

2. Because of the presence of two  $B^4$ 's in the plant, the meiotic loss of this chromosome is cut down from 42.6% to 28.0% through the female. The loss through the pollen is cut down from 68.0% to 35.0%. It therefore appears that the  $B^4$  suffered heavier losses when present in the univalent condition.

3. The difference between the results obtained in reciprocal crosses is less striking when two  $B^4$ 's are present in the plant. Gametophyte competition (of normal pollen grains versus  $B^4$ -hyperploid ones), is therefore less important, as a loss factor, when the majority of spores in the pollen pool is carrying one  $B^4$ .

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1. New albino alleles and a mutable allele at the  $w_3$  locus.

Two alleles have been reported for the  $w_3$  locus located in the long arm of chromosome two. The original mutant,  $w_3$ , is a viviparous white-albino mutant (white endosperm-albino seedling). A second allele pas8686 (white endosperm-pale green seedlings) has also been described. Four additional viviparous white-albino alleles have been found, three of these among stocks of albino mutants sent to Iowa State University for testing and one was found in a Tama flint line grown here. The alleles have been given the temporary symbols  $w_{\text{Everett}\#1}$ ,  $w_{\text{Illinois}}$ ,  $w_{\text{Chase}\#8}$  and  $w_{\text{Tama}}$ .

More interesting alleles of  $w_3$  were found in a stock supplied by Dr. J. L. Kermicle. Some years ago he sent me a pale yellow endosperm mutant that produced pale green zebra plants which could be grown to maturity. This mutant was given the symbol  $w_{\text{Kermicle}\#3}$  and has been placed on chromosome ten.

One of the pale yellow seeds from the original ear supplied by Dr. Kermicle was planted and the resulting plant selfpollinated. The ear from this plant was homozygous for pale yellow seeds, but no seedling test was made of it. Progeny of this selfed ear was grown and one plant

was used as a male parent on a translocation stock T3-9c and a sibling plant was pollinated by the inbred N25.

Progeny of the cross with T3-9c were grown and self pollinated. Of the eight segregating ears, seven segregated for  $\underline{w}_{\text{Kermicle}} \#3$  and one segregated for  $\underline{w}_{\text{Kermicle}} \#3$  and a white endosperm-albino seedling mutant. In future generations it was possible to separate the white endosperm-albino seedling from  $\underline{w}_{\text{Kermicle}} \#3$  and establish a line that only segregated for the new albino mutant. This mutant was given the symbol

$\underline{w}_{\text{Kermicle}} \#2^\circ$

Progeny of the cross between the homozygous  $\underline{w}_{\text{Kermicle}} \#3$  and the inbred N25, described above, were grown and self pollinated. Of the nine segregating ears, eight segregated for  $\underline{w}_{\text{Kermicle}} \#3$  and one segregated for  $\underline{w}_{\text{Kermicle}} \#3$  seedlings, pastel, albescent-like and white seedlings. Progeny from this self were grown. Upon self pollinating the progeny plants, 1/4 of them segregated only for  $\underline{w}_{\text{Kermicle}} \#3$ , 1/2 segregated for both  $\underline{w}_{\text{Kermicle}} \#3$  and the new mutant and 1/4 segregated only for the new mutant, in which various combinations of mutant phenotypes were observed among the seedlings coming from the white seeds. These phenotypes included seedlings that were pastel (pale green), albescent, or white (albino). Some ears segregated for only albino seedlings, others for only pastel, while still others segregated for various combinations of albino, pastel and/or albescent seedlings. This mutant was given the symbol  $\underline{w}_{\text{Kermicle}} \#1^\circ$

Allele tests of  $\underline{w}_{\text{Kermicle}} \#1$  and  $\underline{w}_{\text{Kermicle}} \#2$  with  $\underline{w}_3$  established that both of these new mutants were allelic to  $\underline{w}_3$ .

Plants of  $\underline{w}_{\text{Kermicle}} \#1$  that segregated only for pastel seedlings were selected for further testing since they resembled the  $\underline{pas}_{8686}$  allele of  $\underline{w}_3$ . However, the pastel  $\underline{w}_{\text{Kermicle}} \#1$  allele did not prove to be stable like  $\underline{pas}_{8686}$ . Self pollination of progeny from homozygous pastel ears, besides producing homozygous pastel ears, would frequently have ears that segregated for pastel and albescent seedlings. Some of these ears also had mutable pastel (pale green with dark green stripes) or mutable albescent seedlings (albescent seedlings with dark green stripes). Most of the progeny of outcrosses of homozygous pastel  $\underline{w}_{\text{Kermicle}} \#1$  plants to standard lines upon being self-pollinated would produce ears segregating

for pastel seedlings and albescent seedlings with occasional pastel mutable and albescent mutable seedlings. An occasional plant was found that, besides the pastel and albescent seedlings, segregates for some white seedlings and one plant had a white mutable seedling.

At the same time the selfs described in the above paragraph were made, the selfed plants were crossed as male parents to  $w_3$  plants. These outcrosses to an albino allele resulted in the segregation of the same classes of seedlings described above. However, white and white mutable seedlings were more frequent and they were found in some outcrosses in which the self pollinated male parent did not segregate for white seedlings. In two instances selfed plants which did not segregate for any white seedlings gave outcross plants that were homozygous for white seedlings.

The data suggest that the  $w_{\text{Kermicle \#1}}$  allele is a mutable allele of the  $w_3$  locus that can mutate to various levels of expression (e.g. pastel, albescent or albino). The instability of this gene in transmission from one generation to the next and the occurrence of mutable phenotypes support this conclusion. The nature of the mutable system can not be determined from the present data.

The fact that  $w_{\text{Kermicle \#1}}$  and  $w_{\text{Kermicle \#2}}$  are descended from the same self pollinated ear would certainly suggest that they might have had their origin in the same mutational event.

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## 2. A pseudoallele test at the $Y_1$ locus.

Since several alleles are known at the  $Y_1$  locus, a pseudoallele test was undertaken involving two of them. One of the alleles was the standard  $y_1$  (white-endosperm-green plant) found in genetic stocks. The second allele was  $w^{\text{mut}}$ , (white mutable). This is a mutable allele of  $Y_1$  that originated as a spontaneous mutant in one of Dr. E. G. Anderson's stocks. The original mutant had white endosperm with small areas of yellow tissue and seedlings which when grown at high temperatures were pale green with streaks of green tissue. Stable lines have been derived from this original mutant in which there is no mutability in the endosperm or seedling. These lines have white endosperm and pale green seedlings