Scholefield, J. and D. T. Suzuki. University of British Columbia, Vancouver, Canada. A test system for studies on the mechanism of reverse mutation.

Demerec (PNAS 48:1696, 1962) proposed that reverse mutations might arise by an unequal crossover following a mistake in pairing at the molecular level. Demerec (Genetics 48:1519, 1963) later found this hypothesis would not explain the "selfer" phenomenon in Salmonella but Magni (PNAS 50:975, 1963) proposed a similar mechanism in yeast. He found a high reversion rate of a homozygous allele associated with an exchange of outside markers that was greatly depressed when the allele was hemizygous in a deficiency heterozygote. Baylor et al. (Genetics 52:539, 1965) with phage T2 and Strigini (Genetics 52:759, 1965) with phage T4 have suggested a similar mechanism.

In order to determine whether reversion by unequal crossing over might occur in Drosophila melanogaster, studies were made of Notch mutants. Since both "point" and deficiency mutants are known at this locus, reversion rates in point mutant homozygotes and point/deficiency heterozygotes could be compared. The point mutant tested was N^{40} and the deficiency was N^{8}. Welshons' (Genetics 47:743, 1962) selector system was used to kill almost all Notch offspring in the following crosses:

1 + w^a N^{40} rb/Y w^a N^{40} +;Cy,Dp,bw^v/+ ♀ X w^a fa^{no} spl/Y;Cy/Pm ♂

2 w^a N^{40} rb/+ N^{8} +;Cy,Dp,bw^v/+ ♀ X w^a fa^{no} spl/Y;Cy/Pm ♂

In one series of experiments, females were radiated with 4000 rads of γ-rays.

15 females and 10 males were mated in quarter pint bottles and 30 bottles per tray. The flies were transferred through 2 or 3 six day broods. All bottles were checked daily for offspring from the 10th to the 20th day of the culture. Any possible revertants were testcrossed to w^a fa^{no} spl rb flies. The number of matings is summarized in the following table.

Brood Number	Non-irradiated		Irradiated	
	N^{40}/N^{40}	N^{40}/N^{8}	N^{40}/N^{40}	N^{40}/N^{8}
1	6 trays	11 trays	12 1/2 trays	7 trays
2	10 trays	11 trays	12 1/2 trays	7 trays
3	2 trays	5 trays	1 tray	--
Total	18 trays	27 trays	26 trays	14 trays
Gametes Sampled	180,000	270,000	108,250	56,700

The number of gametes tested was estimated by crossing test females to Oregon-R males and counting the number of offspring produced per bottle, the estimate being based on the sum of half the number of females and all males. No revertants were found in an estimated 450,000 gametes in the non-irradiated and 165,000 gametes in the irradiated series.

While the selector system is relatively efficient, the task of setting up sufficient numbers of crosses to yield large numbers of test females and males proved too great. Since it is quite possible that Notch point mutants are of the "shift" type, the system described should be feasible where facilities and technical help are abundant. (This research was supported by NRC grant A-1764.)

Oshima, C. and T. K. Watanabe. National Institute of Genetics, Misima, Japan. Persistence of some recessive lethal genes in natural populations of D. melanogaster.

Many lethal chromosomes (the second chromosome) were isolated from different male flies collected simultaneously from natural populations located at Kofu and Katsunuma locality in Yamanashi Prefecture in October 1963 and 1964. A total of 16,086 crosses were performed diallelically between the lethal - Curly balanced strains.

The results of allelism tests were divided into three parts; two of them represented