the breakpoint of TB-10(22) and a fourth factor of minor effect located distal to golden.

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ADDENDUM:

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1. Modulator as viewed through the pericarp.

Previous published works have stressed the importance of the conclusion that all transpositions of Modulator from the P locus result in only potential twin mutations. Potential in that a pair of differently mutant cells always arise from a transposition, but only sometimes do they condition pericarp phenotypes visibly definable as twin spots of red and light variegated tissue. While the pre-transposition cell has a $P^{rr}Mp$ complex (medium variegated), the post-transposition pair of cells are altered, and one carries only P^{rr} with or without Mp somewhere within its nucleus but not at the P locus (potentially red-forming tissue), while the other member of the pair carries a $P^{rr}Mp$ complex plus an Mp within its genome (potentially light variegated tissue).

The conclusion that there is equality in mutant frequency comes from a model of the mechanism of transposition rather than the published counts of equal red vs. light variegated frequencies. In fact, due to the effect of intervening events such as meiosis, only indirect evidence has been offered to support the model (Greenblatt, Genetics, 1968) which demands that mutant classes arise as equals since only in twin spots are they found in that ratio.

New data on untwinned mutant sectors and a reevaluation of previously published data derived from homozygous variegated pedigrees offer direct support for the contention of a 1 red: 1 lt. variegated ratio at the time of transposition. The two tables which follow are abstracted from a forthcoming publication in Genetics. Table 1 shows that mutant spots one kernel and larger in size in the pericarp tissue are most often twinned. Among those that are not twinned, the two mutant classes occur in equal frequency. Thus when only the uncertain consequences of ear morphogenesis intercede between transposition and visualization of its consequences, the mutant types are in the expected 1:1 ratio.

Table 1

Frequency of sectors larger than one kernel in size on heterozygous medium variegated pericarp ears in the 4Co63 genetic background

Sector phenotype	Number of sectors			
	Small (1 kernel)	Medium (2-8 kernels)*	Large (>9 kernels)*	Totals
Untwinned light variegated	155	19	2	176
Untwinned red	136	17	6	159
Twinned red/light variegated	453	278	21	752

*When both sectors occurred together as twins, the larger sector was used to define size of sector.

Table 2

Segregation of major colored pericarp phenotypes among the offspring from the mating W23 $P^{rr}Mp/P^{rr}Mp$ X P^{wr}/P^{wr} (Data extracted from Brawn, 1956)*

Pericarp phenotype	Number of ears	Percent colored
Medium variegated	6114	90.53
Red	302	4.47
Light and very light variegated	337	4.99
Total	6753	100.00

*The relatively rare orange variegated and colorless pericarp classes are omitted for reason of clarity.

Table 2 lists the phenotypic classes arising from the backcross of a homozygous medium variegated parent. It can be seen that red and light variegated types are in equal frequency. In comparison, in a similar mating, with a heterozygous variegated parent, the red class is repeatedly found in a significantly higher frequency than the light variegated. This difference in relative frequency of mutant class is due to the recombination of the Modulator elements which have transposed from the P locus. In the case of heterozygous medium variegated, potential light variegated individuals among the progeny are converted to medium variegated due to recombination of tr-Mp with the $P^{rr}Mp$, (tr-Mp segregates with the colorless allele, P^{ww}), and thus are not recorded as mutants. Whereas, in the progeny of a homozygous medium variegated, the recombining tr-Mp will segregate with another $P^{rr}Mp$ complex and thus the tr-Mp will not be lost to the total count of mutants. Thus, recombination in homozygous medium parents does not alter the expected mutant ratio while in heterozygous medium parents the ratio is expected to be altered by the loss of light variegated types.

Irwin M. Greenblatt

2. Proximal-distal polarity of Modulator transpositions upon leaving the P locus.

Modulator has been previously shown to transpose from the P locus on chromosome 1 to receptor sites throughout the genome in a nonrandom pattern. The major prior findings were that the nonrandom movement resulted in a disproportionately large number of transpositions to chromosome 1 locations and that the number of receptor sites increased as the distance from the P locus decreased. Findings reported here for the first time show that this high frequency of transposition to chromosome 1 locations occurs more often to distal locations than proximal ones relative to P. As striking as this left/right total difference is the additional finding that a region proximal to P and extending approximately three recombinational units from P is totally refractory to Modulator, while the distal equivalent length of chromosome contains the highest frequency of receptor sites.

Studies of Modulator locations after transposition from the P locus were conducted employing the P locus, transposed Modulator, and the