

BREEDING FOR FUSARIUM WILT (FOV) RACE 4 RESISTANCE IN COTTON**Mauricio Ulloa and Michael R. McGuire****USDA-ARS,****Shafter, CA****Robert Hutmacher and Brian Marsh****Univ. of California, Shafter CA****Shafter, CA****R. Michael Davis****Univ. of California - Davis****Davis, CA****Richard Percy****USDA-ARS****Maricopa, AZ****Abstract**

Fusarium oxysporum f.sp. *vasinfectum* (FOV) Atk. Sny & Hans continues to threaten cotton production in the U.S. Several troubling developments with this pathogen (e.g., newly-recognized Australian FOV races) highlight the need for additional comprehensive research to protect our cotton industry against this pathogen, either from introduced virulent populations or virulent strains arising from within our borders. Recently, a FOV race 4 isolate has been identified in California soils. Disease expression of this race has been most severe in Pima cotton fields, but also has the capability to infect many Acala and Upland cotton varieties to a high degree depending upon inoculum levels. In order to assess the U.S. cotton gene pool and study the resistance inheritance of FOV race 4, in 2003 and 2004 more than 150 Pima and Acala/Upland commercial and experimental varieties, and improved germplasm were evaluated in known infested fields and in inoculated greenhouse assays. For the heritability study, 32 Pima (*Gossypium barbadense* L.) populations were used. Each population was derived from a single F₂ plant. Preliminary results showed that most commercial Pima varieties grown in California were observed to be more susceptible to FOV race 4 (stand loss, stunting, etc) than any Upland cottons (*G. hirsutum* L.). However, tested Acala and non-Acala Upland cotton varieties were still infected by FOV race 4 at levels where plants would be expected to reproduce the fungus and expand inoculum. Highly resistant germplasm to FOV race 4 were identified on Pima for inoculum levels tested (field and greenhouse). In Pima for this study, preliminary results showed that resistance for FOV race 4 may be inherited quantitatively and controlled by several genes. Heritability estimates indicated that selection for FOV race 4 may be accomplished in early as well as advanced generations. Development of highly resistant germplasm and genetic mapping populations are ongoing in order to further study FOV resistance and its heritability.