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1. Effect of segment relocation on intragenic recombination (continued).

In two previous notes (MNL 44 and 45), experiments were described and results presented on the effect of segment relocation on intragenic recombination. The assay of intragenic recombination was that of the wx locus utilizing 4 alleles and 5 proximal relocations (see figure 1), i.e., five relocations of the wx locus away from the centromere and 5 distal relocations, i.e., 5 different sized segments distal to the wx locus. Each of the heteroalleles (ex. wx^x/wx^y) was analyzed as a homotranslocation. The results of these experiments can be summarized as follows:

- (1) In most instances, the frequencies of wx intragenic recombination in the rearranged chromosomes, both in proximal and in distal series, were lower than those in the controls.
- (2) Among the relocated segments, there is a linear correlation between the wx-centromere distances and the wx recombination frequencies (see figure 2). The longer distance between the wx locus and the centromere results in higher recombination values. This supports the concept of a continuing distribution of exchange events proportional to distance and subject to limitations imposed by the centromere effect on linked exchange and in this instance on intragenic recombination.
- (3) Each of the heteroallelic combinations responded differently with respect to differences from the control in percentage change in recombination value at the same proximal relocated position. This is influenced principally by the closeness of the wx-breakage point distance. A greater diversity in degree of change from control is associated with the shorter distance between the wx locus and the breakage point.
- (4) On homoalleles:
 - (a) The frequency of occurrence of Wx pollen grains from homoalleles was lower among inbreds than from outcross sources indicating background effect on this change.

FIGURE 1.

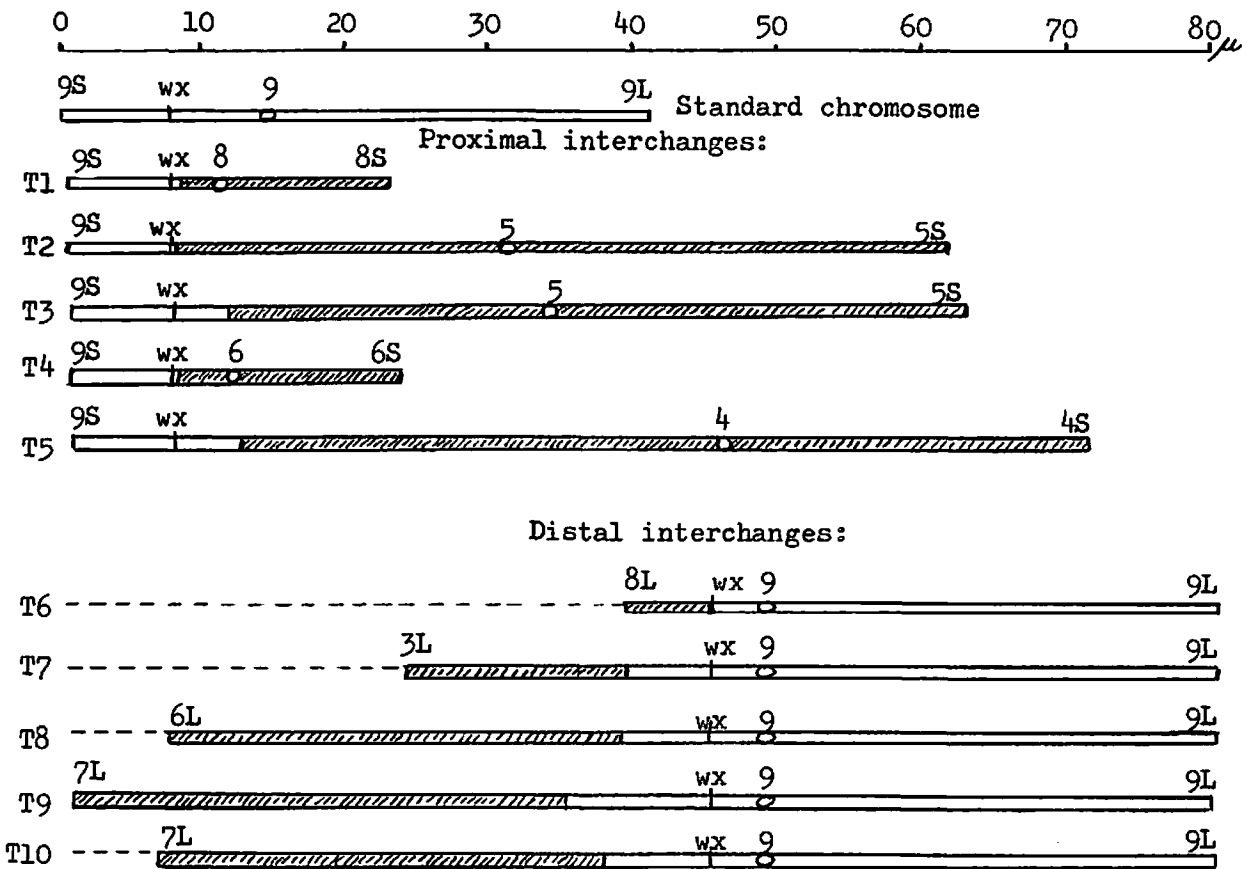
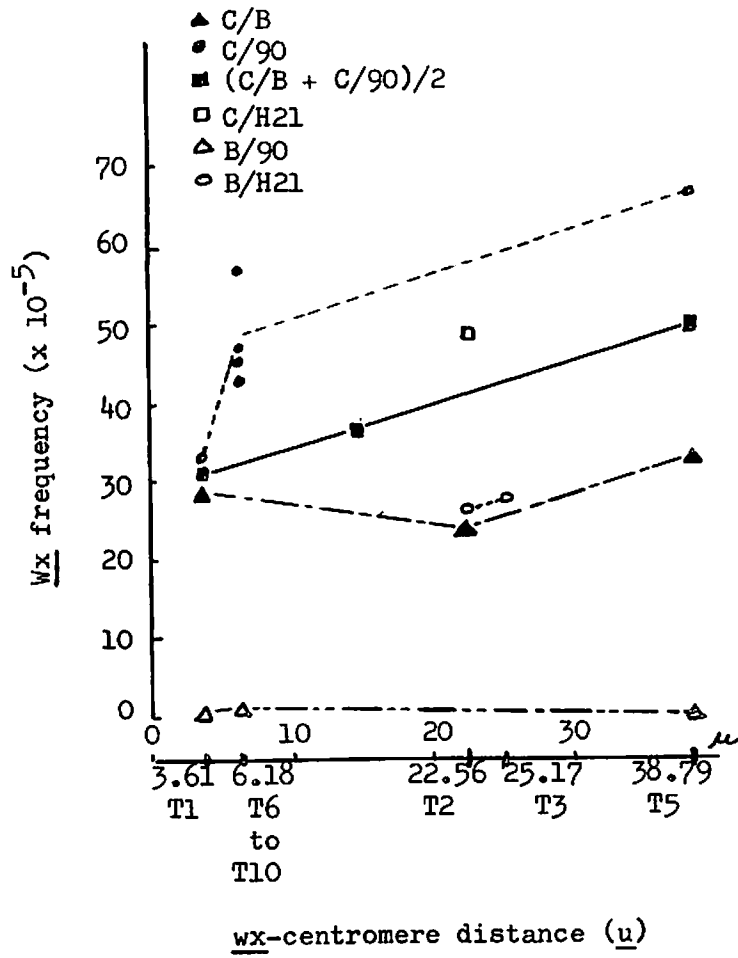


FIGURE 2.



- (b) When proportionate changes from the controls are compared, significantly different Wx frequencies are found for the same homoallelic combinations at the same position. These differences are not assignable to the influence of the wx-centromere or wx-breakage point distances.

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2. The $a_2^{m(r-pa-pu)}$ allele: phase changes.

The $a_2^{m(r-pa-pu)}$ allele is a derivative of $a_2^{m 1 1511}$ (Peterson 1968, Genetics 59: 391) of the En system. In the absence of En this allele shows a uniform pale pigmentation and in the presence of En it shows purple, pale and colorless sectors in a colorless background. Changes in the mutability pattern from higher to lower levels have been observed among kernels and some of these have been ascribed to changes in En. Thus, En undergoes phase variation changing from periods of high activity to various levels of lower activity that is expressed in a reduced ability to suppress the $a_2^{m(r-pa-pu)}$ allele and the responsive $a_2^{m(r)}$ allele. This altered activity, designated En^v (En variable) originally exhibiting a low level of activity expressed a higher level of activity in kernels of ears from tillers than in kernels of ears from main stalks of the same plant. These different levels of En^v expression were inherited in the next generation in main stalk ears indicating that En^v itself had been altered. Thus, En^v is in a labile or unstable condition and susceptible to environmental alterations that influence its level of activity.

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3. Hydrolytic enzymes during development of SCLB.

Resistant (N-Normal) and susceptible (T-Texas male sterile) varieties of maize, infected with Helminthosporium maydis race T (SCLB -