5. An unstable locus for size of endosperm.

A study has been made of the inheritance of de^{t5}, one of the defective seed mutants resulting from the hybridization of maize and teosinte. This defective proved to be unstable in its inheritance. When defective seeds are grown, the ears which they produce bear seeds which very greatly in size and weight, ranging from complete defectives to normal seeds. The weights of seeds on the same ear very from approximately 5 to approximately 275 mg. The frequency distribution of seed weights is always multimodal. Some of the modes are undoubtedly no more than random fluctuations, but the fact that the frequency curves are always multimodal is probably significant.

When the data on seed weights from fifteen different ears were pooled to eliminate random fluctuations, a frequency curve with five distinct modes resulted, indicating that five different phenotypes are involved.

The most simple explanation of this situation is that we are dealing with a series of three alleles or "states", all mutable, of which the highest, De^{t5}, is completely dominant and the other two interact with various degrees of dominance of the first over the second, producing various degrees of defectiveness, as the result of dosage relations in the triploid endosperm.

If this explanation is correct, then there are six different embryo genotypes and there should be six different kinds of frequency distributions with respect to seed weight in the progeny of any ear of this stock. This appears to be the case. The frequency curves for seed weights of the seventeen ears so far analyzed fall into six distinct groups with respect to their pattern.

It is assumed that none of the "alleles" breed true, each mutating to the two alternative states. The rates of mutation of each state to the other two has not yet been determined; and, since the different endosperm genotypes are not completely distinguishable, it may not be possible to do so.

This defective seed mutant is of interest in representing an unstable locus, affecting size and development rather than a simple qualitative character like color.

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