ASSESSMENT OF ACALA/UPLAND AND PIMA COTTONS RESPONSE TO FUSARIUM WILT DISEASE IN THE SAN JOAQUIN VALLEY OF CALIFORNIA

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Abstract

Fusarium wilt of cotton in California has been considered a potentially serious fungal disease caused by the organism Fusarium oxysporum vas infectum (also called "FOV") for many decades in areas of the San Joaquin Valley (SJV). This fungus is a soil-inhabiting organism. Certain forms of this pathogen can survive for long periods in soils, even if the host plant is not present, making it nearly impossible to eradicate from soil once the inoculum is widely distributed. In the past, FOV in the SJV and in western U.S. states was primarily FOV races, Nos. 1 or 2, and typically was found in coarse-textured soils in association with root-knot nematode (Meloidogyne incognita). Recently, a strain of Fusarium (race 4) was identified in the SJV that damages most cultivars of Pima cotton and many Upland cultivars. For the last seven years, we have conducted many field and greenhouse evaluations. These efforts have had two primary purposes: (1) support field efforts to collect plant tissue samples for identification and characterization of FOV race (focusing on race 4); and (2) to conduct germplasm evaluation-trials to identify useful genetic differences in susceptibility/resistance to race 4 FOV. Germplasm evaluations to date can be summarized as follows: (1) most Pima varieties show more severe symptoms and suffer higher levels of stunting and plant mortality than Acala/Uplands; (2) several highly-resistant commercial Pima varieties and USDA-ARS experimental germplasm have been identified at evaluations done at multiple sites; and (3) most Acala / Upland germplasm tested, while less severely impacted than most Pima varieties, were infected by the race 4 FOV when present in soil at field sites or when inoculated in greenhouse trials. Results from our studies can be utilized in further genetic evaluations and to identify sources of host plant resistance useful to growers and breeders. Development of host-plant resistance is currently considered the most economic and effective strategy for managing FOV in California cotton production regions.