We would recommend this experimental approach to other workers involved in allozyme surveys of natural populations in view of recent suggestions that enzyme variability is correlated with subunit size (e.g., Nei et al. 1978).

We are indebted to Dr. J.B. Gibson in whose laboratory this work was carried out.

References: Batterham, P. and S.W. McKechnie 1980, submitted to Genetica; McReynolds, M.S. and G.B. Kitto 1970, Biochim. Biophys. Acta. 198:165-175; Seybold, W.D., D.S. Meltzer and H.K. Mitchell 1975, Biochem. Genet. 13:85-108; Nei, M., P.A. Fuerst and R. Chakraborty 1978, Proc. Nat. Acad. Sci. 75:3359-3362.

Bewley, G.C. and S. Lubinsky. North Carolina State University, Raleigh, North Carolina. Thermal stability of catalase during development in Drosophila.

An analysis of the thermal stability of the enzyme catalase (H_2O_2:H_2O_2 oxidoreductase, E. C. 1.11.1.6) during Drosophila development was conducted on crude extracts of an Oregon-R-6 strain and the results are illustrated in Figs. 1 and 2. The optimum temperature for this study was considered to be 56°C since about half the activity decayed in 5 min (Fig. 1). In extracts from each develomental stage, there is a break in the semilog plot after 5 min, with a half-life of 6.5 min in adult and pupal extracts and 14 min in larval extracts (Fig. 2). Similar results have been obtained in screening 20 different wild type laboratory stocks. Such a bimodal curve indicates the possibility that more than one molecular form of the enzyme exists, although isozymic patterns are not yet evident on electrophoretic gels. Multiple forms could arise by one or more of the following mechanisms, although none of these have been rigorously ruled out in our current studies: (1) isozymes coded for by different structural genes, although only a single enzyme dosage-sensitive region has been identified by segmental aneuploidy (Lubinsky and Bewley 1979); (2) post-translational modification of a primary gene product leading to conformational alterations; (3) the partitioning into compartmentalized and soluble fractions of the enzyme; and (4) dissociation of the enzyme into enzymatically active subunits.

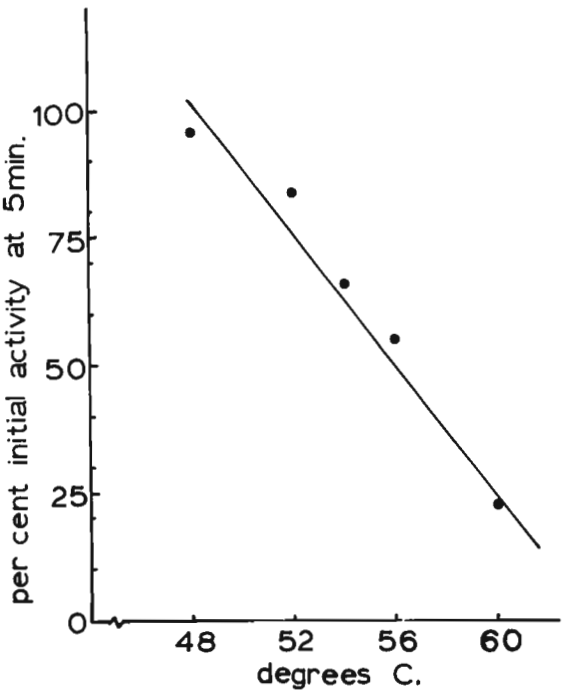

Fig. 1. The effect of increasing temperature on the thermal stability of catalase in adult crude extracts incubated for a period of 5 min.

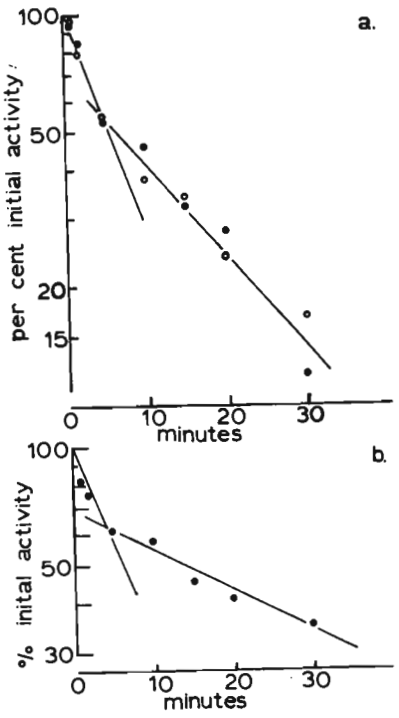

Fig. 2. Thermal denaturation at 56°C of catalase activity in crude extracts. a. Crude adult (0) and crude pupal (●) extracts. b. Crude larval extracts.

It has previously been demonstrated that a fraction of catalase is compartmentalized in the glyoxosomes of maize (Scandalios 1974) and the liver peroxisomes of mammals (Holmes 1971). In our studies, the use of triton X-100 increased the amount of soluble extracted enzyme by 1/3 in adult extracts and by two-fold in larval extracts. These results may indicate that a fraction of the catalase activity is compartmentalized or membrane-bound to subcellular organelles in Drosophila.

Supported by NIH Grants GM-23617 and AG-01739.

References: Holmes, R.S. 1971, Nature N.B. 232:218-219; Lubinsky, S. and G.C. Bewley 1979, Genetics 91:723-742; Scandalios, J. 1974, J. Heredity 65:28-32.

Biémont, C. Université Lyon I, Villeurbanne, France. Parental effect and inbreeding depression in D. melanogaster.

Natural populations of Drosophila carry genetic loads consisting of deleterious variants which reduce the viability of their carriers when homozygous as a result of inbreeding (see Lewontin 1974). Dying of inbred offspring ranges from early embryogenesis to larval and pupal stages. Recently, in D. melanogaster, I interpreted such effects in terms of a single gene hypothesis (Biémont 1978, 1979). An Is (inbreeding sensitivity) gene, located on chromosome III, with alleles Is^- and Is^+ is involved in morphogenetic events. Its expression in homozygous (Is^-/Is^-) embryos depends on the presence in one parent of an Is^+ allele which promotes embryogenesis. Crosses between Is^-/Is^- sibs produce embryonic deaths, of a level that varies according to the regulation of the expression of the Is^- allele. We now report further evidence supporting the parental control of expressivity of the gene involved.

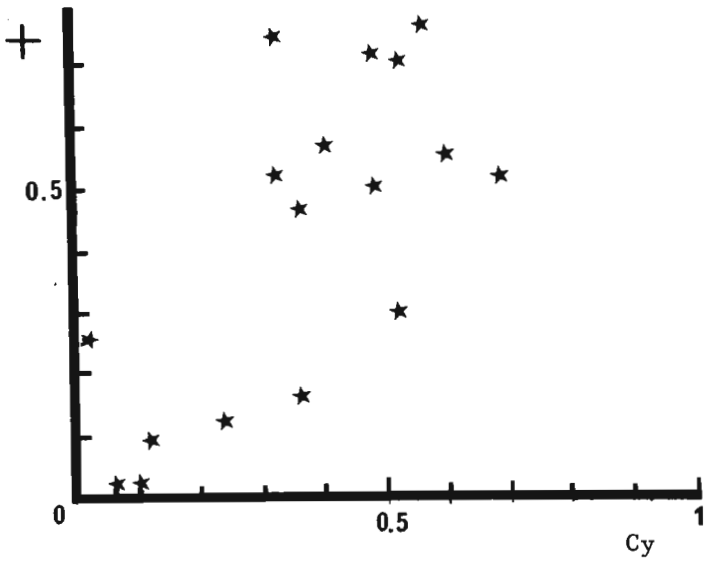

Fig. 1. Egg-to-adult survival of wild type offspring from the + class, versus egg-to-adult survival of wild type offspring from the Cy class. For comparison between the two classes, values of the Cy class were multiplied by 4 since only 1/4 of the flies were theoretically expected to be wild type.

Brother-sister couples which laid eggs showing blocking in development were selected and the male and female separated. Once females from these couples of presumed Is^-/Is^- constitution were no longer producing fertilized eggs, they were crossed with Cy/Pm H/Sb males. Is^-/Is^+ Cy Sb flies from different sibships were then intercrossed leading to four classes of offspring with phenotypes

+: $\left(\frac{++}{++}\ \frac{+Is^-}{+Is^-}\right)$, Cy: $\left(\frac{Cy\ +}{+\ +}\ \frac{+Is^-}{+Is^-}\right)$,

Sb: $\left(\frac{++}{++}\ \frac{+Is^-}{Sb\ +}\right)$ and Cy Sb: $\left(\frac{Cy+}{+\ +}\ \frac{+Is^-}{Sb\ +}\right)$.

In each class, brothers and sisters were mated and viability of their offspring was evaluated as the proportion of wild type individuals (all $+Is^-/+Is^-$) obtained from the eggs laid by the sibs. Therefore, to each Is^- Is^+ Cy Sb x Is^- Is^+ Cy Sb parental couple, is associated the inbreeding response of the four classes of their offspring. Since our study is based on the egg-to-adult survival of wild type flies, I have eliminated the Cy Sb class in the progeny of which only 1/16 of wild type flies is expected; the number of such flies obtained was too small for valuable statistical analysis. The rank correlation coefficient of Spearman reveals a significant link between the values of the + and Cy classes (Fig. 1) ($r = 0.57$; $t = 2.5$; $P < 0.05$). This correlation was not significant either between