

homologs, ears segregating for the Sh Bz and sh bz phenotypes would be expected. None was found but a total of 48 ears contained kernels of the following phenotypes: 33 Pr Sh Bz; 41 pr Sh Bz; 4 Pr sh Bz; 4 pr sh Bz; 1 pr Sh bz; and 4 Sh colorless. The pr classes are most likely the result of fertilization by foreign pollen. Rhode Island summers are generally quite breezy, a condition which raises the comfort factor appreciably but also increases the likelihood of contamination. The alternative of simultaneous reversion of sh-bz-x2 and mutation of Pr to pr is highly unlikely. The origin of the remaining classes will be determined by testing for the presence of yg. The four colorless Sh kernels could have arisen from Sh a pollen since some of the sh-bz-x2 homozygotes used in this study were A/a in constitution.

Since the above exceptional kernels occurred as single cases rather than segregating populations, it is unlikely that they represent reversions induced by the x-ray treatment. It is conceivable that the events which gave rise to the original reversions were discrete changes which might not be readily induced by ionizing radiation. Since EMS is known to induce genetic changes at the molecular level at a detectable frequency in maize (Chourey, MNL 43:53-54), treatment of sh-bz-x2 with this mutagen will be performed next summer.

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## 2. Tests of bz-x3, bz-x4 and bz-x5 with the Ac Ds and Spm systems.

The x-ray-induced mutants bz-x3, bz-x4 and bz-x5 are mutable alleles which revert to the dominant state somatically in both endosperm and plant tissue. (For background, see MNL 44:182-183). Tests have been conducted to determine if the mutability is due to the presence of either Ac or Spm.

Plants of the constitution bz-x3 wx/bz wx, bz-x4 wx/bz wx or bz-x5 wx/bz wx which exhibited reversion activity due to the presence of the bz-x alleles were crossed with a stock homozygous for wx<sup>m-8</sup>, an allele which responds to Spm. In the progeny of these crosses, no kernels with Wx tissue were observed indicating that Spm was not present in the bz-x heterozygotes.

Tests for the presence of Ac were performed using bz<sup>m-1</sup>. From crosses of bz-x3, bz-x4 or bz-x5 heterozygotes with bz<sup>m-1</sup> homozygotes, usable progeny were recovered only from bz-x3 crosses due to severe ear rot. Since the reversion patterns of bz<sup>m-1</sup> and the bz-x alleles are quite distinct, there was no problem in distinguishing their respective activities. No kernels were observed with reversion patterns resembling that of bz<sup>m-1</sup> indicating that Ac was not present in the bz-x3 stock.

Preliminary tests indicate that mutability of the bz-x alleles is either autonomous or due to a tightly linked regulating element. Distinction between these two alternatives and information on the nature of these systems await further tests.

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#### 1. Variation in pollen grain size of inbred maize lines.

Pollen grain diameter was measured on a number of inbred maize lines in 1970 and 1971. The lines were agronomic stocks grown in the field at Brookings, South Dakota. Pollen collected in petri dishes throughout the day was stained with carmine and at least 50 grains measured for each sample. A total of 172 diploid lines were tested and significant differences among them detected. A frequency distribution is shown in Table 1. The distribution was quite normal with a median diameter of 0.0960 mm and a range of 0.0216 mm.

Similar measurements were obtained for five homozygous autotetraploid lines. Mean diameters of these lines ranged from a low of 0.1020 mm to a high of 0.1200 mm. Only one 4N line fell within the range of the diploids. The difference between diploid and tetraploid means was highly significant ( $P < .01$ ). Differences among the five 4N means also were highly significant.

Banerjee and Barghoorn (Maize Genetics Coop. News Letter 45:244-245, 1971) reported that position of the flower on the tassel, size of