

5. Notes on the Inheritance of Restoration of Pollen Production in Cytoplasmic Male Sterile Lines of Corn

In the Fall of 1952 a project dealing with the inheritance of restoration of pollen production in cytoplasmic male sterile lines was initiated. Linkage tester lines were obtained from the Maize Genetics Coop. The Texas type sterile lines were used in all field corn crosses and were obtained from Dr. D. F. Jones and Dr. O. H. Pearson. This is a brief report of the findings made to date.

It has been known from the breeding work of others that linkage tester lines currently available will restore pollen production to cytoplasmic male sterile lines with much greater frequency than will normal inbreds. In the present study, four out of ten linkage testers restored viable, mature pollen to cytoplasmic male-sterile lines. The sources of these lines, along with the chromosomes they mark and the segregation for fertility in the F_1 progenies of sterile x tester, are given in the following table.

Sterile x Linkage Testers	Chromosome Marked	No. Plants Segregating			Possible Genotypes of Linkage Testers
		Fertile	Sterile	Semi- Sterile	
C106 ^{T6} x Coop 51-80	1	86	29	0	$S_1S_1S_2S_2$
x Coop 50-88	1	0	80	0	$s_1s_1s_2s_2$
x Coop 50-32	1	30	0	0	$S_1S_1S_2S_2$, $S_1S_1s_2s_2$, or $s_1s_1S_2S_2$
x Coop 50-105	2	0	30	0	$s_1s_1s_2s_2$
x Coop 49-26					
Selection 1	3	126	0	0	$S_1S_1S_2S_2$, $S_1s_1S_2S_2$ or $s_1s_1S_2S_2$
Selection 2	3	23	18		$s_1s_1s_2s_2$ or $S_1S_1s_2s_2$
Selection 3	3	0	30	0	$s_1s_1s_2s_2$
x Coop 51-17	4	0	2	0	$S_1S_1s_2s_2$
x Coop 49-37					
Selection 1	5	0	240	0	$s_1s_1s_2s_2$
Selection 2	5	0	47	14	$S_1S_1s_2s_2?$
x Coop 51-36					
Selection 1	6	0	90	0	$s_1s_1s_2s_2$
Selection 2	6	9	9	0	$s_1s_1s_2s_2$ or $S_1S_1s_2s_2$
x Coop 47-52	7	0	130	2	$s_1s_1s_2s_2?$
x Coop 51-10	Multiple Tester	0	30	0	$S_1S_1s_2s_2$

An explanation for the observed segregations could be that duplicate genes are controlling the inheritance of pollen production in these particular crosses. With this assumption, the possible genotypes of the linkage testers are presented in the last column of the table.

The ultimate goal of this study is to assign pollen restoration genes to specific linkage groups.

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