Narise, S. Josai University, Sakado-Machi, Saitama-Ken, Japan. Biochemical differences between α- and β-esterase isozymes in D. virilis.

It has been reported that 15 electrophoretic variants of esterase were found in D. virilis collected in Japan. Among them, ten were controlled by α-esterase locus, and other five were by β-esterase locus. The former, α-esterase, reacted on α-naphthyl acetate and the latter, β-esterase, had the specific activity on β-form when α- and β-naphthyl acetates were used together as substrates after agar gel electrophoresis (S. Ohoba, DIS 45: 56 and DIS, this issue).

13 of 15 electrophoretic variants of the esterase have been extracted separately from the homozygous strains and purified more than 150 fold of the crude enzymes by means of ammonium sulfate fractionation, DEAE-Cellulose and DEAE-Sephadex column chromatography. The molecular weight of the α-esterase was estimated as 80,000 by Sephadex column technique, and that of the β-esterase was 150,000 respectively. All of α-esterases had the activities on both of α- and β-substrate, while the activities of all β-esterases were restricted to β-substrate only. Both α- and β-esterases were not affected by o-iodobenzoate (10^{-4} M) and EDTA (10^{-4} M), slightly inhibited by eserine (10^{-4} M), and strongly inhibited by DFP (10^{-4} M). However, 10^{-4} M PCMB inhibited (90%) only the activities of α-esterases. Furthermore, α-esterases retained their activities (about 70% of controls) after heat treatment at 60°C for one minute while β-esterases lost greatly their activities by the same treatment even though the degree of heat stability was variable among α-esterases as well as β-esterases.

Moyer, S.E., C. Grenier and D. Arthur. Northeastern University, Boston, Massachusetts. "Genetic assimilation" and other characteristics of a salt resistant population of D. melanogaster.

Some preliminary descriptions have been obtained of a population that is able to reproduce in Carolina Instant Medium to which 8 gm. NaCl/100cc H_2O is added. It was initiated by S.M. ten years ago from an outcross of vg stock to a large sample of a natural collection and made homozygous for the vg marker. Wing length began to increase more than five years ago and has gradually become longer, including a low frequency of normal type wings. Males have a much greater frequency of longer wings than females.

The effect of salt to produce longer wings in a vg strain can be interpreted as a type of genetic assimilation with sexual dimorphism. Inherent variability for length of vg wings, exists, especially during occasional higher temperatures. Males with longer wings probably have a mating advantage, especially under the stress of salt in the food. Hence, the frequency of longer wings has increased due to this selective advantage. Furthermore, "sexual dimorphism" for a greater frequency of longer wings in the males may result from selection primarily in males as part of courtship behavior.

A true breeding sub-population of short vg can be established by selection but the wings become longer again in a few generations. Wings have remained short in two other populations initiated from the same base that have not been subjected to salt food, including one that has developed some resistance to DDT.

Limited data indicated no obvious enlargement of the larval "anal organ" in the vg salt strain as compared to the two other vg strains in the sense of genetic assimilation in a salt resistant strain described by Waddington (1958, 1959). His index for measuring this organ shows a possibly slight enlargement if our salt strain is cultured in normal media for at least two generations. (Details and data, present and future, is available on request).

However, the larvae have developed ability to regulate salinity. Evidence obtained by C.G. is that intestinal bacteria from pupae of the salt strain have no greater salt resistance than from other pupae and are the same microbial species.

Adults of the vg salt strain die on the 8% NaCl food within two or three days after transfer. Hence, they are required to lay sufficient eggs during this period to establish a new culture. The salt causes generation time to be nearly a week longer and adult body size is smaller.

Limited data suggests that the third chromosome contributes less resistance factors than the X or second.

References: Waddington, C.H. 1958 DIS 32: 163; 1959 Nature 183: 1654.