

## 1. Relation Between Activator (Ac) and Modulator (Mp)

Studies have been made on the possible relationship of Ac (Activator) a hereditary element described by McClintock that controls certain types of mutable loci in maize, to Mp (Modulator) the unit postulated by Brink and Nilan as a component of the variegated pericarp allele, P<sup>V</sup>.

McClintock's Ds, at its standard position in the short arm of chromosome 9 without Ac in the nucleus, was introduced in 1952 into plants containing one or more representatives of the following P alleles: variegated; mosaic; "Q36" (a possibly new unstable type); stable colorless pericarp, red cob (P<sup>WR</sup>); and stable orange. Ds also was introduced into the P<sup>WR</sup> inbreds to which the above stocks were being graded by repeated backcrossing. The objective was to test whether any element at the P locus, or known to cause modifying effects on alleles at this locus, would promote Ds events similar to those which McClintock described as occurring when Ac was present with Ds. Such Ds events would be recognizable insofar as the breaks caused the loss of dominant endosperm markers on the short arm of chromosome 9 distal to Ds, resulting in the phenotypic expression of the recessive alleles. Kernels with variegations for aleurone color which appeared to be comparable to those resulting from Ds events were then selected and grown in 1953. Testcrosses were then made on an A R c sh<sub>1</sub> wx stock which afforded a definitive test of the ability of any of these pericarp characters to promote Ds events expressed as losses of C (or I), Sh<sub>1</sub>, or Wx, in the short arm of chromosome 9.

From the results of the above crosses it was clear that a promoter of Ds events was present in plants with the variegated allele (P<sup>V</sup>) and in some nonvariegated segregates from variegated plants. This promoter was not present in the corresponding P<sup>WR</sup> inbreds or in plants with mosaic (a highly unstable allele), Q36, or orange alleles. On testing the variegateds the expected proportions of Ds events were obtained consistent in most cases with an hypothesis that one Ac was present in the parent being tested. This held for both of the two possible dominant-recessive combinations at the C locus, C/c and I/C, and for the sh<sub>1</sub> and wx loci. The element promoting these Ds events also is similar to Ac in that, associated with somatic divisions, changes of dosage frequently occur. These dosage changes result in an alteration in the time and frequency with which Ds events take place, so that kernels or sectors of kernels appear with changed patterns of aleurone variegation. This promoter may be identical with or similar to Ac, or it may only contain Ac. It seems reasonable to conclude, however, that the promoter is Mp (Modulator).

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