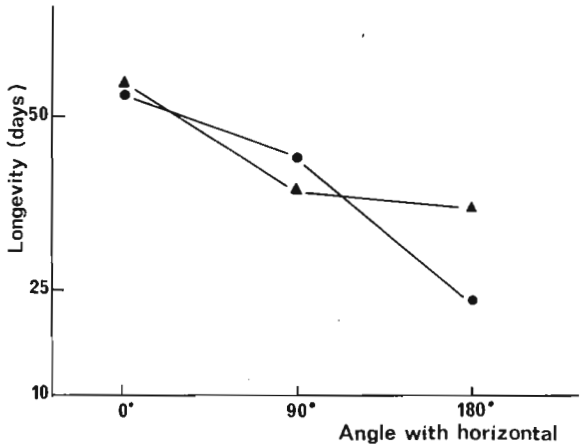
David, J. and Y. Cohet. University Claude Bernard, Lyon, France. Accessibility of food and life span of Drosophila adults.

Although longevity of Drosophila adults has been studied in many publications, little attention has generally been paid to the influence of experimental conditions. In an attempt to get more reproducible results for Drosophila life span, we studied the importance of food accessibility, expressed by the position of food in cages, and the inclination of its surface.

Groups of 10 females and 10 males of highly vigorous F_1 heterozygote adults were placed in plastic cages (5 x 5, 5 x 8, 5 cm) of the model used for measuring egg production (David and Clavel 1968). Food (killed yeast, axenic medium) was placed in small round containers and changed every other day. Three experimental conditions were used:



1 - food in normal position at the bottom of the cage (horizontal position); 2 - food vertical on a side of the cage (angle of 90° with horizontal); 3 - food inverted at the top of the cage (angle of 180° with horizontal).

Four or five repetitions were made for each treatment.

The results are summarized in the table and figure. It appears that, when food is not in the normal position, and thus less accessible, the life span is reduced. Moreover, this reduction is roughly proportional to the difficulty of getting food, expressed by the angle made by the surface with horizontal (see figure). For the two first treatments, longevity of males and females is approximately identical. But a clear sex difference is observed when food is placed at the top of cages, the survival of males then being definitely higher.

It is concluded that food accessibility interfers with the ageing process. Young adults can feed in any position. But, as the flies age, their activity diminishes and old flies are less able to get food when it is poorly accessible. Then they die prematurely. Male activity is not so greatly affected, so that they live longer.

For the theoretical interpretation of the data, it may be said that, when food is difficult to get, there is a lowering of the threshold of a "dying process", different from the

FOOD	FEMALES				MALES			
Position	Mean (days)	Variance	Variation Coefficient	n	Mean (days)	Variance	Variation Coefficient	n
normal	53.45 ± 1.85	136.35	21.9	40	55.25 ± 1.29	53.35	13.2	32
vertical	44.44 ± 1.22	61.50	17.7	41	39.45 ± 0.97	39.18	15.9	42
reversed	24.18 ± 0.88	33.78	24.0	44	37.14 ± 1.38	78.07	23.8	41

"aging process", as this has been considered by Maynard Smith. But it is also possible to explain the results in terms of "wear and tear" or "rate of living" theory: the excessive activity imposed on the flies in adverse conditions resulting in an acceleration of the aging process.

It is supposed that new experiments will allow a choice between the two conceptions. Anyway, the great importance of the experimental conditions in longevity studies must be underlined.

Reference: David, J. and M.F. Clavel 1968, A new method for measuring egg production without disturbing the flies. DIS 43:122-123.

Aknowledgements: We thank Professor J.H. Sang for helpful discussion of our data.