Short Staple Breeding, Genetics and Cytology

BREEDING FOR RESISTANCE TO PINK BOLLWORM

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AET-5 resistance to pink bollworm is being transferred into various nectariless, okra leaf versions of breeding stocks and cultivars and include the following: DES 24, DES 24 semi-smoothleaf (Sm_3), DES 56, Deltapine 712, Deltapine 712 Smoothleaf (Sm_2), Deltapine 733, Deltapine NSL, Stoneville 825N, Stoneville 870IN, and Stoneville 8737N.

Two new sources of antibiosis to pink bollworm, T-39B-2-L and T-39C-1-L, are being transferred into DES 24 nectariless, okra leaf; DES 24 nectariless semi-smoothleaf, okra leaf; DES 56 nectariless, okra leaf; and Stoneville 825 nectariless, okra leaf.

The nectariless-okra leaf combination is being transferred into a range of backgrounds, including DES 24, DES 56; Deltapine 62, 120, 712, 733, and NSL; Stoneville 825, 8701, 8737; and 7203-14-104.

In 1983, 32 advanced-generation backcross progenies were tested for pink bollworm resistance; donor parent was AET-5 and recurrent parents were 24-8ne, DES 24 neSm_3, and DES 56ne. One of the 17 24-8ne progenies was saved for future testing (27.3% seed damage vs. 44.8% for 24-8ne), while four of the 14 DES 56ne progenies were saved (14.6 to 19.8% seed damage vs. 36.5% for DES 56ne). The single DES 24 neSm_3 progeny was not saved. No progeny had significantly lower seed damage than AET-5 (25.2%). Plants that were selected were cut back and moved into the greenhouse for winter crosses.

LINKAGE ANALYSIS OF OPEN-BUD (OB) AND YELLOW PETAL (Y2)

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Earlier tests had shown that the ob Y2 markers were located on chromosome 18 of the D subgenome. In 1981 it was established by telosomic analysis that the ob locus is located in the short arm and Y2 is located in the long arm of chromosome 18.

Testcross analysis in 1982 with the monotelodisomic for 18S and 18L revealed that the ob locus is 3.4 $\pm$ 2.7 map units from the centromere and that the Y2 locus is 8 $\pm$ 1.4 map units from the centromere. The additive data of the two monotelodisomics analysis indicated that the ob Y2 loci, which span the

centromere, are 11.4 ± 1.2 map units apart. The additive 11.4 map units between ob Y2 obtained in 1982 with the monotelodisomics did not agree with disomic analysis of the map distance between ob Y2 determined in 1979, which was found to be only 1.25 map units.

This year a second disomic testcross analysis with linkage in the repulsion phase, Ob y2/ob Y2 was conducted to reevaluate the map distance between ob Y2. These data are given in Table 1, and they show that in this testcross, the ob Y2 loci are 7.26 ± 2.33 map units apart, which is much greater than the 1.25 map units observed between ob Y2 in the 1979 test. But the 7.26% recombination is in close agreement with the additive map distance obtained with the monotelodisomic 18S and 18L.

The 7.26 and 11.45 recombination values are significantly different at the 68% confidence limits but not at the 95% confidence limits.

Table 1. Segregation of ob and Y2 in testcross of ob y2 x Ob y2/ob 2.

	Number of plants in each class			
Ob Y2 co*	**Ob y2 nco***	**ob Y2 nco**	**ob y2 co**	**Total**
5	56	59	4	124

*co = crossovers, nco = nco or parental type

$$\text{Percent recombination} = \frac{9}{124}(100) = 7.26 \pm 2.33$$

GENETIC TESTS FOR THE ASSOCIATION OF MONOSOMES AND TELOSOMES WITH MARKER GENES

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Table 1 lists the tests that were completed for this year for the association of marker genes with specific aneuploid chromosomes. These tests show that independence was observed for mono 3 and glandless stem and boll (gl_1), mono 9 and brown lint (Lc_yLc_z) and yellow and orange pollen (P_1P_2), mono 12 and glandless stem and boll (gl_1) and virescent-4 (v_4), telo-20L and cupleaf (cu) and virescent-2 (v_2), and the telo 20S and virescent-2 (v_2).

The above results are the completion of a study started in 1981 and reported in part in 1982. The complete results for the