give germinally transmissible $\underline{R}^{sc}$ mutants, but segregated stippled and colorless kernels. Among these plants two were found which segregated 1/4 $\underline{R}^{st}$, 1/4 $\underline{R}^{st}$ (light), and 1/2 $\underline{r}$, instead of the expected 1/2 $\underline{R}^{st}$, and 1/2 $\underline{r}$ kernels.

It has been shown that $\underline{R}^{st}$ differs from $\underline{R}^{st}$ (light) only in a modifier located about 5.7 crossover units distal to $\underline{R}$ (see above). An explanation which satisfactorily accounts for the ratio observed on the ears from the two exceptional plants would assume that the linked modifier ($\underline{M}^{st}$) which conditions the $\underline{R}^{st}$ phenotype is a transposable unit. On this basis it could be assumed that the $\underline{R}^{st}$ (light) phenotype results from the absence of $\underline{M}^{st}$, and that in the two exceptional ears $\underline{M}^{st}$ has shifted from its standard position, 5.7 crossover units distal to $\underline{R}$, to a new position which assorts independently of $\underline{R}$. Verification of the transposition hypothesis requires progeny tests of the three classes of kernels on the ears from the two exceptional plants.

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5. Mutability of R^{st}.

Tests were made of the mutability of $\underline{R}^{st}$ and $\underline{R}^{st}$ (light) in homozygous and in several heterozygous combinations.

$\underline{R}^{st}$ and $\underline{R}^{st}$ (light) in homozygotes were observed to mutate to self-color ($\underline{R}^{sc}$) at the respective rates of 17.0 and 19.9/10^4 gametes tested. A total of 19,920 $\underline{R}^{st}$ and 24,599 $\underline{R}^{st}$ (light) gametes were scored. When $\underline{R}^{st}$ and $\underline{R}^{st}$ (light) were heterozygous with $\underline{r}^{r}$, they were observed to mutate to $\underline{R}^{sc}$ at the respective rates of 4.9 and 4.3/10^4 gametes tested. A total of 2,055 $\underline{R}^{st}$ and 4,623 $\underline{R}^{st}$ (light) gametes were scored from heterozygotes with $\underline{r}^{r}$. The basis for the difference in rate of mutation of $\underline{R}^{st}$ and $\underline{R}^{st}$ (light) to $\underline{R}^{sc}$ in homozygotes and heterozygotes with $\underline{r}^{r}$ is not yet known. Several somatic mutations of $\underline{R}^{st}$ to $\underline{R}^{sc}$ have been found, which indicates that mutations to $\underline{R}^{sc}$ are probably not regularly associated with crossing over.

In $\underline{R}^{st}$ (light) homozygotes, one mutation to colorless or near-colorless aleurone was found in 26,805 gametes tested. No mutations to colorless or near-colorless aleurone were found in $\underline{R}^{st}$ homozygotes; 20,825 $\underline{R}^{st}$ gametes were scored. Mutations to colorless or near-colorless aleurone with either red or green plant color were observed in both $\underline{R}^{r}\underline{R}^{st}$ and $\underline{R}^{r}\underline{R}^{st}$ (light) heterozygotes. It was assumed that mutants with green plant color came from stippled, and mutants with red plant color from $\underline{R}^{r}$. Based on this assumption, $\underline{R}^{st}$ and $\underline{R}^{st}$ (light) were observed to mutate to colorless or near-colorless aleurone in heterozygotes with $\underline{R}^{r}$ at the respective rates of 5.4 and 4.2/10^4 gametes tested. A total of 10,942 $\underline{R}^{st}$ and 4,720 $\underline{R}^{st}$ (light) gametes were scored. These data show that the frequency of mutations of $\underline{R}^{st}$ and $\underline{R}^{st}$ (light) to colorless or near-colorless is much greater when stippled is heterozygous with $\underline{R}^{r}$ than when it is homozygous. The basis for this effect of homozygosity

and heterozygosity on the mutability of stippled is not yet known. Allelic interaction or crossing over, or both, may be involved.

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6. Paramutagenic action of colorless and near-colorless mutants from R^{st}.

The colorless and near-colorless mutants from R^{st} and R^{st} (light) (see above) were made heterozygous with R^{r} and tested for their paramutagenic action. ("Paramutagenic" is a term used to describe the action of R^{st} on the pigmenting capacity of R^{r} in $R^{r}R^{st}$ heterozygotes; see Brink, Cold Spring Harbor Symp. Quant. Biol. 23, 1958.)

The one near-colorless mutant obtained from homozygous R^{st} (light) was found to be paramutagenic. Eight mutants with green plant color were obtained from $R^{r}R^{st}$ and $R^{r}R^{st}$ (light) heterozygotes, and all were found to have retained the paramutagenic action of stippled. This is additional evidence for the assumption made above that mutants with green plant color from R^{r}/stippled heterozygotes are mutations from the stippled allele.

Ten colorless mutants with red plant color were obtained from $R^{r}R^{st}$ and $R^{r}R^{st}$ (light) heterozygotes; five of these mutants were found to be paramutagenic, and five were found to be nonparamutagenic. These results suggest that at least some of the r^{r} mutants arise from recombination between components of R^{r} and R^{st}. The paramutagenic r^{r} mutants exhibit the plant color characteristic of R^{r}, the paramutagenic action of R^{st}, and have lost the aleurone pigmenting action of both R^{r} and R^{st}. It is not possible at this time to postulate a single crossover or mutational event that will satisfactorily explain all the observed changes. Tests on these mutants are being continued.

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7. Dosage effect of the R^{st} allele on aleurone pigmentation.

An experiment was made to determine the quantitative effect of varying doses of the R^{st} allele on aleurone pigmentation. The matings were as follows: $r^{g}r^{g}$ x R^{st} R^{st}, R^{st} R^{st} x $r^{g}r^{g}$, and R^{st} R^{st}, selfed. The kernels were scored using a modification of the reticule method described by Brink (MGCNL, 31). The results were as follows:

Dosage of R	No. of kernels scored	Mean index of pigmentation per kernel
R^{st} r^{g} r^{g}	480	8.75
R^{st} R^{st} r^{g}	480	19.83
R^{st} R^{st} R^{st}	360	27.70