

derived from those in the C sh bz Wx class. Among the latter, two plants had received an unmodified fragment chromosome in addition to the structurally normal chromosome 9. It is of interest to note that the ratio of Bz to bz among the sh class of kernels in A of table 4 (22 : 111) is much the same as the ratio of these two phenotypes among the sh class that was obtained from heterozygotes (normal chromosome 9 with I Sh Bz wx/deficient chromosome 9 with Sh Bz Wx/fragment with C sh bz) when these were used as pollen parents in crosses to plants that were homozygous either for C, sh, bz, and wx, or for c, sh, bz, and wx. This ratio was 57 C sh Bz (6 Wx : 51 wx) to 206 C sh bz (27 Wx : 179 wx).

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1. Defective endosperm factors from maize-teosinte derivatives.

Evidence is being accumulated that most of the defective endosperm factors from maize-teosinte derivatives are highly unstable. In several cases all sizes of kernels can be obtained from selfed de<sup>t</sup>/de<sup>t</sup> plant. In a few other types of de<sup>t</sup> factors three distinct "states" seem easily distinguishable; besides the normal, a weak and an extreme defective class appear on the defective-segregating ear. At least a few de<sup>t</sup> factors, when placed in a genetic background other than A158, seem to "recover." Apparently some genotypes "restore" de<sup>t</sup> factors to De<sup>t</sup>. Several de<sup>t</sup> factors, which arose in different derivatives, turned out to be allelic, which, together with the instability, seems to support the hypothesis that the cause of such de<sup>t</sup> factors could be of extragenic nature (in McClintock's sense). The factors de<sup>t</sup>4, de<sup>t</sup>5, de<sup>t</sup>10, de<sup>t</sup>11, de<sup>t</sup>17, de<sup>t</sup>18, de<sup>t</sup>19, de<sup>t</sup>23, de<sup>t</sup>24 are probably identical or allelic; the same is possibly true for the series de<sup>t</sup>13, de<sup>t</sup>22, de<sup>t</sup>26, de<sup>t</sup>27, de<sup>t</sup>29; and is well established for the series de<sup>t</sup>14 and de<sup>t</sup>20 (on chromosome 4).

2. Endosperm chimeras on ears segregating de<sup>t</sup> factors.

Endosperm chimeras have been observed in derivatives of crosses to testers of the stocks showing the de<sup>t</sup> factors. Their rate of appearance, when no teosinte segments are present, is unknown. The chimeras can be observed for characters whose genetic factors are carried by any chromosome, including the de<sup>t</sup> carrier. Out of 17 chimeric kernels (12 Su-su, 3 De<sup>t</sup>-de<sup>t</sup>, 1 Pr-pr, 1 Wx-wx) 8 were found in ears segregating genetic.

marker and de<sup>t</sup> factor on the same chromosome, while the linkage relationships for the others were not evident. Out of 112 ears segregating de<sup>t</sup> factors linked to su, 9 showed Su-su chimeras. In 37 ears segregating de<sup>t</sup> not linked to su the Su-su chimeras were 3.

### 3. Ga factors in maize-teosinte derivatives.

The maize kernel, and especially its highly evolved endosperm, is a structure where mutant factors are susceptible to prompt detection. But when appropriate genetic tests are performed the maize gametophyte turns out to be, as expected, the first place in which mutant factors may show, in some way, their presence. The majority of the many mutants which have been detected in maize-teosinte derivatives (Mangelsdorf 1955, Maize News Letter 29:23) were recognized as defective endosperm factors. However, such derivatives crossed to multiple testers showed that several Ga factors should be postulated to account for aberrant segregation data. A male gametophyte factor has been found on the short arm of chromosome 9, strongly linked to Wx. Self-pollination of plants whose genotype is probably Ga Wx/ ga wx yielded the following segregations:

Plant No.	<u>Wx</u>	<u>wx</u>	% <u>wx</u>
55-356-5	273	2	.73
-10	356	5	1.38
-1	155	2	1.27
-13	225	3	1.31
Total and average	1009	12	1.17

5 sib ears segregated wx with percentages ranging from 21.4 to 24.9.

55 selfed plants from Wx kernels of low wx ears, in 1956 yielded:

- 2 ears segregating waxy close to 25%,
- 18 ears segregating low waxy (80 wx out of a total of 4269 kernels),
- 35 ears non-segregating.

As the last two classes are expected to be almost equally represented (exactly 27:26; Emerson, Genetics 19: 149) it is quite possible that in the non-segregating class some ears occurred whose constitution actually was Ga Wx/ ga wx; the chance for the ga wx gametes to fertilize was probably so low that no wx wx recombinations occurred in some ears.

Twelve low waxy ears were studied, classifying separately the kernels on the upper, middle and lower part of the cob. The three ratios are not very different: 2.43-1.25 and 1.93 respectively (chi square 3.75; P = .15). A slight negative correlation however exists between