DEVELOPMENT OF PEANUT DISEASE MANAGEMENT STRATEGIES

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Introduction

Fungal diseases are responsible for significant economic losses throughout peanut production regions of Texas. To minimize these losses, producers rely heavily on chemical fungicides and resistant cultivars. While there is a wide range of products labeled for control of peanut diseases, resistant germplasm is more limited. Optimal disease management systems should rely on an integrated approach taking into consideration, fungicide selection, timing, application methods, as well as the use of host resistance and other cultural practices known to influence disease development. Results contained within this report reflect strategies aimed at improving overall disease control and increasing economic profitability.

Materials and Methods

A series of small plot trials were conducted in Collingsworth Co., Dawson Co., Erath Co., Gaines Co., and/or Terry Co. focusing on improving seedling disease, leaf spot, pod rot, or Sclerotinia blight control. Plots consisted of two rows, 25 to 50 feet in length. All treatments were arranged in a randomized complete block design with four to five replications. Disease development was monitored and appropriate ratings were taken throughout the growing season. Plots were inverted at maturity and harvested with a combine to obtain pod yields on a per plot basis. Grade comparisons were made in some cases. A description of treatments can be found within respective Tables for each trial.

Results and Discussion

Seedling disease trial (Collingsworth Co.): Disease pressure was relatively low at this location; however, significant differences in plant stands were observed 14 and 28 days after planting (DAP). Stand counts were greater for all treatments when compared the non-treated control; however, no differences were observed between any of the fungicide treatments (Table 1). Similar differences were observed with regard to plot ratings. Although not significant, pod yields were numerically higher for all treatments compared to the non-treated control. These results demonstrate the importance of using high quality treated seed.

Leaf spot trials (Erath Co.): Early leaf spot was the predominant foliar disease at these locations; however, late leaf spot and peanut rust were evident in several non-treated control plots. A total of seven applications were made throughout the season, with all trials containing non-treated control plots. Leaf spot pressure was moderate throughout most of the season with appreciable levels of disease being observed at harvest. Considerable defoliation (≥60%) was observed for the non-treated controls (Tables 2-4). All fungicide programs significantly improved leaf spot control compared to non-treated plots. Yield increases were generally correlated with improved leaf spot control. These trials were conducted in fields with a history of Sclerotinia blight; however, none of the products evaluated reduced Sclerotinia blight compared to the non-treated control plots.

Pod rot trials (Dawson Co. and Gaines Co.): Results from laboratory isolations indicated that *Rhizoctonia solani* was the primary pod rotting agent at both locations (data not shown). Overall, disease pressure was low at both locations, ranging from 2.5-7.5% at Gaines Co. and 0.3-6.8% at Dawson Co. Due to a lack of treatment x trial interaction data from both locations were pooled for analysis. The use of fungicides led to significantly lower pod rot incidence compared to the non-treated controls, and numerically higher yields; however, there were no discernable differences between the fungicides (Abound, Artisan, or Provost), application methods (Broadcast or Banded), or carrier volumes (15, 30, or 45 gallons per acre) evaluated (Tables 5 and 6).

Sclerotinia blight trial (Gaines Co.): Environmental conditions were quite conducive for the development of Sclerotinia blight. Symptoms were visible by the July 12. Overall, the performance of Omega and Endura were similar. Use of either fungicide significantly reduced the final Sclerotinia blight incidence compared to the non-treated and Bravo only controls (Table 7). Preventative applications resulted in significantly lower disease ratings than did curative applications, indicating the importance or scouting and application timing. Pod yields were increased with use of either Omega or Endura; however, an inadvertent application of Omega may have confounded treatment differences.

Leaf spot / Sclerotinia blight trial (Erath Co.): With regard to leaf spot, all treatments significantly improved disease control when compared to the untreated control (Table 8). The use of Tilt-Bravo in addition to Omega or Endura improved leaf spot control compared to either of the products applied alone. No differences in susceptibility were observed among the cultivars evaluated. Plots were artificially infested with oat grain containing *Sclerotinia minor*, thus Sclerotinia blight was quite severe ranging from 20.2-48.5%. Use of either Omega or Endura significantly improved Sclerotinia blight control. Yields were similar for all programs containing either Omega or Endura; however, a minor reduction in yield was observed when Omega was tank-mixed with Tilt-Bravo. These results indicate that Endura and Omega are comparable with regard to both Sclerotinia blight and leaf spot control.

Acknowledgements

Appreciation is expressed toward the National Peanut Producers Board Texas and the Texas Peanut Producers Board for financial assistance provided. The dedicated technical assistance of Max Batla, Jeremy McCalla, Kristen Phillips, John Cason, and Lee Brandon helped make this work possible. We would also like to thank our many cooperators Gary Jackson, Judd Chevarant, Andy Henard, and Mark Boardman.

Table 1. Stand counts, visual ratings, and pod yields for commercially available peanut seed treatments

Treatment	14 day stand count (plants/foot)	28 day stand count (plants/foot)	Visual rating (1-10 scale)	Pod yields (lb/acre)
1. Non-treated	3.3 b	3.2 b	6.8 b	5129 a
2. Trilex Optimum	3.8 a	3.6 a	7.8 a	5995 a
3. Trilex Advanced	3.8 a	3.7 a	8.3 a	5848 a
4. Dynasty PD	3.7 a	3.6 a	7.5 ab	5791 a
5. Vitavax PC	3.8 a	3.6 a	7.5 ab	5824 a

Table 2. Performance of commercially available fungicides for control of peanut leaf spot

Treatment	Rate	Timing[1]	Leaf spot (Fla. 1-10)	Sclerotinia blight (%)	Pod yield (lb/acre)
1. Non-treated	- - -	- - -	7.1 a	48.1 a	1307 b
2. Bravo Weatherstik Folicur	1.5 pt 7.2 fl oz	1,2,7 3 - 6	2.2 cd	34.4 a	2360 ab
3. Bravo Weatherstik Abound	1.5 pt 12.0 fl oz	1,2,4,6,7 3 & 5	2.3 cd	34.4 a	3294 a
4. Bravo Weatherstik Evito	1.5 pt 5.7 fl oz	1,2,4,6,7 3 & 5	2.4 c	46.9 a	2278 ab
5. Bravo Weatherstik Evito	1.5 pt 3.8 fl oz	1,2,4,6,7 3 & 5	2.3 cd	43.8 a	2287 ab
6. Bravo Weatherstik Evito + Folicur	1.5 pt 5.7 fl oz 6.0 fl oz	1,2,4,6,7 3 & 5	2.1 cd	30.6 a	2704 a
7. Bravo Weatherstik Tebuzol	1.5 pt 7.2 fl oz	1,2,7 3 - 6	3.3 b	31.9 a	2977 a
8. Bravo Weatherstik Tebuzol + Topsin-M	1.5 pt 7.2 fl oz 5.0 fl oz	1,2,7 3 - 6	2.1 cd	34.4 a	3476 a
9. Bravo Weatherstik Tebuzol + Bravo Weatherstik	1.5 pt 7.2 fl oz 0.75 pt	1,2,7 3 - 6	1.9 d	34.4 a	2514 ab
10. Bravo Weatherstik Abound	1.5 pt 18.0 fl oz	1,2,4,6,7 3 & 5	2.4 c	45.0 a	2623 a
11. Bravo Weatherstik	1.5 pt	1 - 7	2.1 cd	43.1 a	2350 ab

Table 3. Performance of Provost 433 SC for control of peanut spot

Fungicide program	Rate	Timing[1]	Leaf spot (Fla. 1-10)	Sclerotinia blight (%)	Pod yield (lb/acre)
1. Non-treated	- - -	- - -	9.1 a	21.3 a	1938 b
2. Echo 720 Provost 433 SC	1.5 pt 8.0 fl oz	1,2,7 3 - 6	2.6 b	19.5 a	3524 a
3. Echo 720 Provost 433 SC	1.5 pt 10.7 fl oz	1,2,7 3 - 6	2.0 c	16.3 a	3466 a
Cultivar					
1. Flavorrunner 458	- - -	- - -	4.7 A	24.3 A	3426 A
2. Tamrun OL02	- - -	- - -	4.4 A	13.3 B	2526 B

Table 4. Comparison of Provost and Folicur for control of peanut leaf spot

Treatment	Rate	Timing[1]	Leaf spot (Fla. 1-10)	Sclerotinia blight (%)	Pod yield (lb/acre)
1. Non-treated	- - -	- - -	6.9 a	31.3 a	3167 b
2. Echo 720 Provost 433 SC	1.5 pt 10.7 fl oz	1,2,7 3 - 6	2.3 c	27.5 a	4302 a
3. Echo 720 Folicur	1.5 pt 7.2 fl oz	1,2,7 3 - 6	3.3 b	26.9 a	3367 b
4. Echo 720	1.5 pt	1 - 7	3.0 bc	35.6 a	3140 b

Table 5. Effect of fungicide, application method, and carrier volume on pod rot incidence, yield, and grade parameters

Fungicide, application method, carrier volume	Disease incidence (%)	Yield (lb/A)	Damaged kernels (%)		Grade (% smk+ss)
			Dawson	Gaines	
Abound					
Banded, 15 GPA	2.1	4757	0.63	1.30	73.4
Banded, 30 GPA	2.0	4881	0.88	3.00	72.6
Banded, 45 GPA	2.1	5215	1.63	1.53	74.3
Broadcast, 15 GPA	3.0	5251	0.58	0.60	73.0
Broadcast, 30 GPA	1.5	5240	1.80	0.68	74.3
Broadcast, 45 GPA	2.0	4975	2.08	1.28	72.1
Artisan					
Banded, 15 GPA	1.9	5196	1.03	0.87	75.6
Banded, 30 GPA	2.3	5853	1.03	0.20	73.4
Banded, 45 GPA	3.4	5048	0.73	2.38	74.3
Broadcast, 15 GPA	3.0	4997	1.63	1.50	72.6
Broadcast, 30 GPA	3.4	5018	0.63	1.67	73.5
Broadcast, 45 GPA	2.4	5037	0.28	0.68	74.2
Provost					
Banded, 15 GPA	2.6	5211	0.53	1.83	73.7
Banded, 30 GPA	2.5	5142	1.38	1.78	74.0
Banded, 45 GPA	2.1	4874	0.63	1.28	73.5
Broadcast, 15 GPA	2.4	5360	1.50	0.63	74.0
Broadcast, 30 GPA	2.6	4686	1.33	1.40	74.8
Broadcast, 45 GPA	1.9	5497	0.98	0.48	74.8
Control 1	6.5	4569	1.28	2.28	72.7
Control 2	6.5	4831	1.20	1.03	76.5
Control 3	6.8	5233	0.90	0.50	73.9
Mean of controls	6.6	4878	1.13	1.27	74.4

Table 6. Simple means of fungicides, application methods, and carrier volumes for with respect to pod rot incidence, yield, and grade parameters

Factor, level	Disease incidence (%)	Yield (lb/A)	Damaged kernels (%)		Grade (% smk+ss)
			Dawson	Gaines	
Fungicide					
Abound	2.1	5053	1.27	1.40	73.3
Artisan	2.7	5192	0.89	1.22	73.9
Provost	2.4	5128	1.06	1.23	74.1
Control	6.6	4878	1.13	1.27	74.4
Application method					
Banded	2.3	5077	1.16	1.30	73.8
Broadcast	2.5	5118	1.20	0.99	73.7
Control	6.6	4878	1.13	1.27	74.4
Carrier volume					
15 GPA	2.5	5129	0.98	1.12	73.7
30 GPA	2.4	5137	1.18	1.46	73.8
45 GPA	2.3	5108	1.06	1.27	73.9
Control	6.6	4878	1.13	1.27	74.4

Table 7. Comparison of preventative and curative Sclerotinia blight programs using the fungicides Endura and/or Omega

Fungicide treatment, # of apps (dates)	Rate per acre	Leaf spot (Fla. 1-10)	Sclerotinia blight (%)	Pod yields (lb/acre)**
Preventative program				
Bravo WeatherStik 4 applications (60, 75, 90, 105 DAP)	1.5 pt	1.0 e	42.4 a	3894
Endura 2 applications (75, 105 DAP)	10.0 fl oz	1.5 cde	13.8 cd	5372
Endura 3 applications (75, 90, 105 DAP)	10.0 fl oz	1.2 de	9.6 de	5518
Omega 3 applications (75, 90, 105 DAP)	1.0 pt	1.9 c	4.6 e	5663
Omega 2 applications (75, 105 DAP)	1.5 pt	2.1 bc	3.8 e	4990
Omega (75 DAP) Endura (90 DAP) Omega (105 DAP)	1.5 pt 10.0 fl oz 1.5 pt	1.7 cd	9.2 de	5425
Curative program				
Endura 2 applications (90, 110 DAP)	10.0 fl oz	1.8 cd	20.6 bc	5419
Endura 3 applications (90, 105, 120 DAP)	10.0 fl oz	2.1 bc	22.0 b	5247
Omega 3 applications (90, 105, 120 DAP)	1.0 pt	2.6 b	14.4 cd	5188
Omega 2 applications (90, 110 DAP)	1.5 pt	2.1 bc	14.6 cd	4778
Omega 2 applications (90, 110 DAP)	1.5 pt	2.1 bc	15.2 bcd	4844
Non-treated	- - - - -	3.3 a	44.4 a	4224

Table 8. Effects of Omega and Endura applied alone or in combination with Tilt-Bravo on leaf spot and Sclerotinia blight control on three peanut cultivars

Fungicide program	Rate	Timing[1]	Leaf spot (Fla. 1-10)	Sclerotinia blight (%)	Pod yield (lb/acre)	Grade (%smk+ss)
1. Non-treated	- - -	- - -	8.5 a	48.5 a	2424 c	70.3 a
2. Bravo Weatherstik + Tilt	1.0 pt 2.0 fl oz	1 - 6	2.2 g	47.3 a	3126 bc	71.6 a
3. Endura	10.0 fl oz	3 & 5	5.6 b	33.2 bc	3241 abc	69.8 a
4. Omega	1.5 pt	3 & 5	5.9 b	32.0 bc	3385 ab	70.8 a
5. Endura	10.0 fl oz	3 - 5	5.1 c	32.0 bc	4034 a	68.9 a
6. Omega	1.5 pt	3 - 5	3.8 ef	20.2 e	3254 abc	69.1 a
7. Bravo Weatherstik + Tilt Endura	1.0 pt 2.0 fl oz 10.0 fl oz	1,2,4,6 3 & 5	2.3 g	24.0 de	3558 ab	70.1 a
8. Bravo Weatherstik + Tilt Omega	1.0 pt 2.0 fl oz 1.5 pt	1,2,4,6 3 & 5	2.3 g	24.0 de	3850 ab	71.3 a
9. Bravo Weatherstik + Tilt Endura	1.0 pt 2.0 fl oz 10.0 fl oz	1 - 6 3 & 5	3.4 f	24.5 de	3276 ab	68.8 a
10. Bravo Weatherstik + Tilt Omega	1.0 pt 2.0 fl oz 1.5 pt	1 - 6 3 & 5	3.9 de	29.2 cd	3430 ab	68.8 a
11. Bravo Weatherstik + Tilt Endura	1.0 pt 2.0 fl oz 10.0 fl oz	1 - 6 3 & 5	4.4 d	36.3 b	4079 a	69.4 a
12. Bravo Weatherstik + Tilt Omega	1.0 pt 2.0 fl oz 1.5 pt	1 - 6 3 & 5	4.1 de	21.7 e	3078 bc	70.4 a
Cultivar						
Flavorunner 458	- - -	- - -	4.4 A	36.1 A	2719 C	69.8 A
TamRun OL02	- - -	- - -	4.3 A	34.5 A	3477 B	69.7 A
TamRun OL07	- - -	- - -	4.2 A	21.8 B	4070 A	70.3 A