Quantitative Comparison of Stem Lesions Caused by *Cercosporidium personatum* in Florunner and Southern Runner Peanut Cultivars

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ABSTRACT

Fewer stem lesions caused by *Cercosporidium personatum* (Berk. & Curt.) Deighton developed on peanut (*Arachis hypogaea* L.) cultivar Southern Runner than on cultivar Florunner in field tests conducted near Tifton, GA, in 1989 and 1990 and near Marianna, FL in 1990. Numbers of lesions per stem and lesions per dm of stem length ranged from 3.1 to 9.5 times higher on Florunner than on Southern Runner in tests where severe leafspot epidemics developed and no foliar fungicides were applied. Seven applications of chlorothalonil at 0.5, 0.63 or 1.26 kg ai/ha via ground sprays and 1.26 kg ai/ha via an underslung boom (Pivot Agricultural Spray System = PASS) allowed few stem lesions to develop on either cultivar compared to non-sprayed plants. Delayed harvest required for Southern Runner resulted in an increase in incidence of stem lesions, but incidence of stem lesions at harvest on Southern Runner still was significantly lower ($P \leq 0.01$) than incidence on Florunner at harvest. Differences in number of stem lesions between the two cultivars and among fungicide treatments were reflected in yields. Healthier stem tissue due to fewer stem lesions may be partially responsible for higher yields in Southern Runner than in Florunner grown during severe leafspot epidemics. Incidence of stem lesions caused by *C. personatum* may be useful as a new parameter to be considered in evaluation and selection for resistance and/or tolerance to *C. personatum* in peanut.

Key Words: *Arachis hypogaea*, resistance, tolerance, late leafspot.

Late leafspot, caused by the fungus *Cercosporidium personatum* (Berk. & Curt.) Deighton, is one of the most important diseases of peanut (*Arachis hypogaea* L.) worldwide. The disease can cause extensive defoliation and loss of potential yield. Yield losses to late leafspot are correlated with disease incidence and level of defoliation caused by the pathogen (1,14) and appear to be caused more by loss of mature pods due to breaking of pegs during harvest than to reduction of the number of pods formed (11,22). The cultivar Southern Runner has a moderate level of resistance to *C. personatum* (6,7,11,12) but also loses fewer pods, and thus produces greater harvestable yield than does the cultivar Florunner when defoliation is moderate to heavy (11,18,19). This cultivar requires from 2 to 3 weeks longer than Florunner to reach harvest maturity. Southern Runner continues to produce new foliage as leaves infected by *C. personatum* are lost and maintains a higher leaf area index during leafspot epidemics than does the susceptible cultivar Florunner (15). This may contribute to cultivar tolerance in Southern Runner in addition to resistance. Pod loss of Southern Runner is reduced compared to Florunner with or without good foliar disease control (19). Factors affecting the overall health of the stems and pegs and how these factors affect the strength of pegs of these cultivars, however, have not been considered.

Infection of peanut by *C. personatum* typically is associated with leaf tissue, but all of the plant parts above ground are subject to infection (8,9). Lesions may girdle petioles

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and cause death and abscission of the entire leaf (8) or individual leaflets. More extensive damage may occur when stem lesions or cankers girdle and subsequently kill branch stems (8).

Most reports of resistance in peanut to *C. personatum* have focused on various components of the infection process and fungus colonization of and development in the leaves (3,4,6,17,21). Quantitative differences of cultivars with resistance to *C. personatum* on development of stem lesions have not been reported. The purpose of this investigation was to compare lesion number caused by *C. personatum* on stems of field-grown Southern Runner and Florunner in leafspot epidemics of varying intensity. Such comparisons were made as an initial step in characterizing the effect of resistance in Southern Runner on development of *C. personatum* on the stems and the effect of this pathogen on the health of those tissues.

Materials and Methods

Field tests were established in three locations near Tifton, GA in 1989 and 1990, and in one location near Marianna, FL in 1990. Experiments varied in design and specific treatment combinations, but all consisted of combinations of fungicide applications to Southern Runner and Florunner.

Bowen Farm, 1989, 1990

Florunner and Southern Runner were planted in one quadrant in each of two center pivot irrigation systems at the Georgia Coastal Plain Experiment Station (CPES), Bowen Farm on 22 May in 1989 and 1990 (5). In each of these quadrants, a split-plot design with four replications was used. Whole plots consisted of 4 rows, 0.91 m apart, and row length was 6.1 m and 7.6 m in 1989 and 1990, respectively. Whole plot treatments consisted of: 1) non-sprayed control, 2) ground-rig spray application of chlorothalonil (tetrachloroisophthalonitrile) (1.26 kg ai/ha) as Bravo 720®, and 3) application of chlorothalonil (1.26 kg ai/ha) via standard chemigation or by an underslung boom (PASS = Pivot Agricultural Spray Systems) on the pivot (5). Whole plots were separated by 2 rows of Florunner that were treated with the respective pivot applications of chlorothalonil. Split-plot treatments consisted of two rows each of Florunner and Southern Runner cultivars. These were planted in adjacent beds, with no border rows. In both years, chemigation applications of chlorothalonil were made using 76.5 kL of water/ha. PASS applications were made using 25.5 kL of water/ha. For all applications, plots not treated with pivot-applied fungicides were covered with plastic sheets. Irrigation (114.2 kL of water/ha) was applied to all plots the evening prior to fungicide applications to minimize the effects of water applied during chemigation. Initial fungicide applications were made on 26 June in 1989 and 28 June in 1990. Digging dates were 13 October for Florunner and 25 October for Southern Runner. At all sites, pods from were harvested mechanically three to seven days after digging.

Gibbs Farm, 1989

Southern Runner and Florunner were planted on 15 May 1989 in a field of Tifton loamy sand (pH = 5.8) at the CPES, Gibbs Farm. A randomized complete block experimental design with four replications was used with plots of Florunner and Southern Runner cultivars receiving 0, 0.55 and 1.26 kg ai/ha rates of chlorothalonil applied at 14-day intervals. Plots were two rows (0.91 m apart) wide and 7.6 m long, and were separated by two rows of Florunner not treated with foliar fungicides. The first fungicide application was on 20 June. Florunner plots were inverted on 5 October, and Southern Runner plots were inverted on 12 October.

Belflower Farm, 1990

Florunner and Southern Runner were planted at the CPES, Belflower Farm on 17 May, 1990. Soil type was a Tifton loamy sand (pH = 5.7). The experimental design was a split-plot with eight replications. Whole-plot treatments were nontreated control, and ground sprays with chlorothalonil at 1.26 kg ai/ha. Whole plots were eight rows (0.91 m apart) wide and 7.6 m long. Split-plots consisted of 4 rows each of Florunner and Southern Runner. Whole plots were separated by two border rows of Florunner. Borders were treated with chlorothalonil and cyproconizole for leafspot control at this location. No border rows were used between split-plots. Florunner and Southern Runner plants were dug on 19 October and 30 October respectively.

Ground-spray applications at all Tifton locations in both years utilized a CO_2-powered back-pack sprayer equipped with three D2-13 hollow-cone nozzles per row. Applications in both years were made using 114.2 L of water/ha at 345 kPa. Fungicides were applied at 14 day intervals after initial sprays throughout the remainder of the season. A total of seven applications were made at each location in both years. Except for leafspot control, plots received recommended practices for peanut production in the area (10).

Marianna, FL, 1990

A split-plot design was used at the Marianna, FL site in 1990. Seed of both cultivars were planted on 11 May 1990 in a Chipola loamy sand (pH = 6.2). Florunner and Southern Runner cultivars represented the whole plot treatments. Three split-plot treatments were seven applications of 0.63 and 1.26 kg ai/ha of chlorothalonil and a nontreated control. Split-plots were six rows, 6.1 m long planted on 0.91 m centers. Treatments were replicated four times. Fungicide applications at the Marianna site were made using a tractor mounted sprayer, equipped with three D3-25 hollow-cone nozzles per row. Chlorothalonil was applied in 234 L of water/ha at 310 kPa. Sprays were initiated on 19 June. Plots of Florunner and Southern Runner were dug on 24 September and 8 October, respectively.

Sampling

For evaluation of lesions on the stems, 12 lateral branches were collected from each plot. In 1989, collections were made on 12 October at the Bowen Farm sites and on 5 October at the Gibbs Farm site. This was immediately prior to digging of the plots with Florunner and approximately 2 wk prior to digging of the plots with Southern Runner. In 1990, collections were made on 9 October at the Bowen Farm, on 24 September at the Marianna site, and on 12 October at the Belflower Farm. An additional collection was made from nontreated plots of Southern Runner at the Belflower Farm on 30 October to determine how maturity of this cultivar influenced incidence of stem lesions relative to incidence of lesions on Florunner stems collected earlier.

Lateral stems were collected by random selection, with samples taken from each row along the length of the bed. Stems were collected from the center two rows of each split-plot at each location. Length of each stem was measured, and lesions caused by *C. personatum* were counted. Number of lesions per dm of stem length was calculated for each stem to take into consideration differences in internode and stem length between the two cultivars and variation in length among stems within the two cultivars. Representative lesions from plants at each location were examined using a dissecting microscope, and conidia produced on the stems were evaluated to confirm diagnosis. Number of nodes and leaflets present were counted for each stem. Percent defoliation per stem was calculated as:

% defoliation = 100 X (number of leaflets)/(number of nodes X 4 leaflets/node).

Total number of lesions, lesions per dm of stem, percent defoliation and pod yields were compared for the cultivars and different treatments. Analysis of variance was used for each experiment, and years and locations were analyzed independently. Appropriate comparisons were made using Fisher's protected LSD (20). Student's t test (20) was used to compare numbers of stem lesions and percent defoliation on Florunner for the 12 October sampling date to those of Southern Runner for the 30 October sampling date at the Belflower Farm for plots not treated with fungicide.

Lengths of 1784 lesions from nontreated Florunner stems and 1016 lesions from Southern Runner stems at the Belflower Farm and 344 lesions from Florunner and 46 lesions from Southern Runner from Marianna locations were determined in 1990. The small sample from Southern Runner stems was due to lack of lesions from which to sample. Representative lesions from stems from each nontreated plot from the Marianna location were examined microscopically to determine the number of conidiophore fascicles per lesion. Average lesion length and number of conidiophore fascicles per lesion were compared using Student's t test (20).

Results

Bowen Farm, 1989, 1990

Fungicide treatment, cultivar main effects and fungicide X cultivar interaction effects on total lesions per stem and lesions per dm of stem were significant ($P \leq 0.05$) in both experiments at the Bowen farm in 1989. Numbers of stem lesions and lesions per dm of stem were reduced in both cultivars by application of chlorothalonil via chemigation or ground sprays compared to non-sprayed plots (Table 1). Plants treated via ground sprays had fewer stem lesions than those in chemigated plots. Across fungicide treatments, more total stem lesions and lesions per dm of stem occurred on Florunner plants than on Southern Runner plants (Table 1). Within whole plot treatments, number of stem lesions and lesions per dm of stem were greater on Florunner plants than on Southern Runner plants in nontreated plots (Table 1). Differences between cultivars were not significant ($P > 0.05$) for plots treated with chemigation (Table 1). Applications of chlorothalonil by chemigation did not significantly ($P > 0.05$) reduce the amount of defoliation in either cultivar. Percent defoliation was lower in Southern Runner than in Florunner for plants in nontreated and chemigated plots. Yields were higher in plots treated with groundsprays of chlorothalonil than in those receiving no fungicide or those receiving chemigation. Within whole plot treatments, yields of Southern Runner were higher than those of Florunner in nontreated plots, but yields were similar for the two cultivars within other treatments (Table 1).

Table 1. Effect of peanut cultivar and application of chlorothalonil on number of stem lesions and level of defoliation caused by *Cercosporidium personatum*, and pod yields, Pivot C, Bowen Farm, Tifton, GA, 1989.

Treatment[1]	Lesions per stem[2]	Lesions per dm of stem	Percent Defoliation[3]	Yield kg/ha
Whole plots				
Nontreated	12.1	3.8	71.1	1474
Chemigated Chlorothalonil 1.26 kg ai/ha	4.6	1.6	65.2	1672
Ground sprayed Chlorothalonil 1.26 kg ai/ha	0	0	4.7	3289
LSD ($P \leq 0.05$)	7.0	2.1	19.5	676
Whole Plots X Split-plots				
Nontreated				
Florunner	18.9	5.7	80.1	813
Southern Runner	5.3	1.8	62.0	2134
Chemigated Chlorothalonil 1.26 kg ai/ha				
Florunner	7.7	2.6	81.8	1463
Southern Runner	1.5	0.5	48.5	1880
Ground sprayed Chlorothalonil 1.26 kg ai/ha				
Florunner	0	0	5.8	3365
Southern Runner	0	0	3.5	3212
LSD ($P \leq 0.05$)	7.8	2.2	16.2	783

[1] All fungicide treatments were applied seven times on a 14-day schedule.
[2] Based on 12 stems per plot in each of four replications.
[3] Based on actual counts of leaflets remaining on 12 stems per plot in each of four replications.

In 1989, fungicide, cultivar and fungicide X cultivar interaction effects on number of stem lesions, lesions per dm of stem, percent defoliation and yield were significant ($P \leq 0.05$) in the Bowen Farm PASS experiment. Results were similar to those of the chemigation study, except number of lesions, lesions per dm of stem, defoliation and yields of plants treated with PASS applications of chlorothalonil were not different ($P > 0.05$) from those of plants treated with ground sprays (Table 2). Within treatments, numbers of lesions, lesions per dm of stem and percent defoliation were higher for Florunner than for Southern Runner in nontreated plants only (Table 2). Lesions per stem and lesions per dm of stem of nontreated Southern Runner were not different from those on either cultivar treated with chlorothalonil (Table 2), and were lower ($P \leq 0.05$) than on nontreated Florunner stems. Yield of Southern Runner was higher than that of Florunner only for plots receiving no fungicide (Table 2).

Table 2. Effect of peanut cultivar and application of chlorothalonil on number of stem lesions and level of defoliation caused by *Cercosporidium personatum*, and pod yields, Pivot D, Bowen Farm, Tifton, GA, 1989.

Treatment[1]	Lesions per stem[2]	Lesions per dm of stem	Percent Defoliation[3]	Yield kg/ha
Whole Plots Nontreated	23.8	3.8	69.2	3085
PASS Chlorothalonil 1.26 kg ai/ha	0.4	0.2	13.0	4523
Ground sprayed Chlorothalonil 1.26 kg ai/ha	0.1	0	6.4	4371
LSD ($P \leq 0.05$)	7.5	2.2	17.0	643
Whole Plots X Split-plots				
Nontreated Florunner	20.1	6.3	82.5	2633
Southern Runner	3.7	1.2	55.8	3537
PASS Chlorothalonil 1.26 kg ai/ha Florunner	0.5	0.2	17.7	4675
Southern Runner	0.2	0.1	8.3	4371
Ground sprayed Chlorothalonil 1.26 kg ai/ha Florunner	0.1	0	8.2	4604
Southern Runner	0	0	4.5	4137
LSD ($P \leq 0.05$)	7.9	2.2	15.4	486

[1] All fungicide treatments were applied seven times on a 14-day schedule.
[2] Based on 12 stems per plot in each of four replications.
[3] Based on actual counts of leaflets remaining on 12 stems per plot in each of four replications.

No differences were observed among treatment cultivar or interaction effects on number of stem lesions or yield in either of the Bowen Farm experiments in 1990. No stem lesions were observed on plants of either genotype treated with ground sprays or chemigation applications of chlorothalonil. Number of lesions per stem were 2.6 and 0 on Florunner and Southern Runner, respectively, in nontreated plots of the chemigation experiment. This was equivalent to 0.8 and 0 lesions per dm of stem on the respective cultivars. The differences however, were not significant ($P > 0.05$).

In 1990, incidence of stem lesions was low among nontreated plants in the PASS experiment. Numbers of lesions per stem were 0.5 and 0.2 for Florunner and Southern Runner, respectively. Analysis of variance indicated no significant ($P > 0.05$) fungicide treatment, cultivar or interaction effect on incidence of stem lesions or yield for this location.

Gibbs Farm, 1989

At the Gibbs Farm location, cultivar, fungicide and cultivar X fungicide interaction effects on incidence of stem lesions, percent defoliation and yield were highly significant ($P \leq 0.01$). Application of seven bi-weekly ground spray applications of chlorothalonil at 0.5 or 1.26 kg ai/ha significantly ($P \leq 0.05$) reduced number of lesions per stem, lesions per dm of stem, and percent defoliation of Florunner, compared to nontreated plants (Table 3). Number of lesions per stem and per dm of stem were higher on Florunner than on nontreated Southern Runner. Lesion number did not differ between cultivars for the other treatments (Table 3). Defoliation did not differ for the two cultivars within treatments ($P > 0.05$). Yields of plots of either cultivar treated with chlorothalonil were greater than those of nontreated Florunner (Table 3). Nontreated Southern Runner produced yields that were higher than those of nontreated Florunner, but yields of the cultivars were not different within other treatments (Table 3). Yields of nontreated Southern Runner were not different from those of Florunner treated with sprays of 0.5 kg ai/ha of chlorothalonil.

Table 3. Effect of peanut cultivar and appications of chlorothalonil on number of stem lesions and level of defoliation caused by *Cercosporidium personatum*, and pod yields, Gibbs Farm, Tifton, GA, 1989.

Treatment[1]		Lesions per stem[2]	Lesions per dm of stem	Percent Defoliation[3]	Yield kg/ha
Nontreated	Florunner	11.8	4.2	80.3	1164
	Southern Runner	3.8	1.0	74.6	2628
Chlorothalonil 0.5 kg ai/ha					
	Florunner	1.1	0.3	27.0	3205
	Southern Runner	0.1	0	15.9	3563
Chlorothalonil 1.26 kg ai/ha					
	Florunner	0	0.1	15.4	3352
	Southern Runner	0	0	13.9	3092
LSD ($P \leq 0.05$)		5.5	1.8	21.4	718

[1] All fungicide treatments were applied as ground sprays, seven times on a 14-day schedule.

[2] Based on 12 stems per plot in each of four replications.

[3] Based on actual counts of leaflets remaining on 12 stems per plot in each of four replications.

Belflower Farm, 1990

Ground spray application of chlorothalonil, cultivar and treatment X cultivar effects on lesions per stem, lesions per dm of stem, defoliation and yield were significant ($P \leq 0.01$) in the Belflower Farm experiment (Table 4). Few lesions were observed on stems of either cultivar treated with chlorothalonil. Numbers of stem lesions, lesions per dm of stem and percent defloation were lower on Southern Runner plants than on Florunner plants in nontreated plots (Table 4). Average lesion length was 4.0 mm on Florunner and 3.5 mm on Southern Runner at the Belflower Farm and did not differ significantly ($P > 0.05$).

Table 4. Effect of peanut cultivar and applications of chlorothalonil on number of stem lesions and level of defoliation caused by *Cercosporidium personatum*, and pod yields, Belflower Farm, Tifton, GA, 1990.

Treatment[1]	Lesions per stem[2]	Lesions per dm of stem	Percent Defoliation[3]	Yield kg/ha
Whole Plots				
Nontreated	7.4	2.0	71.9	2981
Ground sprayed Chlorothalonil 1.26 kg ai/ha	0.21	0.01	10.5	5608
(LSD $P \leq 0.05$)	1.4	0.4	9.2	976
Whole Plots X Split-Plots				
Nontreated				
Florunner	13.3	3.7	89.1	1829
Southern Runner	1.4	0.4	54.0	4132
Ground sprayed Chlorothalonil 1.26 kg ai/ha				
Florunner	0.1	0.03	6.5	4969
Southern Runner	0	0	4.2	6247
LSD ($P \leq 0.05$)	1.5	0.8	10.1	824

[1] Fungicide treatments were applied as ground sprays, seven times on a 14-day schedule.

[2] Based on 12 stems per plot in each of eight replications.

[3] Based on actual counts of leaflets remaining on 12 stems per plot in each of eight replications.

Number of lesions per stem of nontreated Southern Runner plants at maturity (30 October) was 7.5 and was significantly ($t = 3.1$; critical t for a = 0.01, and 14 df = 2.98) less than on nontreated Florunner (Table 4) at maturity (two weeks earlier). Number of lesions per dm of stem fof Southern Runner at maturity was 1.4, which was significantly lower (t = 3.73, critical t for a = 0.01 and 14 df = 2.98) than for Florunner (Table 4) plants sampled at maturity. Yields of both cultivars were higher from plots treated with chlorothalonil than from non-tretaed plots (Table 4). Yields of Southern Runner were higher than those of Florunner within both treatments (Table 4).

Marianna, FL, 1990

Cultivar, fungicide and cultivar X fungicide interaction effects on lesions per stem, lesions per dm of stem, percent defoliation and yield were significant ($P \leq 0.01$) at Marianna. Across split-plot treatments, number of lesions per stem and lesions per dm of stem were higher among Florunner than among Southern Runner (Table 5). Most of this difference was due to nontreated plots. Within cultivars, application of either rate of chlorothalonil reduced incidence of stem lesions in Florunner (Table 5). Incidence of lesions on stems of nontreated Southern Runner was not different from the incidence of stem lesions on plants of either cultivar treated with chlorothalonil (Table 5). Across all fungicide treatments, yields of Florunner and Southern Runner were not different ($P > 0.05$). Yields of nontreated Southern Runner were higher than those of nontreated Florunner, and did not differ from yields of either cultivar treated with either rate of chlorothalonil.

Average length of lesions on nontreated plants was 4.7 mm for Florunner and 4.0 mm for Southern Runner and not

Table 5. Effect of peanut cultivar and applications of chlorothalonil on number of stem lesions and level of defoliation caused by *Cercosporidium personatum*, and pod yields, Marianna, FL, 1990.

Treatment[1]	Lesions per stem[2]	Lesions per dm of stem	Percent Defoliation[3]	Yield kg/ha
Whole Plots				
Florunner	2.9	0.5	50.8	3986
Southern Runner	0.3	0.07	43.8	4669
LSD ($P \leq 0.05$)	0.9	0.2	15.7	777
Whole plots X Split-plots				
Nontreated Florunner	8.3	1.6	86.7	2659
Southern Runner	0.8	0.2	73.5	4363
Ground sprayed Chlorothalonil 0.63 kg ai/ha				
Florunner	0.25	0.01	45.3	4368
Southern Runner	0.06	0.001	33.7	4783
Ground Sprayed Chlorothalonil 1.26 kg ai/ha				
Florunner	0.02	0.005	20.6	4931
Southern Runner	0.07	0.001	24.1	4861
LSD ($P \leq 0.05$)	1.59	0.03	27.2	772

[1] All fungicide treatments were applied as ground sprays seven times on a 14-day schedule.
[2] Based on 12 stems per plot in each of four replications.
[3] Based on actual counts of leaflets remaining on 12 stems per plot in each of four replications.

significantly different ($P > 0.05$). Similar numbers of conidiophore fascicles per lesion were observed on stems of Southern Runner snd Florunner. These numbers were highly variable for both cultivars..

Discussion

Fewer stem lesions caused by *C. personatum* developed on Southern Runner than on Florunner under similar conditions. The difference between these cultivars was most evident in severe epidemics. Differences in numbers of lesions that formed appeared to be due to factors other than differences in maturity of the two cultivars, as indicated by 1990 results from delayed sampling of Southern Runner stems.

The formation of fewer lesions on the stems of Southern Runner than on those of Florunner may contribute to a better overall health of the stems. In severe leafspot epidemics, stems may be killed (8) by lesions that interrupt translocation. Better integrity of the stems of Southern Runner under heavy disease pressure may partially explain our observation of greater yields in Southern Runner than in Florunner under situations with high levels of defoliation due to late leafspot. Shokes et al (19) reported less pod loss in Florunner and Southern Runner plants treated with the fungicide diniconazole in comparison to those treated with chlorothalonil or no fungicide. Knauft et al (11) discussed the probable role of differences in levels of deterioration of pegs and other plant parts in explanation of differences in yield among peanut genotypes. Our findings indicate that there are measurable differences in incidence of stem lesions between Southern Runner and Florunner. Lower incidence of *C. personatum* lesions on the stems due to resistance of the stem tissue may help prevent weakening of the stems and pegs. This could complement even slightly higher inherent peg strength to allow greater retention of pods at harvest following severe epidemics.

Resistance of Southern Runner to *C. personatum* may be associated with physical, physiological or chemical factors that impart partial resistance to other pathogens, such as *Sclerotium rolfsii* Sacc. Resistance in Southern Runner to *S. rolfsii* has been reported by Brenneman et al (2). The mechanism of resistance of Southern Runner to these pathogens, however, has not been elucidated.

Application of chlorothalonil at even lower than standard rates prevented development of high numbers of stem lesions in susceptible cultivar Florunner. Therefore, it does not appear that use of this parameter would be advantageous for evaluation of fungicide efficacy. Fungicide applications and various rates were used in this study to allow evaluation of the two cultivars under different levels of leafspot intensity. As previously reported (8), stem lesions in our study were observed only in plots in which high incidence of lesions on the leaves and high levels of defoliation occurred. However, our results indicate that differences in incidence of stem lesions between cultivars may be observed when nearly complete defoliation occurs.

Several subjective rating scale and objective type evaluations of Southern Runner based on foliar infection and lesion development have been reported (3,4,6,11). In addition, reports of disease progress as it relates to growth and refoliation have been reported (15,16). Our study indicates that differences among cultivars also may exist in susceptibility of the plant stems to damage by *C. personatum*. In addition to disease parameters commonly evaluated in breeding programs, incidence of stem lesions may be useful, particularly as it may relate to the tolerance of a particular line to foliar infection and defoliation.

Time of inoculation and infection of stems was not known in this study. Therefore, it was not possible to determine whether differences in incidence of stem lesions were due to differences in inoculum concentration, inoculum efficiency, incubation periods, or combination of these or other factors. The relationship between number of stem lesions and yield in the two cultivars also has not been determined. Our results indicate that differences in number of stem lesions correspond to differences in yield in both Florunner and Southern Runner in plots with severe leafspot epidemics. Yield losses to leafspot in Florunner are highly correlated with disease incidence on the leaves and level of defoliation (1,11,14). Since these parameters are influenced by cultivar and fungicide treatment, the effect of stem lesions on yield can not be elucidated from our study. However, in two locations differences between cultivars were observed for number of stem lesions and yield, but not for defoliation for nontreated plots. The relationship between defoliation and yield in Southern Runner appears to be less direct than in Florunner (11). Number of stem lesions may be better than final assessments of defoliation as an indicator of the effects of severe leafspot epidemics on yield. Use of stem lesion incidence should be examined as a possible index for relating leafspot incidence and severity to yield in this cultivar with resistance and tolerance. Such an index also could be useful for evaluation of genotypes for develpment of peanut cultivars especially in programs for production with a minimum of fungicide inputs.

Lesions on the stem typically are produced late in the season (8,9) and often occur after high levels of infection of the leaflets and the resulting defoliation have developed. Because of the time at which stem lesions are formed, they probably contribute little inoculum for further development of late-season leafspot epidemics. However, Nuesry (13) found that mycelium in lesions formed on the stems is more resilient for survival and overwintering than mycelium in lesions formed on leaf tissue. He also reported that stem tissue was as suitable as leaf tissue for survival of *C. personatum*. and *Cercospora arachidicola* Hori. Fewer lesions on the stems of Southern Runner could represent lower initial inoculum for future crops. Little definitive work has been reported on overwintering of *C. personatum* however, and the role of stem lesions in overwintering of the pathogen on both Florunner and Southern Runner needs to be elucidated.

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