plants with the expected 50% viable pollen. Thus, Mo2RF and K63 do not
invariably prevent restoration in single crosses with restored steriles,
and the high degree of sterility observed in the crosses 33-16 x Mo2RF
and 33-16 x K63 must in some manner depend upon the genotypes peculiar
to these hybrids.

Several investigators have pointed out that certain inbreds, in-
cluding restorer lines, may lack one or more "modifier" genes which com-
plement the "major" restorer genes in bringing about complete restora-
tion. Sterility in the two exceptional single crosses could be explained
by assuming that Mo2RF and K63 do not carry all of the necessary modifiers.
However, these modifiers must be present in 33-16 since it contains S
cytoplasm and is fully fertile (in Connecticut at least). Presumably,
therefore, 33-16 would contribute the necessary modifiers to the single
crosses with Mo2RF and K63. But it could be argued that the modifiers
in 33-16 are recessive and that Mo2RF and K63 carry the dominant alleles.
In other words, pollen fertility in S cytoplasm would require in addition
to dominant restorer genes, one or more recessive modifiers, which are
absent in Mo2RF and K63. If this is true, it is difficult to explain why
Mo2RF and K63 did not also produce sterile offspring when crossed to the
restored S sterile line A158SF (restorers from Ky21).

A possible, formal explanation for the observed results can be
suggested. The restorer system in 33-16 may require recessive modifiers
which are not essential for restoration in A158SF which has restorers
from Ky21. The inbreds Mo2RF and K63 would carry the dominant alleles
of these modifiers whose presence would prevent complete fertility in
single crosses with 33-16, but would have no effect on F₁'s with A158SF.
The fact that 33-16 restores A158S and WF9S in F₁ would mean that the
latter two inbreds carry the recessive modifiers. This is also indicated
by the crosses 33-16 x A158 and 33-16 x WF9, both of which are fertile,
and by the cross A158SF x 33-16 which is close to 100% fertile.

Evidence bearing on the above formal scheme can be obtained from
the comparative behavior of A158SF with restorers from Ky21 and A158SF
with restorers from 33-16. These two restored lines with a common A158
residual genotype might be expected to breed differently (when crossed
by Mo2RF and K63, for example) if the S restorer systems in 33-16 and
Ky21 differ in their requirements for modifier genes.

Harry T. Stinson, Jr.

3. The ms₁ms₁ genotype in T cytoplasm.

As pointed out in earlier notes all evidence indicates that genic
and cytoplasmic male sterility are controlled by completely independent
 genetic systems. As part of this evidence we have previously cited the
behavior of a ms₁ms₁ genotype in plants with S cytoplasm and S restorer
genes (PNL 1959, p. 114). Such plants were male sterile, thus demonstrating that the ms₁ gene operates in S cytoplasm and is not inhibited by S restorer genes. We have now obtained ms₁ms₁ individuals with T cytoplasm and T restorers.

The procedure by which this combination was produced is the same as that described earlier, and takes advantage of the close linkage between the ms₁ and y loci. C107TFR₁r₁Rf₂Rf₂Yms₁Ms₁ plants were crossed as female by a WF9 stock heterozygous at the ms₁ locus, i.e. WF9TFR₁r₁RF₂r₂RF₂YMs₁ms₁, and several fertile F₁ plants were selfed. White kernels on 2 segregating ears were planted. Ignoring X-over, these white kernels should be of the genotype yyms₁ms₁, and 9/16 of them should carry the Rf₁Rf₂ genes. If the ms₁ gene does not produce male sterility in T cytoplasm in the presence of the T restorer genes, 9/16 of the plants from white kernels would be expected to be fertile. The actual results in the two families were 38 sterile:1 fertile and 39 sterile:0 fertile. The ms₁ms₁ genotype, therefore, must be unaffected by T cytoplasm and T restorers.

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1. Cytogenetic changes induced by vegetable oils in Zea mays - a preliminary study.

Certain vegetable oils have been found to induce cytological and genetic changes in wheat. Based on these findings, a similar project was initiated to study the effects of castor and peanut oils on corn.

Procedure. Corn seeds were treated by soaking in castor and peanut oils for periods of 6, 12, 18 and 24 hours. Wiped dry, the seeds were germinated in petri dishes. Controls of untreated seeds were also set up. Excised root tips were fixed in fresh Carnoy's acetic-alcohol for

2. This study was made possible by a grant under the National Science Foundation Teacher Research Participation Program. The project was carried out under the direction of Dr. Margaret Thompson, Department of Plant Breeding, Cornell University.