerotinia blight, but resistance in this variety was not adequate under the extreme disease pressure. All fungicide treatments except the demand application of Omega® at 1.5 pts/A reduced disease and increased yield of all varieties compared to the untreated checks. However, the high-input Omega® program was the only treatment that produced high yields (more than 4,000 lbs/A). Unlike previous trials in which demand applications were highly effective, the high-input treatment resulted in yields greater than demand treatments for each of the varieties except Tamnut OL06. Yield responses to fungicide programs were greatest for ARSOK-R1 and least

Table 3. Disease and yield responses of high O/L peanut varieties to fungicide programs for Sclerotinia blight, Caddo Research Station, 2009.

Treatment and rate / A (timing)[1]	Tamrun OL02	FlavorRunner 458	ARSOK-R1	Tamrun OL07	Tamnut OL06
			Sclerotinia blight (%) – Oct 7		
Omega® 4F 1.5 pts (P1,P2)	8 d[2]	9 d	5 d	4 c	2 d
Omega® 4F 1.5 pts (D1)	44 b	61 b	42 b	28 b	9 b
Omega® 2 pts (D1)	27 c	46 c	22 c	18 bc	6 bc
Endura® 70WG 10 oz (D1)	42 b	58 bc	31 c	28 b	4 cd
Check	71 a	85 a	64 a	57 a	20 a
LSD (*P*=0.05)[3]	12	13	12	20	4
			Sclerotinia blight (%) - Oct 26		
Omega® 4F 1.5 pts (P1,P2)	46 c	54 b	24 d	15 d	9 d
Omega® 4F 1.5 pts (D1)	80 ab	93 a	89 ab	68 ab	32 b
Omega® 2 pts (D1)	64 bc	92 a	77 c	50 c	21 c
Endura® 70WG 10 oz (D1)	87 a	86 a	81 bc	61 bc	20 c
Check	94 a	99 a	96 a	85 a	44 a
LSD (*P*=0.05)	22	14	9	17	10
			Yield (lbs / A)		
Omega® 4F 1.5 pts (P1,P2)	4,465 a	3,802 a	4,910 a	4,111 a	3,467 a
Omega® 4F 1.5 pts (D1)	2,977 c	2,260 c	3,321 b	3,004 bc	2,986 bc
Omega® 2 pts (D1)	3,693 b	2,886 b	4,011 b	3,575 ab	3,149 ab
Endura® 70WG 10 oz (D1)	3,421 bc	2,577 bc	3,612 b	3,585 ab	3,258 ab
Check	2,260 d	1,525 d	2,305 c	2,414 c	2,677 c
LSD (*P*=0.05)	549	565	763	737	432
			Value ($ / A)[4]		
Omega® 4F 1.5 pts (P1,P2)	$766 a	$698 a	$898 a	$708 a	$581 a
Omega® 4F 1.5 pts (D1)	$511 c	$415 c	$608 b	$517 bc	$500 bc
Omega® 2 pts (D1)	$634 b	$530 b	$734 b	$616 ab	$528 ab
Endura® 70WG 10 oz (D1)	$587 bc	$473 bc	$661 b	$617 ab	$546 ab
Check	$388 d	$280 d	$422 c	$416 c	$449 c
LSD (*P*=0.05)	94	104	140	127	72

1 Preventive applications were made on P1=July 31 and P2=Aug. 28; the demand application was made on D1=Aug. 13.

2 Values in a column followed by the same letter are not statistically different according to Fisher's least significant difference test.

3 LSD=least significant difference.

4 Loan rate value based on average grades of 70 for Tamrun OL02, 75 for FlavorRunner 458, 75 for ARSOK-R1, 70 for Tamrun OL07 and 69 for Tamnut OL07.

for FlavorRunner 458 and Tamnut OL06. Except for Tamnut OL06, increases in crop value from fungicide treatment were generally sufficient to offset fungicide costs. Economic returns (crop value minus treatment costs) were greatest for fungicide treatment on ARSOK-R1.

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. Effective management relies on the use of fungicide programs that control both foliar diseases 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 other products and data on limb rot control when Headline® is limited. Except for Moncut®, 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 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 and foliar diseases. Full-season fungicide programs consisted of six applications on a 14-day schedule. The experimental fungicides DPX-LEM17, DPX-YT669 and DPX-Q8Y78; and the registered fungicides Abound® Headline®, and Evito® were applied twice at 65 days and 95 days after planting. The registered fungicides Folicur® and Provost® were applied four times at mid season on a 14-day schedule (four-spray block). The remaining applications in the six-spray programs were Bravo® or Tilt®/Bravo® for leaf spot. Fungicide programs were compared to an untreated check program and a full-season Bravo® program for control of leaf spot.

Soilborne diseases did not develop at this site. Early leaf spot appeared in September and only reached moderate levels in the untreated check by harvest (Table 4). All fungicide programs reduced leaf spot levels compared to the untreated check. Leaf spot pressure was not sufficient to differentiate among fungicide programs. Yields and crop values did not differ among treatments because of the low disease pressure.

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 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® and Provost®. For one of the Provost® treatments, the fungicide Proline® was applied at planting by spraying it in-furrow for additional soilborne disease control. 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. The remaining applications were chlorothalonil as Bravo®.

Table 4. Effect of fungicide program for soilborne diseases and foliar diseases on control of early leaf spot on runner-type peanuts (Tamrun OL07) at the Silk Farm, Sayre, 2009.

Treatment and rate/A (timing)[1]	Early leaf spot (%)	Defoliation (%)	Yield (lbs/A)	Value ($/A)[2]
Check	70.0 a[3]	50.0 a	4,320 a	$805 a
Bravo® 6F 1.5 pts (1-6) Echo® 6F 1.5 pts (1,6)	8.9 bcd	0.0 b	4,066 a	$758 a
Provost® 3.6F 8 fl oz (2-5) Echo® 6F 1.5 pts (1,6)	3.0 d	0.0 b	4,211 a	$785 a
Folicur® 3.6F 7.2 fl oz (2-5) Bravo® 6F 1.5 pts (1,3,5,6)	7.2 cd	0.0 b	4,120 a	$768 a
Evito® 4F 5.7 fl oz (2,4) Bravo® 6F 1.5 pts (1,3,5,6)	15.0 b	0.0 b	4,129 a	$770 a
DPX-LEM17 1.67F 24 fl oz (2,4) Bravo® 6F 1.5 pts (1,3,5,6)	7.7 cd	0.0 b	4,075 a	$760 a
DPX-YT669 2.08F 18.3 fl oz (2,4) Bravo® 6F 1.5 pts (1,3,5,6)	12.9 bc	0.0 b	4,129 a	$770 a
DPX-Q8Y78 240F 24 fl oz (2,4) Tilt®/Bravo® 4.3 SE 1.5 pts (1,3,5,6)	8.5 cd	0.0 b	4,093 a	$763 a
Abound® 2.08F 18.5 fl oz (2,4) Tilt®/Bravo® 4.3 SE 1.5 pts (1,3,5,6)	5.9 d	0.0 b	3,984 a	$743 a
Abound® 2.08F 12.3 fl oz (2,4)	7.5 cd	0.0 b	4,519 a	$842 a
LSD (P=0.05)[4]	6.3	4.8	NS	NS

[1] Numbers 1 to 6 correspond to the spray dates of 1=July 9, 2=July 23, 3=Aug. 3, 4=Aug. 20, 5=Sept. 3, and 6=Sept. 17.
[2] Loan rate value based on an average grade of 77 percent TSMK (total sound mature kernels).
[3] Values in a column followed by the same letter are not statistically different according to Fisher's least significant difference test.
[4] LSD=least significant difference; NS=treatment effect not significant at P=0.05.

Early season conditions favored rapid seedling emergence. As a result, Proline® applied in-furrow did not improve plant stand (2.7 plants/ft) compared to the untreated check (2.6 plants/ft). Early leaf spot appeared in early September and increased to moderate levels in the untreated check. Web blotch appeared during late September when leaf spot had already caused defoliation in the untreated check. All fungicide programs gave a high level of leaf spot control. The full-season Bravo® program, Topguard™ at 28 fl oz/A, and Provost® were the only treatments that reduced web blotch compared to the untreated check. While there were trends for increased yield and crop value for the fungicide treatments, the treatment effect was not statistically significant (P=0.07).

Evaluation of fungicides 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

Table 5. Effect of fungicides on control of foliar diseases on Spanish-type peanuts (Tamspan 90) at the Caddo Research Station, Ft. Cobb, 2009.

Treatment and rate/A (timing)[1]	Early leaf spot (%)	Web blotch (%)	Defoliation (%)	Yield (lbs/A)	Value ($/A)[2]
Check	90.0 a[3]	20.0 b	70.0 a	3,557 a	$580 a
Bravo® 6F 1.5 pts (1-6)	2.5 cd	8.0 d	0.0 b	4,240 a	$692 a
Bravo® 6F 1.5 pts (1,6) Topguard™ 1.04F 7 fl oz (2-5)	5.8 b	38.7 a	0.0 b	3,724 a	$608 a
Bravo® 6F 1.5 pts (1,6) Topguard™ 1.04F 10 fl oz (2-5)	0.8 de	22.5 b	0.0 b	3,855 a	$629 a
Bravo® 6F 1.5 pts (1,6) Topguard™ 1.04F 14 fl oz (2-5)	0.1 e	25.0 b	0.0 b	3,855 a	$629 a
Bravo® 6F 1.5 pts (1,6) Topguard™ 1.04F 28 fl oz (2-5)	0.2 de	10.0 cd	0.0 b	3,623 a	$591 a
Bravo® 6F 1.5 pts (1,6) Bravo® 6F 1.0 pt + Topguard™ 1.04F 28 fl oz (2-5)	1.4 de	10.0 cd	0.0 b	3,782 a	$617 a
Bravo® 6F 1.5 pts (1,6) Folicur® 3.6F 7.2 fl oz (2-5)	3.8 bc	17.5 bc	0.0 b	3,891 a	$635 a
Proline® 4F 5.7 fl oz (IF) Bravo® 6F 1.5 pts (1,6) Provost® 3.6F 8 fl oz (2-5)	0.4 de	4.7 d	0.0 b	3,920 a	$640 a
Bravo® 6F 1.5 pts (1,6) Provost® 3.6F 8 fl oz (2-5)	0.5 de	2.5 d	0.0 b	4,116 a	$672 a
LSD (P=0.05)[4]	2.3	8.2	2.2	NS	NS

[1] Numbers 1 to 6 correspond to the calendar-based spray dates of 1=July 2, 2=July 16, 3=July 31, 4=Aug. 13, 5=Aug. 28, and 6=Sept. 10.
[2] Loan rate value based on an average grade of 66 percent TSMK (total sound mature kernels).
[3] Values in a column followed by the same letter are not statistically different according to Fisher's least significant difference test.
[4] LSD=least significant difference; NS=treatment effect not significant at P=0.05.

applied according to the weather-based advisory program (http://agweather.mesonet.org). Experimental fungicides evaluated as full-season programs with Bravo® were DPX-LEM17, DPX-YT669 and DPX-Q8Y78. Elast® (dodine) and Eminent® (tetraconazole + chlorothalonil) were evaluated in alternation with Bravo® as new fungicides registered on peanuts. Eminent® and Headline® were applied full-season or according to the AgWeather Mesonet Peanut Leaf Spot Advisor. A Headline® treatment also was applied in a reduced, three-spray calendar program.

Early leaf spot appeared in early September and increased to cause more than 60 percent defoliation in the untreated check. All fungicide programs reduced leaf spot compared to the untreated check. Full-season, 14-day programs with Bravo®, Bravo®/Headline® and Eminent®; and the advisory program with Headline®/Tilt®/Bravo® gave the best leaf spot control. Web blotch

appeared during late September after the last fungicide applications, and when leaf spot had already caused defoliation in the untreated check. Full-season, 14-day programs with DX-Q8Y78 and Bravo®/Headline® were the only programs that reduced web blotch compared to the untreated check. Reduced spray programs applied according to the AgWeather Mesonet Peanut Leaf Spot Advisor (Headline®-Tilt®/Bravo® and Eminent®) and the calendar (Headline®-Tilt®/Bravo®) generally performed as well as respective full-season calendar programs. Yield responses were only significant for treatments receiving Headline®. Eminent® provided good leaf spot control, but Elast® appeared less effective than Bravo®.

Evaluation of fungicides and reduced fungicide programs on runner-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

Table 6. Effect of fungicides and reduced fungicide programs on control of foliar diseases on Spanish-type peanuts (Tamspan 90) at the Caddo Research Station, Ft. Cobb, 2009.

Treatment and rate/A (timing)[1]	Early leaf spot (%)	Web blotch (%)	Defoliation (%)	Yield (lbs/A)	Value ($/A)[2]
Check	90.8 a[3]	25.0 bc	66.6 a	3,768 c	$630 c
Bravo® 6F 1.5 pts (1-6)	5.8 ef	15.5 cd	0.0 d	3,855 bc	$645 bc
Bravo® 6F 1.5 pts (1,3,5) Headline® 2.08F 6 fl oz (2,4,6)	2.6 f	11.2 de	0.8 cd	4,283 ab	$717 ab
Bravo® 6F 1.5 pts (1,3,5,6) DPX-YT669 2.08F 18.3 fl oz (2,4)	8.6 de	14.2 cd	1.2 cd	3,819 c	$639 c
Bravo® 6F 1.5 pts (1,3,5,6) DPX-Q8Y78 240SC 24 fl oz (2,4)	10.4 cde	2.7 e	0.0 d	4,051 abc	$678 abc
Bravo® 6F 1.5 pts (1,3,5) Elast® 400F 15 fl oz (2,4,6)	15.8 bc	41.2 a	7.9 bc	3,811 c	$638 c
Eminent® 125SL 7.2 fl oz (1-6)	1.6 f	21.2 bcd	1.7 cd	4,087 abc	$684 abc
Eminent® 125SL 7.2 fl oz (A1-A4)	13.2 bcd	26.7 b	7.1 bcd	3,833 c	$641 c
Headline® 2.08E 6 fl oz (3,5) Tilt®/Bravo® 4.3SE 1.5 pts (4)	18.7 b	30.0 b	13.3 b	4,334 a	$725 a
Headline® 2.08E 6 fl oz (A1, A3) Tilt®/Bravo® 4.3SE 1.5 pts (A2, A4)	6.0 ef	20.5 bcd	7.1 bcd	4,378 a	$732 a
LSD (P=0.05)[4]	5.6	11.2	7.8	439	73

[1] Numbers 1 to 6 correspond to the calendar-based spray dates of 1=July 2, 2=July 16, 3=July 31, 4=Aug. 13, 5=Aug. 28, and 6=10 Sept. A1 to A4 correspond to the advisory based spray dates of A1=July 2, A2=July 31, A3=Aug. 13, and A4=Aug. 28.

[2] Loan rate value based on an average grade of 68 percent TSMK (total sound mature kernels).

[3] Values in a column followed by the same letter are not statistically different according to Fisher's least significant difference test.

[4] LSD=Least significant difference.

achieved by making applications when recommended by the weather-based, AgWeather Mesonet Peanut Leaf Spot Advisor (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®, Elast®, Eminent® and Tilt®/Bravo®) and experimental (Topguard™) fungicides.

Weather conditions favored leaf spot development since the advisory program recommended four fungicide applications. However, leaf spot did not appear until early September. The field had been rotated away from peanuts in 2008, which may explain the low leaf spot pressure at this site. All of the fungicide programs provided excellent leaf spot control compared to the untreated check (Table 7). Soilborne diseases did not develop at this site. Pressure from leaf spot was not sufficient to affect yield. As a result, yields and grades were high and yields and crop values did not differ among treatments.

Table 7. Effect of fungicides and reduced fungicide programs on control of early leaf spot on runner-type peanuts (Tamrun OL07) at the Silk Farm, Sayre, 2009.

Treatment and rate/A (timing)[1]	Early leaf spot (%)	Defoliation (%)	Yield (lbs/A)	Value ($/A)[2]
Check	61.7 a[3]	35.0 a	4,093 a	$763 a
Bravo® 720 1.5 pts (1-6)	5.2 c	0.0 a	4,238 a	$790 a
Bravo® 6F 1.5 pts (1,3,5) Headline® 2.08E 6 fl oz (2,4,6)	3.9 c	0.0 b	4,964 a	$925 a
Bravo® 6F 1.5 pts (1,6) Topguard™ 1.04F 14 fl oz (2-5)	3.9 c	0.0 b	4,565 a	$851 a
Bravo® 6F 1.5 pts (1,6) Topguard™ 1.04F 21 fl oz (2-5)	2.1 c	0.0 b	4,474 a	$834 a
Bravo® 6F 1.5 pts (1,3,5) Elast® 400F 15 fl oz (2,4,6)	3.2 c	0.0 b	4,601 a	$858 a
Eminent® 125SL 7.2 fl oz (1-6)	5.4 c	0.0 b	4,020 a	$749 a
Eminent® 125SL 7.2 fl oz (A1-A4)	6.2 c	0.0 b	4,229 a	$788 a
Headline® 2.08E 6 fl oz (3,5) Tilt®/Bravo® 4.3SE 1.5 pts (4)	12.1 b	0.0 b	4,429 a	$826 a
Headline® 2.08E 6 fl oz (A1,A3) Tilt®/Bravo® 4.3SE 1.5 pts (A2,A4)	7.6 bc	0.0 b	4,492 a	$837 a
LSD (*P*=0.05)[4]	5.6	NS	NS	NS

[1] Numbers 1 to 6 correspond to the calendar spray dates of 1=July 9, 2=July 23, 3=Aug. 3, 4=Aug. 20, 5=Sept. 3, and 6=Sept. 17. A1 to A4 correspond to spray dates for the AgWeather Mesonet Peanut Leaf Spot Advisor of A1=July 9, A2=Sept. 30, A3=Aug. 20, and A4=Sept. 17.

[2] Loan rate value based on an average grade of 77 percent TSMK (total sound mature kernels).

[3] Values in a column followed by the same letter are not statistically different according to Fisher's least significant difference test.

[4] LSD=Least significant difference, NS=treatment effect not significant at *P*=0.05.

Double-Crop Trial

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2009 progress made possible through OPC and NPB support

- At these given yields, peanut appears to have just as good profit potential as any of the other crops, perhaps better.
- Soybeans indicate a high potential because of the high commodity price.
- Of the four peanut varieties evaluated, Tamspan 90 and ARSOK-R1, provided the best profit potential. Even though ARSOK-R1 is a runner variety yield and grade were high.

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 and evaluate the profitability of peanuts compared to other potential double crops.

Methods

In 2009, one location at Ft. Cobb was conducted to determine yield and grade of commercially available peanut varieties. Spanish and runner peanut varieties were included. Also included were sunflower, grain sorghum and soybean. Peanut plots were seeded at a rate of five seeds/row foot June 23, 2009. Table 1 contains other treatment information. Tests were conducted using a randomized, complete block design with four replications.

Interpreting Data

Least significant differences (LSD) are listed at the bottom of the 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 it is 95 percent sure the yield difference is real, with only a 5 percent 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 it is less likely that variety X really is higher yielding than variety Y, under the conditions of the test.

The coefficient of variation (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 2009, no significant differences were observed in yield among any of the market types (Table 2). Yields were considered average given the planting date of June 23 and the cooler-than-normal fall temperatures. Grades were extremely low and probably a result of the cool temperatures. No fungicides were applied because leaf spot was not observed to an extent that warranted treatment. Peanuts were managed with minimum inputs.

Yields for the other crops are listed in

Table 1. Crops and variety/hybrid planted, Ft. Cobb, 2009.

Crop	Variety	Seed Spacing (in)	Herbicide
Peanut			
	Tamspan 90		
	ARSOK-R1	2.5	Prowl® and Dual Magnum 2 pts/A and 1.3 pts/A
	AT 98-99-14	2.5	Prowl® and Dual Magnum 2 pts/A and 1.3 pts/A
	Tamnut OL06	2.5	Prowl® and Dual Magnum 2 pts/A and 1.3 pts/A
Grain Sorghum			
	NK3688	3.5	Cinch® ATZ Lite 2 pts/A
Soybean			
	Midwest 5651R	1.8	Glyphosate
Sunflower			
	Triumphs 672	8.4	Spartan® and Prowl® 4 oz/A and 2 pts/A

Table 2. Yields for sunflower, grain sorghum and soybean are all below average, and one could expect equal or greater yields in most years. Table 2 also indicates crop revenue minus seed, pesticide and fertilizer for each crop. Equipment, labor and land costs would be similar for all of the crops. At these given yields, peanut appears to have just as good profit potential as any of the other crops, perhaps better. Soybeans indicate a high potential because of the high commodity price. Of the four peanut varieties evaluated, Tamspan 90 and ARSOK-R1 provided the best profit potential. Even though ARSOK-R1 is a runner variety, yield and grade were high.

Double-crop planted peanuts (late June) appear to offer just as much profit potential as other possible crops. Reduced inputs, especially fungicides and herbicides, greatly increase the profit potential of a peanut crop planted in late June.

Table 2. Crop, input costs and yields at Ft. Cobb for the double-crop trial, 2009.

Crop	Variety/Hybrid	Seeding Cost	Herbicide	Pesticide	Price of Commodity	Grade (%TSMK)	Yield	Crop Return ($/A)†
			$/A				lbs/A	
Peanut								
	AT 98-99-14	$65	$25	$15	$267/ton	55	2,913	$284
	Tamnut 06	$65	$25	$15	$273/ton	55	2,877	$288
	Tamspan 90	$65	$25	$15	$289/ton	52	3,500	$401
	ARSOK-R1	$65	$25	$15	$254/ton	58	4,084	$422
Sunflower								
	Triumph s672	$23	$20	$40	$0.13/lbs		1,385	$97
Grain Sorghum								
	NK3688	$7.50	$18	$40	$3.75/bu		39	$81
Soybean								
	Midwest 5651R	$45	$16	$0	$9.50/bu		46	$376
	CV					24‡		
	LSD *P*=0.05					NS		

† Crop Revenue minus seed, pesticide and fertilizer.
‡ CV and LSD for peanut varieties only.

Pre-Emergence Weed Control Evaluation

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2009 progress made possible through OPC and NPB support

- Significant injury was observed with Spartan® and Balance® Flexx at the listed application rates.
- Prowl® H_2O and Parallel® (metalachlor) only gave 69 percent control, whereas, the inclusion of Valor® to this mix provided 96 percent control.

Introduction

Continued weed pressure in Oklahoma peanut production systems has reduced yields and acres of peanuts grown. Evaluating any potential new products is necessary to find new weed management options.

Methods

Plots were planted May 27 to Tamspan 90 at a seeding rate of four seeds/row foot. Treatments were applied immediately after planting. Plots were 12 feet wide and 30 feet in length. Treatments applied are listed in Table 1. Weed counts and crop injury ratings were taken 20 days after treatment application. Spartan® (active ingredient: sulfentrazone) and Balance® Flexx (isoxaflutole + safener) are not labeled for use on peanut but were included because they have been observed to be effective on the pigweed species. Plots were not taken to yield and were terminated after early season weed ratings.

Table 1. Pre-emergence herbicide treatments and weed control observations made 20 days after application.

Treatments	Product	Rate	Control (%)	Injury	Cost ($/A)
1	Prowl® H_2O	3 pts/A	70	0	$14.70
2	Parallel®	1.3 pts/A	65	3	$7.50
3	Prowl® H_2O + Parallel®	1.5 pts/A + 0.85 pt/A	69	1	$12.13
4	Spartan®	3 oz/A	96	15	$12.80
5	Prowl® H_2O + Spartan®	1.5 oz/A + 3 oz/A	97	11	$20.00
6	Balance® Flexx + Prowl® H_2O	3 oz/A + 1.5 oz/A	83	16	NA
7	Valor®	2 oz/A	86	1	$7.28
8	Prow® H_2O + Valor®	1.5 pts/A + 2 oz/A	88	1	$14.63
9	Prowl® H_2O + Dual Magnum® + Valor®	1.5 pts/A + 1.33 pts/A + 2 oz/A	96	1	$33.50
10	Untreated		0	0	
	LSD P=0.05		29	4	

Results

Results for weed control and crop injury are given in Table 1. On the day of weed control ratings, morningglory and pigweed species were the most prevalent weeds in the control plots. Significant injury was observed with Spartan® and Balance® Flexx at the listed application rates. Prowl® H_2O and Parallel® (metalachlor) only gave 69 percent control, whereas the inclusion of Valor® to this mix provided 96 percent control.

Peanut Variety Tests

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2009 progress made possible through OPC and NPB support

- ARSOK-R1 was consistently in the higher yield group and in 2010 it continues to out grade all other runner varieties.
- Tamnut 06 and AT 98-99-14 were consistent performers in the Spanish trial. AT 98-99-14 has runner growth habit but is often graded as a Spanish.
- No consistent differences were observed between the Virginia varieties.

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 separated 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 five 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 percent. Total sound mature kernels (TSMK) was determined on a 200 g sample from each plot.

Overview of the 2009 Production Year

Weather conditions were variable in 2009. Above normal rainfall in May delayed planting in some areas. In June, hot and dry weather developed in most of the peanut growing areas. Starting in late July through harvest, temperatures statewide were below normal (30-year average). Disease pressure was low early in the growing season. However, with cooler temperatures in late July and late August, leaf spot and Sclerotinia blight started to appear. Harvest was delayed in many areas due to wet field conditions and slow maturing peanuts. If disease control was adequate, yields were above average. Cool temperatures in the fall delayed peanut maturity resulting in below average grades in some areas.

Interpreting data

Details of establishment and management of each test are listed in footnotes below the tables. Least significant differences (LSD) are listed at the bottom of all but 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 it is 95 percent sure the yield difference is real, with only a 5 percent 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 it is less likely that variety X really is higher yielding than variety Y under the conditions of the test.

The coefficient of variation (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. The trial was planted May 18. No significant foliar diseases were observed during the growing season. The only yield limiting disease that was observed in the plots was pod rot. Pod rot was most severe in the Virginia varieties.

Average yield for the runner test was 4,425 lbs/A with an average grade of 76 percent (Table 1). No significant differences were observed among the runner varieties. Grades of ARSOK-R1 and FlavorRunner 458 were significantly higher than grades from Tamrun OL02 and Tamrun OL07.

Average yield and grade for the Spanish test was 3,815 lbs/A and 73 percent TSMK, respectively. In the Spanish test ARSOK-S1, Tamnut OL06, and AT 98-99-14 were the top yield performers. 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 and it is high oleic.

Average yield and grade in the Virginia test was 4,026 lbs/A and 72 percent TSMK, respectively. All three varieties have been consistent performers during the last three years.

Caddo County

Overall, growing conditions were good during the season at Ft. Cobb. This location suffered the most from the below normal temperatures in October. This is evident from the below average grades of all varieties. Average yield for the runner test was 3,582 lbs/A with an average grade of 63 percent TSMK (Table 2). ARSOK-R1 was the top performing variety in both yield and grade.

Average yield and grade for the Spanish test was 3,140 lbs/A and 64 percent TSMK, respectively.

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, pod rot observations and grades from Beckham County variety tests, 2009.

Variety or line	Pod Rot (%)	Yield (lbs/A)	Grade (% TSMK)[2]
		- - - - 2009 - - - -	
Runner[1]			
Tamrun OL02	<1	4,657	73.9
ARSOK-R1	0	4,461	78.2
FlavorRunner 458	0	4,352	76.3
Tamrun OL07	1	4,229	74.0
CV		6.3	1.8
LSD *P*=0.05	NS[3]	NS	1.5
Spanish[1]			
AT 98-99-14	1	4,320	73.4
ARSOK-S1	0	4,138	71.9
Tamnut OL06	0	3,939	70.6
Spanco	0	3,684	74.3
Tamspan 90	0	3,576	72.2
OLin	0	3,530	72.1
Pronto	0	3,521	75.6
CV		10.0	4.1
LSD *P*=0.05	1	502	1.4
Virginia[1]			
Brantley	2.5	4,068	74.2
Jupiter	3.8	4,034	70.8
Gregory	3.3	3,975	70.3
CV		9.0	6.3
LSD *P*=0.05	NS	NS	NS

[1] Market type.
[2] % TSMK = Percent total sound mature kernels.
[3] NS=treatment effect not significant at *P*=0.05.

Average yield and grade in the Virginia test was 3,457 lbs/A and 64 percent TSMK, respectively.

Custer County

This was the second year for a test location in Hydro. Good growing conditions were observed throughout the growing season. Early season precipitation was above normal, which delayed planting in some cases. The trial was planted May 18 and dug Oct. 20. Yields were excellent at this location. However, grades were low due to a cool September, which slowed maturity. Average yield for the runner test was 6,485 lbs/A with an average grade of 69 percent TSMK (Table 3). Tamrun OL07 performed very well at this location, but grade was lower than some other varieties. ARSOK-R1 had a significantly higher percent of TSMK compared to all other runner varieites.

Yields for the Spanish varieties were excellent, approaching yields for the runner varieties. Average yield and grade for the Spanish test was 6,464 lbs/A and 68 percent TSMK, respectively. The highest

Table 2. Peanut yields and grades from Caddo County variety tests, 2009.

Variety or line	Yield (lbs/A)	Grade (% TSMK)[2]
	- - - - 2009 - - - -	
Runner[1]		
ARSOK-R1	4,068	65.2
Tamrun OL02	3,717	60.7
Tamrun OL07	3,480	61.4
FlavorRunner 458	3,063	63.2
CV	15.8	5.3
LSD *P*=0.05	779	ns[3]
Spanish[1]		
Spanco	3,467	64.7
ARSOK-S1	3,354	64.0
OLin	3,118	65.2
Pronto	3,093	59.6
AT 98-99-14	3,006	65.8
Tamspan 90	3,002	63.3
Tamnut OL06	2,937	63.8
CV	10.1	11.2
LSD *P*=0.05	414	NS
Virginia[1]		
Gregory	3542	63.3
Jupiter	3536	63.2
Brantley	3292	64.1
CV	9.7	3.2
LSD *P*=0.05	NS	NS

[1] Market type.
[2] % TSMK = Percent total sound mature kernels.
[3] NS=treatment effect not significant at *P*=0.05.

yielding varieties at this location were AT 98-99-14 and ARSOK-S1. The variety AT 98-99-14 has a runner growth habit but is typically graded as a Spanish.

Average yield and grade in the Virginia test was 6,710 lbs/A and 67 percent TSMK, respectively. Brantley was the Virginia variety that performed best at this location.

Table 3. Peanut yields, pod rot observations and grades, Custer County variety tests, 2009.

Variety or line	Pod Rot (%)	Yield (lbs/A)	Grade (% TSMK)[2]
		- - - - 2009 - - - -	
Runner[1]			
Tamrun OL07	3.8	6,716	68.2
Tamrun OL02	2.9	6,559	68.9
ARSOK-R1	5.4	6,530	72.4
FlavorRunner 458	9.2	6,135	66.0
CV		8.2	3.9
LSD *P*=0.05	NS[3]	735	3.8
Spanish[1]			
AT 98-99-14	2.1	7,743	70.3
ARSOK-S1	0	7,106	68.4
Tamnut 06	0.4	6,312	67.5
OLin	1.7	6,248	69.9
Spanco	0.4	6,240	65.8
Pronto	0.4	6,047	68.5
Tamspan 90	0.4	5,550	68.0
CV		11.6	4.1
LSD *P*=0.05	1.4	976	NS[3]
Virginia[1]			
Brantley	6.3	7,050	66.4
Jupiter	7.9	6,636	65.9
Gregory	10.4	6,443	67.5
CV		4.4	2.6
LSD *P*=0.05	NS	435	NS

[1] Market type.
[2] % TSMK = Percent total sound mature kernels.
[3] NS=treatment effect not significant at *P*=0.05.

Long-term Averages

When making variety selection it is always important to consider more than one year of data. This is especially true for peanut varieties due to the year to year variability we observe in our climate. Tables 4, 5 and 6 contain multi years of data. Variety comparisons are easier when performed over multiple years.

Beckham County

During the last four-year period Tamrun 96, Tamrun OL07 and ARSOK-R1 have performed the best out of the runner varieties tested. Tamrun 96 is no longer offered and ARSOK-R1 has not yet been released. Grades for ARSOK-R1 has consistently been the best compared to all other varieties.

The Spanish varieties that have performed the best during the past four years have been Tamnut 06, AT 98-99-14, ARSOK-S1 and Spanco. Grades among these top performers have been similar.

All Virginia varieties tested have performed similar.

Caddo County

During the last four-year period in Caddo County, ARSOK-R1 has performed the best out of the runner varieties tested. ARSOK-R1 has not yet been released. Grades for ARSOK-R1 have consistently been better compared to all other varieties.

The Spanish varieties that have performed the best during the past four years have been Spanco, AT 98-99-14 and ARSOK-S1. Grades among these top performers have been similar.

All Virginia varieties tested have performed similar.

Custer County

Over the last two-year period in Custer County, Tamrun OL07 has performed the best out of the runner varieties tested. Grades for ARSOK-R1 has consistently been better compared to all other varieties.

The Spanish varieties that have performed the best during the past four years have been AT 98-99-14 and ARSOK-S1. Grades among these top performers have been similar.

Among the Virginia varieties, Jupiter appears to have a slight yield advantage over the other Virginia varieties.

Table 4. Peanut yields and grades, Beckham County variety tests, 2006 to 2009 and a 4-year-average.

Variety or line	Yield (lbs/A)	Grade (% TSMK)[2]	Yield (lbs/A)	Grade (% TSMK)	Yield (lbs/A)	Grade (% TSMK)	Yield (lbs/A)	Grade (% TSMK)	Yield (lbs/A)	Grade (% TSMK)
	2006		2007		2008		2009		4-year Avg	
Runner[1]										
Tamrun 96	5,250	71	5,041	74	6,331	76	NA[3]	NA[3]	5,541	74
Tamrun OL07	NA[3]	NA[3]	5,838	74	5,710	76	4,229	74.0	5,259	75
ARSOK-R1	5,273	75	5,229	77	5,928	79	4,461	78.2	5,223	77
SW Runner	4,238	69	4,473	74	5,899	74	NA[3]	NA[3]	4,870	72
Tamrun OL02	5,322	68	3,147	71	5,463	74	4,657	73.9	4,647	72
FlavorRunner 458	NA[3]	NA[3]	4,443	74	5,107	78	4,352	76.3	4,634	76
LSD *P*=0.05	417	4	1,825	2	781	3	NS[4]	1.5		
Spanish[1]										
Tamnut 06	NA[3]	NA[3]	4,029	73	5,961	71	3,939	70.6	4,643	72
AT 98-99-14	3,843	71	4,000	75	6,141	73	4,320	73.4	4,576	73
ARSOK-S1	3,421	69	4,046	74	5,619	73	4,138	71.9	4,306	72
Spanco	3,930	72	3,740	76	5,616	69	3,684	74.3	4,243	73
GA 04S	3,639	65	3,766	71	5,147	65	NA[3]	NA[3]	4,184	67
Tamspan 90	3,526	70	3,323	74	5,140	72	3,576	72.2	3,891	72
OLin	3,612	69	2,998	74	4,828	71	3,530	72.1	3,742	71
Pronto	3,326	72	2,886	77	4,672	73	3,521	75.6	3,601	74
LSD *P*=0.05	416	NS[4]	577	2	502	2	502	1.4		
Virginia[1]										
Perry	4,102	72	4,740	72	5,514	78	NA[3]	NA[3]	4,785	74
Gregory	NA[3]	NA[3]	4,866	69	5,173	70	3,975	70.3	4,671	70
Jupiter	4,147	73	4,409	73	5,470	69	4,034	70.8	4,515	72
Brantley	4,456	72	4,433	72	4,599	71	4,068	74.2	4,389	72
LSD *P*=0.05	NS[4]	NS[4]	NS[4]	1	NS[4]	NS[4]	NS[4]	NS[4]		

1 Market type.
2 % TSMK = Percent total sound mature kernels.
3 Data was not available because variety was not included in the trial.
4 NS=treatment effect not significant at *P*=0.05.

Table 5. Peanut yields and grades, Caddo County variety tests, 2006 to 2009 and a 4-year-average.

Variety or line	Yield (lbs/A) 2006	Grade (% TSMK)[2] 2006	Yield (lbs/A) 2007	Grade (% TSMK) 2007	Yield (lbs/A) 2008	Grade (% TSMK) 2008	Yield (lbs/A) 2009	Grade (% TSMK) 2009	Yield (lbs/A) 4-year Avg	Grade (% TSMK) 4-year Avg
Runner[1]										
ARSOK-R1	4,737	69	2,831	72	3,764	74	4,068	65.2	3,850	70
Tamrun 96	4,125	70	2,600	68	3,757	68	NA[3]	NA[3]	3,494	69
SW Runner	4,097	67	2,355	70	3,812	71	NA[3]	NA[3]	3,421	69
Tamrun OL02	4,283	67	2,323	68	3,311	68	3,717	60.7	3,409	66
Tamrun OL07	NA[3]	NA[3]	2,278	68	3,416	68	3,480	61.4	3,058	66
FlavorRunner 458	NA[3]	NA[3]	2,355	69	2,882	69	3,063	63.2	2,767	67
LSD *P*=0.05	406	3	374	2	352	3	779	NS[4]		
Spanish[1]										
Spanco	3,979	67	2,314	70	3,539	67	3,467	64.7	3,325	67
AT 98-99-14	4,061	63	2,804	70	3,224	65	3,006	65.8	3,274	66
ARSOK-S1	3,771	66	2,350	68	3,420	69	3,354	64.0	3,224	67
Tamspan 90	3,889	66	1,938	65	3,278	67	3,002	63.3	3,027	65
OLin	3,802	66	1,593	68	3,325	70	3,118	65.2	2,959	67
Tamnut 06	NA[3]	NA[3]	2,246	64	3,608	69	2,937	63.8	2,930	66
Pronto	3,653	67	1,788	72	3,184	66	3,093	59.6	2,929	66
GA 04S	4,007	64	1,661	63	2,556	62	NA[3]	NA[3]	2,741	63
LSD *P*=0.05	NS[4]	2	521	4	477	3	414	NS[4]		
Virginia[1]										
Perry	4,029	70	2,423	71	3,386	68	NA[3]	NA[3]	3,279	70
Jupiter	4,111	67	1,892	64	3,122	67	3,536	63.2	3,165	65
Brantley	4,057	68	1,974	68	2,820	66	3,292	64.1	3,036	67
Gregory	NA[3]	NA[3]	2,242	65	2,653	68	3,542	63.3	2,812	66
LSD *P*=0.05	NS[4]	1	455	3	NS[4]	NS[4]	NS[4]	NS[4]		

1 Market type.
2 % TSMK = Percent total sound mature kernels.
3 Data was not available because variety was not included in given year.
4 NS=treatment effect not significant at *P*=0.05.

Table 6. Peanut yields and grades, Custer County variety tests, 2008 to 2009 and a 2-year-average.

Variety or line	Yield (lbs/A) 2008	Grade (% TSMK)[2] 2008	Yield (lbs/A) 2009	Grade (% TSMK) 2009	Yield (lbs/A) 2-year Avg	Grade (% TSMK) 2-year Avg
Runner[1]						
Tamrun OL07	7,402	61	6,716	68.2	7,059	65
ARSOK-R1	6,309	65	6,530	72.4	6,420	69
FlavorRunner 458	6,360	66	6,135	66.0	6,248	66
Tamrun OL02	5,340	59	6,559	68.9	5,950	64
LSD *P*=0.05	1,456	4	735	3.8		
Spanish[1]						
AT 98-99-14	5,833	68	7,743	70.3	6,788	69
ARSOK-S1	5,612	68	7,106	68.4	6,359	68
Tamnut 06	5,981	65	6,312	67.5	6,147	66
OLin	5,961	70	6,248	69.9	6,105	70
Spanco	4,879	70	6,240	65.8	5,560	68
Pronto	4,824	71	6,047	68.5	5,436	70
Tamspan 90	5,122	67	5,550	68.0	5,336	68
LSD *P*=0.05	907	2	976	NS[3]		
Virginia[1]						
Jupiter	6,236	63	6,636	65.9	6,436	64
Brantley	5,242	66	7,050	66.4	6,146	66
Gregory	5,485	61	6,443	67.5	5,964	64
LSD *P*=0.05	NS[3]	NS[3]	435	NS[3]		

1 Market type.
2 % TSMK = Percent total sound mature kernels.
3 NS=treatment effect not significant at *P*=0.05.

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

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2009 progress made possible through OPC and NPB support

- 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 have been observed. Yields and grades have been similar since 2004.
- Peanuts yield in 2010 indicate the importance of crop rotation. Rotation with a grass crop 2 out of 3 years provided a significant increase in peanut yield compared to continuous peanut.

Introduction

In 2009, 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 wide by 130 feet long, 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 wide by 50 feet long. 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.

Materials and Methods

All plots were planted to peanut in 2009. An outline of field operations is presented in Table 1.

Arthropod monitoring

Once damage became apparent, thrips populations were monitored on three separate occasions. Ten quadrifoliate leaves were pulled from each plot and placed in 70 percent ethyl alcohol (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.

Table 1. Summary of field operations in 2009.

Date	Description
Land Preparation:	
April 22	Tilled Conventional Plots
May 21	Disc and Triple-K Conventional Plots
May 21	Strip-Tilled/ST Plots
May 21	Planted/Tamrun OL07
Herbicides:	
April 21	Glyphosate at 1 qt
May 22	Prowl® H_20 at 1 qt + Dual Magnum® at 1.33 pts + Glyphosate at 1 qt
June 12	Cobra® at 12.5 oz+ Blazer® at 1.5 pts + Butyrac® 200 at 1 pt + Induce® at 4 oz
June 18	Select® at 10 oz
July 7	Select® at 10 oz
August 13	Outlook® at 20 oz + Cobra® at 12.5 oz + Poast Plus® at 2 pts + Butyrac® 200 at 1.5 pts+Dynamic at 4 oz
Fungicides:	
July 13	Bravo® at 1.5 pts
July 28	Folicur® at 7.2 oz
July 31	Omega® at 1.5 pts
August 13	Headline® at 15 oz
August 31	Omega® at 1.5 pts
September 8	Bravo® at 1.5 pts
Fertilizer:	
May 18	100# 18-46-0
Harvest Information:	
Oct 20	Dug
Oct 27	Thrashed

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 (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 significantly higher number of thrips larvae were found in conventional till plots. The higher larvae population in conventional till plots was observed only in the first sampling date (July 2). The high number of larvae resulted in the total number of thrips being higher in the conventional till plots compared to the no-till plots (Table 2). Over the duration of the study, thrips numbers have been similar in most years between the tillage treatments, but if differences were observed it was often the conventional till plots that had greater thrip populations. Rotation had no effect on the number of thrips (Table 3). In 2009, low numbers of potato leaf hopper, three-cornered alfalfa leaf hopper, wasps, grasshoppers and caterpillars were observed, but no treatment differences were detected (data not shown).

No significant interaction for tillage was detected, so effects were evaluated separately. No significant differences in peanut yields or grades were identified among tillage treatments (Table 4). This follows previous years' data. Tillage does not appear to have an effect on peanut yield or peanut grade after six years. Rotation had a significant effect on peanut yield (Table 5). The use of rotational crops, corn or switchgrass, significantly increased peanut yield compared to a continuous peanut system.

Table 2. Mean number of thrips/10 quadrifoliate leaves as a result of tillage practice.

	Sample Date 1 July 2, 2009			Sample Date 2 July 9, 2009		
Treatment	Larvae	Adult	Total	Larvae	Adult	Total
Strip-Till	5.0 b*	9.0 a	14.0 ab	7.5 a	3.6 a	11.1 a
No-Till	2.2 b	5.9 ab	8.1 b	3.6 a	3.0 a	6.8 a
Conventional Till	9.7 a	5.7 b	15.5 a	6.9 a	3.4 a	10.3 a

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

Table 3. Mean number of thrips/10 quadrifoliate leaves as a result of crop rotation.

Treatment Sub-Samples	Sample Date 1 July 2, 2009			Sample Date 2 July 9, 2009		
	Larvae	Adult	Total	Larvae	Adult	Total
Peanut Only	6.7 a[1]	5.8 b	12.3 a	5.6 a	3.3 a	8.8 a
Peanut/Corn	6.8 a	7.1 ab	13.8 a	6.2 a	2.8 a	9.0 a
Peanut/Switchgrass	3.6 a	8.9 a	12.5 a	6.3 a	4.0 a	10.3 a

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

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. Also, the importance of a good rotation is evident from this study.

Table 4. Effect of tillage on peanut yield and grade from the Long-term tillage study, Ft. Cobb, 2009.

Tillage	Yield (lbs/A)	Grade (% TSMK[1])
No-Till	4,751 a*	57
Strip-Till	4,605 a	58
Conventional Till	5,332 a	61

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

Table 5. Effect of rotation on peanut yield and grade from the Long-term tillage study, Ft. Cobb, 2009.

Rotation	Yield (lbs/A)	Grade (% TSMK[1])
Peanut-Corn-Corn	5,566 a*	58
Peanut-Swithgrass-Swichgrass	5,325 a	64
Continous Peanut	4,308 b	59

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

Summary of Data to Support the Release of ARSOK-R1 as a High Oleic Peanut Cultivar

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2009 progress made possible through OPC and NPB support

- ARSOK-R1 (tested as TX 994313) is a high oleic runner peanut cultivar cooperatively developed by the Agricultural Research Service (ARS) of the United States Department of Agriculture (USDA),Texas AgriLife Research and Extension, and Oklahoma Agricultural Experiment Station.
- ARSOK-R1 grades 3 points to 4 points higher than other high oleic peanut cultivars that are currently grown in Oklahoma.

Breeding and Selection History

- ARSOK-R1 was bred at Texas A&M University by Dr. Olin Smith (deceased). ARSOK-R1 was tested under the experimental designation of TX 994313. Early selections were performed at Texas A&M University.
- ARSOK-R1 was derived from a three-way cross among Tamrun 96, breeding line TX 901639-3 and Sunoleic 95R, the donor of the high O/L genes (O = oleic fatty acid; L = linoleic fatty acid).
- ARSOK-R1 was first tested in Oklahoma in 2002 and was selected for further development based on field plot data that showed its moderate resistance to Sclerotinia blight, and its acceptable resistance to leaf spot as compared with the susceptible Southwest Runner.
- Early bulk seed selection of ARSOK-R1 was accomplished at harvest in 2002 from healthy and Sclerotinia-free plants grown at Ft. Cobb. Seed increase of the selection was performed in 2003 at the Caddo Research Station, Ft. Cobb.
- Advanced line trials in replicated plots with ARSOK-R1 and Tamrun OL02 were conducted in Oklahoma in 2004, 2005 and 2006, where the grade of ARSOK-R1 out performed that of Tamrun OL02.
- ARSOK-R1 was compared to Tamrun OL07 in replicated field plots in Oklahoma and Texas in 2007 and 2008.

Plant Description and Maturity

- Plants of ARSOK-R1 are typically branched runner type peanut and have a similar vine size and color to Tamrun OL07, but with a slightly more open canopy than that of Tamrun OL02 or Tamrun OL07.

- Main stem height of mature plants of ARSOK-R1 was 50.1 cm, which was significantly shorter than that of Tamrun OL07 at 53.4 cm. Leaflet length of ARSOK-R1 averaged 54.4 mm, which was significantly shorter than that of Tamrun OL07 at 57.0 mm. Leaflet width of ARSOK-R1 was 23.9 mm, which was significantly narrower than that of Tamrun OL07 at 22.2 mm.
- ARSOK-R1 plants mature in 145 days to 150 days after planting, which is similar to that of Tamrun OL07, under Oklahoma growing conditions.
- Under Oklahoma growing conditions, pods and seeds of ARSOK-R1 are similar to Tamrun OL07. Pods of ARSOK-R1 are slightly more reticulated than that of Tamrun OL07. Pod constriction of ARSOK-R1 is similar to that of Tamrun OL07.
- Most pods of ARSOK-R1 are two seeded, similar to that of Tamrun OL07. One hundred seed weight of ARSOK-R1 was 65.1 g, while Tamrun OL07 was 64.5 g with a least significant difference (LSD) (P=0.05) of 1.4 g.

Chemical and Roasting Characteristics

- Total fat, fatty acid profile, sugar content, blanching and roasting flavor were determined on bulk kernels of ARSOK-R1, Tamrun OL07 and Okrun from a crop produced at three Oklahoma locations in 2007. These tests were conducted by J. Leek Associates, Inc., Edenton, N.C.
- Total fat content of ARSOK-R1 averaged 47.7 percent (n=6), while the averages for Tamrun OL07 (n=5) and Okrun (n=3) were 46.8 percent and 46.1 percent, respectively.
- Sugar content of ARSOK-R1 averaged 4.7 percent (n=6), while the averages for Tamrun OL07 (n=5) and Okrun (n=3) were 4.7 percent and 3.7 percent, respectively.
- Flavor roasting score of ARSOK-R1 averaged 6.1 percent (n=6), while the averages for Tamrun OL07 (n=5) and Okrun (n=3) were 6.0 percent and 6.1 percent, respectively.
- The O/L ratio of ARSOK-R1 averaged 21.8 (n=6), while the averages for Tamrun OL07 (n=5) and Okrun (n=3) were 22.3 and 1.4, respectively.

Yield, Grade and Crop Value

- ARSOK-R1 and Tamrun OL07 have been tested for yield and grade in Oklahoma and Texas in 2007 and 2008.
- For statistical analysis, mean yield or mean grade of ARSOK-R1 or Tamrun OL07 by year and location were considered as the response variables. Data were subjected to standard analysis of variance to assess the effect of entry on these variables. Location served as the random factor providing the replication. Since the experiment variation is not utilized in this analysis, the possibility of heterogeneous variances was not a concern.
- In 16 Oklahoma trials, a 2-year span yield of ARSOK-R1 ranged from 2,545 lbs/A to 6,309 lbs/A, with a mean of 4,155 lbs/A, whereas yield of Tamrun OL07 ranged from 2,278 lbs/A to 7,402 lbs/A, with a mean of 3,998 lbs/A. Yield difference between ARSOK-R1 and Tamrun OL07 in Oklahoma was not statistically significant at P=0.05.
- In 32 trials in Texas, 2-year span yield of ARSOK-R1 ranged from 1,710 lbs/A to 6,584 lbs/A, with a mean of 4,857 lbs/A, whereas yield of Tamrun OL07 ranged from 3,153 lbs/A to 7,437 lbs/A, with a mean of 5,187 lbs/A. Yield difference between ARSOK-R1 and Tamrun OL07 was statistically significant at P= 0.05 with a least significant value of 277.
- In Oklahoma trials, grade of ARSOK-R1 ranged from 65 to 79, with a mean of 72.6, whereas grade of Tamrun OL07 ranged from 61 to 76, with a mean of

68.3. Grade difference of ARSOK-R1 and Tamrun OL07 was significant at P=0.05 with a least significant difference of 1.2. In 83 percent of trials in Oklahoma, ARSOK-R1 statistically at P=0.05 out graded Tamrun OL07.

- In Texas trials, grade of ARSOK-R1 ranged from 68 to 79, with a mean of 75.2, whereas grade of Tamrun OL07 ranged from 67 to 78, with a mean of 72.7. Grade difference of ARSOK-R1 and Tamrun OL07 was significant at P=0.05 with a least significant difference of 0.9. In 57 percent of trials in Texas, ARSOK-R1 statistically at P=0.05 out graded Tamrun OL07.
- In Oklahoma, crop value in dollars per acre was calculated based on the loan rate in 2008. Mean crop values for ARSOK-R1 and Tamrun OL07 were $730 and $661, respectively. In Texas, mean crop value in dollars per acre for ARSOK-R1 was $884 and $912 for Tamrun OL07. Yield and grade data from the Texas trials in 2007 and 2008 were also analyzed by region (i.e west, south and central). In all regions in Texas, ARSOK-R1 had a significantly (P=0.05) higher grade than Tamrun OL07.

Sclerotinia Blight

- Sclerotinia blight evaluations of ARSOK-R1 were performed in Oklahoma in 2007 and 2008 at Ft. Cobb in a field having a history of Sclerotinia blight.
- ARSOK-R1, Tamrun OL07 and Tamrun 96 had a significantly lower incidence of Sclerotinia blight as compared with the susceptible Okrun.

Shelling Properties

- Comparison of the relative shelling properties of ARSOK-R1, Tamrun OL07, Tamrun OL02, Tamrun 96 and Okrun indicated that ARSOK-R1 produced a significantly (P=0.05) higher percentage of 21/64 (jumbo) kernels than Tamrun OL07.
- ARSOK-R1 also had a significantly (P=0.05) lower percentage of other kernels (smaller) than Tamrun OL07.
- No significant difference between ARSOK-R1 and Tamrun OL07 was found with the 16/64 and 18/64 kernel categories.

Acknowledgments

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Partners in Progress
PEANUTS

Low-Input Peanut Production Systems and Variety Evaluation

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Introduction

The increased desire for the U.S. to gain energy independence has created a need for biofuel feedstock production. Peanut is a crop that has potential as a biofuel but must be grown with lower input costs. Research has indicated that about 120 gals/A of biodiesel could be produced from using peanut as a feedstock. To make this economical, input cost would have to likely be below $200/A. Economic estimates have been made that indicate a 50/50 blend with number 2 diesels would put the cost of the blended diesel at $1.60/gal (assuming at least a $0.50 subsidy). With this said, peanut growers do not want to devalue their crop, but producing on-farm peanut biodiesel may be a viable way to reduce on-farm fuel costs.

Objectives will be to 1) evaluate commercially available varieties in a low-input system, 2) compare yields in the low-input systems and traditional-input systems, and 3) compare the economics of the two production systems.

Methods

Two field locations (dryland and irrigated) were established at the Caddo County Research Station in 2008. An attempt was made in the low-input system to keep input costs to $175/A. Inputs were in the $200/A to $225/A range for the irrigated plots, since we could not limit irrigation based on plot location. A total of 9 inches of irrigation water was applied during the growing season, thus driving our input cost above the $175/A target. A total of 12.7 inches of precipitation was received during the growing season.

Table 1. Summary of field operations and pesticide applications.

Strip-till	May 12
Planted	May 12

Herbicide/Fungicide

Product	Rate/A	Application Date
Glyphosate	1 qt	April 18
Prowl® H_2O	1 qt	May 14
Glyphosate	1 qt	May 14
Poast Plus®	1.5 pts	June 15
Butyrac® 200	1 pt	June 15
Bravo®	1.5 pts	July 4
Bravo®	1.5 pts	Aug. 25

The experimental design was a randomized, complete block design. Varieties included in the study are listed in Table 2. Plots were strip-tilled seven days prior to planting on May 14, 2008. Plots were planted in rows spaced at 36 inches at 4.8 seeds/ft of row.

Results

Peanut yields for the irrigated low-input test averaged 3,209 lbs/A when averaged across varieties. ARSOK-R1 performed as well as Tamrun 96 and

Table 2. Peanut yields and grades for the irrigated low-input variety trial, Caddo County, 2008.

Variety	Market Type	Yield (lbs/A)	TSMK[1] (%)
Tamrun 96	Runner	3,589	69
ARSOK-R1	Runner	3,789	69
Southwest Runner	Runner	3,621	71
Tamrun OL02	Runner	3,095	64
Tamrun OL07	Runner	3,340	67
Tamspan 90	Spanish	3,344	71
AT98-99-14	Runner	2,913	69
DP-1	Runner	1,983	66
CV		11	3
LSD *P*=0.05		552	5

[1] Total sound mature kernel

SW Runner. DP-1 (Southwest variety) did not perform well in the Oklahoma environment. Yields were similar in the low-input study compared to the adjacent yields in the high or normal input variety evaluation trial (Table 3). Yields in the high-input trial were lower than normal.

Table 3. Peanut yields and grades from high-input variety tests, Caddo County, 2008.

Variety	Yield (lbs/A)	Grade (% TSMK[1])
Tamrun 96	3,757	68
ARSOK-R1	3,764	74
Southwest Runner	3,812	71
Tamrun OL07	3,416	68
Tamrun OL02	3,311	68
FlavorRunner 458	2,882	69
CV	7.6	3.4
LSD *P*=0.05	352	3

[1] Total sound mature kernel

Yields for the dryland plots are given in Table 4. No significant differences were observed in yield among the four varieties evaluated. Average yield was 2,577 lbs/A. This is a good yield for dryland peanuts produced in Caddo County. Production cost for the dryland test was $135/A.

Table 4. Peanut yields and grades for the dryland low-input variety trial, Ft. Cobb, 2008.

Cultivar Name	Market Type	Yield (lbs/A)
Tamrun 96	Runner	2,632
DP-1	Runner	2,668
Tamspan 90	Spanish	2,124
Southwest Runner	Runner	2,886
CV		
LSD *P*=0.05		NS[1]

[1] No significant difference.

Another year of data is needed to perform an in-depth economic analysis to see if either irrigated or dryland peanut biofuel feedstocks are feasible. The feasibility of using peanuts as a biofuel feedstock will depend largely on the price of crude oil.

Twin-Row and Single-Row Variety Comparisons

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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 years 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 regard 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 2009, studies were conducted at 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

Table 1. Twin-row and single-row variety comparison, Ft. Cobb, 2009.

	Single-Row†		Twin-Row‡	
Variety	Yield	% TSMK¶	Yield	% TSMK
	- - lbs / A - -		- - lbs / A - -	
Tamrun OL02	4,085 A	62	3,902 A	63
Tamrun OL07	3,567 A	58	3,898 A	62
ARSOK-R1	3,733 A	68	3,861 A	68
AT 98-99-14	3,208 A	66	3,630 A	66
Tamnut 06	3,121 A	63	3,616 B	65
Spanco	3,253 A	65	3,798 B	69
Jupiter	3,843 A	63	4,274 A	63

†Single-row was planted on 36-inch rows at a density of 4.8 seeds/row ft.
‡Twin-row was planted on 36-inch centers with a between row spacing of 7.5 inches in the twin-row. Seeding density was 2.4 seeds/ft.
¶ % TSMK = Percent total sound mature kernels.
§ Differences in uppercase and lowercase letters within the same row are significantly different ($P \leq 0.05$).

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, 2009. 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/row foot. This provided the same number of seeds/A. All plots received the same herbicide and fungicide applications.

Results

At Ft. Cobb, a significant difference was observed between row configurations. Average yield for single row was 3,544 lbs/A, while the average yield across varieties was 3,854 lbs/A for twin-row. When looking at specific varieties, Tamnut 06 and Spanco responded extremely well to twin-row planting. No differences in peanut grades were observed between row configurations.

Results in 2009 were similar to 2007 and 2008. In 2007, twin-row planted Tampsan 90 increased yield by 671 lbs/A and total sound mature kernels by 4 percent compared to single-row. At Stillwater in 2008, 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. Twin-row increased peanut yield by an average of 1,238 lbs/A with the five varieties that responded favorably to twin-row.

Three out of four site years, twin-row peanut has provided a potential yield increase compared to traditional single-row planting on 36-inch centers. The yield increase associated with twin-row configurations most likely has to do with increased light interception from increased leaf area.


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