Restorer Source	Sterile (No.)	Partially Fertile (No.)	Fully Fertile (No.)	S:"F" (No.)
B	19	18	0	19:18
G	25	17	0	25:17
L	17	14	6	17:20
M	23	16	1	23:17
WG3	11	3	18	11:21
Total				95:94

Chi square tests show no significant differences from the ratio 1 sterile: 1 "fertile" for the individual restorer sources, nor for the pooled data, and the interaction chi square is not significant. Nevertheless the WG3 gene clearly has more restoration power than any of the other four genes.

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1. DNA from maize with B-chromosomes.

Heterochromatin, that is, chromosome material showing heteropycnosis, has been reported to differ from euchromatin in coiling cycle, time of DNA replication and turnover of DNA as well as in content of identifiable oligogenes. The suggestion has been made (e.g. Herskowitz, Genetics, p. 371) that heterochromatin might differ from euchromatin in the base composition of its DNA. An investigation of this possibility was made by comparing base ratios of DNA prepared from two lines of Black Mexican Sweet Corn isogenic with the exception that one contained a variable number of largely heterochromatic B-chromosomes in addition to the 20 A-chromosomes.

DNA was extracted from the endosperm of kernels in the milk stage of development. The yield of DNA from the B-chromosome

line was 60% higher than that of the normal line although cytological determinations showed the average number of B-chromosomes present to be only 2 per haploid set of A-chromosomes. Using the pachytene lengths given by Rhoades and assuming that a B-chromosome is about the length of the 10th chromosome, one can see that a chromosome of this size would contribute only about 7% of the total length of a haploid set of chromosomes. If all the extra DNA in the B-chromosome line comes from the B-chromosomes and if they contributed an amount of DNA per unit length equivalent to that of the A-chromosomes, more than 8 B-chromosomes per haploid set would be required to make up the extra 60% of DNA. It must be concluded then, that the B-chromosomes contain on the average, 4 times as much DNA per unit length as the A-chromosomes.

The yield of DNA for the normal Black Mexican line was very similar to that obtained for a white dent commercial inbred line.

Base ratios of the DNAs were determined by paper chromatography and by the bromination reaction. A summary of the results is give in table 1.

Table 1
Purine and pyrimidine constituents of DNA-Na of three lines of maize.

Source	Per cent Bases	
	adenine + thymine	guanine + cytosine + 5-methyl cytosine
K64r Commercial white dent inbred	56	44
Black Mexican Sweet Corn without B-chromosomes	45	55
Black Mexican Sweet Corn with B-chromosomes	30	70

It can be seen from table 1 that the B-chromosome line contains 15% more C-G base pairs than does the normal Black Mexican line. If the extra 60% of DNA presumably contributed by the B-chromosomes is composed largely or entirely of C-G bases, the alteration in base ratios expected is very close

to that actually observed. It would seem then, that DNA from the heterochromatic B-chromosomes of maize is made up largely or entirely of C-G base pairs.

An unexpected result was the difference in base ratios between the normal Black Mexican line and a white dent commercial inbred which is typical of all the maize for which base ratios have been determined in this laboratory. It has been assumed generally that normal individuals of the same species show about the same base ratios in their DNA. Our results indicate that this is not necessarily true for maize. Further studies are being undertaken to investigate this aspect of the problem.

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2. Transmission of the P locus and Modulators in reciprocal crosses.

Reciprocal crosses were made between 31 plants heterozygous for light variegated (Prr Mp + transposed-Mp) and a white commercial inbred line (PwPw, no Mp) in order to study the transmission of the P locus and Modulators through male and female gametes. The light variegateds used were all from families which had shown close linkage between the P locus and the transposed-Modulator in previous generations.

Three comparisons were made for each pair of reciprocal crosses:

1. number of colorless ears to colored ears to determine if the transmission of the P locus itself was normal
2. number of medium variegated ears (P^{rr} Mp) to light variegated ears (P^{rr} Mp + tr-Mp) to compare the transmission of the transposed-Modulator through male and female
3. number of red ears (P^{rr}) to variegated ears to compare the transmission of the Mp at the P locus through male and female.

The results of the reciprocal crosses were compared for each of the three comparisons by means of X^2-tests for 2 x 2 contingency tables. In cases where either the expected values or the totals were too small to use the X^2-test, the probability was computed directly.

The results are summarized in table 1.