

FIELD DAY REPORT - 1996

TEXAS A&M UNIVERSITY AGRICULTURAL RESEARCH and EXTENSION CENTER at OVERTON

**Texas Agricultural Experiment Station
Texas Agricultural Extension Service**

Overton, Texas

June 20, 1996

Research Center Technical Report 96-2

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A FUSARIUM WILT DISEASE NURSERY FOR WATERMELON

J. T. Baker, R. Rodriguez, R. D. Martyn, D. R. Earhart,
F. J. Dainello, and M. L. Baker

Background. Watermelons are grown commercially on at least 222,300 acres annually in the United States, not including production in home gardens and small truck farms. Texas historically ranks first or second in watermelon production with an estimated acreage of 50,000 to 60,000 acres. East Texas is generally considered the major watermelon production region in Texas with an estimated 25,000 acres.

Fusarium wilt disease, caused by the soil-borne fungus *Fusarium oxysporum*, is a major yield and quality limitation for watermelon production. This pathogen is widespread throughout the United States with a high degree of persistence once established in a field. Long-term crop rotations or leaving the soil fallow for several years helps reduce pathogen populations, but, in general, does not eradicate the pathogen.

In the late 1970's, Fuqua and Smith identified an area at the Texas A&M University Agricultural Research and Extension Center at Overton which showed some degree of infestation with the fusarium wilt pathogen. In order to establish the Overton Center's Fusarium Wilt Disease Nursery, two plots in this area, 0.7 acres each, were cleared and infested with laboratory-grown fusarium inoculum in 1993 and 1994. In order to build high levels of fusarium wilt populations for research purposes, the highly fusarium-wilt susceptible watermelon cultivar 'Black Diamond' was grown as a cover crop in both years.

Current Information. *Colletotrichum magna* is a foliar pathogen of watermelon. Researchers at the U.S. National Biological Survey Laboratory, Seattle, Washington, have selected a mutated form of *C. magna* that will colonize and grow in watermelon plants but cause no disease. In preliminary laboratory studies, it was found that watermelon plants that were inoculated with *C. magna* became resistant to fusarium wilt disease. Furthermore, it was found that watermelon plants that were inoculated with *C. magna*, but not challenged by fusarium wilt disease, appeared to grow faster and produce more fruit than non-inoculated plants.

Current field experiments being conducted in the Overton Center's Fusarium Disease Nursery are designed to test the potential of *C. magna* inoculated plants to withstand fusarium wilt disease. Plans for future experiments include screening a wide range of watermelon varieties for resistance to fusarium wilt. Plant breeders from both the public and private sector will be invited to submit watermelon variety entries for screening on a fee per entry basis. Field days and short

courses for the seed industry, plant breeders, and producers will be held annually.

Application. Continued profitability of East Texas watermelon production is contingent upon selection of watermelon varieties that demonstrate resistance to fusarium wilt or to the development of inoculation procedures that induce resistance in susceptible varieties such as with *C. magna*. Field screening of cultivars and inoculation treatments is critical for the complete evaluation of a given germplasm's full genetic potential. The Overton Center's Fusarium Wilt Disease Nursery provides an area where in-depth field research into factors affecting this disease development and its control can be readily manipulated, controlled, and monitored. Furthermore, this nursery will enable The Texas Agricultural Experiment Station to play a major role in developing watermelon varieties and inoculation treatments to support the \$100,000,000 annual business in Texas.