Evaluation of Criteria for the Utilization of Peanut Leafspot Advisories in Virginia

P. M. Phipps and N. L. Powell

Associate professor of plant pathology, Tidewater Research and Continuing Education Center, Suffolk, VA 23437; and associate professor of agronomy, Virginia Polytechnic Institute and State University, Blacksburg 24061.

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ABSTRACT

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The utility of peanut leafspot advisories developed by a computerized agro-environmental monitoring system was assessed in field trials from 1979 to 1982. The total number of fungicide applications according to leafspot advisories averaged 4.25 fewer per season than applications on a conventional, 14-day schedule. Leafspot incidence was generally greater in plots sprayed according to advisories, but peanut yields did not differ significantly from yields where the 14-day schedule was used. Both spray programs suppressed leafspot disease and improved yield in comparisons to untreated controls. Fungicide selection, delays in application, and cultivar susceptibility were found to affect the degree of leafspot control; but none of these factors precluded utilization of leafspot advisories for prevention of losses in crop yield or value. Rainfall immediately following fungicide application was believed to cause some reduction in performance of fungicides applied according to leafspot advisories. Leafspot advisories have been issued daily in Virginia from 10 June through 25 September since 1981. Increasing numbers of growers are utilizing these advisories as an integral part of strategies for leafspot control.

Additional key words: groundnut, *Arachis hypogaea*, early leafspot, *Cercospora arachidicola*, late leafspot, *Cercosporidium personatum*.

Early and late leafspot caused in peanut by *Cercospora arachidicola* Hori and *Cercosporidium personatum* (Berk. & Curt.) Deighton, respectively, have major economic significance in all peanut-producing areas of the world. Both diseases may cause yield losses ranging from <1% to >50%, depending on disease pressure and management (14). Fungicides are used extensively for leafspot control, because of inadequate disease resistance in commercial peanut cultivars. Following the advent of organic fungicides for leafspot control in the early 1970s, growers in the United States have routinely applied these fungicides at 10- to 14-day intervals beginning as early as 30–40 days after planting and continuing until 14–21 days prior to harvest. Six or more fungicide applications are common in a growing season, when a 14-day spray program is followed.

The meteorological conditions that trigger infection and secondary spread of leafspot in peanut fields were defined by Jensen and Boyle (3,4). Their disease-forecasting system focused on the duration of periods with relative humidity above 95% and minimum air temperature during such periods as determinants for leaf infection. Beginning in 1968, the forecasting system was used to develop daily advisories for producers in Georgia. The system was computerized to produce worded advisories in 1971 (7). No reports on the utility of leafspot advisories in Georgia, or assessments of criteria for practical usage in strategies to control leafspot were found in the literature. The availability of fungicides which provide leafspot suppression when applied on a 10- to 14-day schedule has been cited as responsible for nonacceptance of the system by producers in Georgia (14).

As a result of cooperative research agreements between Virginia Polytechnic Institute and the National Aeronautics and Space Administration, an Agro-Environmental Monitoring System (AEMS) was established in Virginia and became operational in 1976 (13). As a computerized system with automated electronic sensors and microprocessors for data collection at each monitoring station, this system offered distinct advantages over hygrothermographs and clerical assimilation of data as a means of developing leafspot advisories. Currently, intensive efforts are underway to utilize AEMS data for predicting disease and insect outbreaks, scheduling irrigation, and developing crop growth models.

This paper reports on the utility of peanut leafspot advisories developed by AEMS in Virginia and discusses criteria that may have significant impact on the performance of fungicides applied according to leafspot advisories.

MATERIALS AND METHODS

AEMS units in Suffolk and Blackstone, VA, were utilized to collect data and develop advisories for leafspot control in the eastern and western halves of the Virginia peanut production area, respectively. Daily advisories were obtained at 1600 hours by processing data according to a computer program described previously (7). Fungicides were applied to peanuts following an AEMS advisory of favorable conditions for infection and secondary spread of disease based upon data from the weather station nearest test plots. Advisories from the more distant weather station were ignored. Guidelines for fungicide application according to advisories included: application of sprays within 1–5 days after a favorable advisory, but not more frequently than intervals of 10 days; application of sprays after foliage was dry and as soon as soil conditions permitted entry of equipment into a field; and use of fungicides at rates specified by manufacturers.

Several on-farm field experiments were conducted at different locations annually between 1979 and 1982 to evaluate the utility of leafspot advisories. Peanuts were planted in early May each year. Plots consisted of two rows (91-cm apart and 12.2-m long), planted with 120 seeds per row. A randomized complete block design with four replications was used. Except for fungicide applications to control leafspot, standard practices for peanut production and management were followed each year. Herbicides (vernolate,

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alachlor, dinoseb plus alanap, bentazon), nematicide (fenamiphos), insecticides (aldicarb, carbaryl, fonofos), and fertilizers (calcium sulfate, boron, manganese) were applied routinely according to recommendations of the Virginia Cooperative Extension Service. PCNB as 10% granules was applied at 112 kg/ha to all plots about 10 wk after planting for the suppression of southern stem rot, which is caused by *Sclerotium rolfsii*.

Florigiant peanut was used in tests to evaluate fungicide performance and spray schedules. Unsprayed pairs of border rows separated adjacent plots in these tests and served to minimize interactions between plots. Evaluations to assess performance of various commercial cultivars of Virginia-type peanuts were made with cultivars planted as two-row subplots in main plots treated as follows: no fungicide treatment; benomyl as 50W plus sulfur as 718 g/L applied at 0.56 kg and 4.68 L/ha, respectively, according to guidelines for use of leafspot advisories; and benomyl plus sulfur at the same rate applied on a conventional 14-day schedule. A pair of Florigiant border rows separated main plots and each border row was treated the same as the adjacent main plot to minimize interactions between main plots.

Sprays were applied in fungicide evaluation studies with a CO_2 pressure-regulated, backpack sprayer. Two rows of peanuts were sprayed simultaneously with three D2-13 (disc-core combination) nozzles per row. Spray nozzles delivered 140 L of liquid per hectare at 345 kPa of pressure. Fungicides were applied with a tractor-mounted sprayer in tests to evaluate the response of cultivars to spray programs. This sprayer delivered a similar quantity of spray at 414 kPa with three, D3-23 (disc-core combination) nozzles per row of peanuts.

Disease assessments were made at about 12, 16, and 20 wk after planting. Leafspot incidence (percentage of leaflets with leafspot symptoms) and defoliation (percentage of leaflets shed as a result of leafspot) were estimated visually. No attempt was made to distinguish between early and late leafspot diseases. Arc sine transformations were performed on percent data prior to analysis for significant differences at $P = 0.05$.

Plots were dug between 135 and 145 days after planting with a commercial digger-inverter and picked with a commercial combine within 5–10 days after digging. Peanuts were then dried to near 10% moisture (w/w), plot weights were recorded, and crop value was determined in accordance with Federal-State Inspection Service methods for any given year. Significant differences in disease, yield, and crop value data among treatments were determined according to Duncan's multiple range test at $P = 0.05$.

RESULTS AND DISCUSSION

In annual tests at different locations from 1979 to 1982, the yield of Florigiant peanut sprayed with benomyl plus sulfur according to leafspot advisories or according to a 14-day schedule were not significantly different (Table 1). Both spray programs increased yield consistently in comparison to the unsprayed check, and during the 4-year period the increase was significant. No consistent differences in the 14-day and the advisory spray programs were found in comparisons of kernel quality factors or value per kilogram in the 4 years of this study. Leafspot incidence in unsprayed plots was heavy and caused excessive defoliation in 1979, 1981, and 1982. A prolonged drought suppressed leafspot incidence and defoliation as well as yield and value in 1980. Leafspot incidence and defoliation in all years, except 1980, were significantly greater in unsprayed plots than in fungicide-sprayed plots by late July or early August. Fungicide applications according to leafspot advisories suppressed infection and defoliation about the same as applications on a 14-day schedule until early September each year. Assessments in late September or early October always indicated greater suppression of leafspot incidence by fungicide applications on a 14-day schedule, but little or no improved suppression of defoliation in comparison to fungicide applications according to leafspot advisories (Table 1). These data suggest that leafspot infection and defoliation must exceed a time-dependent threshold to cause losses in crop yield. Application of fungicides according to leafspot advisories offers an effective means of suppressing disease to levels below this threshold until harvest in Virginia; based on evaluations for 4 yr at various locations and in fields with diverse cropping histories.

TABLE 1. Comparison of fungicide spray programs for control of leafspot on Florigiant peanuts in Virginia[w]

Spray program[x]	Total no. of sprays	Leafspot incidence (%)[y]	Defoliation (%)[y]	Yield (kg/ha)	Value ($/kg)
1979[z]					
14-Day	7	15 c	2 c	3,535 a	0.471 b
Advisory	4	68 b	15 b	3,573 a	0.489 a
Untreated check	0	99 a	86 a	2,529 a	0.496 a
1980					
14-Day	7	0 b	0 a	1,908 a	0.450 a
Advisory	1	37 a	0 a	1,878 a	0.485 a
Untreated check	0	31 a	0 a	1,152 a	0.462 a
1981					
14-Day	7	3 c	1 b	5,517 a	0.460 ab
Advisory	3	26 b	4 b	5,527 a	0.443 b
Untreated check	0	91 a	50 a	4,980 a	0.466 a
1982					
14-day	6	26 b	9 b	4,870 a	0.628 a
Advisory	2	48 b	11 b	4,908 a	0.617 a
Untreated check	0	97 a	66 a	3,789 b	0.608 b
Mean (4-yr)					
14-Day	6.75	11 c	3 b	3,958 a	0.502 a
Advisory	2.50	45 b	8 b	3,972 a	0.509 a
Untreated check	0	80 a	51 a	3,113 b	0.508 a

[w] Means for a given year or period, within a column, followed by the same letter are not significantly different at $P = 0.05$ according to Duncan's multiple range test.

[x] Benomyl as 50W and sulfur as 718 g/L were applied in each spray application at 0.56 kg and 4.68 L/ha, respectively. The 14-day spray schedule began the last week in June and continued until 14–21 days prior to harvest. Advisory program sprays were applied not later than 5 days after favorable weather conditions for secondary spread and infection by leafspot fungi, but not more frequently than intervals of 10 days.

[y] Visual estimates of percent of leaflets with leafspot symptoms and percent of leaflets shed as a result of leafspot were made just prior to harvest in late September or early October each year.

[z] Test location and crop history: 1979 test was ~28 km from the weather monitor and planted with peanuts annually since 1968; 1980 test was ~25 km from the weather monitor and planted with peanuts annually since 1978; 1981 test was ~0.5 km from the weather monitor and planted to a corn/peanut rotation; 1982 test was ~10 km from weather monitor and planted to a corn/peanut rotation.

The timing of fungicide spray application was demonstrated to be an important criterion in leafspot control on Florigiant peanut in 1981 (Table 2). Three sprays applied on the basis of leafspot advisories suppressed leafspot and defoliation to levels obtained with five sprays on a 21-day schedule. As the interval between calendar sprays was increased from 14 days to 21, 28, and 42 days, leafspot incidence and defoliation increased. These data support the contention that application of fungicides following periods of weather conditions conducive to leaf infection and secondary spread of leafspot is more important in leafspot control than the number of spray applications or their frequency in a given season.

The impact of delays in fungicide application following advisories of favorable weather conditions for infection by leafspot fungi was assessed in 1981 and 1982. No distinct trends suggesting a reduction in disease suppression or loss of yield and value as a result of leafspot were apparent with delays of up to 8 days in either year (Table 3). Significant differences in data associated with various delays in fungicide application could not be explained solely on the basis of leafspot incidence or defoliation. Weather immediately following fungicide applications was believed to be responsible for some of the variation in disease symptoms. Rainfall in 1981 occurred on day 1 (7.6 mm) and day 2 (6.6 mm) after the first no-delay treatment; on day 3 (23.6 mm), day 7 (2.5 mm) and day 8 (1.0 mm) after the second no-delay treatment; and on day 1 (2.8 mm), day 3 (12.7 mm) and day 8 (7.4 mm) after the third no-delay treatment. In 1982, rainfall was recorded on day 1 (19.1 mm) and day 7 (2.3 mm) after the first no-delay treatment, and on day 7 (5.1 mm) after the second no-delay treatment. The impact of rainfall on fungicide efficacy remains undefined and is complicated by variations in time, amount, and intensity after fungicide application as well as the physical and chemical properties of fungicides. An understanding of this variable will require further investigation.

A comparison of popular registered fungicides and spray programs in 1981 and 1982 indicated that fungicides commonly used for leafspot control in Virginia were effective in preventing yield losses caused by leafspot diseases (Table 4). Chlorothalonil was consistently more effective in the suppression of leafspot incidence and defoliation in comparisons of fungicides sprayed according to advisories. A low incidence and severity of Sclerotinia blight, caused by *Sclerotinia minor*, was noted in all plots in both years. The overall impact of this disease on yields was believed to be minimal, but may have caused some yield suppression in plots treated with chlorothalonil (9,10).

Results of comparisons including numerous registered fungicides as well as selected experimental materials in 1982 demonstrated that product selection is not a major factor affecting the utility of leafspot advisories in Virginia (Table 5). Although some fungicide treatments suppressed leafspot and defoliation more than others, all chemicals tested increased yield significantly in comparison to the unsprayed check.

The response of peanut cultivars to fungicide spray programs was assessed in 1981 and 1982. Results in both years were similar, but disease pressure was more intense in 1982. Florigiant and VA 81B were found to be highly susceptible to leafspot, whereas NC 7, Keel 29, NC 6, NC 5, and Tifton 8 exhibited significant degrees of resistance (Table 6). No significant yield or value loss occurred as a result of spraying any cultivar according to leafspot advisories in either year, based on comparisons to application of sprays on a 14-day schedule. The relatively high degree of leafspot resistance exhibited by NC 5 has been reported previously (5). Tifton 8 also exhibited high levels of resistance to leafspot. This cultivar represents an elite source of germ plasm for improving commercial cultivars, because of its resistance to other disease (1) and insect pests (2). Late maturity as well as substandard quality factors have precluded development of Tifton 8 for commercial planting (R. W. Mozingo, *personal communication*).

Data obtained in the current study support a previous conclusion

TABLE 2. Comparison of leafspot control in Florigiant peanuts sprayed with fungicides according to leafspot advisories and various calendar spray programs in 1981[x]

Spray program[y]	Total no. of sprays	Leafspot incidence (%)[z]	Defoliation (%)[z]	Yield (kg/ha)	Value ($/kg)
Advisory	3	35 d	5 d	4,867 a	0.505 a
14-Day	7	19 e	2 d	5,301 a	0.514 a
21-Day	5	41 d	5 d	4,867 a	0.504 a
28-Day	4	68 c	20 c	4,816 a	0.516 a
42-Day	3	89 b	31 b	4,740 a	0.515 a
Unsprayed	0	98 a	70 a	4,024 b	0.516 a

[x] Means in columns followed by the same letter are not significantly different at $P = 0.05$ according to Duncan's multiple range test.

[y] Benomyl as 50W and flowable sulfur at 718 g/L were applied in each spray application at 0.56 kg/ha and 4.68 L/ha, respectively. Advisory spray program dates: 6 July, 20 July, and 12 August. All calendar sprays began on 24 June.

[z] Estimates of percent of leaflets with leafspot symptoms and percent of leaflets shed as a result of leafspot were made 28 September.

TABLE 3. The effect of delays in fungicide application after a spray is indicated by the advisory on control of leafspot in Florigiant peanuts[x]

Spray program[y]	Period of delay	Leafspot incidence (%)[z]	Defoliation (%)[z]	Yield (kg/ha)	Value ($/kg)
1981					
Advisory	0 days	8 bc	1 b	6,002 a	0.476 a
Advisory	2 days	10 bc	2 b	5,312 a-c	0.480 a
Advisory	4 days	10 bc	1 b	5,248 bc	0.478 a
Advisory	6 days	8 bc	1 b	5,005 c	0.492 a
Advisory	8 days	22 b	3 b	5,657 a-c	0.486 a
14-Day	0 days	2 c	1 b	5,899 ab	0.493 a
Untreated		81 a	39 a	5,121 c	0.478 a
1982					
Advisory	0 days	45 bc	11 b	4,361 ab	0.575 a
Advisory	2 days	30 d	3 de	4,692 a	0.552 a
Advisory	4 days	50 bc	7 bc	4,438 ab	0.541 a
Advisory	6 days	41 cd	6 cd	4,120 ab	0.556 a
Advisory	8 days	55 b	8 bc	4,298 ab	0.570 a
14-Day	0 davs	6 e	1 e	4,552 ab	0.573 a
Untreated		79 a	40 a	3,954 b	0.598 a

[x] Means in a given year and column followed by the same letter are not significantly different at $P = 0.05$ according to Duncan's multiple range test.

[y] Benomyl as 50W and flowable sulfur as 718 g/L were applied in each spray application at 0.56 kg/ha and 4.68 L/ha, respectively. Advisory spray dates without delay were 4 July, 18 July, and 8 August in 1981 and 13 July and 2 August in 1982. Applications on a 14-day program were initiated 23 June 1981 (total of seven) and 29 June 1982 (total of six).

[z] Visual estimates of percent of leaflets with leafspot symptoms and percent of leaflets shed as a result of leafspot were made 30 September and 27 September in 1981 and 1982, respectively.

TABLE 4. The effect of selected registered fungicides and spray programs on yield of Florigiant peanuts in 1981 and 1982[x]

Fungicide and rate/ha	Spray program[y]	Yield (kg/ha)		
		1981	1982	Mean
Benomyl (50W) 0.56 kg + sulfur (7.18 g/L) 4.7 L	14-Day	5,517 a	4,870 a	5,194 a
Benomyl (50W) 0.56 kg + sulfur (7.18 g/L) 4.7 L	Advisory	5,527 a	4,908 a	5,218 a
Chlorothalonil (500 g/L) 2.3 L	14-Day	5,377 ab	4,514 a	4,946 a
Chlorothalonil (500 g/L) 2.3 L	Advisory	5,963 a	4,921 a	5,442 a
Cupric hydroxide and sulfur (17.5% Cu; 15.5% S) 4.7 L[z]	14-Day	5,517 a	4,705 a	5,111 a
Cupric hydroxide and sulfur (17.5% Cu; 15.5% S) 4.7 L	Advisory	5,274 ab	4,819 a	5,047 a
Triphenyltin hydroxide (47.5W) 0.42 kg + sulfur (7.18 g/L) 2.3 L	14-Day	5,517 a	4,743 a	5,130 a
Triphenyltin hydroxide (47.5W) 0.42 kg + sulfur (7.18 g/L) 2.3 L	Advisory	5,095 ab	4,946 a	5,021 a
Untreated check		4,980 b	3,789 b	4,385 b

[x] Means within columns followed by the same letter are not significantly different at $P = 0.05$ according to Duncan's multiple range test.
[y] Seven and six applications of fungicides were made according to the 14-day spray program, whereas three and two applications were made according to leafspot advisories in 1981 and 1982, respectively.
[z] Kocide 404S (Kocide Chemical Corp., Houston, TX).

TABLE 5. Performance of fungicides applied according to leafspot advisories in control of leafspot on Florigiant peanuts in 1982[v]

Fungicide and rate/ha	Leafspot incidence (%)	Defoliation (%)	Yield (kg/ha)	Value ($/kg)
Chlorothalonil (500 g/L) 2.3 L	21 g	4 e	4,921 ab	0.624 ab
Bitertanol (50W) 0.56 kg + Agridex 1.2 L[w]	34 fg	11 de	4,756 ab	0.633 a
Triphenyltin hydroxide (47.5W) 0.42 kg + mancozeb (419 g/L) 3.5 L	45 ef	12 de	4,692 ab	0.628 a
Captafol (479 g/L) 3.5 L	45 ef	11 de	4,895 ab	0.629 a
Benomyl (50W) 0.56 kg + sulfur (7.18 g/L) 4.7 L	48 d–f	11 de	4,908 ab	0.617 ab
Triphenyltin hydroxide (47.5W) 0.42 kg + sulfur (7.18 g/L) 2.3 L	49 d–f	10 de	4,946 ab	0.632 a
Copper sulfate (23.85% Cu) 3.0 L[x] + sulfur (7.18 g/L) 2.3 L	50 de	15 cd	4,793 ab	0.629 a
Propiconazol (431 g/L) 0.12 L	51 de	10 de	4,883 ab	0.630 a
Thiophanate methyl (70W) 0.56 kg + sulfur (7.18 g/L) 4.7 L	54 de	16 cd	4,857 ab	0.632 a
Copper sulfate and sulfur (4.4% Cu; 50% S) 7.0 L[y]	56 de	13 de	4,997 a	0.627 a
Cupric hydroxide and sulfur (17.5% Cu; 15.5% S) 4.7 L[z]	61 d	18 cd	4,819 ab	0.630 a
Benomyl (50W) 0.56 kg + mancozeb (80W) 1.68 kg	74 c	23 c	4,768 ab	0.616 ab
Mancozeb (419 g/L) 4.2 L	85 b	33 b	4,539 b	0.615 ab
Untreated check	97 a	66 a	3,789 c	0.608 b

[v] Fungicide applications were made on 12 July and 2 August. Visual estimates of percent of leaflets with leafspot symptoms and percent of leaflets shed as a result of leafspot were made 24 September. Means in columns followed by the same letter are not significantly different at $P = 0.05$ according to Duncan's multiple range test.
[w] Agridex (Helena Chemical Co., Memphis, TN).
[x] Super Cu (Griffin Corp., Valdosta, GA).
[y] Top Cop with Sulfur (Stoller Chemical Co., Houston, TX).
[z] Kocide 404S (Kocide Chemical Corp., Houston, TX).

TABLE 6. Response of peanut cultivars to leafspot control by application of fungicide sprays according to leafspot advisories and a 14-day schedule in 1982[x]

Response parameters and spray programs[y]	Florigiant	VA 81B	NC 8C	GK 3	NC 7	Keel 29	NC 6	NC 5	Tifton 8	Mean
Leafspot incidence (%)[z]										
14-Day	14 c	28 c	6 c	6 c	3 b	5 b	2 c	1 c	5 c	8 c
Advisory	41 b	59 b	34 b	25 b	11 b	29 ab	14 b	10 b	14 b	26 b
Untreated	93 a	90 a	79 a	70 a	49 a	45 a	41 a	38 a	26 a	59 a
Defoliation (%)[z]										
14-Day	4 b	15 b	3 b	2 b	2 b	2 b	1 b	1 b	1 b	3 b
Advisory	9 b	24 b	9 b	3 b	3 b	6 ab	4 ab	3 b	1 b	7 b
Untreated	50 a	55 a	33 a	25 a	20 a	12 a	12 a	13 a	5 a	25 a
Yield (kg/ha)										
14-Day	3,841 a	3,764 a	4,298 a	4,069 a	4,272 a	3,675 a	4,082 a	4,107 a	4,401 a	4,057 a
Advisory	3,904 a	3,687 a	4,311 a	4,285 a	4,260 a	3,497 a	4,171 a	3,967 a	4,451 a	4,059 a
Untreated	3,255 b	3,014 b	4,031 a	3,662 b	3,891 b	2,886 b	3,789 b	3,662 b	4,132 a	3,591 b
Value ($/kg)										
14-Day	0.509 a	0.393 a	0.605 a	0.509 a	0.460 a	0.389 a	0.456 a	0.507 a	0.571 a	0.489 a
Advisory	0.495 a	0.347 a	0.559 a	0.503 a	0.495 a	0.403 a	0.400 a	0.490 a	0.562 a	0.473 a
Untreated	0.504 a	0.363 a	0.594 a	0.515 a	0.522 a	0.361 a	0.387 a	0.474 a	0.510 a	0.470 a

[x] Means, for a given parameter in columns, followed by the same letter are not significantly different at $P = 0.05$ according to Duncan's multiple range test.
[y] Benomyl as 50W and sulfur as 718 g/L were applied in each spray application at 0.56 kg and 4.68 L/ha, respectively. Advisory program sprays were applied on 13 July and 2 August. Six fungicide applications were made beginning on 26 June in the 14-day spray program.
[z] Visual estimates of percentage of leaflets with leafspot symptoms and percent of leaflets shed as a result of leafspot were made on 27 September.

(12) that leafspot advisories can be used to reduce the number of fungicide applications for leafspot control without risk of loss in crop yield or value. Fungicide selection, delays in application, cultivar susceptibility to leafspot, and rainfall immediately following fungicide application may affect the degree of disease suppression by fungicides, but do not preclude utilization of leafspot advisories for prevention of losses in crop yield and value. In addition to reducing the number of fungicide applications, utilization of leafspot advisories may indirectly improve the efficiency of production by reducing crop injury caused by spray equipment (6) and the severity of diseases enhanced by vine injury (11). The availability of fungicides providing satisfactory disease suppression when applied on a 10- to 14-day schedule has been cited as responsible for producers not accepting leafspot disease forecasts in Georgia (14). Increased production costs, as predicted in that report, coupled with the need for capital to control certain new destructive diseases of peanuts (ie, Cylindrocladium black rot and Sclerotinia blight) have stimulated grower interest in strategies for reducing production costs.

Leafspot advisories have been issued daily by the Virginia Cooperative Extension Service from 10 June until 25 September since 1981 (8). In addition to the research described, several on-farm demonstrations of the utility of leafspot advisories have been performed annually in Virginia. Effective leafspot control was demonstrated with only two fungicide applications in 1982, and three fungicide applications in 1981 and 1983. At a cost of ~$23.47 per hectare for a single fungicide application in 1983, the total potential benefit of the leafspot advisory was $93.90 per hectare or ~$3.6 million on the 38,850 ha of peanuts in Virginia; assuming three applications were made instead of seven on a 14-day schedule. Numerous growers have testified as to their success in utilization of advisories and expressed their support for continuation of the program. Growers obtain daily advisories by calling a toll-free telephone number or by listening to one of several local radio and television stations. A Code-a-phone 111 (Ford Industries, Inc., Portland, OR) was used to answer telephone calls for daily advisories. This machine logged 1,343, 1,617, and 3,160 calls in 1981, 1982, and 1983, respectively. As a result of grower utilization and support, leafspot advisories are expected to become an integral part of peanut disease control strategies in Virginia.

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