Results of test matings continued

Cross made	R^{st} phenotype tested	# ears scored	Showing M^{st} change	Showing R^{st} change	Showing no change
$g^{10} \times g^{36}$	R^{st} standard	6			6
$g^{10} \times g^{37}$	R^{st} light st.	5	5		
$g^{10} \times g^{38}$	R^{st} very light st.	6	6		
$g^{10} \times g^{39}$	R^{st} standard	3			3
$g^{10} \times g^{40}$	R^{st} light st.	9	9		
$g^{10} \times g^{41}$	R^{st} very light st.	3	3		
$g^{10} \times g^{42}$	R^{st} standard	1			1
$g^{10} \times g^{43}$	R^{st} colorless	11		11	

$g^9 = R^{st}\ m^{st}/R^{st}\ m^{st}$

$g^{10} = r^r\ M^{st}/r^r\ M^{st}$

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4. Further evidence for transposition of M^{st}, a modifier of the R^{st} phenotype.

M^{st}, a genetic element whose existence and phenotypic expression have been studied by Ashman (1962), lies 5.7 units distal to R^{st}. It increases the frequency of dark spots on the colorless aleurone background.

As indicated in the preceding report, Mp was introduced into a homozygous R^{st}/R^{st} inbred line in order to study the possible interaction of R^{st} with Mp.

When R^{st}/r^r, or derivative "abnormal stippled" heterozygotes with r^r, obtained after the aforementioned cross, were crossed with r^g/r^g, some of the resulting ears gave unexpected results. Besides 1/2 colorless kernels, which are genotypically r^r/r^g, they carried two kinds of stippled kernels, dark and light, often in equal numbers. Similar results were previously observed by Ashman in two exceptional ears. They led him to the conclusion that M^{st} had transposed to a position in which it assorts independently of R^{st}.

Evidence of transposition of $\underline{M}^{st}$ to another chromosome was obtained in the present case by selecting the colorless kernels from exceptional ears and then making crosses with appropriate tester stocks that reveal the presence of the transposed modifier.

If $\underline{M}^{st}$ transposes to a chromosome other than 10 (where $\underline{R}^{st}$ resides), then 1/2 of the colorless kernels would have received one transposed modifier. The occurrence of ears that show 1:1 distributions for dark and light stippled is here considered proof of the transposition of $\underline{M}^{st}$ from the standard position to a point in a different chromosome. The strain used to test for the presence of a transposed modifier in such colorless kernels is a homozygous $\underline{R}^{st}\underline{M}^{st-}/\underline{R}^{st}\underline{M}^{st-}$ stock.

The validity of such a test rests on the assumption, experimentally proved, that kernels of the genotypic constitution $\underline{rM}^{st+}/\underline{rM}^{st+}/\underline{R}^{st}\underline{M}^{st-}$ have a darker phenotype than $\underline{rM}^{st-}/\underline{rM}^{st-}/\underline{R}^{st}\underline{M}^{st-}$ kernels.

In fact, if the colorless kernels derived from the exceptional ears carry a transposed modifier, presence of the latter should be revealed by crossing them with the $\underline{R}^{st}\underline{M}^{st-}/\underline{R}^{st}\underline{M}^{st-}$ tester stocks, since the progeny kernels would exhibit a dark stippled phenotype in 50% of the cases, and a light stippled phenotype in the other 50%. However, if there is no transposed modifier in the genome of the colorless kernels under test, then only progeny kernels with a light stippled phenotype are expected.

Following such crosses, in eight cases out of thirteen examined, evidence of a transposed modifier was found. The frequency of dark and light stippled in the ears carrying transposed $\underline{M}^{st}$ was 1274 dark, 1315 light stippled, values that nicely fit the 50% and 50% ratio predicted.

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5. Test for depletion of $\underline{R}^{st}$ paramutagenic action in $\underline{R}^{r}$ $\underline{R}^{st}$ plants.

$\underline{R}^{r}$ $\underline{R}^{st}$ plants were mated recurrently for three generations to a paramutable $\underline{R}^{r}$ $\underline{R}^{r}$ stock. The latter, F_1 $\underline{R}^{r}$ $\underline{R}^{st}$, and $\underline{R}^{r}$ $\underline{R}^{st}$ individuals representing backcrosses 1, 2, and 3 of $\underline{R}^{r}$ $\underline{R}^{st}$ to $\underline{R}^{r}$ $\underline{R}^{r}$ were then testcrossed on $\underline{r}^{g}$ $\underline{r}^{g}$ ♀♀. The resulting sets of $\underline{R}^{r}$ $\underline{r}^{g}$ $\underline{r}^{g}$ kernels were scored for grade of aleurone color to determine whether maintenance of $\underline{R}^{st}$ in freshly constituted $\underline{R}^{r}$ $\underline{R}^{st}$ heterozygotes for a few