Vijayan, V.A. and N.B. Krishnamurthy. University of Mysore, Manasagangotri, Mysore, India. Reduction of oviposition by a polycyclic hydrocarbon in D. melanogaster.

Chlorinated naphthalenes are industrially important polycyclic hydrocarbons used in electrical industry, cable covering compositions and storage batteries. 2,4-Dichloro-1-naphthol is one such chemical employed here to find out its effect on fecundity in D. melanogaster. 30 mg/100 ml food medium is found to be the LC_{50} of this chemical on melanogaster (Krishnamurthy and Vijayan 1978).

20 and 30 mg/100 ml food media represent the concentrations of the above chemical used to feed the larvae of Oregon-K strain of the said test system. Normal food medium was used as a control. Twenty virgin females and 20 bachelor males from each concentration were isolated, aged for five days and used for making crosses. The egg laying was calculated continuously for 10 days for each of the batches and compared with that of the control. All the experiments were carried out at 24 ± 1°C.

Table 1. Fecundity of chemical-treated and control D. melanogaster flies.

Concentrations	Total number of eggs	Number of eggs/ female/day
Control	6910	34.55
20 mg	3666	18.33*
30 mg	2648	13.24*

*P < 0.05, by analysis of variance

The results are presented in Table 1 and the daily pattern of egg laying is graphically represented in Fig. 1. In control the total eggs laid were 6910, whereas in 20 and 30 mg concentrations the totals were 3666 and 2648 eggs, respectively. This shows significant decline in fecundity in both the concentrations employed compared to the control.

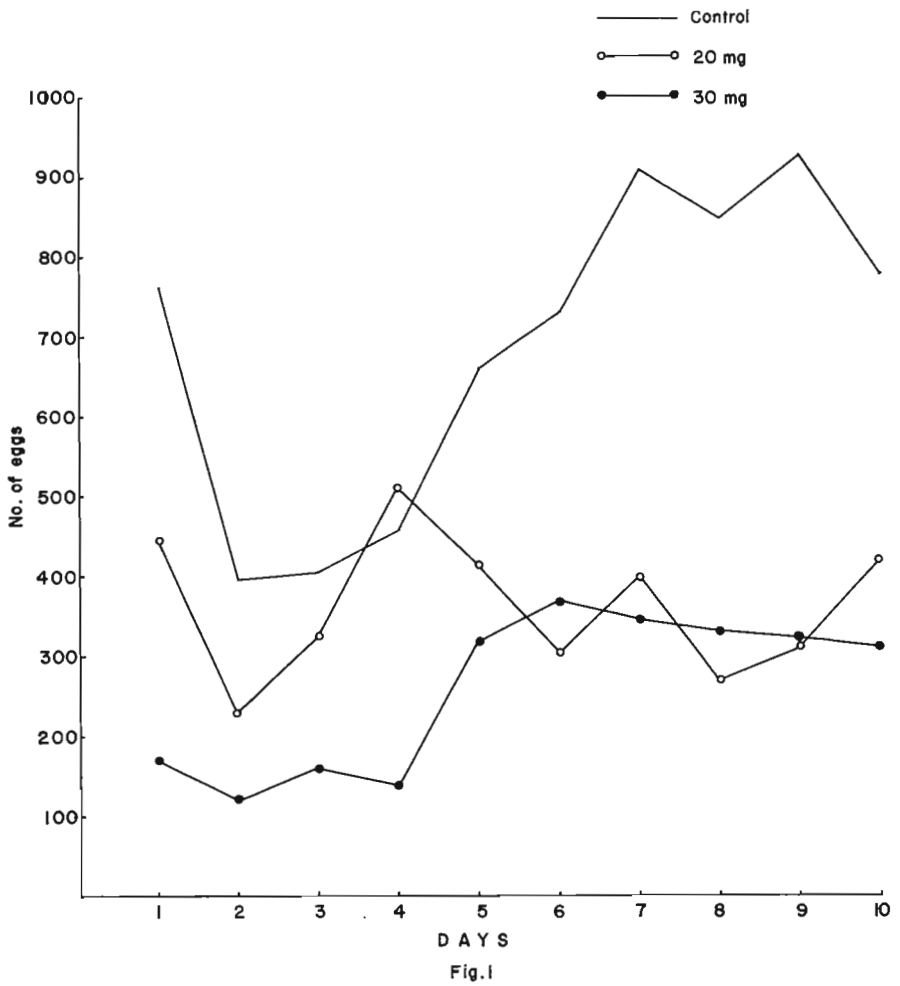

Fig. 1. Pattern of egg-laying by treated D. melanogaster with 2,4-dichloro-1-naphthol and control.

The life span and the fecundity of Drosophila are extremely sensitive to a great variety of environmental conditions like temperature, light, crowding, presence or absence of the opposite sex, and so on. Gruwez et al. (1971) have reported that photoperiodicity rhythm considerably influences the rate of eclosion in melanogaster. In our experiment all the above conditions were stable; the decline in oviposition must have been brought about by the chemical only. The effect may be in the number of ovariole production or in the speed of growth of the successive stages of the egg chambers. So here the authors opine that the chemical might have interfered and affected the oviposition and hence a reduction in fecundity. Higher concentration induced more damage to fecundity than lower concentration (Table 1). The nature of genetic damage that

2,4-dichloro-1-naphthol could cause is being analyzed.

The authors are grateful to Dr. M.R. Rajasekarasetty for his constant encouragement and valuable suggestions. Financial aid by the Dept. of Atomic Energy, Government of India, is greatly acknowledged.

References: Gruwez, G., C. Hoste, C.V. Lints and F.A. Lints 1971, Experientia 27(12): 1414-1416; Hardie, D.W.F. 1964, in Encyclopedia of Chemical Technology, Vol. V (2nd ed.), pp. 302-304; Krishnamurthy, N.B. and V.A. Vijayan 1978, Entomon (in press).

Villa, T.G. and W.T. Starmer*. University of Salamanca, Salamanca, Spain, and *Syracuse University, Syracuse, New York.

Some carbohydrases present in axenic larvae of D. mojavensis.

Most Drosophila species feed on yeasts, which supply vitamins, sterols, proteins and other nutritional requirements of the larvae and adults. Since yeasts are known to have a complex cell wall composed of glucans, mannans, chitin, protein and lipids (Pfaff 1971), it was of interest to assay Drosophila larvae for activity of carbohydrases which could function in degrading the yeast cell wall.

The larvae of an axenic strain of D. mojavensis were collected, washed and homogenized in 0.05 M sodium succinate buffer (pH 5.5) for 10 minutes (10 ml volume). The homogenate was centrifuged at 10,000 g for 15 minutes; the pellet was re-extracted and centrifuged in the same manner. Both supernatants were combined and brought down to 5 ml by ultrafiltration on an amicon ultrafiltration cell using PM-10 membranes. This solution of "soluble" enzymes was assayed for activity on the following carbohydrate substrates obtained from the carbohydrate collection of the Dept. of Food Science and Technology, University of California, Davis: laminarin, pustulan, xylan, α-(1-3)-glucan, CM-chitin, CM-cellulose and starch. The unit of enzyme activity was defined as the amount of enzyme which catalyzed the release of 1 nmol of D-glucose or equivalent reducing power (Villa et al. 1975) per minute at 30°C from each of the substrates given above. Total protein in the sample (4 ml) was determined by the Lowry method to be 20 mg.

Table 1. Summary of some carbohydrases found in cell-free extracts of axenic larvae of D. mojavensis.

Substrate[1]	Enzyme activity units/ml	Associated enzyme activity
Laminarin	3.1	β-(1-3)-Glucanase (EC 3.2.1.6)
Pustulan	4.1	β-(1-6)-Glucanase (EC 3.2.1.75)
Xylan	22.5	β-(1-4)-Xylanase (EC 3.2.1.32)
-(1-3)-Glucan	18.5	α-(1-3)-Glucanase (EC 3.2.1.59)
CM-Chitin[2]	10.3	β-(1-4)-Chitinase (EC 3.2.1.14)
CM-Cellulose[3]	2.3.	β-(1-4)-Cellulase (EC 3.2.1.4)
Starch	131.2	α-(1-4)-Glucanase (EC 3.2.1.3)

[1]All substrates were prepared at a final concentration of 0.5% in 0.05 M sodium succinate buffer (pH 5.5)

[2]CM-Chitin = Carboxy-methyl chitin

[3]CM-Cellulose = Carboxy-methyl cellulose

Table 1 lists the enzyme activities for the various carbohydrases found in the axenic larvae. It is apparent that α-amylase accounts for most of the activity (68%) while xylanase, α-(1-3)-glucanase and chitinase together account for 27% of the activity. The remaining activity (5%) is due to the enzymes β-(1-3)-glucanase, β-(1-6)-glucanase and cellulase. These preliminary results indicate that the cell-free extracts of axenic larvae possess the enzymatic potential to partially hydrolyze the cell wall of yeasts found in the natural diet of the fly (Starmer et al. 1976). It is noteworthy that several hydrolases, xylanase, α-(1-3)-glucanase and chitinase are present in the larvae but the total enzyme complement necessary for the complete degradation of the yeast cell envelope is not present, otherwise the activities of β-(1-3) and β-(1-6)-glucanases would be higher since it is well established that these enzymes are directly related to yeast cell wall hydrolysis (Pfaff 1977). This may indicate that the larvae only "weaken" the wall, rendering the cell more suceptible to extraction of the necessary nutritional factors for the development of the fly. It is known that the fecal pellet of adult Drosophila contains "ghost" cells and the yeast cell wall is left at least partially intact (Shehata et al. 1951). The