

A possible interpretation of these findings is that in the et/et genotype the leucoplasts do not divide at a high enough rate to keep pace with cell division. Segregation of the leucoplast during cell division would then result in some cells being void. A cell, once void of the plastid would then be expected to give rise, by continued division, to a lineage of cells which lack leucoplasts. Repopulation of the leucoplasts could then take place in cells with at least one remaining when cell division ceases.

An alternative explanation is that the starch synthesis of the leucoplast is impaired though their division rate is normal. Spontaneous changes (mutations?) in the leucoplast could account for finding only some cell lineages exhibiting the starch storage defect. At the resolving power of these observations the presence of leucoplasts would go undetected.

It is of importance to note that et/et individuals also exhibit a virescence in the seedling (as reported by Stadler). A common basis for the chloroplast defect and the lack of starch in cells of the endosperm (leucoplast defect) is highly probable. The stage of development of the sporophyte and/or the physiology of the cells in which the etched phenotype occurs may account for the differences in response of a single cytoplasmic organelle to the genome. The granules of pigment (chromophores) in the aleurone show no alteration in the kernels examined.

These observations provide an explanation for the zygotic semi-lethality of et/et genotype noted by Dr. M. M. Rhoades (MNL 35, p. 67). If, during the development of the endosperm, the leucoplast is lost or becomes defective early enough there would remain an insufficient supply of stored food material for the embryo.

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1. All arms tester interchange set in A188 inbred.

The following interchanges in the set have been isolated in homozygous condition: 1-3 (5883), 1-3 (5982), 1-9b, 2-4b, 2-4L, 2-6b, 2-6d, 3-4 (5156), 3-7c, 5-7e, 5-8a, 5-10 (5290), and 5-10 (6061). These have been crossed to the interchange set for identifying chromosomes as a check at the end of the backcrossing program. As more of those in the set reach the desired number of backcrosses, homozygous lines for them will be established and checked. This set is the one which we started introducing into A188, and subsequent backcrossing was continued by Dr. Jenkins and Dr. Sprague. At least two of the lines have been somewhat more difficult to use because they have only about 25% sterility. Other interchanges have been substituted for them.

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