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1. Base ratios of maize DNA's.

It was reported in last year's News Letter that highly unusual base ratios had been found in DNA extracted from young endosperm of two lines of Black Mexican sweet corn (one with and one without B-chromosomes). In view of these peculiar results, determinations on these lines and a number of other maize lines were made again this year. In addition to the extracts of young endosperm which give very good yields of DNA, extracts of seedlings and leaves were also prepared from the two Black Mexican lines.

The results are presented in the following table:

Line	% C-G		
	endosperm	seedlings	leaves
Black Mex. with B-chromosomes	70	44	42
Black Mex. without B-chromosomes	55	43	42
White sweet corn	42		
A C R pr	41		
A C R st	41		
A C R ^{mb}	42		
Peruvian flint, yellow endosperm	44		
T2, white dent inbred	44		
K64r, white dent inbred	43		
lt. variegated pericarp on T2 background	43		
red pericarp dent	42		

The table shows that the C-G proportions from seedlings and leaves of the two Black Mexican lines give typical values for maize as do the endosperm determinations for all the other lines tested. These values confirm those reported by Rinehart in last year's news letter.

Abnormal values were obtained again for the endosperm of the two Black Mexican lines. The DNA's from these two lines differ in their behavior during extraction both from each other and from all the other maize sampled. It appears that in the young endosperm of the Black Mexican

lines some substance which appears to contain starch and a phenolic compound as well as nucleotides is firmly bound to the nuclear DNA. Modification of the extraction process has on one occasion produced a 42% C-G DNA precipitate after the enzymatic removal of RNA. However, the supernatant was still strongly positive for DNA and presumably contained the contaminating substance which produces the distorted base ratios. These results were obtained only for the line lacking B-chromosomes. Identical treatment had no effect on the B-chromosome line.

It can be seen from the table that neither the B-chromosomes, the aleurone color genes nor the sugary gene alone can be responsible for the unusual behavior of the DNA in the endosperm of the Black Mexican lines. Further studies are in progress.

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1. Cytoplasmic differences in respect of some important plant characters in a maize composite.

Current trends in maize breeding techniques are mainly based on increasing the frequency of superior genes in the base population and selecting for specific interaction of these genes determining better performance than the parents. This lays all the emphasis on the manipulation of Mendelian inheritance controlled by nuclear genes and the fact that the differences in cytoplasm may alter the expression of the genes to a considerable extent has not received attention. As early as 1933 Rhoades discovered that male sterility in maize was inherited only from the female parent. In recent years the finding of Rf genes (Restorer genes) has clearly shown that sterility or fertility in maize is conditioned by certain genes in the nucleus and the cytoplasm with which they interact.

Bauman in 1950 (quoted from Stringfield 1958) reported that ear length was significantly different in two three-way crosses differing in their source of cytoplasm only. Later Stringfield (1958), Fleming et al. (1960), Brown (1961), Dhawan and Paliwal (1964), Dhawan et al. (1965) and Mukand Singh (1965) reported high significant differences in yield and other plant characteristics in reciprocal crosses of various types.