

<sup>1</sup>Frequency index: (7) = 101<, (6) = 51-100, (5) = 11-50,  
(4) = 4-10, (3) = 1-3, (2) = 1-2, (1) = 1 sector per leaf respectively.

<sup>2</sup>Sector size (a) -- 1 mm wide, length from 1 mm to 3/4 length of leaf; (b) -- < 1.5 mm; (c) -- 1.5-4 mm; (d) -- 4-10 mm wide, and extending from base to tip or to margin of leaf.

\*Random sample (10-20% of surviving seedlings).  
\*\*Random sample (50% of surviving seedlings).

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## 2. Transposition of mutability between components of the $A_1$ locus.

In studies of two separate cases of mutability arising from potentially compound alleles of the  $A_1$  locus mutant types have occurred which suggest transposition of the factor responsible for mutability from one component to the other.

The first of these (MNL 30:101) originated from  $A^b$  and appeared to be composed of a stable  $\alpha$  and a mutable recessive  $\beta$  component ( $\beta^m$ ). The instability is controlled by one or more separate and as yet unidentified factors. The  $\alpha \beta^m$  complex usually behaves just as would be expected on the basis of its structure. The  $\alpha$  component may be removed by crossing over to produce a colorless mutable allele  $\beta^m$ , the  $\beta^m$  may change to recessive stable to produce a pale stable allele, the  $\beta^m$  may change to dominant stable and thus produce a reconstituted  $A^b$  ( $\alpha \beta$ ) or the  $\beta$  component may change its state of mutability to produce a more or less unstable allele.

An occasional exception is found in the occurrence of cases where the mutability appears to have transferred to the  $\alpha$  component leaving the  $\beta$  component in a recessive and much less mutable condition. Seeds of such a type are colorless with many pale and a few full colored sectors.

The second case originated several years ago in L. J. Stadler's cultures from the standard  $a^p$  allele. The new allele designated  $a^{pm}$  arose from a less mutable allele designated  $a^{px}$  which in turn arose from  $a^p$ . Because of its phenotypic expression and its failure to respond to attempts to subdivide it by crossing over the  $a^p$  allele was considered to be a single unit allele similar to the  $\alpha'$  component of  $A^b$  Peru. However when one considers the behavior of its descendant allele  $a^{pm}$  one is led to conclude otherwise.

Regularly and without the need of any known mutator factor  $a^{pm}$  which has pale aleurone, red brown plant and dominant brown pericarp color ( $\alpha$  phenotype) changes to  $A^r$  which has a purple seed, purple plant and recessive red pericarp color ( $\beta$  phenotype) or to  $A^{br}$  which has purple seed, purple plant and recessive brown pericarp color. Thus the mutants produced fail to fit into a linear series expected if a one-component locus were involved nor do they fit a two-component locus since the mutants obtained require that both components change in opposite directions at the same time. This seems quite illogical until one considers the possibility that such a dual change can occur if one component gives up something at the same time that the other gains

something or in other words that  $a^{Dm}$  is  $\alpha \beta$  (incomplete) and that when  $a^{Dm}$  mutates to  $A^r$  some element leaves  $\alpha$  and moves to the incomplete  $\beta$  component providing a complete  $\beta$ ; thus  $A^r$  is  $\alpha$  (incomplete)  $\beta$  and is potentially able to revert to  $a^{Dm}$  again.

Regardless of the kind of interpretation it is clear that the controlling element of the  $a^{Dm}$  allele is able to move frequently from one aspect of  $A_1$  expression to another and that sometimes it affects both at the same time as shown by the presence of seeds that are simultaneously mutating from colorless to pale and from colorless to full color.

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### 3. Location and effects of $c_2$ .

The following data show  $c_2$  to be on chromosome 4:

Parent	X Y	Phase	+ +	+ y	x +	x y	Recomb.
wx T4-9g/ $c_2$	$C_2$ -Wx	RS	117	30	46	4	35 ± 6.1%
su/ $c_2$	$C_2$ -Su	RS	617	205	251	63	46 ± 2.3%

If  $c_2$  is in the long arm it is probably beyond  $gl_3$  ( $su-gl_3$  is around 35 units). The short arm has not been eliminated, however.

A few effects of  $c_2$  were described briefly in News Letter 34:91. A more complete summary is now possible. The homozygous recessive  $c_2 c_2$  and double-mutant combinations with most others ( $a_1$ ,  $a_2$ ,  $bz_1$ ,  $bz_2$ ,  $c_1$ ,  $C^1$ ,  $r$ , and  $pr$ ) have completely colorless aleurone tissue but  $c_2$  in kernels have dilute purple color. In plant tissues,  $c_2$  results in much-reduced pigmentation in the husks and sheaths; strong color develops only in the leaf auricles, glume bars, and similar tissues. The combinations of  $c_2$  with other plant-color factors show the effects of both; for example,  $c_2 a_1$  plants (with  $B P_1$ ) are very weak brown, like  $a_1$  plants in color but like  $c_2$  in strength of pigmentation. If  $c_2$  affects pericarp color in P background at all, it is only by a very slight reduction in color intensity. The dosage effect of  $c_2$  in the aleurone is very clear; from a selfed ear of  $+/c_2$ , 13 selfs of full-color seeds were found to include 10  $+/+$  and 3  $+/c_2$ , while 15 selfs of pale seeds were all  $+/c_2$ .

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