UNIVERSITY OF NEBRASKA
Lincoln, Nebraska
Department of Agronomy

1. Induced "Necrotic Leaf Spot" mutation allelic to zebra necrosis (zn_1).

Irradiation of seeds of the inbred line N25 with thermal neutrons produced a mutant which developed necrotic spots on the leaves just prior to tasseling. Genetic studies (Hornbrook and Gardner, Radiation Botany 10:113-117, 1970) clearly indicated that the trait is controlled by a pair of alleles with the normal allele being completely dominant over the necrotic leaf-spot allele. In homozygous recessive plants, degree of spotting varies from leaf to leaf but is always present. In 1969, the mutant line was grown alongside zebra necrosis sources obtained from Dr. R. J. Lambert, Illinois, and Dr. Neuffer, Missouri. In the zn_1 lines the necrotic tissue is limited to areas between the veins, whereas in the necrotic leaf spot line irregular spots or blotches appear which may coalesce causing large areas of the leaf to die. The phenotypic expressions of the induced mutant and zn_1 were sufficiently different to lead us to believe that different genes were involved; however, crosses were made between the two in 1969. Both lines were used as male and female. Twelve F_1 families observed in the 1970 nursery were found to have every individual plant expressing necrotic leaf spots. In general, the F_1 plants tended to be more like the induced mutant than the zn_1 line and showed more leaf-tip damage than either parent. The mutant gene causing necrotic leaf spot appears to be allelic to the zn_1 gene or else it is the same gene interacting with other genes to produce the blotches noted. Further research is needed to determine which is the correct hypothesis.

In the 1970 nursery, the symptoms of the induced mutant appeared somewhat earlier than noted in previous years but at about the same time as the zebra necrosis symptoms. They tended to appear first on the 5th, 6th and 7th leaves as large blotched areas with very little evidence of striping. Zebra necrosis lines showed a definite striping and relatively little evidence of blotches. The first evidence of necrosis appeared when plants were about 30 to 40 cm high in 1970, whereas it was believed to have occurred just prior to tassel elongation and emergence in previous years.

C. O. Gardner