

9. Time of the critical cytoplasmically-induced action causing pollen abortion.

The conclusions drawn in article 7 above help to establish the time when the critical step in the abortion mechanism occurs in S-steriles. Because more than one step must precede it, among them, the primary restorer gene action and the restoration process, and since the critical times for these processes occur after microsporogenesis, this critical stage determining the abortion must take place during the maturation of the pollen grain - only a short time before the deterioration can be seen.

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10. Effect of environment on pollen restoration of T (Texas) type cytoplasmic male sterility.

It has frequently been observed in T-sterile material where the restorers from P14, P39, or NJ143y are being employed, that one part of a tassel may be more fertile than another. Occasionally plants will be found where the first day's shedding area will be fertile, the second day will be less-than-half fertile, the third day's will be better-than-half fertile, and the base perfectly normal. Sometimes the tassel on the main stem is almost sterile, while the tassels of the tillers will be normally fertile or nearly so. This behavior appeared attributable to the environment. To investigate this, samples of seed from the same ear, produced by the cross (C13T x NJ143y) C13, were planted at about 5 to 7 day intervals from May 15 to July 23, 1958. From the data of three backcrosses and one F2 progeny, it had been previously established that the restoration brought about by NJ143y segregated as a single dominant gene. Furthermore, seed from the same packet had been sampled the previous year and found to segregate in a 1:1 ratio; it had been planted May 31. Therefore on the basis of both the previous sampling and the previous behavior of this restorer, each planting in 1958 should have contained fertile and sterile plants in equal numbers. Those planted from May 15 through May 25 and from June 30 through July 23 had a significant ( $P < .01$ ) excess of steriles, while the samples planted June 2 through June 16 had a significant ( $P = .02$ ) excess of fertiles. Samples planted on May 28 and June 23 appeared to give a one gene ratio. There was no conscious selection in removing seeds from the packet; also, some samples included various degrees of "partials" while others did not. The environmental factor(s) responsible is not known.

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11. The effect of environment on pollen restoration of the S-type cytoplasmic male sterility.

When grown during the 1955 and 1956 seasons, all cultures having only plants with S cytoplasm, mainly the P39 residual genotype, and the