

Grossman, A.I. The Hebrew University of Jerusalem, Israel. Study of alcohol dehydrogenase and  $\alpha$ -glycerophosphate dehydrogenase in the Israel natural populations of *Drosophila melanogaster*.

Several independent studies have shown, in a variety of natural populations of *Drosophila*, variation in the loci *Adh* (Alcohol dehydrogenase) and  $\alpha$ -Gpdh ( $\alpha$ -glycerophosphate dehydrogenase). The aim of the present work is to extend the survey of these loci to additional populations of *D. melanogaster*.

Flies were collected from four natural populations in Israel, in Qiryat Anavim, Qiryat Tiv'on, Hosen and Parod (Figure 1). Examination was done by standard electrophoretic procedures, on flies collected in nature and on two male progeny of each pregnant female collected in nature. The results are given in Figure 2. No difference was found between the four populations in the frequencies of alleles in locus  $\alpha$ Gpdh. The Parod and Hosen populations showed a higher frequency of alleles  $A_S$  (*Adh*) compared to the Qiryat Tiv'on and Qiryat Anavim populations. In all populations, in both loci, there is a shortage of heterozygotes (Table 1).

Comparison of males (145 individuals) and females (134 individuals), in the pooled data of Q. Tiv'on and Q. Anavim, reveals differences between the sexes in the frequencies of both alleles and genotypes. The frequency of allele  $A_S$  (*Adh*) is 68.6% in males and 72.0% in females, while the frequency of  $\alpha_S$  ( $\alpha$ Gpdh) is 37.6% in males and 48.1% in females. The distribution of genotypes in the two

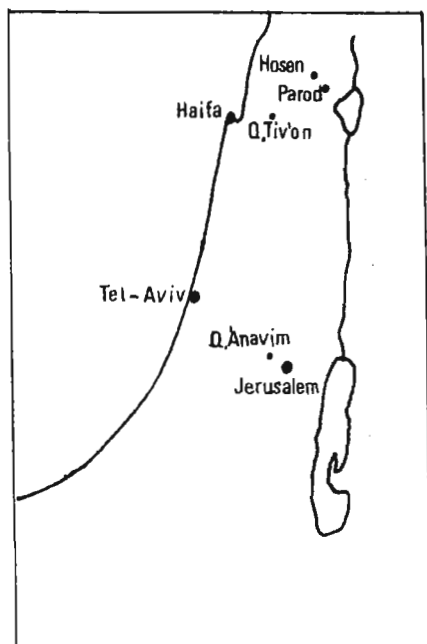


Table 1. Distribution of genotypes at loci *Adh* and  $\alpha$ -Gpdh in males of four wild populations of *D. melanogaster* in Israel

	Q. Anavim		Q. Tiv'on		Parod		Hosen	
	Obs.	Exp.	Obs.	Exp.	Obs.	Exp.	Obs.	Exp.
$A_S A_S$	53	30.7	42	37.6	45	43.8	83	81.2
$A_S A_f$	24	28.6	25	33.8	10	12.3	33	36.6
$A_f A_f$	9	6.7	12	7.6	2	0.9	6	4.1
$\alpha_S \alpha_S$	12	8	14	12.6	13	6.7	22	20.1
$\alpha_S \alpha_f$	22	30	35	37.9	13	25.6	55	58.8
$\alpha_f \alpha_f$	32	28	30	28.5	31	24.7	45	43.1

sexes is given in Table 2. No difference exists with respect to locus *Adh* while in locus  $\alpha$ Gpdh there is a shortage of heterozygotes in the males and an excess of heterozygotes in the females.

Genotype frequencies, combined for both loci, are given in Table 3. The double homozygotes,  $A_S A_S \alpha_S \alpha_S$  and  $A_f A_f \alpha_f \alpha_f$  are in excess, compared to the frequencies expected according to

Table 2. Distribution of genotypes at loci *Adh* and  $\alpha$ -Gpdh in males and females.

	$\sigma$		$\phi$	
	Obs.	Exp.	Obs.	Exp.
$A_S A_S$	75	68.3	74	69.6
$A_S A_f$	49	62.4	45	53.9
$A_f A_f$	21	14.3	15	10.5
$\alpha_S \alpha_S$	26	20.5	28	31.1
$\alpha_S \alpha_f$	57	68.0	73	66.9
$\alpha_f \alpha_f$	62	56.5	33	36.0

Table 3. Genotype frequencies for both loci.

	$A_S A_S$		$A_S A_f$		$A_f A_f$	
	Obs.	Exp.	Obs.	Exp.	Obs.	Exp.
$\alpha_S \alpha_S$	22	13.3	4	8.7	-	3.8
$\sigma \alpha_S \alpha_f$	32	29.4	21	19.3	1	8.3
$\alpha_f \alpha_f$	21	31.9	24	20.9	17	8.9
$\alpha_S \alpha_S$	19	15.4	7	9.4	2	3.1
$\phi \alpha_S \alpha_f$	40	40.2	27	24.5	6	8.2
$\alpha_f \alpha_f$	15	18.2	11	11	7	3.6

random assortment. It seems that selection is operating mainly against the homozygotes  $A_S A_S \alpha_f \alpha_f$  and  $A_f A_f \alpha_S \alpha_S$ . Similar deviations from expected frequencies, of smaller magnitude,

were found in females. The same results were also obtained in a previous study, on flies collected from wild populations in Central Asia (Grossman and Koreneva 1970).

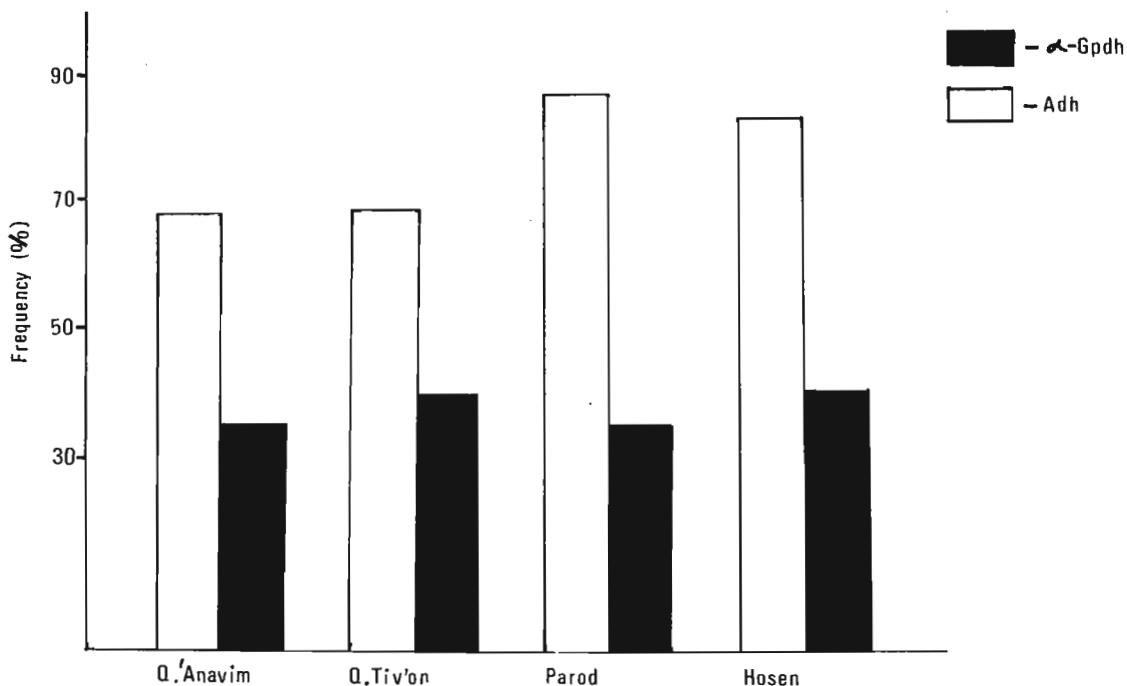


Figure 2. Frequency of allele  $A_S$  (Adh) and  $\alpha_S$  ( $\alpha$ -Gpdh) in males from four wild populations of *D. melanogaster*.

It is suggested that the intra- and inter-population distribution of the Adh and  $\alpha$ Gpdh isozymes is specific.

References: Grossman, A.I. and I.G. Koreneva 1970, *Genetica (Russ.)* 6(8):95-101.

Kenney, J. and A. Hunter. University of the Pacific, Stockton, California. The effect of chlorinated water on *D. immigrans*.

A. Espinos in DIS 48 reported that when chlorinated tap water (0.4-0.5 ppm) was used to moisten the medium, productivity of *D. melanogaster* decreased. Since effects on one species may differ from those on others even within the same genus, we have carried out experiments with

chlorine in the medium on *D. immigrans*.

Clorox (NaClO) was diluted with distilled-deionized water to 200-300 ppm as tested with sodium thiosulfate. Instant *Drosophila* medium was moistened with this solution in the experimental vials and with distilled-deionized water in the controls in a 1:1 volume ratio. Three pairs of virgin flies were placed in 150 ml plastic vials moistened with the experimental or control solution and kept at 25°C. with a 12 hour light-day. The flies were transferred to fresh vials prepared with the corresponding solution every 24 hours.

The average life span of the controls was 30 days as compared to 22 days for the experimentals. Control females produced an average of 13 offspring as compared to 4 for those in chlorinated food. It was noted that the experimental flies were less active than the controls. Handling the flies during transfers it was found that the wings of those on chlorinated medium were more fragile. Experiments on the second generation of offspring gave equivocal results and the experiments have been discontinued due to the difficulty of standardizing and maintaining the concentration of chlorine. It can be concluded however that chlorine does affect the life span and productivity of *D. immigrans*.