

pollen functioning. Another unexpected feature of the data is the relatively high frequency of crossing over in the C Sh region found among the male gametes in both the Dp9 N9 Df3 N3 and Dp9 N9 N3 N3 backcrosses. Again in former studies we found a striking reduction in crossing over throughout the short arm of 9 and this was true for the C Sh interval.

	(0)	(2)	(1-2)	(1)	(1)	(1-2)	(2)	(0)	
	C	C	C	C	c	c	c	c	
	Sh	Sh	sh	sh	Sh	Sh	sh	sh	%
	Wx	wx	Wx	wx	Wx	wx	Wx	wx	Recomb.
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Dp9 <u>C Sh Dp Wx</u> Df3 N3									
N 9 <u>c sh N wx</u>	1299	9	0	4	5	0	9	654	C-Sh 0.45
as female in B. C.									Sh - Wx 0.91
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Dp 9 <u>C Sh Dp Wx</u> Df3 N3									
N 9 <u>c sh N wx</u>	1005	15	0	6	27	0	18	512	C-Sh 2.1
as male in B. C.									Sh - Wx 2.1
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Dp 9 <u>C Sh Dp Wx</u> N3 N3									
N 9 <u>c sh N wx</u>	1422	13	0	1	3	0	14	1541	C-Sh 0.13
as female in B. C.									Sh - Wx 0.90
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Dp 9 <u>C Sh Dp Wx</u> N3 N3									
N 9 <u>c sh N wx</u>	541	9	0	8	9	0	11	539	C-Sh 1.5
as male in B. C.									Sh - Wx 1.8

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18. Crossing over in homozygous Dp 9 plants.

Plants homozygous for the piece of 3L inserted into 9S between the Sh and Wx genes should have a marked increase in recombination values for the Sh-Wx region since the size of the chromatin segment lying between these loci would be increased by the length of the inserted 3L segment. However, when Dp 9 Dp 9 plants heterozygous for yg₂ C wx, and in some cases for C wx or sh wx, were backcrossed there was no increase observed in the C-wx or the sh-wx interval. Indeed the amount of recombination averaged about 17% for C-wx, a value which is significantly less than the standard frequency. So far as I can tell this is the first experiment of the kind conducted in maize and possibly in any organism. The only comparable case I am aware of is the work on the pale translocation in *Drosophila* where Hamlett (Biol. Bull. 1926) presumably studied crossing over in females homozygous for a small duplicated (inserted) piece and found that crossing over in flies homozygous for the duplication was reduced as much as in heterozygous individuals. Kossikov and Muller (J. Heredity 1935), however, have criticized the design of the experiment and believe it unlikely that Hamlett's flies were actually homozygous for the duplication.

One might reasonably assume that the longer the chromosome segment the greater would be the frequency of exchanges within the segment. This obviously is not true for the homozygous Dp. Apparently the insertion of foreign chromatin (piece of 3L) into 9S has modified in some way the mechanism of crossing over within 9S. The data could be interpreted as indicating that corn chromosomes have a certain autonomy in crossing over and that the system is disturbed by the insertion of chromatin from a non-homologous chromosome.

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