SCREENING FOR RESISTANCE IN UPLAND COTTON (GOSSYPIUM HIRSUTUM) TO PYTHIUM ULTIMUM

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Abstract

Pythium ultimum can be a major component of the seed-seedling disease complex of cotton on the Texas High Plains. Twelve isolates were tested for pathogenicity using a culture plate method. The method was developed by N.A. Altier and J.A. Thies at the University of Minnesota in screening alfalfa for resistance (1995). Cultures were grown on corn meal agar for three days at 22° C. *Pythium* cultures were then transferred to water agar and grown for three days at 22° C. 'Paymaster HS-26', a known susceptible cultivar, was used to determine the virulence of the isolates.

The most virulent isolate was used to screen breeding lines in search of resistance to *P. ultimum*. *Pythium* was transferred from corn meal agar plates to water agar and grown for three days at 20° C. Breeding lines were then sterilized in 30 percent hydrogen peroxide for 10 minuets and air dried. Breeding lines were placed on pure cultures of *Pythium ultimum* and on uninoculated plates of water agar. Each line was plated on uninoculated water agar so that germination could be determined. The breeding lines were then placed in a growth chamber for 7 days at 19° C. On the eighth day the lines were examined using a rating system to quantify resistance. This rating system consists of disease readings, percent mortality and percent resistance. Disease readings are based on a scale from 1 to 5. A reading of one designates a healthy seedling; a reading of two designates a firm but necrotic radicle; a reading of three designates a soft and necrotic radicle; a reading of four designates a petruding radicle but rotted seed; a reading of five designates a rotted seed. Percent Mortality describes the number of seed that did not germinate in the presence of the pathogen. Percent resistance is figured by taking the sum of the disease readings of 1 and 2 and dividing them by the number of germinated seed. These three components of disease rating system have proved effective.

Three upland cotton breeding lines (1535, 124 and G-152) showed good resistance using this technique. Resistant seedlings were increased in a greenhouse. Seed from selected plants were screened again to verify resistance and identify possible escapes. Resistant breeding lines will be hybridized with other breeding lines with superior agronomic traits in future work.

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