

Tomato Spotted Wilt Epidemiology and Impacts on Peanut Yield

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Spotted wilt disease of peanut (SWP), caused by thrips-transmitted tomato spotted wilt orthotospovirus (TSWV), is a serious constrain in peanut production. SWP incidence in modern peanut cultivars, which possess field resistance to TSWV, has steadily increased since 2012 in Georgia. However, SWP loss estimates have been inferences based on limited field studies with anecdotal assessments of disease incidence, and the actual economic impact of SWP on peanut yield is unknown. Describing disease spread in time and space will aid in assessment of SWP's impacts on peanut. Field experiments were conducted in 2018 and 2019 in Tifton, GA. The amount of disease symptomatic plants and their field positions, disease severity, and thrips densities were assessed over time. Peanut yield was compared between TSWV infected and non-infected plants. Abundance of the major vector, tobacco thrips, was high in the early season and decreased by 80% after 48 days after planting (DAP). More new symptomatic plants were found at 60-90 DAP than earlier or later in the season. Temporal disease progressions indicated monocyclic epidemics in an overall lower incidence year (2018) and some polycyclic epidemics in an overall higher incidence year (2019). Spatial patterns of diseased plant clusters were not aggregated. Secondary spread was suggested by significant spatiotemporal disease distributions with increased disease incidence over time. Disease severity was significantly higher in plants showing symptoms before 62 DAP. Infected plants showing symptoms before 76 DAP had significantly lower biomass, pod production, and marketable kernel yield compared with non-infected plants. Disease severity was negatively correlated to peanut yield. Yield losses of individual plants to SWP ranged from 0-97%, depending on infection timings; on average, SWP reduced 45% peanut yield.