MECHANISMS IN COTTON SORESHIN BIOCONTROL BY TRICHODERMA VIRENS: VIRIDIOL PRODUCTION C. R. Howell and R. D. Stipanovic USDA, ARS, Southern Crops Research Laboratory, College Station, TX

<u>Abstract</u>

Phytotoxin (viridiol) production by the fungal biocontrol agent Trichoderma (Gliocladium) virens has long been thought to be a limiting factor in the amount of biocontrol preparation that can be used as seed treatment for disease control. In order to test this hypothesis and obtain more effective biocontrol strains, and based on the premise that mutant strains deficient for viridiol production would have more sterol available to overcome the adverse effects of sterol-inhibiting fungicides, putatively viridiol deficient mutants were produced by irradiating T. virens conidia with 254 nm UV light for 55 seconds and incubating the survivors on PDA containing 0.25 ug ml⁻¹ of the sterolinhibiting fungicide flusilazole (NUSTAR) for 5 days. Parent strains produced dense compact colonies on the medium, while mutants produced diffuse and spreading colonies. The latter were transferred to a liquid medium containing 5% ground millet and 1 % ground peat moss and shake incubated for 4 days. The cultures were then centrifuged and the solids were air-dried and ground for use in bioassays. The culture filtrates were extracted with chloform and the extracts were fractionated via TLC and HPLC. Approximately 20% of the mutants transferred from assay plates were deficient for viridiol production, while maintaining production of gliotoxin and viridin.

In bioassays of parent and mutant strains for efficacy against soreshim incited by *Rhizoctonia solani*, many mutants showed reduced biocontrol activity, but some showed activity equivalent to that of the parent strains.

Suppression of viridial production in mutant strains virtually eliminated the phytotoxicity to cotton radicles exhibited by parent strains, although some delay in root development was noted when compared to nontreated control seedlings.

The use of viridiol-deficient mutants of *T. virens* to treat cotton seed should result in seedling disease control without adverse phytotoxic effects on the developing root system.

Reprinted from the Proceedings of the Beltwide Cotton Conference Volume 1:271-271 (1996) National Cotton Council, Memphis TN