Oshima, C. and T. K. Watanabe. National Institute of Genetics, Misima, Japan. Viability of lethal heterozygotes of D. melanogaster under fluctuating temperature.

In natural populations, Drosophila flies are living in variable environment. Effect of fluctuating temperature on the viabilities of heterozygous flies for normal and lethal second chromosomes was examined by an "Insectoron" having a programing controller. 323 second chromosomes were isolated from different male flies captured from natural populations of Kofu-Katsunuma, Japan in 1966. The viability of homozygous flies for each chromosome was estimated by Cy-Pm technique, and 9 D/D, 89 N/D and 225 N/N heterozygotes (D: lethal or semi-lethal chromosome, N: quasinormal chromosome) were obtained by random combinations of these chromosomes. Viabilities of these heterozygotes were estimated under constant (25°C) and fluctuating (20-30°C) environments simultaneously. The results are shown in Table 1. The viability of each heterozygote increased under fluctuating temperature while the number of emerged flies decreased. The most remarkable increase was observed in N/D heterozygotes of which viability became better than that of N/N heterozygotes. This suggests that different heterozygotes possess their own adaptive potentials in respect to the variable environment and the lethal heterozygotes tend to show the highest response to the fluctuating temperature.

Table 1. Viabilities of three fly genotypes under constant and fluctuating environments.

		Constant (25°C)		Fluctuating (20 - 30°C)	
Genotype	No. of lines	No. of counted flies	Relative viability	No. of counted flies	Relative viability
N / N	225	59148	0.9940 ± 0.01395	46088	1.0137 ± 0.01245
N / D	89	22958	0.9794 ± 0.01844	18054	1.0431 ± 0.01616 **
D / D	9	2005	0.8775 ± 0.08520	1682	0.9884 ± 0.09371
Total	323	84111	0.9868 ± 0.01123	65824	1.0211 ± 0.01007 *

The mean viability of Cy/Pm, Cy and Pm flies is standard (1.0000).

Bos, M. University of Groningen, Genetics Institute, Haren (Gn), The Netherlands. The effects of disruptive and stabilizing selection on body size in Drosophila melanogaster.

It was shown by several authors (Thoday 1963, Scharloo, Hoogmoed and ter Kuile 1967) that disruptive and stabilizing selection can influence the phenotypic variance of morphological characters. It seemed worth while to practise these modes of selection on characters with a different biological significance.

Therefore three selection systems were applied to thorax length during 18 generations.

Each selection line was replicated and consisted of four cultures. The cultures were started with a limited number of eggs to prevent effects of crowding on thorax length. From each culture 20♀♀ and 20♂♂ were measured.

Variances were computed as squared coefficients of variation (c.v^2.). The base population (Groningen-1967) was a cage population started from a large number of female flies caught in Groningen. The heritability of thorax length was 0.53; c.v^2. = 8.53.

Two control lines were maintained by selection of 4 flies at random from each culture.

Stabilizing selection was applied by selecting the 4 flies nearest to the mean value of the sample.

Both stabilizing lines showed a small decrease of variation in the first few generations (minimum c.v^2. = 3.76), but came back to control level. The mean thorax length was about 6% below the control level in both lines.

In the disruptive lines the two flies with the lowest value and the two flies with the highest value were selected from each sample. In the D^R lines the selected flies were mated at random. In the $D^R{}_1$ line c.v^2. increased three times, but dropped to control level after every top. In $D^R{}_2$ there was only a single rise in the first few generations. The decrease after the first top ($D^R{}_1$ G 5, c.v^2. = 14.29) coincided with a considerable increase of 5% in thorax length in both lines. Probably larger reproduction of the large flies caused a direc-