

3. A dominant "blotch leaf" factor, homozygous lethal, located in chromosome 9.

A heritable blotch leaf character, present in a stock obtained from K. V. Rinehart at Indiana University in 1967 and in an accession from E. B. Doerschug, was investigated. Both were sugary (su<sub>1</sub>) and the two samples proved to have the same mutant. This material was apparently isolated from commercial sweet corn. Affected plants develop necrotic leaf spots starting from the two-leaf stage. Various degrees of expression are often found especially in plants belonging to families with different backgrounds. Necrotic blotches, normally 1-2.5 mm in diameter, often develop first on the distal part of the leaf blade, and then spread to most of the leaf blade and, with lower intensity, to leaf sheaths and other green parts of the plant. The necrotic spots are often surrounded by a yellowish halo and may, in extreme cases, merge to destroy most of the green surface. The character is better expressed at maturity. The pollen appears normal, but defective seeds are frequently produced upon selfing blotch leaf plants.

This character appears to be controlled by at least one dominant gene: in crosses of blotch x non blotch plants the blotch character is expressed in less than 50% of the F<sub>1</sub>; after selfing blotch plants the character is expressed by a fraction of the progeny with a ratio close to 27:37. These preliminary observations indicate that three independent dominant genes may be involved in the expression of the blotch character. If the hypothesis is correct, the ratio found in the F<sub>2</sub> may be the result of selfing plants which were heterozygous for all three factors. To explain the ratios found in outcrosses of blotch plants, one must assume that they were possibly heterozygous for all three factors, while the non blotch parent may have been homozygous recessive for one or two of them, i.e. it carried at least one dominant factor.

Plants homozygous for the blotch character apparently did not occur, suggesting that at least one of these factors is homozygous lethal, or the homozygous combination of two or three genes may cause lethality.

After crossing blotch plants to a set of wx marked translocations, F<sub>1</sub> blotch plants were used in tests for linkage between the

blotch character and the regions marked by the translocations. Linkage was observed between the blotch character and wx with all of the 17 translocations used. This indicates that at least one of the factors is probably located in chromosome 9. An average of 22% recombination was obtained from pooled data involving all of the translocations. The translocations may have caused some pseudo-linkage in regions proximal to the breakpoints. Moreover, the location of wx with regard to the breakpoint differs from translocation to translocation. Finally, the independent segregation of two more factors makes it difficult to estimate the actual linkage. Therefore, other tests are underway to place the factor in chromosome 9 more accurately. The tentative symbol for this factor is Hl<sub>4</sub>.

Similar characters, controlled by single factors, were described by various authors. A blotch leaf factor was first described by Emerson (1923) as a recessive (bl), occasionally behaving as a dominant. Another factor (bl<sub>2</sub>) was investigated by R. C. Wiggins (unpublished, cited by J. Weijer, 1952). The bl<sub>3</sub> factor was described by N. W. Simmonds (1950) and assigned to chromosome 10, but was later placed in chromosome 2 by E. M. Clark. Other factors controlling similar characters include: a recessive factor reported by J. W. Cameron (1964); a necrotic leaf spot factor, recessive, allelic to zn<sub>1</sub> (A. R. Hornbrook and C. O. Gardner, 1970); and a leaf fleck factor (lf<sub>1</sub>), recessive (J. L. Brewbaker, 1970). Recently M. G. Neuffer (1973, and personal communication) described two mutants induced by EMS treatment, producing necrotic leaf spots of different size; both factors apparently are single dominant genes, segregating 1:1 in outcrosses, and possibly characterized by lethality in the homozygous condition.

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#### 4. Constitution of nonparental strands isolated from R intralocus recombinants.

The data to be presented have been obtained in an effort to explain a quite unexpected result we observed while studying recombination within the R region. Our previous work (Gavazzi and Calati, 1972) indicated that it is possible to isolate, in the progeny of testcrosses