

PUBLICATIONS

1993

FIELD DAY REPORT - 1993

Texas A&M University Agricultural Research and Extension Center at Overton

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

Overton, Texas

May 28, 1993

Research Center Technical Report 93-1

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FUSARIUM WILT DISEASE NURSERY ESTABLISHMENT FOR WATERMELON SCREENING

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Background. Watermelons are one of the most extensively planted and popular summer fruits grown. Approximately 222,300 acres are produced commercially in the United States each year, and undoubtedly, many more in home gardens and on small truck farms. Texas historically ranks first or second in watermelon production in the U.S. with an estimated acreage of 50,000 to 65,000 acres. East Texas is generally considered to be the major watermelon producing region in Texas with an estimated acreage of 25,000 acres.

Fusarium wilt, caused by a soilborne fungus (*Fusarium oxysporum*), is a serious disease of watermelon and can be a limiting factor in production. The pathogen is widespread throughout the U.S. and the world. Once a field is infested, it can survive for many years.

Current Information. Long-term crop rotation and leaving the soil fallow for several years helps reduce the pathogen population but generally does not eradicate the pathogen. Genetic resistance has consistently proven to be the most effective and efficient means of control. Several races of the pathogen have been described and affect watermelon cultivars differently. The most common race is race 1, and most commercial cultivars have a high level of resistance to this race.

In recent years, a new race (race 2) was described in the U.S. and has been reported in Texas, Florida, and Oklahoma. Currently, there is no resistance to race 2 in commercial cultivars.

Application. Continued profitability of East Texas watermelon production is contingent upon development of watermelon cultivars that demonstrate resistance to both races and are adaptable to this area. Field screening of cultivars is critical for a complete evaluation of a given germplasm's full genetic potential. The fusarium wilt nursery will provide an area in which in-depth field research into factors affecting this disease development and its control can be reliably manipulated, controlled, and monitored. Furthermore, a fusarium disease nursery at Overton will enable The Texas Agricultural Experiment Station to play a major role in developing watermelon varieties to support the \$100,000,000 annual business in Texas and establish itself as the leading authority and center of excellence in the United States for fusarium research.

Nursery establishment will be divided into three phases. Phase 1 will consist of the establishment of the nursery area. This will be accomplished in the spring of 1993 by obtaining soil samples, working the area selected, applying lime and fertilizer as needed, planting varieties susceptible to fusarium, and indexing site for fusarium incidence. Also, at this time a team of scientists will be assembled to manage

field operations, coordinate with industry, develop indexing techniques, coordinate Extension activities, and evaluate potential varieties. In spring of 1994, specific sites within the nursery for screening of the two major races (1 and 2) will be established. These sites will be infested with laboratory cultures of races 1 and 2. Plant indicator varieties such as 'Black Diamond' and 'Calhoun Gray' will be planted.

Phase 2 will be initiated in the spring of 1995. Breeders from both the public and private sector will be invited to submit entries for indexing on a fee per entry basis. Field days and short courses for the seed industry, plant breeders, and producers will be held annually.

Phase 3 will be tentatively initiated in 1997. In this phase, mechanisms will be set up to conduct in-depth research to study fusarium in an attempt to develop best management practices for its control.