RECOMBINATION OF DNA MARKERS FOR RENIFORM AND ROOT-KNOT NEMATODE RESISTANCE IN LONREN X ACALA NEMX HYBRIDS

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Abstract

The genes for resistance to reniform and root-knot nematodes are both located on the same arm of chromosome 11. Consequently, recombining them could be difficult depending on how closely they are linked. Also, it is possible that some LONREN lines may be better parents than other lines, since they have different chromosome segments integrated into chromosome 11. We made crosses between six different LONREN lines from different BC_1 families and Acala NemX; F_2, F_3, BC_1 from F_2, and BC_2 generations were analyzed to determine how readily the SSR markers CIR 316_202 and BNL 3279_114 for root-knot and reniform resistance, respectively, would recombine. Recombination among F_2 plants varied from 0% for the MB LONREN Line, lacking both BNL 1066_156 and BNL 836_215 markers, to 19% for the ML LONREN Line, lacking the green fuzz marker. The four lines with segments that were intact from *G. longicalyx* (i.e., BNL 836_215 through green fuzz) gave recombination frequencies of 1-2%. All eight plants with recombination of CIR 316_202 and BNL 3279_114 also had the BNL 1231_null marker of *G. longicalyx* showing that a crossover occured between the CIR 316 and BNL 1231 alleles. F_3 and BC_1 progeny generally segregated in 1:2:1 and 1:1 ratios, respectively, as expected for a single gene. BC_2 progeny from BC_7S_2 plant ME-25 showed linkage between CIR 316_202 and BNL 3279_114 but had a recombination rate of 32%. Thus, the two markers recombine much more readily from the recombinant plants than from the original LONREN lines. Homozygous recombinant lines from BC_7S_2 plants ME-25 and MO-30 had white linters and excellent fiber quality equal to that of the Acala NemX parent and were superior in fiber length compared to the ML LONREN line with white linters. Biological assays are in progress to determine the resistance of the stacked lines to root-knot and reniform nematodes. Release of at least 3 lines is anticipated in 2008.