

Integrated Management of Peanut Diseases

John Damicone, Brenda Anaya, Ross Dees and Brooke King
Department of Entomology and Plant Pathology

2017 progress made possible through OPC and NPB support

- Levels of soilborne diseases such as Sclerotinia blight and pod rot were low in 2017.
- Foliar diseases such as early leaf spot and web blotch, and the soilborne disease southern blight (*Sclerotium rolfsii*) were severe in 2017.
- Control of early leaf spot and web blotch resulted in yield responses of 1,000 to 1,500 pounds per acre.
- Miravis, an experimental fungicide that is anticipated to be registered for use on peanuts in 2018, provided superior control of foliar diseases, but required tank mixing with Elatus for control of southern blight.
- Of the commercially available peanut varieties, the runner variety Lariat and the Spanish variety OLé were the most resistant to Sclerotinia blight, while Georgia 09B and Jupiter were the most susceptible.
- The fungicides Miravis + Elatus provided control of Sclerotinia blight equivalent to Omega or Endura, although disease pressure was low.

Field trials were completed in 2017 that addressed the management of important peanut diseases in Oklahoma. The management strategies that were evaluated included chemical control, biological 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 excellent cooperation of Bobby Weidenmaier and the staff at the Caddo Research Station is greatly appreciated. Additional funding for the trials was provided by BASF, Bayer, DuPont and Syngenta.

Results from 2017 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 were generally favorable for development of the peanut crop and diseases. Most of the trials at the Caddo Research Station were planted May 10. Rainfall during the cropping period (May 10 to Oct. 30) totaled 2.91 inches for May, 2.4 inches for June, 2.78 inches for July, 7.06 inches for August, 3.28 inches for September and 4.02 inches for October. Plots received 14 applications of sprinkler irrigation at 0.5 to 1 inch per application that totaled 9.0 inches of water. Compared to the 30-year average, rainfall was nearly 3 inches above normal for the cropping period of May through October. Monthly rainfall totals were below normal for May and June and were

above normal from for the remaining months. Average daily temperature was below normal each month and was nearly 6 F below normal for August. The cool, wet conditions in August favored foliar disease development. Web blotch was unusually severe in 2017 on Spanish varieties. Pod rot was a minor concern while levels of Sclerotinia blight and southern blight were somewhat below normal. Southern blight pressure was extreme when inoculated with *Sclerotium rolfsii*.

Sclerotinia blight

The objective of this trial was to measure the disease and yield responses of peanut varieties that were commercially available in 2017 to various levels of fungicide input for Sclerotinia blight. Varieties included Jupiter (susceptible Virginia), Lariat and Tamrun OL11 (resistant runners), Georgia 09B (intermediate runner) and OLé (resistant Spanish). The high-input treatment consisted of two preventive applications. The low-input treatment was a single application made at the first appearance of disease (demand). The trial was planted May 10 and dug Oct. 30.

Sclerotinia blight appeared in August, but only reached low levels compared to previous trials at this site. 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 except Lariat and OLé, which had the lowest levels of disease (Table 16). There were no differences in disease control between the preventive and demand programs on any of the varieties. Disease levels were highest for Jupiter and Georgia 09B. Yield and crop value were highest for Lariat, Georgia 09B and Tamrun OL11. 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.

Evaluation of Fungicides and Biologicals for Control of Sclerotinia blight of Peanuts

The objective of this trial was to evaluate fungicides and biologicals (Oso, Double Nickel) for control of Sclerotinia blight on the susceptible variety Florida Fancy. Treatments were applied twice on a preventive schedule approximately four weeks apart. The trial was planted May 10 and dug Oct. 30.

The vines never lapped between rows and despite the cool rainy weather in August, Sclerotinia blight only reached 25 percent in the non-treated check by harvest (Table 17). All treatments except Oso and Double Nickel reduced disease incidence compared to the nontreated check. All treatments except Oso, Double Nickel alone and Fontelis had higher yields than the nontreated check. Because of the low disease pressure, yield and value responses barely offset treatment costs.

Foliar Diseases

The objective of this trial was to evaluate fungicide programs applied on various schedules for control of foliar diseases on the variety OLé. Fungicides were applied on a full-season 14-day schedule that totaled six sprays, on a 3-spray reduced 14-day program and according to the weather-based Peanut Leaf Spot Advisor program on the Oklahoma MESONET (<http://www.mesonet.org>). Treatments included the registered fungicides Folicur + Bravo, Headline + Alto and the experimental fungicide Mirivis + Alto. The trial was

Table 16. Responses of peanut varieties to fungicide programs for control of Sclerotinia blight.

<i>Treatment and rate/A (timing)¹</i>	<i>Lariat</i>	<i>Jupiter</i>	<i>Georgia 09B</i>	<i>OLé</i>	<i>Tamrun OL11</i>	<i>Average²</i>
Sclerotinia blight (%) - Oct. 12						
Omega 4F 1.0 pt (P1, P2)	0.5a ³	5.0b	2.7b	0.0a	1.0b	1.8
Omega 1.5 pt (D)	0.2a	4.7b	2.2b	0.0a	1.2b	1.7
Endura 70WG 8 oz (P1+P2)	0.5a	3.2b	1.5b	0.0a	0.5b	1.1
Endura 70WG 10 oz (D)	0.2a	2.2b	0.7b	0.0a	1.7b	1.0
Untreated check	1.5a	11.0a	10.2a	0.0a	6.5a	5.8
Average ⁴	0.6	5.2	3.5	0.0	2.2	
Yield (lb/A)						
Omega 4F 1.0 pt (P1, P2)	4,456	3,751	4,320	3,703	4,447	4,135a ³
Omega 1.5 pt (D)	4,438	3,276	4,274	3,439	4,519	3,989a
Endura 70WG 8 oz (P1+P2)	4,519	4,002	4,501	3,439	4,528	4,198a
Endura 70WG 10 oz (D)	4,474	3,893	4,383	3,367	4,565	4,136a
Untreated check	4,184	2,967	3,984	3,185	3,957	3,655b
Average ⁴	4,414 a ³	3,578b	4,292a	3,427b	4,403a	
Value (\$/A)⁵						
Omega 4F 1.0 pt (P1, P2)	786	638	775	624	801	725a ³
Omega 1.5 pt (D)	783	558	767	580	814	700a
Endura 70WG 8 oz (P1+P2)	797	681	808	580	816	736a
Endura 70WG 10 oz (D)	789	663	787	568	822	726a
Untreated check	738	505	715	537	713	642b
Average ⁴	778a ³	609b	770a	578b	793a	

¹ P1 and P2 are preventive applications on Aug. 2 and Aug. 31, respectively; D is the demand application on Aug.16.

² Averaged over variety.

³ Values in a column or row followed by the same letter are not statistically different at P = 0.05.

⁴ Averaged over fungicide treatment.

⁵ 2017 loan rate value based on an average grade (% TSMK) of 72 for Lariat, 67 (31% ELK) for Jupiter, 73 for Georgia 09B, 70 for OLé and 73 for Tamrun OL11.

planted May 10 using strip till techniques and dug Oct. 17.

Cool, rainy weather in August favored foliar disease development, which reached severe levels compared to previous trials at this site. Early leaf spot appeared in August and reached 90 percent incidence and over 50 percent defoliation Sept. 14 and 100 percent defoliation by harvest in the non-treated check (Table 18). All treatments reduced early leaf spot and had low defoliation Sept. 14. Web blotch appeared in September and was highest for Folicur,

and Headline + Alto programs, and lowest for Miravis + Alto programs. Web blotch also was low in the non-treated check because nearly all leaves had early leaf spot by the time web blotch began to develop. By Oct. 12, defoliation increased to high levels in the Folicur + Bravo and Headline + Alto programs. Miravis + Alto programs provided the best disease control. The increase in defoliation from Sept. 14 and Oct. 12 was likely due to web blotch. Within each fungicide treatment, disease control was similar among the full-season, leaf spot

Table 17. Evaluation of fungicides and biological for control of Sclerotinia blight on Florida Fancy Virginia-type peanuts.

Treatment and rate/A (timing) ¹	Sclerotinia blight (%)		Yield (lbs/A)	Value (\$/A) ²
	Sept. 14	Oct. 12		
Omega 4F 1.0 pt (1,2)	2.0de ³	7.0bc	4,516bc	809bc
Endura 70WG 8 oz (1,2)	1.0e	5.7c	4,617abc	827abc
Oso 6.5 fl oz + Induce 0.25% (1,2)	9.2a	28.0a	4,363bcd	782bcd
Double Nickel LC 1 qt (1,2)	7.2abc	24.2a	4,327cd	775cd
Double Nickel LC 1 qt (1) Omega 4F 1 pt (2)	7.0abc	14.0b	4,690abc	840abc
Elatus 45WG 7.3 fl oz + Miravus 1.67F 3.42 fl oz (1,2)	2.5de	8.2bc	4,980a	892a
Propulse 3.3F 13.7 fl oz (1,2)	5.2bcd	11.2bc	4,675abc	837abc
Fontelis 1.67F 1.5 pt (1,2)	3.2de	10.0bc	4,472bcd	801bcd
Priaxor 4.17F 8 fl oz (1,2)	5.0cd	9.2bc	4,770ab	854ab
Non-treated check	8.5ab	25.2a	4,080d	731d

¹ Applications 1 and 2 refer to preventive applications on Aug. 2 and Aug. 31, respectively.

² 2017 loan rate value based on an average grade 70% TSMK and 36% ELK.

³ Values in a column followed by the same letter are not statistically different at P = 0.05.

advisor and reduced calendar programs. All treatments increased yield compared to the nontreated check by over 1,050 pounds per acre and increased crop value by at least \$175 per acre.

Foliar Diseases and Southern blight

The objective of this trial was to evaluate fungicide programs for control of foliar and soilborne diseases of peanuts. All fungicides except Miravis are registered for use on peanuts. The full-season Bravo program controls foliar diseases but not soilborne diseases such as southern blight. Plots were inoculated with the southern blight fungus by sprinkling millet seed colonized by the fungus along the center two rows of each plot July 26 after the second fungicide application. The foliar diseases early leaf spot and web blotch developed naturally. The trial was planted May 10 using strip till techniques and dug Oct. 17.

Cool rainy weather in August favored foliar disease development which reached severe levels compared

to previous trials at this site. Early leaf spot appeared in August and reached nearly 90 percent incidence and over 60 percent defoliation Sept. 14, and nearly 100 percent defoliation by harvest in the nontreated check (Table 19). All treatments reduced early leaf spot and had low defoliation Sept. 14. Web blotch appeared in September and was highest for Folicur, Abound and full-season Bravo treatments; and lowest for treatments receiving Miravis. Web blotch also was low in the nontreated check because nearly all leaves had severe early leaf spot when web blotch appeared. Defoliation increased to high levels for the Folicur and full-season Bravo treatments, which did not differ from the nontreated check by Oct. 12. Plots receiving Miravis provided the best foliar disease control. The increase in defoliation from Sept. 14 to Oct. 12 was likely due to web blotch. Southern blight was severe and was highest for plots receiving Miravis alone on the second and fourth applications. Elatus+ Miravis, Provost, Abound and Folicur provided the best southern blight control. All treatments except Miravis alone on the second and fourth

Table 18. Evaluation of fungicide programs on control of early leaf spot and web blotch on OLé Spanish-type peanuts.

Treatment and rate/A (timing) ¹	Sept. 14			Oct. 12		Yield (lbs/A)	Value (\$/A) ³
	Early leaf spot (%)	Web blotch (%)	Defoliation (%)	Foliar disease (%) ²	Defoliation (%)		
Bravo 6F 1.5 pt (1, 6) Folicur 3.6F 7.2 fl oz (2-5)	19.1bcd ⁴	11.7ab	2.9b	95.8 a	79.1 b	3,630d	606d
Bravo 6F 1 pt + Folicur 3.6F 7.2 fl oz (A1-A4)	12.7de	3.7cd	1.2b	96.7a	76.7bc	4,058abc	677abc
Bravo 6F 1 pt + Folicur 3.6F 7.2 fl oz (3-5)	24.6bc	1.7cd	5.0b	92.1a	63.3c	3,840bcd	641bcd
Headline 2.09E 6 fl oz (1, 3, 5) Alto 0.83F 5.5 fl oz (2, 4, 6)	1.2ef	7.9bc	0.0b	95.0a	80.0b	3,811d	636d
Headline 2.09E 6 fl oz (A1, A3) Alto 0.83F 5.5 fl oz (A2, A4)	2.5ef	16.2a	0.0b	97.5a	86.2ab	3,928a-d	656a-d
Headline 2.09E 6 fl oz (3, 5) Alto 0.83F 5.5 fl oz (4)	27.5b	5.0cd	2.1b	94.6a	80.0b	3,703d	618d
Miravis 1.67F 3.4 fl oz (1, 3, 5) Alto 0.83F 5.5 fl oz (2, 4, 6)	1.0f	0.0d	0.0b	25.0c	10.0d	4,174ab	697ab
Miravis 1.67F 3.4 fl oz (A1, A3) Alto 0.83F 5.5 fl oz (A2, A4)	2.5ef	3.7cd	0.0b	31.6bc	18.3d	3,935a-d	657a-d
Miravis 1.67F 3.4 fl oz (3, 5) Alto 0.83F 5.5 fl oz (4)	14.1cd	2.1cd	2.9b	40.4b	23.3d	4,196a	700a
Non-treated check	95.4a	3.1cd	56.6a	100.0a	100.0a	2,585e	431e

¹ 1 to 6 correspond to the spray dates of 1=June 28, 2=July 12, 3=July 26, 4=Aug. 9, 5=Aug. 22 and Sept. 8 for the calendar programs; A1 to A4 correspond to the spray dates of A1=July 28, A2=July 12, A3=Aug. 2, and A4=Aug. 22 for the weather-based Leaf Spot Advisor program.

² Early leaf spot and web blotch were rated together.

³ 2017 loan rate value based on an average grade 69%TSMK.

⁴ Values in a column followed by the same letter are not statistically different at P = 0.05.

Table 19. Evaluation of fungicide programs for control of foliar diseases and southern blight (*Sclerotium rolfsii*) on Olé Spanish peanuts.

Treatment and rate/A (timing) ¹	Sept. 14			Oct. 12			Yield (lb/A)	Value (\$/A) ³
	Early leaf spot (%)	Web blotch (%)	Defoliation (%)	Foliar disease (%) ²	Defoliation (%)	So. blight (%)		
Alto 0.83 SL 5.5 fl oz + Bravo 6F 1.5 pt (1) Elatus 45WG 7.3 oz + Miravis 1.67F 3.4 fl oz (2, 4) Bravo 6F 1.5 pt (5)	0.4e4	0.0d	0.0d	12.9d	4.1e	12.0ef	3,347a	502a
Alto 0.83 SL 5.5 fl oz + Bravo 6F 1 pt (1) Miravis 1.67F 3.4 fl oz (2, 4) Bravo 6F 1.5 pt (5)	0.4e	0.0d	0.0d	13.7d	3.3e	41.7a	1,299d	195d
Alto 0.83 SL 5.5 fl oz + Bravo 6F 1 pt (1) Omega 4F 1.0 pt + Miravis 1.67F 3.4 fl oz (2, 4) Bravo 6F 1.5 pt (5)	0.0e	0.0d	0.0d	6.2d	0.0e	20.2cd	1,779c	267c
Bravo 6F 1.5 pt (1, 5) Provost 3.6F 8 fl oz (2, 3, 4) Bravo 6F 1.5 pt (1, 3, 5) Abound 2.08F 18.5 fl oz (2, 4) Bravo 6F 1.5 pt (1, 3, 5) Fontelis 1.67F 1 pt (2, 4) Bravo 6F 1.5 pt (1, 3, 5) Priaxor 4.17F 6 fl oz (2, 4) Bravo 6F 1.5 pt (1, 5) Folicur 3.6F 7.2 fl oz (2, 3, 4) Bravo 6F 1.5 pt (1-5)	9.2de	5.4cd	2.1d	80.8b	53.7bc	11.2f	2,476b	371b
Bravo 6F 1.5 pt (1, 3, 5) Abound 2.08F 18.5 fl oz (2, 4) Bravo 6F 1.5 pt (1, 3, 5) Fontelis 1.67F 1 pt (2, 4) Bravo 6F 1.5 pt (1, 3, 5) Priaxor 4.17F 6 fl oz (2, 4) Bravo 6F 1.5 pt (1, 5) Folicur 3.6F 7.2 fl oz (2, 3, 4) Bravo 6F 1.5 pt (1-5)	12.5d	10.0bc	1.2d	86.7ab	67.5b	11.7ef	2,621b	393b
Bravo 6F 1.5 pt (1, 3, 5) Fontelis 1.67F 1 pt (2, 4) Bravo 6F 1.5 pt (1, 3, 5) Priaxor 4.17F 6 fl oz (2, 4) Bravo 6F 1.5 pt (1, 5) Folicur 3.6F 7.2 fl oz (2, 3, 4) Bravo 6F 1.5 pt (1-5)	12.8d	0.0d	1.2d	61.7c	35.8d	14.5def	2,592b	389b
Priaxor 4.17F 6 fl oz (2, 4) Bravo 6F 1.5 pt (1, 5) Folicur 3.6F 7.2 fl oz (2, 3, 4) Bravo 6F 1.5 pt (1-5)	2.8de	2.5cd	0.0d	63.3c	40.8cd	24.2c	1,786c	268c
Bravo 6F 1.5 pt (1, 5) Folicur 3.6F 7.2 fl oz (2, 3, 4) Bravo 6F 1.5 pt (1-5)	33.7c	25.0a	10.0c	97.5a	83.3a	12.2ef	2,238b	335b
Bravo 6F 1.5 pt (1-5)	48.3b	16.2b	17.5b	98.7a	86.6a	31.0b	1,241d	186d
Non-treated check	89.6a	3.1cd	62.9a	100.0a	93.7a	18.0cde	915d	137d

¹ 1 to 5 correspond to the spray dates of 1 = June 28, 2 = July 12, 3 = July 26, 4 = Aug. 9 and 5 = Aug. 22

² Early leaf spot and web blotch were rated together.

³ 2017 loan rate value based on an average grade 61%TSMK.

⁴ Values in a column followed by the same letter are not statistically different at P = 0.05.

applications, and the full-season Bravo program increased yield and crop value compared to the nontreated check. Elatus + Miravis had the highest yield and crop value, while Provost, Abound, Fontelis and Folicur were intermediate. The low

average grade and resulting crop values were attributed to severe southern blight because an adjacent trial that had very low southern blight graded a more typical 69 percent TSMK.