David, J. and M. F. Clavel, University of Lyon, France. Variations of the rate of egg chambers production in the ovarioles of Drosophila melanogaster.

According to the strain, the daily egg production of young females ranges from 40 to more than 100. The ovariole number, for both ovaries, is between 40 and 60 in the great majority of strains.

To estimate the rate of egg chamber production in each ovariole, it is possible to divide the daily egg laying by the total ovariole number. This calculation gives a highly variable result, ranging from less than 1 to a little more than 2 egg chambers per day. But this estimation is often biased by the frequent occurrence of non-functional ovarioles which do not produce eggs. Their occurrence is particularly striking in strains with poor fecundity and in old females.

For a correct estimation, only the functional ovarioles are taken into account. These ovarioles, in active vitellogenesis, may be recognized by dissection, and it is then possible to get a fairly stable value for the rate of egg chamber production in all strains of Drosophila melanogaster.

Another more reliable way of estimation is to use a strain in which the ovarioles are all functional. This is generally the case for highly heterozygous flies in their first 10 days of life. Using such heterozygotes, it is possible to get an accurate estimation of the rate and to study its eventual variations. Some results, obtained at a temperature of 25°, are presented here.

The normal rate: The normal rate was estimated in 8 independent experiments with highly heterozygous animals fed on an axenic killed yeast medium (1). The results are presented in table 1. All values lie between 1.81 and 2.29, giving a mean of 1.96 ± 0.06. This is in agreement with a previous result from a vestigial strain (2) and with the latest value calculated by King (3).

Table 1: Influence of yeast autolysate on the daily rate of egg chamber production per ovariole.

Experiment No.	mean daily egg production (from 3rd to 8th day of life)		mean ovariole number		daily rate of egg chamber production		
	I	II	I	II	I	II	difference II - I
1	95.1	105.0	41.5	44.0	2.29	2.39	+ 0.10
2	93.3	100.6	47.5	41.0	1.96	2.45	+ 0.49
3	83.6	94.7	46.0	43.5	1.81	2.17	+ 0.36
4	84.5	102.5	45.5	48.0	1.85	2.14	+ 0.29
5	87.0	92.3	44.2	42.5	1.97	2.14	+ 0.17
6	88.4	99.6	46.0	45.7	1.92	2.18	+ 0.26
7	86.5	100.1	47.3	42.0	1.83	2.38	+ 0.55
8	94.6	103.5	45.7	46.7	2.07	2.21	+ 0.14
means	89.1	99.8	45.5	44.2	1.96	2.26	+ 0.30

I. Drosophila fed with the standard, killed yeast medium; II. Drosophila fed with the same medium supplemented with yeast autolysate. For each experiment, the fecundity of 4 females was studied on each medium during 9 days.

Diminution of the rate of egg chamber production: The rate possibly decreases as females become older (2). But this effect, if significant, is not very important.

In experiments where flies were fed with a folic acid antagonist, the rate of egg chamber production was clearly slowed down (4). This effect, which seems to concern primarily the follicular cells, results finally in a complete cessation of egg chamber formation.

Increase in the rate of egg chamber production: When the surface of the normal

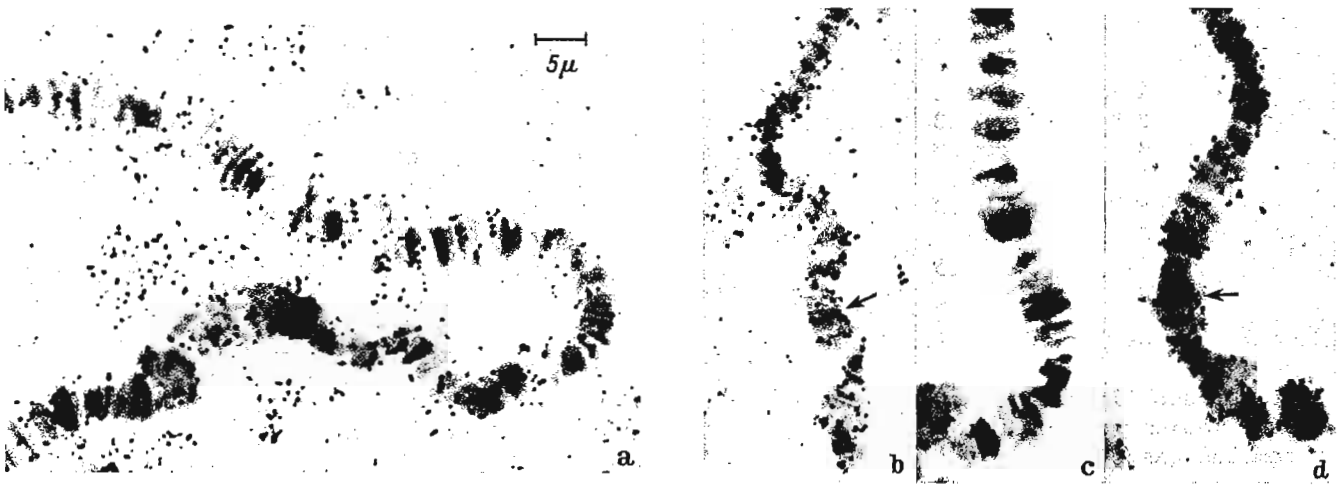
medium is covered with a solution of yeast autolysate, the fecundity of the flies is improved. In heterozygous females, the rate of egg chamber production appears to be increased by this addition of yeast autolysate, as is shown in table 1. The mean rate becomes 2.25 ± 0.05 and the difference between normal and autolysate fed females (+ 0.30 ± 0.06) is highly significant.

Conclusion: If only the functional overioles are considered, the rate of egg chamber production is fairly constant for all strains of Drosophila. But accurate measurements of this character demonstrates some variation, either below or above the normal rate. These variations could be an interesting test character in nutritional studies.

References: (1) David, J. 1959. Bull. Biol. Fr. Belg. 93:472-505; (2) David, J. 1961. Bull. Biol. Fr. Belg. 95:521-535; (3) King, R. C. 1964. Symp. Roy. Entom. Soc. London, 2:13-25; (4) David, J. 1966. J. Ins. Physiol. (in press).

Berendes, H. D. Max Planck Institut für Biologie, Tübingen, Germany. Amino acid incorporation into giant chromosomes of D. hydei.

Staining salivary gland chromosomes with Fast green at pH 214 revealed that normally occurring puffs as well as those produced by a temperature shock contain a high amount of proteins which are absent in the non-puffed condition of these regions. Various tritiated amino acids were injected into larvae to trace their incorporation into the chromosomes and the possible relation of protein synthesis to the origin of puffs. The following experiments were performed: 1 µl of tryptophan H^3(Spec. act. 3.02 C/mM) was injected into 140 hour old larvae. The larvae were kept at 25°C for 10, 30, 60 minutes or 5 hours and then transferred to 35°C to induce temperature specific puffs. After the temperature treatment of 15 minutes the salivary glands were dissected, autoradiographs prepared and the number of grains occurring over the induced puffs was compared with that over a neighboring non-puffed part of the chromosome. No preferential labeling of the induced puffs was ever observed. In many cells the number of grains over the puffed region was even lower than over the neighboring part of the chromosome. In many cases, however, certain unpuffed bands showed a reproducable preferential labeling (see arrow in b and d). Naturally occurring puffs were studied similarly. Larvae of 145 hours old were injected with the



a. part of chromosome 4 labeled with tryptophan H^3 after 5 hours of incubation. The puffs showed no preferential uptake of the amino acid.

b. histidine label over a part of chromosome 5 in a proximal cell of the salivary gland after 15 minutes of incubation.

c. the same part of chromosome 5 in a distal cell of the same gland as in b.

d. the same part of chromosome 5 as shown in b in a distal cell of the salivary gland after 5 hours of incubation.