

5. Pre-meiotic mutation.

Preliminary experiments were made in an attempt to induce recessive mutation by γ -irradiation in pre-meiotic cells for the A_1 , A_2 , Bt_1 , Pr, and R loci. Individual homozygous dominant plants were irradiated for various intervals and at various doses before meiosis and the resulting pollen used to pollinate appropriate recessive testers. It is a reasonable assumption that a cell in which pre-meiotic mutation occurred should by subsequent mitoses give rise to a sector of the tassel which would be heterozygous for the mutation. Thus, depending upon the size of the sector, a number of gametes carrying the mutation would be produced.

In a total of 61 plants tested in this manner two pre-meiotic mutations were found. One pre-meiotic mutation occurred at the A locus and the other at the Bt_1 locus. The phenotype of the A_1 mutant is characterized by a mosaic anthocyanin aleurone. Further tests indicate that this is a mutable in which 22 mutates simultaneously with A_1 . First tests indicate (not definitely established) that this is an autonomous type of mutable. Transmission tests indicate no sterility is involved, and no observable chromosomal aberrations or pollen sterility have been detected. The phenotype of the Bt_2 mutant is characterized by complete mutation to bt_2 . Tests of this mutant indicate no transmission sterility, pollen sterility or detectable chromosomal alteration.

In general, the data indicate that irradiation of pre-meiotic cells is an inefficient method for producing mutation. However, it seems a possibility that most mutations due to gross chromosomal alteration may be screened out by this method.

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