

As is well known, the Dt gene induces the mutation of the a_1 allele to A, which results in the appearance of dots on otherwise colorless kernels. Occasionally, colorless kernels appear which do not respond to Dt; these have been designated a-stable (a^s). Studies were undertaken to analyze the mutation of a_1 to a^s . The isolated but regular occurrence of dotless kernels on normally dotable ears suggests that the mutation of the a_1 allele to a^s arises following a meiotic event. A series of crosses were made to test the hypothesis that a factor necessary for dotting was lost by crossing-over. Crosses with appropriate markers indicate that the mutations of a^s are not related to crossing-over. Further insight into the problem was obtained by testing the role of the Dt gene in the mutation of a_1 to a^s . In the cross, where mutations of a_1 to a^s are being tested for their occurrence in the absence of the Dt gene, no mutations have been found in a population of 6525 gametes tested for dotless kernels. Since the rate of mutation of a_1 to a^s in the presence of Dt is .25% in these tests, approximately 12 cases would be expected if Dt were not responsible for the origin of a^s . This indicates that few, if any, mutations of a_1 to a^s occur in the absence of Dt. The above results suggest that Dt conditions the change not only to higher alleles as has previously been shown (Rhoades), but also to the colorless stable allele, a^s .

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