

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.

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