

DEVELOPMENT OF ROOT-KNOT NEMATODE RESISTANT GERMPLASM WITH HIGH YIELD AND FIBER QUALITY**R. F. Davis****USDA-ARS****Tifton, GA****P. W. Chee****E. L. Lubbers****University of Georgia****Tifton, GA****O. L. May****Delta and Pine Land Company****Tifton, GA****Abstract**

Meloidogyne incognita, the southern root-knot nematode, causes greater yield losses in cotton than any other single pathogen in the US. Although highly-resistant germplasm has been available for years, it is now generally considered to be obsolete when compared to the yield and fiber quality of newer genotypes. In 2001, we began incorporating resistance to *M. incognita* from M-120 RNR into the susceptible PD94042, which has better yield and fiber quality than the available highly-resistant germplasm lines. A single seed descent method was used and plants in each generation were selected individually for resistance. Individual plants with the highest level of resistance were back crossed into PD94042 for three generations followed by eight generations of self-pollination with selection of only the most resistant plants carried to the next generation. After eight generations, individual plant selection ceased, and a line designated GA120R1B3 was selected for field evaluation. In 2007, yield and nematode resistance were evaluated at one location infested with *M. incognita*. In 2008, yield, resistance, and fiber quality were evaluated in two nematode-infested fields (data pooled for analysis) and two non-infested fields (data pooled for analysis). All reported differences are at $P \leq 0.05$. In 2007, root galling (0 to 10 scale) on GA120R1B3 (0.8) was equal to the resistant parent M-120 RNR (galling = 0.6) and less than on the susceptible standards DP147RF (7.4) and FM966 (8.0). Similarly in 2008, root galling on GA120R1B3 (1.0) was equal to M-120 RNR (0.4) and less than on DP147RF (6.1) and FM966 (7.3). In a root-knot nematode infested field in 2007, yield of GA120R1B3 (954 kg/ha) was greater than FM966 (537 kg/ha) and equal to DP147RF (800 kg/ha) and M-120 RNR (782 kg/ha), and the lint fraction for GA120R1B3 (0.416) was equal to DP147RF (0.407) and PD94042 (0.405) but greater than FM966 (0.397) or M-120 RNR (0.383). In the infested fields in 2008, yield of GA120R1B3 (1291 kg/ha) was equal to FM966 (1114 kg/ha) and M-120 RNR (1131 kg/ha) and greater than DP147RF (953 kg/ha), and the lint fraction was greater for GA120R1B3 (0.444) than for DP147RF (0.427), FM966 (0.419), or M-120-RNR (0.397). In the non-infested fields, yield of GA120R1B3 (859 kg/ha) was equal to DP147RF (865 kg/ha) and FM966 (974 kg/ha), but GA120R1B3 had a greater lint fraction (0.455) than DP147RF (0.429) or FM966 (0.417). In infested fields in 2008, fiber length of GA120R1B3 (1.25) was equal to DP147RF (1.23) and greater than FM966 (1.16) and M-120 RNR (1.15), and micronaire of GA120R1B3 (4.63) was equal to DP147RF (4.58) and FM966 (4.78) but less than M-120 RNR (5.13). In non-infested fields in 2008, neither fiber length nor micronaire differed among GA120R1B3, DP147RF, and FM966. The germplasm line GA120R1B3 suppresses *M. incognita* as well as existing resistant germplasm, and GA120R1B3 has longer fiber length, lower micronaire, and greater lint fraction than existing resistant germplasm. A germplasm release is in preparation.