

3. Double mutant stocks with mealy endosperm.

Starting with h_2 and other known mutants that modify the endosperm structure, double recessive stocks have been constituted in order to study the influence of these factors on one another. Stocks now available are: $h_1 h_2$, $fl_1 h_2$ and $sh_1 h_2$. The building of stock $o_2 h_2$ is under way.

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1. Gamete deletion in male-sterile crosses.

Previous reports (Agron. Abs., 1959, p. 60, and M.N.L. 1960) have shown that a greater than expected number of fertile plants is obtained when pollen segregating for Rf and rf is used to pollinate plants carrying 33-16(J) male-sterile cytoplasm. Excesses of fertile plants have also been obtained in certain crosses involving Texas (T) male-sterile cytoplasm. It was suggested (M.N.L. 1960) that the excess of fertile plants could be caused by differential competitive effects between Rf and rf pollen grains such that genotypes carrying rf are eliminated. Several studies the past two years support this suggestion.

Pollinating plants carrying T cytoplasm with equal quantities of pollen from T331, a nonrestoring inbred, and Ky21, restoring, produced 80.3 percent fertile plants while pollinating plants carrying J cytoplasm with equal quantities of pollen from Ky27, a nonrestoring inbred, and 33-16, restoring, produced 67.8 percent fertile plants.

In another experiment, plants with T cytoplasm were pollinated with nonrestoring pollen and 1/2, 1, 2, and 4 hours later were pollinated with restoring pollen. The following numbers and percentages of fertile and sterile plants were obtained from these pollinations:

	Fertile		Sterile	
	No.	%	No.	%
Tcms x $rf\ rf$	0	0	300	100.0
" x $rf\ rf$ + $Rf\ Rf$ 1/2 hr. later	1151	96.7	39	3.3
" x " " 1 " "	347	72.3	133	27.7
" x " " 2 " "	307	58.6	217	41.4
" x " " 4 " "	89	20.1	354	79.9

Ears pollinated with nonrestoring pollen only produced full seed set. Also the delayed pollinations gave similar results from the base, middle, and tip portions of the ears. The results obtained, therefore, could not be due to delayed silking.

These experiments indicate that Rf pollen grains germinate faster than rf grains, pollen tubes from Rf pollen grains grow faster than rf tubes, or both.