IDENTIFICATION OF RESISTANCE SOURCES TO FUSARIUM WILT RACE 4 IN *GOSSYPIUM BARBADENSE* AND CULTIVATED DIPLOID COTTON SPECIES

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Abstract

Fusarium wilt (FW, *Fusarium oxysporum* f.sp. *vasinfectum* Atk. Sny & Hans) race 4 (FOV4) has become a serious problem in the U.S., as it causes seedlings death early in a production season. Identification of different sources of resistance to FOV4 is the pre-requisite for breeding cotton for disease resistance. Cultivated diploid or Asiatic species (*Gossypium arboreum* and *G. herbaceum*) may contain resistance to FOV4, because both the cotton species and the fungal race originated from the same region. Therefore, resistance lines maybe existed in the cotton species that can be identified through germplasm screening. In addition to Pima S-6 which is currently the sole known source of resistance in Pima cotton, other sources of FOV4 resistance may be existent in *G. barbadense*. In this study, 372 Asiatic and 152 Pima accessions were evaluated under temperature-controlled conditions at 20-23^{o}C to assess FOV4 resistance at 7, 14, 21, and 28 days after inoculation (DAI). Foliar disease severity ratings (DSR) at 28 DAI were determined and used to evaluate cotton for FOV4 resistance, based on a rating scale from 0 to 5, with 0 for no symptoms and 5 for plant death. Significant genotypic differences were detected for FOV4 resistance within the Asiatic and the Pima accessions. At 28 DAI, DSR had a mean of 3.89 and 4.32 in the diploid and Pima accessions, respectively. In addition, 50 and 80% of the lines exhibited 100% mortality rate in the diploid and Pima accessions, respectively. The most resistant diploid accessions were A1002, A1124, A1127, A1171, A1184, A1203, A1253, A1282, A1299, and A1808 with DSR ranging from 0.63 to 2.61. The top resistant Pima accessions were AZB 918, AZK 271 and Russian no. 5296 from the former Soviet Union, Giza 7 and Giza 67 from Egypt, Tanguis 8465 from Peru, and Xinhai 16 and Xinhai 30 from China, with DSR ranging from 2.5 to 3.21. The results indicated that the diploid Asiatic accessions as a while are more resistant to FOV4 than the *G. barbadense* accessions. Heterogeneity in FOV4 resistance was detected in the most resistant accessions. Further pedigree selection should increase frequencies of resistant plants in the heterogeneous accessions.