BELTWIDE BREEDERS' ELITE-UPLAND GERMPLASM-POOL ASSESSMENT OF FUSARIUM WILT (FOV) RACES 1 & 4 IN CALIFORNIA

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Abstract

Host-plant resistance is currently the most economic and effective strategy for managing Fusarium wilt [*Fusarium oxysporum* f. sp. *vasinfectum* (FOV)] in the San Joaquin Valley (SJV) of California. Recently, a strain of Fusarium (race 4) was identified in the SJV that damages most cultivars of Pima cotton and many Upland cultivars. To assess the vulnerability of Upland cotton production in California to this disease, elite germplasm consisting of 42 entries from ten public breeding programs was evaluated for response to FOV. Evaluations were done at two race 4 infested field sites (Fresno and Kern Co.), and one race 1 site [co-infested with root-knot nematode (RKN)] (Shafter) using a RCBD with three blocks. Five plants of each entry per block were scored for vascular root staining (VRS, scale 0=no visible staining to 5=plant death) and percentage survival (PS). Both measures of infection were significantly correlated between the two race 4 sites ($r=0.58$ and $r=0.37$, respectively), indicating overall similarity in the responses of evaluated lines at both sites. Neither measure of infection was correlated between the race 1 site and either race 4 site ($P>0.05$). Averages for VRS and PS, respectively, were 2.10 and 55 % (Fresno Co.); 2.0 and 61%

(Kern Co.); and 1.3 and 84% (Shafter). The VRS and PS for checks susceptible to FOV race 4 were 4.4 and 5 % for Fresno Co., and 3.0 and 6 % for Kern Co. (Pima S-7), and 2.6 and 60% for Fresno Co., and 2.1 and 26 % for Kern Co. (Acala/Upland Phytogen 72). Additional analyses revealed interactions in disease response among germplasm lines, FOV races (1 and 4), and evaluation sites. Selected lines from AL, AR, and MS appeared tolerant to both FOV races. Our findings reveal the need for evaluation and breeding for multiple types of disease resistance, which is essential to continued growth and competitiveness of the cotton industry.