PLANT PATHOLOGY SERIES
TIMELY INFORMATION
Agriculture & Natural Resources

ALABAMA COOPERATIVE Extension SYSTEM

EXTENSION PLANT PATHOLOGY, EXTENSION HALL, AUBURN UNIVERSITY, AL 36849-5624

February 15, 2002 PP-522

Control of Leaf Spot Diseases and Southern Stem Rot on Peanut with Headline F500 fungicide

A. K. Hagan, H. L. Campbell, and K. L. Bowen
Department of Entomology and Plant Pathology
Auburn University

Peanut (*Arachis hypogaea* L.) remains an important agronomic crop in Alabama, Florida, and Georgia. In recent years, the value of Alabama's 190,000-acre peanut crop has exceeded $120 million annually. However, the diseases early leaf spot, late leaf spot, and southern stem rot may greatly reduce the profitability of Alabama's peanut crop due to lower yields and poorer nut quality (7). Also, fungicides applied for the control of the above diseases account for a sizable percentage of the peanut production budget on many Alabama farms.

Early leaf spot (*Cercospora arachidicola* Hori) and late leaf spot (*Cercosporidium personatum* Berk. & Curtis) are potentially the most destructive diseases on peanut across the southeast. Currently, early leaf spot is the most common and damaging of the two leaf spot diseases on Alabama's peanut crop. Prior to the introduction of efficacious leaf spot fungicides, harvesting operations started as soon as the crop was defoliated and weeks before the pods matured. Although losses to early and late leaf spot account for only a small percentage of Alabama's total peanut crop, failure to control these diseases with timely fungicide applications in isolated fields may reduce expected yields by 50% (14).

In Alabama, occurrence of southern stem rot (SSR), caused by the soil-borne fungus *Sclerotium rolfsii* Sacc., increases as the number of years between peanut crops decreases, and the occurrence is usually highest in fields cropped to peanut every other year (3). In addition, peanut yields sharply decline as the incidence of SSR increases (3). In isolated fields on Alabama farms, SSR-related pod losses can exceed 40% or more of anticipated yields (2). Crop rotation, the most effective weapon against SSR, is not widely used by peanut producers due to the absence of profitable alternative crops, the lack of fresh tillable land in the major peanut producing Alabama counties, and poorly structured farm programs (2,10). When used according to label directions, fungicides such as Folicur 3.6F, Abound 2.08SC, and Moncut 70W typically reduce SSR incidence by 60 to 70% and may increase pod yield by 900 to 1400 lb/A (8). Although the cultivars 'Southern Runner', 'C-99R', and 'Georgia Green' are less sensitive than 'Florunner' to SSR, none have demonstrated a high level of resistance to this disease, and significant yield gains have consistently been obtained on these cultivars with recommended fungicides (4,9).

Headline F500 (pyraclostrobin) is a new broad-spectrum strobilurin fungicide that is currently being reviewed for registration by the EPA for use on peanut (1). This fungicide is rapidly absorbed and transported translaminarly across the leaf but is not redistributed throughout the plant like a true systemic fungicide (13). Previously, selected rates of Headline F500 have been shown to have superior activity against early and late leaf spot, as well as SSR (11). Most notably, the level of leaf spot control obtained with Headline F500 applied at 3-week intervals was comparable or better than that obtained with other recommended fungicides applied at 2-week intervals (6,11). The extended residual activity of Headline F500 against leaf spot diseases provides an opportunity to reduce the number of fungicide applications typically required for effective season-long disease control on peanut (11).

The objective of this study was to assess the impact of application rate and treatment interval on the efficacy of Headline F500 for the control of leaf spot diseases and southern stem rot on peanut.

Materials and Methods

In 1999, 2000, and 2001, peanuts (*Arachis hypogaea*) cv 'Georgia Green' were planted at a rate of 5-6 seed/ft (17 seed/m) of row in an irrigated field at the Wiregrass Research and Extension Center. Planting dates in 1999, 2000, and 2001 were May 18, May 19, and May 17, respectively. Cropping history of the test areas was a minimum of 10 years in a peanut-cotton-peanut or peanut-corn-peanut rotation. The soil type was a Dothan fine sandy loam [fine-loamy, siliceous, thermic Plinthic Palendults] with less than 1% organic matter. The test areas were heavily infested with the causal fungus of southern stem rot, *S. rolfsii*, and significant southern stem rot (SSR) damage had been observed on previous peanut crops.

In late winter or early spring, the plot area was prepared for planting with a moldboard plow and disk harrow. Soil fertility and pH were maintained according to the results of a soil fertility assay conducted by the Soil Laboratory at Auburn University. In late winter or early spring, broadleaf and grass weeds were controlled by lightly incorporating a pre-emergence application of 1qt/A of Sonalan plus 1.5 pt/A of Dual with a disk harrow. At ground cracking, which was approximately 3 to 4 weeks after planting, a single broadcast application of Gramoxone Maxx at 5.5 fl oz/A or an equivalent rate of another formulation of this herbicide plus 1 pt/A of 2.4 DB, and 1 pt/A of Basagran was made. At planting, Temik 15G at rate of 5.0 lb/A was applied in-furrow to control thrips. For the remainder of the production season, escape weeds were pulled by hand. A center pivot irrigation system was used to water the plots as dictated by rainfall patterns.

The experimental design was a randomized complete block with six replications. Individual plots consisted of two 30-ft rows spaced 3.0 ft apart. Broadcast applications of all fungicides were made with a tractor-mounted four-row boom sprayer with three TX-8 hollow cone nozzles per row that were calibrated to deliver approximately 15 gal/A (140 l/ha) of spray volume per acre.

In 1999, fungicide treatments were applied at two [25, 40, 53, 68, 82, 95, and 111DAP [days after planting]], three [25, 44, 68, 88, and 111 DAP], or four [25, 53, 82, and 111 DAP] week intervals. The 7.7-fl oz/A of Headline F500 and 7.2 fl. oz./A of Folicur 3.6F were applied at spray #2,3,4,5 at two and three-week intervals and at spray #2,3,4 every four-weeks. Applications of the 4.6 fl. oz. rate of Headline F500 were made at 2 and 3-week intervals at spray #2,3,4,5. Bravo Ultrex at 1.4 lb/A was applied at spray #1 in all of the above regimes and at #6,7 on the peanuts treated at 2-week intervals. Also, a full-season, 7-spray program of the recommended 1.4 lb/A rate of Bravo Ultrex applied every 2-weeks was included.

For the 2000 trial, fungicide applications were made at two-week intervals 30, 41, 58, 72, 86, 100, and 114 DAP. Treatment regimes included 1) 1.5 pt./A Bravo 720 6F full season, 2) 1.5 pt./A Bravo 720 6F [# 1,6,7] and four-spray block of 0.45 pt./A Folicur 3.6F [#2,3,4,5], 3) 1.5 pt./A Bravo 720 6F [#1,6,7] and four-spray block of 12.2 fl. oz./A Headline F500 [#2,3,4,5], 4) 1.5 pt./A Bravo 720 6F [#1,6,7] and four-spray block of 15.2 fl. oz./A Headline F500 [#2,3,4,5], 5) 1.5 pt/A Bravo 720 6F [#1,6,7] and 9.3 fl. oz./A Headline F500 [#2,4] alternated with the 0.45 pt./A Folicur 3.6F [#3,5], 6) 1.5 pt/A Bravo 720 6F [#1,6,7] and 12.2 fl. oz./A Headline F500 [#2,4] alternated with the 0.45 pt./A Folicur 3.6F [#3,5], 7) 1.5 pt./A Bravo 720 6F [#1,6,7] and 12.2 fl. oz./A Headline F500 [#2,4] alternated with 1.5 pt./A Bravo 720 6F + 1.2 lb./A of Moncut 50W [#3,5], 8) 1.5 pt/A Bravo 720 6F [#1,2,4,6,7] and 1.5 pt/A Bravo 720 6F + 1.2 lb./A of Moncut 50W [#3,5], and 9) 1.5 pt/A Bravo 720 6F [#1,2,4,6,7] and 1.15 pt/A Abound 2.08SC [#3,5].

In 2001, the fungicides were applied at two-week intervals 32, 46, 61, 75, 90, 102, and 116 DAP or at three-week intervals 32, 53, 74, 95, and 116 DAP. Three [# 2,4,6] or four applications [#2,3,4,5] of Headline F500 at 6.4 fl. oz./A was applied at 2-week intervals, while 1.4 lb./A Bravo Ultrex filled in the remaining treatment slots. Also, applications of the 9.0 fl. oz./A Headline F500 were made at 3-week intervals [#2,3,4] after an application 1.4 lb./A Bravo Ultrex [#1]. Headline F500 at 12.2 fl. oz/A plus 1.1 lb./A of Moncut 70DF, which was applied every 2 or 3 weeks at spray #3,5 or #2,3,4, respectively, also included applications of 1.4 lb./A Bravo Ultrex as specified in Table 3. Headline F500 at 6.4 fl.oz./A, which was applied at 2-week intervals [#2,4,6], was alternated with 1.4 lb./A Bravo Ultrex + 1.1 lb./A Moncut 70DF [#3,5] and bracketed with applications of 1.4 lb./A Bravo Ultrex [#1,7]. Treatment regimes with the 0.45 pt/A Folicur 3.6F applied at 2 or 3-week intervals at spray #2,3,4,5 or #2,3,4, respectively, also included applications of 1.4 lb./A Bravo Ultrex at spray #1,6,7 or at #1, respectively. Abound 2.08SC at 1.15 pt/A applications [#3,5] were bracketed by applications of 1.4 lb./A Bravo Ultrex [#1,2,4,6,7]. A full-season program with 7 applications of the 1.4 lb./A rate Bravo Ultrex, which were made on a 2 week schedule, was included as the negative control.

Specific application dates and timing for each fungicide treatment made in 1999, 2000, and 2001 are listed in the footnotes below Table 1, Table 2, and Table 3, respectively.

Early and late leaf spot were rated simultaneously using the Florida leaf spot scoring system where 1 = no disease, 2 = very few lesions on leaves in lower canopy, 3 = few lesions on leaves in lower and upper canopy, 4 = some lesions in lower and upper canopy with light defoliation (≤10%), 5 = lesions noticeable in upper canopy with some defoliation (≤25%), 6 = lesions numerous with significant defoliation (≤50%), 7 = lesions numerous with heavy defoliation (≤75%), 8 = numerous lesions on few remaining leaves, 9 = very few remaining leaves covered with lesions, and 10 = plants dead (5). The hull scrape method was used to determine the optimum digging date (15). Incidence of SSR in the windrow was determined immediately after the peanuts were inverted by counting the number of disease loci where 1 locus was defined as the number of consecutive symptomatic plant(s) in ≤1 ft (30 cm) of row (12). In 1999, 2000, and 2001, plots were dug with a two-row digger/inverter on September 29 (131 DAP), October 10 (148 DAP), and October 5 (141 DAP), respectively. Typically, peanuts were harvested with a two-row combine approximately three to five days after plot inversion. Pods were dried to 7% moisture and weighed. In each study, significance of treatment effects was tested by analysis of variance and Fisher's Least Significance Difference (LSD) tests at the $P \leq 0.05$ level.

Results

When applied at two-week intervals, the 4.6 fl. oz./A and 7.7 fl. oz./A rates of Headline F500 gave better control of early leaf spot in 1999 than Bravo Ultrex alone (Table 1). At both rates of Headline F500, symptoms were limited to light spotting of the leaves in the lower and upper canopy, compared to moderate leaf spotting with some defoliation on the peanuts treated season-long with Bravo Ultrex. Also, the level of disease control provided by both rates of Headline F500 was similar to that given by the recommended Folicur 3.6F program. Surprisingly, the level of leaf spot control provided by both rates of Headline F500 did not greatly diminish as the interval between applications was lengthened from 2 to 3, and finally at the 7.7 fl. oz./A rate to 4-week intervals. When applied at three-week intervals, the efficacy of Folicur 3.6F for the control of leaf spot diseases did not decline, but a significant increase in leaf spotting and defoliation was recorded at the 4-week treatment interval with this fungicide. Few, if any, symptoms of late leaf spot were observed in the test plots.

In 1999, significant reductions in the incidence of SSR were obtained with all Headline F500 and Folicur 3.6F programs, compared to Bravo Ultrex alone (Table 1). Overall, Headline F500 was as effective as Folicur 3.6F in reducing the incidence of SSR. A similar level of SSR control was obtained with both rates of Headline F500 at all treatment intervals. When applied at two, three, and four-week intervals, the recommended rate of Folicur 3.6F also proved equally effective in controlling SSR.

Despite superior control of leaf spot diseases and SSR in 1999, yields of the Headline-treated peanuts generally were not significantly higher than those of peanuts treated season long with Bravo Ultrex (Table 1). Except for the 7.7 fl. oz./A rate applied at four-week intervals, yield of the Headline F500-treated peanuts was similar to that recorded for Bravo Ultrex alone. In contrast, significant yield gains were obtained with Folicur 3.6F applied at two and three-week intervals. When applied at two and three-week intervals, Folicur 3.6F-treated peanuts yielded significantly higher than those sprayed with the 4.6 fl. oz./A rate of Headline at those same treatment intervals. At the 2-week interval, yield response to Folicur 3.6F was superior to that of the 7.7 fl. oz./A rate of Headline F500, similar at the 3-week treatment interval, and significantly lower at the 4-week interval to that rate of Headline F500.

The 2000 growing season was among the driest ever recorded at the Wiregrass Research Education Center in Headline, AL. Rainfall totals for April, May, June, July, and August were well below the historical average for those months. As a result of the extended drought, overall pressure from early and late leaf spot was exceptionally low. The incidence of SSR was also lower in 2000 than in the previous year.

Although significant differences in early leaf spot severity were noted among the fungicide programs, symptoms, as indicated by disease ratings of 2.2 to 3.0, were restricted to light spotting in the lower and sometimes upper canopy (Table 2). The Bravo 720 + Moncut 50W program had a significantly higher leaf spot rating than did the peanuts treated with Headline F500 at 15.2 fl. oz./A or Headline F500 twice at 12.2 fl. oz./A and Folicur 3.6F twice at 7.2 fl. oz./A. Otherwise, the leaf spot ratings for all remaining fungicide programs were similar.

When compared with Bravo 720 alone, all fungicides significantly reduced the SSR incidence (Table 2). Four applications of Headline F500 at 12.2 and 15.2 fl. oz./A were as effective as the programs that included recommended rates of Folicur 3.6F, Abound 2.08SC and Bravo 720 + Moncut 50W in controlling SSR on peanut. Also, the programs where the two applications of the 9.3 or 12.2 fl. oz./A rates of Headline were alternated with Folicur 3.6F or Bravo 720 + Moncut 50W gave the same level of SSR control as four applications of the 12.2 and 15.2 fl. oz./A rates of Headline F500.

The level of SSR control given by Headline F500 alone or when alternated with Folicur 3.6F or Bravo 720 + Moncut 50W, as well as by Folicur 3.6F, Abound 2.08SC, and Bravo 720 + Moncut 50W were reflected in significantly higher yields than those obtained with Bravo 720 alone (Table 2). Yield in plots treated with both rates of Headline F500 alone or when alternated with Folicur 3.6F or Bravo 720 + Moncut 50W did not significantly differ. In addition, yield gains observed in the Headline F500-treated plots were similar to those recorded with recommended Folicur 3.6F, Abound 2.08SC, and Bravo 720 + Moncut 50W programs.

While rainfall totals for April and May 2001 were well below normal, precipitation levels for the rest of the production season were sufficient for high peanut yields and disease development. As indicated by a disease rating of 4.5, moderate leaf spotting and light defoliation was noted on the peanuts treated season-long with Bravo Ultrex alone (Table 3). When compared with the Bravo Ultrex standard and Bravo Ultrex + Moncut 70DF, three or four applications of Headline F500 at 6.4 fl. oz./A, Headline F500 + Moncut 70DF, and the 6.4 fl. oz./A rate of Headline F500 alternated with Bravo Ultrex + Moncut 70DF applied at 14-day intervals gave superior leaf spot control. All three Headline F500 programs gave the same level of leaf spot control as was recorded with the recommended Abound 2.08SC or Folicur 3.6F programs. When applied at three-week intervals, the 9.0 fl. oz./A rate of Headline F500 and Folicur 3.6F was as effective in controlling leaf spot diseases as the standard Bravo Ultrex program but significantly better disease control was obtained with the Headline F500 + Moncut 70DF program.

As noted in the previous two years, significant reductions in SSR incidence were noted in the plots treated with Headline F500 alone or when alternated with Moncut 70DF, Folicur 3.6F, Abound 2.08SC, or Bravo Ultrex + Moncut 70DF (Table 3). When applied at two-week intervals, three or four applications of Headline F500 controlled SSR was as effective as recommended rates of Bravo + Moncut 70DF, Abound 2.08SC, and Folicur 3.6F. Two applications of Headline F500 + Moncut 70DF and alternation of Heritage F500 and Bravo Ultrex + Moncut 70DF gave better SSR control than four applications but not three applications of the 6.4 fl. oz./A rates of Headline F500. Incidence of SSR in the plots receiving three applications of the 9.0 fl. oz./A rate of Headline F500 at three-week intervals did not differ significantly from that of peanuts treated with Heritage F500 at two-week intervals. Also, no decline in the level of SSR control was noted when the treatment interval with Folicur 3.6F was increased to three weeks and the number of applications reduced from four to three.

When compared with Bravo Ultrex alone, yield was significantly higher in the plots treated at two-week intervals with three or four applications of Headline F500. Significantly higher yields were also noted in plots treated with Abound 2.08SC, Folicur 3.6F, Headline F500 + Moncut 70DF, and alternation of Headline F500 with Bravo Ultrex + Moncut 70DF (Table 3). Yield gains observed where the 6.4 fl. oz./A rate of Headline F500 was alternated with Bravo Ultrex + Moncut 70DF were significantly above those obtained with four but not three applications of the same rate of Headline F500. Yield increases, which were reported for the three or four application programs with Headline F500, were similar to those noted with recommended Abound 2.08SC and Folicur 3.6F programs. Peanuts receiving three Headline F500 applications at two-week intervals had significantly higher yields than those treated at the same schedule with Bravo Ultrex + Moncut 70DF.

On a three-week treatment schedule, yield of peanuts treated with three applications of the 9.0 fl. oz./A rate of Headline F500 were significantly lower than the yield reported for three applications of the lower rate of the same fungicide applied on a two-week schedule (Table 3). Despite similar levels of SSR control, peanuts treated at two-week intervals with Folicur 3.6F or Headline F500 + Moncut 70DF yielded significantly higher than those treated with the same fungicide or a Headline F500 tank-mixture on a three-week schedule.

Discussion

Portillo *et al* (11) previously noted that Headline F500 has activity against several destructive diseases of peanut that is equal and in some cases superior to the efficacy of available fungicides. In this study, Headline F500 clearly demonstrated activity against early leaf spot and SSR on the 'Georgia Green' peanut.

When applied from 4.6 to 15.2 fl. oz./A on a 2-week schedule, Headline F500 consistently gave better control of early leaf spot than the standard 7-spray Bravo Ultrex program or those programs that included applications of Bravo Ultrex + Moncut 50W or Moncut 70DF. On the 'Georgia Green' peanut, Culbreath and Brenneman (6) also obtained similar results in their comparison of Bravo Ultrex and Headline F500 against this same disease. In all three years, the level of early leaf spot control provided by Headline F500 when applied over a range of application rates at two-week intervals was at least equal and sometimes better than that maintained with the recommended Folicur 3.6F and Abound 2.08SC programs. As previously noted (6), Headline F500 applied at three-week intervals was as effective in controlling early leaf spot as recommended rates of Bravo Ultrex, Folicur 3.6F, and Abound 2.08SC applied every two weeks. When applied at four-week intervals in 1999, Folicur 3.6F was far less active against early leaf spot than the 7.7 fl. oz./A rate of Headline F500 applied on the same schedule. Our data supports the conclusion of Portillo *et al* (11) that the superior efficacy of Headline F500 at three and four-week spray intervals raises the possibility of reducing the total number of fungicide applications without sacrificing leaf spot control or pod yields.

In all three years, the efficacy of Headline F500 for the control of SSR was usually equal to that provided by the recommended Folicur 3.6F, Abound 2.08SC, or Bravo + Moncut 50W/ Moncut 70DF programs. In a previous study, this fungicide alone or when alternated with other registered fungicides proved as effective as the above fungicides in controlling SSR in peanut (11). Most notably, Headline F500 at 4.6 and 7.7 fl. oz./A in 1999 and 6.4 fl. oz./A in 2001 was as effective as the latter fungicide standards in controlling SSR. Alternating Headline F500 with Moncut 50W/70DF or applying a tank-mixture of Headline F500 with Moncut 70DF gave better SSR control than Headline F500 alone in 2001 but due to low disease pressure not in 2000. In the 2001 trial, application number did not have a noticeable impact on the effectiveness of 6.4 fl oz/A Headline 500F for the control of SSR. Frequent showers in July and August, which facilitated the redistribution of Headline F500 from the foliage to soil surface around the collar and vines, may be responsible for the effectiveness of the three-application program against SSR.

In 2000 and 2001, the combination of early leaf spot and SSR control provided by Headline F500 was reflected in higher yields compared with those of the Bravo Ultrex standard. In addition, yield gains recorded in both years with Headline F500 at the 6.4, 12.2, and 15.2 fl oz./A rates when applied at two-week intervals were usually comparable to those obtained with the recommended Folicur 3.6F, Abound 2.08SC, and Bravo + Moncut 50W/70DF programs. Typically, alternating Headline F500 with Folicur 3.6F or Moncut 50W/70DF, as well as application of the Headline F500 + Moncut 70DF tank-mix combination did not result in an increase in yield above that of peanuts treated with selected rates of Headline F500 alone. In 1999, however, applications of the 4.6 and 7.7 fl. oz./A rates of Headline F500 failed to stimulate a significant increase in yield above that of the Bravo Ultrex alone-treated peanuts, despite significant reductions in the ratings for early leaf spot and/or SSR. In contrast, significant yield increases were obtained in all three years with the recommended rates of Folicur 3.6F, as well as with Abound 2.08SC in the 2000 and 2001 trials, compared with those recorded for the Bravo Ultrex/500F standard. In previously published reports, the impact of application rate or treatment interval on the yield of Headline F500-treated peanut was not addressed, nor was the yield response to Headline F500 and other recommended fungicides compared (6,11).

As previously noted (1,6,11), the efficacy of Headline F500 for the control of leaf spot and SSR on peanut was equal and in some cases superior to that demonstrated by registered fungicides. Despite significant reductions in the incidence of these diseases, this fungicide failed to consistently increase pod yields in all three years above those recorded for the standard, season-long Bravo Ultrex program. As a result, further studies need to be conducted to clearly establish the optimum application rate needed to obtain effective control of leaf spot diseases and SSR, as well as significantly increase peanut yield. Also, additional information concerning the impact of treatment interval on the efficacy of Headline F500 for the control of leaf spot diseases and SSR must be collected.

Literature Cited

1. Bardinelli, T. R., J. S. Barnes, and H. L. Ypema. 2001. Pyraclostrobin (BAS 500 F): Update on BASF's broad-spectrum strobilurin fungicide. Phytopathology 91:S5.

2. Bowen, K. L., A. K. Hagan, and J. R. Weeks. 1992. Seven years of *Sclerotium rolfsii* in peanut fields: yield losses and means of minimization. Plant Dis. 76:982-985.

3. Bowen, K. L., A. K. Hagan, and J. R. Weeks. 1996. Soil-borne pests of peanut in growers fields with different cropping histories in Alabama. Peanut Sci. 23:36-42.

4. 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. 18:65-67.

5. 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 variability-implications for selection. Peanut Sci. 15:25-30.

6. 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.

7. Hagan, A. K. 1998. Foliar diseases of peanut. Al. Coop. Ext. Sys. Cir. ANR-369. 6 pp.

8. Hagan, A. K., K. L. Bowen, L. Campbell, M. E. Rivas-Davila, M. Pegues, and L. Wells. 2000. Begin the regime: fungicide regimes for foliar and soil disease control in peanut compared. Alabama Agri. Exp. Sta. Auburn University Highlights of Agriculture 47(4):20-22.

9. Hagan, A. K., B. Gamble, and L. Wells. 1999. Efficacy of recommended fungicide treatments for the control of foliar and soilborne diseases on three cultivars of peanut. Proc. Am. Pnut. Res. Ed. Soc. 30:25.

10. Melouk, H. A. and P. A. Backman. 1995. Management of soilborne pathogens. Pages 75-81, in Peanut Health Management, H. A. Melouk and F. M. Shokes, eds. APS Press, St. Paul, MN.

11. Portillo, H. E., R. R. Evans, J. S. Barnes, and R. E. Gold. 2001. F500, a new broad-spectrum fungicide for control of peanut diseases. Phytopathology 91:S202.

12. 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.

13. Stierl, R., E. J. Butterfield, H. Koehle, and G. Lorenz. 2000. Biological chacterization of the new strobilurin fungicide BAS 500 F. Phytopathology 90:S74.

14. Shokes, F. M. and A. K. Culbreath. 1997. Early and late leaf spots. Pages 17-20, in Compendium of Peanut Diseases, 2nd Edition, N. Kokalis-Burelle, D. M. Porter, R. Rodriguez-Kabana, D. H. Smith, and P. Subrahmanyam, eds. APS Press, St. Paul, MN.

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

Table 1. Impact of application rate and treatment interval on the efficacy of Headline F500 for the control of leaf spot diseases and southern stem rot on peanut at the Wiregrass Research and Extension Center, 1999.

Program	Rate Product/A	Timing	Interval weeks[w]	Leaf Spot Rating[x]	SSR # loci/60 ft[y]	Pod Yield Lb/A
Bravo Ultrex	1.4 lb	1 to 7	2	5.0 ab[z]	21.8 a	3070 c
Bravo Ultrex	1.4 lb	1,6,7	2	3.0 cd	16.5 b	3350 c
Headline F500	4.6 fl oz	2 to 5				
Bravo Ultrex	1.4 lb	1,6,7	2	2.8 d	12.0 bcd	3568 abc
Headline F500	7.7 fl oz	2 to 5				
Bravo Ultrex	1.4 lb	1,2,7	2	4.0 bcd	11.3 cd	4387 a
Folicur 3.6F	0.45 pt	3 to 6				
Bravo Ultrex	1.4 lb	1	3	4.0 bcd	15.8 bc	3122 a
Headline F500	4.6 fl oz	2 to 5				
Bravo Ultrex	1.4 lb	1	3	4.5 bc	14.3 bc	3557 abc
Headline F500	7.7 fl oz	2 to 5				
Bravo Ultrex	1.4 lb	1	3	4.5 bc	8.8 d	4045 ab
Folicur 3.6F	0.45 pt	2 to 5				
Bravo Ultrex	1.4 lb	1	4	3.8 bc	14.5 bc	3972 b
Headline F500	7.7 fl oz	2 to 4				
Bravo Ultrex	1.4 lb	1	4	6.3 a	15.8 bc	3205 c
Folicur 3.6F	0.45 pt	2 to 4				
LSD (*P*=0.05)	---	---	---	1.6	5.0	579

[w]Spray dates were as follows:

14-day interval: 1 = June 14, 2 = June 29, 3 = July 12, 4 = July 27, 5 = August 10, 6 = August 23, and 7 = September 7.

21-day interval 1 = June 14, 2 = July 2, 3 = July 27, 4 = August 16, and 5 = September.

28-day interval: 1 = June 14, 2 = July 12, 3 = August 10, and 4 = September 7.

[x]On September 23 (129 DAP), early and late leaf spot severity was assessed using the Florida leaf spot scoring system.

[y]Southern stem rot (SSR) incidence was logged immediately after plot inversion on September 29 (135 DAP) as the number of disease loci per 60 ft of row where 1 locus = 1 foot of consecutive SSR damaged plants in a row.

[z]Mean separation within columns was according to Fisher's Protect Least Significant Difference (LSD) test (*P*=0.05).

Table 2. Efficacy of selected rates of Headline F500 alone or in a combination program with other fungicides for the control of leaf spot diseases and southern stem rot on peanut at the Wiregrass Research and Extension Center, 2000.

Program	Rate/A	Timing[w]	Leaf Spot Rating[x]	SSR # loci/60 ft[y]	Pod Yield Lb/A
Bravo 720	1.5 pt	1 to 7	2.2 c[z]	9.3 a	2759 b
Bravo 720 Headline F500	1.5 pt 12.2 fl oz	1,6,7 2 to 5	2.3 bc	6.5 b	3848 a
Bravo Ultrex Headline F500	1.5 pt 15.2 fl oz	1,6,7 2 to 5	2.2 c	5.0 b	3787 a
Bravo 720 Headline F500 Folicur 3.6F	1.5 pt 9.3 fl oz 7.2fl oz	1,6,7 2,4 3,5	2.5 abc	6.0 b	4009 a
Bravo 720 Headline F500 Folicur 3.6F	1.5 pt 12.2 fl oz 7.2 fl oz	1,6,7 2,4 3,5	2.3 bc	6.0 b	3882 a
Bravo 720 Headline F500 Bravo 720 + Moncut 50W	1.5 pt 12.2 fl oz 1.5 pt + 1.2 lb	1,6,7 2,4 3,5	2.8 ab	4.6 b	3678 a
Bravo 720 Folicur 3.6F	1.5 pt 7.2 fl oz	1,6,7 2 to 5	2.5 abc	6.2 b	3882 a
Bravo 720 Abound 2.08SC	1.5 pt 1.15 pt	1,2,4,6,7 3,5	2.7 abc	6.5 b	3497 a
Bravo 720 Bravo 720 + Moncut 50W	1.5 pt 1.5 pt + 1.2 lb	1,2,4,6,7 3,5	3.0 a	6.7 b	3824 a
LSD (*P*=0.05)	---	---	0.5	2.2	641

[w]Spray dates were 1 = June 19, 2 = June 30, 3 = July 17, 4 = July 31, 5 = August 14, 6 = August 28, and 7 = September 11.
[x]On September 26 (131 DAP), early and late leaf spot severity was assessed using the Florida leaf spot scoring system.
[y]Southern stem rot (SSR) incidence was logged immediately after plot inversion on October 10 (148 DAP) as the number of disease loci per 60 ft of row where 1 locus = 1 foot of consecutive SSR damaged plants in a row.
[z]Mean separation within columns was according to Fisher's Protect Least Significant Difference (LSD) test (*P*=0.05).

Table 3. Effect of application rate and interval on the control of leaf spot diseases and southern stem rot on peanut with Headline F500 at the Wiregrass Research and Extension Center, 2001.

Program	Rate/A	Timing	Interval weeks[w]	Leaf Spot Rating[x]	SSR # loci/60 ft[y]	Yield lb/A
Bravo Ultrex	1.4 lb	1 to 7	2	4.5 ab	16.5 a	3906 e
Bravo Ultrex Bravo Ultrex + Moncut 70DF	1.4 lb 1.4 lb + 1.1 lb	1,2,4,6,7 3,5	2	4.8 a	7.7 bcde	4141 de
Bravo Ultrex Abound 2.08SC	1.4 lb 1.15 pt	1,2,4,6,7 3,5	2	3.8 cd	9.8 bcd	4653 bc
Bravo Ultrex Headline F500	1.4 lb 6.4 fl oz	1,6,7 2 to 5	2	3.0 f	11.3 b	4521 bcd
Bravo Ultrex Headline F500	1.4 lb 6.4 fl oz	1,3,5,7 2,4,6	2	3.3 ef	8.7 bcde	4895 ab
Bravo Ultrex Folicur 3.6F	1.4 lb 0.45 pt	1,6,7 2 to 5	2	3.7 de	7.8 bvfr	4584 bcd
Bravo Ultrex Headline F500 + Moncut 70 DF	1.4 lb 12.2 fl oz + 1.1 lb	1,2,4,6,7 3,5	2	3.0 f	5.5 e	5012 ab
Bravo Ultrex Headline F500	1.4 lb 9.0 fl oz	1 2 to 4	3	4.2 bc	7.7 bcde	4252 cde
Bravo Ultrex Folicur 3.6F	1.4 lb 0.45 pt	1 2 to 4	3	4.8 a	11.0 bc	3754 e
Bravo Ultrex Headline F500 + Moncut 70 DF	1.4 lb 12.2 fl oz + 0.5 lb	1 2 to 4	3	3.8 cd	7.2 cde	4238 cde
Bravo Ultrex Headline F500 Bravo Ultrex + Moncut 70DF	1.4 lb 6.4 fl oz 1.4 lb + 1.1 lb	1,7 2,4,6 3,5	2	3.0 f	6.5 de	5102 a
LSD (*P*=0.05) ---		---	---	0.4	4.0	505

[w]Spray dates were as follows:

14-day interval: 1 = June 19, 2 = July 3, 3 = July 18, 4 = August 1, 5 = August 16, 6 = August 28, and 7 = September 11.

21-day interval 1 = June 19, 2 = July 10, 3 = July 31, 4 = August 21, and 5 = September 11.

[x]On September 20 (126 DAP), early and late leaf spot severity was assessed using the Florida leaf spot scoring system.

[y]Southern stem rot (SSR) incidence was logged immediately after plot inversion on October 5 (141 DAP) the number of disease loci per 60 ft of row where 1 locus = 1 foot of consecutive SSR damaged plants in a row.

[z]Mean separation within columns was according to Fisher's Protect Least Significant Difference (LSD) test (*P*=0.05).