

The recessive mutations for the ten known markers were found to be allelic, with the exception of \underline{g}_1 and \underline{gl}_1 which need to be tested. The recovered new mutants were found to breed true and allelic studies are in progress.

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4. High protein opaque-shrunken endosperm.

Induced opaque-shrunken endosperm (MNL 44:178) was found to have high protein (18.0%). Preliminary studies suggest that the shrunken-opaque is not allelic to either \underline{sh}_1 , \underline{sh}_2 , \underline{sh}_4 or \underline{bt}_2 .

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5. Biochemical nature of \underline{bz}_1 and \underline{bz}_2 mutants.

The chemical nature of the accumulated substance in \underline{a}_2 mutant aleurone was reported earlier (MNL 45:169-171). Similar studies were conducted with \underline{bz}_1 and \underline{bz}_2 along with certain other double mutant combinations.

The characterization of the isolated substances was made by the following: 1) Rf values; 2) absorption maxima; 3) visible color; 4) color reactions; 5) response to various diagnostic spraying reagents; 6) thin layer chromatography (Silicagel); 7) paper chromatography. Absorption maxima of chromatographically pure compounds were recorded in 5% methanol-hydrochloric-acid solution on UV specord VIS. The relative quantities of the pigments were determined on a Klett-Summerson photoelectric colorimeter.

Table 1. Identification of substances accumulated
in different genotypes.

Genotype	Leucoanthocyanidin	cyanidin	cyanidin-3-glucoside
bz_1	P	P	A
bz_1 pr	P	A	A
bz_1 in	P	P	A
bz_1 a_1	A	A	A
bz_1 a_2	P	A	A
bz_2	A	TA	P
bz_2 in	A	TA	P
bz_2 a_1	A	A	A
bz_2 a_2	P	A	A

(P = Present; A = Absent; TA = Trace amounts)

These studies suggest that bz_1 and bz_2 accumulate cyanidin and cyanidin-3-glucoside, respectively, indicating that the Bz_1 gene may control a glycosidation step. The double mutants, a_1 bz_1 , a_1 bz_2 , a_2 bz_1 , and a_2 bz_2 , lack these pigments.

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6. The role of the modifying factors, In/in and Pr/pr.

Colorimetric analysis of the pigment levels in bz_1 in and bz_2 in suggests that the homozygous recessive in enhances the production of cyanidin in bz_1 and cyanidin-3-glucoside in bz_2 tissue. The mutant bz_1 Pr accumulates cyanidin and bz_1 pr pelargonidin. The accumulation of cyanidin in bz_1 and cyanidin-3-glucoside in bz_2 indicates that Bz_1 might be involved in glycosidation. Further the Bz_1 gene may act prior to Bz_2 and both of them act after In, Pr, A_1 and A_2 . These observations independently confirm the sequence of gene action proposed earlier (MNL 35:95).

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