Yoshikawa, I. and T. Shiomi. Nagasaki University, Japan. Effects of X-rays on polygenes controlling the sternopleural bristle number in D. melanogaster.

To obtain fundamental information about the genetic effects of radiation on the quantitative characters, the increase rates of variance resulted from radiation-induced mutations for the sternopleural bristle number have been estimated.

An isogenic line extracted from a wild population of Erie, Pa., U.S.A., was used. The males were irradiated with X-rays at 250, 500, 1000, 2000, 3000, and 4000 R. Immediately after irradiation, the males were crossed to the virgin females of the same line in half pint milk bottles. The number of sternopleural bristle in F_1 females and males which had hatched on or before the 13th day after the mating were scored, and the means and the variances were calculated to test the heterozygous effects of radiation-induced mutations. The results are presented in the table.

Table. Means and variances of sternopleural bristle numbers in F_1 flies.

Doses		Control	250R	500R	1000R	2000R	3000R	4000R
Means	females	17.83	17.82	17.88	17.96**	18,21**	18.27**	18.53**
	males	16.63	--	16.76**	16.71*	16.84**	--	--
Variances	females	2.4374	2.5314	2.6971**	2.5860*	2.7734**	2.9395**	3.4099**
	males	1.8673	--	2.1083**	2.0878**	2.1657**	--	--
No. of tested genomes	females	5618	5916	4992	4608	3035	1853	847
	males	2617	--	2332	2464	1612	--	--

*Significantly different from the control at the 5% level.
**Significantly different from the control at the 1% level.

The variances and the means in sternopleural bristle number of the irradiated groups have approximately linearly increased with doses in both sexes. The increase rates of variance were 2.04×10^{-4}/ R in females and 1.25×10^{-4}/ R in males, and those of means were 1.77×10^{-4}/ R in females and 0.90×10^{-4}/ R in males.

Van Delden, W. Genetisch Instituut, Rijksuniversiteit te Groningen, Haren (Gr.), The Netherlands. Kurtosis as an indication of fitness.

King (1963) found that the frequency distribution of egg hatching time in heterogeneous randomly breeding populations of D. melanogaster was leptokurtic and that of an inbred strain platykurtic. He suggested that leptokurtosis should indicate a well integrated genetic system, platykurtosis a badly integrated one.

A number of populations, originally started from an inbred strain of D. melanogaster (Van Delden, D.I.S. 42:62) provided the opportunity to see whether kurtosis is useful as a fitness indicator. The 12 populations tested for kurtosis of egg hatching distribution, differed greatly in fitness (using measures as productivity, larval survival, etc.) and genetic variance. The experimental procedure was the same as used by King. During one month each population was tested four times with weekly intervals. The calculated kurtosis (g_2) values were all positive, even the original inbred strain, which was tested simultaneously, showed considerable leptokurtosis. Though all g_2 values were positive, nevertheless a correlation could still exist between fitness and the positive g_2 values. To test this possibility populations were ranked for productivity and for g_2 values and Spearman's rank correlation coefficient was calculated: $r_s = -0.172$ ($t = 0.55$, d.f. = 10, $P = 0.30$). So no correlation is found. Also for the distribution of weights of individual flies no relation was found between kurtosis and fitness. It seems that, at least in these populations, kurtosis is not very useful as an indication of fitness.