

**SEEDLING VIGOR EFFECTS ON EVALUATION OF GENETIC RESISTANCE
TO RENIFORM NEMATODE IN *GOSSYPIMUM HIRSUTUM***

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An earlier screening of virtually all upland cotton accessions contained in the USDA cotton collection on reniform nematode resistance resulted in identifying 7 accessions with moderate resistance levels. Two of those accessions were retained for further study: TX245 (promising agronomic characteristics) and TX1419 (promising resistance characteristics). Both were crossed with four adapted upland cotton lines: FM966, PM1218, DeltaPearl and SG747.

Further screening for reniform nematode resistance was conducted on 120 F_{2:3} progeny lines of TX245 x PM1218 and TX1419 x PM1218 crosses (60 lines each). In these tests, the earlier detected moderate resistance levels could not be replicated. In addition, widespread variability in test results was observed.

In order to further our understanding of variability in nematode resistance measurements, especially as it applies to erratic performance of a particular genotype, an experiment was conducted to investigate the relationship between seedling vigor (age and condition) and genetic resistance to reniform nematode. Seed samples of TX245 and TX1419, together with samples from two cultivars (FM966 and PM1218) and with LONREN2 added as a check, were exposed to stress conditions (40°C at 100% humidity) for six different times (0 to 120 hr in increments of 24 hr). The origin of all stressed seeds was identical: all came from plants cultivated under identical conditions in the same field in 2008 at Auburn University's Plant Breeding Unit in Tallahassee, Alabama.

Standard (30°C/86°F for 7 days) and cool (18°C/64.4°F for 7 days) germination tests were carried out on all exposed samples. Germination rate decreased with increased length of exposure time to adverse conditions. PM1218 showed the least decrease in both the standard and cool tests: 5% and 22% reductions over 120 hrs respectively. The exotic TX accessions showed the largest decrease in germination rates: 42% for TX1419 in the standard test and 59% for TX245 in the cool test.

At the conclusion of all germination tests, radicle lengths of all germinated seeds were measured. Over the 120 hr exposure period, average radicle lengths decreased between 10% (TX1419) and 36% (FM966) and between 49% (TX245) and 70% (FM966) in the standard and cool germination tests, respectively.

Resistance to reniform nematode was evaluated in four identical sets: two sets in the spring and two sets in the fall of 2009. Seedlings from all genotypes, representing all adverse condition exposure time periods, were grown in individual cone-tainers on an autoclaved 68% sand / 20% silt / 12% clay mixture. All cone-tainers were inoculated with 1000 juvenile and vermiform adults of *R. reniformis* one week after planting. Vermiform nematodes were counted 60 days after inoculation. Shoot dry weight and root fresh and dry weights were also recorded.

Statistical analysis of collected data failed to demonstrate a significant correlation between nematode reproduction on cotton seedlings and the adverse conditions seeds were exposed to. We conclude that genetic resistance to reniform nematode is not significantly influenced by the age and condition of cotton seedlings.

References

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