Partners in Progress
PEANUTS

Peanut Research at OSU 2015

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-1047

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Foreword

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

Our *Partners in Progress Peanut Research at OSU 2015* report serves as a means to highlight significant accomplishments in research and Extension programs 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 research and Extension programming 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 the 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

Even though the difficulty of farming through a prolonged drought faded somewhat during the last year, Oklahoma peanut growers were still faced with many challenges. Over time, issue focused research has generated solutions for the most vexing production problems and will continue to do so. Today as always, Oklahoma's growers rely on the results of the basic and applied research programs conducted by OSU and USDA-ARS scientists to aid them in profitably producing peanuts.

Since 1965, Oklahoma's peanut growers have themselves supported this research. This work is funded through voluntary contributions collected on the sale of farmer stock peanuts thus growers are investing in their own prosperity. As state and federal government budgets have shrunk, grower support for research and outreach has become even more critical.

The NPB is a farmer-funded national research, promotion and education checkoff program with growers from 10 states submitting funds, and in turn, research and promotion funds are returned to those states. In 2015, the OPC, OSU and USDA-ARS submitted research proposals to the NPB in anticipation of bringing Oklahoma's contributions back to the state for the benefit of state growers. In response, NPB funded the following Oklahoma research projects: Integrated Management of Peanut Diseases; Evaluation of Advanced Breeding Lines and Current Peanut Varieties Across Oklahoma, Volunteer Peanut Control Strategies, and Peanut Cropping Systems; and Weed Management in Oklahoma Peanuts.

Grower-supported research has yielded many beneficial practices and products for adoption by peanut producers. The availability of new varieties bred for Oklahoma conditions from all market types promises to make a significant impact on peanut profitability. These varieties demonstrate excellent disease resistance and desirable maturity, grade, yield and quality factors. Superior varieties combined with improved weed and disease control options, which were identified through research, provide Oklahoma's peanut producers with production tools unthought of just a short time ago. With recent advances in the use of genetic markers, genomic mapping and other cutting edge technology, the future for the peanut industry looks brighter than ever. An important goal for Oklahoma though, will be to increase the number of acres in production in order to take full advantage of new discoveries.

The results of 2015 grower-funded peanut research are contained in the following pages. The professionals that make up Oklahoma's Peanut Improvement Team have once again delivered timely, relevant information that the state's peanut producers need to be competitive in a very tough economic environment.

The OPC will continue to partner with OSU, USDA-ARS the NPB and others having a commitment to a robust Oklahoma peanut industry. Oklahoma's peanut producers are proud of this long standing relationship and therefore to be counted as being among this group of Partners in Progress.

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

2015 progress made possible through OPC and NPB support

- **Performance of runner varieties depended on location but long-term averages across locations indicate advanced breeding line ARSOK-R35 is the top performer, out-yielding Red River Runner and Tamrun OL11. ARSOK-R35 has enhanced Sclerotinia blight resistance and will be released for certified seed production in 2016.**
- **No significant differences were seen among Spanish cultivars across locations and over years. Cultivar OLé should be released for commercial production in 2016.**
- **No significant differences were seen among Virginia cultivars across locations and over years. However, cultivar VENUS is greatly enhanced in pod rot and Sclerotinia blight resistance when compared to Jupiter and Florida Fancy. VENUS will be released for certified seed production in 2016.**

Methods

All variety tests were conducted under an extensive pest management program. The objective was to prevent as much outside influence from pest pressures such as weeds, diseases or insects on yield and grade as possible. The interaction between variety and location was significant so the results were separated by location. Since the varieties and advanced lines response differed by location, growers may find the data for the county closest to their location to be the most useful in selecting a variety or varieties to grow. All test plots were planted using two 36-inch rows that were 20 feet long. Plots were seeded at a rate of five seeds per row-foot (139,392 seeds per acre). Tests were conducted using randomized, complete block design with four replications. The entire plot was dug and then threshed three to four days later. Peanuts were placed in a dryer until moisture reached 10 percent. Total sound mature kernels was determined on a 200 grams sample from each plot.

Pod rot ratings were made within five hours of digging by visually estimating the percentage of discolored pods within each two-row plot. Data were analyzed using one-way ANOVA in PROC GLIMMIX of SAS (version 9.3). The Type I error rate for pairwise comparisons of varieties within each market type was controlled using the Tukey-Kramer adjustment. The incidence of pod rot in Caddo and Tillman counties was less than 5 percent for all entries, so data from these counties were not analyzed. However, moderate to low levels of pod rot were observed in the Custer County variety test, and statistical differences among varieties were found within all market types.

Interpreting Data

Details of establishment and management of each test are listed in footnotes below the tables. Least

significant differences 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 outperforms another variety by as much or more than the LSD value, then there is a 95 percent certainty 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, 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 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 tests. 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.

2015 Caddo County Variety Trial

Location: Ft. Cobb (OAES)
Date Planted: 6/03/2015
Date Dug: 10/27/2015
Date Threshed: 10/29/2015

The trial was planted late June 3, 2015, due to extremely high rainfall in mid- to late-May. A conventional till seedbed was used and managed for foliar and soil-borne disease throughout the season. Percent pod rot estimates were taken after harvest, but no significant differences were noted among those lines tested.

Average yield for the runner test was 4,483 pounds per acre, and average grade was 64 percent TSMK (Table 1) with breeding lines ARSOK-R37, ARSOK-R47A and ARSOK-R35 having higher yields as compared to other genotypes tested. Grades were much lower than in past years due to an unusually wet and cool growing season.

Among the Spanish varieties or lines tested, the average yield and grade were 3,215 pounds per acre and 64 percent TSMK, respectively. AT-98-99 and OLé were numerically the top performers. Georgia 04S had the poorest performance at 2,649 pounds per acre.

The varieties/lines entered into the Virginia test averaged 3,744 pounds per acre with an average grade of 67 percent TSMK. Breeding line ARSOK-V41 was the top performer at 4,271 pounds per acre and a grade of 70 percent TSMK.

Table 2 contains Caddo County yield and grade data for the last three years, along with three-year averages and two-year averages for Virginia type. Best performers over a three-year period were runner lines ARSOK-R35, Tamrun OL11 and Red River Runner; Spanish lines AT-98-99 and Tamnut OL06; and Virginia lines ARSOK-V41 and Florida Fancy.

2015 Custer County Variety Trial

Location: Weatherford (Les Crall Farms)
Date Planted: 6/02/2015
Date Dug: 10/26/2015
Date Threshed: 10/28/2015

The trial was planted June 2, 2015, into a conventional till seedbed and managed for foliar and soil-borne disease throughout the season. Percent pod rot estimates were taken after

harvest and significant differences were noted among those lines tested (Table 3).

Average yield for the runner test was 4,965 pounds per acre with an average grade of 75 percent TSMK. Again, lines ARSOK-R37, ARSOK-R35 and ARSOK-R47A were the top three performers. Flavor Runner 458 had the poorest performance at 4,017 pounds per acre and 74 percent TSMK.

For the Spanish varieties/lines tested, the average yield was 4,250 pounds per acre and average grade was 72 percent TSMK. No significant differences were noted in yield among the genotypes tested, but Tamnut OL06 and OLé were the top performers numerically. Georgia 04S again turned in the poorest performance at 3,884 pounds per acre and 71 percent TSMK.

Virginia varieties/lines averaged 5094 pounds per acre and a grade of 72 percent TSMK. No significant differences in yield were noted among the top three performers which were ARSOK-V41, VENUS and ARSOK-V31. Florida Fancy had the poorest performance at 4,961 pounds per acre and a grade of 70 percent TSMK.

Pod rot ratings (Table 3) taken after digging indicated significant differences among all market types tested. ARSOK-R35 was the most resistant runner type tested while Tamrun OL11 was the most susceptible. OLé and Tamnut OL06 were the most resistant Spanish types and ARSOK-V31 and VENUS were the most resistant among the Virginias.

Table 4 contains yield and grade data for the last three years along long- term averages in Custer and Blaine counties. ARSOK-R35 was the top performer numerically among runners tested, while no significant differences were found among Spanish genotypes tested. No significant differences were found among Virginia lines tested, but Florida Fancy was the top yielder.

2015 Tillman County Variety Trial

Location: Davidson, (Joe D. and Gayle White Farms)
Date Planted: 6/04/2015
Date Dug: 10/28/2015
Date Threshed: 11/04/2015

The trial was planted June 4, 2015, into a conventional till seedbed and managed for foliar and soil-borne disease throughout the season. Percent pod rot estimates were taken and no significant differences were seen among genotypes tested.

Table 5 shows the yield and grade data from Tillman County. Average yield and grade for the runner test was 6,668 pounds per acre and 73 percent TSMK. ARSOK-R47A, Tamrun OL11, and ARSOK-R35 were the top performers and had yields at 7,199; 7,102; and 6,695 pounds per acre, respectively, along with grades at 75 percent, 73 percent and 76 percent TSMK, respectively. Flavor Runner 458 was the poorest performer at 6,025 pounds per acre and 73 percent TSMK.

The average yield and grade among Spanish varieties/lines tested were 4806 pounds per acre and 65 percent TSMK. Significant differences were seen due to plant growth habit, with the prostrate types AT-98-99 and Georgia 04S out-yielding the erect types OLé and Tamnut OL06.

Average yield and grade in the Virginia test was 6,228 pounds per acre and 69 percent TSMK. The top yielder was Florida Fancy at 7272 pounds per acre. No long,term average results were calculated for Tillman County since this was the first year the trial was held at that location.

Table 1. Yields and grades from Caddo County (Ft. Cobb) peanut variety trials, 2015.[1]

Variety or Line[1]	*Yield (lbs/a)*	*Percent of trial Average*	*Grade*[2] *(% TSMK)*	*Revenue*[3] *($/a)*
Runner				
ARSOK-R35	4,864 a	108	65 ab	610
ARSOK-R37	5,022 a	112	65 ab	630
ARSOK-R47A	4,912 a	109	67 a	635
ARSOK-R60A	4,065 c	91	62 b	487
Flavor Runner 458	3,944 c	88	64 ab	487
Florida 107	4,271 bc	95	61 b	502
Red River Runner	4,598 ab	102	67 a	594
Tamrun OL11	4,186 bc	93	67 a	541
Mean	4,483		64	
CV	6.5		4.2	
LSD (p=.05)	429		4.1	
Spanish				
AT-98-99	3,605 a	112	65 ab	436
GA04S	2,649 c	82	59 c	289
OLé	3,460 ab	108	64 b	410
Tamnut OL06	3,146 b	97	68 a	396
Mean	3,215		64	
CV	6.9		3.2	
LSD (p=.05)	356		3.3	
Virginia				
ARSOK-V31	3,351 b	90	69 ab	478
ARSOK-V41	4,271 a	114	70 a	582
Florida Fancy	4,077 a	108	64 c	509
VENUS	3,279 b	88	66 bc	422
Mean	3,744		67	
CV	7.1		3.0	
LSD (p=.05)	426		3.2	

Note: Values within the same column followed by the same letter are not significantly different at p = .01.

[1] Market type.

[2] % TSMK = Percent total sound mature kernels.

[3] Calculated based on peanut market-type price December 2015 (USDA-FSA).

Author question:

for % of trial average and grade, some numbers are in the 100s or 1000s...is that correct?? % TMSK can't be more than 100, right??

Table 2. Yields and grades from Caddo County peanut variety trials in 2013, 2014 and 2015, along with three-year averages and estimated revenue.

Variety or line	*Yield (lbs/a)*	*Grade[2] (% TSMK)*	*Yield (lbs/a)*	*Grade[2] (% TSMK)*	*Yield (lbs/a)*	*Grade[2] (% TSMK)*	*Yield (lbsA)*	*Grade[2] (% TSMK)*	*Revenue[3] ($/a)*
	----2013----		----2014----		----2015----		----3-year average----		
Runner[1]									
ARSOK-R35	4,175	71	6,171	76	4,864	65	5,070	71	695
Flavor Runner 458	3,775	71	5,033	77	3,944	61	4,250	69	566
Florida 107	3,896	71	5,336	74	4,271	61	4,501	69	599
Tamrun OL11	4,477	75	6,013	78	4,186	67	4,892	73	689
Red River Runner	4,344	74	5,360	77	4,598	67	4,767	73	672
Mean	3,998	72	5,671	76	5,372	71	4,696	72	
CV	2.0	2.0	2.1	2.0	9.8	2.8	5.6	1.8	
LSD (p=.05)	593	2.3	928	2.2	428	1.6	495	2.5	
Spanish[1]									
AT-98-99	3,678	70	4,973	74	4,852	68	4,501	69	574
OLé	3,242	71	4,393	74	3,767	68	3,800	71	499
Tamnut OL06	3,521	67	5,227	74	3,803	68	4,183	68	526
Mean	3,382	69	4,703	74	4,090	67	3,916	70	
CV	2.2	2.3	2.3	2.2	21.4	4.0	4.1	1.8	
LSD (p=.05)	597	.02	604	5.5	729	2.2	367	2.9	
Virginia[1,4]							---2-year average---		
ARSOK-V31	4,513	74	5,299	74	4,739	72	5,019	73	714
ARSOK-V41	-	-	5,929	76	5,477	72	5,703	74	823
Florida Fancy	-	-	5,687	75	5,436	67	5,561	71	769
VENUS	3,884	69	5,106	73	4,436	68	4,771	71	619
Mean	4,047	68	5,414	73	5,022	70	5,263	72	
CV	2.0	2.1	2.1	2.2	12.5	2.7	2.2	2.5	
LSD (p=.05)	511	.03	835	3.5	521	1.5	678	2.5	

[1] Market type.
[2] % TSMK = Percent total sound mature kernels.
[3] Calculated for three-year average based on peanut market-type price December 2015 (AgFax).
[4] Data not shown for all varieties tested in 2013 and used to calculate mean, CV and LSD.

AgFax or USDA-FSA??

Table 3. Yields and grades from Custer County peanut variety trials, 2015.

Variety or line[1]	*Percent pod rot*[2]	*Yield (lbs/a)*	*Percent of trial average*	*Grade*[3] *(% TSMK)*	*Revenue*[4] *($/a)*
Runner					
ARSOK-R35	0.8 b	5,142 a	104	77 a	764
ARSOK-R37	2.8 b	5,493 a	111	77 a	816
ARSOK-R47A	2.8 b	5,203 a	105	77 a	773
ARSOK-R60A	1.8 b	5,178 a	104	73 b	729
Flavor Runner 458	12.3 a	4,017 b	81	74 b	573
Florida 107	5.0 ab	4,682 ab	94	71 c	641
Red River Runner	2.8 b	5,009 a	101	76 a	734
Tamrun OL11	10.0 ab	4,997 a	101	76 a	732
Mean		4,965		75	
CV		12.8		1.3	
LSD (p=.05)		941		1.5	
Spanish					
AT-98-99	8.5 a	4,247	99	72 ab	565
GA04S	3.8 ab	3,884	91	71 ab	510
OLé	1.8 b	4,343	102	74 a	595
Tamnut OL06	1.8 b	4,525	106	70 b	585
Mean		4,250		72	
CV		10.8		1.8	
LSD (p=.05)		ns		2	
Virginia					
ARSOK-V31	5.0 b	5,082	99	73 ab	723
ARSOK-V41	8.0 ab	5,239	103	75 a	766
Florida Fancy	16.3 a	4,961	97	70 b	677
VENUS	5.8 b	5,094	99	71 b	705
Mean		5,094		72	
CV		8.9		3.0	
LSD (p=.05)		ns		3.5	

Note: Values within the same column followed by the same letter are not significantly different at p = .01.

[1] Market type.

[2] Pod rot readings taken after threshing and provided by R. Bennett.

[3] % TSMK = Percent total sound mature kernels.

[4] Calculated based on peanut market-type price December 2015 (USDA-FSA).

Table 4. Yields and grades from Custer and Blaine counties peanut variety trials in 2013, 2014 and 2015, along with three-year averages and estimated revenue.

Variety or Line[1]	*Yield (lbs/a)*	*Grade*[2] *(%TSMK)*	*Yield (lbs/a)*	*Grade*[2] *(%TSMK)*	*Yield (lbs/a)*	*Grade*[2] *(%TSMK)*	*Yield (lbs/a)*	*Grade*[2] *(%TSMK)*	*Revenue*[3] *($/A)*
	----2012----		----2013----		----2015----		----3 yr. Avg.----		
Runner									
ARSOK-R35	6,469	73	5,215	78	6,231	80	5,971	77	875
Red River Runner	5,572	76	4,840	77	5,239	78	5,217	77	764
Florida 107	5,986	75	4,078	74	4,779	76	4,947	75	706
Flavor Runner 458	5,590	74	4,222	75	4,126	77	4,646	75	663
Tamrun OL11	5,795	73	2,214	76	5,699	79	4,569	76	661
Georgia 09B	6,130	74	2,952	75	4,247	78	4,443	76	642
LSD (p=.05)	931	2	881	1	811	2	995	3	
Spanish									
AT-98-99	5,812	72	4,670	75	4,852	76	5,111	74	682
Tamnut OL06	5,049	67	4,416	71	4,138	75	4,686	71	601
OLé	5,068	69	4,404	73	4,585	76	4,534	73	598
LSD (p=.05)	795	2	302	.03	647	2	434	2	
Virginia									
Jupiter	4,650	67	5,118	72	4,331	72	4,699	72	779
ARSOK-V30B	5,844	71	4,937	73	5,287	73	5,356	74	766
Gregory	5,474	64	4,792	70	3,896	69	4,720	69	729
LSD (p=.05)	618	5	1,170	1	821	3	805	2	

[1] Market type.
[2] % TSMK = Percent total sound mature kernels.
[3] Calculated based on peanut market-type price December 2015 (USDA-FSA).
[4] Data not shown for all varieties tested in 2013 and used to calculate mean, CV and LSD.

Where does footnote 4 reference??

Table 5. Yields and grades from Tillman County peanut variety trials, 2015.

Variety or line[1]	*Yield (lbs/a)*	*% of trial average*	*Grade*[2] *(% TSMK)*	*Revenue*[3] *($/a)*
Runner				
ARSOK-R35	6,695 abc	100	76 a	982
ARSOK-R37	6,388 bc	96	73 bc	900
ARSOK-R47A	7,199 a	108	75 ab	1042
ARSOK-R60A	6,594 abc	98	70 d	891
Flavor Runner 458	6,025 c	90	73 bc	849
Florida 107	6,656 abc	99	71 cd	912
Red River Runner	6,679 abc	100	76 a	979
Tamrun OL11	7,102 ab	106	73 bc	1000
Mean	6,668		73	
CV	8.2		2.7	
LSD (p=.05)	806		2.8	
Spanish				
AT-98-99	6,703 a	139	69 a	855
GA04S	5,287 b	110	61 b	596
OLé	3,496 c	73	65 ab	420
Tamnut OL06	3,738 c	78	65 ab	449
Mean	4,806		65	
CV	11.6		4.2	
LSD (p=.05)	891		4.4	
Virginia				
ARSOK-V31	5,783 b	93	72 a	812
ARSOK-V41	6,921 a	111	71 a	958
Florida Fancy	7,272 a	117	67 b	950
VENUS	4,936 b	80	69 b	664
Mean	6,228		69	
CV	9.5		2.7	
LSD (p=.05)	949		3.0	

Note: Values within the same column followed by the same letter are not significantly different at p = .01.

[1] Market type.

[2] % TSMK = Percent total sound mature kernels.

[3] Calculated based on peanut market-type price December 2015 (USDA-FSA).

Long-term production and pod brightness

Table 6 includes yield and grade data averaged across locations for 2015. Among the runner types tested, ARSOK-R35, ARSOK-R37 and ARSOK-47A consistently outperformed all others. The top-yielding Spanish line across locations was AT-98-99, due to its prostrate growth habit. No differences were seen among the other Spanish lines tested. ARSOK-V41 and Florida Fancy topped the Virginia lines tested.

Table 7 shows peanut yields and grades averaged across 2013-2015 and all locations in Oklahoma, along with estimated revenue for each entry. The top-performing runner entry overall was breeding line ARSOK-R35, averaging 5,259 pounds per acre and a grade of 74 percent TSMK. ARSOK-R35 will be released for certified seed production in spring 2016. No long-term significant differences were seen among the Spanish and Virginia lines tested.

Table 8 shows pod brightness values and percent fancy pods of Virginia trial entries averaged across locations for 2015. Very little difference was noted among entries, but Florida Fancy was lowest in pod brightness with a Hunter L score of 51.9 and ARSOK-V41 was lowest in percent fancy pods at 90.4 percent.

Acknowledgements

Special thanks to Lisa Myers and Angie Harting for technical support and to Bobby Weidenmaier 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 Golden Peanut Company and Birdsong Peanuts. This project was supported by the OPC and NPB, as well as the USDA-ARS and Oklahoma State University. 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 USDA. USDA is an equal opportunity provider and employer.

Table 6. Yields and grades averaged across all locations for peanut variety trials in 2015.

Variety or Line[1]	*Yield (lbs/a)*	*% of Trial Average*	*Grade*[2] *(% TSMK)*	*Revenue*[3] *($/a)*
Runner				
ARSOK-R35	5,562 ab	104	73 a	784
ARSOK-R37	5,634 ab	105	71 ab	772
ARSOK-R47A	5,771 a	108	73 a	813
ARSOK-R60A	5,279 b	98	68 c	693
Flavor Runner 458	4,662 c	87	70 b	646
Florida 107	5,211 b	97	68 c	683
Red River Runner	5,428 ab	101	73 a	764
Tamrun OL11	5,428 ab	101	72 a	754
Mean	5,372		71	
CV	9.8		2.8	
LSD (p=.05)	428		1.6	
Spanish				
AT-98-99	4,852 a	118	68 a	610
GA04S	3,940 b	96	64 b	466
OLé	3,767 b	92	68 a	474
Tamnut OL06	3,803 b	93	68 a	478
Mean	4,090		67	
CV	21.4		4.0	
LSD (p=.05)	729		2.2	
Virginia				
ARSOK-V31	4,739 b	94	72 a	665
ARSOK-V41	5,477 a	109	72 a	769
Florida Fancy	5,436 a	108	67 b	710
VENUS	4,436 b	88	68 b	588
Mean	5,022		70	
CV	12.5		2.7	
LSD (p=05)	521		1.5	

[1] Market Type.
[2] % TSMK = Percent total sound mature kernels.
[3] Calculated based on peanut market-type price December 2015 (USDA-FSA).
[4] Values within the same column followed by the same letter are not significantly different at p = .01; ns = not significantly different.

Table 7. Yields and grades from peanut variety trials at all locations in 2013, 2014 and 2015, along with three-year averages and estimated revenue.

Variety or line[1]	*Yield (lbs/a)*	*Grade*[2] *(%TSMK)*	*Revenue*[3] *($/a)*
		---three-year average---	
Runner			
ARSOK-R35	5,259 a	74 a	751
Flavor Runner 458	4,259 c	72 b	592
Florida 107	4,755 b	70 c	642
Tamrun OL11	5,029 ab	74 a	718
Red River Runner	4,898 ab	74 a	699
Mean	4,840	72	
CV	7.2	1.6	
LSD (p=.05)	418	1.4	
Spanish			
AT-98-99	4,353	70	563
OLé	4,157	71	546
Tamnut OL06	4,129	70	534
Mean	4,180	70.2	
CV	8.1	2.3	
LSD (p=.05)	ns	ns	
Virginia[4]		---two-year average---	
ARSOK-V31	4,679	73 a	667
ARSOK-V41	5,112	75 a	747
Florida Fancy	5,136	70 b	701
VENUS	4,691	71 b	649
Mean	4,904	72	
CV	6.4	1.8	
LSD (p=.05)	ns	2	

Note: Values within the same column followed by the same letter are not significantly different at p = .01.
1 Market type.
2 % TSMK = Percent total sound mature kernels.
3 Calculated based on peanut market-type price December 2015 (USDA-FSA).
4 Data not shown for all varieties tested in 2013 and used to calculate mean, CV and LSD.

Table 8. Pod brightness and percent fancy pods for Virginia genotypes included in the 2015 Peanut Variety Trials. Values are averaged across locations.

Entry	*Brightness (Hunter L score)*	*% fancy pods*
ARSOK-V31	53.2 a	94.7 a
ARSOK-V41	53.4 a	90.4 b
Florida Fancy	51.9 b	95.7 a
VENUS	52.2 ab	95.8 a
Mean	52.4	94.1
CV	3.7	3.8
LSD (p=.05)	1.6	2.9

Note: Values within the same column followed by the same letter are not significantly different at p = .01.

Disease Evaluations and Agronomic Traits of Advanced Peanut Breeding Lines in 2015

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2015 progress made possible through OPC and NPB support

- **A total of 20 breeding lines and reference cultivars (12 runner, two Spanish and six Virginia market types) were evaluated in fields infested with *Sclerotinia minor* and *Sclerotium rolfsii*, the fungi causing Sclerotinia blight and southern blight, respectively. All advanced breeding lines were high oleic.**
- **Environmental conditions in 2014 were not favorable for Sclerotinia blight, southern blight or pod rot. No statistically significant differences among cultivars were observed for disease resistance.**
- **The top four runner entries for revenue were Red River Runner ($747 per acre), ARSOK-R37 ($710 per acre), ARSOK-R47A ($708 per acre), and Tamrun OL11 ($706 per acre). The highest-yielding entries, numerically, were Red River Runner (4,683 pounds per acre), and ARSOK-R37 and ARSOK-R47A, which both produced 4,622 pounds per acre. Tamrun OL11 was the highest-grading entry at 76 percent TSMK, but was statistically similar to Florida 07 (75 percent TSMK) and Red River Runner (74 percent TSMK).**
- **No significant differences were observed between the two Spanish entries, OLé and ARSOK-S88, in crop value, yield and shelling characteristics. Mean yield and grade for OLé were 3,267 pounds per acre and 69 percent TSMK, respectively. ARSOK-S88 produced 3,182 pounds per acre and an average grade of 71 percent TSMK.**
- **The Virginia entries differed statistically in crop value, yield and grade. The breeding line ARSOK-V41 ($771 per acre) had the highest crop value. VENUS ($560 per acre), ARSOK-V85 ($588 per acre) and Jupiter ($618 per acre) had the lowest crop values. The best yields were obtained from ARSOK-V41 (4,804 lbs/A) and Florida Fancy (4,477 pounds per acre). Neither were statistically different from ARSOK-V41 (73 percent TSMK).**

The primary 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 2015, commercial and advanced breeding lines of runner, Spanish and Virginia peanuts were evaluated in small plots at the Caddo Research Station in Fort Cobb. The objectives of the field study were to compare advanced or newly released lines to commercially available cultivars in agronomic quality (e.g., yield and seed grade) and disease resistance (e.g., Sclerotinia and southern blights and pod rot) in plots with substantial soilborne inoculum.

Methods and Field Conditions

A total of 20 breeding lines and reference cultivars (12 runner, two Spanish and six Virginia) 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 perfoot in plots consisting of two 15-foot-long rows with 36-inch beds. A randomized complete block design was used with an equal number of replications. The field was divided into four blocks to account for potential disease gradients and environmental variables. Each breeding line or cultivar was planted once in each block. Excessive rainfall occurred in May, so plots were not planted until June 3. All plots were managed for weeds, foliar diseases and Southern blight, but plots were not managed for Sclerotinia blight, pod rot or nematodes.

Environmental conditions were not conducive for Sclerotinia or southern blights. Daily average temperatures in June (78 F), July (82.3 F), and August (79.6 F) were equal or within one degree of the 15-year average. However, September (76.4 F) and October (63 F) were 4 and 2 degrees warmer, respectively, than the 15-year average (Table 9). Rainfall was greater (0.51 to 1.69 inches) than the 15-year average in all months except August (-1.57 inches). Additional water (0.5 to 1 inch) was applied to the plots 16 times between June 5 and October 9 using a pivot system.

Disease evaluations for Sclerotinia and southern blights were conducted on Sept. 16 and Oct. 7 and 14. Disease incidence was measured by counting the number of 6-inch sections within each plot that had symptoms of Sclerotinia blight, caused by *Sclerotinia minor*, and southern blight, caused by *Sclerotium rolfsii*. Southern blight was not observed in any plots, and no Sclerotinia blight was observed in the Spanish plots. Only the results from the last Sclerotinia blight evaluation are reported because disease was most severe at that date. Spanish entries were dug on Oct. 27 and threshed on Oct. 29. Runner and Virginia plots were dug on Nov. 9 and threshed on Nov. 12. Pod rot ratings were taken within five hours of digging by estimating the percentage of discolored pods. Pod rot damage was minimal and no greater than 5 percent in the most affected plots, so statistical analyses were not conducted for pod rot. Peanut grades

Table 9. Monthly air temperature and rainfall for 2015 field season at the Caddo Research Station in Fort Cobb.[a]

Month	*Air Temperature (F)*		*Rainfall (Inches)*	
	Daily mean	*Departure from 15-year average*	*Total*	*Departure from 15-year average*
June[1,2]	79.1	0	4.58	+0.51
July[2]	82.3	+1	4.00	+1.69
August	79.6	-1	1.49	-1.57
September[2]	76.4	+4	2.42	+0.81
October	63.0	+2	4.09	+1.02

Note: Data from Mesonet.

[1] Mean temperature and rainfall are for June 3 (planting date) to June 30. Departure from 15-year average includes all days in June.

[2] Incomplete records.

were determined following USDA-AMS guidelines using a 200-gram sample from each plot. Pods were presorted prior to shelling, and all sound mature kernels from grade samples were assessed for visible and concealed damage. Seeds were split by hand using a razor blade instead of a mechanical seed splitter to reveal concealed damage.

Data were analyzed using one-way ANOVA with block as a random factor in PROC GLIMMIX of SAS (version 9.3). Proportion data (grade, extra large kernels, hull, damaged kernels and fancy pods) were analyzed using the LOGIT function, but means of untransformed data are presented (Tables 2 and 3). The Type I error rate for pairwise comparisons of breeding lines and cultivars was controlled at $\alpha = .05$ using the ADJUST=TUKEY option.

Performance of the Advanced Runner-Type Breeding Lines and Cultivars in 2015

Twelve runner peanut entries, including Tifrunner and the high-oleic cultivars Flavor Runner 458, Florida 07, Red River Runner and Tamrun OL11 were evaluated (Table 10). Statistical differences among entries were found for crop value, yield and all shelling characteristics except damaged kernels. The top four entries in numerical crop value were Red River Runner ($747 per acre), ARSOK-R37 ($710 per acre), ARSOK-R47A ($708 per acre) and Tamrun OL11 ($706 per acre). The entries with the lowest crop value and yield were Tifrunner ($475 per acre; 3,194 pounds per acre), ARSOK-R58A ($513 per acre; 3,557 pounds per acre) and Flavor Runner 458 ($540 per acre; 3,654 pounds per acre). The highest-yielding entries, numerically, were Red River Runner (4,683 pounds per acre) and ARSOK-R37 and ARSOK-R47A, which both produced 4,622 pounds per acre. Tamrun OL11 was the highest grading-entry at 76 percent TSMK, but Florida 07 (75 percent TSMK) and Red River Runner (74 percent TSMK) were statistically similar to Tamrun OL11 in grade. Entries with the largest seeds included ARSOK-R47A (75.6 grams per 100 seeds; 34 seeds per ounce), Red River Runner (74.9 grams per 100 seeds; 33 seeds per ounce), and ARSOK-R35 (73.8 grams per 100 seeds; 34 seeds per ounce). The greatest percentage of ELK was found in Red River Runner (56 percent), while ARSOK-R60A had the fewest (33 percent). The hull percentage for the four top-yielding entries ranged from 22 to 24 percent; ARSOK-R58A, ARSOK-R60A, and Tifrunner had the greatest percentage of hulls (28 to 29 percent).

The incidence of Sclerotinia blight differed numerically but not statistically among the runner entries. Tifrunner, Flavor Runner 458 and Florida 07 had the highest disease incidence at 15 percent.

Performance of Spanish Market Types in 2015

Two Spanish entries, OLé and the advanced breeding line ARSOK-S88, were evaluated (Table 11). The two entries performed similarly, and no significant differences were observed for crop value, yield and shelling characteristics. Mean yield and grade for OLé were 3,267 pounds per acre and 69 percent TSMK, respectively. ARSOK-S88 produced 3,182 pounds per acre and an average grade of 71 percent TSMK.

Performance of the Advanced Virginia-Type Breeding Lines and Cultivars in 2015

Six Virginia peanut entries, including Jupiter and high-oleic Florida Fancy and VENUS, were evaluated (Table 11). At harvest, plants were missing from 3- to 5.5-feet sections within one block each of VENUS and ARSOK-V85. As a result, these two blocks were not included in revenue and yield analyses. The entries differed statistically in crop

value, yield, grade and all shelling characteristics except percent fancy pods and damaged kernels. The breeding line ARSOK-V41 had the highest crop value ($771 per acre); VENUS ($560 per acre), ARSOK-V85 ($588 per acre) and Jupiter ($618 per acre) had the lowest crop values. The best yields were obtained from ARSOK-V41 (4,804 pounds per acre) and Florida Fancy (4,477 pounds per acre). ARSOK entries V31 and V85 had the best grades (74 percent TSMK), but neither were statistically different from V41 (73 percent TSMK). ARSOK-V41 (85 grams) had a smaller 100-seed weight than ARSOK-V31 (97 grams). In addition, ARSOK-V41 (30 seeds per ounce) had more seeds per ounce than ARSOK-V30B (2seeds per ounce). Florida Fancy had the fewest ELK (42 percent) and largest hull fraction (31 percent).

No statistically significant differences among Virginia entries in Sclerotinia blight were found. Numerically, the incidence of Sclerotinia blight was highest in Jupiter (7.5 percent) and ARSOK-V41 (6.7 percent) and was lowest in ARSOK-V85 (0.8 percent).

Additional Acknowledgements

Special thanks to A. Harting and L. Myers at USDA-ARS and R. Weidenmaier, H. Houston and B. Leighton at the Caddo Research Station for excellent technical support. Seed for several commercial lines were provided by Golden Peanut Company 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 USDA. USDA is an equal opportunity provider and employer.

ARS or AMS?? conflicts with page 15

What are the first names?? We use those in other chapters.

Table 10. Yield, grade, shelling characteristics and disease incidence in advanced runner breeding lines at the Caddo Research Station in Fort Cobb, 2015.[a]

Entry	*Revenue ($/a)[1]*	*Yield (lbs/a)*	*Grade %TSMK*	*100-seed weight (g)*	*No. seeds per oz*	*ELK (%)[c]*	*Hull (%)*	*DK (%)[2]*	*SM (%)*
Runner									
Red River Runner	747 a	4683 a	74 ab	74.9 ab	33 e	56 a	23 e	0.7	7.1
ARSOK-R37	710 ab	4622 ab	71 bc	70.5 ab	34 c-e	49 a-c	24 b-e	0.5	3.8
ARSOK-R47A	708 ab	4622 ab	71 bc	75.6 a	34 de	52 ab	24 de	0.4	2.9
Tamrun OL11	706 ab	4296 a-c	76 a	69.2 ab	35 b-d	49 a-c	22 e	0.4	3.3
ARSOK-R35	696 ab	4513 a-c	71 bc	73.8 ab	34 de	51 ab	24 c-d	0.6	4.2
ARSOK-R60A	642 a-c	4404 a-c	67 c	61.5 cd	40 a	33 d	28 a	0.5	1.3
Florida 07	627 a-d	3884 a-d	75 ab	69.0 ab	37 b	50 a-c	23 de	0.7	15.0
ARSOK-58C	604 a-d	4138 a-d	68 c	59.1 d	41 a	45 bc	27 ab	0.3	3.8
ARSOK-58B	576 b-d	3920 a-d	68 c	58.8 d	42 a	48 bc	27 a-c	0.3	4.6
Flavor Runner 458	540 dc	3654 b-d	68 c	67.6 bc	37 bc	47 bc	26 a-d	1.2	15.4
ARSOK-R58A	513 dc	3557 dc	67 c	61.0 cd	42 a	43 c	29 a	0.2	4.6
Tifrunner	475 d	3194 d	69 c	59.3 d	40 a	51 ab	28 a	0.1	15.4

Note: Market types were analyzed separately. Numbers with the same lowercase letter within columns for each market type are not significantly different (α = .05). No Southern blight was observed and incidence of pod rot was too low for analyses.

[1] Based on the following peanut loan rate per percent of total sound mature kernels: $4.824. Calculations do not include deductions for excess splits or damaged and other kernels.

[2] ELK=percentage of seeds riding 21/64 screen. DK=kernels with visible and concealed damage.

Hyphenated--does a-c mean a AND c or a THROUGH c (a, b and c)??

Table 11. Yield, grade, shelling characteristics and disease incidence in advanced Spanish and Virginia breeding lines at the Caddo Research Station in Fort Cobb, 2015.[a]

Entry	*Revenue ($/a)[1]*	*Yield (lbs/a)*	*Grade % TSMK*	*Fancy pods (%)[2]*	*100-seed weight(g)*	*No. seeds per oz*	*ELK (%)[3]*	*Hull (%)*	*DK (%)[3]*	*SM (%)*
Spanish										
OLé	485	3,267	69	-	52.3	49	51	28	0.4	0
ARSOK-S88	483	3,182	71	-	54.7	48	54	27	0.6	0
Virginia										
ARSOK-V41	771 a	4,804 a	73 ab	83	85.1 b	30 a	58 a	25 c	0.2	6.7
Florida Fancy	659 b	4,477 ab	67 d	84	87.7 ab	28 ab	42 b	31 a	0.7	4.2
ARSOK-V31	653 b	4,017 bc	74 a	89	97.0 a	27 ab	60 a	25 c	0.4	5.4
Jupiter	618 bc	4,054 bc	69 cd	89	89.9 ab	28 ab	53 a	29 ab	0.8	7.5
ARSOK-V85	588 bc	3,641 c	74 a	82	93.3 ab	28 ab	57 a	24 c	0.7	0.8
VENUS	560 c	3,602 c	71 bc	90	93.3 ab	27 b	56 a	28 b	<0.1	2.1

Note: Market types were analyzed separately. Numbers with the same lowercase letter within columns for each market type are not significantly different (α = 0.05). No Southern blight was observed and incidence of pod rot was too low for analyses.

[1] Based on the following peanut loan rate per percent of TSMK (Spanish: $4.800 and Virginia: $4.921). Calculations do not include deductions for excess splits or damaged and other kernels.

[2] Percentage of Virginia pods riding the 34/64-inch spacing on presizer.

[3] ELK=percentage of seeds riding largest screen (Spanish: 19/64 and Virginia: 21.5/64). DK=kernels with visible and concealed damage.

Genome (DNA) Sequencing of *Sclerotinia minor*

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2015 progress made possible through OPC and NPB support

- **The fungus *Sclerotinia minor* causes blight on peanuts in Oklahoma and elsewhere, which results in heavy yield loss, if not managed properly. Also, the fungus *Sclerotinia sclerotiorum* causes blight of peanut under cooler conditions.**
- **Both *Sclerotinia minor* and *Sclerotinia sclerotiorum* produce black sclerotia which survive in soil and germinate directly by producing filamentous mycelia capable of infecting plant tissues. The fungal mycelium will infect and colonize the plants, causing maceration of tissues and producing a new crop of sclerotia.**
- **Epidemic development of sclerotinia blight in peanuts is directly correlated to sclerotia density in soils.**
- **Effective disease management requires a deep understanding of the biology of the pathogen and its interaction with the host, as well as accurate identification of the pathogenic species.**
- **Because of the limited morphological characters available for discrimination between the two species, molecular methods are needed for accurate identification and sensitive detection of these pathogens.**
- **Previously, a multiplex polymerase chain reaction protocol was designed to discriminate four species of *Sclerotinia* for routine use in plant disease diagnostic laboratories. Although this protocol is accurate and sensitive, it has limited use for screening of asymptomatic plant materials since its detection power may not be sensitive enough to detect early-stage infections.**
- **The objective of this project is to sequence the genome (DNA) and transcriptome (RNA) of *Sclerotinia minor* and compare them to those of closely related species in order to identify genetic differences among them that can be used as signature characters (e-probes).**
- **A new bioinformatic tool called E-probe Diagnostic Nucleic acid Analysis (EDNA) was developed at OSU, which allows the sensitive detection of fungal plant pathogens directly from nucleic acids (DNA and RNA) of infected plant samples at various levels of infection, reducing the time required for diagnosis from a few days or weeks, to potentially several hours.**
- **Additionally, the knowledge generated by this project can be used in the future to identify pathogenicity factors that could be used as targets for development of resistant peanut cultivars and new fungicides.**

Sclerotinia minor Jagger is a fungus that causes Sclerotinia blight on peanuts. Symptoms of Sclerotinia blight first appear near the soil line as small, light tan lesions on stems or pegs. White, fluffy mycelium often is evident within the canopy on diseased stems, pegs and leaves, especially during periods of high humidity. As the infection progresses, elongating stem lesions become distinctively bleached or straw colored. Eventually, infected stems and pegs may shred and break. Tips of individual infected stems may remain green and look healthy for several days before they wilt and the foliage turns light brown, withers and dies. These symptoms result in the blighted appearance for which the disease is named. Dark, irregularly shaped sclerotia are formed on and in infected stems, pegs and pods and are indicative of Sclerotinia blight. Infection of young peanut plants by *S. minor* under greenhouse conditions often leads to tissue collapse. *Sclerotinia minor* lacks host specificity, as do many soilborne organisms, and has a broad host range.

The disease cycle of Sclerotinia blight starts with the germination of sclerotia that remained in soils from the previous cropping season. Sclerotia germinate directly by producing filamentous mycelia capable of infecting plant tissues. The fungal mycelium will infect and colonize the plants, causing maceration of tissues and producing new sclerotia, which can stay latent until the next cropping season or can be disseminated by soil movement to other locations, where they will germinate under the appropriate environmental conditions. High humidity, with rain six to 15 days before infection and temperatures between 68 F and 80 F are optimal for epidemic development. Epidemic development of sclerotinia blight in peanuts is directly correlated to sclerotia density in soils.

Disease management requires selection of resistant cultivars, management of irrigation, careful handling of the crop to avoid excessive plant injuries and application of fungicides when needed. If the disease is observed in a field, sanitation of equipment, tools and shoes is fundamental to avoid moving inoculum such as sclerotia or mycelium to clean fields. Effective disease management requires a deep understanding of the biology of the pathogen and its interaction with the host, as well as accurate identification of the pathogenic species.

Sclerotinia minor is routinely identified based on the morphological characteristics of the mycelium and the size of sclerotia. However, under certain environmental conditions, *S. sclerotiorum*, a close relative of *S. minor,* can also infect peanuts. Although *S. sclerotiorum* prefers cooler temperatures, it also is capable of producing Sclerotinia blight. The two *Sclerotinia* species can be distinguished by the size of the sclerotiam However, previous research demonstrated the range of sclerotia size can overlap between these species, leading to erroneous identifications. Misidentification of the pathogen can be problematic, since *S. sclerotiorum* often produces apothecia and large amounts of airborne spores, and has a broader range of hosts than *S. minor,* which could result in extensive disease in peanut and other crops under propitious environmental conditions.

Because of the limited morphological characters available for discrimination between the two species, molecular methods are needed for accurate identification and sensitive detection of these pathogens. Previously, a multiplex polymerase chain reaction protocol was designed to discriminate four species of *Sclerotinia* for routine use in plant disease diagnostic laboratories. Although this protocol is accurate and sensitive, it has limited use for screening of asymptomatic plant materials since its detection power

may not be sensitive enough to detect early-stage infections. Furthermore, this tool cannot distinguish active from latent infections.

The objective of this project is to sequence the genome (DNA) and transcriptome (RNA) of *Sclerotinia minor* and compare them to those of closely relate species in order to identify genetic differences among them that can be used as signature characters, or e-probes. E-probe patterns can be used as genetic fingerprints that allow discriminating among the species using nucleic acids of infected plants (metagenomics samples) and computational biology (bioinformatic) approaches. A new bioinformatic tool called EDNA was developed at OSU, which allows the sensitive detection of fungal plant pathogens directly from nucleic acids (DNA and RNA) of infected plant samples at various levels of infection, reducing the time required for diagnosis from a few days or weeks, to potentially several hours.

Additionally, the knowledge generated by this project can be used in the future to identify pathogenicity factors that could be used as targets for development of resistant peanut cultivars and new fungicides.

To sequence the genome and transcriptome of *S. minor*, high-quality nucleic acids were obtained from mycelia grown on liquid media using standard protocols. Nucleic acids were sequenced at OSU's Recombinant DNA and Protein Core Facility. The data generated was analyzed using multiple bioinformatic tools to assemble (Newbler Assembler 2.9; CEGMA) and annotate (MAKER V.2.31.8; SNAP) the draft genome, while comparing it to the public genomes of *S. sclerotiorum* and *Botrytis cinerea*, two close relatives of *S. minor*. General aspects of the *S. minor* genome also were compared to the genomes of other fungi of the same class (Leotiomycetes).

A summary of the statistics and metrics of the *S. minor* genome are summarized in Table 12. Comparisons of general aspects of the *S. minor* genome and genomes of other Leotiomycetes are presented in Table 12. A graphic representation of the *S. minor* genome compared to the *S. sclerotiorum* genome is provided in Figure 1.

The size of the *S. minor* draft genome was estimated at 43.4 megabases (Mb). The average sequencing depth was 6x (525K reads). Annotated genes include approximately five thousand proteins, of which 23 percent were unique to *S. minor*, while others were similar to protein-coding genes of *S. sclerotiorum* (47 percent), genes of *B. cinerea* (39 percent), and genes shared by *S. sclerotiorum* and *B. cinerea* (34 percent) and other Leotiomycetes (25 percent). The draft generated was estimated to represent approximately 88 percent of the *S. minor* genome.

The transcriptome of *S. minor* is currently being sequenced, which will provide additional information about the proteins expressed during growth in vitro and during peanut infection. Future work will use this information to design e-probes for detection of *S. minor* from plant-infected materials using EDNA and complete comparisons of the genetic and evolutionary relationships of *S. minor* and other fungi of the Leotiomycetes.

Table 12. *Sclerotinia minor* genome assembly statistics and metrics.

Genome metrics	
Largest segment size	39,554 bp
Average DNA segment size	4,245 bp
Aligned reads	525,545 bp
Estimated Genome Size	43.4 X 10^6 bp
Average Sequencing Depth	6.0x

bp = base pairs

Table 13. Genome information of fungal genome sequenced in the Leotiomycetes class used for the whole genome phylogeny.

Organism	*Contigs/ Chromosomes*	*Scaffolds*	*Size (Mb)*	*GC content*	*Proteins*
Sclerotinia minor	9,060	-	33.98	42.31	4,727
Sclerotinia borealis	1,741	1,241	39.24	41.87	10,166
Sclerotinia sclerotiorum	682	39	38.20	41.79	14,446
Sclerotinia homoeocarpa	31,623	-	29.73	44.61	0
Botrytis cinerea	18	-	42.63	42.00	16,581
Botrytis paeoniae	11,700	-	44.24	41.11	0
Erysiphe necator	5,935	-	52.51	38.74	6,484
Erysiphe pisi	35,300	-	69.26	39.16	0
Oidiodendron maius	433	100	46.24	47.11	16,702
Blumeria graminis f. sp. *hordei*	15,056	6,843	87.91	43.96	6,495
Pseudogymnoascus destructans	3,580	1,848	28.36	50.12	9,153
Pseudogymnoascus pannorum	3,339	-	27.65	50.21	9,482
Marssonina brunnea f. sp. *'multigermtubi'*	2,415	89	51.72	42.92	10,027
Glarea lozoyensis	239	22	39.17	45.82	13,083
Poculum sydowianum	11,777	-	51.99	43.07	0
Rutstroemia echinophila	7,345	-	40.25	43.11	0
Ascocoryne sarcoides	219	13	34.17	46.38	0

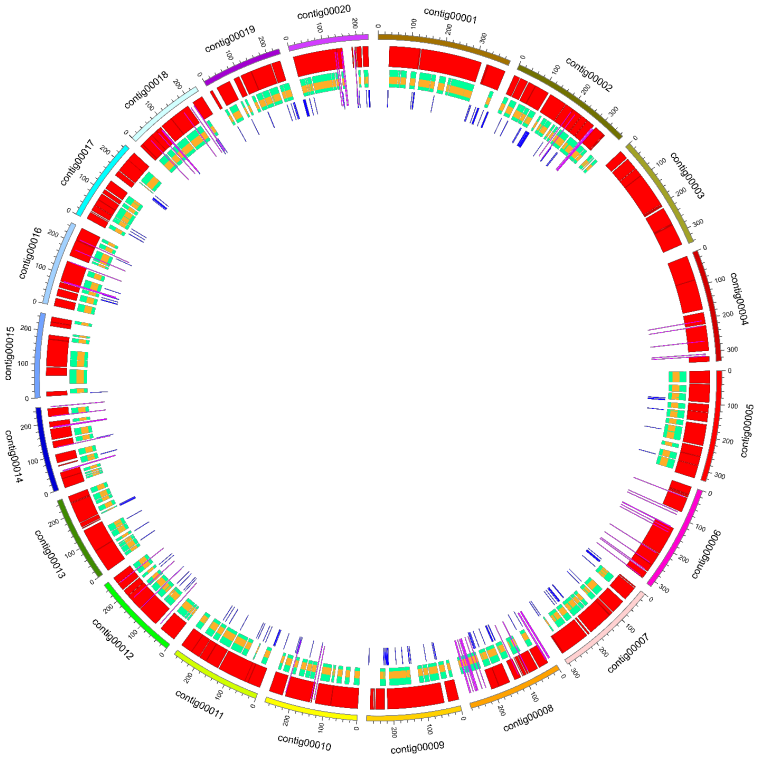

Figure 1. Partial genome visualization of *Sclerotinia minor* represented by the 20 largest sequence segments. The outer shell shows the segments delimited by different colors. Red highlights show similar regions in *S. minor* and *S. sclerotiorum.* Green highlights show annotated genes, the orange highlight shows coding regions, the blue highlights show repetitive sequences and the purple highlights show the areas in the genome where e-probes were developed.

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Integrated Management of Peanut Diseases

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2015 progress made possible through OPC and NPB support

- **Levels of soilborne diseases such as Sclerotinia blight, Southern blight and pod rot were low in 2015.**
- **Yield responses from control of early leaf spot ranged from 500 to 1,000 pounds per acre.**
- **Calendar (six applications) and weather-based (four applications) fungicide programs continued to provide better leaf spot control than the reduced (three applications) calendar programs.**
- **Of the available high O/L runner varieties, Red River Runner and Tamrun OL11 were the most resistant to Sclerotinia blight, while Florida-07 and FloRun107 were the most susceptible.**
- **ARSOK-V41, ARSOK-R35 and Red River Runner were the highest yielding entries in pod rot and/or Sclerotinia blight trials.**

Field trials were completed in 2015 that addressed the management of important peanut diseases in Oklahoma. The management strategies that were evaluated included chemical control and disease-resistant varieties. Efforts were made to develop and demonstrate a range of input levels for the fungicide programs. The diseases studied included seedling disease, early leaf spot, southern blight, Sclerotinia blight and pod rot.

The excellent cooperation of Robert Weidenmaier and the farm crew at the Caddo Research Station continues to be greatly appreciated. Merlin Schantz is also gratefully acknowledged for providing land and resources for the pod rot trial at Hydro. Additional funding for the trials was provided by Agriphar, BASF, Bayer and DuPont.

Results from 2015 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 was applied to all the trial data. Unless values were statistically different, little confidence can be placed in the superiority of one treatment or variety over another.

Because of excessive rain in May, trials at the Caddo Research Station were planted about three weeks later than normal. Rainfall during the cropping period at the Caddo Research Station (June 5 to Nov. 10) totaled 4.58 inches for June, 4 inches for July, 1.49 inches for August, 2.42 inches for September, 2.49 inches for October, and 1.15 inches for November. Compared to the 30-year average, rainfall was above normal in June and July, and below normal from August through October. Average daily temperature was below normal in Aug., above normal in Sept. and near normal for the remaining months. Rainfall during the cropping period at Hydro (May 18 to Oct. 27) totaled 6.76 inches for May, 2.2 inches for June, 3.89 inches for July, 1.72 inches for August, 1.73 inches for September and 2.52 inches for October. At Hydro, compared to the 30-year average,

rainfall was above normal in May and July and below normal for the remainder of the cropping season. Average daily temperature was below normal from May through August, above normal in September, and near normal in October.

The early season rainfall favored foliar disease development, which was severe in 2015. However, pressure from soilborne disease such as Sclerotinia blight, southern blight and pod rot was low. Below normal rainfall from Aug. to October and above normal temperatures in September apparently reduced soilborne disease development.

Foliar Diseases

Evaluations of fungicide programs

The objective of this trial was to compare various registered fungicides applied on a full-season, 14-day schedule that totaled six sprays, on a three-spray reduced calendar program, and according to the weather-based, Peanut Leaf Spot Advisor program on the Oklahoma MESONET (mesonet.org). The trial was planted June 5 and dug Oct. 15.

Early leaf spot appeared in early Aug and reached severe levels in untreated check plots by harvest (Table 14). All treatments reduced leaf spot and defoliation compared to the untreated check. The full-season and weather-based programs generally provided the best control. Disease levels for the reduced calendar program were higher than respective full-season and advisory programs. All treatments increased yield and crop value compared to the untreated check except for Bravo and Alto applied according to the reduced calendar schedule.

Table 14. Evaluation of fungicide programs for control of early leaf spot on Spanish peanuts (Tamnut OL06) at the Caddo Research Station in Ft. Cobb, 2015.

Treatment and rate/a (timing)[a]	*Early leaf spot*	*Defoliation (%) Oct. 14*	*Yield (lb/a)*	*Value ($/a)[2]*
Tilt/Bravo SE 4.3F 1.5 pt (1,3,5) Headline 2.09E 6 fl. oz (2,4,6)	4.9 g	0.0 f	3,390 a	538 a
Tilt/Bravo SE 4.3F 1.5 pt (A1,A3) Headline 2.09E 6 fl. oz (A2,A4)	10.8 g	0.0 f	3,187 abc	506 abc
Tilt/Bravo SE 4.3F 1.5 pt (3,5) Headline 2.09E 6 fl. oz (4)	58.8 bc	30.0 bc	2,962 cd	470 cd
Bravo 6F 1.5 pt (1,6) Folicur 3.6F 7.2 fl. oz (2-5)	21.6 f	4.2 ef	3,325 ab	528 ab
Bravo 6F 1 pt + Folicur 3.6F 7.2 fl. oz (A1-A4)	47.5 ed	13.3 d	3,013 bc	478 bc
Bravo 6F 1 pt + Folicur 3.6F 7.2 fl. oz (3,4,5)	64.2 bc	34.2 b	2,991 bc	475 bc
Bravo 6F 1.5 pt (1,3,5,6) Alto 100SL 5.5 fl. oz (2,4)	39.1 e	10.8 ed	2,984 c	474 c
Bravo 6F 1.5 pt (A1,A3) Alto 100SL 5.5 fl. oz (A2,A4)	56.7 cd	25.8 c	3,042 bc	483 bc
Bravo 6F 1.5 pt (3,5) Alto 100SL 5.5 fl. oz (4)	70.0 b	35.4 b	2,628 de	417 de
Untreated check	97.5 a	68.7 a	2,570 e	408 e
LSD (p=.05)[d]	11.2	7.7	335	335

Note: Values in a column followed by the same letter are not statistically different according to Fisher's LSD test at p=.05.

[1] 1 to 6 correspond to the spray dates of 1 = July 20, 2 = Aug. 3, 3 = Aug. 18, 4 = Aug 31, 5 = Sept. 14 and 6 = Sept. 25; A1 to A4 correspond to the spray dates of A1 = July 20, A2 = Aug. 3, A3 = Aug. 31 and 4 = Sept. 25 made according to the weather-based Leaf Spot Advisor.

[2] 2015 loan rate value based on an average grade of 65 percent TSMK.

Southern Blight and Foliar Diseases

Evaluations of fungicide programs

The objective of this trial was to evaluate the experimental fungicide Prosaro and several registered fungicides for control of early leaf spot and southern blight. Bravo was included as a reference for control of only leaf spot. Fungicides were applied in full-season, 14-day programs. The trial was planted June 5 and dug Oct. 15.

Early leaf spot appeared in early August and reached severe levels in untreated check plots by harvest (Table 15). Southern blight appeared in October and only reached trace levels. All treatments reduced levels of leaf spot and defoliation compared to the untreated check. Levels of southern blight did not differ among treatments. All treatments increased yield and crop value compared to the untreated check. Yield responses were due primarily to control of early leaf spot.

Inoculant, Stand Establishment and Foliar and Soilborne Diseases

Evaluation of in-furrow treatments and fungicide programs

The objective of this trial was to evaluate the effects of inoculant with *Rhizobium* (Vault Liquid, Primo Power), in-furrow fungicide application with Priaxor and fungicide programs for leaf spot and

Table 15. Evaluation of fungicide programs for control of early leaf spot and southern blight on Spanish peanuts (Tamnut OL06) at the Caddo Research Station in Ft. Cobb, 2015.

Treatment and rate/a (timing)[1]	*Leaf spot (%) Oct. 14*	*Defoliation (%) Oct. 14*	*Southern blight (%)*	*Yield (lb/a)*	*Value ($/a)*[2]
Bravo 6F 1.5 pt (1,6) Provost 3.6F 10.7 fl. oz (2-5)	12.6 def[3]	0.2 b	0.0 a	3,144 b	497 b
Bravo 6F 1.5 pt (1,6) Prosaro 3.52F 10 fl. oz (2-5)	6.4 gf	0.0 b	0.0 a	3,369 ab	533 ab
Prosaro 3.52F 10 fl. oz (1,3,5) Abound 2.08F 18 fl. oz (2,4) Bravo 6F 1.5 pt (6)	8.2 efg	0.0 b	0.0 a	3,507 a	554 a
Bravo 6F 1.5 pt (1,6) Custodia 2.67F 15.5 fl. oz (2-5)	14.6 de	0.4 b	0.0 a	3,318 ab	525 ab
Bravo 6F 1.5 pt (1,3,5,6) Priaxor 4.17F 6 fl. oz (2-4)	2.0 g	0.4 b	0.2 a	3,485 ab	551 ab
Bravo 6F 1.5 pt (1,6) Folicur 3.6F 7.2 fl. oz (2-5)	23.3 bc	2.5 b	0.0 a	3,238 ab	512 ab
Bravo 6F 1.5pt (1,3,5,6) Abound 2.08F 18 fl. oz (2,4)	21.7 bc	1.2 b	0.4 a	3,514 a	556 a
Bravo 6F 1.5 pt (1,5) Fontelis 1.67F 1.5 pt (2,4)	26.2 b	2.5 b	0.2 a	3,412 ab	539 ab
Bravo 6F 1.5 pt (1-6)	18.7 cd	1.7 b	0.4 a	3,268 ab	517 ab
Untreated check	96.7 a	65.0 a	0.0 a	2,287 c	362 c
LSD (p=.05)[3]	6.3	2.8	NS	359	57

Note: Values in a column followed by the same letter are not statistically different at p=.05 according to Fisher's LSD Test.

[1] 1 to 6 correspond to the spray dates of 1 = July 20, 2 = Aug. 3, 3 = Aug. 18, 4 = Aug. 31, 5 = Sept. 14 and 6 = Sept. 25.

[2] Loan rate value based on an average grade of 65 percent TSMK.

[3] NS=treatment effect not significant at p=.05.

southern blight on stand establishment, disease control and yield. The trial was planted June 9 and dug Oct. 15.

Treatment effects on stand establishment and vigor were not statistically significant (Table 16). Conditions favored development of early leaf spot which appeared in early August and reached severe levels in untreated check plots by harvest compared to previous trials at this site. All treatments reduced final levels of leaf spot and defoliation compared to the untreated check and provided similar levels of disease control. Southern blight incidence was less than 1 percent and was not a limiting disease in the trial. All treatments increased yield and crop value compared to the untreated check. The average yield of the foliar treatments that received in-furrow inoculant (2,991 pounds per acre, n=5) did not differ from foliar treatments not receiving inoculant (2,967 pounds per acre, n=4).

Sclerotinia blight

Variety response to fungicide programs

The objective of this study was to evaluate the disease and yield responses of high O/L runner varieties Georgia 09B, Red River Runner, Tamrun OL11, Florida07 and FloRun 107 to various levels of fungicide input for control of Sclerotinia blight. The high-input treatment consisted of two preventive applications. The low-input treatment was a single application made at the first appearance of disease. The trial was planted June 5 and dug Nov. 10.

Sclerotinia blight appeared in early September, but only reached low levels compared to previous trials at this site (Table 17). The low disease incidence was attributed to reduced plant growth in which the vines did not cover the ground in between rows. Fungicides reduced Sclerotinia blight on all varieties. There were no differences in disease control between the preventive and demand programs of Endura on any of the varieties. However, the demand program with Omega was generally less effective than the other programs. Disease levels were lowest for Red River Runner and Tamrun OL11 and highest for Florida07 and FloRun 107. Yield and crop value were highest for Red River Runner compared to the other varieties. Fungicides increased yields above the untreated check for all varieties. However, crop value responses were below those observed in the past and generally not sufficient to offset treatment costs.

Breeding line responses to fungicide programs

The objective of this trial was to measure the disease and yield responses of runner and Virginia-type breeding lines to a maximum rate of the fungicide Omega for control of Sclerotinia blight. Because Omega is fairly specific for Sclerotinia blight, the lack of a yield response to Omega suggests a high level of resistance. Tamrun OL11 and Gregory were reference varieties for runner and Virginia market types, respectively. The trial was planted June 5 and dug Nov. 10.

Sclerotinia blight appeared in early September, but only reached low levels compared to previous trials at this site (Table 18). The low disease incidence was attributed to limited plant growth in which the vines did not cover the ground in between rows. Fungicide effects on levels of Sclerotinia blight were statistically significant for Venus and some of the breeding lines. However, the fungicide effects on Sclerotinia blight, yield and value were not meaningful due to the low disease pressure. The breeding line ARSOK-R35 was the highest-yielding entry followed by ARSOK-V41. Grade was highest for ARSOK-V41 and lowest for Gregory. Crop values were highest for ARSOK-V41 and ARSOK-R35 and lowest for Gregory and Tamrun OL11.

Table 16. Evaluation of inoculant and fungicide programs on stand establishment, foliar disease control, and yield of Spanish peanuts (Tamnut OL06) at the Caddo Research Station in Ft. Cobb, 2015.

Treatment and rate/A (timing)[1]	*Stand (plts/ft)*	*Leaf spot (%)*	*Defoliation (%)*	*Yield (lb/a)*	*Value ($/a)*[2]
Untreated check	1.8 a[3]	79.2 a	49.2 a	2,171 d	334 d
Bravo 6F 1.5 pt (1,5) Folicur 3.6F 7.2 fl. oz (2,3,4)	2.1 a	25.8 b	5.0 b	2,918 abc	449 abc
Bravo 6F 1.5 pt (1,5) Headline 2.08E 9 fl. oz (2,4) Folicur 3.6F 7.2 fl. oz (3)	1.9 a	22.1 bc	7.5 b	2,788 bc	429 bc
Bravo 6F 1.5 pt (1,5) Headline 2.08E 9 fl. oz (2) Folicur 3.6F 7.2 fl. oz (3) Priaxor 4.17F 6 fl. oz (4)	2.1 a	10.4 cd	0.0 b	3,151 ab	485 ab
Vault Liquid 15 fl. oz (IF) Bravo 6F 1.5 pt (1,5) Headline 2.08E 9 fl. oz (2) Folicur 3.6F 7.2 fl. oz (3) Priaxor 4.17F 8 fl. oz (4)	2.1 a	12.9 bcd	0.0 b	2,810 bc	433 bc
Priaxor 4.17F 6 fl. oz (IF,2,4) Bravo 6F 1.5 pt (1,5) Folicur 3.6F 7.2 fl. oz (3)	2.0 a	1.9 d	0.0 b	3,013 abc	464 abc
Vault Liquid 15 fl. oz + Priaxor 4.17F 6 fl. oz (IF) Bravo 6F 1.5 pt (1,5) Priaxor 4.17F 8 fl. oz (2,4) Folicur 3.6F 7.2 fl. oz (3)	2.0 a	8.5 cd	0.0 b	3,049 abc	470 abc
Primo Power 15 fl. oz (IF) Bravo 6F 1.5 pt (1,5) Headline 2.08E 9 fl. oz (2) Folicur 3.6F 7.2 fl. oz (3) Priaxor 4.17F 6 fl. oz (4)	2.3 a	11.0 bcd	0.4 b	3,347 a	515 a
Primo Power 15 fl. oz + VLS 2000-02-1 11.6 fl. oz (IF) Bravo 6F 1.5 pt (1,5) Headline 2.08E 9 fl. oz (2) Folicur 3.6F 7.2 fl. oz (3) Priaxor 4.17F 6 fl. oz (4)	1.8 a	12.3 bcd	0.0 b	2,708 c	417 c
Primo Power 15 fl. oz + VLS 2000-02-1 23.2 fl. oz (IF) Bravo 6F 1.5 pt (1,5) Headline 2.08E 9 fl. oz (2) Folicur 3.6F 7.2 fl. oz (3) Priaxor 4.17F 6 fl. oz (4)	2.0 a	11.7 bcd	0.0 b	3,042 abc	468 abc
LSD (p=.05)	NS	15.2	9.1	432	66

Note: Values in a column followed by the same letter are not statistically different at p=0.05 according to Fisher's LSD Test.

[1] IF=applied in furrow at planting; 1 to 4 correspond to the spray dates of 1 = July 20, 2 = Aug. 3, 3 = Aug. 18, 4 = Aug. 31 and 5 Sept. 14.

[2] Loan rate value based on an average grade of 63 percent TSMK.

[3] Least significant difference, NS=treatment effect not significant at p=.05.

Table 17. Disease and yield responses of high O/L peanut varieties to fungicide programs for Sclerotinia blight at the Caddo Research Station, 2015.

Treatment and rate/A (timing)[1]	*Georgia 09B*	*Florida07*	*Red River Runner*	*Tamrun OL11*	*FloRun 107*	*Avg*[2]
			Sclerotinia blight - Nov. 9			
Omega 4F 1.0 pt (P1, P2)	3.0 c	8.0 c	4.7 bc	3.0 b	7.7 c	5.3
Omega 1.5 pt (D)	9.0 b	16.2 b	7.7 ab	5.2 b	15.0 b	10.6
Endura 70WG 8 oz (P1+P2)	1.5 c	1.0 c	1.5 c	1.5 b	1.5 c	1.4
Endura 70WG 10 oz (D)	2.7 c	7.2 c	1.2 c	1.5 b	6.0 c	3.7
Untreated check	17.2 a	26.5 a	10.0 a	10.7 a	29.2 a	18.7
LSD (p=.05)	5.6	7.3	5.2	4.0	6.9	
Avg[3]	6.7	11.8	5.0	4.4	11.9	
			Yield (lbs/a)			
Omega 4F 1.0 pt (P1, P2)	3,484	3,857	4,374	3,512	3,757	3,797 ab
Omega 1.5 pt (D)	3,494	3,784	4,165	3,249	3,494	3,637 bc
Endura 70WG 8 oz (P1+P2)	3,394	4,156	4,465	3,503	3,566	3,817 ab
Endura 70WG 10 oz (D)	3,839	4,229	4,501	3,793	3,566	3,986 a
Untreated check	3,330	3,793	3,993	3,439	3,294	3,570 c
LSD (p=.05)						223
Avg[3]	3,508 c	3,964 b	4,300 a	3,499 c	3,536 c	
			Value ($/a)[4]			
Omega 4F 1.0 pt (P1, P2)	627	662	772	611	654	665 ab
Omega 1.5 pt (D)	628	649	735	565	608	637 bc
Endura 70WG 8 oz (P1+P2)	610	713	788	610	621	668 ab
Endura 70WG 10 oz (D)	691	726	794	660	621	698 a
Untreated check	599	651	705	599	573	625 c
LSD (p=.05)						39
Avg[3]	631 c	680 b	759 a	609 c	615 c	

Note: Values in a column or row followed by the same letter are not statistically different at P=0.05.

[1] P1 and P2 are preventive applications on Aug. 14 and Sept. 11, respectively; D is the demand application on Sept. 3.

[2] Averaged over variety.

[3] Averaged over fungicide treatment.

[4] Based on an average grade (percent TSMK) of 74 for GA09B, 70 for Florida-07, 72 for Red River Runner, 71 for Tamrun OL11 and 71 for FloRun 107.

Table 18. Disease and yield responses of peanut breeding lines to fungicide programs for Sclerotinia blight at the Caddo Research Station in Ft. Cobb, 2015.

Treatment and rate/a (timing)[1]	*Tamrun OL11*	*Gregory*	*ARSOK-V41*	*Venus*	*ARSOK-R35*	*ARSOK-R60A*	*Avg*[2]
			Sclerotinia blight - Nov. 9				
Omega 4F 1.5 pt (P1, P2)	1.2 a	4.2 a	2.2 b	1.0 b	0.5 b	0.2 a	1.5
Untreated check	3.0 a	14.5 a	13.7 a	6.0 a	5.5 a	2.7 a	7.6
LSD (p=.05)	NS	NS	9.5	2.3	3.4	NS	
Avg[3]	2.1	9.4	8.0	3.5	3.0	1.5	
			Yield (lbs/a)				
Omega 4F 1.0 pt (P1, P2)	3,004	3,040	4,020	3,521	4,619	3,185	3,565 a
Untreated check	3,004	2,849	3,793	3,212	4,311	3,358	3,421 a
LSD (p=.05)							NS
Avg[3]	3,004 de	2,945 e	3,907 b	3,367 c	4,465 a	3,271 cd	
			Grade (% TSMK)				
Omega 4F 1.0 pt (P1, P2)	71	67	73	69	72	69	70.3 a
Untreated check	72	65	74	69	72	68	70.3 a
LSD (p=.05)							NS
Avg[3]	72 b	66 d	74 a	69 c	72 ab	69 c	
			Value ($/a)[4]				
Omega 4F 1.0 pt (P1, P2)	523	523	763	632	819	546	634 a
Untreated check	534	478	721	576	766	568	607 a
LSD (p=.05)							NS
Avg[3]	528 cd	501 d	742 a	604 b	792 a	557 bc	

Note: Values in a column or row followed by the same letter are not statistically different at p=.05.

1 P1 and P2 are preventive applications July 30 and Aug. 30, respectively.

2 Averaged over variety.

3 Averaged over fungicide treatment.

4 Based on grade using the 2015 Peanut Loan Rate Schedule.

Evaluation of fungicides

The objective of this trial was to compare registered fungicides for control of Sclerotinia blight. Fungicides were applied preventively at high and low labeled rates. The trial was planted June 5 and dug Nov. 10.

Sclerotinia blight appeared in early September, but only reached low levels compared to previous trials at this site (Table 19). The low disease incidence was attributed to reduced canopy development as the vines did not cover the ground in between rows and the planting of a moderately resistant cultivar. Seeds of other cultivars were not available. All treatments except for Fontelis at 1 pint per acre reduced final disease incidence. Plot yields were not correlated with final disease incidence. All treatments except Endura at 10 ounces per acre and Propulse at 10 fluid ounces per acre increased yield and crop value compared to the untreated check. None of the treatments caused phytotoxicity symptoms.

Evaluation of fungicides and application timing

The objective of this trial was to evaluate application timing and rate of registered fungicide for control of Sclerotinia blight. Applications were made preventively at approximately 65 and 95 days after planting or on demand after symptoms first appeared. The trial was planted June 5 and dug Nov. 10.

Sclerotinia blight appeared in early September, but only reached low levels compared to previous trials at this site (Table 20). The low disease incidence was attributed to reduced canopy development (the vines did not cover the ground in between rows) and the planting of a moderately resistant cultivar. Seeds of other cultivars were not available. All treatments except for the demand application of Fontelis reduced final disease incidence. Endura treatments and the preventive program with Omega at 1.5 pints per acre provided the best disease control. Except for Fontelis, disease control did not differ between demand and preventive applications for each of the fungicides. Plot yields were negatively correlated with final levels of disease, and all treatments increased yield and crop value compared to the untreated check.

Pod Rot

The objective of this trial was to assess pod rot reaction in peanut

Table 19. Effects of fungicide and application rate on control of Sclerotinia blight of runner peanuts (Red River Runner) at the Caddo Research Station in Ft. Cobb, 2015.

Treatment and rate/a (timing)[1]	*Sclerotinia blight (%)*	*Yield (lbs/a)*	*Value ($/a)*[2]
Omega 4F 1.5 pt (1,2)	4.7 de	4,015 ab	715 ab
Omega 4F 1.0 pt (1,2)	8.2 cd	3,877 ab	691 ab
Endura 70WG 10 oz (1,2)	1.5 e	3,739 cd	666 cd
Endura 70WG 8 oz (1,2)	1.0 e	3,899 ab	695 ab
Propulse 3.3F 10 fl. oz (1,2)	12.2 bc	3,761 bc	670 bc
Propulse 3.3F 13.7 fl. oz (1,2)	6.0 cde	4,066 ab	724 ab
Fontelis 1.67F 1 pt (1,2)	15.7 ab	4,007 ab	714 ab
Fontelis 1.67F 1.5 pt (1,2)	7.0 cde	3,920 ab	698 ab
Priaxor 4.17F 8 fl. oz (1,2)	4.7 de	4,349 a	775 a
Untreated check	21.0 a	3,390 c	604 c
LSD (p=.05)	6.4	486	86

Note: Values in a column followed by the same letter are not statistically different according to Fisher's LSD test at p=.05.
[1] P1 and P2 refer to preventive applications Aug. 14 and Sept. 11, respectively.
[2] Loan rate values based on an average grade of 73 percent TMSK.

cultivars and breeding lines in order to recommend resistant varieties. The trial was conducted at the Schantz Farm near Hydro in a field of Eda sand previously cropped to cotton. The trial was planted May 18 and dug Oct. 27.

Pod rot only developed to low levels compared to a previous trial at this site. Florida Fancy had more pod rot than the other entries (Table 21). Because of the low level of pod rot, it was not possible to differentiate the reactions of the other entries. Yield and crop value were highest for ARSOK-V41 and Red River Runner and lowest for the Spanish entries.

Table 20. Effects of fungicide and application timing on control of Sclerotinia blight of runner peanuts (Red River Runner) at the Caddo Research Station in Ft. Cobb, 2015.

Treatment and rate/a (timing)[1]	*Sclerotinia blight (%)*	*Yield (lbs/a)*	*Value ($/a)[2]*
Omega 4F 1.5 pt (P1+P2)	6.0 cd	3,978 abc	692 abc
Omega 4F 1.0 pt (P1+P2)	14.2 ab	3,949 abc	687 abc
Omega 4F 1.5 pt (D1)	12.7 bc	3,739 cd	651 cd
Endura 70WG 8 oz (P1+P2)	4.0 d	4,269 a	743 a
Endura 70WG 10 oz (D1)	4.2 d	4,160 ab	724 ab
Propulse 3.3F 10 fl. oz (P1+P2)	9.2 bcd	4,051 abc	705 abc
Propulse 3.3F 13.7 fl. oz (D1)	10.7 bcd	4,167 ab	725 ab
Fontelis 1.67F 1 pt (P1+P2)	12.5 bc	3,833 bc	667 bc
Fontelis 1.67F 1.5 pt (D1)	16.2 ab	3,957 abc	689 abc
Untreated check	21.0 a	3,405 d	593 d
LSD (p=.05)	7.8	397	69

Note: Values in a column followed by the same letter are not statistically different according to Fisher's LSD at p=.05.

[1] P1 and P2 refer to preventive applications August 14 and Sept. 11, respectively. D1 refers to the demand application made after symptoms first appeared Sept. 3.

[2] Loan rate value based on an average grade of 71 percent TSMK.

Table 21. Reaction of peanut varieties and breeding lines to pod rot at the Schantz Farm, 2015.

Entry (market type)[1]	*Pod rot (%)*	*Yield (lb/A)*	*Value ($/A)[2]*
Florida Fancy (V)	20.6 a	4,726 bc	880 bc
Jupiter (V)	8.1 b	4,955 abc	939 abc
Venus (V)	1.9 b	4,392 c	838 c
ARSOK-V41 (V)	8.6 b	5,513 a	1,049 a
Tamnut OL06 (S)	1.0 b	3,360 d	584 d
OLé (S)	0.0 b	3,548 d	641 d
Red River Runner (R)	3.4 b	5,118 ab	953 ab
Tamrun OL11 (R)	3.6 b	4,429 c	835 c
Georga 09B (R)	4.4 b	4,547 bc	859 bc
ARSOK-R60A (R)	0.9 b	4,592 bc	837 c
FloRun 107 (R)	1.6 b	4,601 bc	894 bc
ARSOK-R35 (R)	5.0 b	4,855 bc	888 bc

Note: Values in a column followed by the same letter are not statistically different at p=.05 according to t-tests.

[1] V = Virginia, R = runner, S = Spanish.

[2] Loan rate value based on an average grade (percent TSMK) of 72 for Florida Fancy (44 percent ELK), 73 for Jupiter (53 percent ELK), 74 for Venus (50 percent ELK), 74 for ARSOK-V41 (44 percent ELK), 72 for Tamnut OL06, 75 for OLé, 77 for Red River Runner, 78 for Tamrun OL11, 78 for Georgia 09B, 75 for ARSOK-R60A, 80 for FloRun 107 and 75 for ARSOK-R35.


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