

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.

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2. Allelism of  $\underline{Rf}_1$  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.

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

The effect of  $\underline{Ga}^S$   $\underline{Ga}^S$  in Japanese Hulless popcorn apparently does not change in the presence of other cytoplasm. By recurrent back-crossing, 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.

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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.