Korochkin, L.I., M.B. Evgeniev and N.M. Matveeva, Institute of Cytology and Genetics, Novosibirsk, USSR; Institute of Developmental Biology, Moscow, USSR. The influence of the genotype on the phenotypical expression of esterases in Drosophila of the virilis group.

Previous work has demonstrated some interstrain and interspecies differences in electropherograms from single Drosophila flies of virilis group (Korochkin, Matveeva, DIS 49). The problem remains whether these differences are determined by the 2nd chromosome alone (in which esterase genes were localized), or by other chromosomes as well. Taking into consideration these data concerning the localization of esterase genes in the 2nd chromosome, which is marked by other mutations (detached, break, broken etc.) we produced two stocks with the 2nd chromosome from both species (one from D. virilis, another from D. texana) and whose other chromosomes were derived either from D. virilis or D. texana (2nd and 3rd chromosomes are linked by their proximal ends in D. texana, therefore they always remained together).

We carried out the following crosses: D. texana stock 123 +/+ ♀ x D. virilis stock 147 dt/dt ♂.

Then males from F_1 were crossed with D. virilis dt/dt ♀. We selected normal males in each following generation and crossed them repeatedly with D. virilis dt/dt ♀. Thus all chromosomes of D. texana, except the 2nd and 3rd, were replaced by the chromosomes of D. virilis. Through this method we obtained the stock which was designated P_1. In another case we crossed D. virilis stock 142 +/+ ♀ x D. texana stock 119 dt/dt ♂, then F_1 dt(tex)/+ (vir) ♂ x D. texana stock 119 dt/dt ♀ repeatedly as in the first experiment. This stock, in which all chromosomes of D. virilis except the 2nd were replaced by the chromosomes of D. texana, was designated P_2. In both cases we selected males and females of normal phenotype for electrophoretical analysis of esterases in single flies. It was found that the esterase spectra of the P_1 stock correspond to the "virilis" type, which has a strongly expressed esterase-4. The P_2 stock is similar with "texana" type, in that esterase-4 appears weak. Therefore it seems probable that the pattern of esterases in Drosophila from the virilis group is determined not only by the second chromosome, but by other chromosomes as well.

Korochkin, L.I. and M.D. Golubovsky. Institute of Cytology and Genetics, Novosibirsk, USSR. Localization of two genes controlling esterase electrophoretic mobility in Drosophila virilis.

It has been established earlier that D. virilis from Prof. Sokoloff's stocks differs with respect to the electrophoretic variants of the two main types of esterases, Est-2 and Est-4. Strain 147 with the genotype b bk dt was found to be homozygous for the fast (A) Est-2 variant and the slow (B) Est-4 one. Strain 140 - va - is homozygous for the slow variant (B) Est-2 and the fast (A) Est-4 variant. Strain 103 bearing the dominant gene R was homozygous for the A Est-2 variant and polymorphic for variants Est-4. The crosses performed have shown that both esterase variants are under monogenic control (Table 1). The progeny from ♀♀ 147 x F_1(147 x 140) ♂♂ crosses or

$$♀♀ \frac{b\ bk\ dt}{b\ bk\ dt}\left(\frac{Est\text{-}2^A}{Est\text{-}2^A}\ \frac{Est\text{-}4^B}{Est\text{-}4^B}\right) \times \frac{b\ +\ bk\ dt}{+\ va\ +\ +}\left(\frac{Est\text{-}2^A}{Est\text{-}2^B}\ \frac{Est\text{-}4^B}{Est\text{-}4^A}\right) ♂♂$$

with b bk dt phenotype had only A Est-2 variant and B Est-4 variant. Thus, both esterase loci are linked with visible second chromosome markers. Ohba and Sasaki (1968) have made a report concerning the location of loci for esterases on chromosome 2, however, these authors were not able to localize precisely these loci on the chromosome. For a more definite localization of the loci Est-2 and Est-4 the following crosses were carried out:

$$♀♀ \frac{b\ +\ bk\ dt}{+\ va\ +\ +}\left(\frac{Est\text{-}2^A}{Est\text{-}2^B}\ \frac{Est\text{-}4^B}{Est\text{-}4^A}\right) \times \frac{b\ +\ bk\ dt}{b\ +\ bk\ dt}\left(\frac{Est\text{-}2^A}{Est\text{-}2^A}\ \frac{Est\text{-}4^B}{Est\text{-}4^B}\right) ♂♂$$

Then the distribution of esterase variants among recombinant phenotypes was analyzed (Table 2). According to the Chino's map (1937) three visible markers have the following localization: b-143.5, bk-203.5 and dt-210 map units. The results of table 2 shows 83% of crossovers occurred in the process of the recombination between bk-Est-2 and 17% between Est-2 - dt. The locus for Est-2 is, therefore, calculated as being at 209.3 ±. On the other hand,