7. Linkage in tetraploid corn.

Tetraploid plants of varying constitutions for the C and Wx loci were used in backcrosses with homozygous c wx pollen from a tetraploid line. The linkage formulas of Mather were applied to the group involving plants in simplex condition and coupling phase. The recombination between C and Wx is 25.5%, a value very close to that found in diploids. If exchange of pairing partner occurs at random along the length of the chromosome, a reduction in crossing over might be expected in the tetraploid. Since none was found, it may be that there are preferential points of synaptic interchange which permit uninterrupted pairing throughout the C-Wx region.

The expected frequency of the four phenotypic classes has been calculated on the basis of 50% chiasmata between C and Wx and no chiasmata between Wx and the centromere. A second calculation assuming 20% chiasmata between Wx and the centromere was made for the simplex coupling data and since the change in frequencies of the phenotypic classes was slight, only the first method was used to obtain expected frequencies in the other two cases.

		C Wx	C wx	c Wx	c wx
C Wx / c wx x c wx / c wx	obs. no.	2021	522	602	2114
	obs. freq.	38.4%	9.9%	11.4%	40.2%
	exp. freq.	39.6%	8.4%	10.4%	41.6%
	exp. freq.*	39.1%	8.8%	10.3%	42.2%

*based on 50% C-Wx chiasmata and 20% Wx-centromere chiasmata

C wx / c Wx x c wx / c wx	obs. no.	436	610	666	441
	obs. freq.	20.2%	28.3%	30.9%	20.5%
	exp. freq.	18.6%	30.4%	31.2%	19.4%
C Wx / C Wx x c wx / c wx	obs. no.	937	83	126	161
	obs. freq.	71.7%	6.4%	9.6%	12.3%
	exp. freq.	75.9%	4.9%	7.7%	11.9%

All calculations were based on the assumption that chromosome disjunction is at random and is unaffected by the occurrence of a crossover in the C-Wx region.

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