EVALUATION OF A MAGIC POPULATION DERIVED FROM RMBUP-C4 FOR VERTICILLIUM

WILT RESISTANCE G. K. Martinez Jr. Z. Larson A. Abdelraheem Jinfa Zhang New Mexico State University Las Cruces, NM J. McCarty Jr. J. N. Jenkins USDA ARS Mississippi State, MS

Abstract

Verticillium dahliae Kleb., a soil borne plant pathogen that causes Verticillium wilt (VW) in Upland cotton (Gossypium hirsutum L.), is one of the most damaging diseases to the global cotton industry. Isolates of V. dahliae can be classified into defoliating and non-defoliating pathotypes. The development of cotton cultivars with VW resistance remains the only practical option. G. barbadense L. is known to convey high levels of resistance to V. dahliae: however, breeders have faced challenges transferring this resistance to G, hirsutum. The objective of this study was to evaluate 712 lines in an inter-mated Upland population for Verticillium wilt resistance. The 712 lines were derived from RMBUP-C4 (Reg. No. GP-961, PI 665950), which is a unique random-mated germplasm population of Upland cotton with introgression of G. barbadense alleles. Verticillium wilt resistance was evaluated in two replicated tests based on disease incidence and severity in the greenhouse. Test 1 consisted of 712 lines and Test 2 consisted of 200 lines selected from the 712 initial lines in Test 1. The plants in both tests were inoculated via pipette method with roughly 1.0 - 2.0×10^6 spores at the 3rd true leaf stage with a defoliating type isolate. The lines were screened at 58 days after inoculation (DAI) in Test 1 and 51 DAI in Test 2. The total number of remaining leaves and abscised leaves were counted on a plant basis. Significant differences between the lines were observed for both the number of remaining leaves (p < 0.033) and abscised leaves (p < 0.017). Genotypic differences (p < 0.0001) in regards to disease severity ratings were also observed after combining the results from the two tests. The top ten most resistant genotypes and the ten most susceptible genotypes were selected based on their disease severity ratings. The difficulty of achieving consistent and uniform inoculation with soil borne pathogens such as V. dahliae continues to be a problem in phenotypic selection. Therefore, replicated tests are recommended in order to negate experimental errors as much as possible.