EFFECTS OF VERTICILLIUM WILT ON PHOTOSYNTHESIS, YIELD AND FIBER QUALITY OF GREENHOUSE-GROWN UPLAND COTTON LINES

Addissu G. Ayele
Terry A. Wheeler
Jane K. Dever
Texas A&M AgriLife Research
Lubbock, TX

Abstract

Verticillium wilt is a soil-borne disease that systematically infects cotton (*Gossypium hirsutum L.*) and drastically reduces crop productivity worldwide. To investigate the effects of Verticillium wilt on photosynthesis rate, lint production per plant, and fiber quality, six upland cotton genotypes including a susceptible and resistant check were grown at Texas A&M AgriLife Research, Lubbock, TX under greenhouse condition. Genotypes (both treated with *V. dahliae* and untreated) were arranged in a randomized complete design with six replications. Data on photosynthesis rate and other related physiological traits were recorded using LI-6400 portable photosynthesis systems at 15-day intervals starting from 30 days after planting (DAP) up to 105 DAP. Data on lint yield production per plant was recorded by harvesting bolls from different positions on the plant. Fiber quality of bolls harvested from the first and second fruiting positions were tested using High Volume Instrument (HVI) and Advanced Fiber Information System (AFIS). The result indicates, genotypes treated with Verticillium wilt were highly variable for photosynthesis rate and fiber quality. The rate of photosynthesis, lint yield production, and fiber properties were significantly affected when each genotype was inoculated with microsclerotia of *V. dahliae* suggesting that Verticillium wilt impacts photosynthesis rate, and ultimately cotton lint production per plant, and cotton fiber quality. Compared to the resistant check, breeding lines 16-13-601V maintained good fiber quality and lint yield and is a potential candidate as sources of resistance to develop Verticillium resistant/tolerant varieties in a cotton breeding program.