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Würgler and Maier (Mutation Research, 1972 15: 41-53) have reported that after irradiation of mature sperm carrying a ring-X chromosome, the rate of chromosome loss, as recorded by the frequency of X/O males, depends on the type of female used. They concluded that viability differences cannot account for their data, and suggested that a maternal influence on the repair of X-ray induced lesions might provide an explanation. The following data, obtained by methods similar to those used by Würgler and colleagues, indicate that substantial viability differences between various kinds of X/O males may be density dependent and may in fact account for the different frequencies of X/O males recorded in irradiation experiments.

Egg-laying females per bottle	Mean progeny per bottle	Ratio $\frac{y\ sn^3/O}{Oster/O}$	
2	148	2.22	
6	394	2.12	) *
15	562	3.26	

* Difference significant at the 1% level

Method 1. Females of the genotype Oster/y sn^3 (Oster stands for y sc^{S1} In 49 sc^8) were mated to X·Y males which lacked a free Y chromosome, and the proportions of Oster/O and y sn^3/O males in the progeny recorded. A range in population densities was achieved by using 2, 6 or 15 egg-laying females per bottle. Egg laying was restricted to 48 hours.

Method 2. Oster females, or y sn^3 females, were crossed to X·Y males and the percent of X/O progeny recorded in each case. Again, varying population densities were achieved by placing 2, 6 or 15 females in each bottle.

Egg-laying females per bottle	Mean progeny per bottle	Percent of X/O progeny obtained from: y sn^3 females	Oster females
2	112	69.1%	65.9%
6	229	70.1%	58.7%
15	385	70.4%	49.2%

In method 1, developing Oster/O and y sn^3/O males are in competition in the same culture, while in method 2, the particular X/O males are in competition with Oster/X·Y females as the case may be. Both methods lead to the same conclusion, that as population density increases, Oster/O males are at increasing disadvantage; this effect could well be related to the Y-suppressed viability factor of chromosomes of the sc^{S1} sc^8 type. (See, for example: Hess, Zool. Anz. Suppl. 1963, 26:87-92; Traut, Scheid and Wind, Mutation Res. 1970, 9:489-499.) On the other hand, y sn^3/O males seem to be relatively insensitive to population density over the range covered in these experiments. There is no single measure of the relative viabilities of Oster/O males and y sn^3/O males. In view of the need to control population density very carefully, it seems that viability difference should still be considered as a possible explanation for the results obtained by Würgler and Maier.

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imago, the larvae are characterized by higher levels of the S-band activity. The changes from the "larval" type of isozymes to the "adult" type take place at the stage of middle pupae. If the S-form predominates in imago, or both the F- and S-subfractions have identical activities, a picture similar to that in imago can be seen in electropherograms of 3rd instar larvae. Equal activity of F- and S-subfractions was observed in the 3rd instar larvae and imago of hybrids between flies of "S" and "F" strains. This work on the esterases of D. virilis yielded results similar to those of Doane (1969), who studied changes in the activities of amylase subfractions, controlled by duplicating genes in D. melanogaster.

References: Doane, W. 1969, Drosophila amylases and problems in cellular differentiation. In: Problems in Biology: RNA in Development (Univ. of Utah Press) 73-109.