

4. Unique characters in maize.

Cultivated maize is unique among cereals in many ways, for example, in possessing the pistillate inflorescence in the form of an ear, in being one of the most heterotic organisms, in possessing peculiar mutagenic systems, and in throwing extreme segregates on inbreeding. There is evidence from our studies, and from those of Mangelsdorf and his associates, that these unique properties of maize result, in part at least, due to introgression from teosinte and possibly even from *Tripsacum*.

S. M. Sehgal

5. Evidence for transposition in maize.

In single crosses between some of the teosinte and "*Tripsacum*" derived lines of inbred Al58, segregation into normally tripsacoid ears and extremely tripsacoid ears was found (Sehgal, 1963). The internal morphology of the two types of cobs supports the previous assumption that the extremely tripsacoid ears are homozygous for the introduced germ plasm, and the normally tripsacoid ears are heterozygous. Furthermore, the extremely tripsacoid ears show numerous differences in internal morphology when compared to the parental derivatives, thus suggesting that these are not the result of accidental selfing. The homozygosity of the introgressed segments is tentatively attributed to the transposition of the chromosomal segments from one chromosome to another.

S. M. Sehgal

6. Crossing inbred Al58 and its modified derivatives with Florida teosinte.\*

In a previous News Letter (No. 36), I reported the results of crossing original Al58 and its teosinte and "*Tripsacum*" derivatives, with Nobogame teosinte. The same group was studied in the summer of 1962 in crosses with Florida teosinte. The pistillate inflorescences in the  $F_1$ 's remained in their initial stage of development till late October due to the long day environment in which they were grown and therefore could not be studied. The staminate inflorescences, although late, were well developed and were employed for various observations. The hybrids between Al58 and Florida teosinte showed a well developed compact central spike with polystichous arrangement of the spikelets, whereas the hybrids between modified derivatives x Florida teosinte, fell into one of the following categories:

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| (1) Lax central spike with polystichous arrangement of spikelets | Florida 3A<br>Florida 3B<br>Florida 9<br>Mexico<br>Honduras |
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\*This work was done at the Bussey Institution of Harvard University.

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| 2. Lax central spike, primarily distichous arrangement of spikelets              | Durango 1,7,9<br>Florida 4+<br>Nobogame 4A<br>Bolivia<br>Argentina<br>Paraguay |
| 3. Absence of central spike in some individuals of the F <sub>1</sub> population | Nicaragua  |

S. M. Sehgal

7. Immunological studies of corn kernel proteins.

The double diffusion agar method (Ouchterlony) has been used to study precipitin reactions of salt-soluble proteins extracted from germs of mature corn kernels. Several precipitin lines, each presumably representing a different protein or group of proteins, have been identified. Two of these lines are most easily produced and have been studied intensively. They are labeled "A" and "B". Most inbred lines contain antigen necessary to produce both lines. However, a few inbred lines (all tracing back to one source) lack the antigen necessary to produce precipitin line "A". One other inbred lacks the antigen necessary to produce precipitin line "B". Single kernel analyses of F<sub>2</sub> and BC<sub>1</sub> populations, and of P<sub>1</sub>, P<sub>2</sub> and reciprocal F<sub>1</sub> crosses show that each antigen is inherited as a dominant, single gene character. The fit to a two-factor ratio was good when a small F<sub>2</sub> population segregating for both "A" and "B" was tested, indicating that they are probably not linked. Variations in intensity of reaction indicate that modifiers probably affect the amount of each antigen produced in a kernel. It is also possible that homozygous recessive individuals do not really lack the antigen, but merely have it in concentrations so low that the test, as employed, does not detect it. Further studies will, it is hoped, answer some of these questions.

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1. Heritability of radiation induced alterations of paramutation.

Last year experiments were described in which the radiosensitivity of  $\underline{R}^r$  and the  $\underline{R}^{st}$ ,  $\underline{R}^{mb}$  components of paramutation was investigated (MNL 37:133-134). When  $\underline{R}^r$  is irradiated prior to crossing, about 50% of the time the paramutation expression was altered. The classification can be summarized into two categories: no paramutation and segregating for paramutation. When the  $\underline{R}^{st}$  and  $\underline{R}^r$  components were irradiated, about 25% of the time paramutation expression was altered. An additional category of increased paramutation alteration after  $\underline{R}^{mb}$  irradiation occurred along with the no paramutation and segregating for paramutation classes.