

The two bottom lines in the above tabulation show that  $\underline{M}^{st}$  in the linked position had no significant effect on the frequency of  $\underline{R}^{sc}$  mutations. These two rates are lower than those in the  $\underline{tp-M}^{st}$  stocks; the difference was significant for  $\underline{tp-M}^{st}1$  and approached significance for  $\underline{tp-M}^{st}2$ . Also, the  $\underline{tp-M}^{st}1$  rate was significantly higher than the  $\underline{tp-M}^{st}2$  rate. If  $\underline{tp-M}^{st}1$  and  $\underline{tp-M}^{st}2$  are in fact  $\underline{M}^{st}$  transpositions,  $\underline{M}^{st}$  has been altered in such a manner that it increases the frequency of  $\underline{R}^{st}$  to  $\underline{R}^{sc}$  mutations, and the degree of increase was not the same in the two cases tested. The altered action of  $\underline{M}^{st}$  could be the consequence of the positional change or of a transposition associated mutation (change of state).

It is possible that  $\underline{tp-M}^{st}1$  and  $\underline{tp-M}^{st}2$  are not in fact  $\underline{M}^{st}$  transpositions but transpositions of some other element, probably from the  $\underline{R}$  locus, that modifies the stippled phenotype in a manner similar to  $\underline{M}^{st}$  but also increases the instability of  $\underline{R}^{st}$ . Kermicle (Genetics 64:247-258) has suggested that a hypothesized  $\underline{R}$  locus element ( $\underline{I}^R$ ) might, following transposition, have a phenotypic effect on  $\underline{R}^{st}$  similar to that of  $\underline{M}^{st}$ .

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## 2. Plant color suppression by a component of the $\underline{R}^{st}$ gene.

Colorless and near-colorless aleurone mutants of several different classes have been isolated from  $\underline{R}^r \underline{R}^{st}$  plants. Mutants of one class are associated with crossing over, have near-colorless aleurone, and mutate from green to red plant color. The  $\underline{R}^{st}$  allele has been resynthesized in heterozygotes between a mutant of this class,  $\underline{r}^g(nc)1-3$ , and  $\underline{R}^{sc}$  (self-colored aleurone mutant from  $\underline{R}^{st}$ ) (Ashman Genetics 64:239-245). Based on these and other data,  $\underline{R}^{st}$  was postulated to be composed of an aleurone pigmenting component,  $\underline{Sc}$ , and a pigment inhibitor,  $\underline{I}^R$ . On this basis, the resynthesis of  $\underline{R}^{st}$  in the above heterozygote resulted from a crossover that brought together on the same chromosome an  $\underline{Sc}$  component from  $\underline{R}^{sc}$  and an  $\underline{I}^R$  component from  $\underline{r}^g(nc)1-3$ .

$\underline{r}^g(nc)1-3$  mutates from green to red plant color, and these mutants were designated  $\underline{r}^{r-m}(nc)1-3$ . Tests were made to determine the effect of the plant color mutation on the resynthesis of  $\underline{R}^{st}$  in heterozygotes with  $\underline{R}^{sc}$ . The data are presented below.

Heterozygous combinations	Progeny numbers	Number of kernels	No. of $\underline{R}^{st}$ mutants
$\underline{r}^{r-m}(nc)1-3/\underline{R}^{sc}$	68:512-525 69:121-127	88,645	0
$\underline{r}^g(nc)1-3/\underline{R}^{sc}$	64:278-281 66:67-73 69:106-112	109,217	20

$\underline{R}^{st}$  was not resynthesized in the heterozygous combination involving the red plant mutant  $\underline{r}^{r-m}(nc)1-3$ . Based on the frequency of  $\underline{R}^{st}$  resynthesis in the heterozygous combination involving  $\underline{r}^g(nc)1-3$ , the kernel population from the  $\underline{r}^{r-m}(nc)1-3$  combination should have yielded about 16  $\underline{R}^{st}$  mutants, and their absence is clearly significant.

The data above indicate that  $\underline{I}^R$  is lost when  $\underline{r}^g(nc)1-3$  mutates to  $\underline{r}^{r-m}(nc)1-3$ . The direction of the plant color mutation, from green to red, suggests loss of a suppressor of a plant pigmenting component, and the implication is that  $\underline{I}^R$  is the suppressor. A crossover in the parental  $\underline{R}^r \underline{R}^{st}$  plants could have brought together the plant color component (P) from  $\underline{R}^r$  and  $\underline{I}^R$  from  $\underline{R}^{st}$ .

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1. Rapid test to screen "opaque 2" maize for approximate lysine content.

The obtaining of hybrids, from maize "opaque 2," rich in lysine with higher test weight than kernels that are entirely opaque would be interesting from an agronomic standpoint. We do not know the relations between lysine content of the entire kernel and the degree of opacity. A test would be very useful in order to screen, at the beginning of a breeding program, the young lines rich in lysine with modified opaque kernels (opaque 2 x modifier genes interactions).

Described below is a test called "double-analyzing of nitrogen" using Kjeldahl and Pro-meter, a dye-binding method.

The principle of this test is based on the following observations:

- the contents of nitrogen, determined with Pro-Meter and Kjeldahl, are identical with "normal" kernels,
- the Pro-Meter and Kjeldahl determinations give different values in tests of "opaque 2" kernels; the proteins of "opaque 2" kernels absorb more dye than those of "normal" kernels.

The importance of the difference between nitrogen content, as determined with Pro-Meter and Kjeldahl, is related with the proportions