organelle DNA has been postulated for Euglena chloroplast DNA by J. R. Mielenz and C. L. Hershberger (Biochem. Biophys. Res. Commun. 58:769, 1974), who have identified five species of covalently closed circular chloroplast DNA that differ in buoyant density.

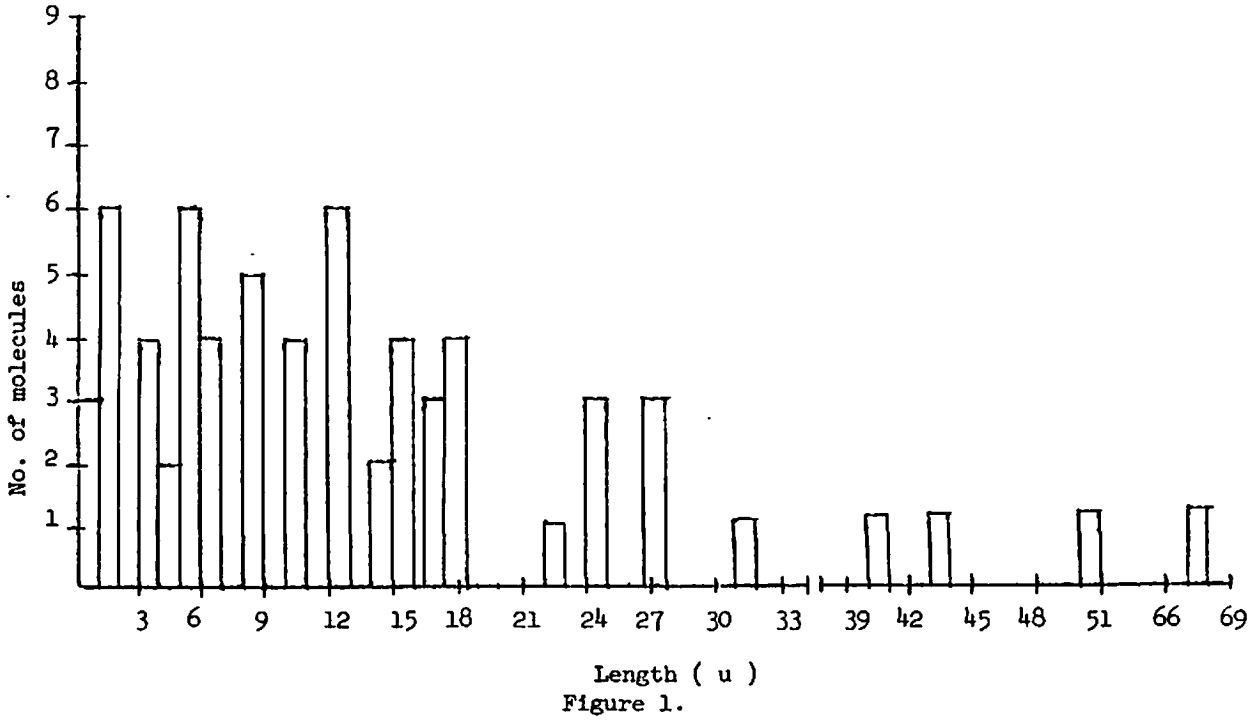

Figure 1.

Frequency distribution of circular mitochondrial DNA.

We have also observed a significant number of mini-circles in our mtDNA preparations with the average molecular lengths of 0.6, 1.7 and 3.6 μ. A fraction of these mini-circles has been found to be resistant to digestion by Eco RI restriction endonuclease. Mini-circles have also been demonstrated in mitochondria of other higher plants. The significance of these mini-circles is presently unknown.

Finally, we have identified circular molecules with attached double-stranded tails (rolling circles). The length of the tail varied from 6.4% to 880% as compared to the length of the attached circle, which varied from 1.7 to 17.9 μ. This suggests that rolling circles are a mechanism for mtDNA replication in corn and also a probable means to provide for amplification of mtDNA.

D. M. Shah, C. S. Levings, III, W. W. L. Hu, and D. H. Timothy

Preliminary genetic analysis of the maize catalase inhibitor

We have previously reported on quantitative variation of catalase inhibitor levels in several inbred lines (MGCNL, Vol. 49). We have presently screened over forty inbreds, and inhibitor levels in all can be categorized into one of three distinct groups having either high, intermediate, or low inhibitor activity. The F_1 hybrids between lines in the low and intermediate categories suggest that the low levels may be dominant to intermediate levels:

	Inhibitor Specific Activity
Line 386	21.7 U/mg
Line 399	9.4 U/mg
386 x 399	11.6 U/mg

Suitable crosses are presently being made to confirm this relationship, to further characterize the genetic relationships of the variants, and to establish any linkage relationships with the two catalase structural loci in maize.

John C. Sorenson and John G. Scandalios

Comparative biochemical properties of maize aminopeptidases

We have investigated some biochemical properties of maize aminopeptidase isozymes for comparative purposes. Maize aminopeptidases ("leucine" aminopeptidase, LAP) are the products of four diallelic loci (Scandalios, 1969, Biochem. Gen. 3:37-79), which are designated A, B, C, and D.

Figure 1 shows the relative heat stabilities of the aminopeptidases which have been separated by starch gel electrophoresis of immature endosperm extracts. The

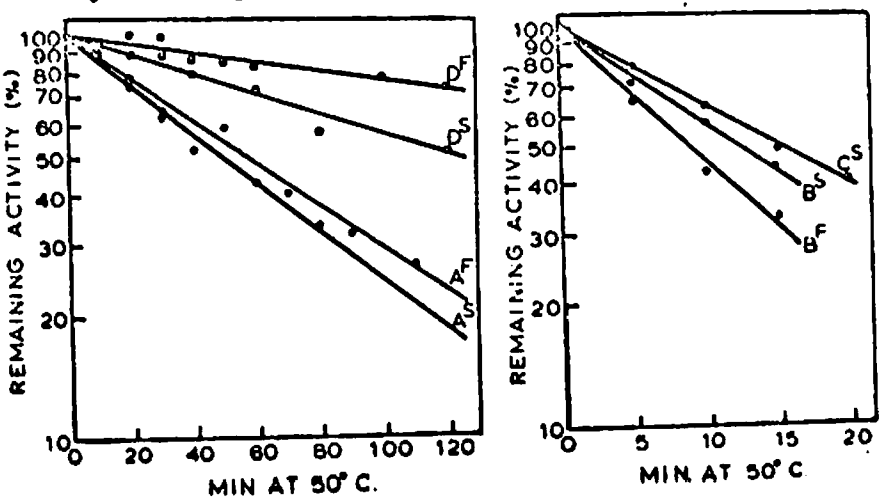

Figure 1. Relative heat stabilities of maize aminopeptidase isozymes at 50 C.

B^F, B^S, and C^S forms have half-lives of approximately 9, 12, and 15 minutes at 50 C, respectively. In contrast, the A and D forms are much more heat stable. $T_{½}$ for the A forms is in the range of 55 minutes while the half-lives for the D variants are over 120 minutes at 50 C.

We have previously reported on the substrate specificities and apparent Michaelis constants for the aminopeptidase isozymes with various amino acid-naphthylamide substrates (MNL 49:145, 1975). The molecular weights of the aminopeptidases have been determined utilizing the knowledge of their differential substrate specificities. Immature endosperm extracts were applied to a calibrated G-200 Sephadex column. Ten-drop (0.61 ml) fractions were collected to maximize resolution. Aliquots of the fractions were assayed with three substrates, arginine-, alanine-, and leucine-naphthylamide for aminopeptidase activities and with benzoyl DL-arginine-naphthylamide (BANA) for maize endopeptidase activity.

Figure 2 shows the resolution of the aminopeptidase activities. Based on knowledge of the substrate specificities, the alanine-NA peak represents the D isozyme (the D forms have high activities toward alanine-NA in addition to high activities with arginine-NA). The arginine-NA peak, which coincides with the alanine-NA peak, would be less specific. Its value would be contributed to by both the A and D forms. The B and C isozymes have highest activities with leucine-NA and would constitute this peak. Zymogram patterns of column fractions are consistent with this interpretation. They show that the A isozyme elutes ahead of the B and C forms. Based on this evidence, it is clear that the arginine-NA peak represents both the A and D isozymes, which have molecular weights of 71,500. The B and C forms are 63,500, and the endopeptidase is somewhat smaller, 58,000. While