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1. Crossing over in chromosome-3 as influenced by B-chromosomes.

Closely related lines of Black Mexican Sweet Corn with and without B-chromosomes were crossed to a chromosome-3 tester homozygous for gl₁, lg₂, a₁, et. Root-tips were obtained from the F₁ seedlings and the number of B-chromosomes possessed by each plant ascertained. The F₁ plants were then backcrossed to the chromosome-3 tester and the crossover frequencies between the gene markers determined.

Frequencies of crossing over from a backcross of

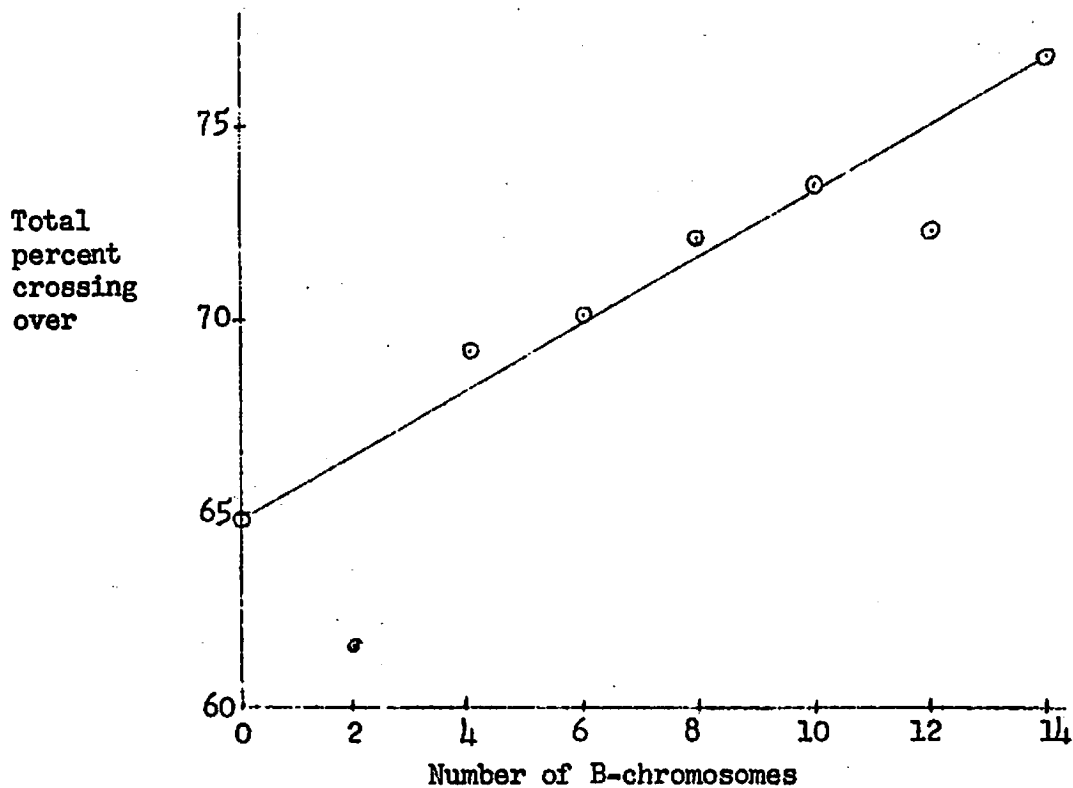
<u>G</u> ₁	(1)	<u>L</u> _g	(2)	A	(3)	<u>E</u> _t	♀	X	<u>g</u> ₁	<u>l</u> _g	a	<u>e</u> _t	♂
<u>g</u> ₁		<u>l</u> _g		a		<u>e</u> _t							

No. of B chromosomes	Total progeny	Percent crossing over			
		1	2	3	Total
0	3111	21.8	31.5	11.6	64.9
1-4	2300	24.5*	31.9	12.1	68.5**
5-8	7153	26.5**	31.3	13.3*	71.1**
9-12	3819	26.0**	33.8	13.5*	73.3**
13-16	596	27.9**	34.6	14.4*	76.9**

*, ** = Significantly different from 0 B-chromosome class at 5% and 1% level, respectively.

The data indicate a significant increase in crossing over due to the B-chromosomes in the gl-lg and the a-et regions. Crossing over in the lg-a region is increased but the amount is not significant. The total percent crossing over between gl and et indicates a significant increase in the presence of the B's and a graphic plot of the data suggests that the effect of the B-chromosomes is additive.

Studies are being made to determine the interaction, if any, of B-chromosomes and knobs on crossover frequencies.



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2. Further studies with heterozygous inversions in chromosome 3.

The paracentric inversion In 3b has breakpoints at positions .25 and .75 in the long arm of chromosome 3. Backcross data from In 3b heterozygotes presented in the 1956 News Letter gave the following recombination values:

$G1_6-Lg_2$	0.57%
$G1_6-A_1$	9.7%
Lg_2-A_1	9.6%
A_1-Et	17.7%

It is apparent that the A locus is distal to point .75 in the long arm, but the close linkage of G1 with Lg could arise if both loci were included in the inversion or if G1 were in the proximal uninverted segment. In order to delimit more precisely the cytological location of G1, plants homozygous for In 3b and heterozygous for the G1 and A loci were testcrossed as shown below:

$\frac{g1}{G1}$	$\frac{In}{In}$	$\frac{A}{a}$	X	$g1$	a	$g1$	A	$G1$	a	$g1$	a	$G1$	A	$\Sigma = 665$
						193	165	127	180					

The 46.2% of recombination between G1 and A indicates that G1 is in the proximal uninverted segment. A much lower recombination value