Smaragdov, M.G., A.F. Smirnov, A.V. Dukelskaya and A.V. Felcher. Dept. of Genetics & Breeding, Leningrad State University, USSR. Condensation and interchromosomal heterogeneity of D. melanogaster heterochromatin.

In relation to the frequency of C and H (Hoechst 33258) banding interchromosomal heterogeneity of heterochromatic regions have been demonstrated in third instar larvae neuroblasts. Both very different methods revealed practically the same results. Heterochromatin of sex chromosomes was stained differentially more frequently than these regions of autosomes (Table 1). Interstock differences have been demonstrated also for chromosome 2 heterochromatin of Canton-S and inbred stock LA (Smaragdov 1977, 1978; Patkin et al. 1978). In respect to specific decondensation heterogeneity of heterochromatin has been shown also by using Hoechst according to the method of Pimpinelli et al. (1975). Besides different intra- and interchromosomal sensitivity of heterochromatin the differences for male and female X chromosomes have been discovered (Table 2). Regarding the nature of interchromosomal heterogeneity of heterochromatin it is possible to imagine different levels of chromosomal DNA packing inside heterochromatin due to various timetables of mitotic condensation. True morphometric analysis revealed definite timetables of mitotic condensation for heterochromatin of LA and Canton-S.

Table 1. The frequency of differential staining in D. melanogaster heterochromatin (in percentage).

| Type of banding | Stock | Chromosome X | Y | 2L | 3L | 3R | 4 |
|---|---|---|---|---|---|---|---|
| H band | C-S | 97±2 | 94±3 | 62±4 | 66±4 | 26±4 | 34±4 |
| | LA | 96±1 | 95±2 | 47±3 | 64±3 | 16±3 | 29±3 |
| C band | C-S | 99±1 | 95±4 | [ | 66±2 | ] | 35±4 |
| | LA | 98±1 | 99±1 | [ | 79±2 | ] | 44±6 |

Table 2. Specific decondensation of X chromosome heterochromatin (after 6 hrs Hoechst 33258 treatment, 80) (ml).

| Sex | n | Number of decondensed X | Length of decondensed heterochromatic regions |
|---|---|---|---|
| ♀ | 624 | 41 ± 2.8 | 0.354 ± 0.0049 |
| ♂ | 189 | 16 ± 2.5 | 0.287 ± 0.0021 |

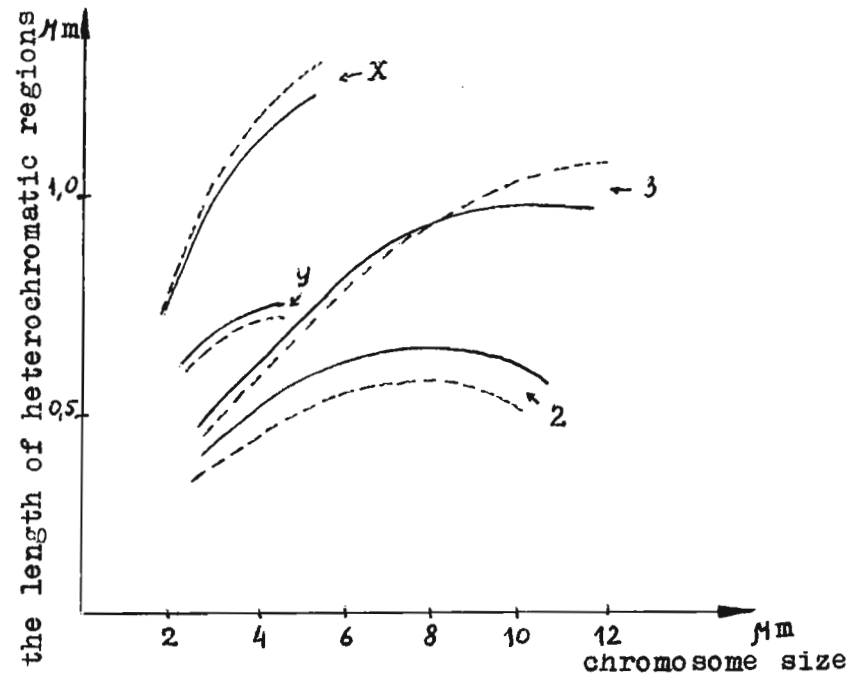


Fig. 1. The length of heterochromatin and chromosome size in D. melanogaster mitotic chromosomes from neuroblasts. ----- C-S ——— LA [For the Y chromosome H (LB) region has been measured.]

References: Pimpinelli, S., M. Gatti and A. DeMarco 1975, Nature 256:335; Patkin, E.L., A.F. Smirnov and M.G. Smaragdov 1978, Vestn. Ser. Biol. Leningr. Univ. 15:143; Smaragdov, M.G. 1977, Vestn. Ser. Biol. Leningr. Univ. 15:143; Smaragdov, M.G. 1978, Tzytologia 11:1278.