In summary, the allele tests indicate that in the mutator line most mutations occur very late in development or during meiosis. Early mutations that give rise to sizable mutant tassel sectors can occur, however, at low frequency. Tests involving the c sh bz wx stock and yg2 gave no evidence for somatic mutants for any of the loci involved.

If most mutations are very late somatic or meiotic in origin the estimated mutation rates reported in 1975 are much too low. Instead of an average 31.5-fold increase in mutation rate it would be closer to a 50-60 fold increase.

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Chromosome segregation in hyperploid female plants carrying compound A-B translocations

In 1967 Robertson (Genetics 55:433-449, 1967) tested the transmission of chromosomes from hyperploid TB-9b plants of the genotype 9(c sh wx) 9^B(Wx) B^9(C Sh) B^9(C Sh). The evidence suggested that approximately 96% of the time the two B^9 chromosomes separated from each other and went to daughter poles. Occasional nondisjunction of the B^9 element would result in recessive c sh wx seeds. In one test 3.44% of the progeny were c. Included in this 3.44% are those seed that are c due to nondisjunction (2.34%) and those that are c as a result of crossing over (1.10%).

In 1974 hyperploid female plants of compound A-B translocations involving the long arm of chromosome 4 of the genotype 4(c2) B^4(C2) B^4(C2) were pollinated by c2 c2 plants. Table 1 lists the translocations studied and the pertinent cytological information. The results of the hyperploid tests are given in Table 2.

Table 1. Compound A-B translocations studied in the hyperploid tests.

Compound A-B Translocation	Old A-B Transl.	Reciprocal A Transl.	A segments in new compound B^A	Length of A segments of new B^A
TB-1La-4L4692	TB-1a	T1-4(4692)	1L.20-.46, 4L.15 to end	125.0
TB-7Lb-4L4698	TB-7b	T4-9(4698)	7L.30-.74, 4L.08 to end	144.3
TB-9Sb-4L6222	TB-9b	T4-9(6222)	9S.40-.68, 4L.03 to end	116.6
TB-9Sb-4L6504	TB-9b	T4-9(6504)	9S.40-.83, 4L.09 to end	116.2

Table 2. Results of crossing hyperploid female plants of the constitution 4(c2) B^4(C2) B^4(C2) with c2 c2 male plants.

Translocation	No. of C2 seeds	No. of c2 seeds	Total	% C2	% c2
TB-1La-4L4692	1185	167	1352	87.6	12.4
TB-7Lb-4L4698	2239	317	2556	87.6	12.4
TB-9Sb-4L6222	2288	261	2549	89.8	10.2
TB-9Sb-4L6504	3027	319	3346	90.5	9.5

The low percentage of c2 seeds indicates that the hyperploid compound B^A elements regularly separate from each other, ending up in daughter cells. The small percentage of c2 seeds is due to either nondisjunction of the B^A elements or crossing over, as were the small percentage of c seeds in the TB-9b crosses. In the latter crosses, only 3.44% c seeds were observed while in the crosses in Table 2 c2 seeds occur in a considerably higher frequency (9.5 - 12.4%). The higher percentage of recessive seeds in the TB-4 crosses could be due to a higher rate of nondisjunction in the TB-4L translocations than in TB-9b. However, in the TB-4L translocation the segments attached to the B centromere are considerably longer (unit lengths 116.2 - 144.3) compared to that of the B^9 element (unit length 24.4). The longer segments involved in the TB-4L translocations may result in more effective pairing (in spite of the complex configuration) and thus allow for more crossing over than is possible in the TB-9b translocation. Higher crossing over would result in a higher percentage of recessive c2 seeds.

In the crosses of each of the TB-4L translocations one or two ears with off ratios were observed. These were not included in Table 2 but are listed in Table 3.

Table 3. Off ratio types from the cross of compound TB-4L translocations.

Translocation	No. of C2 seeds	No. of c2 seeds	Total	% C2	% c2
TB-1La-4L4692	84	75	159	52.8	47.2
TB-1La-4L4692	63	27	90	70.0	30.0
TB-7Lb-4L4698	125	95	220	56.8	43.2
TB-9Sb-4L6222	110	74	184	59.8	40.2
TB-9Sb-4L6504	93	62	155	60.0	40.0
TB-9Sb-4L6504	165	129	294	56.1	43.9
Total	640	462	1102	58.1	41.9

The 41.9% c2 seed is very close to the 41.8% c seeds observed when euploid heterozygous female TB-9b plants (9c $9^B B^9$C) are pollinated by c c plants (Robertson, Genetics 55:433-449, 1967). Thus, it is possible that the TB-4L plants that gave off ratios were not hyperploid for the translocation but euploid. An analysis of the TB-9b euploid ratios indicated that the B^A element moved at random with respect to the 9 and 9^B chromosomes. If the off ratios are from euploid TB-4L plants they would suggest that the compound B^A elements in these translocations also are moving at random with respect to the other elements.

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The cytological localization of bm on the short arm of chromosome 5

Last year I reported (M.G.C.N.L. 49:79-81, 1975) on the production of the new compound translocation TB-1La-5S8041. This translocation had 90% of the short arm of chromosome 5 attached to a proximal portion of B^1 segment of TB-1a. In 1974 plants carrying this translocation (genotype a2 1^B $B^{5,1}$A2 $B^{5,1}$A2 51) were crossed to a homozygous a2 bm bt stock. Last summer I grew out large purple seeds and large yellow seeds from this cross and obtained the following plants:

Large purple seeds			Large yellow seeds		
Tall Plants	Small green midrib plants	Very small, brown midrib	Tall plants	Small green midrib plants	Very small, brown midrib
10	1	5	18	5	0

Two classes of small plants were observed in this cross. In one, the plants were about 3 feet tall and had green midribs and in the other the plants were about 2 feet tall and had brown midribs. The taller of these small plants were similar to deficient TB-1a plants and are probably produced following crossing over that reconstituted the original B^1 chromosome. The smaller brown midrib plants probably represent those that are deficient for the new compound translocation. Because of the genotype of the cross, these small brown midrib deficient plants would only be expected from purple seeds while the B^1 deficient plants could occur from both purple and yellow seeds. Five small brown midrib plants were observed from the purple seeds and none from the yellow seeds while the taller small green midrib