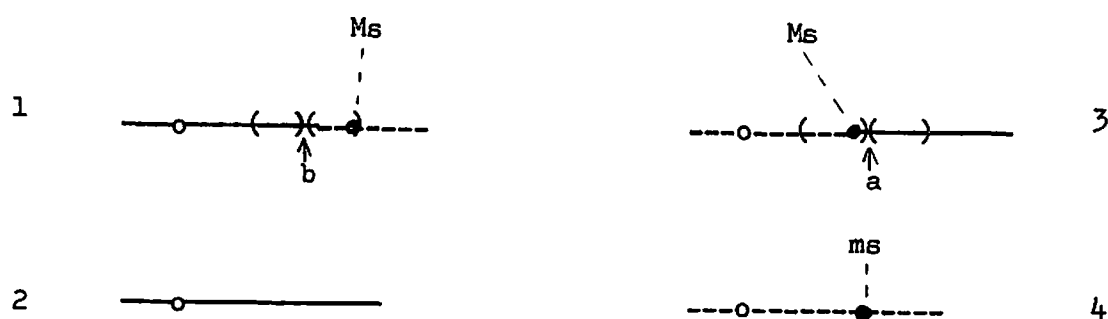


The progeny (each heterozygous for the two interchanges) are crossed, as the female parent, with a stock possessing a chromosome complement that is normal but carrying the desired male-sterile gene in the heterozygous condition. One-sixth of the total progeny from the previous cross should be of the desired genotype. The desired progeny contain a duplication for the "between breakpoints" region of each of the two chromosomes involved (a double duplication) and a normal set of chromosomes carrying the recessive male-sterile allele. This can be represented as below.



The only chromosome combination to successfully be transmitted through the pollen is 2 & 4. Chromosome combinations 1 & 3, 1 & 4, and 2 & 3 all result in aborted pollen grains or ones that are unable to compete with normal pollen. The line diagrammed above is crossed, as the male parent, to plants homozygous for the recessive male-sterile allele and with a normal chromosome complement. All the progeny from such a cross should be male-sterile and the type to be used in commercial seed production.

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3. Position of bm_1 in chromosome 5.

The T1-5 (8041) interchange was shown by diakinesis observations on intercrosses with the other T1-5 interchange stocks to have the

breakpoints either in the short arm of 1 and the long arm of 5, i.e. SL, or in LS. Linkage tests with markers show that the break in chromosome 1 was in the long arm, indicating it is an LS interchange. The breakpoint in 5 is close to the centromere. A linkage test in a stock homozygous for the interchange shows that bm₁ and pr are now independent. Hence, bm₁ is not as close to the centromere as we had formerly believed or hoped, and is not absolutely reliable as a centromere marker. We list the breakpoints as being at 1L.80-5S.10. The break was in 5L in Longley's original list.

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C. R. Burnham

4. A 3-chromosome triple interchange stock.

The interchange stocks T8-9b (8S.67-9L.75), T8-10 (5944) (8L.75-10L.40), and T9-10b (9S.13-10S.40) were used for the three possible intercrosses. In each intercross, the breakpoints in the common chromosome were in opposite arms in the two parents. The permanent @ 6 that arose by crossing over in the differential segment to produce a tripartite chromosome was established from each of the three intercrosses. The studies of chromosome pairing in intercrosses between the @ 6 stocks will be reported elsewhere.

By intercrossing two of the permanent @ 6 stocks, backcrossing to one of the parent @ 6 stocks, followed by selection of plants whose sterility suggested they carried the three different tripartite chromosomes, a stock has been selected which is homozygous for those three chromosomes. The following testcross results verify this conclusion:

1. cross with standard normal = @ 6 + 7II
2. cross with each of the 3 permanent @ 6 = @ 4 + 8II.

In this stock in which the three interchanges are combined, chromosomes 8, 9, and 10 are marked by an interchange breakpoint in each arm. The efficiency of this 3-chromosome, triple interchange stock remains to be tested.

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