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FIELD EVALUATION OF RENIFORM NEMATODE RESISTANCE IN PRIMITIVE COTTON ACCESSIONS IN ALABAMA, LOUISIANA, MISSISSIPPI, AND TEXAS

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Abstract

Sources of resistance to the reniform nematode have been discovered in several *Gosyspium* species and several laboratories have projects underway to transfer resistance into agronomic cotton from resistant primitive accessions. Until 2002, however, resistant accessions identified in pot studies to our knowledge had been tested in only one field experiment, near Weslaco, TX, and in that study no accessions of *G. arboreum*, *G. herbaceum*, or *G. barbadense* suppressed nematode populations sufficiently to be agronomically useful. Subsequent microplot and growth chamber experiments in 2001 indicated the genetic composition of the nematode population at Weslaco was not responsible for differences between greenhouse and field results, but some other soil-specific factor was involved. In 2002, parallel field experiments were conducted at Weslaco, TX, Baton Rouge, LA, Stoneville, MS and Huxford, AL to determine whether accessions resistant in pots would fail to show resistance at additional sites where the reniform nematode is considered important. With one exception, the following genotypes were planted at each site: *G. arboreum* A2-87, *G. herbaceum* A1-17, *G. longicalyx* F1-1, the resistant *G. barbadense* accessions GB-49, GB-264, GB-536, GB-713, TX-110, and TX-1348, and the susceptible *G. hirsutum* cultivars Suregrow 501 and Fibermax 832. Primitive accessions grew well, reaching heights and foliar biomasses comparable to or exceeding agronomic cotton at each site. Soil was sampled in 15-cm increments from the surface to 120 cm in each plot at harvest and analyzed for nematode content and total root length. Soil texture and moisture at each depth were also analyzed in some samples. Results indicated that resistant accessions did not suppress reniform nematode populations adequately at any site. Soil samples taken 120 cm deep in fallow areas showed an unexpected high rate of nematode survival, and contained 29-44% of the nematodes found under the susceptible control. When numbers of nematodes in fallow samples were subtracted from nematodes under each accession, resistance expression was highly significant and the pattern of relative resistance levels among the genotypes mimicked that observed in pot studies. The lowest nematode population densities were under *G. arboreum* A2-87, *G. barbadense* GB-713, and *G. longicalyx* F1-1. It was concluded that resistance was probably expressed at each site at levels comparable to those predicted by pot studies but was masked by nematodes surviving in the soil from the previous year's crop. Thus, cotton breeders probably will not be able to utilize nematode population densities to monitor inheritance of reniform nematode resistance in field nurseries and future use of reniform nematode-resistant cultivars may require supplemental nematicide application the first year to eliminate nematodes in the soil surviving from the previous year's crop.