

PIONEER HI-BRED CORN COMPANY
Johnston, Iowa

1. Allelism of FR genes of inbreds which restore pollen fertility to WF9^S.

The inbreds KY21, BH2, GE1, JG3 and JG5 (all but KY21 are lines of the Pioneer Hi-Bred Corn Co.) restore pollen fertility to WF9^S, in such a way that all anthers appear normal, although only 60-90% of the pollen grains are "fertile" (plump, starch-filled). When these five lines were intercrossed in all possible combinations and the resulting F₁ hybrids crossed as male to WF9^S, 100% of the plants in each 3-way cross were fertile, as described above. This indicates that all 5 FR lines contain dominant forms of the same FR genes, with respect to WF9^S.

2. Further evidence for two complementary major genes for fertility restoration in T cytoplasm.

In the winter of 1956-57 five ear-progenies of the cross $\Delta(WF9^T \times KY21)WF9 / SK2$ gave the following segregations:

| <u>Ear Number</u> | <u>Sterile Plants</u> | <u>Partially Fertile Plants</u> | <u>Fertile Plants</u> |
|-------------------|-----------------------|---------------------------------|-----------------------|
| 1 | 12 | 1 | 14 |
| 2 | 17 | 7 | 0 |
| 3 | 20 | 5 | 0 |
| 4 | 26 | 0 | 0 |
| 5 | 25 | 0 | 0 |

Each of the $(WF9^T \times KY21)WF9$ plants used as female parent was fully pollen sterile. $WF9^T \times SK2$ is pollen sterile. These results are in agreement with the postulated fertility restorer genotypes of: WF9 - aabb, SK2 - aaBB, and KY21 - AABB (postulated in Genetics, 1956, on the basis of backcross and three way cross data). According to this hypothesis, one in three crosses of SK2 to sterile plants of the backcross $(WF9^T \times KY21)WF9$ should segregate 50% fully fertile to 50% sterile plants. The partially fertile plants presumably are due to interaction of minor genes (non-allelic with the two major fertility restorer genes) which can effect partial fertility restoration under some environmental conditions.

Donald N. Duvick