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Eiche, A. and K. Fridman. University of Stockholm, Sweden. Variation in the number of ovarioles in Drosophila melanogaster females as a source of error in estimating oocyte stage.

Many experiments have been made with the view of elucidating frequency of lethal induction and the rate of oviposition. The investigations of King, Rubinson and Smith (1956) (1) on oogenesis and its division into 14 successive stages opened new ways for further experiments in this field.

During the last decade much interest has been devoted to the problem of sensitivity to irradiation during stages 7 and 14. When estimating the oocyte stage researchers have, as a rule, based their calculations on the findings of King et al. concerning Oregon-R flies, namely that the number of ovarioles per female is 24 [e.g. Rinehart 1964 (2) and Sankaranarayanan 1969 (3)].

In our tests two lines of a wild type stock, Karsnäs, were used. One of these lines was a non-irradiated control line (C), and the other one (R) was acutely irradiated for a considerable number of generations with 1120 R/generation at larval stage. Females were irradiated with different doses at the age of 4 days (80 R/min., 15 mA, 170 kV) and then the hatching of the first 24 and the following 24 eggs was studied.

Results obtained in our test differ considerably from those obtained by other researchers when irradiating stage 14 or rather the first 24 eggs. As an example may serve the fact that when irradiating with 2000 R we found that hatching in the first laid 24 eggs in the C-line was 29.6 ± 1.9 per cent and in the R-line 21.5 ± 2.5 per cent. This divergence may have several interpretations.

In some experiments females were presumed to have identical number of ovarioles, which appears not to be the case. Robertson (1957) (4) has found that the number of ovarioles can vary considerably between individual females. Great variations also exist as regards the rate of oviposition. Most probably there also exist variations in the sensitivity pattern within the same stage of oogenesis.

In a count of ovarioles with late oocytes in the posterior chambers in the lines used in the hatchability test the following results were obtained (the females were examined after the hatchability test):

	C - line			R - line		
	Range	Mean	n	Range	Mean	n
Series 0 R	16-25	22.8 ± 0.46	25	16-26	22.3 ± 0.44	25
Series 4000 R	15-26	21.0 ± 0.70	18	16-26	20.8 ± 0.55	24
Series 5000 R	16-24	20.8 ± 0.39	24	18-26	21.2 ± 0.45	23

If these findings - namely that in these series 15-26 eggs may be found simultaneously in stage 14 - are not taken into account, it is easy to arrive at misleading conclusions about the sensitivity pattern. The number of eggs should not be limited to 24 for any stage since considerable variations may exist with regard to the number of ovarioles in individual females. Neither should the hour-interval be considered a criterium for the different stages, since individual females have different rates of egglaying.

Thus when estimating the oocyte stage, consideration should be taken to age, rate of egglaying, the dosage and last but not least, to the fact that individual females have different numbers of (functioning) ovarioles.

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