Peanut Disease Control Field Trials, 2009: Standard Fungicide Trials

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Peanut Disease Control Field Trials, 2009
Standard Fungicide Trials

A. K. Hagan, K. L. Bowen, and H. L. Campbell

INTRODUCTION

Fungicides, cultural practices, and resistant cultivars are available for the control of damaging diseases and nematode pests that can limit peanut yield. A management program that incorporates these practices can enhance the control of diseases and nematode pests and can increase crop yield and profit potential.

In order to provide timely information concerning disease management practices, Alabama Agricultural Experiment Station personnel conducted foliar and soil-borne disease as well as nematode control trials at the Wiregrass Research and Extension Center (WREC) in Headland, Alabama, and at the Gulf Coast Research and Extension Center (GCREC) in Fairhope, Alabama. This report summarizes the results of those trials.

During the 2009 production season at the WREC, temperatures were near normal historical averages (Figure 1), and monthly rainfall totals were at or above normal historical averages throughout the entire growing season (Figure 2). As a result of the increased rainfall, leaf spot severity was much worse than previously observed in all trials, and soil-borne disease incidence was similar to that observed in previous years and adversely affected yield.

At the GCREC, temperatures were at or near historical averages throughout the entire growing season (Figure 1), and rainfall totals were at or above normal throughout the entire growing season (Figure 2). More consistent rainfall throughout the growing season led to higher than normal leaf spot severity and higher rust severity. Although stem rot incidence was low, it was similar to that previously observed and resulted in yield decreases.

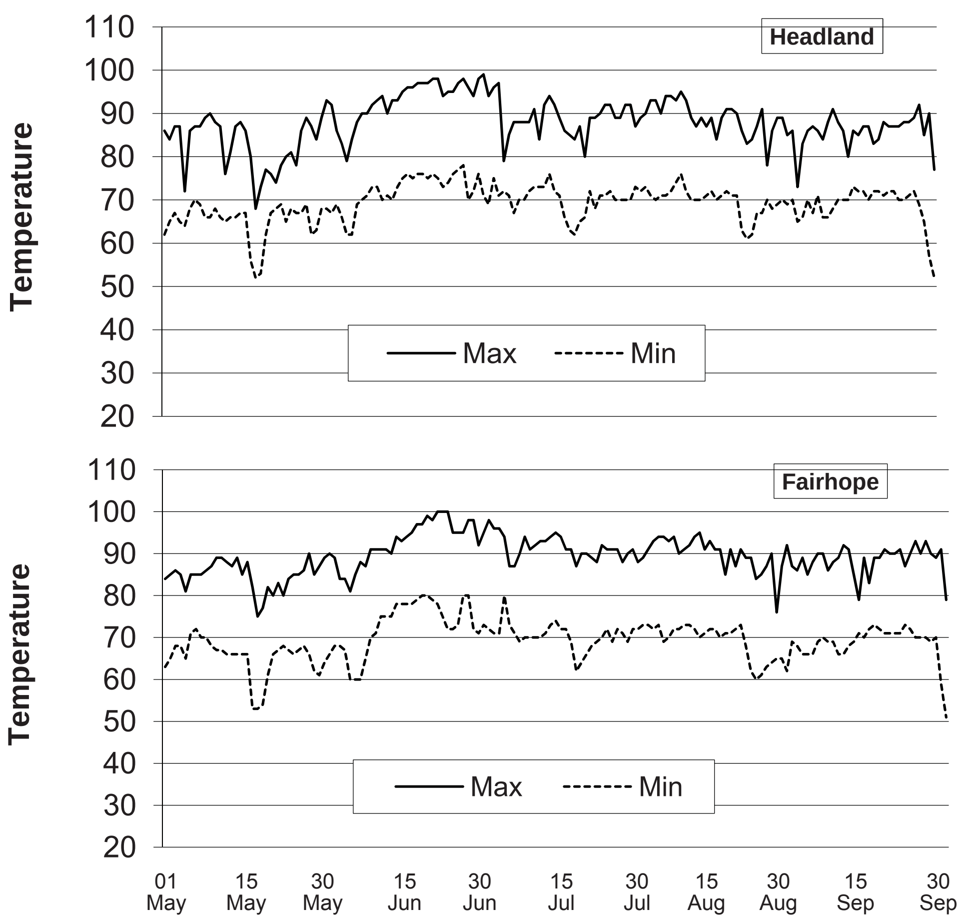
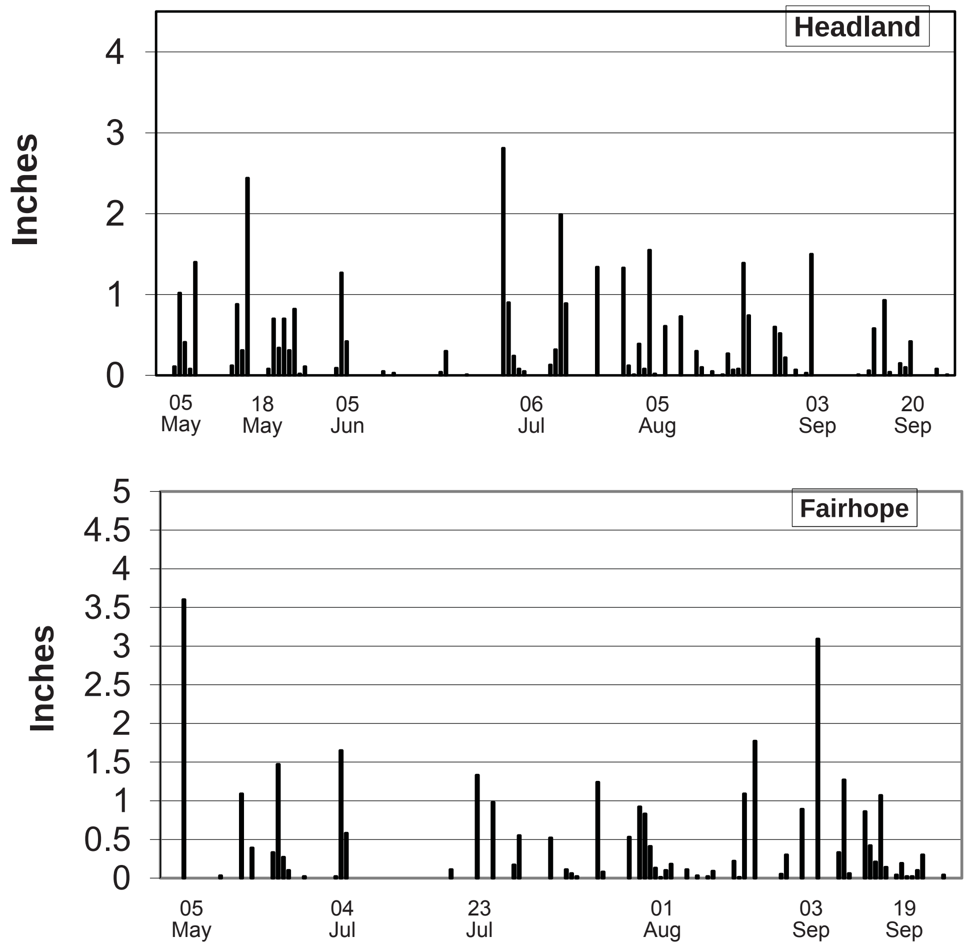


Figure 1. Daily minimum and maximum temperature (^{o}F), May to October 2009.

Figure 2. Daily precipitation (inches), May to October 2009.



DISEASE AND YIELD RESPONSE OF SELECTED COMMERCIAL PEANUT CULTIVARS AS INFLUENCED BY SEEDING RATE, WREC

A. K. Hagan, H. L. Campbell, K. L. Bowen, and L. W. Wells

Objective: To determine the impact of seeding rate on the occurrence of TSWV, leaf spot, and Cylindrocladium black rot as well as on the yield of selected commercial peanut cultivars at the Wiregrass Research and Extension Center in Headland, Alabama.

Production Methods: On May 30, the runner peanut cultivars AT3085RO, Florida 07, Georgia 06G, Georgia Green, and York were planted using conventional tillage practices in a Dothan fine sandy loam (organic matter < 1 percent)) soil. Weed control and soil fertility recommendations of the Alabama Cooperative Extension System were followed. The test area was irrigated as needed. A split plot design with peanut cultivars as whole plots and seeding rates as subplots was used. Whole plots were randomized in six complete blocks. Subplots, which consisted of four 30-foot rows spaced 3 feet apart, were randomized within each whole plot. Seeding rates were two, three, four, and six seed per row foot. Bravo Weather Stik 6F at 1.5 pints per acre was broadcast for leaf spot control on June 29, July 14, August 4, August 11, August 25, September 10, and September 23 with a tractor-mounted boom sprayer with three TX-8 nozzles per row calibrated to deliver 15 gallons of spray volume per acre at 45 psi.

Disease Assessment: Final TSWV hit counts (one hit was defined as ≤ 1 foot of consecutive TSWV-damaged plants per row) were made on October 7 on all cultivars except for York, which was rated on October 22. Early and late leaf spot were rated together on October 7 for all cultivars except for York, which was rated on October 22, using the 1 to 10 Florida peanut leaf spot scoring system (1 = no disease, 2 = very few spotted leaves in canopy, 3 = few spotted leaves in lower and upper canopy, 4 = some leaf spotting and ≤ 10 percent defoliation, 5 = leaf spotting noticeable and ≤ 25 percent defoliation, 6 = spotted leaves numerous and ≤ 50 percent defoliation, 7 = spotted leaves very numerous and ≤ 75 percent defoliation, 8 = numerous leaf spots on few remaining leaves and ≤90 percent defoliation, 9 = very few remaining leaves covered with leaf spots and ≤ 95 percent defoliation, and 10 = plants defoliated or dead). White mold and Cylindrocladium black rot (CBR) hit counts (one hit was defined as ≤ 1 foot of consecutive white mold -damaged plants per row) were made immediately after plots were dug on October 9 for all cultivars except for York, which was rated on October 23. Yields are reported at 7 percent moisture. Significance of treatment effects was tested by analysis of variance and the least significant difference (LSD) test (P<0.05).

Results: Since the cultivar x seeding rate interaction for TSWV, leaf spot, CBR, and yield were not significant; data presented in the table for the whole and subplot variables are pooled. White mold pressure was low, so the data were not displayed.

Peanut cultivar had a significant impact on the incidence of TSWV and CBR as well as leaf spot severity and yield (Table 1). TSWV incidence was highest for Georgia Green, lowest for AT3085RO, and intermediate for Florida 07, Georgia 06G, and York. While leaf spot severity was higher on AT3085RO compared with the other peanut cultivars, equally low leaf spot ratings were recorded for Georgia 06G and Florida 07. Incidence of CBR was also higher on AT3085RO than on Georgia Green, Florida 07, Georgia 06G, and York, which had similar CBR loci counts. Georgia 06G had the highest pod yields. Yields for AT3085RO, Florida 07, Georgia Green, and York were similar.

Seeding rate had a significant effect on TSWV and CBR incidence as well as leaf spot severity but not on yield (Table 1). Incidence of TSWV was higher at three than at four seeds per row foot, but both had similar ratings to the two- and six-seed-per-row-foot seeding rates. Leaf spot severity and CBR incidence rose as seeding rates increased. With leaf spot, highest ratings were seen at the seeding rate of six seed per row foot, while disease severity at the lower seeding rates was similar. For CBR, disease loci counts were lower at two and three seed per row foot compared with six seed per row foot. Despite significant differences in the levels of several diseases, seeding rate did not have a significant effect on peanut yield.

Summary: Of the cultivars tested, Georgia 06G displayed the best combination of the least disease damage with the highest yields. While Georgia Green and AT3085RO suffered serious TSWV and CBR damage, respectively,

yields of both cultivars were similar to Florida 07 and York. While seeding rate did not have a definitive impact on TSWV incidence, leaf spot severity and CBR incidence was higher at the four- and three-seed-per-foot rates, respectively. Despite the above differences in disease, seeding rate did not have a significant impact on yield.

TABLE 1. IMPACT OF SEEDING RATE ON THE YIELD OF SELECTED PEANUT CULTIVARS AND OCCURRENCE OF SEVERAL DISEASES

Peanut cultivar	TSWV [1]	LS [2]	CBR [1]	Yield (*lb/A*)
Split plot analysis P(F value)				
Peanut cultivar	<0.0001***[3]	<0.0001***	<0.0001***	<0.0001***
Seeding rate	0.0264*	<0.0001***	0.0296*	0.9719
Cultivar x seeding rate	0.5522	0.4548	0.2487	0.2456
Peanut cultivar means				
AT3085RO	5.3 c	4.8 a	12.4 a	4006 b
Florida 07	8.8 b	3.8 d	4.8 b	4158 b
Georgia 06G	8.5 b	3.9 cd	4.0 b	4840 a
Georgia Green	21.5 a	4.4 b	4.7 b	4067 b
York	9.0 b	4.2 bc	6.6 b	3945 b
Seeding rate (per row foot) means[4]				
2	11.9 ab	4.0 b	5.0 b	4240 a
3	12.2 a	4.2 b	5.4 b	4167 a
4	8.7 b	4.1 b	6.8 ab	4221 a
6	9.8 ab	4.6 a	8.5 a	4188 a

[1] Tomato spotted wilt (TSWV) and Cylindrocladium black rot (CBR) incidence is expressed as the number of disease hits per 60 feet of row.
[2] Leaf spot (LS) severity was rated using the 1 to 10 Florida leaf spot scoring system.
[3] Significance at the 0.05, 0.01, and 0.001 levels is indicated by *, **, or ***, respectively.
[4] Seeding rates were two, three, four, and six seed per foot of row.
Means in each column that are followed by the same letter are not significantly different according to analysis of variance and Fisher's protected least significant difference (LSD) test (P≤0.05).

TABLE 2. DATA SEPARATED BY PEANUT CULTIVAR

Seeding rate/ft	TSWV [1]	LS [2]	TSD [3]	CBR [1]	WM [1]	Yield (*lb/A*)
AT3085RO						
2	4.8	4.6 ab	11.6 ab	11.2 ab	0.4	3820 ab
3	7.8	4.8 ab	9.7 b	9.5 b	0.2	4001 ab
4	4.5	4.5 b	11.2 ab	10.2 b	1.0	3703 b
6	4.2	5.2 a	19.2 a	18.5 a	0.7	4501 a
P<0.05	NS	0.6	8.0	8.2	NS	745
Florida 07						
2	10.0	3.5 b	2.8	2.8	0	3911
3	9.7	3.8 ab	3.7	3.7	0	4041
4	4.3	3.9 ab	6.3	6.2	0.2	4542
6	11.3	4.1 a	6.7	6.2	0.5	4098
P<0.05	NS	0.5	NS	NS	NS	NS
GA 06G						
2	8.5	3.7 b	3.8	3.8	0 b	4687
3	9.5	3.8 ab	5.2	4.7	0.5 a	4913
4	6.8	3.9 ab	2.7	2.5	0.2 b	5001
6	9.0	4.2 a	5.0	4.8	0.2 b	4759
P<0.05	NS	0.4	NS	NS	0.4	NS
Georgia Green						
2	24.2	4.0 b	5.2 ab	4.0	1.1 ab	4211
3	24.3	4.3 b	3.5 b	3.5	0.0 b	4130
4	20.3	4.1 b	5.2 ab	4.8	0.3 b	4162
6	17.2	5.3 a	9.5 a	6.5	4.2 a	3764
P<0.05	7.4	1.0	4.4	5.6	3.8	988
York						
2	11.7	4.0	3.8 b	3.7 b	0.2	4517 a
3	9.7	4.2	6.3 ab	5.8 ab	0.5	3751 b
4	7.3	4.2	11.0 a	10.3 a	0.7	3695 b
6	7.2	4.3	7.2 ab	6.7 ab	0.5	3816 b
P<0.05	NS	NS	5.1	5.1	NS	582

[1] Tomato spotted wilt (TSWV), Cylindrocladium black rot (CBR), and white mold (WM) incidence is expressed as the number of disease hits per 60 feet of row.
[2] Leaf spot (LS) severity was rated using the 1 to 10 Florida leaf spot scoring system.
[3] Total soil disease (TSD)
Means in each column that are followed by the same letter are not significantly different according to analysis of variance and Fisher's protected least significant difference (LSD) test (P≤0.05).

DISEASE RISK INDEX FUNGICIDE PROGRAMS COMPARED FOR DISEASE CONTROL AND YIELD RESPONSE OF PEANUT, WREC

A. K. Hagan, H. L. Campbell, K. L. Bowen, and L. W. Wells

Objective: To validate the effectiveness of Disease Risk Index fungicide programs for the control of leaf spot diseases as well as their effect on yield response of two peanut cultivars at the Wiregrass Research and Extension Center in Headland, Alabama.

Production Methods: On May 20, the peanut cultivars AT3085RO and Georgia 06G were planted at a rate of six seed per foot of row using conventional tillage practices in a Dothan fine sandy loam (organic matter < 1 percent)) soil. Weed control and soil fertility recommendations of the Alabama Cooperative Extension System were followed. The test area was irrigated as needed. A split plot design with peanut cultivars as whole plots and fungicide treatments as subplots was used. Whole plots were randomized in four complete blocks. Individual subplots consisted of four 30-foot rows spaced 3 feet apart. Full canopy sprays of each fungicide treatment were made on June 29, July 10, July 13, August 4, August 11, August 31, September 10, September 14 and September 23 with a tractor-mounted boom sprayer with three TX-8 nozzles per row calibrated to deliver 15 gallons of spray volume per acre at 45 psi. A total of four, five, and seven fungicide applications were scheduled for the Peanut Disease Risk Index low, medium, and high risk categories, respectively.

Disease Assessment: Early and late leaf spot were rated together on October 7 using the 1 to 10 Florida peanut leaf spot scoring system (1 = no disease, 2 = very few lesions in canopy, 3 = few lesions noticed in lower and upper canopy, 4 = some leaf spotting and ≤ 10 percent defoliation, 5 = lesions noticeable and ≤ 25 percent defoliation, 6 = lesions numerous and ≤ 50 percent defoliation, 7 = lesions very numerous and ≤ 75 percent defoliation, 8 = numerous lesions on few remaining leaves and ≤90 percent defoliation, 9 = very few remaining leaves covered with lesions and ≤ 95 percent defoliation, and 10 = plants defoliated or dead). White mold and Cylindrocladium black rot (CBR) hit counts (one hit was defined as ≤ 1 foot of consecutive white mold or CBR-damaged plants per row) were made immediately after plot inversion on October 9. Yields are reported at 7 percent moisture. Significance of treatment effects was tested by analysis of variance and the least significant difference (LSD) test (P<0.05).

Results: With the exception of June, monthly rainfall totals for the 2009 production season equaled and often exceeded the 30-year historical average for the study site. Since stem rot and CBR loci counts were low across all fungicide treatments on both peanut cultivars, those data are not displayed.

Peanut cultivar and fungicide treatment had a significant impact on leaf spot ratings and yield (Table 1). While late leaf spot was dominant, early leaf spot development was occasionally seen. When compared with Georgia 06G, AT3085RO suffered significantly higher leaf spot damage, reflected in significantly lower yield (Table 1).

On AT3085RO, the high risk Bravo Weather Stik as well as the Tilt Bravo/Abound 2SC (12.3 fluid ounces) and the Tilt Bravo/Abound 2SC (18.2 fluid ounces) programs gave better leaf spot control than the corresponding medium and low risk programs, which gave similar leaf spot control at both of the above rates of Abound 2SC (Table 2). Better leaf spot control was obtained with the low compared with the medium risk Bravo Weather Stik program. For each risk category, Abound 2SC application rate did not significantly impact leaf spot control. Significantly higher leaf spot ratings but not lower yields were noted in the high risk programs with both rates of Abound 2SC where Tilt

TABLE 1. ANALYSIS OF VARIANCE AND IMPACT OF PEANUT CULTIVAR SELECTION ON LEAF SPOT SEVERITY AND PEANUT YIELD

Peanut cultivar	LS [1]	Yield (*lb/A*)
Split plot analysis P(F value)		
Peanut cultivar	<0.0001***[2]	0.0011**
Fungicide program	<0.0001***	<0.0001***
Fungicide program x cultivar	<0.0001***	0.0484*
Peanut cultivar means		
AT3085RO	6.0 a	4422 b
Georgia 06G	5.1 b	4720 a

[1] Leaf spot (LS) severity was rated using the 1 to 10 Florida leaf spot scoring system.
[3] Significance at the 0.05, 0.01, and 0.001 levels is indicated by *, **, or ***, respectively.
Means in each column that are followed by the same letter are not significantly different according to analysis of variance and Fisher's protected least significant difference (LSD) test (P≤0.05).

Bravo SE was substituted for Bravo Weather Stik 6F. The Bravo Weather Stik 6F and Bravo Weather Stik/Abound 2SC programs gave similar levels of leaf spot control. For Bravo Weather Stik 6F, the medium and low risk programs yielded less than the corresponding high risk program. In addition, yields with this fungicide were lower for the five-application medium risk than the four-application low risk program. With the Tilt Bravo/Abound 2SC (12.3 fluid ounces) program, highest yields were obtained with the high risk program compared with the medium and low risk programs, which had similar yields. In contrast, the medium and high risk Tilt Bravo/Abound 2SC (18.2 fluid ounces) programs had higher yields than the corresponding low risk program.

With Georgia 06G, similar levels of leaf spot control were obtained with the low, medium, and high risk Tilt Bravo/Abound 2SC (12.3 fluid ounces) programs (Table 2). The high and medium risk programs with the Tilt Bravo/Abound 2SC (18.2 fluid ounces) programs gave better leaf spot control than the corresponding low risk program. With Bravo Weather Stik, the best leaf spot control was obtained with the high risk compared with the medium and low risk programs. Higher leaf spot ratings but not differences in yield were noted in the high risk Abound 2SC (18.2 fluid ounces) programs where Tilt Bravo SE was substituted for Bravo Weather Stik 6F. With Bravo Weather Stik 6F and Tilt Bravo/Abound 2SC (12.3 fluid ounces) programs, yields were similar regardless of total application number. As was noted on AT3085RO, the medium and high risk Tilt Bravo/Abound 2SC (18.2 fluid ounces) programs on Georgia 06G had higher yields than the corresponding low risk program. At each risk level, yield response with the low and high rates of Abound 2SC was similar.

TABLE 2. LEAF SPOT CONTROL AND YIELD RESPONSE TO DISEASE RISK INDEX FUNGICIDE PROGRAMS ON TWO PEANUT CULTIVARS

Treatment and rate/A	—Application— timing[1]	number	Risk index	—AT3085RO— LS[2]	Yield (*lb/A*)	–Georgia 06G– LS[2]	Yield (*lb/A*)
Bravo WS 24 fl oz	1,2,3,4,5,6,7	7	High	4.4 e	4913 ab	4.2 f	4413 cd
Bravo WS 24 fl oz	1.5,3,4.5,5.5,7	5	Med	8.0 a	3340 e	6.1 a	4332 d
Bravo WS 24 fl oz	2,3.5,5,6.5	4	Low	6.5 c	4104 cd	5.6 ab	4556 cd
Bravo WS 24 fl oz	1,2,4,6,7	7	High	4.5 e	4913 ab	4.3 f	5122 ab
Abound 2SC 12.3 fl oz	3,5						
Tilt Bravo SE 36 fl oz	1,2,4	7	High	5.3 d	4953 a	5.1 cd	4719 bcd
Abound 2SC 12.3 fl oz	3,5						
Bravo WS 24 fl oz	6,7						
Tilt Bravo SE 36 fl oz	1.5,4	5	Med	7.0 b	4130 cd	5.5 bc	4663 bcd
Abound 2SC 12.3 fl oz	3,5.5						
Bravo WS 24 fl oz	7						
Tilt Bravo SE 36 fl oz	2	4	Low	6.6 bc	4266 bcd	5.5 bc	4671 bcd
Bravo WS 24 fl oz + Abound 2SC 12.3 fl oz	3.5,5						
Bravo WS 24 fl oz	6.5						
Bravo WS 24 fl oz	1,2,4,6,7	7	High	4.6 e	5082 a	4.4 ef	5219 a
Abound 2SC 18 fl oz	3,5						
Tilt Bravo SE 36 fl oz	1,2,4	7	High	5.4 d	4517 abc	4.9 de	5146 ab
Abound 2SC 18.2 fl oz	3,5						
Bravo WS 24 fl oz	6,7						
Tilt Bravo SE 36 fl oz	1.5,4	5	Med	6.7 bc	4888 bc	5.2 bcd	4888 bc
Abound 2SC 18.2 fl oz	3,5.5						
Bravo WS 24 fl oz	7						
Tilt Bravo SE 36 fl oz	2	4	Low	6.6 bc	3840 de	5.5 bc	4380 d
Bravo WS 24 fl oz + Abound 2SC 18.2 fl oz	3,5.5						
Bravo WS 24 fl oz	6.5						

[1] Fungicide applications were made on 1 = 29 June, 1.5 = 10 July, 2 = 13 July, 3 = 4 August, 3.5 = 11 August, 4 = 11 August, 5 = 31 August, 5.5 = 31 August, 6 = 10 September, 6.5 = 14 September, and 7 = 23 September, 2009.

[2] Leaf spot (LS) severity was rated using the 1 to 10 Florida leaf spot scoring system.

Means in each column that are followed by the same letter are not significantly different according to analysis of variance and Fisher's protected least significant difference (LSD) test ($P \leq 0.05$).

YIELDS AND REACTION OF COMMERCIAL RUNNER PEANUT CULTIVARS TO LEAF SPOT DISEASES AND CBR AS INFLUENCED BY FUNGICIDE PROGRAM IN A ONE-YEAR ROTATION WITH COTTON, WREC

A. K. Hagan, H. L. Campbell, K. L. Bowen, and L. W. Wells

Objective: To assess the yield response and reaction of commercial peanut cultivars to leaf spot diseases, CBR, and tomato spotted wilt in a one-year rotation with cotton when maintained under a standard and high-input fungicide program.

Production Methods: The study area at the Wiregrass Research and Extension Center in Headland, Alabama, was turned on March 11 with a moldboard plow and worked to seed bed condition with a disk harrow. On May 14, 13 runner peanut cultivars and advanced breeding lines were planted at a rate of six seed per foot of row using conventional tillage practices in a Dothan fine sandy loam (organic matter < 1 percent)) soil. Temik 15G at 6 pounds per acre was applied in furrow for thrips control. Weed control was obtained with a preemergent, incorporated application of Sonalan HFP at 1 quart per acre on May 11 that was followed by a broadcast application of Cadre at 1.44 ounces per acre on June 23. Soil fertility recommendations of the Alabama Cooperative Extension System were followed. The test area was irrigated as needed. A split plot design with peanut cultivars as whole plots and fungicide treatments as subplots was used. Whole plots were randomized in four complete blocks. Subplots, which consisted of four 30-foot rows spaced 3 feet apart, were randomized within each whole plot. While the standard fungicide program consisted of seven applications of the 24 fluid ounce per acre rate of Bravo Weather Stik, the high input program included two initial applications of Bravo Weather Stik at 24 fluid ounces per acre followed by Abound 2SC at 1.1 pint per acre, Bravo Weather Stik at 24 fluid ounces per acre + Convoy at 21 fluid ounces per acre, Abound 2SC at 1.1 pint per acre, Bravo Weather Stik at 24 fluid ounces per acre + Convoy at 21 fluid ounces per acre, and two final applications of Bravo Weather Stik at 24 fluid ounces per acre. Fungicides were applied on June 29, July 14, August 4, August 11, August 25, September 10, and September 23 with a tractor-mounted boom sprayer with three TX-8 nozzles per row calibrated to deliver 15 gallons of spray volume per acre at 45 psi.

Disease Assessment: Final TSWV hit counts (one hit was defined as ≤ 1 foot of consecutive TSWV-damaged plants per row) were made on September 30. Early and late leaf spot were rated together on September 30 for all cultivars except for York and Georgia 02C which were rated on October 21 using the 1 to 10 Florida peanut leaf spot scoring system (1 = no disease, 2 = very few spotted leaves in canopy, 3 = few spotted leaves in lower and upper canopy, 4 = some leaf spotting and ≤ 10 percent defoliation, 5 = leaf spotting noticeable and ≤ 25 percent defoliation, 6 = spotted leaves numerous and ≤ 50 percent defoliation, 7 = spotted leaves very numerous and ≤ 75 percent defoliation, 8 = numerous leaf spots on few remaining leaves and ≤90 percent defoliation, 9 = very few remaining leaves covered with leaf spots and ≤ 95 percent defoliation, and 10 = plants defoliated or dead). White mold and Cylindrocladium black rot (CBR) hit counts (one hit was defined as ≤ 1 foot of consecutive white mold- or CBR-damaged plants per row) were made immediately after plots were dug on October 9 for all cultivars except for York and Georgia 02C which were rated on October 29. Yields are reported at 7 percent moisture. Significance of treatment effects was tested by analysis of variance and the least significant difference (LSD) test ($P \leq 0.05$).

Results: In 2009, rainfall totals were below the historical average in June but were average to well above average for May, July, August, September, and October. Since the cultivar x treatment interaction for leaf spot, white mold, and yield is not significant, data presented in Table 1 were pooled by fungicide program and in Table 2 by peanut cultivar. The peanut cultivar x fungicide program interaction for CBR, which was significant, was separated by peanut cultivar (Table 3).

Peanut cultivar had a significant impact on white mold and TSWV incidence, leaf spot severity, and yield but not CBR incidence (Table 1). Fungicide program significantly impacted the white mold and CBR incidence as well as yield but not TSWV incidence and leaf spot severity.

While the leaf spot ratings for the standard and high input fungicide programs were similar, incidence of white mold and CBR was lower and yields were higher for the latter program (Table 1). As expected, TSWV incidence was not influenced by fungicide program.

Significant differences in leaf spot intensity, TSWV and CBR incidence, as well as yield were noted among peanut cultivars and advanced breeding lines. Incidence of TSWV was higher in the industry standard Georgia Green than any of the other commercial cultivars and breeding lines. Similarly low TSWV levels were recorded for NPRL-0904, AT3085RO, Georgia 06G, Georgia Greener, NPRL-09-01, Georgia 07W, Georgia 02C, and York. While late leaf spot was the dominant leaf spot disease, some early leaf spot was seen. Leaf spot intensity was equally high on NPRL-09-04 and NPRL-09-02. Other cultivars and breeding lines with leaf spot ratings similar to those of NPRL-09-02 were Georgia 02C, NPRL-09-03, AT3085RO, and Georgia Green. Tifguard and Florida 07 had equally low leaf spot ratings. White mold incidence was very low and no differences in the level of white mold damage were seen between peanut cultivars and breeding lines. Highest yields were recorded for Georgia 07W, Georgia 06G, Tifguard, and Florida 07 while Georgia Green, AT3085RO, Georgia Greener, NPRL-09-04, Georgia 02C, and York had equally low yields.

Under the standard and high input fungicide programs, incidence of CBR was higher in AT3085RO than all other peanut cultivars and breeding lines (Table 3). With the standard fungicide program, Georgia 07W suffered less CBR damage than Georgia Green, and Georgia Greener but not Florida 07, Georgia 06G, NPRL-09-01, NPRL-09-02, NPRL-09-03, NPRL-09-04, Tifguard, and York. With the exception of AT3085RO, no differences in CBR incidence were noted between peanut cultivars and breeding lines under the high input fungicide program.

Summary: As has been shown in this and previous field trials, Georgia Green is susceptible to TSWV and as a result has too low a yield potential when compared with newly released cultivars to be grown in the Wiregrass Region of Alabama. Peanut cultivars with the least TSWV damage and highest yields included Georgia 06G, Georgia 07W, and Tifguard. While Florida 07 had elevated TSWV counts, its yield response equaled that of the above peanut cultivars (Georgia 06G, Georgia 07W, and Tifguard). Lower leaf spot and/or CBR ratings may also have contributed to the higher yields obtained with Florida 07, Georgia 06G, Georgia 07W, and Tifguard.

The value of the high input over the standard Bravo Weather Stik program that mainly targets leaf spot control is questionable. While significant reductions in CBR incidence and higher yields were obtained, the additional cost of the high input fungicide program would not be covered by the increased receipts from the approximately 340 pound per acre yield gain.

TABLE 1. ANALYSIS OF VARIANCE AND IMPACT OF FUNGICIDE PROGRAMS ON TSWV, LEAF SPOT DISEASES, WHITE MOLD, CBR, AND PEANUT YIELD

Peanut cultivar	TSWV [1]	LS [2]	WM [1]	CBR [1]	Yield (*lb/A)*
Split plot analysis P(F value)					
Peanut cultivar	<0.0001***[3]	<0.0001***	0.7535	<0.0001***	0.0001***
Fungicide program	0.6580	0.3028	0.0301*	0.0004***	0.0089**
Fungicide program x cultivar	0.4239	0.1092	0.2960	0.0379*	0.1471
Fungicide program means					
Standard[4]	5.6 a	4.6 a	1.0 a	8.4 a	4528 b
High Input[4]	5.0 a	4.7 a	0.2 b	5.4 b	4867 a

[1] Tomato spotted wilt (TSWV), white mold (WM), and Cylindrocladium black rot (CBR) incidence is expressed as the number of disease hits per 60 feet of row.
[2] Leaf spot (LS) severity was rated using the 1 to 10 Florida leaf spot scoring system.
[3] Significance at the 0.05, 0.01, and 0.001 levels is indicated by *, **, or ***, respectively.
[4] The standard fungicide program consisted of seven applications of Bravo Weather Stik, while the high input fungicide program began with two consecutive applications of Bravo Weather Stik followed by alternating applications of Abound 2SC with Convoy + Bravo Weather Stik, and a final application of Bravo Weather Stik for at total of seven 2-week calendar applications. Fungicide applications were scheduled at approximately 14-day intervals.
Means in each column that are followed by the same letter are not significantly different according to analysis of variance and Fisher’s protected least significant difference (LSD) test ($P \leq 0.05$).

TABLE 2. DISEASE RATINGS AND YIELD FOR COMMERCIAL PEANUT CULTIVARS AND BREEDING LINES

Peanut cultivar	TSWV [1]	LS [2]	WM [1]	Yield (*lb/A*)
Mid-season Maturity (130 – 145 DAP)				
AT3085RO	12.5 c	5.2 bc	1.0 a	3912 cd
Florida 07	18.6 b	3.9 fg	0.8 a	5524 a
Georgia 06G	10.3 c	4.4 def	0.1 a	5705 a
Georgia 07W	14.4 bc	4.3 ef	0.1 a	5863 a
Georgia Green	31.5 a	4.7 cde	0.9 a	3781 d
Georgia Greener	10.3 c	4.4 def	0.2 a	4350 bcd
NPRL-09-01	11.8 c	4.8 cd	1.3 a	4612 bc
NPRL-09-02	18.6 b	5.4 ab	1.1 a	4541 bc
NPRL-09-03	9.6 c	5.1 bc	0.8 a	4613 b
NPRL-09-04	19.6 b	5.8 a	1.3 a	4355 bcd
Tifguard	10.6 c	3.4 g	0.5 a	5633 a
Late Maturity (140 – 165 DAP)				
Georgia 02C	14.1 bc	5.1 bc	0.1 a	4005 bcd
York.	15.0 bc	4.4 de	0.1 a	4120 bcd
GA03L	2.6 b	0.6 a	0.5 a	5320 a

[1] Tomato spotted wilt (TSWV) and white mold (WM) incidence is expressed as the number of hits per 60 feet of row.
[2] Leaf spot (LS) was rated using the Florida 1 to 10 rating scale.
Means that are followed by the same letter in each column are not significantly different according to analysis of variance and Fisher's protected least significant difference (LSD) test ($P \leq 0.05$).

TABLE 3. IMPACT OF FUNGICIDE PROGRAM ON THE INCIDENCE OF CBR ON COMMERCIAL PEANUT CULTIVARS AND ADVANCED BREEDING LINES

	CBR [1]	
Peanut cultivar	Standard	High input
Mid-season Maturity (130 – 145 DAP)		
AT3085RO	24.5 a	15.3 a
Florida 07	6.0 bcd	7.5 b
Georgia 06G	5.0 bcd	4.0 b
Georgia 07W	2.5 d	3.0 b
Georgia Green	11.0 bc	5.0 b
Georgia Greener	12.7 b	7.0 b
NPRL-09-01	10.3 bcd	2.3 b
NPRL-09-02	8.8 bcd	2.8 b
NPRL-09-03	6.3 bcd	6.0 b
NPRL-09-04	10.3 bcd	8.3 b
Tifguard	3.0 cd	4.3 b
Late Maturity (140 – 165 DAP)		
Georgia 02C	5.0 bcd	1.8 b
York.	5.3 bcd	3.0 b

[1] Cylindrocladium black rot (CBR) incidence is expressed as the number of hits per 60 feet of row.
Means that are followed by the same letter in each column are not significantly different according to analysis of variance and Fisher's protected least significant difference (LSD) test ($P \leq 0.05$).

IMPACT OF PROLINE AP TREATMENTS ON DISEASE CONTROL AND YIELD RESPONSE OF TWO PEANUT CULTIVARS WITH RECOMMENDED FUNGICIDES, WREC

A. K. Hagan, H. L. Campbell, K. L. Bowen, and L. W. Wells

Objective: To evaluate the impact of at-plant, in furrow applications of Proline 480 on the control of leaf spot diseases, white mold, and CBR as well as on the yield response of two peanut cultivars at the Wiregrass Research and Extension Center in Headland, Alabama.

Production Methods: The test site was turned with a moldboard plow on March 11 and worked to seed bed condition with a disk harrow. On May 20, the peanut cultivars AT3085RO and GA 06G were planted at a rate of six seed per foot of row with an in furrow application of Temik 15G at 6 pounds per acre using conventional tillage practices in a Dothan fine sandy loam (organic matter < 1 percent)) soil. Sonalan at 1 quart per acre was broadcast on May 11 for preemergent weed control and incorporated with a disk harrow. Escaped weeds were pulled by hand. Postemergent weed control was obtained with a broadcast application of Cadre 70DF at 1.44 ounces per acre + a non-ionic surfactant at 1 quart per 100 gallons of spray volume on June 23. Soil fertility recommendations of the Alabama Cooperative Extension System were followed. The test area was irrigated as needed. A split plot design with peanut cultivars as whole plots and fungicide treatments as subplots was used. Whole plots were randomized in four complete blocks. Individual subplots consisted of four 30-foot rows spaced 3 feet apart. Proline 480SC was applied at-plant on a 6-inch band centered over the seed in the open furrow with a single TX-8 nozzle calibrated to deliver 5 gallons of spray volume per acre. Full canopy sprays of each fungicide were made on June 29, July 13, August 4, August 11, August 31, September 10, and September 23 with a tractor-mounted boom sprayer with three TX-8 nozzles per row calibrated to deliver 15 gallons of spray volume per acre at 45 psi.

Disease Assessment: Early and late leaf spot were rated together on October 7 using the 1 to 10 Florida peanut leaf spot scoring system (1 = no disease, 2 = very few lesions in canopy, 3 = few lesions noticed in lower and upper canopy, 4 = some leaf spotting and ≤ 10 percent defoliation, 5 = lesions noticeable and ≤ 25 percent defoliation, 6 = lesions numerous and ≤ 50 percent defoliation, 7 = lesions very numerous and ≤ 75 percent defoliation, 8 = numerous lesions on few remaining leaves and ≤90 percent defoliation, 9 = very few remaining leaves covered with lesions and ≤ 95 percent defoliation, and 10 = plants defoliated or dead). White mold and Cylindrocladium black rot (CBR) hit counts (one hit was defined as ≤ 1 foot of consecutive white mold or CBR-damaged plants per row) were made immediately after plot inversion on October 9. Yields are reported at 7 percent moisture. Significance of treatment effects was tested by analysis of variance and the least significant difference (LSD) test ($P<0.05$).

Results: In 2009, rainfall totals were below the historical average in June but were average to well above average for May, July, August, September, and October. Since the cultivar x treatment interactions for leaf spot, white mold, CBR and yield are not significant, data presented in Table 1 were pooled across fungicide programs and across peanut cultivars in Table 2.

Leaf spot severity ratings as well as the incidence of white mold and CBR were significantly higher for AT3085RO than for Georgia 06G (Table 1). Higher disease levels, particularly for leaf spot diseases and CBR translated into lower yields for AT3085RO.

A combination of early and late leaf spot was observed. Highest leaf spot ratings were recorded for the Folicur 3.6F programs. With the exception of the Bravo Ultrex standard and Proline 480AP/Abound 2SC program, the Provost 433SC (10.7 fluid ounces) program gave better leaf spot control than the remaining fungicide treatments including the Provost 433SC (8 fluid ounces) program. Addition of Proline 480 AP did not improve leaf spot control with either rate of Provost 433SC or with Abound 2SC and Folicur 3.6F. Given the low incidence of white mold, little difference in the control of this disease was noted among the fungicide programs. In contrast, fungicide treatments had a significant impact on CBR damage. The addition of the Proline 480 AP treatment to Provost 433SC (10.7 fluid ounces), Provost 433SC (8 fluid ounces), Folicur 3.6F, and Abound 2SC did not enhanced control of CBR. Incidence of this disease was higher for Bravo Ultrex and both Abound 2SC programs as well as the Folicur 3.6F without Proline 480 AP than the Provost 433SC (8 fluid ounces) with Proline 480 AP and both of the Provost 433SC (10.7 fluid ounces) programs. Yields for the Bravo Ultrex standard and both Abound 2SC programs were similar to those obtained with both rates of Provost 433SC. Yields were lower for the Folicur 3.6F programs compared with the Bravo Ultrex standard and the Provost 433SC (10.7 fluid ounces) program. As was noted with leaf spot diseases and CBR, addition of Proline 480 AP to recommended Abound 2SC, Folicur 3.6F, and Provost 433SC programs did not result in higher yields compared with the same programs that did not include Proline 480 AP.

Summary: The newly released peanut cultivar Georgia 06G proved to have better leaf spot and possibly CBR resistance as well as yield potential under significant disease pressure compared with AT3085RO. Due either to poor residue retention on peanut leaves or increasing tolerance in leaf spot fungi populations, Folicur 3.6E showed only limited activity against early and late leaf spot. Companion studies show that this fungicide can still give effective disease control on peanuts only when tank mixed with a chlorothalonil or another broad spectrum fungicide. The only fungicide program that demonstrated significant activity against CBR was the Provost 433SC at 10.7 fluid ounces per acre. While a slight numerical improvement in CBR control with the Proline 480 IF treatment with both rates of Provost 433SC occurred, control of CBR with Abound 2SC and Folicur 3.6F was not improved with the addition of Proline 480 IF. While high levels of leaf spot damage were responsible for the yield reductions noted with the Folicur 3.6F programs, the reduction in CBR obtained with the high rate of Provost 433SC did not result in higher peanut yields.

TABLE 1. ANALYSIS OF VARIANCE AND IMPACT OF PEANUT CULTIVAR SELECTION ON LEAF SPOT SEVERITY, INCIDENCE OF WHITE MOLD AND CBR, AND ON PEANUT YIELD

	LS [1]	WM [2]	CBR [2]	Yield (*lb/A*)
Split plot analysis P(F value)				
Peanut cultivar	<0.0001***[3]	0.0062	0.2579	0.0001***
Fungicide program	<0.0001***	0.2251	0.0533	0.0001***
Fungicide program x cultivar	0.1236	0.0588	0.4559	0.3508
Peanut cultivar means				
AT3085RO	5.6 a	0.8 a	4.5 a	4560 b
Georgia 06G	4.8 b	0.2 b	3.0 b	5220 a

[1] Leaf spot (LS) severity was rated using the 1 to 10 Florida leaf spot scoring system.
[2] White mold (WM) and Cylindrocladium black rot (CBR) incidence is expressed as the number of disease hits per 60 feet of row.
[3] Significance at the 0.05, 0.01, and 0.001 levels is indicated by *, **, or ***, respectively.
Means in each column that are followed by the same letter are not significantly different according to analysis of variance and Fisher's protected least significant difference (LSD) test (P≤0.05).

TABLE 2. IMPACT OF AT-PLANT APPLICATIONS OF PROLINE 480 FUNGICIDE ON THE OCCURRENCE OF FOLIAR AND SOIL DISEASES ALONG WITH PEANUT YIELD

Treatment and rate/A	Application timing	LS [1]	WM [2]	CBR [2]	Yield *lb/A*
Bravo Ultrex 1.4 lb	1-7	4.7 cd	0.7 ab	4.9 a	5207 a
Bravo Ultrex 1.4 lb	1,2,7	5.1 c	0.2 b	3.3 abc	4872 ab
Provost 433SC 8 fl oz	3,4,5,6				
Proline 480 5.7 fl oz	IF AP[3]	5.1 c	0.5 ab	1.3 bc	4792 ab
Bravo Ultrex 1.4 lb	1,2,7				
Provost 433SC 8 fl oz	3,4,5,6				
Bravo Ultrex 1.4 lb	1,2,7	4.1 d	0.1 b	2.4 bc	5174 a
Provost 433SC 10.7 fl oz	3,4,5,6				
Proline 480 5.7 fl oz	IF AP	4.1 d	0.2 b	0.9 c	5300 a
Bravo Ultrex 1.4 lb	1,2,7				
Provost 433SC 10.7 fl oz	3,4,5,6				
Bravo Ultrex 1.4 lb	1,2,7	6.5 b	1.5 a	4.6 a	4607 b
Folicur 3.6F 7.2 fl oz	3,4,5,6				
Proline 480 5.7 fl oz	IF AP	7.3 a	0.5 ab	3.9 ab	3780 c
Bravo Ultrex 1.4 lb	1,2,7				
Folicur 3.6F 7.2 fl oz	3,4,5,6				
Bravo Ultrex 1.4 lb	1,2,4,6,7	5.1 c	0.3 b	4.3 a	5143 ab
Abound 2SC 18.5 fl oz	3,5				
Proline 480 5.7 fl oz	IF AP	4.7 cd	0.2 b	4.5 a	4888 ab
Bravo Ultrex 1.4 lb	1,2,4,6,7				
Abound 2SC 18.5 fl oz	3,5				

[1] Leaf spot (LS) severity was rated using the 1 to 10 Florida leaf spot scoring system.
[2] White mold (WM) and Cylindrocladium black rot (CBR) incidence is expressed as the total number of white mold hits per 60 feet of row.
[3] IF AP = In furrow application of Proline 480 at-planting.
Means in each column that are followed by the same letter are not significantly different according to analysis of variance and Fisher's protected least significant difference (LSD) test (P≤0.05).

DISEASE AND YIELDS OF DRYLAND COMMERCIAL PEANUT CULTIVARS AND ADVANCED BREEDING LINES, WREC

A. K. Hagan, H. L. Campbell, K. L. Bowen, and B. E. Gamble

Objective: To assess the yield potential of commercial peanut cultivars and advanced breeding lines as well as their reaction to TSWV, leaf spot diseases, and white mold in a dryland production system at the Wiregrass Research and Extension Center in Headland, Alabama.

Production Methods: On May 12, commercial peanut cultivars and advanced breeding lines were planted at a rate of approximately six seed per foot of row in a field that was cropped the previous two years to cotton using conventional tillage practices in a fine Dothan sandy loam (organic matter < 1 percent)). Gypsum at a rate of 600 pounds per treated acre was applied on a 14-inch band over the row middle on June 29. A pre-plant application of 1.0 quart per acre of Sonalan and 0.45 ounce per acre of Strongarm on April 22 was lightly incorporated. Escape weeds were plowed with flat sweeps on June 18 or pulled by hand. Temik 15G at 6.5 pounds per acre was placed in furrow at planting to control thrips. Generic chlorothalonil at 1.5 pints per acre was applied on June 12, June 22, July 20, August 18, August 31, and September 14, while Abound 2SC at 18.5 fluid ounces per acre was broadcast on July 10 and August 3. Plots consisted of two 20–foot rows spaced 3 feet apart and were arranged in a randomized complete block with four replications.

Disease Assessment: Final TSWV hit counts (one hit was defined as ≤ 1 foot of consecutive severely TSWV-damaged plants per row) were made on September 22. Early and late leaf spot were rated together on September 22, October 6, October 15, and October 21 for the early, mid-season, late, and very late maturing cultivars, respectively, using the 1 to 10 Florida peanut leaf spot scoring system (1 = no disease, 2 = very few lesions in canopy, 3 = few lesions noticed in lower and upper canopy, 4 = some leaf spotting and ≤ 10 percent defoliation, 5 = lesions noticeable and ≤ 25 percent defoliation, 6 = lesions numerous and ≤ 50 percent defoliation, 7 = lesions very numerous and ≤ 75 percent defoliation, 8 = numerous lesions on few remaining leaves and ≤90 percent defoliation, 9 = very few remaining leaves covered with lesions and ≤ 95 percent defoliation, and 10 = plants defoliated or dead). White mold hit counts (one hit was defined as ≤ 1 foot of consecutive white mold damaged plants per row) were made immediately after plot inversion on September 22, October 8, October 21, and October 26 for the early, mid-season, late, and very late maturing cultivars, respectively. Yields are reported at 10 percent moisture. Significance of treatment effects was tested by analysis of variance and the least significant difference (LSD) test ($P<0.05$).

Results: In 2009, rainfall totals were below the historical average in June but were average to well above average for May, July, August, September, and October.

Incidence of TSWV was equally high for Georgia 08V, Georgia Green, PT 0907, Florida Fancy, PT 0930, EXP 27-1516, AT215 Florida 07, and AT3085RO (Table 1). While the fewest TSWV hits were recorded for C-724-19-25, similarly low disease levels were seen on 13 additional cultivars and breeding lines, which included then newly released cultivars AP-4, Tifguard, Georgia 03L, Georgia 06G, Georgia 07W, and Georgia Greener. Although a low level of early leaf spot was present on some cultivars, late leaf spot dominated. Highest leaf spot levels were recorded for EXP 27-1516. Other cultivars with similarly high leaf spot ratings included Florida 07, PT 0930, PT 0931, PT 0907, PT 0904, PT 0903, Georgia 02C, Georgia 08V, and York. Among all cultivars and breeding lines, only C-724-19-2 and Tifguard had leaf spot ratings as low as Georgia 03L. White mold incidence was equally high on EXP 27-1516, Georgia Green, and AT215. While fewest white mold hits were recorded for Georgia 02C, disease incidence was similarly low on 16 other cultivars and breeding lines. Highest yields were noted for Georgia 07W and Georgia Greener. Cultivars with among the highest TSWV hit counts such as EXP 27-1516 and Georgia Green also had among the lowest yields.

Summary: Abundant late summer rains not only contributed to high yields for dryland peanuts but also considerable leaf spot pressure. Commercial peanut cultivars that combined low disease ratings, particularly for TSWV, with high yield potential included Georgia 03L, Georgia 06G, Georgia 07W, Georgia Greener, and McCloud. Florida 07 had relatively high yields despite moderate TSWV and leaf spot damage. Despite low ratings for TSWV, leaf spot, and white mold, yield response with Tifguard was not as high as expected.

TABLE 1. DISEASE RATINGS AND YIELDS FOR COMMERCIAL PEANUT CULTIVARS AND ADVANCED BREEDING LINES IN A DRYLAND PRODUCTION SYSTEM, WREC

Peanut cultivar	Maturity	TSWV [1]	LS [2]	WM [1]	Yield (*lb/A*)
AP-4	Mid	6.7 d-g	3.8 gh	3.0 cde	5192 b-e
AT 215	Early	13.0 a-e	3.4 hi	7.3 ab	5075 b-f
AT3085RO	Mid	12.0 a-f	4.9 b-e	4.7 bc	4893 c-g
C-724-19-25	Mid	4.2 g	3.5 hi	0.6 e	5470 bc
EXP 27-1516	Mid	13.1 a-e	6.9 a	9.5 a	4181 g
Florida 07	Late	11.7 a-g	5.4 b	0.8 e	5497 bc
Florida Fancy [3]	Mid	13.6 a-d	3.9 gh	4.7 bc	5192 b-e
Georgia 02C	Late	10.0 c-g	5.0 bcd	0.3 e	5113 b-f
Georgia 03L	Mid	7.5 c-g	2.9 i	1.1 e	5696 b
Georgia 06G	Mid	7.0 d-g	4.4 d-g	3.1 cde	5686 b
Georgia 07W	Mid	5.8 efg	4.0 fgh	1.4 e	6521 a
Georgia 08V [3]	Mid	18.6 a	4.8 b-e	3.0 cde	5326 bcd
Georgia Green	Mid	18.1 ab	4.6 c-f	8.3 a	4347 fg
Georgia Greener	Mid	8.6 c-g	4.0 fgh	5.0 bc	5758 ab
McCloud	Mid	10.3 c-g	4.3 efg	2.8 cde	5552 bc
PT 0903	V. late	10.0 c-g	5.1 bc	3.1 cde	5268 bcd
PT 0904	V. late	9.4 c-g	5.3 bc	2.8 cde	5073 b-f
PT 0907	V. late	14.7 abc	5.1 bc	1.9 cde	4419 efg
PT 0930	V. late	12.8 a-e	5.4 b	1.7 de	4644 d-g
PT 0931	V. late	10.8 b-g	5.4 b	1.4 e	4603 d-g
Tifguard	Mid	4.7 fg	3.5 hi	2.5 cde	5212 bcd
York	Late	6.1 d-g	4.8 b-e	0.6 e	5285 bcd

[1] Tomato spotted wilt (TSWV) and white mold (WM) incidence is expressed as the number of disease hits per 40 foot of row.
[2] Leaf spot (LS) severity was rated using the 1 to 10 Florida leaf spot scoring system.
[3] All cultivars are a runner-market type except for Florida Fancy and Georgia 08V, which are Virginia-market types.
Means in each column that are followed by the same letter are not significantly different according to analysis of variance and Fisher's protected least significant difference (LSD) test ($P \leq 0.05$).

YIELDS AND REACTION OF COMMERCIAL PEANUT CULTIVARS AND ADVANCED BREEDING LINES TO DISEASES IN AN IRRIGATED PRODUCTION SYSTEM, WREC

A. K. Hagan, H. L. Campbell, K. L. Bowen, B. Gamble, and J. Bostick

Objective: To compare the yield potential of commercial peanut cultivars and advanced breeding lines as well as their reaction to TSWV, leaf spot diseases, and white mold in an irrigated production system at the Wiregrass Research and Extension Center in Headland, Alabama.

Production Methods: On May 14, commercial and advanced peanut breeding lines were planted at a rate of approximately six seed per foot of row in a field that was cropped to peanut after two years of cotton using conventional tillage practices in a fine Dothan sandy loam (organic matter < 1 percent)). Gypsum at a rate of 600 pounds per treated acre was applied on a 14-inch band over the row middle on June 29. A pre-plant application of 1.0 quart per acre of Sonalan and 0.45 ounce per acre of Strongarm on April 22 was lightly incorporated. Poast Plus at 1.5 pints per acre +1 percent COC was applied on August 7 to control escaped grasses. Escape weeds were plowed with flat sweeps on June 18 or pulled by hand. Temik 15G at 6.5 pounds per acre was placed in furrow at planting to control thrips. Generic chlorothalonil at 1.5 pints per acre was applied on June 12, June 22, July 20, August 18, August 31, and September 14, while Abound 2SC at 18.5 fluid ounces per acre was broadcast on July 10 and August 3. The test area received 0.5 acre inch of water delivered by a side roll irrigation system on June 25 and July 2, respectively. Plots consisted of two 20-foot rows spaced 3 feet apart and were arranged in a randomized complete block.

Disease Assessment: Final TSWV hit counts (one hit was defined as ≤ 1 foot of consecutive severely TSWV-damaged plants per row) were made on September 22. Early and late leaf spot were rated together on September 22, September 30, October 15, and October 21 for the early, mid-season, late, and very late maturing cultivars, respectively, using the 1 to 10 Florida peanut leaf spot scoring system (1 = no disease, 2 = very few lesions in canopy, 3 = few lesions noticed in lower and upper canopy, 4 = some leaf spotting and ≤ 10 percent defoliation, 5 = lesions noticeable and ≤ 25 percent defoliation, 6 = lesions numerous and ≤ 50 percent defoliation, 7 = lesions very numerous and ≤ 75 percent defoliation, 8 = numerous lesions on few remaining leaves and ≤90 percent defoliation, 9 = very few remaining leaves covered with lesions and ≤ 95 percent defoliation, and 10 = plants defoliated or dead). White mold hit counts (one hit was defined as ≤ 1 foot of consecutive stem rot damaged plants per row) were made immediately after plot inversion on September 22, October 8, October 21, and October 26 for the early, mid-season, late, and very late maturing cultivars, respectively. Yields are reported at 10 percent moisture. Significance of treatment effects was tested by analysis of variance and the least significant difference (LSD) test ($P<0.05$).

Results: In 2009, rainfall totals were below the historical average in June but were average to well above average for May, July, August, September, and October. Significant differences in leaf spot intensity, TSWV. and white mold incidence, and yield were noted among peanut cultivars and breeding lines. While the highest incidence of TSWV was noted in Georgia 08V, the current industry standard Georgia Green, AP-4, and the breeding line PT0931 had equally high ratings for this disease. Disease incidence in 12 peanut cultivars and breeding lines was similar to the low TSWV hit counts recorded for Tifguard and C-724-19-25. Although a low level of early leaf spot was present on some cultivars, late leaf spot dominated. Highest leaf spot was recorded for the breeding line EXP 27-1516. Other cultivars with similarly high leaf spot ratings were PT0930, Florida 07, Georgia 02C, AT215, PT0904, PT0907, and Georgia Green. Tifguard, C-724-19-25, Georgia 03L, Georgia 07W, Georgia Greener, York, Georgia 06G, AP-4, and Florida Fancy had equally low leaf spot ratings. While the highest white mold counts were noted on AT215, AT3085RO and Georgia 08V had higher hit counts compared with the majority of cultivars and breeding lines. Low white mold hit counts for PT0907 were similar to 17 other peanut cultivars and breeding lines. Yields for Georgia 07W were higher than all cultivars except C-724-19-25, Georgia Greener, Florida 07, Georgia 03L, and McCloud.

Summary: Commercial peanut cultivars that combined low disease ratings, particularly to TSWV, with high yield potential included Georgia 03L, Georgia 06G, Georgia 07W, Georgia Greener, and McCloud. Florida 07 had relatively high yields despite moderate TSWV and leaf spot damage. Of the advanced breeding lines, C-724-19-25 displayed a high level of resistance to TSWV and leaf spot as well as high yield potential. Despite low ratings for TSWV, leaf spot, and white mold, yield response with Tifguard was not as high as expected.

DISEASE RATINGS AND YIELDS FOR COMMERCIAL PEANUT CULTIVARS AND ADVANCED BREEDING LINES IN A IRRIGATED PRODUCTION SYSTEM, WREC

Peanut cultivar	Maturity	TSWV [1]	LS [2]	WM [1]	Yield (*lb/A*)
AP-4	Mid	14.4 abc	4.3 h-k	3.6 b-e	4809 b-h
AT 215	Early	11.9 b-e	5.3 b-e	12.2 a	4019 h
AT3085RO	Mid	9.3 b-g	5.6 b	5.9 b	4434 d-h
C-724-19-25	Mid	4.4 g	3.9 jk	2.6 b-e	5601 ab
EXP 27-1516	Mid	7.0 d-g	6.5 a	4.2 b-e	4232 gh
Florida 07	Late	11.1 b-f	5.5 bc	1.4 de	5222 a-d
Florida Fancy[3]	Mid	8.6 c-g	4.3 h-k	3.3 b-e	5083 b-f
Georgia 02C	Late	7.5 d-g	5.4 bcd	2.2 cde	4532 c-h
Georgia 03L	Mid	5.6 efg	4.0 jk	2.2 cde	5181 a-e
Georgia 06G	Mid	8.6 c-g	4.3 h-k	3.9 b-e	4972 b-g
Georgia 07W	Mid	5.0 fg	4.0 jk	1.4 de	5956 a
Georgia 08V[3]	Mid	19.7 a	5.0 c-f	5.6 bc	4759 b-h
Georgia Green	Mid	15.6 ab	5.2 b-f	4.4 bcd	4353 e-h
Georgia Greener	Mid	6.4 d-g	4.1 ijk	1.7 de	5286 abc
McCloud	Mid	9.7 b-g	4.6 ghi	4.2 b-e	5124 a-f
PT 0903	V. late	9.7 b-g	4.9 d-g	2.2 cde	4877 b-g
PT 0904	V. late	12.2 bcd	5.3 b-e	2.8 b-e	4766 b-h
PT 0907	V. late	11.9 b-e	5.3 b-e	0.8 e	4311 fgh
PT 0930	V. late	6.4 d-g	5.5 bc	1.4 de	4503 c-h
PT0931	V. late	15.0 abc	4.8 e-h	4.2 b-e	4180 gh
Tifguard	Mid	4.2 g	3.8 k	1.1 de	4870 b-g
York	Late	11.7 b-e	4.4 g-J	1.1 de	4772 b-h

[1] Tomato spotted wilt (TSWV) and white mold (WM) incidence is expressed as the number of disease hits per 40 foot of row.
[2] Leaf spot (LS) severity was rated using the 1 to 10 Florida leaf spot scoring system.
[3] All cultivars are a runner-market type except for Florida Fancy and Georgia 08V, which are Virginia-market types.
Means in each column that are followed by the same letter are not significantly different according to analysis of variance and Fisher's protected least significant difference (LSD) test ($P \leq 0.05$).

LEAF SPOT AND RUST CONTROL AS WELL AS YIELD RESPONSE WITH RECOMMENDED FUNGICIDES PROGRAMS ON PEANUT IN SOUTHWEST ALABAMA, GCREC

A. K. Hagan, H. L. Campbell, K. L. Bowen, and M. Pegues

Objective: To evaluate the yield response and effectiveness of recommended fungicide programs for the control of late leaf spot and rust on two peanut cultivars at the Gulf Coast Research and Extension Center in Fairhope, Alabama.

Production Methods: On May 26, the peanut cultivars Georgia Green and Florida 07 were planted at a rate of six seed per foot of row using conventional tillage in a Malbis fine sandy loam (organic matter < 1 percent)) soil in a field cropped to peanut every third year. Temik 15G was applied at 5 pounds per acre in furrow for thrips control. An early cracking herbicide application of 8 fluid ounces per acre Gramoxone Inteon + 1 pint per acre Storm + 1 pint per acre Butyrac 175 was made on June 11. Postemergent weed control was obtained with an application of 2 fluid ounces per acre Cadre + 0.225 ounce per acre Strongarm + Induce (NIS) at 1 percent v/v. The test area was not irrigated. A split plot design with cultivars as whole plots and fungicide treatments as subplots was used. Whole plots were randomized in four complete blocks. Individual subplots consisted of four 30-foot rows spaced 3.2 feet apart. Full canopy sprays of were made using an ATV-mounted boom sprayer with three TX-8 nozzles per row at 10 gallons of spray volume per acre at 45 psi. Fungicide applications were made on July 6, July 20, August 4, August 18, September 2, September 10, and September 28.

Disease Assessment: Early and late leaf spot were rated together on October 12 using the 1 to 10 Florida peanut leaf spot scoring system (1 = no disease, 2 = very few lesions in canopy, 3 = few lesions noticed in lower and upper canopy, 4 = some leaf spotting and ≤ 10 percent defoliation, 5 = lesions noticeable and ≤ 25 percent defoliation, 6 = lesions numerous and ≤ 50 percent defoliation, 7 = lesions very numerous and ≤ 75 percent defoliation, 8 = numerous lesions on few remaining leaves and ≤90 percent defoliation, 9 = very few remaining leaves covered with lesions and ≤ 95 percent defoliation, and 10 = plants defoliated or dead). Rust severity was assessed on October 12 using the ICRISAT 1 to 9 rating scale (1 = no disease and 9 = 80 to 100 percent of leaves withered. White mold hit counts (one hit was defined as ≤ 1 foot of consecutive stem rot damaged plants per row) were made immediately after plot inversion on October 20. Yields are reported at 8.5 percent moisture. Significance of treatment effects was tested by analysis of variance and protected least significant difference (LSD) test ($P<0.05$).

Results: In 2009, rainfall totals for May, July, August, September, and October were above the 30-year average but were below average for June. Since the cultivar x treatment interaction for leaf spot, rust, and yield is not significant, data presented in Table 1 were pooled by fungicide treatment and in Table 2 by peanut cultivar. Since the peanut cultivar x fungicide treatment for white mold was significant, these data were separated by peanut cultivar (Table 3). Peanut cultivar had a significant impact on white mold incidence and yield but not on leaf spot and rust severity (Table 1). Fungicide treatments significantly impacted the control of leaf spot, rust, and white mold but not yield (Table 2).

While late leaf spot and rust ratings for Georgia Green and Florida 07 were similar, significant differences in white mold incidence and yield were noted between the two peanut cultivars (Table 1). White mold incidence was higher for Florida 07 than Georgia Green. In contrast, Georgia Green significantly outyielded Florida 07.

The Bravo Weather Stik, Provost 433SC, Convoy + Bravo Weather Stik, Artisan 3.6E + Bravo Weather Stik, and Folicur 3.6F + Bravo Weather Stik programs controlled late leaf spot and rust significantly better than the Headline 2.09E and Evito programs. Bravo Weather Stik, which gave superior control of late leaf spot and rust compared with the Convoy + Bravo Weather Stik program, also gave significantly better control than the Provost 433SC program. Similarly effective rust control was obtained with the standard Bravo Weather Stik, Artisan 3.6E + Bravo Weather Stik, and Folicur 3.6F + Bravo Weather Stik programs. Yields were higher for the standard Bravo Weather Stik and Folicur 3.6F + Bravo Weather Stik programs compared with the Evito program. Otherwise, yields were similar.

Stem rot incidence for the Artisan 3.6E + Bravo Weather Stik program, which was higher compared with Bravo Weather Stik, Provost 433SC, Folicur 3.6F + Bravo Weather Stik, and Evito programs, was similar to the Headline 2.09EC and Convoy + Bravo Weather Stik programs.

Overall, white mold pressure was low. On Georgia Green, white mold hit counts were higher for the Convoy + Bravo Weather Stik and Artisan 3.6E + Bravo Weather Stik programs compared with the standard Bravo Weather Stik and Provost 433 SC programs. With Florida 07, the Artisan 3.6E + Bravo Weather Stik and Headline 2.09E programs proved less effective in controlling white mold than the Provost 433SC, Evito, and Folicur 3.6F + Bravo Weather Stik programs.

Summary: While the level of late leaf spot and rust damage on Georgia Green and Florida 07 was similar, the former peanut cultivar had lower white mold hit counts and significantly higher yields. The best combination of late leaf spot and rust control was given by the standard Bravo Weather Stik, Artisan 3.6E + Bravo Weather Stik, and Folicur 3.6F + Bravo Weather Stik programs. Unfortunately, the Artisan 3.6E + Bravo Weather Stik program was also the least effective of these three programs against white mold. The Evito program, which gave the poorest control of both of the above diseases, also had lower yields than the more efficacious standard Bravo Weather Stik and Folicur 3.6F + Bravo Weather Stik programs.

TABLE 1. ANALYSIS OF VARIANCE ALONG WITH DISEASE RATINGS AND YIELDS FOR PEANUT CULTIVARS

	LLS [1]	Rust [2]	WM [3]	Yield (*lb/A*)
Split plot analysis P(F value)				
Peanut cultivar	0.7190	0.4174	<0.0001***[4]	0.0020**
Fungicide treatment	<0.0001***	<0.0001***	0.0101**	0.2129
Fungicide x cultivar interaction	0.5611	0.2646	0.0439*	0.5737
Peanut cultivar means				
Georgia Green	3.1 a	3.7 a	1.5 b	5415 a
Florida 07	3.2 a	3.8 a	3.6 a	5004 b

[1] Late leaf spot (LLS) severity was rated using the 1 to 10 Florida leaf spot scoring system.
[2] Rust severity was assessed using the ICRISAT 1 to 9 rating scale.
[3] White mold (WM) incidence is expressed as the number of disease hits per 60 feet of row.
[4] Significance at the 0.05, 0.01, and 0.001 levels is indicated by *, **, or ***, respectively.
Means in each column that are followed by the same letter are not significantly different according to analysis of variance and Fisher's protected least significant difference (LSD) test ($P \leq 0.05$).

TABLE 2. YIELD ALONG WITH LEAF SPOT AND RUST CONTROL WITH RECOMMENDED FUNGICIDE PROGRAMS COMPARED

Fungicide and rate/A	Application timing	LLS [1]	Rust [2]	Yield *lb/A*
Bravo Weather Stik 1.5 pt	1-7	2.7 d	2.8 d	5360 a
Bravo Weather Stik 1.5 pt	1,2,7	2.9 cd	4.0 b	5314 ab
Provost 433SC 8 fl oz	3-6			
Bravo Weather Stik 1.5 pt	1,2,7	3.0 c	3.6 bc	5261 ab
Convoy 8 fl oz + Weather Stik 1.5 pt	3-6			
Bravo Weather Stik 1.5 pt	1,2,7	2.8 cd	3.2 cd	5307 ab
Artisan 3.6E 26 fl oz + Bravo Weather Stik 1 pt	3-6			
Bravo Weather Stik 1.5 pt	1,2,4,6,7	2.9 cd	3.0 cd	5368 a
Folicur 3.6F 7.2 fl oz + Bravo Weather Stik 1 pt	3,5			
Bravo Weather Stik 1.5 pt	1,2,4,6,7	3.8 b	5.0 a	5016 ab
Headline 2.09EC 9.0 fl oz	3,5			
Bravo Weather Stik 1.5 pt	1,2	4.0 a	5.1 a	4840 b
Evito 3.5 fl oz + Induce 1% v/v	3,4,5,6,7			

[1] Late leaf spot (LLS) was rated using the Florida 1 to 10 rating scale.
[2] Rust severity was assessed using the ICRISAT 1 to 9 rating scale.
Means that are followed by the same letter in each column are not significantly different according to analysis of variance and Fisher's protected least significant difference (LSD) test ($P \leq 0.05$).

TABLE 3. CONTROL OF WHITE MOLD ON GEORGIA GREEN AND FLORIDA 07 WITH RECOMMENDED FUNGICIDE PROGRAMS

Fungicide and rate/A	Application timing	WM [1] Georgia Green	WM [1] Florida 07
Bravo Weather Stik 1.5 pt	1-7	0.5 b	3.3 bc
Bravo Weather Stik 1.5 pt	1,2,7	0.8 b	2.8 c
Provost 433SC 8 fl oz	3-6		
Bravo Weather Stik 1.5 pt	1,2,7	2.3 a	3.2 bc
Convoy 8 fl oz + Bravo Weather Stik 1.5 pt	3-6		
Bravo Weather Stik 1.5 pt	1,2,7	2.0 a	5.2 a
Artisan 3.6E 26 fl oz + Bravo Weather Stik 1 pt	3-6		
Bravo Weather Stik 1.5 pt	1,2,4,6,7	1.5 ab	3.0 c
Folicur 3.6F 7.2 fl oz + Bravo Weather Stik 1 pt	3,5		
Bravo Weather Stik 1.5 pt	1,2,4,6,7	1.3 ab	4.8 ab
Headline 2.09EC 9.0 fl oz	3,5		
Bravo Weather Stik 1.5 pt	1,2	2.0 a	2.8 c
Evito 3.5 fl oz + Induce 1% v/v	3,4,5,6,7		

[1] White mold (WM) incidence is expressed as the number of hits per 60 foot of row.
Means that are followed by the same letter in each column are not significantly different according to analysis of variance and Fisher's protected least significant difference (LSD) test ($P \leq 0.05$).

PEANUT DISEASE RISK INDEX FUNGICIDE PROGRAMS COMPARED FOR THE CONTROL OF LATE LEAF SPOT AND RUST ON SELECTED PEANUT CULTIVARS IN SOUTHWEST ALABAMA, GCREC

A.K. Hagan, H. L. Campbell, K. L. Bowen, and M. Pegues

Objective: To validate the effectiveness of Disease Risk Index fungicide programs for the control of late leaf spot and rust as well as the yield response of two peanut cultivars at the Gulf Coast Research and Extension Center, Fairhope, Alabama.

Production methods: On May 26, the peanut cultivars AT3085RO and Georgia 06G were planted at a rate of six seed per foot of row using conventional tillage practices in a non-irrigated field with a Malbis fine sandy loam (organic matter < 1 percent)) soil that has been cropped to peanut every third year. Weed control and soil fertility recommendations of the Alabama Cooperative Extension System were followed. A split plot design with peanut cultivars as whole plots and fungicide programs as subplots was used. Whole plots were randomized in four complete blocks. Individual subplots consisted of four 30-foot rows spaced 3.2 feet apart. Fungicide applications were made on July 6, July 13, July 20, August 4, August 11, August 18, September 2, September 4, September 10, September 17, and September 28 with an ATV-mounted boom sprayer with three TX-8 nozzles per row at 10 gallons of spray volume per acre at 45 psi.

Disease assessment: Late leaf spot was rated on October 12 using the 1 to 10 Florida peanut leaf spot scoring system (1 = no disease, 2 = very few lesions in canopy, 3 = few lesions noticed in lower and upper canopy, 4 = some leaf spotting and ≤ 10 percent defoliation, 5 = lesions noticeable and ≤ 25 percent defoliation, 6 = lesions numerous and ≤ 50 percent defoliation, 7 = lesions very numerous and ≤ 75 percent defoliation, 8 = numerous lesions on few remaining leaves and ≤90 percent defoliation, 9 = very few remaining leaves covered with lesions and ≤ 95 percent defoliation, and 10 = plants defoliated or dead). Rust severity was assessed using the ICRISAT 1 to 9 rating scale (1 = no disease and 9 = 80 to 100 percent of leaves withered) on October 12. Yields are reported at 9 percent moisture. Significance of treatment effects was tested by analysis of variance and least significant difference (LSD) test (P≤0.05). Since the cultivar x treatment interaction for leaf spot and rust is significant, data presented in the table was displayed by peanut cultivar.

Results: During the 2009 peanut production season, monthly rainfall totals equaled and often exceeded the 30-year average except for June. Frequent late summer rain showers along with a delay in digging resulted in exceptionally high late leaf spot and rust pressure. Based on the Peanut Disease Risk Index rules, this study site was rated a low risk for leaf spot on Georgia 06G and a medium risk for leaf spot on AT3085RO (http://www.caes.uga.edu/commodities/fieldcrops/peanuts/2009peanutupdate/index.html). Peanut cultivar and fungicide treatment had a highly significant impact on the intensity of late leaf spot and rust as well as on yield (Table 1). Of the two cultivars, Georgia 06G not only proved less susceptible to late leaf spot and rust but also had significantly higher yield compared with AT3085RO.

Since the cultivar x fungicide treatment interaction for leaf spot and rust intensity is significant, data presented in Table 2 was segregated by peanut cultivar (Table 1). In contrast, the cultivar x fungicide treatment for yield was not significant, so yield data presented in Table was pooled across peanut cultivars.

At both rates of Abound 2SC on the AT3085RO peanut cultivar, the low risk Disease Index programs gave significantly poorer late leaf spot control than the corresponding medium and high risk programs, which gave similar disease control (Table 2). At the high rate of Abound 2SC, rust ratings were higher for the low and medium programs than for the high risk program. In contrast, the medium and high risk programs with the low rate of Abound 2SC gave better rust control compared with the corresponding low risk Abound 2SC program. With Bravo Weather Stik 6F, late leaf spot and rust intensity rapidly declined with increasing numbers of application of this fungicide.

At the low rate of Abound 2SC on Georgia 06G, the medium and high risk programs provided similar late leaf spot control, which differed from the control provided by the corresponding low risk program (Table 2). At the high rate of Abound 2SC, the high risk program controlled late leaf spot control better than the medium and low risk programs, where the latter program gave the poorest control of this disease. While similar rust control was given at all risk categories with low rate of Abound 2SC, disease ratings were lower for the high than medium and low risk programs at the high rate of the same fungicide. With Bravo Weather Stik 6F, rust control on Georgia 06G was superior for the high compared with the medium and low risk programs, which had similar rust ratings.

With Bravo Weather Stik 6F and the high rate of Abound 2SC, yields were higher for the high compared with medium and low risk programs, which also significantly differed in yield (Table 3). High and medium risk programs with the low rate of Abound 2SC yielded more than the corresponding low risk program.

Summary: When compared with AT3085RO, Georgia 06G showed better late leaf spot and rust resistance, which translated into higher yields. When the efficacy of high and medium risk programs is compared, Bravo Weather Stik alone gave better control of late leaf spot than either rate of Abound 2SC. In contrast, the level of rust control provided by Bravo Weather Stik and both rates of Abound 2SC at each corresponding risk category on both cultivars did not greatly differ. The superior disease control obtained with the medium and high risk Bravo Weather Stik programs was reflected in significantly higher yields when compared with both rates of Abound 2SC. At the predicted low and medium risk programs on Georgia 06G and AT3085RO, Bravo Weather Stik 6F and both rates of Abound 2SC failed to provide the expected level of late leaf spot and rust control needed to avoid sizable yield loss.

TABLE 1. ANALYSIS OF VARIANCE ALONG WITH DISEASE RATINGS AND YIELDS FOR PEANUT CULTIVARS

	LLS [1]	Rust[2]	Yield (*lb/A*)
Split plot analysis P(F value)			
Peanut cultivar	<0.0001***[3]	<0.0001***	<0.0001***
Fungicide treatment	<0.0001***	<0.0001***	<0.0001***
Fungicide x cultivar interaction	0.0249*	0.0026**	0.1015
Peanut cultivar means			
AT3085RO	7.0 a	6.1 a	1937 b
Georgia 06G	5.5 b	4.4 b	3754 a

[1] Late leaf spot (LLS) was rated on October 12 using the 1 to 10 Florida leaf spot scoring system.
[2] Rust severity was assessed on October 12 using the ICRISAT 1 to 9 rating scale.
[3] Significance at the 0.05, 0.01, and 0.001 levels is indicated by *, **, or ***, respectively.
Means in each column that are followed by the same letter are not significantly different according to analysis of variance and Fisher's protected least significant difference (LSD) test (P≤0.05).

TABLE 2. DISEASE RISK INDEX FUNGICIDE PROGRAMS COMPARED FOR THE CONTROL OF LATE LEAF SPOT AND RUST ON TWO PEANUT CULTIVARS

Treatment and rate/A	—Application— timing[1]	number	Risk index	—AT3085RO— LLS[2]	Rust [3]	–Georgia 06G– LLS[2]	Rust [3]
Bravo WS 1.5 pt	1,2,3,4,5,6,7	7	High	4.0 d4	3.2 d	3.3 f	3.2 c
Bravo WS 1.5 pt	1.5,3,4.5,5.5,7	5	Med	5.2 c	5.8 bc	4.2 e	4.7 ab
Bravo WS 1.5 pt	2,3.5,5,6.5	4	Low	8.8 a	7.8 a	7.0 a	4.7 ab
Tilt Bravo SE 2.25 pt	1,2,4	7	High	6.5 b	4.5 cd	5.8 c	4.0 bc
Abound 2SC 0.8 pt	3,5						
Bravo WS 1.5 pt	6,7						
Tilt Bravo SE 2.25 pt	1.5,4	5	Med	7.2 b	6.5 ab	5.8 c	5.5 a
Abound 2SC 0.8 pt	3,5.5						
Bravo WS 1.5 pt	7						
Tilt Bravo SE 2.25 pt	2	4	Low	8.7 a	7.8 a	6.2 bc	4.5 abc
Bravo WS 1.5 pt + Abound 2SC 0.8 pt	3.5,5						
Bravo WS 1.5 pt	6.5						
Tilt Bravo SE 2.25 pt	1,2,4	7	High	6.3 b	5.3 bc	5.0 d	3.7 bc
Abound 2SC 1.1 pt	3,5						
Bravo WS 1.5 pt	6,7						
Tilt Bravo SE 2.25 pt	1.5,4	5	Med	7.0 b	6.3 b	5.8 c	4.8 ab
Abound 2SC 1.1 pt	3,5.5						
Bravo WS 1.5 pt	7						
Tilt Bravo SE 2.25 pt	2	4	Low	8.8 a	7.8 a	6.7 ab	4.3 abc
Bravo WS 1.5 pt + Abound 2SC 1.1 pt	3,5.5						
Bravo WS 1.5 p	6.5						

[1] Fungicide applications were made on 1 = 6 July, 1.5 = 13 July, 2 = 20 July, 3 = 4 August, 3.5 = 11 August, 4 = 18 August, 5 = 2 September, 5.5 = 4 September, 6 = 10 September, 6.5 = 17 September and 7 = 28 September.
[2] Late leaf spot (LLS) was rated on October 12 using the Florida 1 to 10 rating scale (1 = no disease and 10 = plants defoliated or dead).
[3] Rust severity was assessed on October 12 using the ICRISAT 1 to 9 rating scale (1 = no disease and 9 = 80 to 100 percent of leaves withered).
Means in each column that are followed by the same letter are not significantly different according to analysis of variance and Fisher's protected least significant difference (LSD) test (P≤0.05).

TABLE 3. AVERAGE YIELD RESPONSE TO PEANUT DISEASE RISK FUNGICIDE PROGRAMS

Treatment and rate/A	—Application— timing [1]	number	Risk index	Yield *lb/A*
Bravo WS 1.5 pt	1,2,3,4,5,6,7	7	High	4393 a
Bravo WS 1.5 pt	1.5,3,4.5,5.5,7	5	Med	3687 b
Bravo WS 1.5 pt	2,3.5,5,6.5	4	Low	1625 g
Tilt Bravo SE 2.25 pt	1,2,4	7	High	2848 d
Abound 2SC 0.8 pt	3,5			
Bravo WS 1.5 pt	6,7			
Tilt Bravo SE 2.25 pt	1.5,4	5	Med	2998 cd
Abound 2SC 0.8 pt	3,5.5			
Bravo WS 1.5 pt	7			
Tilt Bravo SE 2.25 pt	2	4	Low	1862 fg
Bravo WS 1.5 pt + Abound 2SC 0.8 pt	3.5,5			
Bravo WS 1.5 pt	6.5			
Tilt Bravo SE 2.25 pt	1,2,4	7	High	3410 bc
Abound 2SC 1.1 pt	3,5			
Bravo WS 1.5 pt	6,7			
Tilt Bravo SE 2.25 pt	1.5,4	5	Med	2703 de
Abound 2SC 1.1 pt	3,5.5			
Bravo WS 1.5 pt.	7			
Tilt Bravo SE 2.25 pt	2	4	Low	2229 ef
Bravo WS 1.5 pt + Abound 2SC 1.1 pt	3,5.5			
Bravo WS 1.5 pt	6.5			

[1] Fungicide applications were made on 1 = 6 July, 1.5 = 13 July, 2 = 20 July, 3 = 4 August, 3.5 = 11 August, 4 = 18 August, 5 = 2 September, 5.5 = 4 September, 6 = 10 September, 6.5 = 17 September and 7 = 28 September.using the 1 to 10 Florida leaf spot scoring system.

Means in each column that are followed by the same letter are not significantly different according to analysis of variance and Fisher's protected least significant difference (LSD) test ($P \leq 0.05$).

INFLUENCE OF CROPPING SEQUENCE ON DISEASES, NEMATODES, AND ON THE YIELD OF PEANUT, COTTON, AND CORN IN SOUTHWEST ALABAMA, GCREC

A. K. Hagan, H. L. Campbell, K. S. Lawrence, K. L. Bowen, and M. Pegues

Objective: (1) To assess the impact of corn cropping frequency on the severity of peanut diseases and on populations of the southern root-knot nematode on corn, cotton, and peanut; and (2) to define the agronomic benefits of corn as a rotation partner with peanut and cotton.

Production Methods

General: On March 11, 230 pounds per acre of 9-24-17 fertilizer with 10 pounds per acre of sulfur and 3 pounds per acre of zinc plus 2 pints per acre of Prowl H_2O herbicide was broadcast and incorporated. The entire study area was bedded on March 11. Roundup Weathermax at 22 fluid ounces per acre was broadcast over cotton and peanut plots as well as the established corn plots on May 1. The experimental design was a randomized complete block with four replications. Plots for individual rotation sequences consisted of eight rows on 38-inch centers that were 30 feet in length.

Corn: The experimental design for corn was a split plot with crop sequence as the whole plot and a soil insecticide/nematicide treatment as the split plot. Individual four-row subplots received either 6.5 pounds per acre of Counter 15G in furrow or served as a non-treated control. On April 7, the corn variety DeKalb 69-72 was planted. On May 20, 58 gallons per acre of 28 percent liquid nitrogen (180-0-0) was broadcast. A postdirected application of Roundup Weathermax at 22 fluid ounces per acre plus Atrazine at 1 quart per acre was made on May 14. Corn was combined on August 18.

Cotton: The cotton variety DP 555BR was planted at a rate of four seed per row foot on May 13. Thrips and seedling disease control was provided by in furrow applications of 5 pounds per acre of Temik 15G and 7 pounds per acre of Terraclor 10G, respectively. An application of 22 fluid ounces per acre Roundup Weathermax to cotton on June 8 was followed by a postdirect application of 1.5 pints per acre Caparol (promethryne) + 2 pints per acre MSMA + 2 quarts per 100 gallons of spray volume Induce applied on July 9. An application of 2 fluid ounces per acre of the plant growth regulator Stance was made to cotton on June 16 and July 9. Cotton was prepared for harvest with an application of 1 ounce per acre Diuron + 2 ounces per acre Dropp 50W + 1 quart per acre Boll Buster + 1 quart per 100 gallons of spray volume Herbimax on September 18. Cotton plots were picked on September 29.

Peanut: In 2009, the experimental design for the peanut was a split plot with crop sequence as the whole plot and soil fungicide treatment as the split plot. Individual four-row subplots received either a broadcast application of 1 pint per acre of Convoy on August 4 and September 2 or served as a non-treated control. The peanut cultivar Florida 07 was planted on May 28 with 4 pounds per acre of Thimet 20G placed in furrow for thrips control. Weed control was obtained with an application of Gramoxone Inteon at 8 fluid ounces per acre + Storm 4L at 1 pint per acre + Induce at 1 quart per 100 gallons of spray volume on June 18. Full canopy sprays of Bravo Weather Stik 6F at 1.5 pints per acre were made using an ATV-mounted boom sprayer with three TX-8 nozzles per row at 10 gallons of spray volume per acre at 45 psi on July 6, July 20, August 4, August 18, September 2, September 16, and September 28. Peanut plots were combined November 5. Pod yields are reported at 10 percent moisture.

Disease and Nematode Assessment: The occurrence of foliar diseases in corn was visually assessed on June 24 on the ear leaf on a 0 to 10 scale (0 = no disease, 1 = 1 to 10 percent, 2 = 11 to 20 percent, 3 = 21 to 30 percent, 4 = 31 to 40 percent, etc. of leaf area diseased). In peanuts, TSWV hit counts (one hit equaled ≤ 1 foot of consecutive TSWV-damaged plants per row) were made on October 14. Early and late leaf spot were rated on October 14 using the 1 to 10 Florida peanut leaf spot scoring system (1 = no disease, 2 = very few lesions in canopy, 3 = few lesions noticed in lower and upper canopy, 4 = some lesions seen and ≤ 10 percent defoliation, 5 = lesions noticeable and ≤ 25 percent defoliation, 6 = lesions numerous and ≤ 50 percent defoliation, 7 = lesions very numerous and ≤ 75 percent defoliation, 8 = numerous lesions on few remaining leaves and ≤90 percent defoliation, 9 = very few remaining leaves covered with lesions and ≤ 95 percent defoliation, and 10 = plants defoliated or dead). Rust severity was assessed using the ICRISAT 1 to 9 rating scale (1 = no disease and 9 = 80 to 100 percent of leaves withered) on October 14. White mold (WM) hit counts (one hit was defined as ≤ 1 foot of consecutive stem rot damaged plants per row) were made immediately after the plots were dug on October 21. Soil samples for a nematode assay from the corn, peanut, and cotton plots were collected on October 27, November 10, and November 19, respectively, but have not been processed.

Results

Corn: Cropping sequence but not Counter 15G soil insecticide/nematicide had a significant impact on corn yield (Table 1). The non-significant cropping sequence x soil insecticide interaction shows that the impact of the Counter 15G treatment on corn yield was similar for all cropping sequence, so the data were pooled. Yield for the Counter 15G-treated corn and for the non-treated control was almost identical (Table 2), which indicates that very little if any soil insect or nematode-related damage to the roots occurred. Disease activity on corn was minimal in 2009. Low levels of common rust and Physoderma brown spot were noted on the ear leaves. Yield for continuous corn was lower compared with corn cropping sequences (Table 3), including corn cropped behind one or two years of the same crop.

Peanut: Cropping sequence had a significant impact on leaf spot intensity and the yield of peanut (Table 4), while the soil fungicide treatment influenced only white mold incidence. Since the soil fungicide x crop sequence interaction for leaf spot intensity, white mold incidence, and yield was not significant, data were pooled across soil fungicide treatments. Regardless of the cropping sequence, TSWV incidence, which was low, was similar (Table 5). With the exception of the peanut cropped behind one year of corn and two years of peanut, highest leaf spot intensity was recorded in the continuous peanuts. Peanut cropped behind one or more years of cotton had lower leaf spot ratings than for peanut after corn. The lowest leaf spot ratings were seen where peanut followed one or two years of cotton. Cotton cropping frequency did not influence leaf spot intensity. While overall white mold levels were low, highest disease counts were seen where peanut followed one year of cotton compared with continuous peanuts and Peanut-Peanut-Cotton-Peanut rotation. Highest yields were recorded where peanut followed one year of cotton while continuous peanuts had the lowest yields. Surprisingly, peanut following two years of cotton yielded less than peanut behind one year of cotton. While white mold incidence of this disease was lower in the Convoy-treated plots than the non-treated controls, the soil fungicide treatment had no impact on yield.

Cotton: No diseases were noted in the cotton in 2009. With one exception, seed cotton yields were similar (Table 7) regardless of cotton cropping frequency and rotation partner. Surprisingly, cotton following one year of peanut had lower yields than five of the other cotton cropping sequences, including continuous cotton. No diseases were noted that would account for this yield differential.

Summary: While cropping sequence had no impact on diseases in corn, yield for the continuous corn was lower compared with the other cropping sequences where corn at some point over the past three years followed peanut or cotton. At this point, the cause of the yield decline compared with the other cropping sequences has not been determined. In the absence of cotton root-knot nematode, no yield benefit was seen from growing corn after peanut rather than after cotton. Cropping sequence did have a sizable impact on leaf spot intensity and to a lesser extent white mold incidence, which may in part account for the significant rotation-related differences in yield. Due to lower leaf spot ratings, cotton appears to be a better rotation partner with peanut than corn. Influence of cropping sequence on cotton yield was minimal. Failure of damaging rotation-related diseases or nematode populations to develop probably accounts for the general absence of a cropping sequence-related yield reductions and overall high cotton yields.

TABLE 1. ANOVA TABLE FOR MAIN AND SUBPLOT TREATMENT EFFECTS FOR CORN

Split plot analysis P(F value)	Corn yield
Cropping sequence	<0.0180*[1]
Soil insecticide	0.8154
Cropping sequence x soil insecticide	0.9310

[1]Significance at the 0.05 level is indicated by *.

TABLE 2. CORN YIELDS ACROSS ALL CROPPING SEQUENCES AS IMPACTED BY COUNTER 15G INSECTICIDE/NEMATICIDE

Treatment and rate/A	Yield (*bu/A*)
Counter 15G 6.5 lb	119 a
Non-treated control	119 a

Means in each column that are followed by the same letter are not significantly different according to analysis of variance and Fisher's protected least significant difference (LSD) test (P=0.05).

TABLE 3. IMPACT OF CROPPING SEQUENCE ON THE YIELD OF CORN

Crop sequence							Yield
2003	2004	2005	2006	2007	2008	2009	*bu/A*
Corn	Corn	Corn	Corn	Corn	Corn	Corn	110 b
Corn	Peanut	Corn	Peanut	Corn	Peanut	Corn	124 a
Corn	Corn	Peanut	Corn	Corn	Peanut	Corn	124 a
Corn	Corn	Corn	Peanut	Corn	Corn	Corn	119 a
Cotton	Corn	Corn	Corn	Cotton	Corn	Corn	120 a

Means that are in each column that are followed by the same letter are not significantly different according to Fisher's least significant difference (LSD) test ($P \leq 0.05$).

TABLE 4. ANOVA TABLE FOR MAIN AND SUBPLOT EFFECTS ON PEANUT

Split plot analysis P(F value)	LS [1]	WM [1]	Yield (*bu/A*)
Cropping sequence	<0.0001*** [2]	0.1739	<0.0001***
Soil fungicide	0.5919	<0.0001***	0.2513
Rotation x soil fungicide	0.4901	0.8795	0.5385

[1] Leaf spot (LS) and white mold (WM)
[2] Significance at the 0.001 levels is indicated by ***.

TABLE 5. IMPACT OF CROP ROTATION ON THE LEVEL OF DAMAGE ATTRIBUTED TO DISEASES IN PEANUT IN 2009

Crop sequence							TSWV[1]	LS [2]	WM [1]	Yield
2003	2004	2005	2006	2007	2008	2009				*lb/A*
Pnut	Pnut	Pnut	Pnut	Pnut	Pnut	Pnut	2.3 a	6.1 a	2.0 b	3997 d
Pnut	Corn	Pnut	Corn	Pnut	Corn	Pnut	1.8 a	5.3 b	2.5 ab	4878 b
Pnut	Pnut	Corn	Pnut	Pnut	Corn	Pnut	1.8 a	5.8 a	2.3 ab	4341 cd
Pnut	Pnut	Cotton	Pnut	Pnut	Cotton	Pnut	0.8 a	4.7 c	1.9 b	5467 a
Pnut	Cotton	Pnut	Cotton	Pnut	Cotton	Pnut	0.8 a	4.6 c	3.6 a	5453 a
Pnut	Cotton	Cotton	Pnut	Cotton	Cotton	Pnut	0.5 a	4.6 c	2.9 ab	4615 bc

[1] Tomato spotted wilt (TSWV) and white mold (WM) incidence is expressed as number of hits per 60 foot of row.
[2] Early leaf spot (LS) was rated using the Florida 1 to 10 scoring system.
Means that are in each column that are followed by the same letter are not significantly different according to Fisher's least significant difference (LSD) test ($P=0.05$).

TABLE 6. IMPACT OF CONVOY FUNGICIDE ON WHITE MOLD AND YIELD IN 2009

Treatment and rate/A	White mold[1]	Yield *bu/A*
Convoy	1.4 b	4723 a
Non-treated control	3.7 a	4861 a

[1] White mold incidence is expressed as number of hits per 60 foot of row.
Means in each column that are followed by the same letter are not significantly different according to Fisher's least significant difference (LSD) test (P=0.05).

TABLE 7. IMPACT OF CROP SEQUENCE ON COTTON YIELD

Crop sequence							Yield
2003	2004	2005	2006	2007	2008	2009	*bu/A*
Cotton	Cotton	Cotton	Cotton	Cotton	Cotton	Cotton	3098 a
Cotton	Peanut	Cotton	Peanut	Cotton	Peanut	Cotton	2643 b
Cotton	Cotton	Peanut	Cotton	Cotton	Peanut	Cotton	2995 a
Cotton	Cotton	Cotton	Peanut	Cotton	Cotton	Cotton	2949 ab
Cotton	Corn	Cotton	Corn	Cotton	Corn	Cotton	2915 ab
Cotton	Corn	Corn	Cotton	Corn	Corn	Cotton	3006 a
Cotton	Cotton	Corn	Cotton	Cotton	Corn	Cotton	3018 a
Cotton	Cotton	Cotton	Corn	Cotton	Cotton	Cotton	3040 a

Means that are in each column that are followed by the same letter are not significantly different according to Fisher's least significant difference (LSD) test ($P \leq 0.05$).

YIELD RESPONSE AND EARLY LEAF SPOT SUSCEPTIBILITY OF RUNNER PEANUT CULTIVARS, PBU

A. K. Hagan, H. L. Campbell, K. S. Lawrence, K. L. Bowen, and S. P. Nightengale

Objective: To assess the yield potential and disease susceptibility of commercial runner peanut cultivars at the Plant Breeding Unit in Tallassee, Alabama.

Production methods: The test site, which was cropped to peanut in the previous three years, was disked with a leveling disk harrow on May 21 and on June 1. Runner market-type commercial peanut cultivars were sown on June 2 at a rate of six seed per foot of row in an Independence (Cahaba) loamy fine sand (organic matter < 1 percent). Plots were not irrigated. Weed control was obtained with a pre-plant application of Pendant at 1.0 quart per acre on June 2 followed by a broadcast application of Dual Magnum II at 1.5 pints per acre on June 4. Plots, which contained four 30-foot rows spaced 3 feet apart, were arranged in a randomized complete block with six replications. To control leaf spot diseases, full canopy applications of Echo 720 6F at 24 fluid ounces per acre were made on June 29, July 15, July 31, August 13, August 28, September 14, and September 29 with a four-row, tractor-mounted sprayer.

Disease assessment: Early leaf spot was rated on October 13, using the 1 to 10 Florida peanut leaf spot scoring system (1 = no disease, 2 = very few lesions in canopy, 3 = few lesions noticed in lower and upper canopy, 4 = some leaf spotting and ≤ 10 percent defoliation, 5 = lesions noticeable and ≤ 25 percent defoliation, 6 = lesions numerous and ≤ 50 percent defoliation, 7 = lesions very numerous and ≤ 75 percent defoliation, 8 = numerous lesions on few remaining leaves and ≤90 percent defoliation, 9 = very few remaining leaves covered with lesions and ≤ 95 percent defoliation, and 10 = plants defoliated or dead). White mold and TSWV hit counts (one hit was defined as ≤ 1 foot of consecutive white mold- or TSWV-damaged plants per row) were made immediately on the mid-maturity cultivars on October 22. Yields are reported at 10 percent moisture. Significance of treatment effects was tested by analysis of variance and the least significant difference (LSD) test ($P \leq 0.05$).

Results: In 2009, rainfall totals were below the historical average in June but were average to well above average for May, July, August, September, and October. Very little TSWV was noted in any of the peanut cultivars screened. Early leaf spot was the dominant leaf spot disease identified. Equally high levels of leaf spotting and defoliation were noted for Georgia 06G, Georgia Greener, and the current industry standard Georgia Green. Lesser but still sizable levels of leaf spotting and premature defoliation were also recorded for AT3085RO, Georgia 02C, and McCloud. York had the lowest leaf spot ratings. While white mold pressure was low, significant differences in the incidence of this disease were found between cultivars. White mold incidence was higher on Georgia Green than on Florida 07, McCloud, Tifguard, Georgia 02C, Georgia 07W, and York, all of which had similar loci counts. Generally, cultivars with the highest early leaf spot ratings such as Georgia Green, Georgia Greener, and Georgia 06G, had the lowest yields. York and Florida 07, which had among the lowest early leaf spot ratings, also had the highest pod yields.

LEAF SPOT RATINGS AND YIELD FOR RECOMMENDED RUNNER PEANUT CULTIVARS, PBU

Peanut cultivar	LS [1]	WM [2]	Yield (*lb/A*)
AT3085RO	5.9 b	1.2 ab	3071 def
Florida 07	5.0 c	0.2 c	3960 ab
Georgia 02C	5.9 b	0.0 c	3484 bcde
Georgia 06G	6.8 a	0.3 c	2947 ef
Georgia 07W	5.7 b	0.0 c	3595 bcd
Georgia Green	6.8 a	1.5 a	2593 f
Georgia Greener	6.4 a	0.8 abc	2609 f
McCloud	5.7 b	0.3 c	3374 cde
Tifguard	5.1 c	0.2 c	3713 bc
York	4.1 d	0.0 c	4391 a

[1] Early leaf spot (LS) was rated using the Florida 1 to 10 leaf spot rating scale.
[2]White mold (WM) severity is expressed as the number of hits per 60 feet of row.
Means followed by the same letter in each column are not significantly different according to analysis of variance and Fisher's protected least significant difference (LSD) test ($P \leq 0.05$).

Summary: Peanut cultivars greatly differed in their reaction of early leaf spot and to a much lesser extent white mold. Typically, cultivars that had the lower leaf spot ratings, particularly York, had the highest yields. Of the most recently released peanut cultivars, Florida 07 and Tifguard suffered the least early leaf spot damage and had among the highest yields. Georgia 06G and Georgia Greener performed as poorly as the current industry standard Georgia Green.

RECOMMENDED FUNGICIDE PROGRAMS COMPARED FOR LEAF SPOT CONTROL ON PEANUT, PBU

A. K. Hagan and S. P. Nightengale

Objective: (1) To assess the efficacy of recommended fungicide programs for the control of early leaf spot on selected peanut cultivars and their impact on yield at the Plant Breeding Unit in Tallassee, Alabama.

Production Methods: The test site was cropped to peanut for four consecutive years. On May 29, peanut cultivars Georgia Green and Georgia 06G were sown at a rate of six seed per foot of row in an Independence (Cahaba) loamy fine sand (organic matter < 1 percent)). Weed control was obtained with broadcast applications of 1 quart per acre Pendant on June 1 and 1.5 pints per acre Dual Magnum II on June 4. A split plot design with cultivar as whole plot and fungicide treatments as subplots was used. Individual subplots, which contained four 30-foot rows spaced 3 feet apart, were arranged in a randomized complete block with four replications. Fungicide treatments were applied on June 29, July 15, July 31, August 13, August 28, September 14, and September 28 with a four-row, tractor-mounted sprayer at 15 gallons of spray volume per acre.

Disease Assessment: Leaf spot diseases were rated together on October 13 using the 1 to 10 Florida peanut leaf spot scoring system (1 = no disease, 2 = very few lesions in canopy, 3 = few lesions noticed in lower and upper canopy, 4 = some leaf spotting and ≤ 10 percent defoliation, 5 = lesions noticeable and ≤ 25 percent defoliation, 6 = lesions numerous and ≤ 50 percent defoliation, 7 = lesions very numerous and ≤ 75 percent defoliation, 8 = numerous lesions on few remaining leaves and ≤90 percent defoliation, 9 = very few remaining leaves covered with lesions and ≤ 95 percent defoliation, and 10 = plants defoliated or dead). White mold counts (one locus was defined as ≤ 1 foot of consecutive stem rot damaged plants per row) were made immediately after plot inversion on October 22. Yields are reported at 10 percent moisture. Significance of treatment effects was tested by analysis of variance and protected least significant difference (LSD) test ($P \leq 0.05$).

Results: In 2009, rainfall totals were below the historical average in June but were average to well above average for July, August, September, and October. Since the treatment x cultivar interaction for leaf spot intensity and yield were not significant, data presented in Table 1 and Table 2 were pooled across fungicide programs and peanut cultivars, respectively. Peanut cultivar selection had a significant effect on early leaf spot intensity but not on yield (Table 1). In contrast, fungicide program had a significant impact on the control of early leaf spot and on yield. While Georgia 06G had a lower rating for early leaf spot, yields of this cultivar and Georgia Green were similar.

Early leaf spot was the dominant leaf spot disease. The best early leaf spot control was obtained with the Provost 433SC (10.7 fluid ounces) and Headline 2.09E programs (Table 2). While less effective than the latter programs, the Provost 433SC (8 fluid ounces) program gave superior leaf spot control when compared with the Echo 720, Artisan 3.6E + Echo 720, and Echo 720 + Folicur 3.6F programs, which failed to control early leaf spot. Poorest early leaf spot was provided by the Convoy + Echo 720 program. As indicated by the 8.8 rating, peanuts in the non-treated control plots had shed all but a few of the leaves at the shot tips at digging and lower yields compared with all fungicide programs. Since white mold incidence was low throughout the study, data are not presented in the tables. Yields were higher for the Provost 433SC (10.7 fluid ounces) and Headline 2.09E programs compared with all fungicide treatments except for the Provost 433SC (8 fluid ounces) program. The Echo 720, Artisan 3.6E + Echo 720, Echo 720 + Folicur 3.6F, Convoy + Echo 720 programs had equally low yields.

Summary: Results of this study illustrate how cropping sequence impacts disease intensity, particularly early leaf spot, as well as fungicide program performance. Exceptionally heavy rainfall in August, September, and October also contributed to the exceptionally high early leaf spot pressure and poor program performance. Superior leaf spot protection provided by both rates of Provost 433SC as well as Headline 2.09E was rewarded with the highest pod yields. Efficacy of Echo 720, Artisan 3.6E + Echo 720, Echo 720 + Folicur 3.6F, and Convoy + Echo 720 for the control of early leaf spot was poorer than expected and was reflected in lower yields.

TABLE 1. ANOVA WITH MEAN DISEASE RATINGS AND YIELD FOR PEANUT CULTIVARS

	LS [1]	Yield (*lb/A*)
Split plot analysis P(F value)		
Peanut cultivar	0.0015**[2]	0.8329
Fungicide program	<0.0001***	<0.0001***
Cultivar x fungicide program	0.3852	0.3664
Peanut cultivar means		
Georgia Green	6.1 a	3222 a
Georgia 06G	5.7 b	3296 a

[1] Leaf spot (LS) was rated using the 1 to 10 Florida leaf spot scoring system.
[2] Significance at the 0.05, 0.01, and 0.001 levels is indicated by *, **, or ***, respectively.
Means in each column that are followed by the same letter are not significantly different according to analysis of variance and Fisher's protected least significant difference (LSD) test ($P \leq 0.05$).

TABLE 2. EARLY LEAF SPOT CONTROL AND YIELD RESPONSE WITH RECOMMENDED FUNGICIDE PROGRAMS

Fungicide	Application schedule	LS [1]	Yield *lb/A*
Echo 720 1.5 pt	1–7	6.6 c	2897 c
Echo 720 1.5 pt	1,2,7	4.9 e	3842 ab
Provost 433SC 8 fl oz	3,4,5,6		
Echo 720 1.5 pt	1,2,7	4.1 f	4145 a
Provost 433SC 10.7 fl oz	3,4,5,6		
Echo 720 1.5 pt	1,2,4,6,7	6.5 cd	3045 c
Artisan 3.6E 26 fl oz + Echo 720 1.5 pt	3,5		
Echo 720 1.5 pt	1,2,4,6,7	7.1 b	2940 c
Convoy 1 pt + Echo 720 1.5 pt	3,5		
Echo 720 1.5 pt	1,2,4,6,7	4.3 f	3954 a
Headline 2.09E 9 fl oz	3,5		
Echo 720 1.5 pt	1,2,4,6,7	6.1 d	3292 bc
Folicur 3.6F + Echo 720 1.5 pt	3,5		
Non-treated control	—	8.8 a	1196 d

[1] Early leaf spot (LS) was rated using the Florida 1 to 10 peanut leaf spot rating scale.
Means that are followed by the same letter in each column are not significantly different according to analysis of variance and Fisher's protected least significant difference (LSD) test ($P \leq 0.05$).

INFLUENCE OF CROPPING SEQUENCE ON DISEASES, NEMATODES, AND YIELD OF PEANUT, COTTON, AND CORN IN CENTRAL ALABAMA, PBU

A. K. Hagan, H. L. Campbell, K. L. Bowen, K. S. Lawrence, and S. Nightengale

Objective: (1) To assess the impact of corn cropping frequency on the severity of peanut diseases and on populations of the southern root-knot nematode on corn, cotton, and peanut; and (2) to define the agronomic benefits or limitations of corn as a rotation partner with peanut and cotton.

Production Practices

General: Prior to 2003, the cropping history of the study site was cotton in 2002, sweet corn in 2001, and either lupine or vetch in 2000. The cotton root-knot nematode (*Meloidogyne incognita* race 3) and the causal fungi of Fusarium wilt of cotton (*Fusarium oxysporum*) and of white mold (*Sclerotium rolfsii*) were established before the start of this study.

The site was disked and paratilled on February 27. On June 25 and July 23, 1.0 and 1.7 acre inches of water, respectively, were applied with a hose-tow irrigation system. Whole plot crop sequence treatments had eight rows of corn, cotton, and peanut that were 30 feet in length in four replications. While the overall experimental design was a randomized complete block, a soil insecticide/nematicide and soil fungicide subplot treatment was added to the corn and peanuts, respectively.

Corn: Four-row subplots treatments were Counter 15G at 6.5 pounds per acre in furrow or a non-treated control. Plots received a broadcast application of 182 pounds per acre of 33-0-0 (+ 10 pounds per acre S) analysis fertilizer (60 pounds per acre actual N) on April 10, were leveled with a field cultivator, and then planted to Pioneer 31P42 corn on 30-inch centers. A layby application of 286 pounds per acre of ammonium nitrate (28-0-0) (60 pounds per acre actual N) was made on May 11. Postemergent weed control was obtained with 32 fluid ounces per acre Roundup applied on May 6 and 24 fluid ounces per acre Roundup applied on May 29. Corn was picked on August 24.

Cotton: On June 3, 91 pounds per acre of 33-0-0 analysis fertilizer was broadcast and then incorporated with a leveling disk harrow in the plots planted to DPL 555 cotton on 3-foot centers later that day. Thrips control on cotton was provided in furrow application of 6.5 pounds per acre Temik 15G. Roundup OriginalMax at 22 fluid ounces per acre was broadcast over the cotton on June 26. A tank mixture of 28 fluid ounces per acre Def-6 + 28 fluid ounces per acre Bollbuster + 5 ounces per acre Takedown was applied on November 13 to prepare the cotton for harvest. Cotton was picked on December 4.

Peanut: The experimental design was a split plot with peanut crop sequence as the whole plot and Moncut 70DF soil fungicide treatment as the split plot. Individual four-row subplots received either a single broadcast application of 2.9 pounds per acre Moncut 70W or remained untreated. On June 2, plots were prepared for planting with a leveling disk harrow. On June 3, a preemergent application of 1 quart per acre Pendant was incorporated with a leveling disk harrow and then the peanut cultivar Georgia Green was planted in single rows on 3-foot centers with 6.5 pounds per acre Temik 15G applied in furrow. On June 4, 1.5 pints per acre Dual was broadcast over the peanut plots. On July 23, 1.5 pints per acre Poast Plus was broadcast over the peanuts for postemergent grass control. Peanut plots were hand weeded as needed during the growing season. Leaf spot control on peanut was maintained with broadcast applications of 24 fluid ounces per acre Echo 720 on July 2, July 15, July 31, August 18, August 24, August 31, September 14, and September 29. As previously noted, an application of 2.9 pounds per acre Moncut 70DF was made on July 31 to four of eight rows of each peanut plot. Peanuts were inverted on October 22 and picked on November 5.

Disease and Nematode Assessment: The occurrence of foliar diseases in corn was visually assessed on June 24 on the ear leaf on a 0 to 10 scale (0 = no disease, 1 = 1 to 10 percent, 2 = 11 to 20 percent 3 = 21 to 30 percent 4 = 31 to 40 percent, etc. of leaf area diseased). Early leaf spot severity on peanut was rated using the Florida 1 to 10 peanut leaf spot scoring system on August 17, September 10, October 13 and October 22. White mold and Cylindrocladium black rot (CBR) hit counts (one hit was defined as ≤ 1 foot of consecutive white mold or CBR-damaged plants) were made on October 22. Incidence of tomato spotted wilt virus (TSWV) in peanut was assessed on August 17 by counting the number of TSWV hits (one hit was defined as ≤ 1 foot of consecutive TSWV-damaged plants). Soil samples for a nematode assay were taken on August 29, October 26, and December 12 from the corn, peanut, and cotton plots, respectively, and were processed using the sugar flotation method.

Results

Corn: Rotation and the Counter 15G soil insecticide treatment had a significant impact on corn yield (Table 1). Since the soil insecticide treatment x crop sequence interaction for corn yield was not significant, data for this variable was pooled across crop sequences. Yield was significantly higher for the Counter 15G-treated corn (more than 16 bushels per acre) when compared with the non-treated controls (Table 2). Regardless of the crop sequence, no noticeable disease activity was observed in corn.

Highest corn yields were noted in a one-year-out rotation pattern where corn was alternated with peanut (Table 3). In addition the plots in a seven-year corn monoculture or corn cropped for three consecutive years after one year of peanut had higher yields compared with corn cropped behind successive cotton and corn crops.

Peanut: Occurrence of CBR and peanut yield were significantly influenced by crop sequence but TSWV and white mold incidence and early leaf spot severity were not (Table 4). The Moncut 70DF soil fungicide significantly impacted white mold incidence but not CBR incidence or peanut yield. Since the soil fungicide x crop sequence interaction for CBR and white mold incidence as well as yield was not significant, data were pooled across soil fungicide treatments.

TSWV levels were so low that only a few symptomatic plants were observed (data not shown). Due to frequent rain showers, leaf spot severity was high regardless of peanut cropping frequency (Table 5). Incidence of CBR was highest in the plots maintained in continuous peanuts. Damaging CBR levels were also noted where peanut followed one year of corn which was preceded by two years of peanut. Little if any CBR damage was observed for the one-year-out cropping sequence where peanut followed corn or cotton as well as in peanut cropped behind two years of cotton. Highest pod yields were recorded for the peanuts following one or two years of cotton. Peanut following one year of cotton had higher yields than the same crop following one year of corn. Yield for the continuous peanuts was significantly below that of peanuts cropped behind one or two years of either cotton or corn.

While the incidence of white mold was reduced, Moncut 70DF soil fungicide treatment did not reduce CBR incidence or increase peanut yield (Table 6).

Cotton: Just prior to picking, a number of bolls in the mid- and upper canopy had failed to open. Unusually wet and cool weather patterns are probably responsible to low numbers of open bolls and low yields. Generally, cotton cropping frequency had little impact on yield (Table 7). Yields for the one-year-out cropping sequence where cotton followed corn were higher compared with cotton following cotton and corn.

Summary: Cropping sequence had a significant impact on corn yield, CBR disease, and peanut yield but not the severity of foliar disease on corn or early leaf spot and white mold on peanut. When compared with continuous corn, yield gains were seen only in a one-year-out rotation with peanut but not cotton. One or two years of cotton or corn between peanut crops dramatically reduced CBR incidence, which resulted in significantly higher peanut yields. Yield response in peanut due to the one- and two-year-out rotations was similar. Due to poor yields, the impact of crop sequence on cotton yields was minimal.

TABLE 1. ANOVA TABLE FOR MAIN AND SUBPLOT TREATMENT EFFECTS FOR CORN

Split plot analysis P(F value)	Corn yield
Corn rotation	<0.0001***[1]
Soil insecticide	<0.0016**
Corn rotation x soil insecticide	0.5687

[1]Significance at the 0.05, 0.01, and 0.001 levels is indicated by *, **, or ***, respectively.

TABLE 2. IMPACT OF COUNTER INSECTICIDE/NEMATICIDE TREATMENT ON CORN YIELD

Treatment and rate/A	Yield (*bu/A)*
Counter 15G 6.5 lb.	170 a
Non-treated control	154 b

Means in each column that are followed by the same letter are not significantly different according to analysis of variance and Fisher's protected least significant difference (LSD) test (P≤0.05).

TABLE 3. IMPACT OF CROPPING SEQUENCE ON THE YIELD OF CORN

Crop sequence							Yield
2003	2004	2005	2006	2007	2008	2009	*bu/A*
Corn	Corn	Corn	Corn	Corn	Corn	Corn	167 b
Corn	Peanut	Corn	Peanut	Corn	Peanut	Corn	187 a
Corn	Corn	Peanut	Corn	Corn	Peanut	Corn	149 cd
Corn	Corn	Corn	Peanut	Corn	Corn	Corn	160 bc
Cotton	Corn	Corn	Corn	Cotton	Corn	Corn	146 d

Means that are in each column that are followed by the same letter are not significantly different according to Fisher's least significant difference (LSD) test ($P \leq 0.05$).

TABLE 4. ANOVA TABLE FOR MAIN AND SUBPLOT EFFECTS ON PEANUT

Split plot analysis P(F value)	CBR [1]	WM [1]	Yield (*bu/A)*
Rotation	<0.0001***[2]	0.5279	<0.0001***
Soil fungicide	0.2112	0.0071**	0.1817
Rotation x soil fungicide	0.0710	0.6713	0.2974

[1] Cylindrocladium black rot (CBR) and white mold (WM) incidence
[2] Significance at the 0.05, 0.01, and 0.001 levels is indicated by *, **, or ***, respectively.

TABLE 5. IMPACT OF CROPPING SEQUENCE ON DISEASE AND YIELD OF PEANUT

Crop sequence							Early LS [1]	CBR [2]	WM [2]	Yield
2003	2004	2005	2006	2007	2008	2009				lb/A
Pnut	Pnut	Pnut	Pnut	Pnut	Pnut	Pnut	7.5 a	14.6 a	2.4 a	1752 c
Pnut	Corn	Pnut	Corn	Pnut	Corn	Pnut	7.0 a	2.1 c	5.4 a	3027 b
Pnut	Pnut	Corn	Pnut	Pnut	Corn	Pnut	6.6 a	7.8 b	3.6 a	3307 ab
Pnut	Pnut	Cotton	Pnut	Pnut	Cotton	Pnut	6.8 a	0.0 c	3.4 a	3404 ab
Pnut	Cotton	Pnut	Cotton	Pnut	Cotton	Pnut	6.4 a	0.0 c	5.9 a	3644 a
Pnut	Cotton	Cotton	Pnut	Cotton	Cotton	Pnut	6.6 a	0.0 c	3.4 a	3662 a

[1] Early leaf spot (LS) was rated using the Florida 1 to 10 scoring system.
[2] Cylindrocladium black rot (CBR) and white mold (WM) incidence is expressed as number of hits per 60 foot of row.
Means that are in each column that are followed by the same letter are not significantly different according to Fisher's least significant difference (LSD) test ($P \leq 0.05$).

TABLE 6. IMPACT OF SOIL FUNGICIDE TREATMENT ON THE INCIDENCE OF SOIL DISEASES AND YIELD OF PEANUT

Treatment and rate/A	CBR [1]	WM [1]	Yield (*bu/A)*
Moncut 70W 2.9 lb/A	4.5 a	5.8 a	3059 a
Non-treated control	3.7 a	2.2 b	3206 a

[1] Cylindrocladium black rot (CBR) and white mold (WM) incidence is expressed as number of hits per 60 foot of row.
Means in each column that are followed by the same letter are not significantly different according to Fisher's least significant difference (LSD) test ($P \leq 0.05$).

TABLE 7. IMPACT OF CROPPING SEQUENCE ON COTTON YIELD

Crop sequence							Yield
2003	2004	2005	2006	2007	2008	2009	*bu/A*
Cotton	Cotton	Cotton	Cotton	Cotton	Cotton	Cotton	651 ab
Cotton	Peanut	Cotton	Peanut	Cotton	Peanut	Cotton	819 ab
Cotton	Cotton	Peanut	Cotton	Cotton	Peanut	Cotton	820 ab
Cotton	Cotton	Cotton	Peanut	Cotton	Cotton	Cotton	652 ab
Cotton	Corn	Cotton	Corn	Cotton	Corn	Cotton	898 a
Cotton	Corn	Corn	Cotton	Corn	Corn	Cotton	489 b
Cotton	Cotton	Corn	Cotton	Cotton	Corn	Cotton	689 ab
Cotton	Cotton	Cotton	Corn	Cotton	Cotton	Cotton	720 ab

Means that are in each column that are followed by the same letter are not significantly different according to Fisher's least significant difference (LSD) test ($P \leq 0.05$).

YIELD RESPONSE AND REACTION OF COMMERCIAL PEANUT CULTIVARS TO TSWV AND LEAF SPOT DISEASES, BARU

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Objective: To evaluate the reaction of commercial runner peanut cultivars to TSWV and early and late leaf spot and the impact of those diseases on peanut yield at the Brewton Agricultural Research Unit in Brewton, Alabama.

Production Methods: On June 9, ten commercial runner peanut cultivars were planted at a rate of approximately six seed per foot of row in a field that was cropped to peanut the previous year using conventional tillage practices in a Benndale sandy loam soil (organic matter < 1 percent) at the Brewton Agricultural Research Unit, which is located 45 miles northwest of Pensacola, Florida. The study area was not irrigated. Just before planting, preemergent weed control was obtained with a broadcast application of 1.3 pints per acre Dual Magnum II. Escape weeds were plowed with flat sweeps or pulled by hand. Plots that consisted of four 30-foot rows spaced 3 feet apart were arranged in a randomized complete block with six replications. Full canopy sprays of 1.5 pints per acre of Bravo Weather Stik were applied on August 4, August 17, August 24, and September 23 with a tractor-mounted boom sprayer with three TX-8 nozzles per row calibrated to deliver 15 gallons per acre spray volume at 45 psi.

Disease Assessment: Final TSWV loci counts (one locus was defined as ≤ 1 foot of consecutive severely TSWV-damaged plants per row) were made on October 20. Early and late leaf spot (LS) were rated together on October 20 using the 1 to 10 Florida peanut leaf spot scoring system (1 = no disease, 2 = very few lesions in canopy, 3 = few lesions noticed in lower and upper canopy, 4 = some leaf spotting and ≤ 10 percent defoliation, 5 = lesions noticeable and ≤ 25 percent defoliation, 6 = lesions numerous and ≤ 50 percent defoliation, 7 = lesions very numerous and ≤ 75 percent defoliation, 8 = numerous lesions on few remaining leaves and ≤90 percent defoliation, 9 = very few remaining leaves covered with lesions and ≤ 95 percent defoliation, and 10 = plants defoliated or dead). Stem rot hit counts (one hit was defined as ≤ 1 foot of consecutive stem rot-damaged plants per row) were made immediately after plot inversion on October 20. Significance of treatment effects was tested by analysis of variance and least significant difference (LSD) test (P<0.05).

Results: With the exception of June, monthly rainfall totals for the 2009 production season equaled and often exceeded the 30-year historical average for the study site. Since TSWV and stem rot incidence was low on all peanut cultivars, data were not included in the table. A mixture of early and late leaf spot was found on all peanut cultivars. While overall leaf spot disease severity was not unusually lower given the frequent showers, significant differences in the disease intensity and yields were found between peanut cultivars. York suffered the least leaf spotting and premature defoliation. Tifguard and Georgia 02C had lower leaf spot ratings than the rest of the remaining peanut cultivars. Equally high leaf spot ratings were noted for McCloud, AT3085RO, Florida 07, and Georgia 07W. York, which had the lowest leaf spot rating, had significantly higher yields than Georgia 07W, Georgia 06G, Georgia 02C, and McCloud. Yields for Florida 07, AT3085RO, and AP-4 also were higher than yields for McCloud.

Summary: Peanut cultivars with equally high yields included York, Florida 07, AP-4, AT3085RO, Tifguard, and Georgia Green. Apparently, leaf spot intensity had limited impact on pod yields. Of the above cultivars, several cultivars had higher leaf spot ratings than York and Tifguard. Occurrences of TSWV and stem rot, which were well below the levels where reductions in yield would occur, would have been higher had the peanuts been sown three or more weeks earlier.

LEAF SPOT RATINGS AND YIELDS FOR COMMERCIAL PEANUT CULTIVARS SCREENED, BARU

Peanut cultivar	LS [1]	Yield (*lb/A*)
AP-4	5.2 bc	3763 ab
AT3085RO	5.4 ab	3725 ab
Florida 07	5.4 ab	3800 ab
Georgia 02C	4.9 c	3517 bc
Georgia 06G	5.1 bc	3564 bc
Georgia 07W	5.4 ab	3613 bc
Georgia Green	5.3 bc	3617 abc
McCloud	5.7 a	3320 c
Tifguard	4.3 d	3676 abc
York	3.8 e	4003 a

[1]Early and late leaf spot (LS) was rated using the Florida 1 to 10 leaf spot rating scale.
Means followed by the same letter in each column are not significantly different according to analysis of variance and Fisher's protected least significant difference (LSD) test ($P \leq 0.05$).

Alabama's Agricultural Experiment Station
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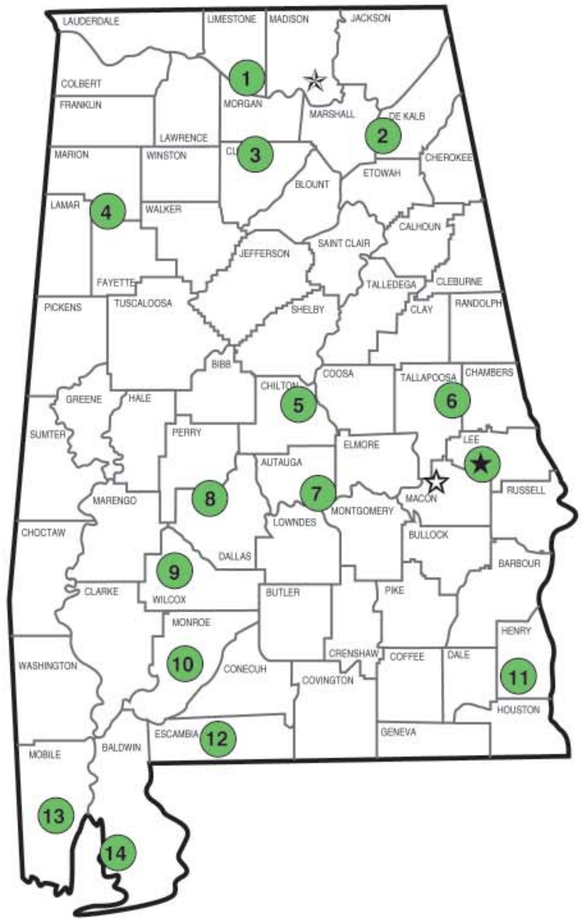
With an agricultural research unit in every major soil area, Auburn University serves the needs of field crop, livestock, forestry, and horticultural producers in each region in Alabama. Every citizen of the state has a stake in this research program, since any advantage from new and more economical ways of producing and handling farm products directly benefits the consuming public.



Research Unit Identification

- ★ Main Agricultural Experiment Station, Auburn.
- ✯ Alabama A&M University.
- ☆ E. V. Smith Research Center, Shorter.

1. Tennessee Valley Research and Extension Center, Belle Mina.
2. Sand Mountain Research and Extension Center, Crossville.
3. North Alabama Horticulture Research Center, Cullman.
4. Upper Coastal Plain Agricultural Research Center, Winfield.
5. Chilton Research and Extension Center, Clanton.
6. Piedmont Substation, Camp Hill.
7. Prattville Agricultural Research Unit, Prattville.
8. Black Belt Research and Extension Center, Marion Junction.
9. Lower Coastal Plain Substation, Camden.
10. Monroeville Agricultural Research Unit, Monroeville.
11. Wiregrass Research and Extension Center, Headland.
12. Brewton Agricultural Research Unit, Brewton.
13. Ornamental Horticulture Research Center, Spring Hill.
14. Gulf Coast Research and Extension Center, Fairhope.