The plasmatypes T, A, B, and S had an average sterilizing capacity of 41.6, 29.4, 32.8, and 16.3, per cent respectively. It seems that the T-type is more efficient in sterilizing Philippine inbreds or that the frequency of restorer factors for T in these inbreds is much less than those for any of A, B, or S. Also, there is a very striking similarity in the behavior of A, B, and S plasmatypes. Any line that is sterilizable by one is also sterilizable by the other two; and any line that is essentially a restorer for one is also a restorer for all. This could indicate that the same factors can restore the three cytoplasms and/or the three cytoplasms are essentially the same.

It can also be seen from the results that segregation of the restorer factors for A, B, or S within an inbred line occurs very rarely. An inbred is essentially either a restorer or a non-restorer. Very seldom will a sterile plant appear in a restorer line or a fertile plant in a non-restorer. This lack of variability is a disadvantage because one has to grow larger populations to obtain the less frequent desirable segregate.

There is however one big advantage for the A, B or S cytoplasms to warrant their utilization in spite of their apparent inferiority to T in some aspects. Not one had a tendency to increase leaf disease susceptibility in the F_1 progenies of their crosses. Under epiphytotics of Helminthosporium leaf spot, the crosses were definitely as resistant as their original normal inbred parent.

A. C. Mercado
A. A. Gomez

PIONEER HI-BRED CORN COMPANY
Johnston, Iowa
Department of Plant Breeding

1. Environmental modification of rf_2 rf_2 sterility.

(ms_1) Rf_1 __ rf_2 rf_2* appears not to be as completely sterile under all environmental conditions as (ms_1) rf_1 rf_1 Rf_2 __. Test crosses of plants segregating for both loci gave good sterile versus fertile segregations in Florida in 1961-62 for the test of segregating Rf_1 but gave partial fertiles versus full fertiles for the test of segregating Rf_2. When the same populations were regrown in Iowa in 1962 both loci gave good sterile versus fertile segregations. In the winter of 1962-63 in Florida a similar test once again gave good sterile versus fertile segregations for test crosses of segregating Rf_1 but test crosses

*(ms_1) is used as symbol for Texas (T) cytoplasm.

of segregating $\underline{Rf}_2$ were almost entirely fully fertile. Further, a usually completely sterile line of the genotype ($\underline{ms}_1$) $\underline{Rf}_1$ $\underline{Rf}_1$ $\underline{rf}_2$ $\underline{rf}_2$ was partly fertile.

Donald N. Duvick

2. Allelism of Rf_1 and partial-restorer genes.

The partial fertility restoration ability of several inbred lines has been found to be due in each case to a single dominant gene. A preliminary series of test crosses has indicated that the single gene is in every case allelic with $\underline{Rf}_1$. That is, test cross populations of ($\underline{ms}_1$) $\underline{rf}_1$ $\underline{rf}_1$ x ($\underline{Rf}_1$ $\underline{Rf}_1$ x partial restorer) gave segregations of approximately 1 full fertile to 1 partial fertile. The possibility that there is an allelic series of restorer genes at the $\underline{Rf}_1$ locus is being explored.

Donald N. Duvick

3. $\underline{Ga}^S$ $\underline{Ga}^S$ in foreign cytoplasms.

The effect of $\underline{Ga}^S$ $\underline{Ga}^S$ in Japanese Hulless popcorn apparently does not change in the presence of other cytoplasms. By recurrent backcrossing, the genotype of a Hulless inbred line was transferred to the cytoplasm of (1) Gourdseed Southern Dent, and (2) Argentine multiple eared popcorn. When these two new lines plus the original Hulless were pollinated as females by two corn belt inbred lines of $\underline{ga}$ $\underline{ga}$ constitution, virtually no pollinations were effected on any of the three strains.

Donald N. Duvick

UNIVERSITY OF PRETORIA
and
TRANSVAAL REGION, DEPARTMENT OF AGRICULTURE
Pretoria, Republic of South Africa

1. Investigations on possible episomic nature of Modulator.

As reported in the 1962 Newsletter (p. 78-79) several experiments were undertaken to test for a possible cytoplasmic state of the controlling element, Modulator.