

was used to pollinate three different tester stocks each sensitive to a different controlling element, viz: (1) C Ds (no Ac), (2) a<sub>1</sub><sup>m</sup> (no En) and (3) a<sub>1</sub><sup>m-1</sup> (pale aleurone, no Spm).

The kernels from the cross with the C Ds tester would be expected to show a chromosome breakage pattern in the F<sub>1</sub> if the pale green stock carried recessive c as expected and an Ac-like element. They did not show such a pattern.

The second and third crosses had to be carried to the F<sub>2</sub> to detect mutability at the a-locus because the unstable pale green plants carried a dominant A<sub>1</sub> allele. In both crosses a few dotted seeds were present on the F<sub>2</sub> ears as one would expect if A and a<sup>m</sup> were segregating along with C-c, R-r and if a controlling element were present as well. One F<sub>1</sub> with the pale aleurone a<sup>m-1</sup> stock was backcrossed to the a<sup>m-1</sup> parent and produced an ear which segregated 1/2 purple to 1/2 dotted as expected where A and a<sup>m-1</sup> were segregating in the presence of C- and R-. The fact that all of the non-purple class were dotted is puzzling.

It thus appears that my unstable pale green stock activated mutable a<sub>1</sub> alleles which had previously been described as part of the En and Spm systems. This is additional confirmation of Dr. Peterson's report that his En element is the same as Dr. McClintock's Spm (MNL 37:72).

The origin of this new isolation of a mutable system can be traced to the hybrid of three dent corn stocks, viz: (1) C0111, an inbred line produced at the Central Experimental Farm, Ottawa, Canada; (2) a line received in 1952 from the Eastern States Farmers Exchange which had come originally from the Bishop open pollinated variety; and (3) J.H.L.E., a long eared variety received from Dr. W. L. Brown in 1954. Evidence of a mutable phenotype had not been observed in these three lines prior to combining them into a three-way hybrid, nor in the first two lines which have been grown every year since. No unstable pale green plants were observed in the first segregating generation either, although the progeny consisted of only 13 plants, as did the next selfed generation in which the two original mutable pale green plants were found.

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## 2. Mutation of P<sup>cw</sup> to P<sup>wr</sup>.

Further observations are available on the origin of the colorless pericarp-red cob inbred Pa W703 which apparently arose by mutation from the red pericarp white cap-white cob inbred Q703 (see MNL 36:50 and 37:109). The F<sub>1</sub> from the cross Q703 x Pa W703 was both selfed to produce an F<sub>2</sub> and testcrossed to the colorless pericarp-white cob allele P<sup>ww</sup> as carried by inbred A171 to produce:

	<u>F<sub>2</sub></u>	<u>F<sub>1</sub> x P<sup>ww</sup></u>
Red pericarp white cap - red cob	363	0
Red pericarp white cap - white cob	196	347
Colorless pericarp - red cob	160	329
Colorless pericarp - white cob	0	0

The  $F_2$  results do not show a significant deviation from a 1:2:1 ratio while the testcross fits a 1:1 ratio consisting of parental classes only. Both populations suggest that the two inbreds differ at only one locus with regard to pericarp and cob color. It is suggested that the original inbred Q703 carried  $\underline{P}^{CW}$  and the derived inbred Pa W703 has  $\underline{P}^{WR}$ . This would have involved a mutation of both the pericarp and cob color component of  $\underline{P}^{CW}$ , the pericarp component from dominant to recessive and the cob color component from recessive to dominant, to produce  $\underline{P}^{WR}$ .

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### 3. T1-2c - P linkage.

Testcross data of a plant heterozygous for T1-2c and  $\underline{P}^{WR}-\underline{P}^{WW}$  indicates about 20 per cent crossing over between them:

<u>T1-2c <math>\underline{P}^{WR}</math></u>	<u>T1-2c <math>\underline{P}^{WW}</math></u>	<u>+ <math>\underline{P}^{WR}</math></u>	<u>+ <math>\underline{P}^{WW}</math></u>	<u><math>\Sigma</math></u>
11	48	41	10	110

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### 4. Brown pericarp and salmon silks with $\underline{P}^{VV}$ .

The gene combinations  $\underline{P}^{VV}$  bp (brown pericarp) and  $\underline{P}^{VV}$  sm (salmon silks) have been synthesized. The first has brown stripes on a clear background as expected. The silks with sm, however, are not pigmented, even when a sizeable area of red pericarp occurs on an ear. This is understandable since the red pigment of the pericarp on newly arisen red spots, and the stripes of medium variegated, do not seem to extend to the silk attachment region.

On the other hand the pericarp phenotype "dark crown", which has thus far defied genetic analysis, might be expected to interact with sm to produce pigmented silks. It is planned accordingly to examine the dark crown situation in the background of sm.

The principle reason for synthesizing these combinations is to study the residue at the P locus after the controlling element Mp has transposed away from the locus. It appears that the self-colored (red) pericarp mutants arising from  $\underline{P}^{VV}$  following transposition of Mp are not all alike in color. In the background of sm and bp it may be possible to make more definitive observations.

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Maize is an important summer season crop in West Pakistan where it is grown over an area of over one million acres every year for the production of grain. About as much area is grown for fodder. Maize being a