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1. Intra-genic recombination at various positions in the maize genome.

Utilizing Nelson's results and methodology (Genetics 47:737; Genetics 60:507) on the mapping of the wx locus, an investigation was initiated with this locus to examine the effect of changes in the position of this locus on intragenic recombination by moving this locus to various locations in the maize genome. The general plan includes the crossing of four of the wx alleles (C, 90, H21 and B and hereafter referred to by numbers without the wx) to translocation stocks, the isolation of the desired crossover, followed by the intercrossing of the desired wx-translocation strains with each other in order to secure heteroallelic combinations in homozygous translocation lines with which to test for the frequency of wx recombinants. Fourteen translocations are utilized in this study; seven involve breaks proximal to wx so as to move the locus to various positions away from the centromere and seven, involving the lengthening of the chromosome, are distal to wx. Four of the forty-two possible combinations in the proximal series are reported here. In the following table the results from the analysis of two different years of two of the combinations as well as controls (heteroalleles on standard chromosomes) are given:

	Approx. distance of <u>wx</u> to centromere (u)	Crosses	Wx frequency $\times 10^{-5}$	Year Collected
<u>Standard</u> <u>chromosomes:</u>	7.7	C x B	63.19	1969
		C x 90	69.60	"
		C x H21	57.21	"
		B x 90	1.33	"
		B x H21	94.20	"
		90 x H21	37.22	"
<u>Translocation</u> <u>chromosomes:</u>	26.7	T 5-9a; B/H21	19.75	1967
		" " ; " "	22.71	1968
	24.1	T 5-9 4871; B/H21	35.87	1967
		" " ; " "	45.73	1968
		" " ; C/B	30.06	"
		" " ; C/H21	30.03	"

Considering first the Wx recombinants observed among the standard chromosomes, it is evident that the map derived from these data is roughly equivalent with Nelson's map, i.e., H21 is distal to C, 90 is proximal to C, while B and 90 do not recombine. There is an inconsistency in these data in that the 90/H21 heteroallele yields a value of 37.22×10^{-5} Wx recombinants, which is lower than expected in view of the relation between B and 90. B and 90 appear very close together and give equivalent values with C.

In the "relocated" wx series, the recombination values are reduced. The wx intragenic recombination value with T 5-9 4871 is less than one-half of that of the standard chromosomes, and in T 5-9a, one-quarter. Apparently, there is also an effect of season as is obvious in a comparison of the results from two different years (1967 and 1968). The data show that the shift of recombination values over seasons is unidirectional for both of the translocations in the consecutive years.

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2. The synchrony of the mutation event.

One of the most obvious features of unstable loci in maize is the prevalence of states that are distinguishable in the time and frequency of the mutation event, i.e., phenotypically observable as size and distribution of colored spots on a colorless background. In a screening test for the origin of unstable \underline{a}_2 alleles (\underline{a}_2^m) from \underline{A}_2 , one unstable allele was found in which the mutation event occurred very late in the ontogeny of the corn kernel. It has been identified as $\underline{a}_2^{m(4\ 1629)}$ and in this report will be referred to as \underline{a}_2^m .

In order to measure the size and distribution of the mutation event (colored spots on a colorless background), counts were made of the various sized spots in designated quadrants at the crown of the kernel. Under a dissecting microscope, colored aleurone cells can be clearly and individually distinguished and the mutation events that cover one, two, three, four, etc. cells can be separated into classes. The kernels