

4. Irradiation of growing I Sh Bz Wx/C sh bz wx/C sh bz wx endosperms.

Irradiation of heterozygous growing endosperm allows detection of numerous losses of the dominant markers. When C sh bz wx plants were pollinated by I Sh Bz Wx pollen and then transferred to a gamma field for their entire post-fertilization life, the F_1 kernels showed phenotypes that mimicked those obtained from mutable alleles. Subsequently, we irradiated the fertilized plants for fixed periods such as 6-24 hrs, 24-48 hrs, 48-72 hrs and so on. The frequency of sectors or dots was counted on the mature kernels. The following general observations were made:

(i) The sector size is correlated with the time of irradiation. The earlier the irradiation, the larger the sector of loss or change.

(ii) There is practically no effect of irradiation about the time the aleurone-pigment genes express themselves. This suggests that the expression of I and C is unaffected and that all the changes that occur are due to a loss or a change in the genetic material.

(iii) Although the number of I losses can be estimated by counting the C sectors, the data are complicated by the varying number of nuclei or cells present at the time of irradiation, lethality etc.

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5. Cryptic deletion on the short arm of chromosome 9.

A locus has been detected on the short arm of chromosome 9 which completely prevents the transmission of the male gametes carrying it. The female gametes bearing it also have a slightly, but significantly, lower rate of transmission (Table 3). The position of the locus was mapped 1.13 map units distal to I. The four markers linked to this locus show a polarity of transmission, the transmission of I, Sh, Bz and Wx being 1.13%, 2.26%, 4.49% and 27.18% respectively. For I, it was verified that the transmitted gametes were due to crossing-over between I and the distorting locus. The basis of the aberrant transmission was considered to be either a mutation of a gametophytic factor or a cryptic deletion. Cytologically, no aberration was detectable and stainability of pollen was normal. The data, however, appear to be more compatible