

subsequent generations. Both early and late events were observed but the former were quite rare.

These data would seem to indicate that gene control systems affecting the bronze locus have either been induced by x-rays or existed previously in the stocks. Control experiments with the same original stocks will be conducted to determine which of the two alternatives is correct.

A second question to be answered is whether these systems involve one or two elements. In all three cases, the reversion events show tight linkage with the Sh allele; therefore, if the systems involve two elements, the second resides on chromosome nine. The exact location of this element cannot be ascertained until progeny tests are made of all individuals. If a kernel does not exhibit any reversions, it may contain the mutable allele and the reversion-inducing element, but the time of activation may be so late that no reversions have occurred before the endosperm has matured. Reversions may or may not be observed in subsequent testcrosses.

At the present time, tests are being conducted to determine (1) whether these mutable alleles respond to Ac or Spm, (2) whether these stocks can affect mutable alleles which do respond to Ac or Spm, (3) whether reversion patterns remain stable or unstable and (4) if an increased dosage of the mutable alleles has any observable effect.

Although no apparent intragenic changes at the bronze locus arose in these experiments, a number of mutations at the Sh₁ locus have yet to be tested.

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2. Reversion of sh-bz-x2.

In a greenhouse planting of sh-bz-x2 A/sh-bz-x2 a individuals (for background data on sh-bz-x2 see MNL 39:98 and 43:148) an open-pollinated ear was observed which segregated for ShBz and sh bz kernels. The phenotypic counts were 180 A Sh Bz, 63 A sh bz, 70 a Sh and 21 a sh. Since only sh-bz-x2 homozygotes were present, contamination could be ruled out as a source of the dominant phenotypes. And, since the plant bearing this unusual ear was bz in phenotype, heterofertilization in the kernel from

which the plant arose could not be the cause of the A Sh Bz or a Sh progeny.

The above ratio can be explained by an hypothesis which states that the sh-bz-x2 allele is invariably reverting as a unit in only one homolog. The gametic ratio would then be 1 A Sh Bz : 1 A sh bz : 1 a Sh Bz : 1 a sh bz in both male and female flowers. Since no major air disturbances occurred in the greenhouse, the phenotypic ratio apparently resulted from self-pollination of most of the silks. Some foreign pollen may have alighted on silks of this plant, but not enough to cause much deviation from a 9:3:3:1 ratio.

In a much larger field planting of sh-bz-x2 A/sh-bz-x2 a individuals, two bronze plants bore ears which segregated for dominant and recessive phenotypes. On the first ear which had been sibbed (1538-1 x 1538-2) the phenotypic counts were 48 A Sh Bz, 50 A sh bz, 51 a Sh, 49 a sh and 13 a Sh kernels which had a slight amount of diffuse purple pigment at the crown. Progeny tests of the a Sh and a sh individuals indicated that they were Bz and bz respectively.

Judging from the appearance of plants exhibiting the dominant phenotypes, the time of the reversion event appears to be after formation of the meiocytes. If reversions occurred earlier, Bz sectors on the plant would occur.

When just the Sh and Bz loci are considered, the 1:1 ratio of Sh Bz : sh bz in the 1538-1 x 1538-2 progeny fits the expectation if both alleles on one homolog, in one parent, invariably revert and if there is a failure of crossing over between Sh and Bz. The gametic ratio of this plant would then be 1 Sh Bz : 1 sh bz. However, the ratio of A : a in the progeny should be 3 : 1 since both parents were heterozygous. No hypotheses have been formed at present to explain this aberrancy.

The second ear with reversions (1538-2) arose on a bz plant and was either a sib or a self; the notation on the bag had been obscured by weather and was unreadable. The phenotypic classes were 121 A Sh Bz, 53 A sh bz, 119 a Sh and 60 a sh. Again, the a Sh and a sh kernels proved to be Bz and bz, respectively, from progeny tests. On this ear, the ratio of Sh Bz : sh bz classes was 2 : 1 but that of A : a was 1 : 1. The results fit neither the expected ratio of a sib or self cross, an enigma still under consideration.

On the remaining ears of this planting, single Sh Bz kernels were observed on a few individuals, but contamination cannot be eliminated as the source of these phenotypes.

The sh-bz-x2 mutant is not affected by the presence of Ac but has not as yet been tested with Spm.

Although the cause of the ratios observed to date is open to speculation, it cannot be denied that sh-bz-x2 is reverting, apparently as a unit.

Experimentation with this double mutant is made difficult by the fact that (1) reversions show no regular pattern except that independent reversions of neither sh nor bz have been observed and (2) reversions which do occur are relatively rare.

Hopefully, data collected in future experiments will shed more light on this puzzling but fascinating situation.

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1. Relative frequencies of meiotic stages.

Relative frequencies of meiotic stages were estimated in microsporocytes of a KYS/Inversion 5083 stock grown under controlled environmental conditions (light cycle: 14 hours light, 10 hours dark; relative humidity 85 percent to 95 percent; temperature 24°C to 25°C at sporocyte level). Samples were collected at 8½ hours into the light cycle, fixed in alcohol-acetic 3:1 mixture, and stored in a freezer until examination. Tassel branches were selected for study which contained a seriation of four stages: either synizesis, pachytene, diplotene-through-telophase II (counted as a single stage in this instance), and quartets, or pachytene, diplotene-through-telophase II, quartets, and spores. In the first type of branch comparisons were made of the relative frequencies of pachytene vs diplotene-through telophase II, in the second of diplotene-through-