

Doane, W. W. Yale University, New Haven, Connecticut. Disc electrophoresis of α -amylases in individual *Drosophila*.

A new method was used to analyze amylases separated by disc electrophoresis and derived from individual flies, larvae, or their tissues (see technical note, this issue). Amy alleles

representing 8 different banding patterns were studied in homozygotes of *D. melanogaster*; various laboratory strains of *D. hydei* and *D. nigrohydei* were also examined. Relative activities were determined microdensitometrically for the different isozymes separated from a given individual.

Terminology of Amy alleles was made to conform to the system worked out by Kikkawa (1964, Jap. J. Genet. 39:401) for his agar gel studies, even though discrepancies were found. Major bands from each homozygote are indicated by superscripts with "1" the fastest and "6" the slowest migrating band (see Figure 1). A very weak band was found to precede the migration of each major band, rather than to follow as in agar gel studies. Thus, for the Amy alleles in melanogaster, a total of 7 bands were found and labelled from 0 to 6 (instead of 1 to 7, as in agar gels). Kikkawa's Amy⁴ allele has been called Amy^{1.4} since band "1" always appears and, the younger the fly, the more pronounced it is. Relative activities change during both larval and adult development and show a tendency for greater activity to shift from the faster to the slower migrating major band as age increases. Figure 1 shows the pattern typical of 4-day old adult female homozygotes in melanogaster (A to H), and a mixture of all eight types (I). Amy^{1.2} is a new allele found in adp¹⁵ strains; Amy^{1.3} was isolated from an inbred Canton-S strain; Amy^{4.5} came from an adp⁶⁰ line; others were generously provided by Prof. Kikkawa. All strains were made isogenic for Chromosomes I, II and III, and co-isogenic for I and III (Amy locus being on II).

From the effects of various activators (e.g., MaCl: GaCl₂) and inhibitors (e.g., EDTA, PCMB, α -amylase inhibitor, glutathione), it is clear that all the bands represent α -amylases. Heterozygotes show additive effects of the allele from each parent, i.e., no hybrid enzymes, indicating that the amylases are monomers. Altering pore size of the gel in which separation occurs does not change the basic banding pattern, merely the over-all rate of migration; thus the isozymes are apparently similar in molecular size, but differ in electric

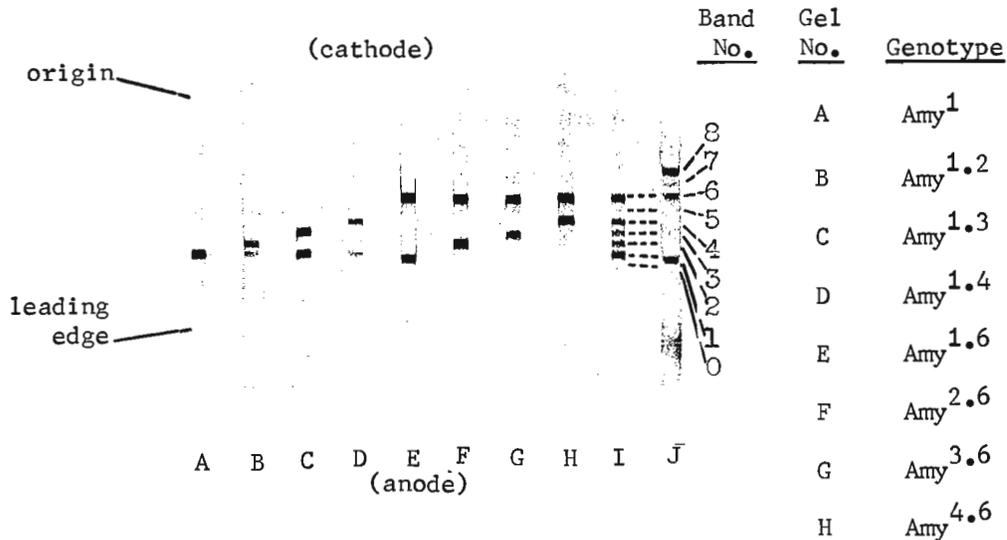


Figure 1. Banding patterns of Amy alleles in 4-day old adult females of *D. melanogaster* (A-H are individual homozygotes; I is a mixture of all alleles taken at 1/8 total strength of each); J provides a standard of graded activities (see text) from which total activity per fly is determined. Minor bands preceding major ones, e.g., 0 and 5, are barely visible but are recorded microdensitometrically.

change.

The banding pattern of the last gel (J) in Figure 1 results from mixing supernatants of the following sources: Amy¹ of melanogaster, our strain of nigrohydei, and Zurich and Chile strains of hydei. Each of these strains has only a single major band: "1", "6", "7" and "8", respectively. The supernatants are derived from mass collections of flies and diluted to provide a graded series of known activities. Band "7" is the weakest (equivalent to .0036 μ M maltose released/min.), "6" is twice as active, "1" is three times, and "8" four times as active. With these activities as a standard, the total activity, as well as relative, for any given fly can be determined in the other gel columns.

Shiomi, T. Hiroshima University, Japan.
Effects of penicillamine feeding on the growth and radiation induced mutation rates in *D. melanogaster*.

Penicillamine is β -mercaptovaline or β,β -dimethyl cysteine and it is the most characteristic degradation product of the penicillin type antibiotics. Culture media containing 0.5-3.0 mg DL-penicillamine per ml were examined for their

effect on the growth and radiation induced mutation rates with Canton-S strain. Contrary to the results of penicillin fed cases, penicillamine had no remarkable delayed effect on the growth rate. At 2 mg or less per ml concentration, it had also no effect on the emergence rate of adult flies, but when culture medium containing 3 mg concentration was employed, the emerged rate was significantly decreased. Sex-ratios (σ/ϕ) in the progeny produced by the fed males were significantly decreased. Hatchability of eggs fertilized by the sperm of the fed males was significantly reduced.

In the radiation experiments, penicillamine prefeeding effects on the induction of sex-linked recessive lethal mutation were inconsistent with its concentrations. 1 mg group showed similar brood pattern to the control group, and the pattern for 3 mg group was run to opposite direction. Induction of dominant lethals with X-ray irradiation for mature sperms in the inseminated females was reduced by the feeding.

In the case of penicillin feeding experiments, growth rate of flies was prolonged for one day as compared with the normal cultured conditions. On the other hand, the emergence rate was significantly higher in the fed group. The sex-ratio was not changed. Hatchability was not affected or rather increased. X-ray induced sex-linked recessive lethal mutation rates were significantly reduced. However, there were no differences in dominant lethality for sperms irradiated in inseminated females.

Thus the experimental results on the effect of penicillamine feeding seem somewhat different from the results of penicillin fed cases. The picture of contradictory results is one of an intricate network of intermediate factors and their possible interactions which determine the final yield of detectable genetic changes.

Manna, G. K. and K. Chatterjee. University of Kalyani, India. Ganglionic metaphase chromosomes of *D. malerkotliana*, Parshad & Paika 1964

The larval ganglionic preparations were made following the technique of E. B. Lewis and Linda Smith Riles (DIS 34) with a modification by us for replacing the solution F of Lewis & Riles with a solution of 2% Gurr's natural orcein,

0.25% fast green dissolved in 50% glacial acetic acid and 50% lactic acid (85%) of I. Oster & G. Balaban (DIS 37). Some clear mitotic complement (Fig. 1) contained five pairs of chromosomes: two pairs large, two pairs medium and one pair of small V-shaped chromosomes. The detailed account will be published elsewhere.

Fig. 1

