Report to the Georgia Agricultural Commodity Commission for Peanuts-2009

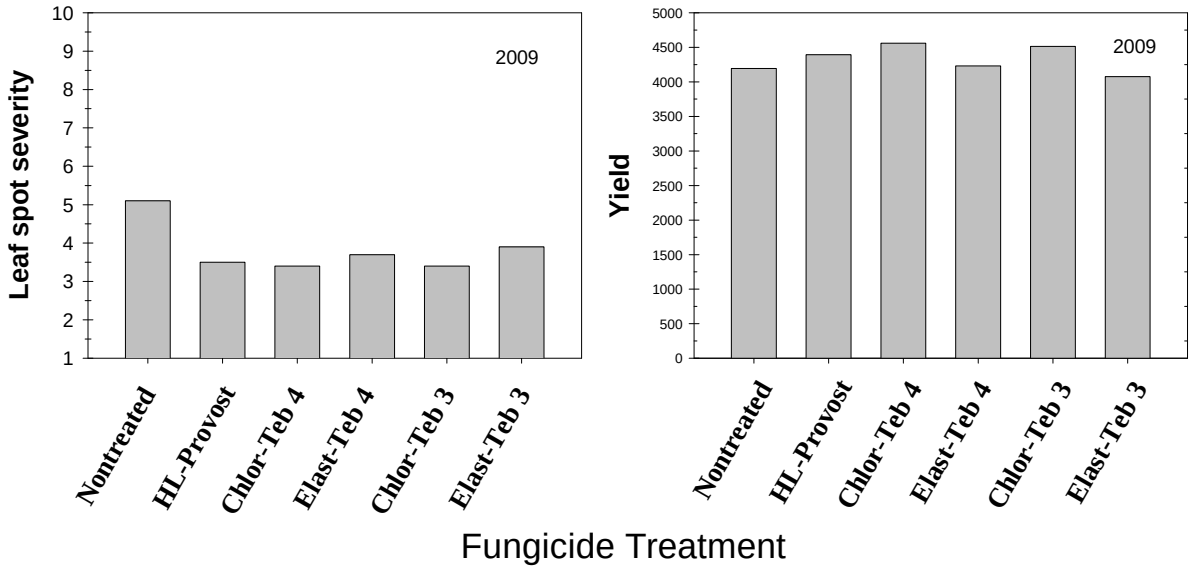
Adaptation of New Fungicides and Application Strategies for Control of Early and Late Leaf Spot of Peanut

Investigators: A. K. Culbreath, T. B. Brenneman, R. Kemerait, K. Stevenson

Late planting dates and frequent rainfall (at least in some parts of the state) made leaf spot control a challenge for growers in 2009. In our plots at Tifton, late leaf spot progressed rapidly from mid-season on. Across tests conducted from 2001-2009 the new fungicide prothioconazole (Proline) has shown excellent control of leaf spot diseases compared to Folicur. However, in 2007 and 2008, examination of the components of the Provost mixture indicated that the tebuconazole component was not providing much of the leaf spot control. In 2009, applications of Proline alone or Proline + Topsin showed potential as an alternative to Headline for use in a situation where leaf spot epidemics are in progress before initial fungicide applications are made. In that study, mixtures of Proline and Topsin provided leaf spot control that was very similar to that of 9.0 fl oz/A of Headline.

We have examined several generic formulations of tebuconazole, and have found little difference in the efficacy of most of the formulations tested. Addition of low rates of Topsin or Bravo (1.0 pt/A) helped improve leaf spot control with tebuconazole. The use of three or four applications of tank mixes of tebuconazole + chlorothalonil (Chlor-Teb 4) provided leaf spot control and produced yields as good as that of full season Headline Provost Chlorothalonil (six total applications) (HL-Provost) treatments on the cultivar Tifguard (Figure 1).

Figure 1. Effect of fungicide treatment on leaf spot severity and pod yield on Tifguard cultivar, 2009.



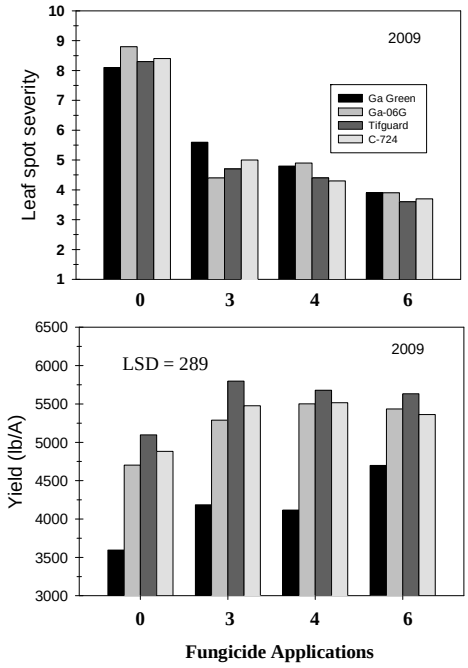
In 2008, the new fungicide Evito (fluoxastrobin) held up adequately under heavy pressure from late leaf spot, although it was not as good for leaf spot control as Abound or the experimental fungicide LEM 17 for leaf spot control when applied on the same schedule. In 2009, there were similar trends among the fungicides for relative control, but disease pressure was heavier, and

neither Evito nor Abound treatments were as good as the full season chlorothalonil treatment for leaf spot control.

The experimental fungicide LEM17 (penthiopyrad) has performed well in our experiments across 2005 - 2009. The proposed product name is “Fontelis”, and may be available for the 2011 field season. It has potential to help control leaf spot and white mold, and should complement available fungicides for both disease control and pathogen resistance management.

Experiments were conducted in 2009 in which Georgia Green, Georgia-06G, Tifguard cultivars, and proposed cultivar (C724-19-25) were combined with fungicide treatments of 3, 4, and 6 applications of chlorothalonil (Bravo pt/A) plus tebuconazole (Muscle 7.2 fl oz/A) as well as a nontreated control. In spite of having more severe leaf spot than Georgia Green in the nontreated plots, Georgia-06G had yields that were much greater than those of Georgia Green in the respective treatments. Yields of Tifguard were higher than those of Georgia 06G for the nontreated plots and three-spray treatments, but yields were similar for those two cultivars for the 4 and 6 spray treatments.

Figure 2. Effect of peanut cultivar and fungicide treatment on leaf spot severity and pod yield, 2009.



Report to the Georgia Agricultural Commodity Commission for Peanuts-2009

Effect of Seeding Rate on Tomato Spotted Wilt in New Resistant Cultivars and Breeding Lines

Investigators: A. K. Culbreath, R. S. Tubbs, J. P. Beasley, T. Brenneman, R. Kemerait, C. Holbrook, W.D. Branch, N.B. Smith, and B. Tillman

Stand establishment is critical for managing Tomato spotted wilt (TSW), caused by *Tomato spotted wilt virus*, in peanut, especially in cultivars such as Georgia Green with moderate levels of spotted wilt resistance. Fields with plant stands of less than 3 plants/ft of row typically are at much greater risk than with populations of greater than 4 plants/ft of row (**Figure 1**). Growers plant 6 (or more) seed/ft of row to obtain stands of 4 (or more) plants/ft of row.

Figure 1. Relationship between final plant population and risk of damage by spotted wilt in peanut according to the 2010 TSWV Risk Index

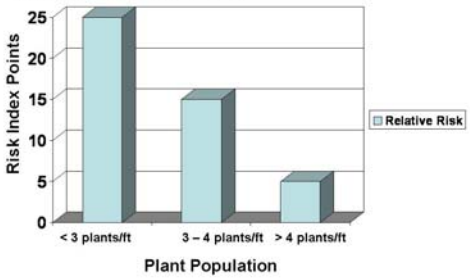
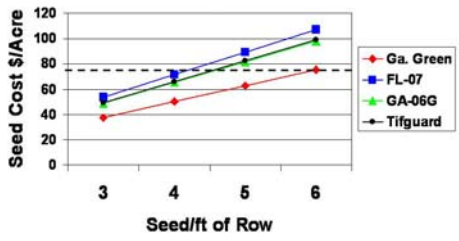


Figure 2. Effect of peanut cultivar and seeding rate on estimated seed cost ($/Acre) in 2009. Dashed line represents cost of Georgia Green at 6 seed/ft of row.



From Amanda Smith and Nathan Smith, April, 2009

New cultivars are available with better field resistance to Tomato spotted wilt than that of Georgia Green. However, several of these promising cultivars have larger seed size than that of Georgia Green. Therefore, even if the cost per pound is the same, larger seed translates into increased seed cost to plant at the same rate/ft of row. 2009 estimates of relative seed costs for Georgia Green, Florida-07, Georgia-06G, and Tifguard are given in **Figure 2**. All three new cultivars have significantly higher costs/A than Georgia Green at the same seeding rate. The objective of this study was to determine if seeding rates could be reduced in these new cultivars without increasing the risk of losses to TSW.

Planting 4.5 seed/ft of row would result in seed costs similar to that of Georgia Green at 6 seed/ft of row (**Figure 2**). Field experiments were conducted in 2008 and 2009 at Tifton. Georgia Green, Florida-07, Georgia-06G, and Tifguard were planted at 3,4,5, and 6 seed/ft of row in conventionally tilled single rows, with no insecticide for thrips control. Planting date was April 23 in both years. Plant populations that resulted from the different seeding rates were similar for the four cultivars (**Figure 3)**.

Final incidence of TSW in Florida-07, Georgia-06G, and Tifguard was lower than in Georgia Green, regardless of seeding rate (**Figures 4**), and there was little difference in TSW among seeding rates in any of those three cultivars. Similarly, across all seeding rates, yields were much higher for all three than for Georgia Green. Grades of Georgia-06G and Tifguard were similar to that of Georgia Green (**Figure 5**). These results indicate that better resistance in Florida-07, Georgia-06G, and Tifguard may allow reducing seeding rates without increasing the risk of losses to Tomato spotted wilt if seed quality and soil conditions are favorable for stand establishment.

Figure 3. Effect of peanut cultivar and seeding rate on plant population, Lang Farm 2008-2009 (Averaged across 4 cultivars and 2 years). Numbers on bars represent Risk Index Values associated with the respective populations

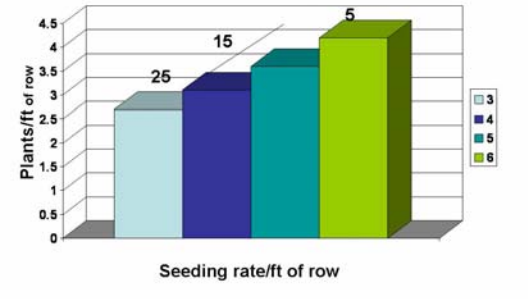


Figure 4. Effect of peanut cultivar and seeding rate on final incidence of spotted wilt, Tifton, GA 2008-2009.

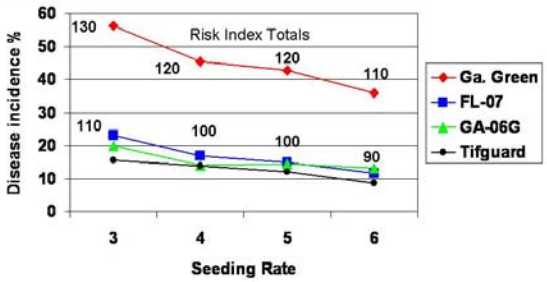
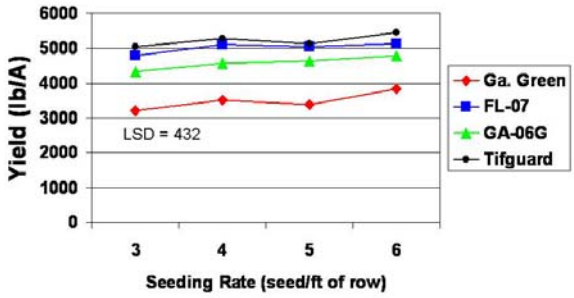


Figure 5. Effect of peanut cultivar and seeding rate on pod yield, Tifton, GA 2008-2009.



In a second study, Georgia Green, Georgia-01R, Georgia-02C, and 4 breeding lines were compared at 3 and 6 seed/ft of row in a test at the UGA-Lang Farm. Seeding rate had little effect on final spotted wilt ratings or yield in some of the breeding lines (Table 1). These data indicate that greater reductions in seeding rates may be possible with some breeding lines for spotted wilt management. It was notable, however, that there was an obvious difference in mainstem prominence with higher plant populations with some lines.

Table 1. Effect of peanut genotype and seeding rate on spotted wilt and yield, 2008-2009.

	Final spotted wilt %		Yield (lb/A)	
Genotype	3 seed/ft	6 seed/ft	3 seed/ft	6 seed/ft
Georgia Green	53.3	40.0	4228	4967
GA 052524	10.4	6.0	6303	6801
GA 052527	9.3	4.4	6399	6604
GA 052529	7.3	3.0	6562	6722
Georgia-01R	21.2	13.2	5892	6180
Georgia-02C	14.3	9.1	5512	5728
C724-19-25	18.7	15.0	6265	6758
LSD	3.6	3.6	281	281

Report to the Georgia Agricultural Commodity Commission for Peanuts-2009

Development of a Diagnostic Test to Differentiate "Funky Leaf Spot" and Early Leaf Spot of Peanut

Investigators: A. K. Culbreath,R. Kemerait, R. Gitaitis, K. Lewis, and E. Cantonwine

"Funky leaf spot" (FLS) (also known as "Irregular Leaf Spot" or "Florida Leaf Spot) is a source of confusion in peanut production, especially early in the season and with certain cultivars. The cause of FLS is not known. It is worse on some cultivars (eg. Georgia-02C and Georgia-03L) than on Georgia Green, but is observed on Georgia Green as well as several new cultivars. Epidemics of FLS typically are worse in fields with conservation tillage than conventional tillage.

PCR tests with universal fungal primers (ITS4 and ITS5) were used to probe for fungal DNA from leaf spots of Georgia-02C suspected of being "Funky Leaf Spot" and also from spots from Georgia-02C with visible sporulation of *Cercospora arachidicola* (early leaf spot). Samples were compared to DNA extracted from pure cultures of *Cercospora arachidicola* grown on artificial media.

Bands corresponding to those obtained from DNA extracted from the pure culture of *C. arachidicola* were obtained from 56% spots that showed signs of *C. arachidicola.* No bands were obtained from any of the spots thought to be "Funky Leaf Spot" after visual evaluation. As with previous field and laboratory experiments, these results show no evidence that Funky Leaf Spot is caused by a fungal pathogen. Sequences of fungal DNA obtained from leaf samples with *C. arachidicola* were homologous with those from pure cultures of the fungus and other isolates previously evaluated. However, inconsistent results with PCR tests on leaf lesions that had a high probability of being infected with *Cercospora arachidicola* indicate that PCR can help rule-out Funky Leaf Spot when C. a. is detected, but is not currently reliable for detecting *C. arachidicola* with methods used thus far.