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The effect of B chromosomes on chiasmata

Last year I reported on the influence of K10 on the total chiasmata at metaphase I and the distribution of the exchanges. It was indicated that K10 increased the total number of chiasmata and that proximal exchanges increased at the expense of distal exchanges.

The same procedure was used to determine the effect of B chromosomes on chiasma distribution. Sporocytes were taken from a line with mainly OB and 1B plants, and chiasma counts were made on ten cells in seven plants of each of OB and 1B groups. A chart was constructed with schematic representations of tetrads having various numbers of proximal and distal exchanges, and a count made of the number of each of the tetrad types; an average was obtained for the number of distal, proximal and total chiasmata for each plant. Statistical analyses were by means of t tests (Table 1).

Table 1. Effect of B's on chiasmata.

	Average chiasmata per cell			Total number of chiasmata		
	distal	proximal	total	distal	proximal	total
OB	9.41	9.54	19.0	659	668	1327
1B	7.50	12.50	20.0	526	873	1399
P	<.01	<.001	<.001			

U. W. Ayonoadu and H. Rees (Genetica 39:75, 1968) were the first to report the enhancement effect of B chromosomes on chiasma frequency in maize. Their results have been repeated here and extended to demonstrate a shift of exchanges from distal to more proximal regions. These observations are not unexpected, as they agree with recombination data. However, only a few regions have been tested genetically, and different responses could occur throughout the genome. The individual tetrads remain unidentified; but, as with the K10 results, it is suggested that all chromosomes are affected by the presence of the B's.

Thus, both B chromosomes and K10 increase chiasma frequency and redistribute chiasmata from distal to more proximal regions.

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Previously unreported wx heteroalleles

Since the last reported map of the wx locus (Genetics 60:507, 1968), some previously unreported mutations have been mapped. These are the mutations K, L, M, BL2, Stonor and B3. In addition, more extensive data are available for mutations B2, B4, B7, C31 and C34.

The mutations K, L and M occurred as spontaneous mutations in inbred lines of the Bear Hybrid Corn Company of Decatur, Illinois. The BL2 mutation is a presumptive EMS-induced mutation detected by R. W. Briggs, who was then at Brookhaven National Laboratory. The Stonor mutation was found in maize collected in Assam and was received from Edgar Anderson. The B3 mutation, obtained from R. A. Brink, is an autonomous mutable allele that resulted from the association of Mp (Ac) with a functional allele at the wx locus; the rate of germinal reversion is sufficiently