Among several conclusions that may be drawn from the comparisons shown above, referring to the II Quadrant, where most of the leaves from the middle of the plant fall, we may see that in the first single cross, the line NS 54 -223 is dominant over C.P. -117 in determining long, wide leaves. In the second single cross, an intermediate value is found between the indexes for both parents. In the third single cross, HIM -40 x P.C. -37, there is a higher value 90.66 than the index for either parent, pointing to marked heterosis for length and width of leaf.

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1. Anthranilic acid incorporation in Bf-1 and normal seedling leaves.

Bf-1 seedlings and anthers are known to accumulate several substances that fluoresce blue in ultraviolet light (Proc. Nat. Acad. Sci. 37: 645-649 and MGCNL 24: 12). One of these substances was identified as anthranilic acid (AA) and two others were found to have microbiological activity as AA. In order to obtain evidence on the relationship of AA to the other fluorescent AA-containing substances, radiocarbon labeled AA was employed. Normal bf-1/bf-1 and mutant Bf-1/Bf-1 seedling leaf slices were incubated in pH 6.5 phosphate buffer containing 2 microM uniformly labeled (biosynthesized) AA containing ca. 2×10^6 cpm. Parallel normal and mutant leaf slices heated at 100° C for 5 minutes in buffer before incubation with AA were used as controls. After 6 hours incubation the leaf slices were ground, centrifuged, and the supernatants taken for paper chromatography in butanol-acetic acid solvent. Fluorescent spots were marked and some chromatograms cut into strips for direct counting and radioautograms prepared from others. It was found that (a) normal (boiled or unheated) seedling leaves did not convert AA to the two major blue fluorescent substances as indicated by fluorescence or radioactivity, and (b) mutant (unboiled but not boiled) seedling leaf slices incorporated AA into one of the major fluorescent materials and probably the other. Thus, the mutant accumulated AA and AA-like materials, and also contains a thermolabile system for conversion of AA to AA-like substances; normal leaves do neither. Unless the AA-converting system is adaptive over a longer time than 6 hours, it appears that the Bf-1 gene does not operate simply by causing the accumulation of AA which is convertible to AA-complexes by processes common to both normal and mutant seedling leaves.

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