ROLE OF FUSARIC ACID IN THE VIRULENCE OF COTTON WILT PATHOGEN *FUSARIUM OXYSPORUM* F. SP. *VASINFECTUM*

J. Liu
J. Cho
A. A. Bell
R. D. Stipanovic
L. S. Puckhaber
USDA-ARS-SPARC
College Station, TX
R. L. Nichols
Cotton Incorporated
Cary, NC

Abstract

Fusaric acid is a potent phytotoxin to cotton. It has also long been implicated in the pathogenesis of Fusarium wilt for a number of plant species including cotton, tomato, watermelon, and flax. The Australian biotype isolates of *Fusarium oxysporum* f. sp. *vasinfectum* (Fov) produce copious amount of fusaric acid in culture and virulence among isolates is directly correlated to the amounts of fusaric acid produced. Race 4 isolates of Fov that cause severe yield loss to susceptible Pima cotton cultivars in the San Joaquin Valley of California also produce relatively high amounts of fusaric acid. To assess the role of fusaric acid in the virulence of these isolates, we identified and cloned genes for a polyketide synthase and an amino acid kinase that are involved in the biosynthesis of fusaric acid in these virulent Fov lines. We also generated gene disruption mutants for each of the two genes in the Australian biotype Fov isolates. The respective transformed isolates failed to produce detectable fusaric acid. Pathogenicity test on susceptible cultivar Coker 312 demonstrated that knocking-out fusaric acid production did not affect the isolate's ability to colonize the host, but significantly reduced virulence. The results indicate that fusaric acid plays an important role in the pathogenicity of the Australian biotype isolates of Fov.