Table 2

mμM ADP Released Per Mg. of Starch Under Standard Assay Conditions. All Preparations from Developing Seeds Frozen 16 Days After Pollination. 1963 Collections. Whole Seed Preparations.

Mutant	Origin	mμM ADP
C	Spontaneous	5.4
90	Spontaneous	3.8
Bear G	Spontaneous	6.0
Brink 1	Spontaneous	3.6
Brink 2	Spontaneous	4.2
Brink 4	Spontaneous	4.8
Brink 6	Spontaneous	3.8
Brink 8	Spontaneous	3.2
H21	Spontaneous	4.4
T4B	Presumptive Irradiation*	6.6
Q1R	Presumptive Irradiation*	3.4
S3G	Presumptive Irradiation*	6.6
N1R	Presumptive Irradiation*	4.8
N3Y	Presumptive Irradiation*	7.4
wx^{m-1}	Ds	5.0
wx^{m-6}	Ds	6.4
wx^{m-8}	Spm System	4.8
M14 (Non-waxy)		62

*From Dr. Caspar, Blandy Experimental Farm.

measurable activity and in a rather restricted range. To find that 17 different mutants (spontaneous, irradiation, and controlling element), were all hypomorphic and to about the same degree would be improbable if the waxy locus were the structural locus for transferase unless a special set of assumptions was invoked.

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3. Differential crossing over in male and female gametes of plants heterozygous for Dp 9.

Rhoades (MNL, 32) first reported reduced recombination between markers on the short arm of chromosome 9 in plants heterozygous for Dp 9. In attempting in 1961 to evaluate the effect of heterozygosity for Dp 9 on recombination within the wx locus, we observed a pronounced difference between male and female gametes in crossing over between markers on the short arm of 9.

The genotype of the heterozygous plants (15562) was C Sh Dp + wx^{90} Gl_{15}/ c sh N wx^{c} + gl_{15}. Randomly selected plants were crossed as male parents onto a c sh N wx^{c} + gl_{15} tester and as females by the same tester stock. Table 1 presents the data for the c sh interval and Table 2 for the sh gl_{15} interval.

Table 1

15562 Plants as Male and Female Parents in Crosses with a c sh N wx^c + gl_{15} Tester

Plant		C Sh	C sh	c Sh	c sh	Σ	% Recomb.	% Fertilization Effected by Dp 9 Gametes
15562-3	♀	426	1	1	440	868	0.2	25.4
	♂	500	37	4	1444	1985	2.1	
15562-6	♀	442	2	0	401	825	0.2	29.8
	♂	446	23	18	1069	1556	2.6	
15562-8	♀	137	0	0	159	296	0	26.5
	♂	318	49	5	848	1220	4.4	
15562-15	♀	431	0	1	437	869	0.1	28.9
	♂	356	24	0	851	1231	1.9	
All	♀♀	1436	3	2	1437	2878	0.2	27.5
All	♂♂	1620	133	27	4212	5992	2.7	
Remaining 11 15562 Plants Used as ♀♀		2380	2	5	2337	4724	0.1	

Table 2

15562 Plants as Male and Female Parents in Crosses with a c sh N wx^c + gl_{15} Tester. Only sh Kernels Sampled.

Plant		sh gl_{15}	sh Gl_{15}	Σ	% Recombination
15562-3	♀	95	3	98	3.1
	♂	866	71	937	7.6
15562-6	♀	94	2	96	2.1
	♂	650	36	686	5.2
15562-8	♀	32	1	33	3.0
	♂	587	47	634	7.4
15562-15	♀	105	2	107	1.9
	♂	575	80	655	12.2
All	♀♀	326	8	334	2.4
All	♂♂	2676	234	2912	8.0
Remaining 11 15562 Plants Used as ♀♀		856	21	877	2.4

There is a significant difference between male and female gametes for both the c-sh and the $sh\text{-}gl_{15}$ regions. The difference is most pronounced in the c-sh region where recombination in the male gametes is nearly normal. For the $sh\text{-}gl_{15}$ region the rate of recombination in the male gametes is more reduced relative to normal values (8 percent versus 25 percent), and less difference is observed between male and female gametes.

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1. Effect of diplontic selection on estimates of change in radiosensitivity during seed germination.

Some recent studies on responses of germinating seeds to x-rays have involved comparisons of temporal changes in (a) somatic mutations and (b) inhibition of seedling growth. Maize seeds heterozygous for "wd", a terminal deficiency of chromosome 9 that conditions an albino phenotype when homozygous, were irradiated on a rotating turntable with their roots shielded by a disc of lead. Sectors of albino tissue in embryonic leaves (nos. 1-6, those present as discrete primordia in the embryo) of plants grown from irradiated seeds were used as an index of chromosome breakage. Plant height after 3 weeks of post-treatment growth furnished estimates of growth inhibition.

Changes in these two variables produced by 800r of x-rays showed positive correlation through an initial period of low sensitivity, 0-15 hours, and an abrupt rise in x-ray-induced injuries from 15-32 hours (Table 1). However, somatic mutation frequencies were maximal at 32 hours, then declined to a low at 40 hours (Table 1, column 4). Growth inhibition showed a similar sequence of changes but was not maximal until 40 hours (Table 1, column 6).

To gain insight into this apparent discrepancy between two widely used criteria of radiosensitivity, samples of seed were irradiated with one of three doses of x-rays, 200, 500, or 800r, at four points in time (Table 2, column 1) including the interval where changes in growth inhibition and frequencies of albino sectors showed opposite trends.

Changes in growth inhibition were the same at all doses (Table 2). There was a progressive increase from 31-41 hours after which time growth inhibition decreased.

Though changes in somatic mutation frequencies were somewhat more complex some definite trends could be distinguished. Albino sectors induced by irradiation with 800r showed the characteristic decline in frequency from 37-41 hours (Table 3, column 5). Subsequently their