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Abstract

Vascular wilt diseases, such as Verticillium and Fusarium wilt, are economically important diseases that affect cotton production. They are both capable of extensively reducing cotton yields and negatively impacting fiber quality. Both are soilborne pathogens that cause systemic infections, meaning they are able to live in the soil and enter the root tissues leading to the infection of the vascular system of the plants where they reduce the plants ability to transport nutrients and water from the roots, therefore reducing yield potential and fiber quality. Verticillium wilt is caused by Verticillium dahliae, which survives in the soil as microsclerotia. While infections occur early in the season, disease symptoms typically develop after flowering. Fusarium wilt is caused by Fusarium oxysporum f. sp. vasinfectum, surviving in the soil as chlamydospores. Symptoms of this disease generally occur earlier in the season. Management options for both diseases are limited, depending mainly on variety selection and cultural practices, however, there is interest in industry to evaluate chemical management options. The objective of this study was to evaluate the effect of in-furrow fungicides on two varieties with differing levels of tolerance to the diseases. Trials were conducted at four locations with varying levels of disease pressure. The two fungicides that were used include Propulse (fluopyram + prothioconazole) at a rate of 12 oz/acre and Velum Total (fluopyram + imidicloprid) at 14 oz/acre. The varieties used were FiberMax 1830 GLT (Verticillium wilt tolerant) and Stoneville 4946 GLB2 (tolerant to Fusarium wilt). Field observations were made at Lubbock, Hale, Dawson and Crosby counties in the High Plains region of Texas. The experimental design of the tests was a split-plot design, with the fungicide as the main plot and the variety as the subplot. The treatments were replicated four to eight times per location. Each plot was four rows by 35 feet in length planted on 40 inch centers. Data including disease incidence, lint yield, lint turnout, and fiber quality were analyzed by PROC ANOVA (SAS 9.3). Appreciable levels of Verticillium wilt were observed at only one of the four locations selected (Hale County); whereas Fusarium wilt was observed at the Dawson County location. The Lubbock and Crosby County locations were characterized by no apparent evidence of disease and no differences in disease incidence or yield were observed across treatments or varieties. There was a significant difference (p=0.05) in yield between varieties at the Dawson County location, where Stoneville 4946 GLB2 increased lint yield by 499 lb/ac over FiberMax 1830 GLT. Although not significant, the application of Propulse increased lint yield by 160 lb/ac with both varieties when compared to the non-treated control. At the Hale County location, where the greatest incidence of Verticillium wilt was observed, FiberMax 1830 GLT significantly (p=0.001) increased lint yield by 131 lb/ac over Stoneville 4946 GLB2. Although lint yield differences were not detected with the use of Propulse and Velum Total as in-furrow fungicides, results from this first year of research do suggest promise of the fungicides interacting with varietal characteristics to reduce the impact of Verticillium wilt or Fusarium wilt in cotton. Additional information on the effect of in-furrow fungicides on Verticillium wilt is needed, thus testing will be repeated in subsequent years.