PATHOGENECITY TEST OF FUSARIUM WILT AND SCREENING GERMPLASM LINES FOR FUSARIUM WILT RESISTANCE IN COTTON

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Abstract

Fusarium wilt (FW), caused by soil-borne pathogen *Fusarium oxysporum* f. sp. *vasinfectum* (FOV), has become a threat in cotton production in the US. The objectives of this study were, (1) to identify FOV in New Mexico and evaluate to pathogenicity of FOV isolates collected from southern New Mexico and Fabens, Texas; and (2) to evaluate commercial cotton cultivars and advanced breeding lines for FW resistance under the greenhouse conditions. A total of 21 isolates were collected from different cotton fields in Las Cruces and the neighboring areas, NM and Fabens, TX in May 2018 and identified based on morphological characteristics and DNA sequences coding for translation elongation factor (EF-1±) and ² -tubulin (BT). Colonies of 19 isolates exhibited *F. oxysporum*-like morphology and the 19 isolates were identified as FOV based on DNA sequences coding for EF-1±. The other two isolates were identifed as *F. solani* and *F. proliferatum*. All the isolates were tested for their pathogenicity with four cotton genotypes in the greenhouse. The results showed that all the 21 isolates were pathogenic and exhibited different levels of virulence to the four cotton genotypes based on foliar disease severity ratings. A total of 104 cotton germplasm lines were evaluated for FOV resistance in three independent tests using a randomized complete block design with 3 replications in each test. The analysis of variance showed that there was a significant genotypic variation. The overall average foliar disease severity ratings across the three tests ranged from 1.03 to 3.02. No cotton germplasm lines tested was immune to FW, but 15 lines were more resistant to FW with an overall average severity ratings below 2. These lines were: TAM 13Q-51 (1.03), TAM WK-11L (1.60), TAM 13S-03 (1.62), Ark 0921-31ne (1.64), PD 09046 (1.65), DP 493 (1.66), TAMCOT G11 (1.71), DG 3385 B2XF (1.85), NM 16M1070 (1.86), NG 3406 B2XF (1.90), UA 222 (1.91), DP 1646 B2XF (1.92), NM 13R1015 (1.94), and Ark 0908-60 (1.98), Ark 0912-18 (1.98).