2. Effect of segment relocation on intra-genic recombination.

In MNL 44: 79-80, we reported on the intra-genic waxy recombination of heteroallelic combinations following changes in the position of this locus in the maize genome. The wx recombination frequencies of three heteroallelic combinations involving two translocated segments were reported. Here, data are presented (Table 2) for six translocated segments that include five heteroallelic combinations. Four of the translocations have breakpoints proximal to wx and two, distal.

The sampling included a test of over 1/2 million pollen grains in each instance. As indicated in the table, the values for the standard chromosome changed in comparison to our 1969 values; three increased and three decreased. The 1970 results are in better agreement with Nelson's preliminary map (1959, Sci 130: 795) which itself was not completely consistent with respect to the additivity of distances.

All recombination values from the proximal translocation series are lower than the 1969 values. Within this series, there are some inconsistencies. When two different heteroallelic combinations involving the same translocation are compared, it is found that the recombination values differ even though the recombination frequencies of these same combinations are very similar in the control series. For example, the C/H21 combinations (lines 9 and 10) show more recombination than the C/B (lines 7 and 8) but the control values (lines 1 and 3) are very similar.

The B/H21 heteroallelic combination shows a similar rate in two different translocations that have similar breakpoints with respect to the centromere, at 26.72 μ and 24.10μ.

For the B/90 combination (proximal series) with a longer distance from the wx locus to the centromere, a higher recombination value resulted.

	distance wx-centromere	recombination value
proximal B/90	5.16μ (line 12 - table 2)	0.73
"	31.83μ (" 13 - ")	1.23
	distance wx-distal tip	
distal C/90	38.07μ (line 19 - table 2)	95.98
"	18.23μ (" 18 - ")	56.72

Table 2

Intracistron recombination values among heteroallelic combinations involving standard and relocated waxy segments

Line		Approx. distance of wx to centromere (μ)	The heteroallelic combination	wx frequency x 10-5	Compared** to 1969	Year#
A	1	7.72	C/B	74.64	+	1970
	2	"	C/90	111.45	+	"
	3	"	C/H21	74.80	+	"
	4	"	B/90	0.85	-	"
	5	"	B/H21	54.15	-	"
	6	"	90/H21	30.54	-	"
B	7	24.10	T 5-9 4871; C/B	36.52		1969
	8	"	" " ; "	28.33	-	1970
	9	"	" " ; C/H21	48.17		1969
	10	"	" " ; "	43.08	-	1970
	11	5.16	T 8-9 5391; B/90	1.02		1969
	12	"	" " ; "	0.73	-	1970
	13	31.83	T 8-9 5300; "	1.23		"
	14	24.10	T 5-9 4871; B/H21	47.79		1969
	15	"	" " ; "	30.35	-	1970
	16	26.72	T 5-9a ; "	41.41		1969
	17	"	" ; "	30.67	-	1970
C	18	18.23*	T 3-9F ; C/90	56.72		1970
	19	38.07*	T 7-9 7074; "	95.98		"

*Distance between wx locus and the end of chromosome arm.

**+ = increase; - = decrease.

A - Standard; B - Proximal translocation; C - Distal translocation.

- designates year collected.

A comparison can also be made in the distal series with the C/90 combination. A longer distal segment results in more recombination than that found with the shorter distal segment.

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