Collection	Race	Marbled type	Stippled type	Paramutation Induction
Bolivia 928	Checchi	X	X	yes?
Bolivia 643	-	X	X	yes?
Bolivia 591	Huilcaparu	X	X	yes?
Bolivia 623	Huilcaparu Moteado	X	X	yes?
Bolivia 666	Huilcaparu Moteado	X	X	no
Bolivia 718	Paru	X	-	no
Bolivia 724	Paru	X	-	no
Bolivia 723	-	X	X	no
Bolivia 663	Altiplano	-	X	no

Some of the races tested appear to be segregating for paramutation induction ability. Within races, some testcross ears are 50% dark purple while others have no purple. Each tested F_1 plant ($\underline{R}^{st}$ $\underline{R}^{r}$) was also either selfed or used as a female with $\underline{r}^{g}$ $\underline{r}^{g}$.

In some races particularly Bolivia 967 the paramutation expression was very evident in the crosses using the F_1 as female. This again is not a uniform expression within the race as some ears were 50% dark purple, others 25% dark purple 25% light purple, and still others with more complicated ratios or no dark purple.

The degree of paramutation alteration induced in $\underline{R}^{r}$ varied among the different races as well as within some races. Bolivia 320 appears to be as strong as and probably stronger than $\underline{R}^{st}$. Others are similar to $\underline{R}^{mb}$ types while still others seem to be distinctly different from either of these two.

The portion of the paramutation interaction which induces the change in the $\underline{R}^{r}$ gene seems to have a considerable degree of variability. Further tests are underway to investigate the nature of this variability. The relationship between the various sources will be studied and interactions among them will be determined.

D. B. Linden

3. Fluorescent metabolites accumulated by a mutant of maize.

A mutant of maize obtained by exposure to high energy irradiation at the atomic bombs test site in Bikini was shown to accumulate blue fluorescent metabolites.

The homozygous segregated mutant accumulated fluorescent compounds in leaves during the first stage of plant growth and in the anthers of mature plant. Progeny from the heterozygous mutant accumulated the fluorescent metabolites in both the young leaves and the anthers or in anthers only, according to the gene dose. A single gene was suggested to be responsible for the accumulation of blue fluorescent material.

Separation of these materials by paper chromatography showed three main fluorescent spots called A, B and C in order of increased Rf. The blue fluorescent compound pertaining to the C spot was isolated and identified as anthranilic acid; the eluates from B and A spots showed anthranilic acid activity in biological assays. Incubation of uniformly C^{14}-labeled anthranilic acid with unboiled and boiled mutant and normal seedling leaf slices showed that unboiled mutant seedling slices incorporated radiocarbon into the B spot and presumably into that of lower Rf. Incorporation of AA into the succeeding compounds of the tryptophan cycle could not be demonstrated for either normal or mutant seedling slices, although coupling of indole with serine by tryptophan synthetase was demonstrated to occur in maize.

In the present study an attempt was made to isolate and identify the blue fluorescent material of the B spot. Chromatographic separation on paper showed that the B spot was a mixture of two compounds. Acid and alkaline hydrolysis of the whole B spot eluates gave rise to two compounds, one of which was a fluorescent compound identified as anthranilic acid by chromatography, electrophoresis and chemical test. The other compound that arose from hydrolysis was identified as a sugar by chromatography with control of pure sugars, chemical tests, and by preparation and identification of 2,4-dinitrophenylhydrazine derivatives by chromatographic methods. The experimental evidence suggested a six carbon aldose and it was tentatively identified as glucose.

The nature of the bonding between anthranilic acid and glucose was demonstrated to be a B-glucoside ester in one of the separated compounds called B_1. This compound was insoluble in ether, migrated toward the cathode in electrophoresis with 0.1M phosphate pH 7.5 and was completely hydrolyzed by the enzyme B-glucosidase but not with maltase. In addition to the ester another compound apparently having a glucosylamine structure was found in the B spot eluates although the actual evidence do not permit to establish with certainty the origin of this compound or its physiological role.

The lack of transformation of AA into the succeeding compounds of the tryptophan cycle under genetic control of maize suggest there are internal metabolic regulatory systems for AA conversion to indole and tryptophan. Mutation can arise from alteration after irradiation of the gene responsible for this inhibition or by the activity of a new gene suppressor which in turn represses the one mentioned before.

A direct block in the pathway of AA is discarded since the available evidence shows that snythesis of this compound is not under genetic control. It is suggested that there is a detoxifying mechanism which permits the plant to store the accumulated AA as a B-glucosidic ester indefinitely or to discharge it in some adaptive metabolic pathway. The arrested production of AA after the development of the fourth leaf suggest that a feed back mechanism is involved and that some of the fluorescant compound or related substances cause the suppression of the system responsible for AA biosynthesis.

Vincente Julio Medina