

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

R. B. Ashman

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

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

The one near-colorless mutant obtained from homozygous $\underline{R^{st}}$ (light) was found to be paramutagenic. Eight mutants with green plant color were obtained from $\underline{R^r R^{st}}$ and $\underline{R^r R^{st}}$ (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 $\underline{R^r}$ /stippled heterozygotes are mutations from the stippled allele.

Ten colorless mutants with red plant color were obtained from $\underline{R^r R^{st}}$ and $\underline{R^r R^{st}}$ (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 $\underline{r^r}$ mutants arise from recombination between components of $\underline{R^r}$ and $\underline{R^{st}}$. The paramutagenic $\underline{r^r}$ mutants exhibit the plant color characteristic of $\underline{R^r}$, the paramutagenic action of $\underline{R^{st}}$, and have lost the aleurone pigmentation action of both $\underline{R^r}$ and $\underline{R^{st}}$. 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.

R. B. Ashman

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

An experiment was made to determine the quantitative effect of varying doses of the $\underline{R^{st}}$ allele on aleurone pigmentation. The matings were as follows: $\underline{r^r r^r} \times \underline{R^{st} R^{st}}$, $\underline{R^{st} R^{st}} \times \underline{r^r r^r}$, and $\underline{R^{st} R^{st}}$, 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
$\underline{R^{st} r^r r^r}$	480	8.75
$\underline{R^{st} R^{st} r^r}$	480	19.83
$\underline{R^{st} R^{st} R^{st}}$	360	27.70

These data were tested for conformity to expectation on the basis of linear regression and were found to give a close fit. Thus the aleurone spotting effect of increasing dosages of the \underline{R}^{st} allele appears to be additive.

H. B. Cooper

8. Partial restoration of paramutant R^r .

A test was made to determine the amount of restoration that paramutant R^r undergoes when passed through one sporophytic generation with three different r^r mutants from standard R^r , and when passed through one sporophytic generation as a homozygote. The modified R^r will be designated as $R^r:lst$ (Brink, MGCNL 32). The R^{lst} allele used as the "inducer" in this test has been described by Ashman (see current MGCNL). All alleles used in this test had been previously incorporated into the highly inbred line of W22. The female test parent used was the uniform inbred line W23 r^{GrG} . The mating plan was as follows:

Testcrosses

	$R^r:lst R^{lst}$	(1)	W23 r^{GrG} x $R^r:lst R^{lst}$
W22 $R^r R^{lst}$ (selfed)	$R^r:lst R^r:lst$	(2)	W23 r^{GrG} x $R^r:lst R^r:lst$
W22 $r^r r^r$ x $R^r R^{lst}$ (mutants from standard R^r)	$R^r:lst r^r$	(3)	W23 r^{GrG} x $r^r R^r:lst$
W22 $R^r R^r$ (selfed)	$R^r R^r$	(4)	W23 r^{GrG} x $R^r R^r$

The kernels of aleurone phenotype $R^r:lst$ and standard R^r mottled were scored with the aid of a head lens, magnification approximately 1.1x. The kernels were matched to a set of standard kernels ranging in aleurone pigmentation from colorless, through grades of mottling, to self colored. The kernels from testcross (1) above provide an estimate of the initial aleurone phenotype of the paramutant $R^r:lst$ allele. The kernels from testcross (2) provide an estimate of the phenotype of the $R^r:lst$ allele after it has passed through one sporophytic generation as a homozygote. The kernels from testcross (3) provide an estimate of the $R^r:lst$ allele after it has passed through one sporophytic generation heterozygous with the three respective r^r mutants. The kernels from testcross (4) provide an estimate of the phenotype of standard R^r . The scores for each class of $R^r:lst$ phenotypes and the R^r phenotype were converted to percentages. The results are as follows: