Table 3. Frequency of spontaneous recessive lethals in chromosome 1 from wild stocks of Drosophila melanogaster.

STOCKS	DATA FROM	TESTED CHROMOSOMES	LETHALS	PERCENTAGE
Sukhum (Caucaso)	Zuitin	2039	24	1.18
Florida (U.S.A.)	Demerec, 1928	2108	23	1.09
Akhalcikh (Caucaso)	Duseeva	1300	10	0.77
Wooster 0 (U.S.A.)	Demerec, 1937	1266	8	0.63
Ticino (Italy)	Buzzati-Traverso	2335	13	0.56
Vladikavkaz (Caucaso)	Duseeva	1544	8	0.52
Florida (U.S.A.)	Shapiro y Volkova	9228	5	0.50
Formosa (Japan)	Demerec, 1937	2054	8	0.39
Ordjonikidze "Lab"	Zuitin, 1940	2348	8	0.35
Nalchik (Caucaso)	Sakharov	5169	18	0.35
Vladikavkaz (Caucaso)	Zuitin	2348	8	0.34
California-C (U.S.A.)	Demerec, 1937	708	2	0.28
Florida (U.S.A.)	Sakharov	81457	19	0.23
Birkina's	Birkina, 1938	9695	21	0.22
Pittsford (U.S.A.)	Spencer, 1948	2218	5	0.22
Florida (U.S.A.)	Olenov	2397	5	0.21
Lausanne (Switzerland)	Demerec, 1937	955	2	0.21
Mexico City	Félix, 1966 (this paper)	3962	8	0.20
London (England)	Timofeef-Ressovsky	5863	11	0.19
Swedish-B	Demerec, 1937	1627	3	0.18
Florida (U.S.A.)	Timofeef-Ressovsky	8963	15	0.17
Leningrad "Lab. line"	Zuitin	8614	14	0.16
Paris (France)	Timofeef-Ressovsky	7483	12	0.16
Florida (U.S.A.)	Buchman, Timofeef Ress. 1936	6495	10	0.15
Steglitz (Germany)	Timofeef-Ressovsky	8637	12	0.14
Merv (Turq.)	Lobashov	1424	2	0.14
Tashkent (Turq.)	Timofeef-Ressovsky	9972	13	0.13
Samarcanda (Turq.)	Magrzhikovskaya	4416	5	0.11
Kiev (Russia)	Timofeef-Ressovsky	12481	1	0.11
Madrid (España)	Timofeef-Ressovsky	5476	5	0.09
Canton-S (U.S.A.)	Spencer, 1948	20324	17	0.08
Canton-S (U.S.A.)	Félix, 1966 (this paper)	1469	1	0.07
Oregon-R	Demerec, 1937	3049	2	0.07
Oregon-R	Müller	3935	4	0.03

Félix, R., V. Salceda and R. Villalobos-Pietrini. Programa de Genetica, Comision Nacional de Energia Nuclear, Mexico City, Mexico. Induction of recessive lethals by x-rays in sex chromosomes during successive stages of spermatogenesis in the wild type of Mexico City Drosophila melanogaster.

The mutagenic effect of x-rays over the successive stages of spermatogenesis has been investigated by many authors. In this experiment the frequency of recessive lethals in the X chromosome is determined by the Müller-5 technique. The wild type from Mexico City was homogenized at the Laboratory for 24 generations. The general procedure consists in obtaining broods procedent from gametes in which the time and stage on which they were irradiated is known.

Auerbach (1954) obtained broods by mating a male with three females for three days, taking out the fertilized females and obtaining another offspring by placing three new female virgins with the same male. The offspring of each period is called brood which represents irradiated gametes in successive stages of spermatogenesis:

1st Brood: from 1 to 3 days after irradiation; stage during treatment: mature sperms and spermiogenesis.

2nd Brood: from 3 to 6 days after irradiation; stage during treatment: second meiotic division and early spermiogenesis.

3rd Brood: from 6 to 9 days after irradiation; stage during treatment: first meiotic division and probably some early stages in the second state of meiosis, late gonial cells.

4th Brood: from 9 to 12 days after irradiation; stage during treatment: spermatogonial cells and early meiotic cells.

Hoenigsberg (1961), obtained broods by mating a male with a female, and changing females every 24 hours. The highest proportion of dominant lethals was obtained in the 6 to 9 broods which belong to the second meiotic division and to the beginning of spermiogenesis at the moment of irradiation. Hoenigsberg's experiment shows that the stage of greater sensitivity comes after the first six days and even lasts until the ninth day. Both experiments should be explained in the same manner, but Auerbach's experiment reaches earlier the most sensitive stages due to the greater amount of spermatozoa transferred per day. In our experiment the transfer of spermatozoa is delayed by mass mating with the same number of males and females.

PROCEDURE

The experiment was performed as follows:

1. M-5 female virgins aged 3 to 5 days were mated to irradiated males (1 to 3 days old). The fertilized females were transferred to culture bottles with fresh medium and new emerged females were added every four days.
2. When the emergence of F_1 starts, the adults 1 to 2 days old were aged for 2 more days. The fertilized females (3 to 4 days old) lay eggs as soon as they are placed in test vials, in this way the F_2 emergence is assured.
3. Each test vial contains the male carriers of one irradiated X chromosome which has passed to the F_1 heterozygous females, just at the time the M-5 chromosome did. Vials without wild type males are scored as cultures with a lethal sex linked mutation induced by the x-ray treatment. Irradiation was applied in different doses to three groups of adult males.

A. Miller RT 250 apparatus was employed. It was operated at 250 kV and 8 MA with an additional 0.5 mm Cu filter. The total doses were delivered in the periods of time contained in table 1.

Table 1. Doses of x-rays applied to three groups of wild-type males.

Number of males	Doses	Duration of exposition
320	1,500r	1'21''
340	2,500r	1'35''
480	4,500r	2'43''

Male adults were mass mated in 14 cultures to M-5 females immediately after irradiation. They were transferred to new cultures after 4 days and two more broods were obtained by changing adults after two periods of 4 days. By this procedure the oviposition period of 12 days was divided in three equal periods. F_2 cultures without wild type males or with less than 5% of them were placed aside in order to obtain the 3rd generation. If the proportion of wild type males, putting the two generations together was less than 5% the culture was scored as a lethal carrier.

In the following table and graph the results of the experiment are summarized.

Table 2. Recessive Lethals induced by three different doses of X-rays.

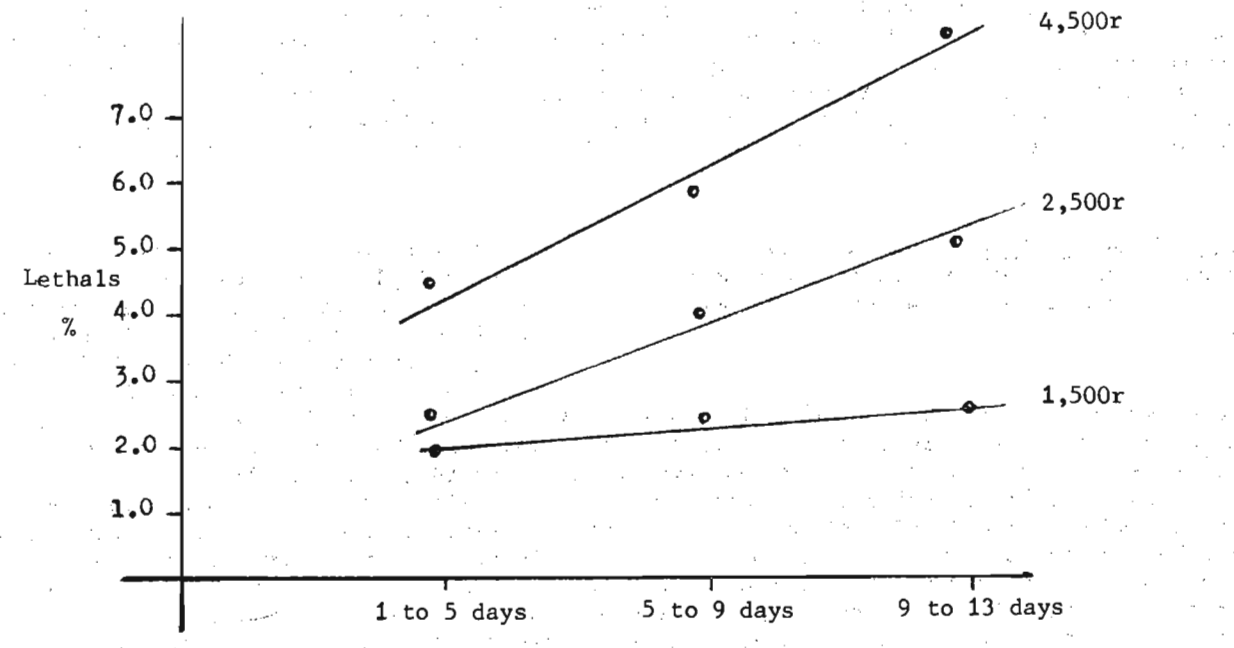
	First Brood (1 to 5 days)						Second Brood (5 to 9 days)						Third Brood (9 to 13 days)					
	1,500r		2,500r		4,500r		1,500r		2,500r		4,500r		1,500r		2,500r		4,500r	
	N	L	N	L	N	L	N	L	N	L	N	L	N	L	N	L	N	L
	277	5	310	6	282	11	288	6	322	11	198	10	298	7	219	10	270	20
%		1.81		1.93		3.90		2.08		3.41		5.05		2.34		4.56		7.41

r: roentgen units
N: normal offspring
L: lethals

The testes of the adult fly contains all the stages of spermatogenesis. Auerbach points out the greater sensitivity of the second brood which contains the higher proportion of spermatids and late spermatocytes. In this experiment the scoring of spermatozoa coming

from the irradiated stages of spermatogenesis were delayed because the number of females and males is the same in each of the four-day P mass cultures. By this procedure the second brood of Auerbach's experiment is reached only after nine days.

Graph 1. Lethals induced in successive broods with three doses of x-rays.



Puro, J. and P. Arajärvi. University of Turku, Finland. Localization of cp, in, and ri by means of T(2;3)spy.

A number of the 3rd chromosome genes of D. melanogaster between st (44.0) and p (48.0) are in a strategic position due to their intimate linkage with the centromere. Yet the evidence is contradictory as to how some of these genes are distributed into the two chromosome arms. In particular, the position of the in (47.0) and ri (47.1) loci in relation to the centromere has been in doubt. On the basis of a new translocation designated as T(2;3)spy (see New Mutants, this issue) we have been able to delimit the cp, in, and ri loci to the left of the band 79B1 in the salivary chromosome map.

T(2;3)spy is a homozygous viable reciprocal translocation with the recessive wing character (spready) inseparable from it. Linkage data suggest the breaks to the left of B1 and at the cp-ri region respectively in the 2nd and 3rd chromosomes. After introducing marker genes in the translocated chromosomes it could be shown that, in the new arrangement, ru and h (3L) belong to the same linkage group as bw (2R), whereas e (3R) and bw are in different groups. Salivary chromosome analyses of both heterozygous and homozygous larvae corroborate the genetic data showing the exchange of the left arms. The breaks are in 2L at 33D or E (probably just to the right of the thick doublet of 33D3-4) and in 3L at 79A (to the left of 79B1).

By studying crossing over in translocation heterozygous females the evidence was obtained that cp, in, and ri are to the left of the break point. Recombinants derived from females of the genotype th st cp in ri p^p/T(2;3)spy or th st in ri p^p e^s/T(2;3)spy were individually tested, by mating to translocation homozygotes, for the presence or absence of spy. The data indicate that crossing over at any of the regions st-cp, st-in, cp-in, or