predominated, whereas no significant differences were recorded in the progenies of T1-4a and T1-7b. It is of interest to note that although chromosome 1 was involved in all the reciprocal translocations studied, there was a marked difference in pollen tube competition recorded for the different progenies.

Crosses Normal X Semi-sterile

Chromosome Translocation Type	Progeny		P Value
	Normal	Semi-sterile	
T1-3i	165	345	<0.01
T1-4a	83	83	>0.99
T1-6c	142	188	0.01-0.02
T1-7b	111	135	0.10-0.20
T1-8i	240	100	<0.01

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5. Location of genes for ear-row number in Zea mays, L.

The different progenies recorded in the table of contribution No. 4 (above), showed a wide segregation for ear-row number, ranging from 8 to 16 rows. Of these only the first (T1-3i) showed a significant difference between the normal and semi-sterile ears with respect to ear-row number, and hence only these results are recorded in Table 1.

Table 1. Results of the cross: Normal X Semi-sterile

	Ear Row Number					
	8	10	12	14	16	Average
Normal	1	10	85	62	8	12.8
Semi-sterile	3	66	227	49	-	11.9

Table 2. Factorial Analysis

Source	D.F.	S.S.	M.S.	F
Total	39	12551		
Replications	3	455	155	3.77*
Fertility(a)	1	801	801	17.4 **
Rows per ear (b)	4	5024	1256	27.3 **
Interaction: (a) X (b)	4	5029	1257	27.3 **
Error	27	1232	46	

**Significant at P = 0.01, * Significant at P = 0.05.
Coeff. of Rank Correlation = 0.8 (significant).

The results show a clear association between ear-row number and semi-sterility when the T1-3i reciprocal translocation is employed, which was not the case for the other reciprocal translocations. Since chromosome 1 was employed in every case it would appear that the genes for ear-row number are concentrated mainly in Chromosome 3.

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1. Radiation induced modification of paramutation expression.

Experiments were designed to determine whether the paramutation inducing process has a radiosensitivity similar to gene mutational events. The source inducing the paramutation change (R^{st} and R^{mb}) and the site of action (R^{r}) were each tested.

The experimental procedure was similar for all groups. Tassels were cut one day after they began to shed pollen and placed in flasks. They received 2000r from the gamma source and were then bagged for use the following day. The tassels were used to make individual crosses onto the appropriate tester (i.e. R^{r} for R^{st} tassel etc.). The hybrids were then crossed to r^{g} r^{g} stock, using the r^{g} r^{g} as female.

When the site for paramutation change was irradiated before crossing to R^{st} or R^{mb}, approximately 10% of the time (10 out of 107 ears) there is no apparent paramutation, (i.e. the testcross ears were 50% dark purple). In addition there is evidence that there is some alteration of the usual paramutation interaction in 15-20% of the rest of the ears. They appear to have either a reduced paramutational change or are segregating for paramutation alteration on the ear. Each ear traces back to a single irradiated pollen grain. Further tests are being conducted to determine more precisely which event has happened.

When the R^{st} stock was irradiated prior to crossing to R^{r} and then testcrossed, 64% of the time there was no apparent effect. There were no ears that were 50% dark purple (i.e. no paramutation). However 23% of the ears had light spotted and dark spotted seed predominantly with very few yellow and some dark purple kernels. There was a definite effect on the paramutation interaction but probably no instance of complete inactivation. The remainder of the ears are in a suspect category with light spotted predominant and some dark mottled or full purple seed, but very few yellow. The ears appear to be significantly different from the majority class which had predominantly light spotted and full yellow seeds.