5. Anthocyanin synthesis: Some biochemical effects of a_1, a_2, and bz.

Aleurone and husk tissues from the combinations of a_1, a_2, and bz have been studied in sib comparisons in segregating families, using visual observation and chemical technics. B Pl individuals were used for husk studies, and C R Pr individuals were used for aleurone studies.

Visually, husks of the combinations of a_2 and bz with a_1 a_2 are indistinguishable from a_1 tester. Also, by paper chromatography land a phase separation technic, it has been determined that husks of all such combinations contain the usual large quantity of an isoquercitrin-like pigment, and that alcoholic extracts of aleurone tissue of these combinations have similar ultraviolet absorption spectra.

In contrast, husks of a_2 tester, bz tester, and a_2 bz combination all differ visually. Isoquercitrin is present in small quantity in a_2 tester, but apparently absent in husks of a_2 bz and bz tester. Absorption spectra of extracts of aleurone tissue indicate that a_2 bz is more like bz tester than like a_2 tester, although this point is still uncertain.

If the sequence of reactions is linear, all indientions are that is thus the first-acting factor of the three. Some more direct test is needed to confirm this, and to determine the sequence of A_2 and Bz, since the last-acting factor is apparently able to bring about a change In the "substrate" accumulated when the preceding factor fails to act (since a_2 bz husks have a new phenotype, unlike either a_2 or bz). It may be possible to perform such direct tests on sterile cultures of aleurone tissue. Tester lines are being prepared with su and in, the first to allow culture of the tissue, the second to increase the production of anthocyanin pigment.

Aleurone tissue of a_1, a_2, and bz tester was subjected to isoquercitrin tests and found to contain no detectable isoquercitrins in contrast to the husks, where isoquercitrin is the predominant simple pigment of a_1 tester, and is at least detectable in a_2 tester.

In isoquercitrin content, acyanic combinations segregating for a_1 show A_1 a_1 husks to be intermediate between the two homozygotes. This dosage effect is to be checked quantitatively for anthocyanin content in cyanic individuals next summer.