Late leaf spot (Cercosporidium personatum) is one of the predominant pathogens causing reduction in pod yield for peanut producers in the southeastern U.S. Cultivar improvement and reduced fungicide use through improved understanding of host-pathogen interactions offer a promising way to improve yield and reduce cost of peanut production. Therefore, we collected data on disease severity, leaf gas exchange, growth, partitioning and yield of two commercial runner type varieties differing in late leaf spot resistance under fungicide treated and non-treated conditions in the field. Leaf spot pressure was fairly heavy near Gainesville, Florida, in 2009, resulting in significantly greater area under disease progress curve (AUDPC) values for Carver compared to York, consistent with their disease resistance ratings for leaf spot.

Accordingly, total pod yield was greater for York, averaging 3346 kg ha$^{-1}$ compared to 2821 kg ha$^{-1}$ in Carver. A biweekly commercial fungicide schedule increased yield by 533 kg ha$^{-1}$. Interestingly, there was no significant interaction between cultivar and fungicide schedule, indicating that the benefit of fungicide was the same in absolute terms for both varieties. However, the relative increase in yield due to York was only 13% in fungicide-treated plots compared to 26% in untreated plots. Although not significant, fungicide seemed to increase both pod number and average pod size in both cultivars. Fungicide did not affect defoliation in York, but reduced defoliation in Carver. Reductions in leaf photosynthesis at comparable disease severities tended to be greater in York, which could help explain why AUDPC values were greatly reduced compared to Carver while yield only increased marginally. Thus, future efforts to enhance leaf spot resistance should focus on sustaining leaf photosynthesis following infection, which would complement reduced defoliation and spread of disease.