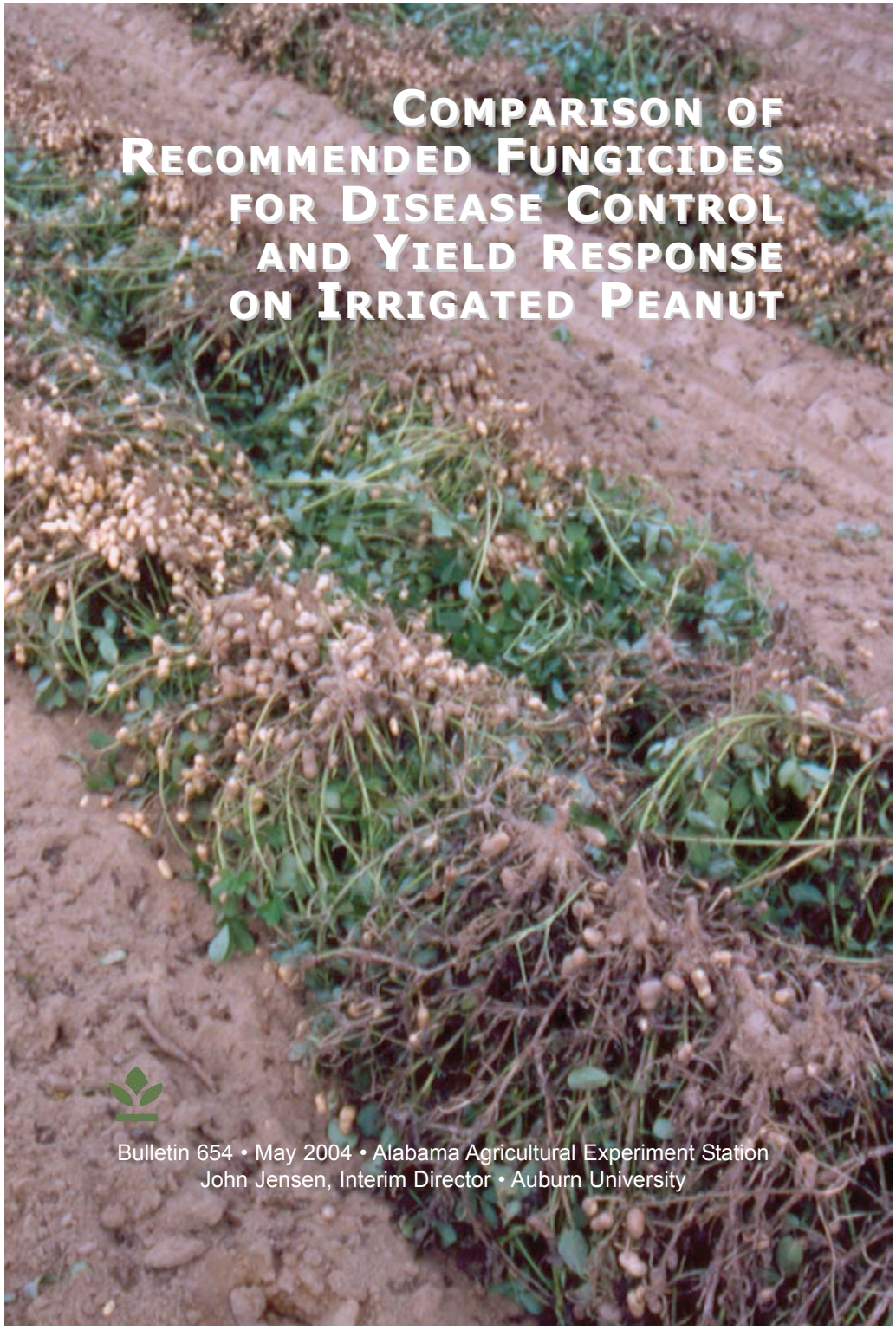


Comparison of Recommended Fungicides for Disease Control and Yield Response on Irrigated Peanut

Bulletin 654 • May 2004 • Alabama Agricultural Experiment Station
John Jensen, Interim Director • Auburn University

CONTENTS

First Printing 1M, May 2004

http://www.auburn.edu
http://www.ag.auburn.edu/aaes

Comparison of Recommended Fungicides for Disease Control and Yield Response on Irrigated Peanut

A.K. Hagan, M.E. Rivas-Davila, K.L. Bowen, H.L. Campbell, and L. Wells

INTRODUCTION

For nearly 30 years, formulations of chlorothalonil such as Bravo Ultrex, Bravo WeatherStik 6F, Echo 720 6F, Terranil 6F have been widely used for the control of early leaf spot (*Cercospora arachidicola* S. Hori), late leaf spot (*Cercosporidium personatum* Berk. & M.A. Curtis), and rust (*Puccinia arachidis* Speg.) on peanut *(19,22)*. Despite the widespread use of chlorothalonil on nearly every acre of peanut across the Southeast, this fungicide, when applied according to label directions, gives effective control of the above diseases *(15)*. However, this fungicide has no activity against white mold (southern stem rot), which is caused by the soil fungus *Sclerotium rolfsii* Sacc. *(11,18,22)*.

Within the last decade, Folicur 3.6F *(1,4,5,6),* Abound 2.08SC *(13,20),* and Headline 2.09EC *(9,10)* have been registered for the control of white mold, Rhizoctonia limb rot (*Rhizoctonia solani* Kuhn), as well as both leaf spot diseases and peanut rust on peanut. Depending on the fungicide chosen, two to four applications of Folicur 3.6F, Abound 2.08SC, or Headline 2.09EC are used as part of a standard seven-application calendar treatment regime are usually made *(17)*. Typically, Bravo Ultrex, Bravo WeatherStik 6F, Echo 720 6F, Terranil 6F have filled the remaining three to five treatment slots in a Folicur 3.6F, Abound 2.08SC, or Headline 2.09EC spray program *(17)*. On peanut, Moncut 70DF will give effective control of white mold but is always applied with a chlorothalonil tank-mix partner to control early and late leaf spot, as well as peanut rust *(17,18)*.

Questions are constantly raised by peanut producers concerning the relative effectiveness of Folicur 3.6F, Abound 2.08SC, Headline 2.09EC, or Moncut 70DF programs in controlling diseases on peanut and their impact on yield. Escalating production costs combined with a decline in crop value have forced producers to reassess the need for costly fungicide inputs to their peanut crop. Also, the role of fungicides

Hagan and Bowen are professors and Rivas-Davila and Campbell are research associates in the Department of Entomology and Plant Pathology. Wells is superintendent at the Alabama Agricultural Experiment Station Wiregrass Research and Extension Center.

such as Folicur 3.6F, Abound 2.08SC, Headline 2.09EC, and Moncut 70DF on the productivity of peanut cultivars with partial resistance to leaf spot diseases and white mold has not been clarified. This study was designed to compare the efficacy of recommended fungicide programs for the control of early leaf spot and white mold, as well as on the yield of selected peanut cultivars in an irrigated production system.

MATERIALS AND METHODS

Peanut (*Arachis hypogaea* L.) was planted in on May 18, 2000 and 2001, and May 22, 2002 at a rate of six seed per foot of row at the Wiregrass Research and Extension Center, Headland, Alabama. Virugard (matures 126 to 140 days after planting [DAP] [group 3]) and Georgia Green (matures 130 to 145 DAP [group 4]) were planted in all three years of the study. Southern Runner (matures 140 to 165 DAP [group 5]), which was sown only in 2000, was replaced the following year by the group 5 peanut Florida C-99R. The cropping history of the test areas was a minimum of 10 years in a peanut-cotton-peanut rotation. The soil type was a Dothan fine sandy loam [fine, loamy, siliceous, thermic Plinthis Palendut] with less than 1 percent organic matter. The test areas were heavily infested with *S. rolfsii* and significant white mold damage had been seen on previous peanut crops.

The plot area was prepared for planting with a moldboard plow and disk harrow. Optimal soil fertility and pH were maintained according the results of a soil fertility assay conducted by the Soil Testing Laboratory at Auburn University. Lightly incorporating a tank mixture of 1.5 pint per acre Sonolan HFP and 1 pint per acre Dual Magnum provided pre-emergent broadleaf and grass weed control. At five days after seedling emergence (ground cracking), an application of 5.5 fluid ounces per acre Gramoxone Maxx plus 1 pint per acre Butyrac 200 and 0.5 pint per acre Basagran 4EC was made. At planting, Temik 15G at 6.7 pounds per acre was applied in-furrow to control thrips. During the season, escape weeds were pulled by hand or were controlled with field cultivation. Plots were irrigated with a center pivot irrigation system with approximately 1 inch of water on June 7 (19 DAP), June 15 (27 DAP), June 28 (40 DAP), July 22 (64 DAP), August 12 (85 DAP), August 18 (91 DAP), and August 29 (102 DAP) 2000; on July 16 (60 DAP) 2001; and on August 10 (79 DAP), August 24 (93 DAP), and September 12 (112 DAP) 2002.

A split plot design with peanut cultivars as main plots and fungicide programs 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 main plot. Broadcast applications of all fungicides were made on a standard 14-day calendar schedule with a tractor-mounted four-row boom sprayer with three TX-8 hollow-cone nozzles per row that were calibrated to deliver 15 gallons per acre spray volume.

For the 2000 trial, the standard Bravo Ultrex program consisted of seven applications of this fungicide at 1.4 pounds per acre. A block of four midseason applications of 7.2 fluid ounces per acre of Folicur 3.6F was preceded by two, and followed by a final application, of Bravo Ultrex at 1.4 pounds per acre. The Abound 2.08SC programs included applications at either the 18.3 and 24.6 fluid ounces per acre rate on July 25 and August 22. A single application of Bravo Ultrex plus Moncut 70DF at 1.4 lb plus 1.4 pounds per acre was made on July 25. The remaining treatment slots in the seven-application Abound 2.08SC and the Bravo Ultrex plus Moncut 70DF programs were filled by applications of 1.4 pounds per acre of Bravo Ultrex. Application dates for 2000 were June 27 (40 DAP), July 11 (54 DAP), July 25 (68 DAP), August 8 (82 DAP), August 22 (96 DAP), and September 5 (110 DAP).

In 2001, Bravo Ultrex, Folicur 3.6F, and Abound 2.08SC programs were identical to those evaluated in the preceding year. In addition to the program with the single application of 1.4 pounds per acre of Bravo Ultrex plus 1.4 pounds per acre of Moncut 70DF, a program with a block of four midsummer applications of 1.4 plus 0.4 pounds per acre of Bravo Ultrex plus Moncut 70DF was added. Bravo Ultrex at 1.4 pounds per acre filled out the remaining treatment slots in both of the Bravo Ultrex plus Moncut 70DF programs. Fungicides were applied in 2001 on approximately a 14-day schedule on June 25 (30 DAP), July 9 (52 DAP), July 23 (66 DAP), August 6 (80 DAP), August 20 (94 DAP), and September 4 (109 DAP).

With the exception of the 24.6 fluid ounces per acre Abound 2.08SC program, the same Bravo Ultrex, Folicur 3.6F, Abound 2.08SC, and Bravo Ultrex plus Moncut 70DF programs, which were tested in 2001, were included in the 2002 study. A Headline 2.09EC program with three consecutive midseason 6.4 fluid ounces per acre applications that were preceded and followed by two applications of Bravo Ultrex at 1.4 pounds per acre was added. Also, a combination program with two midsummer applications of Abound 2.08SC at 12.3 fluid ounces per acre were separated by one of Folicur 3.6F at 7.2 fluid ounces per acre was also evaluated. The Abound 2.08SC/Folicur 3.6F applications were bracketed by applications of 1.4 pounds per acre of Bravo Ultrex. In 2002, application dates were June 25 (34 DAP), July 9 (47 DAP), July 23 (61 DAP), August 6 (75 DAP), August 21(91 DAP), September 3 (104 DAP), and September 17 (118 DAP).

Early leaf spot damage was rated using the 1 to 10 Florida leaf spot scoring system where 1 = no disease, 2 = very few leaf spots in the lower canopy, 3 = few leaf spots in lower and upper canopy, 4 = some leaf spots in lower and upper canopy with light defoliation (≤10 percent), 5 = leaf spots noticeable with some defoliation (≤25 percent), 6 = moderate leaf spotting and defoliation (≤25 percent), 6 = leaf spots numerous with significant defoliation (≤50 percent), 7 = leaf spots numerous with heavy defoliation (≤75 percent), 8 = numerous leaf spots on few remaining leaves and severe defoliation (≤90 percent), 9 = very few remaining leaves covered with leaf spots and severe defoliation (≤95 percent), and 10 = plants defoliated or dead *(8)*. In the first year of the study, disease severity was assessed on Virugard on October 3, on Georgia Green on October 12, and on Southern Runner on October 26. In the following year, leaf spot ratings were taken on September 14 on Virugard, September 29 on Georgia Green, and October 17 on Florida C-99R. In 2002, leaf spot ratings were recorded on September 13 for Virugard, September 30 for Georgia Green, and October 17 for Florida C-99R. The hull scrape method of estimating pod maturity was used to determine the optimum digging date *(23)*. Incidence of white mold was

determined immediately after the peanuts were dug by counting the number of hits in the windrow where one 'hit' was defined as the number of consecutive symptomatic plant(s) in up to 1 foot of row *(21)*. Digging dates in 2000 were October 3 (138 DAP) for Virugard, October 12 (147 DAP) for Georgia Green, and October 26 (161 DAP) for Southern Runner. In 2001, Virugard, Georgia Green, and Florida C-99R plots were dug with a two-row inverter on September 14 (119 DAP), October 1 (136 DAP), and October 17 (152 DAP), respectively. Plots were inverted the following year on September 24 (124 DAP) for Virugard, October 4 (135 DAP) for Georgia Green, and October 17 (153 DAP) for Florida C-99R.

Significance of fungicide program and peanut cultivar effects on the severity of early leaf spot, incidence of white mold, and yield in each year of this study were tested by analysis of variance. Means for the measured variables for each fungicide program were compared with Fisher's protected least significant difference (LSD) test with a level of significance at the $P \leq 0.05$ level. Since the cultivar x treatment interaction for each measured variable by year was not significant, data for early leaf spot severity, white mold incidence, and yield was pooled across peanut cultivars.

RESULTS

The 2000 production season was among the driest recorded at the Wiregrass Research and Extension Center. The total rainfall for April through August of 5.7 inches was significantly less than the historical 25.5-inch average for that five-month period. As a result of the extended drought, early leaf spot and white mold pressure was lower than that noted in the previous year. Monthly rainfall totals for most of the 2001 production season were at or above the historical average for the test site. For the final year of this study, rainfall totals were at or below the historical average for April through September but above average for October.

Early Leaf Spot

In all three years of this study, the level of early leaf spot control that was provided by the fungicide programs across the three peanut cultivars was similar (data not shown). As a result, early leaf spot ratings for each fungicide program that were evaluated were pooled for each year and the average leaf spot rating for all three peanut cultivars is presented by year in Table 1.

In all three years, noticeable differences in the level of early leaf spot control were noted between the fungicide programs. Due to unusually dry weather patterns during the 2000 production season, early leaf spot was limited to light leaf spotting in the lower and upper canopy, as well as minimal premature leaf shed on the Bravo Ultrex-treated peanuts (Table 1). Abound 2.08SC at 18.3 fluid ounces per acre gave better control of early leaf spot than Bravo Ultrex alone or the Bravo Ultrex plus Moncut 70DF program. The level of early leaf spot control provided by the 24.6-fluid ounces per acre Abound 2.08SC, as well as the recommended Folicur 3.6F program, was similar to that obtained with the season-long Bravo Ultrex program.

For the 2001 production season, leaf spot intensity appeared to be slightly higher than that observed in previous year. The 24.6 fluid ounces per acre Abound

Table 1. Comparison of Recommended Fungicide Programs for The Control of Early Leaf Spot on Peanut in an Irrigated Production System, WGREC, 2000-2002

	——Application——		Early leaf spot severity[1]		
Fungicide program	Rate/ac	Sequence[2]	2000	2001	2002
Bravo Ultrex	1.4 lb	1-7	3.4	4.1	3.6
Bravo Ultrex Folicur 3.6F	1.4 lb 7.2 fl oz	1,2,7 3,4,5,6	2.9	3.6	4.6
Bravo Ultrex Bravo Ultrex + Moncut 70DF	1.4 lb 1.4 lb + 1.4 lb	1,2,4,5,6,7 3	3.5	3.9	3.4
Bravo Ultrex Bravo Ultrex + Moncut 70DF	1.4 lb 1.4 lb + 0.4 lb	1,2,7 3,4,5,6	—[3]	3.5	2.7
Bravo Ultrex Abound 2.08SC	1.4 lb 18.3 fl oz	1,2,4,6,7 3,5	2.6	3.8	3.6
Bravo Ultrex Abound 2.08SC	1.4 lb 24.6 fl oz	1,2,4,6,7 3,5	2.9	3.3	—
Bravo Ultrex Abound 2.08SC Folicur 3.6F	1.4 lb 12.1 fl oz 7.2 fl oz	1,2,6,7 3,4 5	—	—	3.6
Bravo Ultrex Headline 2.09EC	1.4 lb 6.4 fl oz	1,2,6,7 3,4,5	—	—	2.6

[1]Early leaf spot severity was visually assessed using the Florida 1 to 10 scoring system.
[2]Application sequence refers to the placement of a treatment application in a fungicide program.
[3]— = treatment not included in that year of the study.

2.08SC program gave better control of early leaf spot than Bravo Ultrex alone, Bravo Ultrex plus Moncut 70DF, Folicur 3.6F, and the 18.3 fluid ounces per acre Abound 2.08SC programs (Table 1). The effectiveness of the latter four fungicide programs for the control of early leaf spot was similar.

In 2002, the early leaf spot rating for the Folicur 3.6F program was higher than for those recorded for the other programs, including Bravo Ultrex season-long (Table 1). With leaf spot rating of 4.6, light to moderate leaf spotting, as well as low level of defoliation was seen on the Folicur 3.6F-treated peanuts. The level of early leaf spot control obtained with Bravo Ultrex season-long was similar to that provided by 18.3 fluid ounces per acre of Abound 2.08SC, the high rate of Bravo Ultrex plus Moncut 70DF, and the combination Abound 2.08SC/Folicur 3.6F program. The low rate of Bravo Ultrex plus Moncut 70DF and the Headline 2.09EC programs gave better control of early leaf spot than all of the above fungicide programs. Over the three years, the Abound 2.08SC regimes were generally gave the best control of early leaf spot.

White Mold

Since the peanut cultivar x fungicide program interaction for white mold for 2000, 2001, and 2002 was not significant, white mold hit counts were pooled for each fungicide program across peanut cultivars (data not shown). The non-significant cultivar x fungicide program interaction indicates that the ranking of fungicide programs for the control of white mold control on all peanut cultivars was similar.

In all three years, the incidence of white mold was significantly higher for peanuts treated with Bravo Ultrex alone compared with the other fungicide programs except for Headline 2.09EC, which was evaluated only in 2002 (Table 2). Both Abound 2.08SC programs gave better control of white mold than did those that included one application of Moncut 70DF or the Folicur 3.6F program in 2000 but not in the following year. In 2001, the Folicur 3.6F program, as well as those programs that included Moncut 70DF or Abound 2.08SC, was equally effective in controlling white mold. In 2002, both Bravo Ultrex plus Moncut 70DF programs gave better white mold control than Folicur 3.6F, Abound 2.08SC, or the program that included a combination of these two fungicides. In addition, the Abound 2.08SC/Folicur 3.6F program controlled this disease better the programs with one of either of these fungicides alone. Overall, the four-application Bravo Ultrex plus Moncut 70DF and 24.6 fluid ounces per acre Abound 2.08SC programs gave the best control of white mold.

Yield Response

A non-significant peanut cultivar x fungicide interaction for yield in 2000, 2001, and 2002 shows that the ranking of each fungicide program for yield on all peanut cultivars was similar (data not shown).

In 2000, the 18.3 fluid ounces per acre Abound 2.08SC program but not higher rate of the same fungicide increased peanut yield compared to Bravo Ultrex alone

TABLE 2. COMPARISON OF RECOMMENDED FUNGICIDE PROGRAMS FOR THE CONTROL OF WHITE MOLD ON PEANUT IN AN IRRIGATED PRODUCTION SYSTEM, WGREC, 2000-2002

	——Application——		White mold Incidence[1] No. hits/60 row feet		
Fungicide program	Rate/ac	Sequence[2]	2000	2001	2002
Bravo Ultrex	1.4 lb	1-7	12.4	20.2	17.0
Bravo Ultrex Folicur 3.6F	1.4 lb 7.2 fl oz	1,2,7 3,4,5,6	6.7	11.1	13.3
Bravo Ultrex Bravo Ultrex + Moncut 70DF	1.4 lb 1.4 lb + 1.4 lb	1,2,4,5,6,7 3	8.3	10.8	4.5
Bravo Ultrex Bravo Ultrex + Moncut 70DF	1.4 lb 1.4 lb + 0.4 lb	1,2,7 3,4,5,6	—[3]	8.6	4.5
Bravo Ultrex Abound 2.08SC	1.4 lb 18.3 fl oz	1,2,4,6,7 3,5	3.3	11.9	10.0
Bravo Ultrex Abound 2.08SC	1.4 lb 24.6 fl oz	1,2,4,6,7 3,5	4.4	11.3	—
Bravo Ultrex Abound 2.08SC Folicur 3.6F	1.4 lb 12.1 fl oz 7.2 fl oz	1,2,6,7 3,4 5	—	—	7.9
Bravo Ultrex Headline 2.09EC	1.4 lb 6.4 fl oz	1,2,6,7 3,4,5	—	—	17.0

[1]White mold incidence was estimated immediately after plot inversion where one hit was defined as the number of consecutive symptomatic plant(s) in 1 foot of row.
[2]Application sequence refers to the placement of a treatment application in a fungicide program.
[3]— = treatment not included in that year of the study.

or Bravo Ultrex plus Moncut 70DF (Table 3). Yield response was considerably higher for both Abound 2.08SC programs compared to the recommended Folicur 3.6F program. Yield for the peanuts treated with Bravo Ultrex alone, Folicur 3.6F, or Bravo Ultrex plus Moncut 70DF were similar.

Compared to the Bravo Ultrex program, significant yield gains were obtained with the Folicur 3.6F, as well as both of Bravo Ultrex plus Moncut 70DF and Abound 2SC programs in 2001 (Table 3). Yields in plots that received one application of Bravo Ultrex plus Moncut 70DF at 1.4 plus 1.4 pounds per acre were lower than that recorded for those peanuts receiving four applications of the 1.4 plus 0.4 pounds per acre rate of the same fungicide tank mixture. Yield response to the recommended Folicur 3.6F program was similar to that obtained with both of the Abound 2.08SC and both of the Bravo Ultrex plus Moncut 70DF programs.

Regardless of application rate and number, Moncut 70DF-treated peanuts had higher yields than those obtained with any of the other fungicide programs in 2002 (Table 3). Yield response in the plots treated with Abound 2.08SC or the Abound 2.08SC/Folicur 3.6F program was superior to that provided by the Headline 2.09E program or Bravo Ultrex alone. Yield of peanuts receiving applications of Bravo Ultrex alone and the Folicur 3.6F program did not greatly differ. Finally, the Abound 2SC and Folicur 3.6F programs had a similar impact on peanut yield.

Peanut Cultivars

In all three years, sizable differences in the level of early leaf spot and white mold damage were noted between the three peanut cultivars (Table 4). Due to early

TABLE 3. IMPACT OF FUNGICIDE PROGRAM SELECTION ON THE YIELD OF PEANUT IN AN IRRIGATED PRODUCTION SYSTEM, WGREC, 2000-2002

	——Application——		——Yield (lb/ac)——		
Fungicide program	Rate/ac	Sequence[1]	2000	2001	2002
Bravo Ultrex	1.4 lb	1-7	3949	3162	3057
Bravo Ultrex Folicur 3.6F	1.4 lb 7.2 fl oz	1,2,7 3,4,5,6	3907	3730	3630
Bravo Ultrex Bravo Ultrex + Moncut 70DF	1.4 lb 1.4 lb + 1.4 lb	1,2,4,5,6,7 3	3970	3695	4616
Bravo Ultrex Bravo Ultrex + Moncut 70DF	1.4 lb 1.4 lb + 0.4 lb	1,2,7 3,4,5,6	—[2]	3985	4586
Bravo Ultrex Abound 2.08SC	1.4 lb 18.3 fl oz	1,2,4,6,7 3,5	4447	3730	3894
Bravo Ultrex Abound 2.08SC	1.4 lb 24.6 fl oz	1,2,4,6,7 3,5	4396	3786	—
Bravo Ultrex Abound 2.08SC Folicur 3.6F	1.4 lb 12.1 fl oz 7.2 fl oz	1,2,6,7 3,4 5	—	—	4086
Bravo Ultrex Headline 2.09EC	1.4 lb 6.4 fl oz	1,2,6,7 3,4,5	—	—	3273

[1]Application sequence refers to the placement of a treatment application in a fungicide program.
[2]— = treatment not included in that year of the study.

Table 4. Disease Ratings and Yield of Peanut Cultivars, WGREC, 2000-2002

	—Early leaf spot[1]—			—White mold[2]—			—Yield (lb/ac)—		
Peanut cultivar	2000	2001	2002	2000	2001	2002	2000	2001	2002
Virugard	3.0	2.9	2.3	4.5	9.4	10.4	4397	3763	3954
Georgia Green	2.8	4.5	4.0	6.5	13.0	11.8	3760	3833	3755
Southern Runner	3.2	—[3]	—	8.6	—	—	4225	—	—
Florida C-99R	—	3.8	3.6	—	14.6	8.9	—	3477	3924

[1]Early leaf spot severity was visually assessed using the Florida 1 to 10 scoring system.
[2]White mold incidence was estimated immediately after plot inversion where one hit was defined as the number of consecutive symptomatic plant(s) in 1 foot of row.
[3]— = treatment not included in that year of the study.

fall rain showers in 2000, the late maturing Southern Runner peanut had a higher leaf spot rating than did Georgia Green but not the early maturing cultivar Virugard. In contrast, the lowest leaf spot ratings in 2001 and 2002 were recorded for Virugard, while those noted for Georgia Green were considerably higher. In 2001, late maturing Florida C-99R had an early leaf spot rating that was intermediate between that recorded for Virugard and Georgia Green. Florida C-99R and Georgia Green peanut cultivars had similar early leaf spot ratings in 2002.

In two of three years, the cultivar Virugard suffered less white mold damage than did Georgia Green or the late maturing Southern Runner and Florida C-99R (Table 4). In 2002, lower white mold hit counts were recorded on Florida C-99R than on the Georgia Green and Virugard peanuts.

In all three years, noticeable differences in yield were seen between the three peanut cultivars (Table 4). In 2000, yields for Virugard and Southern Runner were higher than those recorded for Georgia Green. In the following year, Virugard and Georgia Green yields were similar and higher than those for Florida C-99R. In 2002, Georgia Green yielded slightly less than Virugard and Florida C-99R.

DISCUSSION

Overall, none of the other fungicide programs consistently controlled early leaf spot better than the standard season-long Bravo Ultrex program. The 18.3 and 24.6 fluid ounces per acre Abound 2.08SC programs gave better early leaf spot control than Bravo Ultrex in one and two years, respectively, over the three-year study period. As expected, the program with a single application of Moncut 70DF at 1.4 pounds per acre, which has no activity against the causal fungi of early leaf spot, was as effective in controlling this disease as was the standard Bravo Ultrex program. However, early leaf spot ratings for the peanuts receiving four applications of the 1.4 plus 0.4 pounds per acre rate of Bravo Ultrex plus Moncut 70DF tank mixture were lower than those obtained with the Bravo Ultrex program in one of two years. In 2002, early leaf spot ratings were higher for the Folicur 3.6F-treated peanuts than those recorded for the Bravo Ultrex program, as well as the recommended Abound 2.08SC and Bravo Ultrex plus Moncut 70DF programs but not in the other two years. Folicur 3.6F has proven to be as effective in controlling early and late leaf spot as

other recommended fungicides in other 2002 and 2003 Alabama field trials *(14,15,16)*. In earlier studies, the recommended block spray program for Folicur 3.6F was as effective in controlling leaf spot diseases as Abound 2.08SC *(13)* and often gave better leaf spot control than chlorothalonil fungicides such as Bravo Ultrex, Bravo WeatherStik 6F, Echo 720 6F, or Terranil 6F *(4)*. Possible explanations for the declining effectiveness of Folicur 3.6F appears to be more related to poor rainfastness of the current formulation and rather than resistance in the target fungi. As was noted in previous Alabama *(16)* and Georgia *(10)* studies, Headline 2.09EC, which has excellent activity against both leaf spot diseases, gave better control of early leaf spot than either the recommended Folicur 3.6F and Abound 2.08SC programs.

Recommended Folicur 3.6F, Abound 2.08SC, and Bravo Ultrex plus Moncut 70DF programs greatly reduced the incidence of white mold compared to levels noted on the Bravo Ultrex-treated peanuts as was expected. Overall, Abound 2.08SC and Bravo Ultrex plus Moncut 70DF programs appeared to have a slight edge in controlling white mold over the Folicur 3.6F program. In two of three years, the 18.3 fluid ounces per acre Abound 2SC program controlled white mold better than Folicur 3.6F compared with improved control in one of two years with the 24.6 fluid ounces per acre Abound 2.08SC program. In a series of field trials in Texas *(13)*, Abound 2.08SC also was as, and sometimes more, effective in controlling white mold than the recommended Folicur 3.6F program. In 2002, both Bravo Ultrex plus Moncut 70DF tank mixtures gave better white mold control than either the recommended Abound 2.08SC or Folicur 3.6F programs. Surprisingly, Headline 2.09EC demonstrated little activity in controlling white mold on peanut. In a previous Alabama study, this fungicide was nearly as effective in most years in controlling white mold as Abound 2.08SC and Folicur 3.6F *(16)*. Additional studies need to be done in order to establish the effectiveness of this fungicide for the control of white mold on peanut.

Of the programs evaluated, only the 18.3-fluid ounces per acre Abound 2.08SC program increased yield in all three years above that recorded for the standard Bravo Ultrex program. When compared with the season-long Bravo Ultrex program, sizable yield gains were obtained with 1.4 plus 1.4 pounds per acre Bravo Ultrex plus Moncut 70DF program in two of three years and in only one of three years with recommended Folicur 3.6F program. Of the programs tested for only two years, the 1.4 plus 0.4 pounds per acre Bravo Ultrex plus Moncut 70DF and the 24.6 fluid ounces per acre Abound 2.08SC programs increased yield in two and one year(s), respectively, above those obtained with the standard calendar Bravo Ultrex program.

Yield gains obtained with the 18.3 and 24.6 fluid ounces per acre rates of Abound 2.08SC were significantly higher than for those recorded with the Folicur 3.6F and Bravo Ultrex plus Moncut 70DF program in 2000. In 2001 and 2002, yield response to the 18.3 fluid ounces per acre Abound 2.08SC and Folicur 3.6F programs was similar. Grichar et al. *(13)* also noted that yield of peanut treated with the 24.6 fluid ounce rate of Abound 2.08SC was equal to and sometimes better than that obtained with the recommended Folicur 3.6F program. While yields for peanut treated with either rate of Bravo Ultrex plus Moncut 70DF were similar to those obtained with Abound 2.08SC and Folicur 3.6F in 2001, yield gains for both Bravo Ultrex plus

Moncut 70DF programs were superior to those given by all of the other fungicide programs that were evaluated in 2002. Application rate did not have an appreciable impact on the yield gains obtained with either of the Abound 2.08SC and Bravo Ultrex plus Moncut 70DF programs.

Georgia Green was the most disease-prone of the peanut cultivars screened, while the early Virugard peanut, which probably matures before some leaf spot and white mold damage occurs, suffered less disease-related damage. In two of three years, leaf ratings for Georgia Green cultivar were higher than those recorded for Virugard and the two late maturing peanut cultivars. Virugard also suffered significantly less early leaf spot damage than Southern Runner, and Florida C-99R. Florida C-99R, which also had lower leaf spot ratings compared to Georgia Green in 2001 and 2002, may have partial resistance to early and late leaf spot *(7,12)*. White mold damage on Georgia Green was higher compared with the other peanut cultivars in one of three years. While the Southern Runner peanut reportedly has partial resistance to white mold *(2,3)*, loci counts were higher in 2000 on this peanut cultivar than on Virugard or Georgia Green. Although, Georgia Green had the lowest white mold incidence in a recent Georgia study *(2)*, this cultivar often suffered the heaviest white mold damage in the current study.

However, differences in yield between cultivars were relatively minor, Virugard consistently had the highest yields across all fungicide treatments in all three years. In 2000 and 2001, respectively, yield for Georgia Green and Florida C-99R were lower than those reported for Virugard. Lower leaf spot and white mold damage ratings largely account for the superior yield response for Virugard.

SUMMARY

Over the three-year test period, the 18.3 fluid ounces per acre Abound 2.08SC program gave the most consistent combination of better disease control and increased yield response compared with the season-long Bravo Ultrex program. The level of white mold control and yields obtained with four-application block program with Bravo Ultrex plus Moncut 70DF at 1.4 plus 0.4 pounds per acre, respectively, were superior to those maintained with the season-long Bravo Ultrex standard. While Folicur 3.6F continued to be effective fungicide on peanut, the reason for the occasional declines in early leaf spot control noted need to be explored. Headline 2.09EC has excellent activity against early and late leaf spot but higher rates of this fungicide are needed to insure effective control of white mold on peanut. Georgia Green was more susceptible to early leaf spot and white mold than Virugard and to a lesser extent Florida C-99R. Although some year-to-year variations in yields were noted between Georgia Green and the other peanut cultivars, none had a substantial advantage in yield potential.

REFERENCES

1. Bowen, K. L., A. K. Hagan, and J. R. Weeks. 1997. Number of tebuconazole applications for maximizing disease control and yield of peanut in grower's fields in Alabama. Plant Dis. 81:927-931.

2. Branch, W. D., and T. B. Brenneman. 1996. Pod yield and stem rot evaluation of peanut cultivars treated with tebuconazole. Agron. J. 88:933-936.

3. Brenneman, T. B., W. D. Branch, and A. S. Csinos. 1990. Partial resistance of Southern Runner, *Arachis hypogaea*, to stem rot caused by *Sclerotium rolfsii.* Peanut Sci. 17:65-67.

4. Brenneman, T. B., and A. K. Culbreath. 1994. Utilizing a sterol demethylation inhibiting fungicide in an advisory program to manage foliar and soilborne diseases of peanut. Plant Dis. 78:866-872.

5. Brenneman, T. B., and A. P. Murphy. 1991. Activity of tebuconazole on *Cercosporidium personatum*, a foliar pathogen on peanut. Plant Dis. 75:699-703.

6. Brenneman, T. B., A. P. Murphy, and A. S. Csinos. 1991. Activity of tebucona zole on *Sclerotium rolfsii* and *Rhizoctonia solani,* two soilborne pathogens of peanut. Plant Dis. 75:744-747.

7. Cantonwine, E. G., A. K. Culbreath, C. C. Holbrook, and D. W. Gorbet. 2002. Response of moderately resistant peanut breeding lines and cultivars to chlorothalonil for management of early leaf spot. Proc. Am. Pnut. Res. Ed. Soc. 34:92-93 (abstr.).

8. Chiteka, Z. A., D. W. Gorbet, F. M. Shokes, T. A. Kucharek, and D. A. Knauft. 1988. Components of resistance to late leaf spot in peanut. I. Levels of vari ability-implications for selection. Peanut Sci. 15-25-30.

9. Culbreath, A. K., and T. B. Brenneman. 2001. Peanut leaf spot response to rates and application timing of BAS 500 fungicide. Phytopathology 91:S201-202 (abstr.).

10. Culbreath, A. K., and T. B. Brenneman. 2002. Management of early leaf spot of peanut with pyraclostrobin as affected by rate and spray interval. Online. Plant Health Progress doi:10.1094/PHP-2002-1018-01-RS.

11. Culbreath, A. K., T. B. Brenneman, K. Bondari, K. L. Reynolds, and H. S. Mclean. 1995. Late leaf spot, southern stem rot, and peanut yield responses to rates of cyproconazole and chlorothalonil applied alone and in combination. Plant Dis. 79:1121-1124.

12. Gorbet, D. W., and F. M. Shokes. 2002. Registration of 'C-99R' peanut. Crop Sci. 42:2207.

13. Grichar, W. J., B. A. Besler, and A. J. Jaks. 2000. Use of azoxystrobin for dis ease control on Texas peanut. Peanut Sci. 27:83-87.

14. Hagan, A. K., K. L. Bowen, H. L. Campbell, and M. E. Rivas-Davila. 2002. Peanut disease control field trials, 2001. Alabama Agri. Exp. Sta. Entomology and Plant Pathology Deparmental Series No. 5. 40 p.

15. Hagan, A. K., K. L. Bowen, H. L. Campbell, and M. E. Rivas-Davila. 2003. Peanut disease control field trials, 2002. Alabama Agri. Exp. Sta. Entomology and Plant Pathology Deparmental Series No. 6. 43 p.

16. Hagan, A. K., H. L. Campbell, K. L. Bowen, and L. Wells. 2003. Comparison of Headline 2.09EC and recommended fungicides for disease control and yield response in peanut. AL Agri. Exp. Sta. Bul. 650. 20 p.

17. Hagan, A. K., J. E. Everest, J. R. Weeks, and D. Hartzog. 2003. Peanut IPM. Alabama Coop. Ext. Sys. 2003IPM360 24 p.

18. Hagan, A. K., J. R. Weeks, and K. L. Bowen. 1991. Effect of application tim ing and method on control of southern stem rot of peanut with foliar-applied fungicides. Peanut Sci. 18:47-50.

19. LaPrade, J., D. Hartzog, J. R. Weeks, W. S. Gazaway, J. W. Everest, and A. K. Hagan. 1999. 1996 Alabama Statewide Peanut Producer Survey for the Alabama Pesticide Impact Assessment Program. Alabama Coop. Ext. Sys. Timely Information (TI-96). 7 p.

20. Rideout, S. L., T. B. Brenneman, and A. K. Culbreath. 2002. Peanut disease management utilizing an in-furrow treatment of azoxystrobin. Online. Plant Health Progress doi:10.1094/PHP-2002-0916-01-RS.

21. Rodriguez-Kabana, R., P. A. Backman, and J. C. Williams. 1975. Determination of yield losses to *Sclerotium rolfsii* in peanut fields. Plant Dis. Rep. 59:855-858.

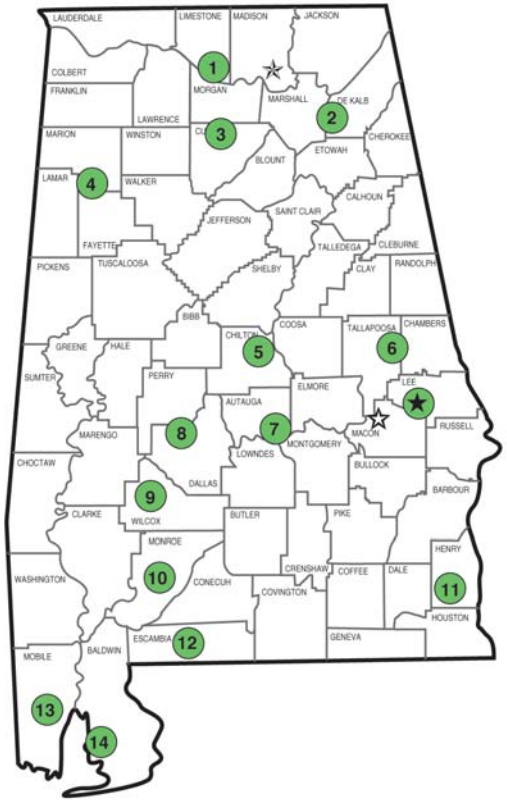
22. Smith, D. H., and R. H. Littrell. 1980. Management of peanut foliar diseases with fungicides. Plant Dis. 64:356-360.

23. Williams, E. J. and J. S. Drexler. 1981. A non-destructive method for determining peanut pod maturity. Peanut Sci. 8:134-141.

.

Alabama's Agricultural Experiment Station
AUBURN UNIVERSITY

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.