during germination. If this is the case, then this would account for the considerable variation among these proteins without any overt phenotypic variation. If they are merely storage molecules, they would serve only to provide amino acids for the seedling prior to the initiation of photosynthesis, a very nonspecific function. As far as the pollen and chloroplasts are concerned, one may also presume that at least some of these proteins are membrane components. There is no evidence to support any specific function.

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1. Comparison of mitochondrial DNA from hybrids with normal and Texas cytoplasms.

Texas cytoplasm (cms T) contains factors for male sterility and susceptibility to two leaf diseases, southern leaf blight, Helminthosporium maydis and yellow leaf blight, Phyllosticta zeae. These traits are known to be inherited in an extra chromosomal fashion. A recent study (1) has found a difference in the response of mitochondria from corn with normal and sterile cytoplasm when challenged by a pathotoxin from H. maydis race T. Since this study indicated the involvement of mitochondria, mitochondrial DNA (mt DNA) must be given consideration as a possible site of factors responsible for the traits associated with cms T. Indeed, mt DNA from normal and T cytoplasms may be speculated to differ in base composition by virtue of significant alterations in the mt DNA of the Texas cytoplasm. In this connection, the mt DNA from normal and Texas cytoplasm has been isolated and characterized with respect to buoyant density and molar percent guanine and cytosine (molar % GC).

Mitochondrial DNA was isolated from two hybrids, NC232 x T204N (normal cytoplasm) and NC232 x T204 cms T. Roots and coleoptiles from 7-10 day old etiolated maize seedlings and leaves from 2-3 month old plants served as sources of mitochondria. Plant materials were ground in

a Waring blender with buffered sucrose and mitochondria were isolated by differential centifugation in a sucrose gradient. The mitochondrial fraction was suspended in Tris buffer containing 1% sodium lauryl sulfate, appropriate amounts of CsCl were added and it was stored overnight in a refrigerator. The mixture was then centrifuged at slow speed to remove the protein meniscus. Mitochondrial DNA was pelleted from the remaining clear fraction by centrifugation at 50,000 rpm for 18 hr. Preparative CsCl density gradient centrifugation (2) was used to further purify the mt DNA. Buoyant density determinations in CsCl were carried out according to the usual procedures (2) with a Beckman model E analytical ultracentrifuge.

The buoyant densities and molar % GC of the mt DNA's were identical for the two hybrids (Table 1). Furthermore, the mt DNA's from both hybrids were resolved as single components. Since no differences were found in the GC content and buoyant densities of mt DNA isolated from the two hybrids, it can be concluded that the cytoplasmic dissimilarities between the normal and the Texas cytoplasm cannot be accounted for by discernible alterations in the base composition of mt DNA. The technique used in this investigation has limited resolution; therefore, if the differences between the two cytoplasms were due to minute alterations (e.g., point mutations) in the mt DNA, they would remain undetected.

Table 1

Buoyant densities* and molar % GC of mt DNA from NC232 x T204N and NC232 x T204 cms T

Buoyant Density	NC232 x T204N	NC232 x T204 cms T
g/cm^3	1.706	1.706
% GC	46.9	46.9

*Two determinations were made for each DNA type.

Maize mt DNA has a mean buoyant density of 1.706 g/cm^3 and a molar GC content of 46.9%. This is in agreement with the conclusion that higher

plant mt DNA's have a buoyant density of 1.706 ± 0.001 g/cm^3 and a molar GC of 46.8% (e.g., 3). Furthermore, our results confirm the finding in higher plants that mt DNA forms a single band in CsCl with no satellites. From this and a previous study (2), we are now able to summarize the buoyant density and molar % GC data for the three types of maize DNA, nuclear, chloroplast and mitochondrion.

Table 2

Buoyant densities and molar % GC of nuclear, chloroplast and mitochondrial DNA of maize

	Buoyant density, g/cm^3	Molar % GC
nuclear DNA	1.702	42.9
chloroplast DNA	1.700	40.8
mitochondrial DNA	1.706	46.8

References:

1. Miller, R. J. and D. E. Koeppe. 1971. Science 173:67-69.
2. Shah, D. M. and C. S. Levings, III. 1973. Crop Sci. 13:709-713.
3. Wells, R. and J. Ingle. 1970. Plant Physiol. 46:178-179.

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1. Confirmational studies of the accumulated flavonol in a_1 mutant aleurone tissue.

Extensive chemical analysis of a_1 mutant aleurone tissue showed the accumulation of quercetin in the hydrolysates. Average Rf values, Abs. Max. in UV, and data from infrared and mass spectral analyses confirmed its structure. Trace amounts of kaempferol (tetrahydroxy) and