

The final group involved irradiation of the R^{mb} with subsequent testcrossing identical to R^{st} . Here there was 5% apparently complete inactivation of the paramutation interaction (i.e. ears were 50% dark purple). A reduced paramutation effect is more difficult to detect in the marbled induced change as the variability is greater. There was no effect on the paramutation interaction or perhaps some with reduced effect in 84% of the ears. The other 9% of the ears have what appears to be an increased paramutation expression. The seeds are predominantly yellow and light spotted with no very dark mottled and no full purple seed on the ears. The altered R^r seed appear very similar to the R^r from a R^{st} induced paramutation change. This would indicate that the R^{mb} source has some mechanism which inhibits full induction of the paramutation alteration.

These results indicate that paramutation has a radiosensitivity much greater than can be attributed to gene mutation changes. The effects seem more in line with an inactivation process. Further tests are being conducted to obtain additional information of the effects of radiation on paramutation.

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2. Survey of some South American races with variegated aleurones for paramutation induction ability.

From the collection of 37 races with marbled and/or stippled like aleurones successful evaluation for paramutation like induction ability was completed for 17 and partially completed for 6 others. The results are as follows:

Collection	Race	Marbled type	Stippled type	Paramutation Induction
Bolivia 596	-	X	X	yes
Bolivia 648	-	X	X	yes
Bolivia 706	-	X	-	yes
Bolivia 733	-	X	-	yes
Bolivia 753	-	X	X	yes
Bolivia 646	-	X	X	yes
Bolivia 876	Huilcaparu	-	X	yes
Bolivia 320	Checchi	-	X	yes
Bolivia 833	Checchi	-	X	yes
Bolivia 967	-	X	X	yes
Peru 683	-	-	X	yes
Peru 1085	-	-	X	yes?
Bolivia 617	-	X	X	yes?
Bolivia 771	Huilcaparu	X	X	yes?

Collection	Race	Marbled type	Stippled type	Paramutation Induction
Bolivia 928	Checchi	X	X	yes?
Bolivia 643	-	X	X	yes?
Bolivia 591	Huilcaparu	X	X	yes?
Bolivia 623	Huilcaparu Moteado	X	X	yes?
Bolivia 666	Huilcaparu Moteado	X	X	no
Bolivia 718	Paru	X	-	no
Bolivia 724	Paru	X	-	no
Bolivia 723	-	-	X	no
Bolivia 663	Altiplano	-	X	no

Some of the races tested appear to be segregating for paramutation induction ability. Within races, some testcross ears are 50% dark purple while others have no purple. Each tested F₁ plant ($R^{st} R^r$) was also either selfed or used as a female with $r^g r^g$.

In some races particularly Bolivia 967 the paramutation expression was very evident in the crosses using the F₁ as female. This again is not a uniform expression within the race as some ears were 50% dark purple, others 25% dark purple 25% light purple, and still others with more complicated ratios or no dark purple.

The degree of paramutation alteration induced in R^r varied among the different races as well as within some races. Bolivia 320 appears to be as strong as and probably stronger than R^{st} . Others are similar to R^{mb} types while still others seem to be distinctly different from either of these two.

The portion of the paramutation interaction which induces the change in the R^r gene seems to have a considerable degree of variability. Further tests are underway to investigate the nature of this variability. The relationship between the various sources will be studied and interactions among them will be determined.

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3. Fluorescent metabolites accumulated by a mutant of maize.

A mutant of maize obtained by exposure to high energy irradiation at the atomic bombs test site in Bikini was shown to accumulate blue fluorescent metabolites.

The homozygous segregated mutant accumulated fluorescent compounds in leaves during the first stage of plant growth and in the anthers of mature plant. Progeny from the heterozygous mutant accumulated the fluorescent metabolites in both the young leaves and the anthers or in anthers only, according to the gene dose. A single gene was suggested to be responsible for the accumulation of blue fluorescent material.