

#### 4. Masking of v4 by growth substances.

This mutant is best expressed under cool growing temperatures; this past season provided ideal conditions for a study of overcoming the effects (i.e., causing the plant to become greener sooner). Each of the substances IAA, IBA and NAA was effective, provided they were applied daily during the growing season. At a time when control plants were only pale green in the older leaves and clear yellow in the younger leaves, IBA caused the older leaves to be more intensely green, but had little effect on the very youngest leaves, which were often yellower than in control plants. NAA caused all leaves to be greener and shorter than controls. IAA had least effect, but still plants were greener than controls. Three rows of 60 plants each in four randomized groups per row formed the basis of these results.

#### 5. Dry-weight increases in 2 genetic strains of milo.

10-day interval treatments of both 38-day and 44-day milo with TIBA, an auxin antagonist, results in dry-weight increases in roots and shoots. Such data indicate that the plants may owe their dwarfness to an excess rather than a deficiency of substances concerned with cell elongation. Studies are continuing.

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#### 1. Mutagenic effects of barley stripe mosaic on corn.

The most common effect, and the one most extensively studied, is a type of segregation distortion. One set of typical data is presented in Table 1. Progenies 752 and 753 were A a and a a in genotype and were derived from a 1963 culture exhibiting segregation distortion. Male and female transmission deviate significantly from the expected 50:50.

All treatments were applied to a susceptible, multiple marked dominant stock. The multiple marked recessive female appears to be immune to the virus. Previous tests have demonstrated that the virus is not transmitted through either the seed or pollen. All effects are therefore presumed to trace back to effects induced in the original virus infected male. The following tentative conclusions appear justified on the basis of studies thus far completed.

a. The types of segregation distortion illustrated in Table 1 occur with a frequency slightly greater than 1:500 and have been observed for each of the marker genes studied: A, Pr and Su. The effect is local rather than general in character, segregation at one locus being aberrant and at other loci normal.

b. Segregation distortion, in some cultures, has persisted through 3 backcross (A a x a a) generations.

c. Distortion may exhibit 3 states: (1) high frequency of the recessive; (2) low frequency of the recessive and (3) normal segregation. Stocks carrying A (virus exposed), when used as either males or females can transmit the abnormal condition to unrelated stocks.

d. Each of the abnormal states may shift to the other abnormal state or to normal. The four progenies in Table 1 exhibiting percentages of a in the 20's represent cases of shift. There is also evidence that the derived "normals" can revert to a high or low state but the incidence of reversion in this direction appears to be low.

Table 1  
Data on the transmission of A and a alleles in reciprocal backcrosses

Culture and Plant Number	Female Transmission			Male Transmission		
	A	a	%a	A	a	%a
64:752-1 x 753-8	279	92	24.8	299	107	26.4
752-2 x 753-3	370	121	24.6	269	81	23.1
752-4 x 753-11	97	195	66.8	119	207	63.5
752-6 x 753-13	164	259	61.2	129	192	59.8
752-7 x 753-14	214	346	61.8	137	195	58.7
752-8 x 753-15	107	164	60.5	74	149	66.8
752-12 x 753-1	186	53	22.2	215	71	24.8
752-13 x 753-12	184	49	21.0	278	98	26.1
752-14 x 753-4	125	182	59.3	120	210	63.6
752-17 x 753-5	176	285	61.8	124	236	65.6
752-18 x 753-7	71	163	69.7	146	244	62.6

e. The source of the a a genotype in the A a x a a backcrosses has no appreciable effect on male or female transmission values.

f. Cytological studies have not been made of the "distortion" stocks but neither the appearance of the ears nor of pollen suggests chromosomal deficiencies or translocations.

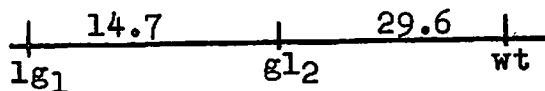
g. Comparable studies with sugarcane mosaic indicate that this virus has no significant mutagenic effect.

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## 2. Linkage of white tip (wt).

This chlorophyll deficient seedling type is characterized by a white tip on the first seedling leaf. In extreme cases this first leaf may be entirely white. Viability is excellent and the mature plant is normal. Backcross linkage data from the cross Lg<sub>1</sub> Gl<sub>2</sub> wt/lg<sub>1</sub> gl<sub>2</sub> Wt are as follows:

Lg <sub>1</sub> Gl <sub>2</sub> Wt	204	lg <sub>1</sub> Gl <sub>2</sub> Wt	17
Lg <sub>1</sub> Gl <sub>2</sub> wt	500	lg <sub>1</sub> Gl <sub>2</sub> wt	124
Lg <sub>1</sub> gl <sub>2</sub> Wt	94	lg <sub>1</sub> gl <sub>2</sub> Wt	475
Lg <sub>1</sub> gl <sub>2</sub> wt	15	lg <sub>1</sub> gl <sub>2</sub> wt	266



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