

STRATEGIES FOR MANAGING VERTICILLIUM WILT IN PEANUT

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Introduction

Verticillium wilt, caused by the soilborne fungus *Verticillium dahliae*, is an economically important disease throughout the High Plains of Texas. The fungus is capable of surviving in the soil for extremely long periods of time, thus the benefits of crop rotation are somewhat limiting. The fact that the fungus is capable of infecting both peanut and cotton also poses serious problems for producers in the region. Development of Verticillium wilt and reproduction of *V. dahliae* is favored by cool soil temperatures, and increased moisture. The aforementioned conditions were encountered during the 2004 growing season resulting in significant yield losses, as well as increased populations of *V. dahliae*. The impact on cotton is characterized by significant reductions in lint yields, as well as substantial reductions in fiber quality. Likewise, significant reductions in peanut yield may be observed under severe Verticillium wilt pressure. As the disease develops, peanut vines are weakened, often requiring peanuts to be dug prematurely.

Cultivar trials: Fields with a history of the disease were identified during the 2008 growing season for use in 2009. A total of two Runner trials (Gaines and Terry counties) and one Virginia trial (Terry county) were conducted. The Runner trials included the commercially available cultivars Flavorrunner 458 (commercial standard), McCloud, Tamrun OL02 and Tamrun OL07, and the advanced breeding lines TX-61816, TX-61821, TX-55307 and TX-55308. The Virginia trial included the cultivars AT-07V, VC-2, Gregory, Gregory Hi OL, and Georgia 05E. Plots were 2-rows wide (on 40-in centers) and 50 feet in length. Cultivars were arranged in a randomized complete block design with four replications. Verticillium wilt incidence was assessed throughout the growing season (recorded as the number of row feet affected). All plots were planted in late April and harvested in late October to early November. Production practices, other than cultivar selection, were at the discretion of the collaborating producer. Disease assessments were made throughout the growing season. Plots were inverted at maturity and allowed cure in rows prior being harvested.

Disease symptoms were first observed in mid-August and progressed throughout October in a linear fashion (data not shown). Verticillium wilt pressure was high at the Gaines county trial. Disease incidence ranged from 13.5 % (Flavorrunner 458) to 46.0 (TX-061816). High levels of disease were also observed in TX-061821, but not Tamrun OL07 TX-055308, or McCloud. Pod yields were greatest for TX-055307, Flavorrunner 458, TX-055308, and McCloud at 4498, 4429, 4316, and 3996 lb/A, respectively. Disease incidence was highly correlated with yield at this

location (data not shown). Moderate levels of Verticillium wilt were observed at the Terry county Runner trial (Table 9). Disease incidence was greatest for TX-061816 and lowest for TX-055308, TX-055308, and Flavorrunner 458. Despite these differences yields were similar for all cultivars, ranging from 4488 to 5336 lb/A. Overall, disease pressure was lower in the Terry county Virginia trial than in the Runner trial. Significant differences in disease incidence and yield were observed (Table 10). Disease incidence was highest for Georgia 05E and lowest for AT-07V. Yields were greatest for AT-07V (5689 lb/A); whereas, yields for the remaining cultivars were similar to one another.

Summary and conclusions

Verticillium wilt is an increasingly important disease on the Southern High Plains of Texas in both cotton and peanut production. Much information is available with regard to cultivar selection and performance as it relates to Verticillium wilt in cotton; however, information regarding peanut cultivars is limited. Results from these studies indicate that differences in the response to Verticillium wilt are present in both Runner and Virginia cultivars. While the commercial standard cultivar, Flavorrunner 458, performs well in field with a history of Verticillium wilt, producers often comment on the level of disease they observe. Additional studies are needed to better define the performance of commercially available cultivars.

Table 8. Final Verticillium wilt ratings and pod yields for eight Runner peanut cultivars planted in Gaines County^a

Cultivar	Verticillium wilt incidence (%)^b	Pod yield (lb/acre)
TX-055307	30.8 bc	4498 a
Flavorrunner 458	13.5 d	4429 a
TX-055308	14.5 d	4316 ab
McCloud	17.3 d	3996 abc
TX-061821	39.3 ab	3845 bc
Tamrun OL02	19.8 cd	3808 bc
Tamrun OL07	14.0 d	3798 bc
TX-061816	46.0 a	3541 c
LSD ($P \leq 0.05$)	12.1	583

^a Data are the means of four replications. ^b Percent of row feet exhibiting symptoms of Verticillium wilt. ^c Means within a column followed by the same letter are not significantly different according to Fisher's protected LSD.

Table 9. Final disease ratings and pod yields for seven Runner peanut cultivars planted in Terry County^a

Cultivar	Verticillium wilt incidence (%)^b	Pod yield (lb/acre)
Tamrun OL02	4.5 b	5336 a ^c
Tamrun OL07	4.0 bc	5058 a
TX-055307	2.3 c	4941 a
TX-055308	2.0 c	4801 a
Flavorunner 458	3.3 c	4728 a
TX-061816	10.3 a	4645 a
TX-061821	6.0 b	4488 a
LSD ($P \leq 0.05$)	2.5	ns

^a Data are the means of four replications. ^b Percent of row feet exhibiting symptoms of Verticillium wilt. ^c Means within a column followed by the same letter are not significantly different according to Fisher's protected LSD.

Table 10. Final disease ratings and pod yields for five Virginia peanut cultivars planted in Terry County^a

Cultivar	Verticillium wilt incidence (%)^a	Pod yield (lb/acre)
AT-07V	1.8 c	5689 a
VC-2	3.0 bc	4806 b
Gregory	6.8 a	4709 b
Gregory Hi OL	5.3 ab	4549 b
Georgia 05E	7.0 a	4133 b
LSD ($P \leq 0.05$)	2.5	774

^a Data are the means of four replications. ^b Percent of row feet exhibiting symptoms of Verticillium wilt. ^c Means within a column followed by the same letter are not significantly different according to Fisher's protected LSD.