Partners in Progress
PEANUTS

Peanut Research at OSU 2018

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 the
U.S. Department of Agriculture -
Agricultural Research Service

P-1056

Partners in Progress PEANUTS

Partners in Progress PEANUTS

Peanut Research at OSU 2018

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

P-1056

This report of the Oklahoma Agricultural Experiment Station is printed and issued by Oklahoma State University as authorized by the Vice President for Agricultural Programs and has been prepared and distributed at a cost of $850.00 for 250 copies. 0219

Table of Contents

Partners in Progress
PEANUTS

Partners in Progress
PEANUTS

Foreword

Oklahoma State University has a long-standing partnership with the Oklahoma Peanut Commission and the peanut producers of this state. Peanut acreage and production in Oklahoma have been increasing over the last several years. New varieties, disease resistance and fungicide programs developed by OSU and the USDA-ARS have aided the peanut industry. 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 Research at OSU 2018* report highlights significant accomplishments in research and Extension programming that have been supported in partnership with the OPC and the National Peanut Board. With all the work that has been accomplished, it is important to recognize that much more needs to be done to keep our peanut producers competitive and in business. Therefore, our work must be focused on solving meaningful issue-based problems facing peanut producers in Oklahoma.

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.

Keith Owens
Assistant Vice President and 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.

Enhancing Peanut Production Profitability through Research and Extension

Agriculture in Oklahoma and on the national level continues to struggle with low crop prices and returns below the cost of production. Peanuts remain an exception to this trend, offering some rare, but very welcome positive news.

Oklahoma peanuts planted in 2018 were lower than in 2017, but higher than recent years. Oklahoma producers increased plantings by 35 percent between 2015 and 2016 and by more than 70 percent between 2016 and 2017. In 2017, almost 20,000 acres were planted with peanuts. Large plantings in the southeastern U.S. and excess production carried over from previous crops continue to limit contract availability in Oklahoma. Due to limited contract opportunities for Oklahoma growers in 2018, planted acreage dropped to 15,000 acres.

The 2018 growing season was characterized by generally favorable weather, followed by good maturing conditions. This caused producers to anticipate good yields of high-quality peanuts. However, just as harvest was set to begin, poor weather conditions began and persisted throughout the entire harvest season. Frequent rain events followed by days of high humidity and wet field conditions prevailed, making harvest a veritable nightmare for most growers. When the first frost rolled around, much of the crop remained unharvested and growers were forced to closely manage digging and combining activities to avoid freeze injury. Yields in 2018 were around 2,600 pounds per acre compared to 4,000 pounds per acre in 2017.

Prices are such that growers must still carefully manage inputs in every phase of production. Despite tight margins, peanuts can still produce a profit for efficient growers. With the prospects for the overall farm economy expected to remain sluggish, peanuts will continue to be favored by those having experience and commitment to the crop.

The results of Oklahoma State University and USDA-ARS research programs continue to provide essential information for producers during a very challenging time. Recent peanut variety releases by USDA-ARS at the Peanut Improvement Center in Stillwater have been welcomed by producers and the industry. Due to their high yielding ability, outstanding quality and disease resistance, new varieties OLé and Lariat are positively impacting the Oklahoma peanut industry and the state's agricultural economy.

Similarly, OSU and USDA-ARS research programs are providing growers with much-needed answers for yield-robbing disease and weed problems. Partial funding for this research is being provided through the National Peanut Board (NPB) and the Oklahoma Peanut Commission (OPC).

The NPB is a grower-funded national research, promotion and education checkoff program with growers from 10 states submitting funds, and in turn, receiving research and promotion funds back in those states. As part of an ongoing partnership, in Fiscal Year 2018, the Oklahoma Peanut Commission teamed with OSU and USDA-ARS to submit research proposals to the NPB. NPB provided $18,000 in research funding for OSU and USDA-ARS. Funded research projects were: Integrated Management of Peanut Diseases; Evaluation of Advanced Breeding Lines and Current Peanut Varieties across Oklahoma; and Weed Management in Oklahoma Peanuts. Results of those research projects are of great interest to Oklahoma producers and are presented in this report.

An additional positive note is that the national peanut industry is benefiting from increasing per-capita peanut consumption. For Oklahoma to benefit from this good news, growers must continue to have access to research-based results and recommendations as they make production decisions. The OPC will continue to team with OSU and USDA-ARS to provide critical assistance and NPB, which will deliver essential resources. All have a commitment to a robust peanut industry in the state, and Oklahoma's peanut growers are very appreciative of that fact.

Oklahoma's peanut producers and the Oklahoma Peanut Commission are proud of their long and productive history with OSU, USDA-ARS and NPB and look forward to the future shared benefits of continuing this partnership.

Ron Sholar
Executive Director
Oklahoma Peanut Commission

Peanut Variety Tests

Kelly D. Chamberlin and Rebecca S. Bennett
USDA-ARS, Stillwater

John P. Damicone
Department of Entomology and Plant Pathology

2018 progress made possible through OPC and NPB support

- **Performance of runner varieties depended on location, but averages across locations and years indicate that cultivars Lariat, Webb and Tamrun OL11 were the top three entries in value per acre.**
- **No significant differences were seen among Spanish entries across locations and over years, but cultivars Tamrun OL06 and OLé performed best numerically.**
- **The high-oleic Virginia-type cultivar Contender numerically out-yielded all other Virginia entries across locations in 2018 and across years and locations for 2017-2018.**

Peanut production in Oklahoma is generally located in three geographical regions across the state: southwest, west-central and far west. Each region differs from the others in environmental and biological stressors that affect crop production, so the same peanut cultivar is likely to perform differently in each growing region. Therefore, the Oklahoma Peanut Variety Trials are conducted annually in each region and are designed to test the performance of commonly grown cultivars and potential cultivar releases against each other. Results of these annual trials can serve as a guide for producers when choosing a cultivar to plant.

Variety Trial Methods

All entries (cultivars and advanced breeding lines) in the Oklahoma Peanut Variety trials were high-oleic, except the Virginia-type cultivar Jupiter. The following entries were included in all locations in 2018: **13 runner-types:** Cultivars Flavor Runner 458, Georgia 09B, Georgia 14N, Tamrun OL11, Lariat and Webb and breeding lines ARSOK R47A, ARSOK R90-12, ARSOK R92-13, ARSOK 93-10, ARSOK R94-4, ARSOK R96-7 and ARSOK R98-8. Additionally, runner breeding line ARSOK R 96-3 was included in the Fort Cobb location only; **six Spanish-types:** Cultivars AT98-99, OLé, Tamnut OL06, Schubert and Span17, and breeding line ARSOK-S88-2; **15 Virginia types:** Cultivars ACI 351, Contender, Florida Fancy, Jupiter, Sullivan, VENUS and Wynne and breeding lines ARSOK V85-7, NC-1EX, NC-2EX, NC-7EX, NC-17EX, NC-19EX, NC-20EX and NC-22EX.

All variety trials were conducted under an extensive pest management program. The objective was to prevent as much outside influence from weed, disease and insect pressures on yield and grade as possible. The interaction between variety and location was significant, so the results were separated by location. Averages across locations and years were included to give producers a better estimate of line performance. 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 15 feet long. Plots were seeded at a rate of five seeds per row foot (139,392 seeds per acre). Trials were conducted using randomized, complete block design with four replications. The entire plot was dug, then thrashed two to three days later. Peanuts were placed in a dryer until moisture reached 10 percent. Percent total sound mature kernels (%TSMK) were determined on a 200-gram sample from each plot. Analysis of variance (ANOVA) and significance (LSD) were analyzed SAS (ver. 9.1).

Value per acre was determined by converting estimated plot yields to tons per acre and using the 2018 contract price values for each market-type (runner = $475 per ton; Spanish = $450 per ton; Virginia = $500 per ton). No adjustments were made for damaged kernels or concealed damage. Virginia dollars per acre values may be underestimated, as grade is not as large a factor for in-shell peanuts. Calculations of dollars per acre are based on yield and grade only and do not include possible input costs. The following formula was used: dollars per acre = yield (tons per acre) times contract price (dollars per ton) times grade.

Excessive rainfall in October led to delayed harvest of the Custer/Beckham and Tillman county trials and may have resulted in a drop in yield and grade for some Virginia trial entries in the Tillman County trial compared to past years.

Interpreting Data

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 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 pounds per acre 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, there is less confidence 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 management conditions similar to those of the trials. The relative yields of all peanut varieties are affected by crop management and by environmental factors including soil type, summer conditions, soil moisture, disease and insects.

2018 Caddo County Peanut Variety Trial

Location: Fort Cobb, OK (OAES)
Date Planted: 5/15/2018
Date Dug: 10/24/2018
Date Threshed: 10/26/2018

A conventional till seedbed was used and managed for foliar and soil-borne disease throughout the season. Average yield for the runner test was 6,219 pounds per acre and average grade was 76 percent TSMK (Table 1) with entries Lariat, ARSOK R47A and ARSOK 98-8 having higher yields numerically, compared to other genotypes tested.

Table 1. Yield, grade, average seed weight and value per acre for entries in the Caddo County peanut variety trial, 2018.[1]

Entry	*Yield (lb/A)*	*% of Trial Average*	*Grade[2] (%TSMK)*	*SdWt/100[3] (g)*	*ELK (%)*	*Value[4] ($/A)*
Runner[5]						
Lariat	6,982 a	112	77 b-d	71 gh	-	1,177
ARSOK R47A	6,877 a	111	75 e	72 fg	-	1,176
ARSOK R98-8	6,877 a	111	71 g	88 a	-	1,437
Webb	6,728 ab	108	74 f	74 ef	-	1,182
ARSOK R92-13	6,583 a-c	106	78 a-c	77 de	-	1,204
ARSOK R96-7	6,558 a-c	105	77 b-d	80 cd	-	1,246
Georgia 09B	6,321 b-d	102	76 de	65 h	-	961
ARSOK R94-4	6,304 b-d	101	76 de	84 b	-	1,258
Tamrun OL11	6,280 b-d	101	77 b-d	69 h	-	1,014
ARSOK R90-12	6,099 c-e	98	78 a-c	74 fg	-	1,057
ARSOK R93-10	5,904 de	95	76 de	71 gh	-	996
Flavor Runner 458	5,904 de	95	77 b-d	58 k	-	813
Georgia 14N	5,638 e	91	79 a	61 j	-	817
ARSOK R96-3	3,968 f	64	68 h	81 bc	-	763
Mean	6,219		76	73		
CV	5.46		1.31	3.05		
LSD (0.05)	486		3.18	3.18		
Spanish[5]						
Span17	6,437	103	74 ab	56 a	-	1,072
Tamnut OL06	6,389	103	75 a	49 b	-	1,078
Schubert	6,219	99	69 d	48 bc	-	965
OLé	6,207	99	72 c	46 cd	-	1,006
AT 98-99	6,062	97	72 c	44 d	-	982
ARSOK S88-2	6,038	97	73 bc	44 d	-	992
Mean	6,225		73	48		
CV	5.80		1.4	3.5		
LSD (0.05)	544		1.5	2.5		
Virginia[5]						
NC-17EX	6,825 a	107	74 b	120 a-c	61	1,336
ARSOK V85-7	6,824 a	107	77 a	95 f-h	57	1,382
Contender	6,703 ab	105	73 b-e	97 e-h	63	1,297
VENUS	6,570 a-c	103	71 d-f	89 gh	61	1,236
Jupiter	6,558 a-c	103	72 c-f	105 c-g	55	1,243
NC-1EX	6,413 a-d	101	72 c-f	129 ab	60	1,221
NC-20EX	6,377 a-e	100	72 c-f	111 c-e	60	1,215
Wynne	6,364 a-e	100	71 d-f	106 c-e	56	1,192
ACI 351	6,255 b-e	98	72 c-f	103 d-g	56	1,187
NC-2EX	6,232 b-e	98	74 bc	128 ab	64	1,223
NC-19EX	6,231 b-e	98	71 d-f	114 b-d	62	1,174
NC-7EX	6,247 c-e	98	73 b-e	131 a	60	1,205
Florida Fancy	6,098 c-e	96	68 f	85 h	53	1,094
Sullivan	5,978 de	94	70 ef	89 gh	61	1,110
NC-22EX	5,893 e	93	72 c-f	108 c-e	55	1,118
Mean	6,364		73	107		
CV	5.55		1.61	10.5		
LSD (0.05)	503		1.79	16.1		

[1] Values within the same column followed by the same letter are not significantly different at P = 0.05.
[2] % TSMK = Percent total sound mature kernels.
[3] SdWt/100 = Weight of 100 SMK.
[4] Calculated based on peanut market-type contract price 2018. ELK bonus added for Virginias.
[5] Market Type.

Statistical differences in yield and grade were seen among entries. Grades were higher than in immediate past years, with breeding line ARSOK R98-8 grading highest at 88 percent TSMK and Georgia 14N having the lowest grade at 61 percent TSMK.

Among the Spanish entries tested, the average yield and grade were 6,225 pounds per acre and 73 percent TSMK, respectively. In Caddo County, no statistical differences among entries were reported for yield. Span17 was numerically the top performer, followed by Tamnut OL06, Schubert and OLé. Again, grades were higher than in previous years and statistical differences were reported with cultivars Tamnut OL06 and Span17 both grading highest at 75 percent and 74 percent TSMK, respectively. Cultivar Schubert had the lowest grade at 69 percent TSMK.

Entries in the Virginia test averaged 6,364 pounds per acre with an average grade of 73 percent TSMK. Statistical differences were reported for yield and grade. Breeding lines NC-17EX and ARSOK V85-7 were the top yielders numerically at 6,825 pounds per acre and 6,824 pounds per acre, respectively. Contender was the top yielding cultivar averaging 6,703 pounds per acre, followed by cultivar VENUS at 6,570 pounds per acre. Breeding line NC-22EX had the lowest yield at 5,893 pounds per acre.

Table 2 contains Caddo County yield and grade data for 2017 and 2018. Average yield among runner entries for the two-year period was 5,550 pounds per acre, while the average grade was 70 percent TSMK. ARSOK-R47A and Lariat were the top yielders over the two-year period at 5,998 pounds per acre and 5,935 pounds per acre, respectively. Statistical differences in yield and grade were seen among runner entries. Significant differences in yield also were found among all Spanish entries over the two years. Numerically, cultivar Tamnut OL06 was the top yielder among Spanish entries, averaging 5,487 pounds per acre. No statistical differences were reported for Spanish entry average grades. The average yield for Virginia entries in 2017-2018 was 5,763 pounds per acre, but no statistical differences in yield were seen among entries. Contender was numerically the top yielder over the two years, averaging 6,074 pounds per acre. Statistical differences for average grade among Virginia-type entries were reported, with breeding line ARSOK V85-7 topping the , averaging 76 percent TSMK.

2018 Custer/Beckham County Variety Trial

Location: Weatherford, OK
(Les Crall Farms)
Date Planted: 5/18/2018
Date Dug: 10/29/2018
Date Threshed: 11/01/2018

The trial was planted into a conventional till seedbed and managed for weeds as well as foliar and soil-borne disease throughout the season. Average yield for the runner test was 5,792 pounds per acre with an average grade of 77 percent TSMK. Statistical differences for yield and grade were reported. Entries Georgia 09B and Lariat were the top performers, averaging 6,425 and 6,376 pounds per acre, respectively. Flavor Runner 458 had the poorest performance at 5,118 pounds per acre. Runner entry grades were higher compared to past years, ranging from 71 to 81 percent TSMK and averaging 77 percent TSMK.

Statistical differences for yield and grade also were seen among Spanish entries, which averaged 5,090 pounds per acre and 74 percent TSMK. Cultivar AT 98-99 topped the entries in yield and grade at 6,062 pounds per acre and 77 percent TSMK.

Virginia entries averaged 5,579 pounds per acre and a grade of 72 percent TSMK. Significant differences in yield

Table 2. Peanut yields and grades from Caddo County variety trials in 2017 and 2018 along with two-year averages (2017-2018) and estimated value.[1,2]

Entry	Yield (lb/A)	Grade[3] (%TSMK)	Yield (lb/A)	Grade[3] (%TSMK)	Yield (lb/A)	Grade[3] (%TSMK)	ELK (%)	Value[4] ($/A)
	2017		2018		2-year average			
Runner[5]								
ARSOK-R47A	5,119	69 de	6,877 a	72 fg	5,998 a	71 a-c	-	1,011
Lariat	4,888	71 b-d	6,982 a	71 gh	5,935 a	71 a-c	-	1,001
Webb	4,997	72 b-d	6,728 ab	74 ef	5,862 ab	73 ab	-	1,016
ARSOK R92-13	4,780	72 b-d	6,583 a-c	77 de	5,681 a-c	75 a	-	1,012
Georgia 09B	4,743	65 e	6,321 b-d	64 i	5,532 b-d	65 bc	-	854
ARSOK 90-12	4,707	73 ab	6,099 c-e	73 fg	5,403 cd	73 ab	-	937
ARSOK 94-4	4,465	72 a-c	6,304 b-d	84 b	5,384 cd	68 a-c	-	870
Tamrun OL11	4,332	78 a	6,280 b-d	68 h	5,306 cd	73 ab	-	920
Flavor Runner 458	4,537	69 de	5,904 de	58 k	5,220 d	63 c	-	781
ARSOK R93-10	4,453	74 ab	5,904 de	71 gh	5,178 d	73 ab	-	898
Mean	4,702	71	6,219	76	5,550	70		
CV	15	3.5	5.46	1.31	3.10	5.59		
LSD (0.05)	703	3.5	486	3.18	389	8.89		
Spanish[5]								
Tamnut OL06	4,586	63 b	6,389	75 a	5,487 a	69	-	852
Schubert	4,549	71 a	6,219	69 d	5,384 ab	70	-	848
OLé	4,477	66 ab	6,207	72 c	5,342 ab	69	-	829
AT 98-99	4,452	63 b	6,062	72 c	5,245 bc	68	-	802
ARSOK S88-2	4,296	71 a	6,038	73 bc	5,167 c	72	-	837
Mean	4,472	67	6,225	73	5,325	70		
CV	7.2	5.7	5.80	1.4	1.09	5.65		
LSD 0(.05)	462	5.8	544	1.5	161	10.9		
Virginia[5]								
Contender	5,445	69 b	6,703 ab	73 b-e	6,074	71 b	63	1,145
Jupiter	5,287	66 bc	6,558 a-c	72 c-f	5,922	69 b	56	1,080
VENUS	5,094	69 b	6,570 a-c	71 d-f	5,832	70 b	61	1,083
ARSOK V85-7	4,561	75 a	6,824 a	77 a	5,692	76 a	59	1,140
Florida Fancy	5,203	65 c	6,098 c-e	68 f	5,650	66 c	54	957
Wynne	4,453	68 bc	6,364 a-e	71 d-f	5,408	70 b	55	998
Mean	5,007	69	6,364	73	5,763	70		
CV	6.2	3.5	5.55	1.61	6.07	1.51		
LSD (0.05)	821	3.6	503	1.79	900	2.73		

[1] Data not shown for all varieties tested in 2017-2018 and used to calculate mean, CV, and LSD.
[2] Values within the same column followed by the same letter are not significantly different at P = 0.05.
[3] % TSMK = Percent total sound mature kernels.
[4] Calculated based on peanut market-type contract price 2018. ELK bonus added for Virginias.
[5] Market Type.

were noted among entries. Cultivar Contender had the highest yield at 6,377 pounds per acre, while breeding line NC-19EX had the lowest at 4,888 pounds per acre. Grade differences were significant among entries and ranged from 77 percent to 69 percent TSMK, averaging 72 percent TSMK.

Table 4 contains yield and grade data for the last two years as well as two-year averages in the Custer/Blaine location. Statistical differences were seen among runner entries for yield and grade, with the average yield being 4,540 pounds per acre and average grade reported at 71 percent TSMK. Among runner entries, Lariat was the highest in average yield at 5,245 pounds per acre, while Flavor Runner 458 had the lowest at 3,847 pounds per acre. No significant differences were seen among average Spanish or Virginia yields for the two-year period, but numerically, the leading cultivars were OLé (Spanish) and Contender (Virginia).

2018 Tillman County Variety Trial

Location: Davidson, OK
(Joe D. and Gayle White Farms)
Date Planted: 5/23/2018
Date Dug: 11/08/2018
Date Threshed: 11/12/2018

The trial was planted into a conventional till seedbed and managed for foliar and soil-borne disease throughout the season.

Table 5 shows the yield and grade data from Tillman County. Average yield and grade for the runner test was 5,194 pounds per acre and 74 percent TSMK. Tamrun OL11 was the top yielder at 6,207 pounds per acre and 74 percent TSMK. Statistical differences were seen among entries. ARSOK R47A was the poorest performer at 4,210 pounds per acre and 76 percent TSMK.

Spanish entries performed well in Tillman County in 2018, with the average yield being 5,124 pounds per acre and an average grade of 72 percent TSMK. Tamnut OL06 was the highest in yield at 6,340 pounds per acre and a grade of 77 percent TMSK. AT98-99 was the bottom in yield at 4,053 pounds per acre and a grade of 70 percent TMSK.

Average yield and grade in the Virginia-type test was lower than past years at 4,985 pounds per acre and 70 percent TSMK. The top yielder was cultivar Contender at 5,873 pounds per acre and a grade of 73 percent TSMK. Grades of Virginia-type entries ranged from 63 to 76 percent TSMK and statistical differences were found. ARSOK V85-7 had the top grade at 76 percent TSMK.

The performance of Virginia-type entries over a two-year period in Tillman County is shown in Table 6. The top performer among runner types was cultivar Georgia 09B, which averaged 6,110 pounds per acre and a grade of 68 percent TSMK. Although differences were seen among yield, no statistical differences were noted among average runner grades. Flavor Runner 458 was the poorest performer in two years at 4,428 pounds per acre. Although no significant differences were seen for yield among Spanish entries numerically, the top entry over the two-year period was Tamrun OL06, averaging 5,862 pounds per acre and 67 percent TSMK. Schubert was the lowest yielder at 5,239 pounds per acre and 68 percent TSMK. Over 2016-2017, Virginia-types averaged 6,278 pounds per acre in Tillman County with the top performer numerically being cultivar Contender at 6,278 pounds per acre and 68 percent TSMK. However, no statistical differences were seen among entries except for Virginia grades which ranged from 67 to 75 percent TSMK and averaged 70 percent TSMK.

Table 3. Yield, grade, average seed weight, and value per acre for entries in the Custer/ Beckham County (Les Crall Farms) peanut variety trial, 2018.[1]

Entry	*Yield (lb/A)*	*% of Trial Average*	*Grade[2] (%TSMK)*	*SdWt/100[3] (g)*	*ELK (%)*	*Value[4] ($/A)*
Runner[5]						
Georgia 09B	6,425 a	111	77 cd	67 f	-	1,175
Lariat	6,376 a	110	81 a	72 de	-	1,227
Tamrun OL11	6,340 ab	109	78 b-d	69 ef	-	1,174
ARSOK R94-4	6,062 a-c	105	78 b-d	82 b	-	1,123
ARSOK R96-7	6,062 a-c	105	77 cd	79 bc	-	1,109
ARSOK R98-8	5,796 a-d	100	71 f	88 a	-	977
ARSOK R47A	5,614 b-d	97	80 ab	71 ef	-	1,067
Georgia 14N	5,590 b-d	96	79 a-c	61 g	-	1,049
Webb	5,554 cd	96	74 e	73 de	-	976
ARSOK R90-12	5,517 cd	95	78 b-d	72 de	-	1,022
ARSOK R93-10	5,506 cd	95	76 d	76 cd	-	994
ARSOK R92-13	5,336 cd	92	77 cd	81 bc	-	976
Flavor Runner 458	5,118 d	88	77 cd	59 g	-	936
Mean	5,792		77	73		
CV	9.13		1.79	4.97		
LSD (0.05)	759		1.09	5.20		
Spanish[5]						
AT 98-99	6,062 a	119	77 a	51 b	-	1,050
Span17	5,408 ab	106	77 a	58 a	-	937
Tamnut OL06	5,142 b	101	73 b	46 c	-	845
OLé	5,033 b	99	71 b	49 b	-	804
Schubert	4,816 bc	95	71 b	46 c	-	769
ARSOK S88-2	4,078 c	80	72 b	45 c	-	661
Mean	5,090		74	50		
CV	10.3		2.36	3.27		
LSD (0.05)	787		2.62	2.4		
Virginia[5]						
Contender	6,377 a	114	73 bc	96 ef	62	1,233
Wynne	6,255 ab	112	72 b-d	103 de	56	1,187
NC-1EX	6,099 a-c	109	72 b-d	117 b	60	1,162
VENUS	6,098 a-c	109	74 ab	93 fg	60	1,192
NC-2EX	5,820 a-c	104	71 b-d	126 a	63	1,097
Sullivan	5,711 a-d	102	70 cd	87 g	55	1,054
NC-17EX	5,711 a-d	102	74 ab	121 ab	62	1,119
NC-7EX	5,711 a-d	102	72 b-d	116 b	61	1,088
ARSOK V85-7	5,517 b-d	99	77 a	97 ef	65	1,125
Florida Fancy	5,408 b-d	97	71 b-d	78 h	54	1,011
ACI 351	5,288 cd	95	72 b-d	107 cd	57	1,005
NC-20EX	4,948 d	89	74 ab	106 d	61	968
NC-22EX	4,925 d	88	71 b-d	106 d	56	922
Jupiter	4,924 d	88	72 b-d	96 ef	54	932
NC-19EX	4,888 d	87	69 d	115 bc	63	897
Mean	5,579		72	104		
CV	10.8		3.65	5.07		
LSD (0.05)	856		3.76	7.55		

[1] Values within the same column followed by the same letter are not significantly different at P = 0.05.
[2] % TSMK = Percent total sound mature kernels.
[3] SdWt/100 = Weight of 100 SMK.
[4] Calculated based on peanut market-type contract price 2018. ELK bonus added for Virginias.
[5] Market Type.

Table 4. Peanut yields and grades from Custer/Blaine County (Les Crall Farms) variety trials in 2017 and 2018 along with two-year averages (2017-2018) and estimated value.[1, 2]

Entry	Yield (lb/A)	Grade[3] (%TSMK)	Yield (lb/A)	Grade[3] (%TSMK)	Yield (lb/A)	Grade[3] (%TSMK)	ELK (%)	Value[4] ($/A)
	2017		2018		2-year average			
Runner[5]								
Lariat	4,114 a	67 ab	6,014 a-c	79 a	5,245 a	74 a	-	922
Tamrun OL11	3,944 ab	69 a	6,276 a	76 b-d	5,142 ab	73 a	-	891
ARSOK R47A	3,702 a-c	64 a-c	5,574 b-d	77 a-c	4,658 a-c	72 ab	-	797
ARSOK R94-4	3,194 b-e	62 bc	5,690 a-d	74 e	4,628 a-c	70 ab	-	769
Webb	3,630 a-c	65 ab	5,990 a-c	74 e	4,592 a-c	72 ab	-	785
Georgia 09B	2,577 e	63 a-c	6,269 a	75 c-e	4,501 a-c	72 ab	-	770
ARSOK R92-13	3,460 a-d	58 c	5,744 a-d	77 b-d	4,398 a-c	68 b	-	710
ARSOK R93-10	3,024 c-e	65 ab	5,421 cd	75 c-e	4,265 bc	71 ab	-	719
ARSOK R90-12	2,722 de	63 a-c	5,578 b-d	76 b-d	4,119 c	71 ab	-	695
Flavor Runner 458	2,577 e	61 bc	5,122 d	75 c-e	3,847 c	72 ab	-	658
Mean	3,294	64	5,792	76	4,540	71		
CV	16.9	6.4	14.7	3.32	9.25	3.04		
LSD (0.05)	811	6.0	671	2.03	950	4.89		
Spanish[5]								
OLé	4,332 a	70 a	5,433 ab	71 cd	4,682	71	-	748
AT 98-99	3,097 c	67 ab	5,392 ab	73 b	4,579	72	-	742
Tamrun OL06	3,654 b	68 a	5,957 a	75 a	4,398	70	-	693
ARSOK S88-2	4,441 a	65 b	5,009 b	72 bc	4,259	69	-	661
Schubert	3,109 bc	67 ab	5,352 ab	69 d	3,962	69	-	615
Mean	3,726	68	5,480	73	4,376	70		
CV	9.5	3.1	16.6	2.83	19.9	3.39		
LSD (0.05)	548	3.3	745	1.68	2,423	6.60		
Virginia[5]								
Contender	4,053	67 ab	6,377 a	73 bc	5,215	70 ab	63	970
ARSOK V85-7	4,561	70 a	5,517 b-d	77 a	5,039	74 a	64	989
Wynne	3,436	56 d	6,255 ab	72 b-d	4,845	65 b	57	835
VENUS	3,448	64 bc	6,098 a-c	74 ab	4,773	69 ab	61	874
Florida Fancy	3,944	59 cd	5,408 b-d	71 b-d	4,676	65 b	55	805
Jupiter	4,334	62 bc	4,924 d	72 b-d	4,629	67 ab	56	800
Mean	3,965	64	5,579	72	4,862	68		
CV	20.8	6.1	10.8	3.65	13.5	4.07		
LSD (0.05)	625	5.8	856	3.76	1,690	7.14		

[1] Data not shown for all varieties tested in 2017-2018 and used to calculate mean, CV, and LSD.
[2] Values within the same column followed by the same letter are not significantly different at P = 0.05.
[3] % TSMK = Percent total sound mature kernels.
[4] Calculated based on peanut market-type contract price 2018. ELK bonus added for Virginias
[5] Market Type.

Table 5. Yield, grade, average seed weight, and value per acre for entries in the Tillman County (Joe D. and Gayle White Farms) Oklahoma peanut variety trial, 2018.[1]

Entry	*Yield (lb/A)*	*% of Trial Average*	*Grade[2] (%TSMK)*	*SdWt/100[3] (g)*	*ELK (%)*	*Value[4] ($/A)*
Runner[5]						
Tamrun OL11	6,207 a	119	74 b-d	62 cd	-	1,091
Georgia 09B	6,062 ab	117	72 de	60 d	-	1,037
ARSOK R98-8	5,759 a-c	111	69 f	80 a	-	944
Webb	5,687 a-c	109	73 e-c	66 b-d	-	986
Georgia 14N	5,602 a-c	108	76 a-c	60 d	-	1,011
ARSOK R92-13	5,312 a-d	102	75 b-d	74 ab	-	946
ARSOK R90-12	5,118 a-d	99	72 de	69 bc	-	875
ARSOK 96-7	4,985 b-d	96	77 ab	69 bc	-	912
ARSOK R93-10	4,852 cd	93	73 c-e	67 b-d	-	841
ARSOK R94-4	4,705 cd	91	68 f	68 bc	-	760
Lariat	4,683 cd	90	78 a	64 cd	-	868
Flavor Runner 458	4,344 d	83	71 ef	50 e	-	733
ARSOK R47A	4,210 d	81	76 a-c	69 bc	-	760
Mean	5,194		74	66		
CV	15.3		2.72	8.36		
LSD (0.05)	1,136		2.87	7.90		
Spanish[5]						
Tamnut OL06	6,340 a	123	77 a	47 b	-	1,098
Span17	5,360 ab	105	75 ab	56 a	-	905
OLé	5,058 bc	99	71 cd	46 b	-	808
Schubert	5,021 bc	98	69 d	45 b	-	780
ARSOK S88-2	4,912 bc	96	73 bc	46 b	-	807
AT98-99	4,053 c	79	70 d	44 b	-	638
Mean	5,124		72	48		
CV	16.5		2.10	3.92		
LSD (.05)	1,270		2.30	2.81		
Virginia[5]						
Contender	5,873 a	118	73 ab	88 c-e	62	1,135
Florida Fancy	5,711 ab	115	69 a-d	68 f	55	1,040
VENUS	5,554 ab	111	71 a-c	88 c-e	60	1,044
ARSOK V85-7	5,252 a-c	105	76 a	86 de	59	1,052
Wynne	5,227 a-c	105	67 a-d	85 de	57	928
Jupiter	5,070 a-c	102	71 a-c	94 b-d	56	950
NC-7EX	5,009 a-c	100	72 ab	111 a	61	956
NC-17EX	4,997 a-c	100	74 ab	103 ab	62	955
ACI 351	4,901 bc	98	63 cd	87 c-e	55	819
NC-2EX	4,852 bc	97	68 a-d	101 a-c	63	879
NC-22EX	4,743 b-d	95	70 a-d	97 a-d	54	875
Sullivan	4,743 b-d	95	73 ab	82 ef	60	916
NC-19EX	4,562 cd	92	62 d	92 b-e	61	756
NC-20EX	4,489 cd	90	71 a-c	96 b-e	61	845
NC-1EX	3,799 d	76	66 b-d	89 b-e	59	666
Mean	4,985		70	91		
CV	13.7		8.33	10.9		
LSD (.05)	972		8.29	14.1		

[1] Values within the same column followed by the same letter are not significantly different at P = 0.05.
[2] % TSMK = Percent total sound mature kernels.
[3] SdWt/100 = Weight of 100 SMK.
[4] Calculated based on peanut market-type contract price 2018. ELK bonus added for Virginias.
[5] Market Type.

Table 6. Peanut yields and grades from Tillman County (Joe D. and Gayle White Farms) variety trials in 2017 and 2018 along with two-year averages (2017-2018) and estimated value.[1, 2]

Entry	Yield (lb/A)	Grade[3] (%TSMK)	Yield (lb/A)	Grade[3] (%TSMK)	Yield (lb/A)	Grade[3] (%TSMK)	ELK (%)	Value[4] ($/A)
	2017		2018		2-year average			
Runner[5]								
Georgia 09B	6,159 ab	63 bc	6,062 ab	72 de	6,110 a	68	-	987
Webb	6,231 ab	70 ab	5,687 a-c	73 e-c	5,959 ab	72	-	1,019
Tamrun OL11	5,650 b	73 a	6,207 a	74 b-d	5,928 ab	73	-	1,028
ARSOK R47A	6,703 a	69 ab	4,210 d	76 a-c	5,456 ab	73	-	946
ARSOK R92-13	5,493 b	68 ab	5,312 a-d	75 b-d	5,402 ab	72	-	924
Lariat	5,977 ab	69 ab	4,683 cd	78 a	5,330 ab	74	-	937
ARSOK R90-12	5,493 b	60 c	5,118 a-d	72 de	5,305 ab	66	-	832
ARSOK R94-4	5,856 ab	71 ab	4,705 cd	68 f	5,280 ab	70	-	878
ARSOK R93-10	5,299 bc	70 ab	4,852 cd	73 c-e	5,075 ab	72	-	868
Flavor Runner 458	4,513 c	66 bc	4,344 d	71 ef	4,428 b	69	-	726
Mean	5,737	68	5,194	74	5,427	71		
CV	11.6	7.7	15.3	2.72	13.2	6.78		
LSD (0.05)	966	7.6	1136	2.87	1,593	8.20		
Spanish[5]								
Tamrun OL06	5,384 b	57 b	6,340 a	77 a	5,862	67	-	884
OLé	5,917 b	63 ab	5,058 bc	71 cd	5,488	67	-	827
ARSOK S88-2	5,965 b	67 a	4,912 bc	73 bc	5,438	70	-	856
AT 98-99	6,667 a	60 b	4,053 c	70 d	5,363	65	-	784
Schubert	5,457 b	67 a	5,021 bc	69 d	5,239	68	-	802
Mean	5,878	63	5,124	72	5,478	67		
CV	7.3	5.4	16.5	2.10	16.5	7.05		
LSD (.05)	663	5.2	1270	2.30	2,512	13.1		
Virginia[5]								
Contender	6,683 a	63 c	5,873 a	73 ab	6,278	68 b	62	1,135
VENUS	6,425 ab	69 ab	5,554 ab	71 a-c	5,989	70 ab	61	1,112
ARSOK V85-7	6,642 a	73 a	5,252 a-c	76 a	5,947	75 a	60	1,177
Florida Fancy	5,989 b	67 bc	5,711 ab	69 a-d	5,850	67 b	55	1,036
Jupiter	6,207 ab	64 c	5,070 a-c	71 a-c	5,638	68 b	57	1,013
Wynne	6,025 b	64 c	5,227 a-c	67 a-d	5,626	66 b	56	983
Mean	6,328	67	4,985	70	5,888	70		
CV	6.20	4.41	13.7	8.33	4.49	3.35		
LSD (.05)	589	4.40	972	8.29	680	5.94		

[1] Data not shown for all varieties tested in 2017-2018 and used to calculate mean, CV, and LSD.
[2] Values within the same column followed by the same letter are not significantly different at P = 0.05.
[3] % TSMK = Percent total sound mature kernels.
[4] Calculated based on peanut market-type contract price 2018. ELK bonus added for Virginias.
[5] Market Type.

Table 7. Yield, grade, average seed weight, and value per acre for entries in Oklahoma peanut variety trials in 2018 averaged across all locations.[1]

Entry	*Yield (lb/A)*	*% of Trial Average*	*Grade[2] (%TSMK)*	*SdWt/100[3] (g)*	*ELK (%)*	*Value[4] ($/A)*
Runner[5]						
Tamrun OL11	6,276 a	108	76 b-d	66 de	-	1,133
Georgia 09B	6,269 a	108	75 c-e	64 ef	-	1,117
ARSOK R98-8	6,151 ab	106	70 f	85 a	-	1,023
Lariat	6,014 a-c	104	79 a	69 cd	-	1,128
Webb	5,990 a-c	103	74 e	71 c	-	1,053
ARSOK R96-7	5,869 a-c	101	77 a-c	76 b	-	1,073
ARSOK R92-13	5,744 a-d	99	77 b-d	77 b	-	1,050
ARSOK R94-4	5,690 a-d	98	74 e	78 b	-	1,000
Georgia 14N	5,610 a-d	97	78 ab	61 f	-	1,039
ARSOK R90-12	5,578 b-d	96	76 b-d	72 c	-	1,007
ARSOK R947A	5,574 b-d	96	77 a-c	70 cd	-	1,019
ARSOK R93-10	5,421 cd	94	75 c-e	71 c	-	966
Flavor Runner 458	5,122 d	88	75 c-e	55 g	-	912
Mean	5,792		76	70		
CV	14.7		3.32	7.46		
LSD (0.05)	671		2.03	4.24		
Spanish[5]						
Tamnut OL06	5,957 a	109	75 a	47 bc	-	1,005
Span17	5,735 ab	105	75 a	57 a	-	968
OLé	5,433 ab	99	71 cd	48 b	-	868
AT98-99	5,392 ab	98	73 b	46 b-d	-	886
Schubert	5,352 ab	97	69 d	45 cd	-	831
ARSOK S88-2	5,009 b	91	72 bc	44 d	-	811
Mean	5,480		73	48		
CV	16.6		2.83	4.75		
LSD (.05)	745		1.68	1.87		
Virginia[5]						
Contender	6,318 a	112	73 bc	98 de	62	1,141
VENUS	6,074 ab	108	72 b-d	90 ef	60	1,092
Wynne	5,949 a-c	105	70 c-e	97 de	56	1,030
ARSOK V85-7	5,864 a-d	104	77 a	93 ef	60	1,073
NC-17EX	5,844 a-d	104	74 ab	115 ab	61	1,029
Florida Fancy	5,739 a-d	102	70 c-e	78 g	54	941
NC-2EX	5,634 a-d	100	71 b-d	118 a	63	951
NC-7EX	5,622 b-d	99	72 b-d	119 a	61	959
Jupiter	5,512 b-d	98	72 b-d	98 d e	55	935
ACI 351	5,481 b-d	97	69 de	99 de	56	891
Sullivan	5,477 b-d	97	71 b-d	86 gf	59	899
NC-1EX	5,437 b-d	96	70 c-e	112 a-c	60	887
NC-20EX	5,271 cd	93	72 b-d	105 cd	61	877
NC-19EX	5,227 d	93	67 e	107b-d	62	809
NC-22EX	5,187 d	92	70 c-e	104 cd	55	715
Mean	5,643		72	101		
CV	15.1		5.77	12.1		
LSD (.05)	686		3.32	9.78		

[1] Values within the same column followed by the same letter are not significantly different at P = 0.05.
[2] % TSMK = Percent total sound mature kernels.
[3] SdWt/100 = Weight of 100 SMK.
[4] Calculated based on peanut market-type contract price 2018. ELK bonus added for Virginias.
[5] Market Type.

Table 8. Peanut yields and grades averaged across all variety trial locations (Caddo, Custer and Tillman counties) for 2017 and 2018 along with two-year averages (2017-2018) and estimated value.[1, 2]

Entry	Yield (lb/A)	Grade[3] (%TSMK)	Yield (lb/A)	Grade[3] (%TSMK)	Yield (lb/A)	Grade[3] (%TSMK)	ELK (%)	Value[4] ($/A)
	2017		2018		2-year average			
Runner[5]								
Lariat	4,993 a	69 a-c	6,014 a-c	79 a	5,503 a	74	-	967
Webb	4,953 a	69 a-c	5,990 a-c	74 e	5,471 a	71	-	923
Tamrun OL11	4,642 ab	73 a	6,276 a	76 b-d	5,459 a	74	-	959
Georgia 09B	4,493 ab	65 c	6,269 a	75 c-e	5,381 ab	70	-	895
ARSOK R47A	5,175 a	67 bc	5,574 b-d	77 a-c	5,374 ab	72	-	919
ARSOK R92-13	4,577 ab	66 bc	5,744 a-d	77 b-d	5,160 ab	72	-	882
ARSOK R94-4	4,505 ab	68 a-c	5,690 a-d	74 e	5,097 ab	71	-	859
ARSOK R90-12	4,307 ab	65 bc	5,578 b-d	76 b-d	4,942 a-c	71	-	833
ARSOK R93-10	4,259 ab	70 ab	5,241 cd	75 c-e	4,840 bc	73	-	839
Flavor Runner 458	3,875 b	66 bc	5,122 d	75 c-e	4,498 c	70	-	748
Mean	4,578	68	5,792	76	5,172	73		
CV	28.1	7.71	14.7	3.32	5.05	9.77		
LSD (0.05)	1,044	4.20	671	2.03	591	16.2		
Spanish[5]								
Tamnut OL06	4,541	63 b	5,957 a	75 a	5,249	69	-	815
OLé	4,909	66 ab	5,433 ab	71 cd	5,171	69	-	803
AT 98-99	4,739	64 b	5,392 ab	73 b	5,066	68	-	775
ARSOK S88-2	4,901	68 a	5,009 b	72 bc	4,955	70	-	780
Schubert	4,382	68 a	5,352 ab	69 d	4,967	68	-	760
Mean	4,692	66	5,480	73	5,061	70		
CV	24.2	7.1	16.6	2.83	6.85	4.43		
LSD (.05)	601	3.80	745	1.68	963	8.49		
Virginia[5]								
Contender	5,394	66 bc	6,318 a	73 bc	5,856	70 b	63	1,090
ARSOK V85-7	5,255	73 a	5,864 a-d	77 a	5,559	75 a	63	1,103
VENUS	4,989	67 b	6,074 ab	72 b-d	5,531	70 b	61	1,027
Jupiter	5,280	65 bc	5,512 b-d	72 b-d	5,396	68 bc	56	970
Florida Fancy	5,046	64 cd	5,739 a-d	70 c-e	5,392	67 c	55	955
Wynne	4,638	63 c	5,949 a-c	70 c-e	5,293	66 c	56	925
Mean	5,100	66	5,643	72	5,504	69		
CV	24.1	6.32	15.1	5.77	4.90	1.29		
LSD (.05)	782	3.40	686	3.32	693	2.30		

[1] Data not shown for all varieties tested in 2017-2018 and used to calculate mean, CV, and LSD.
[2] Values within the same column followed by the same letter are not significantly different at P =.005.
[3] % TSMK = Percent total sound mature kernels.
[4] Calculated based on peanut market-type contract price 2018. ELK bonus added for Virginias.
[5] Market Type.

Partners in Progress
PEANUTS

Performance Across Locations

Table 7 includes yield and grade data averaged across locations for 2018. Statistical differences for yield and grade were reported for all market-types. Among the runner types tested, Tamrun OL11 and Georgia 09B were the top yielders, averaging 6,276 and 6,269 pounds per acre. Numerically, the top yielding Spanish entry across locations was Tamnut OL06 at 5,957 pounds per acre, but no statistical differences in yield were observed. Significant differences were reported for Virginia entry yields and grades. The top Virginia-type entry tested was cultivar Contender at 6,318 pounds per acre and 73 percent TSMK. Table 8 shows peanut yields and grades averaged across years (2017-2018) and all locations in Oklahoma, along with estimated revenue for each entry. Averaged over years and across locations, the top performing runner entries were Lariat, Webb and Tamrun OL11 with yields of 5,503; 5,471 and 5,459 pounds per acre, respectively. Statistical differences were seen for yield but not grade for runner entries. Flavor Runner 458 averaged 4,498 pounds per acre, making it the poorest performer overall. Among the Spanish entries, Tamnut OL06 and OLé were the top yielders numerically, but no statistical differences in performance were found for yield or grade. Cultivar Contender was numerically the top yielder across locations and years, averaging 5,856 pounds per acre, but no significant differences were seen for Virginia-type entries.

Acknowledgements

Special thanks to Lisa Myers and Angie Harting for technical support and to Bobby Weidenmaier, Harley Houston and Brennan Leighton at the Caddo Research Station for location support. Thanks also to farmer cooperators Les Crall and Joe D. and Gayle White. Variety seed for these trials was provided by Birdsong Peanuts. This research is supported by USDA-ARS CRIS Project No. 3072-21220-007-00D, the Oklahoma Peanut Commission and National Peanut Board as well as OAES. Mention of trade names or commercial products in this publication is solely for the purpose of providing specific information and does not imply recommendation or endorsement by the U.S. Department of Agriculture. USDA is an equal opportunity provider and employer.

Integrated Management of Peanut Diseases

John Damicone, Dylon Teeter, Felipe Cevallos and Brooke King
Department of Entomology and Plant Pathology

2018 progress made possible through OPC and NPB support

- **Levels of soilborne diseases such as Sclerotinia blight and pod rot were low in 2018.**
- **Foliar diseases such as early leaf spot and web blotch and the soilborne disease southern blight (*Sclerotium rolfsii*) were severe in 2018.**
- **Control of early leaf spot and web blotch resulted in yield responses of 1,000 to 1,500 pounds per acre.**
- **Miravis® and Elatus® are newly registered fungicides that provided exceptional control of foliar diseases and southern blight, respectively.**
- **Experimental fungicides such as BAS 75007 and BAS 75303 containing a new active ingredient, Revysol, and Lucento™ provided better control of foliar diseases and southern blight, and generally higher yields of Spanish peanuts compared to Folicur®.**
- **The experimental fungicide Pyraziflumid appeared to provide excellent control of Sclerotinia blight, but results were not definitive because of low disease pressure.**
- **Spanish and Virginia-type breeding lines from the USDA/ARS breeding program generally had better yields and grades than other available varieties, but their resistance to Sclerotinia blight could not be determined because of low disease pressure.**

Field trials completed in 2018 addressed the management of important peanut diseases in Oklahoma. The management strategies 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, web blotch, southern blight and Sclerotinia blight. The cooperation of Bobby Weidenmaier and the staff at the Caddo Research Station is greatly appreciated. Additional funding for the trials was provided by BASF, FMC Corporation, Nichino and Syngenta.

Results from 2018 are summarized in this report. In interpreting the results, small differences in treatment values should not be overemphasized. Statistical analysis at the 95 percent confidence level is applied to all the trial data. Unless values are statistically different (followed by different letters), little confidence can be placed in the superiority of one treatment or variety over another.

Conditions at the Caddo Research Station were generally favorable for development of the peanut crop and diseases. Rainfall during the cropping period (May through October) totaled 3.5 inches for May; 3.75 inches for June; 4.03 inches for July; 1.61 inches for August; 7.31 inches for September; and 6.02 inches for October. Monthly rainfall totals were below normal in May, June and August,

but were from 1.7 to 4.3 inches above normal in the other months. Average daily temperatures were above normal in May and June and below normal for the remaining months. The cool wet conditions favored severe foliar disease development. Web blotch was unusually severe in 2018 on Spanish varieties. Pod rot was a minor concern while levels of Sclerotinia blight and southern blights were somewhat below normal. However, trials that were inoculated with *Sclerotium rolfsii,* southern blight pressure was extreme. Adverse weather late in the season including excessive rainfall, cool temperatures and an early freeze, made harvest conditions challenging statewide. Harvest losses due to weather were a problem in commercial fields, but not in the trials reported here.

Sclerotinia blight

Peanut variety responses to fungicide programs for control of Sclerotinia blight

The objective of this trial was to measure the disease and yield responses to a fungicide program with Endura® for control of Sclerotinia blight on peanut varieties that were commercially available in 2018. The experimental design was a split-plot, randomized complete block with four replications. Whole plots were fungicide treatment (Endura at 8 oz/A or not) and sub-plots consisted of each entry planted in two-row plots. Fungicide was applied on a preventive schedule at 75 and 105 days after planting. The trial was planted on May 10 and dug Oct. 29.

Sclerotinia blight appeared in August, but only reached low levels compared to previous trials at this site.

The cooler and wetter conditions should have been favorable for severe disease development, but Sclerotinia blight did not develop to meaningful levels in this trial. Varieties responded similarly to the fungicide program (Table 9). The Endura® program increased yields and crop values despite the low disease pressure. The yield response to fungicide averaged 300 pounds per acre, but the crop value response averaged only $75 per acre, which was not sufficient to offset the cost of the fungicide program. Varieties also differed in yield and crop value. Florida Fancy, Georgia 09B, Lariat and Tamrun OL11 had the highest yields and the Spanish entries had the lowest. Florida Fancy had the highest crop value and Tamnut OL06 had the lowest.

Peanut breeding line responses to fungicide for control of Sclerotinia blight

The objective of this trial was to measure the disease and yield responses of advanced peanut breeding lines from Dr. Kelly Chamberlin's breeding program at USDA/ARS to fungicide for control of Sclerotinia blight. The breeding lines were compared to reference varieties of each market type. The experimental design was a split-plot, randomized complete block with four replications. Whole plots were fungicide treatment (Omega® at 1.5 pints per acre or not) and sub-plots consisted of each entry planted in two-row plots. Fungicide was applied on a preventive schedule at 75 and 105 days after planting. The trial was planted on May 10 and dug Oct. 29.

The cooler and wetter conditions should have been favorable for severe disease development, but Sclerotinia blight did not develop to meaningful levels in this trial. As a result of the low disease pressure, fungicide treatment with Omega® did not have a statistical effect on disease, yield of grade and only the main effect data of entry averaged over fungicide treatment are presented (Table 10). Disease levels were near zero. Yields were good and did not differ among the entries. The effect of entry, but not treatment or treatment x entry, was a significant effect on grade. Lariat

Table 9. Responses of peanut varieties to fungicide programs for control of Sclertotinia blight.

Entry (market type)[2]	Treatment and rate/A (timing)[1] Endura 70WG 8 oz (1,2)	Non-treated check	Average[3]
	Sclerotinia Blight (%) 20 Sept.		
Lariat (R)	0.0	0.0	0.0 b[4]
Jupiter (V)	0.0	0.3	0.2 b
Georgia 09B (R)	0.0	0.0	0.0 b
Olé (S)	0.0	0.0	0.0 b
Tamrun OL11 (R)	0.0	0.3	0.2 b
Span 17 (S*)	0.3	0.0	0.2 b
Sullivan (V)	0.0	0.0	0.0 b
GA14N (V)	0.0	0.6	0.3 ab
Florida Fancy (V)	0.0	0.0	0.0 b
AT-9899 (S*)	1.3	0.0	0.6 a
Tamnut OL06 (S)	0.0	0.3	0.2 b
Avg[5]	0.1 a[4]	0.1 a	
	Yield (lb/A)		
Lariat (R)	5,363	4,610	4,987 abc
Jupiter (V)	4,674	4,256	4,465 cde
Georgia 09B (R)	5,345	4,547	4,946 abcd
Olé (S)	4,519	4,247	4,383 de
Tamrun OL11 (R)	5,146	5,191	5,168 ab
Span 17 (S*)	4,238	3,981	4,128 e
Sullivan (V)	4,320	4,238	4,279 e
GA14N (V)	4,737	4,456	4,596 bcde
Florida Fancy (V)	5,699	5,282	5,490 a
AT-9899 (S*)	4,156	4,138	4,147 e
Tamnut OL06 (S)	4,120	3,902	4,011 e
Avg[5]	4,756 a	4,451 b	
	Value ($/A)[6]		
Lariat (R)	1,297	1,115	1,206 bc
Jupiter (V)	1,210	1,102	1,156 bcd
Georgia 09B (R)	1,299	1,105	1,202 bc
Olé (S)	1,104	1,037	1,070 cde
Tamrun OL11 (R)	1,228	1,239	1,234 b
Span 17 (S*)	1,081	1,015	1,053 cde
Sullivan (V)	1,129	1,107	1,118 bcd
Georgia 14N (V)	1,156	1,087	1,121 bcd
Florida Fancy (V)	1,498	1,388	1,443 a
AT-9899 (S*)	1,046	1,042	1,044 ed
Tamnut OL06 (S)	992	940	966 e
Avg[5]	1,185 a	1,109 b	

[1] Timings 1 and 2 correspond to preventive fungicide applications on July 25 and Aug. 24, respectively.
[2] R=runner, V=Virginia, S=Spanish, S*=small seeded runner graded as Spanish.
[3] Averaged over fungicide treatment.
[4] Values in a column or row followed by the same letter are not significantly different at P = 0.05.
[5] Averaged over entry.
[6] Based on a contract price (including a $25 per ton seed bonus) of $525 per ton for Virginia types, $500 per ton for Spanish types, and $475 per ton for runner types. Based on average grade (% TSMK) of 74 for Lariat; 69 (39 percent Extra Large Kernels, or ELK) for Jupiter; 75 for Georgia 09B; 70 for Olé; 73 for Tamrun OL11; 73 for Span 17; 69 (41 percent ELK) for Sullivan; 75 for Georgia 14N; 70 (41% ELK) for Florida Fancy; 72 for AT-9899; and 69 for Tamnut OL06.

and the breeding line ARSOK-R47A and ARSOK-V85-7 had the highest grades, and the Spanish entries had the lowest grades.

Evaluation of fungicides for control of Sclerotinia blight of peanuts–Trial 1:

The objective of this trial was to evaluate experimental fungicide S-2399 and registered fungicides for control of Sclerotinia blight on the susceptible, Virginia-type variety Florida Fancy. Treatments were applied once or twice on a preventive schedule approximately four weeks apart. The trial was planted on May 10 and dug Oct. 30.

The cooler and wetter conditions should have been favorable for severe disease development, but Sclerotinia blight only reached about 10 percent in the non-treated check by harvest (Table 11). All treatments except the single application of S-2399 and Priaxor® reduced disease incidence compared to the non-treated check. However, because of the low disease levels, yields and crop values did not differ among treatments.

Evaluation of fungicides for control of Sclerotinia blight of peanuts–Trial 2:

The objective of this trial was to evaluate experimental fungicides (S-2399 and Pyraziflumid) and registered fungicides for control of Sclerotinia blight on the susceptible, Virginia-type variety Florida Fancy (Table 12). Treatments were applied twice on a preventive schedule approximately four weeks apart, or on a four-spray, 14-day schedule beginning 75 days after planting. The trial was planted on May 10 and dug Oct. 30.

Foliar Diseases

Evaluation of experimental fungicides for control of foliar diseases on Spanish-type peanuts–Trial 1:

The objective of this trial was to evaluate experimental fungicides from BASF (BAS 75303 and BAS 75007) and Nichino (Pyraziflumid) in spray programs with Bravo® for control of early leaf spot and web blotch. Experimental fungicides were compared to programs with the registered fungicides Priaxor®

Table 10. Peanut breeding line and variety response to fungicide for control of Sclerotinia blight.

Entry and market type[1]	*Sclerotinia blight (%)*	*Yield (lb/A)*	*Grade (TSMK %)*	*Value ($/A)*[2]
Lariat (R)	0.0 b[3]	4,587 a	75.6 a	1,126 a
Florida Fancy (V)	0.8 a	4,501 a	72.4 c	1,174 a
Venus (V)	0.2 ab	4,442 a	72.6 c	1,160 a
Olé (S)	0.0 b	4,438 a	71.6 cd	1,107 a
Tamnut OL06	0.0 b	4,292 a	71.1 d	1,063 a
ARSOK-R47A (R)	0.0 b	4,474 a	76.4 a	1,108 a
ARSOK-V85-377 (V)	0.8 a	4,134 a	74.1 b	1,102 a
ARSOK-V85-7 (V)	0.2 ab	5,077 a	75.4 a	1,372 a
ARSOK-S88-2 (S)	0.0 b	4,950 a	72.1 cd	1,243 a

1 R=runner, V=Virginia, S=Spanish.
2 Based on a contract price (including a $25 per ton seed bonus) of $525 per ton for Virginia types, $500 per ton for Spanish types, and $475 per ton for runner types. ELK was inadvertently not determined for the Virginia types and not included in the value of the Virginia types.
3 Values in a column or row followed by the same letter are not statistically different at P = 0.05.

Table 11. Evaluation of fungicides for control of Sclerotinia blight on 'Florida Fancy' Virginia-type peanuts, Trial 1.

Treatment and rate/A (timing)[1]	*Sclerotinia blight (%)*		*Yield (lb/A)*	*Value ($/A)*[2]
	Sept. 20	*Oct. 16*		
Omega® 4F 1.0 pt (1,2)	1.0 a[3]	4.2 bc	6,018 a	1,692 a
S-2399 2.84F 2 fl oz (1,2)	1.5 a	5.7 bc	5,714 a	1,606 a
Endura® 70WG 8 oz (1,2)	0.2 a	4.2 bc	6,026 a	1,693 a
S-2399 2.84F 3 fl oz (1,2)	2.0 a	9.5 ab	5,634 a	1,584 a
Elatus® 45WG 7.3 fl oz + Miravus® 1.67F 3.4 fl oz (1,2)	0.2 a	3.7 bc	6,200 a	1,743 a
Propulse® 3.3F 13.7 fl oz (1,2)	0.5 a	3.2 c	5,859 a	1,647 a
S-2399 2.84F 4 fl oz (1)	1.7 a	11.7 a	5,655 a	1,590 a
Fontelis® 1.67F 1.5 pt (1,2)	0.7 a	3.5 c	5,873 a	1,651 a
Priaxor® 4.17F 8 fl oz (1,2)	0.5 a	6.2 abc	6,069 a	1,706 a
Non-treated check	2.0 a	11.7 a	5,852 a	1,645 a

[1] Applications 1 and 2 were made on Aug. 2 and Aug. 31, respectively.
[2] Crop value based on a contract price of $525 per ton and an average grade of 75% TSMK and 46% ELK.
[3] Values in a column followed by the same letter are not statistically different at P = 0.05.

Table 12. Evaluation of fungicides for control of Sclerotinia blight on 'Florida Fancy' Virginia-type peanuts, Trial 2.

Treatment and rate/A (timing)[1]	*Sclerotinia blight (%)*		*Yield (lb/A)*	*Value ($/A)*[2]
	Sept. 20	*Oct. 16*		
Non-treated check	1.2 a[3]	15.2 a	5,227 a	1,453 a
Cannonball® 50WG 5.7 oz (1,2)	2.7 a	6.5 bc	5,401 a	1,501 a
Omega® 4F 1.5 pt (1,2)	1.0 a	4.0 c	5,401 a	1,501 a
Endura® 70WG 8 oz (1,2)	0.0 a	6.5 bc	5,278 a	1,467 a
Pyraziflumid 1.83F 2.33 fl oz (14-d)	1.2 a	7.2 bc	5,351 a	1,487 a
Pyraziflumid 1.83F 3.11 fl oz (14-d)	0.7 a	2.2 c	5,576 a	1,550 a

[1] Applications 1 and 2 were made on July 25 and Aug. 24, respectively. Applications for the 14-day schedule were made on July 25, Aug. 16, Aug. 29 and Sept. 13.
[2] Crop value based on a contract price of $525 per ton and an average grade of 74 percent TSMK and 47 percent ELK.
[3] Values in a column followed by the same letter are not statistically different at P = 0.05.

and Provost®. The experimental design was a randomized complete block design with four replications. Treatments received six applications on a 14-day schedule beginning July 5. Using strip till techniques, the trial was planted May 8 and dug Oct. 22.

Early leaf spot appeared in July and caused more than 30 percent defoliation in the non-treated check by Sept. 10. Web blotch appeared in August and became severe in September and October (Table 13). All treatments reduced early leaf spot, web blotch and defoliation by Sept. 14, compared to the untreated check. All treatments reduced leaf spot and defoliation by Oct. 16. However, leaf spot increased for Pyraziflumid treatments to intermediate levels. Web blotch increased to high levels by Oct. 16. All treatments except Priaxor® reduced web blotch compared to the non-treated check. Generally, pyraziflumid provided the best web blotch control. Despite the fact plots were not inoculated with *Sclerotium rolfsii*, southern blight appeared late in

Table 13. Evaluation of fungicide programs for control of foliar diseases on 'Olé' Spanish peanuts, Trial 1.

Treatment and rate/A (timing)[1]	Sept. 10 Early leaf spot (%)	Sept. 10 Web blotch (%)	Oct. 16 Early leaf spot (%)	Oct. 16 Foliar Disease (%)	Oct. 16 Defoliation (%)	Oct. 16 So. blight (%)	Yield (lb/A)	Value $/A[2]
Non-treated check	55.8 a[3]	28.3 a	100.0 a	100.0 a	100.0 a	20.5 a	2425 g	594 g
Bravo® 6F 1.5 pt (1) BAS 75303 3.3F 8 fl oz (2-6)	2.9 bc	8.8 bc	0.0 c	58.3 cd	34.0 efg	2.7 de	4,966 bcd	1,217 bcd
Bravo® 6F 1 pt (1) BAS 75303 3.3F 12 fl oz (2-6)	4.2 bc	11.6 bc	0.0 c	80.0 b	54.1 bcd	2.7 de	5,336 ab	1,308 ab
Bravo® 6F 1 pt (1) BAS 75303 3.3F 15 fl oz (2-6)	5.4 bc	13.7 b	0.0 c	47.5 de	26.6 fg	1.0 e	5,474 a	1,342 a
Bravo® 6F 1.5 pt (1) BAS 75007 3.3F 3 fl oz (2-6)	4.1 bc	13.7 b	0.0 c	68.3 bc	44.5 cde	6.0 de	4,334 ef	1,062 ef
Bravo® 6F 1.5 pt (1) Priaxor® 4.17F 6 fl oz (2-6)	2.9 bc	11.3 bc	0.0 c	85.0 ab	63.3 b	3.2 de	4,603 de	1,128 de
Bravo® 6F 1.5 pt (1) Provost® 3.6F 8 fl oz (2-6)	3.3 bc	14.1 b	0.0 c	77.5 b	56.6 bc	3.2 de	4,864 cd	1,192 cd
Bravo® 6F 1.5 pt (1) Bravo® 6F 1.5 pt + BAS 75303 3.3F 8 fl oz (2-6)	1.2 c	12.5 bc	1.4 c	42.5 de	17.4 g	1.2 e	5,205 abc	1,276 abc
Pyraziflumid 1.8F 2.3 fl oz (1-6)	12.9 bc	2.9 c	45.8 b	36.6 ef	38.7 def	12.5 b	4080 f	1,000 f
Pyraziflumid 1.8F 3.1 fl oz (1-6)	13.8 b	4.7 bc	56.6 b	24.1 f	27.0 efg	10.5 bc	3906 f	958 f

[1] Timings 1 to 6 correspond to the spray dates of 1 = July 5, 2 = July 19, 3 = Aug. 2, 4 = Aug. 15, 5 = Aug. 29, 6 = Sept. 13.
[2] Crop value based on a contract price of $475 per ton and an average grade of 70 percent TSMK.
[3] Values in a column followed by the same letter are not statistically different at P = 0.05.

the season and became severe in the non-treated check. All treatments reduced levels of southern blight compared to the non-treated check. Pyraziflumid treatments had higher levels of southern blight than the other fungicide treatments. All treatments increased yields and crop value compared to the non-treated check. Yields were high and yield responses to fungicide programs compared to the non-treated check ranged from 1,480 to more than 3,000 pounds per acre. Given a contract price of $475 per acre for Spanish peanuts, crop value responses to the fungicide programs ranged from to $364 to $748 per acre.

Evaluation of fungicide programs for control of foliar diseases on Spanish-type peanuts–Trial 2:

The objective of this trial was to evaluate the new fungicide Miravis® for control of leaf spot and web blotch when applied on a calendar or weather-based advisory schedules. The experimental design was a randomized complete block design with three replications. Treatments were applied according to the Mesonet Leaf Spot Advisor Program (www.mesonet.org) or on a 14-day schedule beginning July 5. Using strip till techniques, the trial was planted on May 8 and dug Oct. 22.

Early leaf spot appeared in July and caused more than 30 percent defoliation in the non-treated check by Sept. 10. Web blotch appeared in August and increased in September and October (Table 14). All treatments reduced early leaf spot and defoliation by Sept. 10, compared to the non-treated check. Web blotch was highest for the Bravo®+Folicur® program on Sept. 10. Web blotch was low in the non-treated check because most leaves had early leaf spot. Miravis® treatments had the lowest levels of web blotch. All treatments except the Bravo®+Folicur® program reduced foliar disease and defoliation on Oct. 16. Web blotch increased to high levels by Oct. 16, and likely caused most of the increase in foliar disease from Sept. 10 to Oct. 16. Despite the fact that plots were not inoculated with the *Sclerotium rolfsii*, southern blight became severe late in the season. All treatments reduced southern blight compared to the non-treated check. All treatments increased yields compared to the non-treated check. Yield responses compared to the non-treated check ranged from 1,400 to over 2,000 pounds per acre. Given a contract price of $475 per acre for Spanish peanuts, crop value responses to the fungicide programs ranged from to $358 to $510 per acre.

Foliar diseases and southern blight

Evaluation of fungicide programs for control of foliar diseases and southern blight on Spanish-type peanuts–Trial 1:

The objective of this trial was to evaluate the experimental fungicide Lucento™ for control of foliar diseases and southern blight of peanuts. Lucento™ was applied in various programs with Bravo®, Topguard EQ® and Folicur® on a five-spray 14-day schedule. Lucento™ programs were compared to programs with the registered fungicides Folicur® and Elatus®. The full-season Bravo® program controls foliar diseases, but not soilborne diseases such as southern blight. The experimental design was a randomized complete block with four replications. Plots were inoculated with the southern blight fungus by sprinkling millet seed colonized by the fungus along the center two rows of each plot Aug. 15 after the third fungicide application. The foliar diseases early leaf spot and web

Table 14. Evaluation of fungicide programs for control of foliar diseases on 'Olé' Spanish peanuts, Trial 2.

Treatment and rate/A (timing)[1]	Sept. 10		Oct.16			Yield	Value
	Early leaf spot (%)	Web blotch (%)	Foliar Disease (%)[2]	Defoliation (%)	So. blight (%)	(lb/A)	($/A)[3]
Bravo® 6F 1 pt + Folicur® 3.6F 7.2 fl oz (A1-A3)	45.5 b[4]	43.3 a	93.3 a	93.3 a	15.3 b	3456 ab	851 a
Miravis® 1.67F 3.4 fl oz (1,3,5) Alto® 100SL 5.5 fl oz (2,4,6)	1.1 c	0.6 c	13.9 c	0.0 c	14.0 b	3204 b	789 b
Miravis® 1.67F 3.4 fl oz (A1) Alto® 100SL 5.5 fl oz (A2,A3)	5.0 c	3.8 c	23.3 b	23.3 b	12.7 b	3824 a	941 a
Non-treated check	72.2 a	15.5 b	100.0 a	100.0 a	38.0 a	1752 c	431 c

1 Timings 1 to 6 correspond to the spray dates of 1 = July 5, 2 = 9 July 19, 3 = Aug. 2, 4 = Aug. 16, 5 = Aug. 29 and 6 = Sept. 13 for the 14-day schedule; and A1 to A3 correspond to the spray dates of A1 = July 5, A2 = Aug. 17 and A3 = Aug. 29 for the weather-based schedule.
2 Early leaf spot and web blotch were rated together.
3 Crop value based on a contract price of $475/ton and an average grade of 70 percent TSMK.
4 Values in a column followed by the same letter are not statistically different at P = 0.05.

blotch developed naturally. Using strip till techniques, the trial was planted on May 8 and dug Oct. 22.

Conditions favored severe development of early leaf spot, web blotch and southern blight compared to previous trials at this site. Early leaf spot appeared in July and caused over 40 percent defoliation in the non-treated check by Sept. 10 (Table 15). Web blotch appeared in August and became severe in September and October. All treatments reduced early leaf spot and had low defoliation on Sept. 14. Among the fungicide treatments, the three-spray Folicur® program had the highest levels of early leaf spot and defoliation on Sept. 10. Treatment effects on web blotch were not statistically significant. Levels of foliar disease (early leaf spot + web blotch) did not differ among treatments on Oct. 16, which was attributed to severe late-season web blotch development. All treatments except the Folicur® program reduced defoliation levels compared to the non-treated check, although defoliation levels were generally high. All treatments except the full-season Bravo® program reduced southern blight compared to the non-treated control. All treatments increased yields compared to the non-treated check. Despite severe web blotch defoliation in most treatments, yields were high and exceeded 4,000 pounds per acre for all treatments except the full-season Bravo® program and the three-spray Folicur® program. Given a contract price of to $475 per acre for Spanish peanuts, crop value responses to the fungicide programs ranged from to $341 per acre for the full season Bravo® program to over $567 per acre for the Lucento™ programs.

Table 15. Evaluation of fungicide programs for control of foliar diseases and southern blight on 'Olé' Spanish peanuts, Trial 1.

	Sept. 10			Oct. 16				
Treatment and rate/A (timing)[1]	*Early leaf spot (%)*	*Web blotch (%)*	*Defoliation (%)*	*Foliar disease (%)[2]*	*Defoliation (%)*	*So. blight (%)*	*Yield (lb/A)*	*Value ($/A)[3]*
Non-treated check	79.1 a[4]	40.8 a	47.5 a	100.0 a	100.0 a	46.2 a	1,713 d	414 d
Bravo 6F 1.5 pt (1-5)	12.1 bc	30.0 a	10.0 c	100.0 a	78.3 cd	29.0 a	3,122 c	755 c
Bravo 6F 1 pt (1,2,5) Lucento 5.53 fl oz (3,4)	10.8 c	32.1 a	10.0 c	95.0 a	76.6 d	12.2 c	4,058 ab	981 ab
Bravo 6F 1.5 pt (1,4,5) Lucento 5.53 fl oz (2,3)	2.5 c	30.4 a	5.8 c	95.0 a	76.2 d	13.2 c	4,174 a	1010 a
Bravo 6F 1.5 pt (1,5) Lucento 5.53 fl oz (2,3) Topguard EQ 4.3F 8 fl oz (4)	4.6 c	30.4 a	8.3 c	97.5 a	83.8 cd	9.5 c	4,225 a	1,022 a
Bravo 6F 1.5 pt (1,5) Lucento 5.53 fl oz (2,3) Folicur 3.6F 7.2 fl oz (4)	8.8 c	34.2 a	8.3 c	96.6 a	88.3 bc	10.2 c	4,545 a	1,099 a
Bravo 6F 1.5 pt (1,5) Topguard EQ 4.3F 8 fl oz (2,3) Folicur 3.6F 7.2 fl oz (4)	6.7 c	32.9 a	11.7 bc	100.0 a	94.6 ab	4.5 c	4,218 a	1,020 a
Bravo 6F 1.5 pt (1,3,5) Elatus 45WG 7.3 oz (2,4)	4.2 c	22.5 a	7.1 c	100.0 a	87.9 bc	8.0 c	4,232 a	1,024 a
Bravo 6F 1.5 pt (1,4,5) Topguard EQ 4.3F 8 fl oz (2,3)	4.1 c	28.3 a	10.0 c	96.6 a	83.3 cd	8.0 c	4,247 a	1,027 a
Bravo 6F 1.5 pt (1,5) Folicur 3.6F 7.2 fl oz (2,3,4)	25.0 b	39.2 a	17.5 b	100.0 a	95.0 ab	12.5 c	3,579 bc	866 bc

[1] Timings 1 to 5 correspond to the spray dates of 1 = July 5, 2 = July 19, 3 = Aug. 2, 4 = Aug. 16, 5 = Aug. 29.
[2] Early leaf spot and web blotch were rated together.
[3] Crop value based on a contract price of $475/ton and an average grade of 69 percent TSMK.
[4] Values in a column followed by the same letter are not statistically different at P = 0.05.

Evaluation of fungicide programs for control of foliar diseases and southern blight on Spanish-type peanuts–Trial 2:

The objective of this trial was to evaluate various timings of the experimental fungicide Lucento™ for control of foliar diseases and southern blight of peanuts. Treatments received from three to five applications that were based on a five-spray, 14-day schedule. In the four-spray program, either spray three or four was omitted. In the three-spray treatment, Lucento™ was tank mixed rather than alternated with Bravo®, and the mixture was applied on 28-day intervals. Lucento™ programs were compared to a Folicur® program and a full-season Bravo® program that control foliar diseases but not soilborne diseases such as southern blight. The experimental design was a randomized complete block with four replications. Plots were inoculated with the southern blight fungus by sprinkling millet seed colonized by the fungus along the center two rows of each plot Aug. 15 after the third fungicide application. The foliar diseases early leaf spot and web blotch developed naturally. The trial was planted on May 8 using strip till techniques and dug Oct. 22.

Early leaf spot appeared in July and caused 50 percent defoliation in the non-treated check by Sept. 10 (Table 16). Web blotch appeared in August and because severe in September and October. All treatments reduced early leaf spot and had low (less than 10 percent) defoliation on Sept. 14. Among the fungicide treatments, the three-spray Folicur® program and the four-spray program that omitted the third application had higher levels of early leaf spot and defoliation on Sept. 10 than the other treatments. Treatment effects on web blotch were statistically significant; however, none of the treatments provided a high level of web blotch control. Levels of foliar disease (early leaf spot + web blotch) were high (more than 90 percent) for all treatments by Oct. 16, which was attributed to severe late season web blotch development. All treatments except Folicur® reduced defoliation levels compared to the non-treated check, although defoliation levels were generally high. All treatments reduced southern blight compared to the non-treated control. The treatments that included three consecutive mid-season applications (sprays two, three and four) of fungicide active on southern blight (Lucento™ or Folicur®) had the lowest levels of southern blight. All treatments increased yields compared to the non-treated check. Despite severe web blotch defoliation in most treatments, yields were high and exceeded 4,000 pounds per acre for treatments that included three applications of either Lucento™ or Folicur®. Crop value responses from the spray programs compared to the non-treated check ranged from $303 per acre for the full-season Bravo® program to $649 per acre.

Evaluation of fungicide programs for control of foliar diseases and southern blight on Spanish-type peanuts–Trial 3:

The objective of this trial was to evaluate the experimental fungicides BAS 75303 and S-2399 in comparison with registered fungicide (Elatus®, Convoy®, Fontelis®, Miravis® and Priaxor®) for control of foliar diseases and southern blight of peanuts. The fungicides were applied in various programs with Bravo®, Folicur® and Alto® on a five-spray, 14-day schedule. The experimental design was a randomized complete block with four replications. Plots were inoculated with the southern blight fungus by sprinkling millet seed colonized by the fungus along the center two rows of each plot on Aug. 15 after the third fungicide application. The foliar diseases early leaf spot and web blotch developed naturally. Using strip till techniques, the trial was planted May 8 and dug Oct. 22.

Conditions favored severe development of early leaf spot, web

Table 16. Evaluation of fungicide programs for control of foliar diseases and southern blight on 'Olé' Spanish peanuts, Trial 2.

Treatment and rate/A (timing)[1]	Sept. 10			Oct. 16			Yield (lb/A)	Value ($/A)[3]
	Early leaf spot (%)	Web blotch (%)	Defoliation (%)	Foliar disease (%)[2]	Defoliation (%)	So. blight (%)		
Non-treated check	82.9 a[4]	17.5 b	50.0 a	100.0 a	100.0 a	41.7 a	1,808 e	439 e
Bravo 6F 1.5 pt (1-5)	14.2 c	22.5 b	5.8 bcd	100.0 a	85.4 bc	28.5 b	3,056 d	742 d
Bravo 6F 1 pt (1,5) Lucento 5.53 fl oz (2,3,4)	2.5 d	25.4 ab	5.4 bcd	95.8 abc	71.2 d	9.7 de	4,479 a	1,088 a
Lucento 5.53 fl oz (1,3,5) Bravo 6F 1.5 pt (2,4)	5.0 cd	22.5 b	2.1 d	99.1 a	75.4 cd	16.7 cde	4,472 a	1,086 a
Bravo 6F 1.5 pt (1,3,5) Lucento 5.53 fl oz (2,4)	5.8 cd	24.6 ab	8.3 bc	95.8 abc	77.0 cd	19.2 c	3,732 bc	906 a
Bravo 6F 1.5 pt (1,5) Lucento 5.53 fl oz (2,4)	28.3 b	31.7 a	9.6 b	100.0 a	84.5 bc	20.2 bc	3,557 cd	864 cd
Bravo 6F 1.5 pt (1,5) Lucento 5.53 fl oz (2,3)	13.3 c	19.6 b	5.0 cd	97.5 ab	75.0 cd	16.7 cde	3,855 bc	936 bc
Bravo 6F 1.5 pt (1,3) Lucento 5.53 fl oz (2,4)								
Bravo 6F 1.5 pt + Lucento 5.53 fl oz (5)	7.5 cd	22.5 a	5.0 cd	93.7 bc	73.3 d	17.5 cd	4,196 ab	1,019 ab
Bravo 6F 1.5 pt + Lucento 5.53 fl oz (1,3,5)	2.9 d	18.7 b	3.7 d	91.2 c	66.2 d	13.7 cde	4,414 a	1,072 a
Bravo 6F 1.5 pt (1,5) Folicur 3.6F 7.2 fl oz (2,3,4)	25.4 b	32.9 a	9.6 b	100.0 a	94.1 ab	8.5 e	4,044 abc	982 abc

[1] 1 to 5 correspond to the spray dates of 1 = July 5, 2 = July 19, 3 = Aug. 2, 4 = Aug. 16, 5 = Aug. 29.
[2] Early leaf spot and web blotch were rated together.
[3] Crop value based on a contract price of $475/ton and an average grade of 69 percent TSMK.
[4] Values in a column followed by the same letter are not statistically different at P = 0.05.

blotch and stem rot compared to previous trials at this site. Early leaf spot appeared in July and caused nearly 50 percent defoliation in the non-treated check by Sept. 13. Web blotch appeared in August and became severe in September and October. All treatments reduced early leaf spot and had less than 10 percent defoliation on Sept. 14, compared to the non-treated check (Table 17). None of the treatments except for Miravis® and Fontelis® reduced web blotch compared to the non-treated check on Sept. 13. Levels of foliar disease (early leaf spot + web blotch) were high (more than 90 percent) for all treatments except Miravis® by Oct. 16, which was attributed to severe late season web blotch development. Most treatments reduced defoliation levels compared to the non-treated check although defoliation levels were generally high except for the Miravis® treatment. All treatments reduced southern blight compared to the non-treated check. Treatments that included BAS 75303, Convoy®, Elatus® and S-2399 had the lowest levels of southern blight, while Miravis® had the highest. All treatments increased yields compared to the non-treated check. Despite the high levels of defoliation, yields were high and exceeded 4,000 pounds per acre for most treatments. Treatments with the lowest stem rot levels generally had the highest yield. Crop value responses to the treatments ranged from $344 to $739 compared to the non-treated check.

Table 17. Evaluation of fungicide programs for control of foliar diseases and southern blight on 'Olé' Spanish peanuts, Trial #3.

Treatment and rate/A (timing)[1]	Sept. 13 *Early leaf spot (%)*	Sept. 13 *Web blotch (%)*	Sept. 13 *Defoliation (%)*	Oct. 16 *Foliar disease (%)*[2]	Oct. 16 *Defoliation (%)*	Oct. 16 *So. blight (%)*	*Yield (lb/A)*	*Value ($/A)*[3]
Bravo 6F 1.5 pt (1,5) BAS 75303 3.3F 12 fl oz (2,4) Folicur 3.6F 7.2 fl oz (3)	5.4 ef[4]	20.8 ab	4.2 c	99.1 a	74.1 c	3.0 e	5147 ab	1306 ab
Bravo 6F 1.5 pt (1,5) Priaxor 4.17F 6 fl oz (2,4) Folicur 3.6F 7.2 fl oz (3)	10.0 def	23.3 ab	5.0 bc	100.0 a	86.6 b	10.2 cd	4617 cd	1171 cd
Bravo 6F 1.5 pt (1-5) Convoy 3.8F 2 pt (2,4)	18.7 bc	18.3 ab	6.2 bc	100.0 a	87.5 b	3.5 e	5169 ab	1312 ab
Alto 100SL 5.5 fl oz + Bravo 6F 1.5 pt (1,3,5) Elatus 45WG 9.5 oz (2,4)	22.1 ab	22.1 ab	0.8 d	99.1 a	83.3 bc	3.2 e	5445 a	1382 a
Bravo 6F 1.5 pt (1,3,5) Fontelis 1.67F 1 pt (2,4)	14.6 bc	14.6 bc	6.7 bc	96.6 a	74.1 c	10.7 cd	4320 a	1096 a
Bravo 6F 1.5 pt (1-5) S-2399 2.84F 2 fl oz (2,4)	23.7 ab	23.7 ab	7.5 b	100.0 a	89.1 ab	6.5 de	4980 bc	1264 a
Bravo 6F 1.5 pt (1-5) S-2399 2.84F 3 fl oz (2)	18.3 bcd	17.5 ab	4.2 c	99.1 a	84.1 bc	12.5 c	4596 cd	1395 cd
Bravo 6F 1.5 pt (1-5) S-2399 2.84F 2 fl oz (2)	12.1 cde	24.1 ab	5.4 bc	98.3 a	82.5 bc	7.2 cde	4697 cd	1192 cd
Alto 100SL 5.5 fl oz + Bravo 6F 1.5 pt (1,3,5) Miravis 1.67F 3.4 fl oz (2,4)	7.9 ef	4.6 c	0.4 d	18.3 b	0.8 d	19.5 b	3891 e	987 e
Non-treated check	72.5 a	28.3 a	49.1 a	100.0 a	100.0 a	39.7 a	2534 f	643 f

1 Timings 1 to 5 correspond to the spray dates of 1=5 Jul, 2=19 Jul, 3=2 Aug, 4=16 Aug, 5=29 Aug.
2 Early leaf spot and web blotch were rated together.
3 Crop value based on a contract price of $475/ton and an average grade of 70 percent TSMK.
4 Values in a column followed by the same letter are not statistically different at P=0.05.

2018 Peanut Weed Management Report

Todd Baughman
Institute for Agricultural Biosciences, Ardmore

Peanut weed management trials were conducted at the Oklahoma Agricultural Experiment Station's Caddo Research Station near Fort Cobb in 2018. Peanut were planted in early May. Cool temperatures slowed peanut growth early in the season and likely attributed to some of the herbicide injury observed. While peanut maturity was delayed along with harvest, peanut yield exceeded 5,000 pounds per acre in 2017.

Trial PFCS18-01 evaluated tolerance of peanut to various application timings of Anthem® Flex. Anthem® Flex at 2 or 4 fluid ounces per acre was applied PRE, At-Crack and POST to peanut. This was compared to a weed-free check or Dual Magnum® at 1.33 pt PRE. This trial was maintained weed-free. Peanut stand reduction and injury was less than 5 percent season regardless of rate or application timing. Plant stand counts and peanut yield were not affected by any treatment. Peanuts exhibited good tolerance to all application rates and timings of Anthem® Flex in 2018.

Trial PFCS18-02 evaluated various PRE and POST herbicide options for weed management programs in peanut. This project is being conducted in collaboration with a graduate program at Mississippi State University. Peanut injury was less than 5 percent with all herbicide treatments except where Storm® + SelectMax® + Induce® was applied POST. However, this injury was transient and was not observed later in the season. Prowl® + Valor® provided 100 percent Texas panicum (PANTE) control prior to the At-Crack treatments. Texas panicum control was at least 90 percent with all treatments except with Warrant PRE and followed by two of the three POST programs and when Outlook® PRE was followed by Storm® + SelectMax® + Induce®. Palmer amaranth (AMAPA) control was at least 98 percent when Valor® or Warrant® PRE was followed by Storm® + SelectMax® + Induce®. Ivyleaf morningglory (IPOHE) control was generally best when Valor® was applied PRE. Yellow nutsedge (CYPES) and wild poinsettia (EPPHH) control was generally best when Cadre® was applied POST. The only treatments that yielded more than 4,000 pounds per acre were those that included Valor® PRE. Valor® PRE followed by Cadre® POST yielded over 4,400 pounds per acre.

Trial (PFCS18-03) evaluated Anthem® Flex (pyroxasulfone + carfentrazone) for weed control in peanuts. Peanut injury was 5 percent or less season long with all treatments. The only treatments that controlled Texas panicum, ivyleaf morningglory, wild poinsettia and yellow nutsedge at least 90 percent were Prowl® + Valor® PRE followed by Cadre® + Anthem® Flex + Induce® POST or Prowl® PRE followed by Storm® + Dual Magnum® At-Crack followed by Cadre® + Dual Magnum® POST.

Trial PFCS18-04 evaluated various PRE and POST herbicide options for weed management programs with Zidua® (pyroxasulfone) in peanuts. Peanut injury was less than 5 percent except for treatments that received an At-Crack application of Gramoxone. This injury was transient and was not observed

later in the season. The only treatment that controlled Texas panicum, ivyleaf morningglory, and wild poinsettia at least 90 percent was a treatment that included Prowl PRE; Zidua® + Gramoxone® + Induce® At-Crack; and Cadre® + Outlook® + 2,4-D + COC POST.

Appreciation is expressed to the Oklahoma Peanut Commission and the National Peanut Board for support of this project. Without the support of the Oklahoma Peanut Commission and the peanut producers of Oklahoma who contribute to the board through their checkoff dollars, much of this research would not be possible. Appreciation extends to Bobby Weidenmaier and the farm crew at the Caddo Research Station for their assistance in conducting these trials. Thanks also goes to the following companies: BASF Crop Protection and FMC Corp. for their support of these projects.

Partners in Progress
PEANUTS

Disease Evaluations and Agronomic Traits of Advanced Peanut Breeding Lines in 2018

Rebecca S. Bennett and Kelly D. Chamberlin
USDA / ARS

2018 progress made possible through OPC and NPB support

- **A total of 32 breeding lines and reference cultivars (12 runner, five Spanish and 15 Virginia market types) were evaluated at the Caddo Research Station for yield, seed and pod characteristics and soilborne diseases (Sclerotinia blight, southern blight and pod rot).**
- **Environmental conditions in 2018 were favorable for Sclerotinia blight. Relatively low levels of southern blight and pod rot were observed.**
- **Numerically, the top three runner entries for revenue and yield were ARSOK-R47A ($1,070 per acre at 6,595 pounds per acre), Georgia-09B ($1,005 per acre at 6,002 pounds per acre) and Webb ($944 per acre at 5,723 pounds per acre). ARSOK-R90-12 had the highest grade at 75 percent. ARSOK-R96-3 and Lariat had the least Sclerotinia blight at 13 and 32 percent, respectively, and Florida-07 had the most at 85 percent.**
- **ARSOK-S96-5 and Span-17 had the highest numerical crop values and significantly higher grades than other Spanish entries ($901 and $898 per acre, and 74 and 73 percent, respectively).**
- **In the Virginia trial, the top three entries for crop value and yield were ARSOK-V85-7 ($1,053 per acre at 5,554 pounds per acre), NC17EX ($1,006 per acre at 5,554 pounds per acre), and Contender ($997 per acre at 5,493 pounds per acre). ARSOK-V85-7 had the highest grade at 76 percent. The entry with the most resistance to Sclerotinia blight was Venus (32 percent).**
- **Significant differences were found among the Virginia entries for distribution of pod sizes.**
- **A separate test was conducted for evaluating pod rot in eight Virginia entries. The most susceptible entry was Jupiter (13 percent disease).**

A major goal of the ARS peanut research program in Stillwater is to develop and release high-oleic peanut cultivars for the Southwest with improved yield, disease resistance and seed characteristics. In 2018, commercial and advanced breeding lines of runner, Spanish and Virginia peanuts were evaluated in small plots at OSU's Caddo Research Station at Fort Cobb. The objectives of these field studies were: 1) to compare advanced or newly released lines to commercially available cultivars in agronomic quality (e.g. yield and seed grade) and disease resistance to soilborne diseases and 2) to evaluate a selection of

Virginia entries for pod rot resistance in a field where moderately high levels of pod rot were observed in 2017.

Methods and Field Conditions for Evaluating Advanced Breeding Lines and Cultivars

A total of 32 breeding lines and reference cultivars (12 runner, five Spanish and 15 Virginia market types) were evaluated. The three peanut market types were grown and evaluated separately, and all advanced breeding lines were high oleic. Each breeding line or cultivar was planted at a density of five seeds per foot in plots consisting of two 15-foot-long rows with 36-inch-wide beds. A randomized complete block design was used by dividing the field into four sections (blocks) to account for potential disease gradients and environmental variables. Extra plots, due to the odd number of cultivars used in the Spanish and Virginia trials, were planted with Florida-07, a cultivar susceptible to Sclerotinia blight (caused by *Sclerotinia minor*) to increase soilborne inoculum; these extra Florida-07 plots were not evaluated. All plots were planted May 18. Spanish plots were dug Sept. 24 and threshed Oct. 1; runner and Virginia plots were dug Oct. 5 and threshed Oct. 11.

Fields were inoculated with pure sclerotia of *Sclerotinia minor* at a rate of 0.35 grams per 15-foot-row. Half of the field was inoculated Aug. 31, and the other half was inoculated Sept. 10. Fields were managed for weeds, foliar diseases and southern blight (caused by *Sclerotium rolfsii*), but were not managed for Sclerotinia blight, pod rot or nematodes.

Environmental conditions were fairly conducive for Sclerotinia blight from September to October. Daily average temperatures in August, September and October were 76.6, 71 and 61 F, respectively. Rainfall was notably greater than the 15-year average in September (+5.22 inches) and October (+3.29 inches). Additional water (0.5 to 1 inch) was applied to the plots 16 times between May 25 and Aug. 30 using a center pivot system.

Two to three evaluations for Sclerotinia and southern blights were conducted: Aug. 24 and Sept. 13 for the Spanish entries; Aug. 24, Sept. 13 and Oct. 4 for the runner entries; and Aug. 31, Sept. 13 and Oct. 4 for the Virginia entries. Little disease was observed during the August ratings, so data from September and October only are reported.

Table 18. Monthly air temperature and rainfall from Mesonet for 2018 field season at the Caddo Research Station at Fort Cobb.

	Air Temperature (°F)		*Rainfall (Inches)*	
Month	*Daily Mean*	*Departure from 15-Year Average*	*Total*	*Departure from 15-Year Average*
May 18 to 31[1]	77.6	+7	0.85	-1.02
June	81	+2	3.75	-0.48
July[2]	82.1	not available	4.03	+1.31
August[2]	76.6	not available	1.61	-1.82
September[2]	71	-1	7.31	+5.22
October 1 to 19[1,2]	61	-3	4.59	+3.29

[1] Mean temperature and rainfall are for May 18 (planting date) to May 31, and Oct. 1 to 19 (last digging date). Departure from 15-year average includes all days in May.
[2] Incomplete records or data unavailable.

Disease incidence was measured by counting the number of 6-inch sections within each plot that had symptoms of Sclerotinia blight and southern blight. Little southern blight was observed. In addition, the area lost to the center pivot's irrigation tracks was estimated in affected plots on the Sept. 13 rating date. Plots were examined for pod rot within 24 hours of digging, but disease was minimal and no ratings were taken.

Peanut grades were determined following USDA-AMS guidelines using two 200-gram samples from each plot. One 500-gram sample per plot was used to determine pod size distribution in the Virginia entries. Yield was adjusted in plots affected by wheels from the center pivot by factoring in the percent of the plot area lost. Data were analyzed using one-way ANOVA in PROC GLIMMIX of SAS (ver. 9.3). The Type I error rate for pairwise comparisons of breeding lines and cultivars was controlled at $\alpha = 0.05$ using the ADJUST=TUKEY option.

Performance of the Runner Market Type Entries

Twelve runner peanut entries, including the high-oleic cultivars Florida-07, Georgia-09B, Georgia-13M, Lariat, Tamrun OL11 and Webb were evaluated (Tables 19 and 20). Statistical differences among entries were found for all Sclerotinia and southern blight ratings. In the Sept. 13 Sclerotinia blight rating, Florida-07 had the highest incidence of disease at 49 percent. By the late rating, Florida-07, ARSOK-R94-4 and Georgia-09B had the most Sclerotinia blight (85, 64 and 61 percent, respectively) compared to Lariat and ARSOK-R96-3 (32 and 13 percent, respectively; Table 19). Florida-07 also had the most southern blight with 12 percent disease incidence. Disease levels in this entry were greater than in ARSOK-R96-3, Tamrun OL11, ARSOK-R47A and ARSOK-R90-12.

Statistical differences were found among runner entries for crop value, yield and all shelling characteristics except visibly damaged kernels (Table 20). Numerically, the top runner entry for revenue and yield was breeding line ARSOK-R47A ($1,070 per acre at 6,595 pounds per acre); the lowest crop value and yield were found in the disease-resistant ARSOK-R96-3 ($523 per acre at 3,509 pounds per acre). Breeding line ARSOK-R90-12 had the highest grade at 75 percent, followed by R93-10, R92-13, R94-4, Georgia-09B and Lariat (74 percent or higher). ARSOK-R96-3 had the lowest grade at 66 percent.

Performance of the Spanish Market Type Entries

Little soilborne disease was found on the Spanish entries OLé, Schubert, Span-17, ARSOK-S88-1 and ARSOK-S96-5. No significant differences were observed in Sclerotinia blight ratings, but Span-17 had significantly more southern blight than Schubert, ARSOK-S88-2 and OLé. Significant differences were found for grade, 100-seed weights and percentages of extra-large and hull (Table 20). Numerically, ARSOK-S96-5 and Span-17 produced the highest value crops and yield ($901 and $898 per acre at 5,143 and 5,155 pounds per acre, respectively). In addition, seed grades from ARSOK-S96-5 and Span-17 (both greater than 73 percent) were significantly higher than the other entries.

Performance of the Virginia Market Type Entries

A total of 15 Virginia peanut entries were evaluated, including Jupiter and high-oleic ACI-351, Florida Fancy, Sullivan, Venus, Wynne and the newly released Contender (Tables 19 and 21). Significant differences were found among entries for both early and late Sclerotinia blight ratings but not for the southern blight (Table 19). In the late Sclerotinia

Table 19. Incidence of Sclerotinia and southern blights in runner, Spanish and Virginia advanced breeding lines and commercial cultivars at the Caddo Research Station at Fort Cobb, 2018.[1]

Entry	*Sclerotinia (Sep.13)*	*Sclerotinia[2] (Oct. 5)*	*Southern Blight[2]*
Runner			
Florida-07	49.2a	85.4a	12.1a
ARSOK-R94-4	18.3b	64.2ab	2.9ab
Georgia-09B	15.0b-d	61.3ab	7.1ab
ARSOK-R92-13	12.5b-d	60.4a-c	5.0ab
Webb	9.6b-d	56.7a-c	5.8ab
Georgia-13M	13.3b-d	47.1bc	2.5ab
ARSOK-R90-12	15.8bc	42.1b-d	1.3b
ARSOK-R93-10	9.6b-d	39.6b-d	4.6ab
ARSOK-R47A	4.2b-d	38.3b-d	0.8b
Tamrun OL11	2.5cd	36.7b-d	0.0b
Lariat	2.1cd	31.7dc	1.7ab
ARSOK-R96-3	0.8d	12.9d	0.0b
Spanish			
Span-17	10.0	—	10.8a
ARSOK-S96-5	2.1	—	3.3ab
Schubert	0.0	—	0.8b
ARSOK-S88-2	0.0	—	0.8b
OLé	0.0	—	0.0b
Virginia			
NC20EX	22.9ab	86.3a	9.6
Florida Fancy	32.5a	84.2a	7.1
NC19EX	31.3a	72.5ab	6.3
Jupiter	20.4ab	70.0ab	16.7
ARSOK-V85-7	10.8ab	66.3ab	7.9
NC22EX	17.9ab	64.2ab	3.8
Wynne	11.7ab	63.3ab	2.1
ACI-351	22.1ab	59.2a-c	6.7
NC7EX	10.8ab	58.7a-c	2.5
Sullivan	10.0ab	57.1a-c	1.7
NC2EX	10.4ab	56.7a-c	2.9
NC17EX	5.8b	52.1bc	4.2
Contender	16.7ab	48.8bc	4.2
NC1EX	5.8b	48.3bc	5.8
Venus	7.9ab	31.7c	7.1

[1] Market types were analyzed separately and are ordered by highest to lowest Sclerotinia blight in the last rating date. Numbers with the same lowercase letter within columns for each market type are not significantly different ($\alpha = 0.05$). No differences among entries if letters absent in column.

[2] —, ratings not available; Spanish plots dug Sept. 24.

Table 20. Yield, grade, shelling characteristics and incidence of Sclerotinia blight in advanced runner and Spanish breeding lines and commercial cultivars planted at the Caddo Research Station at Fort Cobb, May 18, 2018.[1]

Entry	*Revenue ($/A)[2]*	*Yield (lbs/A)*	*Grade[3]*	*100-Seed (g)*	*ELK (%)[4]*	*VDK (%)[4]*	*Hull (%)*	*Sclerotinia[5]*
Runner								
ARSOK-R47A	1,070a	6,595a	72.0ab	71.5b-e	45.6b-d	0.7	25.5ab	38.3b-d
Georgia-09B	1,005ab	6,002ab	74.3a	68.1d-f	51.8a-c	0.8	23.4b	61.3ab
Webb	944ab	5,723ab	73.2ab	75.2b-d	51.2a-d	0.6	24.5b	56.7a-c
ARSOK-R92-13	916ab	5,462ab	74.5a	78.2a-c	55.2ab	0.7	23.3b	60.4a-c
ARSOK-R90-12	906ab	5,360a-c	75.2a	72.2b-e	51.0a-d	0.7	22.4b	42.1b-d
ARSOK-R94-4	890a-c	5,324a-c	74.4a	86.6a	60.6a	0.8	24.0b	64.2ab
ARSOK-R93-10	871a-c	5,179bc	74.7a	71.5b-e	51.3a-d	1.0	22.7b	39.6b-d
Lariat	853a-c	5,141bc	73.7a	69.9c-f	45.3b-d	0.7	24.0b	31.7dc
TamrunOL11	820bc	4,899bc	74.3a	66.2d-f	38.7d	0.3	23.7b	36.7b-d
Florida-07	787bc	4,949bc	70.6ab	64.8ef	38.4d	0.8	25.6ab	85.4a
Georgia-13M	656dc	4,073cd	72.0ab	60.7f	40.6cd	0.7	25.1ab	47.1bc
ARSOK-R96-3	523d	3,509d	66.3b	80.7ab	47.5b-d	0.7	31.4a	12.9d
Spanish								
ARSOK-S96-5	901	5,143	73.8a	58.3a	64.0a	0.4	24.3c	2.1
Span-17	898	5,155	73.4a	56.4a	53.7b	0.3	24.4c	10.0
ARSOK-S88-2	858	5,300	68.5b	42.9c	40.5c	0.7	29.2b	0.0
OLé	827	5,082	68.1b	46.4b	39.5c	0.7	29.1b	0.0
Schubert	788	5,239	63.3c	45.0bc	24.9d	1.2	33.0a	0.0

[1] Market types were analyzed separately and are ordered by highest to lowest revenue per acre. Numbers with the same lowercase letter within columns for each market type are not significantly different ($\alpha = 0.05$). No differences among entries if letters absent in column.

[2] Based on the following contract prices per ton: runner, $450; Spanish, $475. Calculations do not include deductions for excess splits or damaged and other kernels.

[3] Grade = % total sound mature kernels + sound splits.

[4] ELK, extra-large kernels, percentage of seeds riding largest screen: runner, 21/64 screen; Spanish, 19/64. VDK, visibly damaged kernels.

[5] Incidence of Sclerotinia blight at the last rating date, Sept. 13 for Spanish and Oct. 5 for runners.

Table 21. Yield, grade, shelling characteristics and incidence of Sclerotinia blight in advanced Virginia breeding lines and commercial cultivars planted at the Caddo Research Station at Fort Cobb, May 18, 2018.[1]

Entry	*Revenue ($/A)[2]*	*Yield (lbs/A)*	*Grade[3]*	*Super Jumbo (no./oz)[4]*	*Jumbo (no./oz)[4]*	*Fancy (no./oz)[4]*	*Pass Through (%)[4]*	*100-Seed (g)*	*ELK (%)[5]*	*VDK (%)[5]*	*Hull (%)*	*Sclerotinia (Oct.5)[6]*
Virginia												
ARSOK-V85-7	1,053a	5,554	75.9a	10.1a-d	12.0b	15.7b	3.8ab	101e-g	69a	1.1	22.6f	66.3ab
NC17EX	1,006ab	5,554	72.4bc	8.7c-d	10.9b	16.5b	1.0b	121bc	62a-d	0.9	26.7c-e	52.1bc
Contender	997ab	5,493	72.7a-c	9.5a-e	10.7b	15.1b	5.7a	95gh	62a-d	0.6	26.0de	48.8bc
Venus	907a-c	5,203	69.8dc	10.7ab	13.0b	17.5ab	3.7ab	95h	54f	0.9	28.7ab	31.7c
NC1EX	907a-c	5,058	71.7b-d	8.6de	15.3ab	19.9ab	2.4b	118b-d	59b-e	1.2	26.4c-e	48.3bc
NC20EX	903a-c	5,106	70.6b-d	8.9b-e	15.0ab	11.0b	2.8ab	114cd	60b-e	2.0	26.5c-e	86.3a
NC19EX	882a-c	4,949	71.3b-d	8.3de	15.5ab	19.8ab	2.0b	121bc	63a-c	1.5	26.6c-e	72.5ab
NC2EX	856a-c	4,804	71.3b-d	8.1e	24.8a	33.9a	1.6b	135a	64ab	1.3	27.0c-e	56.7a-c
NC22EX	843a-c	4,707	71.6b-d	8.6de	13.6ab	17.3ab	1.9b	112c-e	57b-f	1.2	26.5c-e	64.2ab
NC7EX	830a-c	4,646	71.4b-d	8.9b-e	16.5ab	14.1b	1.1b	127ab	62a-d	1.6	26.0ce	58.7a-c
Wynne	818a-c	4,683	69.9b-d	9.3b-e	15.8ab	19.0ab	3.0ab	102e-g	56d-f	0.9	28.4a-c	63.3ab
Jupiter	798bc	4,659	68.3d	9.7a-e	12.1b	17.7ab	2.8ab	98f-h	52f	1.5	29.6a	70.0ab
Florida Fancy	785bc	4,283	73.3ab	11.3a	17.1ab	19.3ab	5.5a	79i	55d-f	0.9	24.6ef	84.2a
Sullivan	780bc	4,441	70.3b-d	10.4a-c	13.0b	17.1ab	3.7ab	89hi	56c-f	0.9	27.6a-d	57.1a-c
ACI-351	748c	4,296	69.8cd	9.5a-e	15.7ab	19.7ab	2.7ab	109d-f	56c-f	1.3	27.8a-d	59.2a-c

[1] Entries sorted from highest to lowest revenue per acre. Numbers with the same lowercase letter within columns for each market type are not significantly different ($\alpha = 0.05$). No differences among entries if letters absent in column.
[2] Based on contract price of $500 per ton. Calculations do not include deductions for excess splits or damaged and other kernels.
[3] Grade = % total sound mature kernels + sound splits.
[4] Number or percentage of pods per ounce for pods riding slotted screens sized for super jumbo (40/64 x 3-inch slots), jumbo (37/64 x 3 inches), fancy (32/64 x 3 inches). Pass-through pods fit through the 32/64 x 3-inch screen.
[5] ELK, extra large kernels, percentage of seeds riding 21.5/64 screen. VDK, kernels with visible damage.
[6] Incidence of Sclerotinia blight at the last rating date, Oct. 5.

rating, the most disease was found on NC20EX and Florida Fancy (86 and 84 percent, respectively), and the least disease was found on Venus (32 percent).

The Virginia entries differed statistically in all agronomic qualities except yield and visibly damaged kernels (Table 21). The crop value of ARSOSK-V85-7 ($1,053 per acre) was significantly greater than Jupiter, Florida Fancy, Sullivan and ACI-351. The best numerical yields (greater than 5,400 pounds per acre) were obtained from ARSOK-V85-7, NC17EX and Contender. The highest seed grades were found in ARSOK-V85-7 and Florida Fancy (76 and 73 percent, respectively), which were significantly greater than grades from Venus, Jupiter and ACI-351.

Significant differences were found in pod size distribution for the super jumbo, jumbo, fancy and pass-through categories (Table 21). Numerically, the largest super jumbo pods were found in NC2EX (8.1 pods per ounce), which was significantly greater than Florida Fancy, Venus and Sullivan. NC2EX also had the smallest jumbo pods at 25 pods per ounce; numerically, Contender and NC17EX had the largest jumbo pods at fewer than 11 pods per ounce. NC20EX had the largest fancy pods (11 pods per ounce), which was significantly greater than NC2EX (33 pods per ounce). The largest percentage of pass-through pods were found in Contender and Florida Fancy (both above 5 percent).

Average Performance over the Past Three Years (2016-2018)

Five runner, two Spanish and five Virginia entries have been evaluated yearly since 2016. When data from the last three years were averaged, significant differences were found among the runner and Virginia entries (Table 22). Of the runners, Lariat, Tamrun OL11 and ARSOK-R47A had the best resistance to Sclerotinia blight, while Florida-07 was the most susceptible with 78 percent disease. Florida-07 also had the lowest numbers for yield and grade. Numerically, ARSOK-R47A had the highest yield (5,248 pounds per acre) and Tamrun OL11 had the best grade (73.2 percent). Among the Virginia entries, Venus was the most resistant to Sclerotinia blight with an average of 28 percent disease incidence. The entries did not differ significantly in yield, but ARSOK-V85-7 had the best average grade at 76 percent.

Pod Rot Disease Nursery

A total of eight Virginia entries (ACI-351, ARSOK-V85-7, Contender, Florida Fancy, Jupiter, Sullivan, Wynne and Venus) were evaluated in a field where moderately high levels of pod rot were observed in another experiment conducted in 2017 (Table 23). To avoid contamination from volunteers arising from the previous year's crop, the field was not planted until June 18. Entries were planted in a randomized complete block design with four blocks, using one replication per block, except for Jupiter, which had two replications per block. Plots were managed for leaf spots, Sclerotinia and southern blights and irrigated with ½ to 1 inch of water 13 times from June 21 to Sept. 1. To enhance disease, one block was inoculated with a cornmeal-sand mixture colonized by *Pythium myriotylum* July 27, and a second block was inoculated on Aug. 14. Plots were dug Oct. 19 and evaluated for pod rot within two hours of digging by estimating the percentage of discolored pods. Plants were threshed on Oct. 23 and 24. Analyses of yield, seed grade, pod sizing and pod rot evaluations were conducted as in the advanced breeding line experiment.

While relatively low levels of pod rot were observed (Table 23), Jupiter had

Table 22. Three-year averages for incidence of Sclerotinia blight (SM), yield (pounds per acre), and seed grade in advanced breeding lines and commercial cultivars at the Caddo Research Station at Fort Cobb.[1]

	2016-2018			2016			2017			2018		
Entry	*SM*	*Yield*	*Grade*	*SM*	*Yield*	*Grade*	*SM*	*Yield*	*Grade*	*SM*	*Yield*	*Grade*
Runner												
ARSOK-47A	36.3c	5,248a	71.8ab	15.4b	5,858a	68.9a	55.0b	3,291ab	77.2a	38.3b	6,595a	69.3
Florida-07	77.5a	4,287b	67.8c	54.6a	5,034ab	63.4b	95.5a	2,879b	71.1b	85.4a	4,949b	69.0
Lariat	32.2c	4,858ab	71.3ab	11.7b	5,797a	66.8ab	53.3b	3,636ab	75.4a	31.7b	5,141b	71.8
Tamrun OL11	33.1c	4,770ab	73.2a	23.8b	5,370ab	70.3a	38.8c	4,041a	75.9a	36.7b	4,899b	73.3
Webb	57.2b	4,655ab	69.1bc	33.8ab	4,538b	63.4b	81.3a	3,706ab	72.3b	56.7ab	5,723ab	70.9
Spanish												
OLé	2.4	4,806	66.7	0.8	5,058	65.3	6.0	4,254a	65.6	0	5,082	68.0
ARSOK-S88-2	2.2	4,800	66.2	1.7	4,852	65.2	5.0	3,693b	67.4	0	5,300	67.4
Virginia												
ARSOK-V85-7	50.7a	4,306	75.9a	20.6b	5,239a	74.1a	75.0a	1,997c	77.7a	66.3a	5,554	74.4a
Florida Fancy	56.9a	4,486	67.7b	38.3ab	5,433a	62.1b	48.3ab	3,741a	69.8b	84.2a	4,283	71.2ab
Jupiter	61.7a	3,973	66.7b	51.7a	5,082a	64.6b	63.3ab	2,178bc	69.9b	70.0a	4,659	65.5c
Venus	28.3b	4,646	66.8b	13.8b	5,372a	60.8b	39.6b	3,363a	70.8b	31.7b	5,203	68.7bc
Wynne	47.5a	3,932	66.6b	38.3b	4,175b	62.1b	54.6ab	2,938ab	69.9b	63.3a	4,683	67.1c

[1] Market types were analyzed separately. Numbers with the same lowercase letter within columns for each market type are not significantly different ($\alpha = 0.05$). No differences among entries if letters absent in column.

[2] Incidence of Sclerotinia blight at the last rating date.

[3] Grade = % total sound mature kernels + sound splits.

Table 23. Pod rot, yield and shelling characteristics of Virginia entries planted in the pod rot nursery at the Caddo Research Station at Fort Cobb, June 18, 2018.[1]

Entry	*Pod Rot[2]*	*Yield (lbs/A)*	*Grade[3]*	*Super Jumbo (no./oz)[4]*	*Jumbo (no./oz)[4]*	*Fancy (no./oz)[4]*	*Pass Through (%)[4]*
Virginia							
ACI-351	1.8b	2,602ab	63.6b	14.5	18.9	19.3	4.7
ARSOK-V85-7	1.5b	2,505a-c	71.4a	13.4	14.4	18.6	6.8
Contender	3.5b	2,977a	66.9ab	14.7	14.3	17.9	10.5
Florida Fancy	2.0b	2,868a	66.0ab	18.7	24.1	17.7	10.9
Jupiter	12.9a	2,462a-c	64.0b	12.9	15.6	18.1	1.5
Sullivan	3.0b	1,984bc	64.2b	17.7	15.0	15.3	6.6
Wynne	1.8b	2,674a	66.0ab	17.2	18.4	17.1	9.2
Venus	3.5b	1,912c	62.3b	12.5	18.7	20.4	5.5

[1] Plots dug Oct. 19 and threshed Oct. 23 and 24. Numbers with the same lowercase letter within columns for each market type are not significantly different ($\alpha = 0.05$). No differences among entries if letters absent in column.
[2] Percentage of pods with symptoms of pod rot. Ratings taken within two hours after digging.
[3] Grade = % total sound mature kernels + sound splits.
[4] Number of pods per ounce for pods riding slotted screens sized for super jumbo (40/64 x 3-inch slots), jumbo (37/64 x 3 inches), fancy (32/64 x 3 inches). Pass-through pods fit through the 32/64 x 3-inch screen.

significantly more pod rot at 13 percent than the other entries. Overall, yield and grade were lower, and super jumbo pods were markedly lighter than in the advance breeding trial due to the late planting date (Tables 21 and 23).

Additional Acknowledgements

Thanks to A. Harting and L. Myers at USDA/ARS and R. Weidenmaier, H. Houston and B. Leighton at the Caddo Research Station for invaluable technical support. Seed for several commercial lines were provided by Golden Peanut Co. or Birdsong Peanuts. This research is supported by USDA-ARS CRIS Project No. 3072-21220-007-00D. Mention of trade names or commercial products in this publication is solely for the purpose of providing specific information and does not imply recommendation or endorsement by the U.S. Department of Agriculture. USDA is an equal opportunity provider and employer.

Oklahoma Agricultural
Experiment Station