## FUSARIC ACID PRODUCTION AND PATHOGENICITY OF *FUSARIUM OXYSPORUM* f. sp. *VASINFECTUM* Jinggao Liu Alois A. Bell Robert D. Stipanovic Lorraine S. Puckhaber USDA-ARS-SPARC-CPRU

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## **Abstract**

In recent years, Fusarium wilt of cotton has gained increased importance with the emergence of extremely virulent strains of *Fusarium oxysporum* f. sp. *vasinfectum*. The recent discovery of new pathotypes not previously found in the U.S. is of particular concern to the cotton industry. In addition, a virulent Fov biotype has been identified in Australia that can cause > 60% plant mortality. While the Australian biotype has not been found in U.S. fields, a newly discovered Fov race 4 is of increasing concern due to losses of Pima cotton in California. In contrast to US race 1 isolates, which are often associated with root-knot nematodes and thrives in light textured sandy acid soils, race 3, race 4 and the Australian biotypes attack cotton seedlings without root-knot nematode in heavy alkaline clay soils. They also produce prodigious quantities of fusaric acid (FA) when grown on Czapek media. FA is a potent phytotoxin especially to cotton and evidence implicated it in the pathogenicity of races 3, 4, and Australian biotype Fov isolates. We confirmed that FA is derived in part via a polyketide synthase (PKS) through isotope labeling studies. We identified and cloned a gene cluster containing a PKS gene and an amino acid kinase gene. Targeted gene disruption of either of these genes in an Australian biotype Fov isolate resulted in complete blockage of FA production. These FA knockout mutants showed much weaker pathogenicity than their wild type progenitor toward tomato seedling in the seedling germination bioassay on agar plates. These results indicate that fusaric acid play an important role in the pathogenicity of the Australian biotype isolates.