

DNA in each case banded in the same position indicating that overall base-composition of maize and the tested teosinte DNAs is the same.

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8. Basis of cytoplasmic male-sterility (Texas type).

We have made the following observations so far: (i) Two sectorially pollen-fertile plants arose in the male-sterile mitomycin-treated series; (ii) One of the two plants in further breeding tests indicated that the change had occurred at the cytoplasmic level; (iii) Mitomycin inhibits overall DNA synthesis (MNL 41:9-10); (iv) Combined treatment with colchicine and gamma rays yielded a progeny of plants half (5 out of 11) of which were pollen fertile; (v) These on further testing showed that the change had occurred at the cytoplasmic level, although there were two exceptions; (vi) Total DNAs extracted from the germs of male-sterile, maintainer, and restorer lines when banded in cesium chloride gradients yielded only a single peak. No satellite band was observed.

These observations have so far not provided any unique supporting evidence for the involvement of plasmids or episomes in male-sterility. In fact, these observations are compatible with another hypothesis, namely the mutation of a cytoplasmic DNA (plastid or mitochondrial).

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1. Inheritance of male-sterility in Llera III variety of maize.

Last year (MNL 42:12) a few male-sterile plants were reported from Llera III but it could not be determined then as to how this variety inherited male-sterility. In order to resolve this point, five randomly selected male-sterile plants (even numbered plants in Table 1) were sib-pollinated by five different randomly selected male-fertile plants (odd numbered plants in Table 1). The latter five plants were self pollinated also. The progenies of all the ten plants were grown during summer 1968

Table 1
Proposed genetic constitution, observed frequency, and expected ratio
of male-sterile and fertile plants

Plant no.	Pedigree	Proposed genetic constitution	Observed frequency		Expected ratio		χ^2
			Fertile	Sterile	Fertile	Sterile	
1	Llera III ⊗	$m_1m_1 m_2m_2 ms ms$	44	0	1	0	
2	Llera III ♂ St- # plant 1	$m_1m_1 m_2m_2 Ms ms$	57	43	1	1	1.96
3	Llera III ⊗	$m_1m_1 M_2m_2 ms ms$	83	0	1	0	
4	Llera III ♂ St- # plant 3	$m_1m_1 m_2m_2 Ms ms$	63	27	3	1	1.20
5	Llera III ⊗	$M_1m_1 M_2m_2 ms ms$	70	0	1	0	
6	Llera III ♂ St- # plant 5	$m_1m_1 m_2m_2 Ms ms$	75	5	7	1	2.86
7	Llera III ⊗	$M_1m_1 m_2m_2 Ms Ms$	61	17	3	1	0.42
8	Llera III ♂ St- # plant 7	$m_1m_1 m_2m_2 Ms ms$	36	36	1	1	
9	Llera III ⊗	$M_1m_1 M_2m_2 ms ms$	44	0	1	0	
10	Llera III ♂ St- # plant 9	$m_1m_1 m_2m_2 Ms ms$	39	1	7	1	3.65

and male-sterile and fertile plants counted. Table 1 presents the observed frequency and expected ratio of sterile and fertile plants.

It will be noted from Table 1 that the observed frequency of fertile and sterile plants showed a good fit to the expected ratio. From the various segregation ratios we presume that male-sterility in Llera III is caused by a dominant gene, \underline{Ms} , whose action is modified by two modifiers, \underline{M}_1 and \underline{M}_2 . Sterility will be produced if the gene, \underline{Ms} , is present in homozygous dominant or heterozygous condition and the two modifiers, \underline{M}_1 and \underline{M}_2 , in homozygous recessive condition. Therefore the genetic constitution of male-sterile plants will be $\underline{m}_1\underline{m}_1 \underline{m}_2\underline{m}_2 \underline{Ms} \underline{Ms}$ or $\underline{m}_1\underline{m}_1 \underline{m}_2\underline{m}_2 \underline{Ms} \underline{ms}$. Any other alternative form of any one of these three genes will result in a fertile plant. On the basis of this hypothesis the genetic constitution of the ten plants is also presented in Table 1.

Further studies are in progress to determine the linkage relationship of the three genes reported above.

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2. "Notched leaf" a new trait in maize.

In a population of about 200 plants of Caribbean Flint Composite, grown during summer 1967, two plants were observed which very slightly resembled "knotted leaf". The two plants were selfed and also crossed with another variety not having the trait. The S_1 generation of both the plants segregated into the "so called knotted" and normal leaf types whereas the F_1 generation did not (S_1 and F_1 generations were grown during summer 1968). On closer comparison of those plants showing the trait with the description of the knotted leaf in the literature (Bryan, A.A. and J.E. Sass (1941), J. Hered 32:343-346) it was presumed that the trait was different from the knotted leaf and therefore it was designated as "notched leaf". The characteristics of this trait were:

- (i) only the top leaves (9th leaf and above) developed notch like structures about 1.0 cm on either side of the mid-rib and at about 11.5 cm from the leaf base (in three plants, out of a