

## 2. Mutation from $r \rightarrow R$ in the aleurone.

A few of the  $F_2$  seeds from a cross of sweet corn inbred P51 and South American popcorn inbred 24-6 showed irregular spots of color in the aleurone layer. Selection in subsequent generations resulted in stocks where all of the seeds were heavily mottled. No fully colored seeds have appeared so there are apparently no germinal reversions.

Tests showed both parents and the mottled stocks to be  $A_1$ ,  $A_2$ , C, and  $r$ . Considering the genotypes of the two parents, it seemed unlikely that a mutable  $r$  was involved.

A mottled stock was crossed reciprocally by a stock from Laughnan which was heterozygous ( $r/r-m$ ) for the mutable  $r$  which he reported in the 1952 News Letter. When the Purdue mottled stock was the female parent, seeds arising from fertilizations by gametes carrying  $r-m$  showed both types of mottling: the relatively light color over most of the aleurone layer typical of the Purdue stocks and the much more intense color associated with the mutable  $r$ . Seeds arising from fertilizations by gametes carrying  $r$  showed only the mottling typical of the Purdue stocks. When the  $r/r-m$  stock was used as the female parent, seeds from  $r$  megaspores were usually, lightly mottled as in the Purdue stocks although some were colorless. Seeds from  $r-m$  megaspores were heavily mottled. On some of these, however, could be detected the more diffuse Purdue mottling

When such an  $F_1$  (Purdue mottled x  $r-m$ ) was pollinated by an  $R$  tester, one-half the resultant seeds were mottled due to the action of  $r-m$ . The other half were either mottled as in the Purdue stocks or colorless. Significantly, some of the kernels on every ear showed both types of mottling. When the  $R$  tester was used as the female parent, one-half the kernels showed  $r-m$  mottling. Most of the other kernels were colorless. Only rarely did a kernel show Purdue-type mottling.

The above data are indicative that the mottling in the Purdue stocks is due to a rather complex genic background which is necessary if  $r$  or a mutable  $r$  is to function as  $R$ , rather than a mutable  $r$  which is relatively independent of genetic modification, or a simply inherited mutator which acts on  $r$  as  $Dt$  does on  $a$ .

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