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#### FERTILITY OF CHEMOSTERILIZED HOUSEFLIES IN RELATION TO DENSITY

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HOUSEFLIES are maintained routinely in various laboratories for experimental purposes, but considerable variations exist in published data concerning the optimum density of flies with respect to space available in the cages. Adult densities that have been recommended for the satisfactory development of the flies include 0.26; 0.41; 0.43; 1.0; 1.5 and 4.1 flies per inch cube<sup>1-6</sup>. It has also been observed that

the fecundity of *Musca domestica* L. cannot be reduced by increasing adult densities upto 4.77 flies/inch<sup>3</sup>. Females in densely crowded conditions lay a larger number of eggs than the ones reared under uncrowded conditions<sup>7</sup>.

During the present studies an attempt was made to observe the effects of crowding on the fertility of normal and chemosterilized *Musca domestica nebulosa* Fabr., an effective vector of a number of enteric infections in India. Tests were also performed to obtain base line data on the optimum housefly density for rearing flies under laboratory conditions.

Flies used during the present tests were obtained from a normal laboratory colony maintained at a temperature of  $28 \pm 1^\circ \text{C}$  and 60-70% R.H., and were reared after the manner earlier described by Khan and Khan<sup>8</sup>. On emergence they were sexed, and when 3-day old, the flies were topically treated with 0.03125 per cent thiotepa solutions in acetone. The number of normal flies in the four cages (20 cm  $\times$  20 cm in size) were 100, 250, 500 and 750. Similar numbers of treated flies were kept in four other cages. Care was taken to ensure that adequate supplies of sugar and milk were available to the flies at all times. Random samples of about 100 eggs were taken from each of the eight cages to determine the hatch rate. Per cent sterility and per cent net sterility were calculated after the manner described by Hair and Adkins<sup>9</sup>.

It seems that as an ecological factor, crowding plays an important part in the fertility of *M.d. nebulosa*. The per cent sterility in the normal groups at a density of 0.19, 0.47, 0.97 and 1.4 flies/inch<sup>3</sup> was found to be 19.5, 19.9, 21.7 and 23.95 respectively. Similarly, in the treated groups a per cent sterility of 80.5, 83.1, 90.08 and 93.4 was obtained when the adult density was 0.19, 0.49, 0.97 and 1.4 flies/inch<sup>3</sup> respectively (Table I).

TABLE I

Effects of crowding on the fertility of normal and chemosterilized males of *Musca domestica nebulosa*†

Chemosterilant	Number of flies in a cage	Number of eggs		Per cent sterility	Per cent net sterility
		Observed	Hatched		
Thiotepa	100	1322	259	80.5	75.5
	(100)	(1566)	(1284)	(19.5)	
	250	1891	321	83.1	78.9
	(250)	(1900)	(1539)	(19.9)	
	500	2226	201	90.08	89.04
	(500)	(2540)	(2092)	(21.7)	
	750	2483	164	93.4	91.4
	(750)	(2472)	(1880)	(23.95)	

† A dose of 0.0018 ml was applied to each fly. Figures in parenthesis are from normal groups.

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Thus the per cent sterility among the eggs laid by the female increases with an increase in the density of the flies. Pearl<sup>10</sup> observed that the fecundity in *Drosophila melanogaster* was greatly reduced and that crowding of the flies in a limited space produced a depression of the vital functions. Green<sup>11</sup> also found reduced fecundity in *Falsomia candida* under crowded conditions and attributed it to the inhibition of oviposition in a large segment of the population. According to him, reduction in fecundity is a manifestation of stress caused by jostling. However, Smirnov and Polejaeff<sup>12</sup> observed a struggle for space and food in the crowded colonies of *Lepidosaphes ulmi*.

The increase in per cent sterility from 80.5 obtained in the cages containing 100 adults to 93.4 obtained in the cages having 750 adults could be due to the fact that under crowded conditions, successful mating is prevented in most cases due to jostling. A female may oviposit even without mating but such eggs are non-viable. This, therefore, seems to be the main reason for the increased sterility obtained during the present tests. It could be concluded that an initial density of 0.97 adults/inch<sup>3</sup> is favourable for maintaining laboratory colonies of *M.d. nebulo*.

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## TWELFTH NATIONAL CONFERENCE ON CRYSTALLOGRAPHY

The Twelfth National Conference on Crystallography, organized by the Department of Physics, Osmania University, Hyderabad and sponsored by the National Committee for Crystallography (INSA), will be held at Hyderabad from 25th to 28th February 1981. Original contributions in the following topics are invited for presentation: (1) Theoretical Crystallography, (2) Structure determination of organic and inorganic crystals; (3) Microstructure and characteri-

sation; (4) Crystal defects and disorder; (5) Physical properties of crystals; (6) Solid state spectroscopy; (7) Crystal growth and characterisation and (8) Experimental techniques and instrumentation. There will also be a special session on electronic materials.

All correspondence concerning this Conference may be addressed to Prof. G. Sivarama Sastry, Chairman, Local Organising Committee, XII-NCC, Department of Physics, Osmania University, Hyderabad 500 007.

## AWARD OF RESEARCH DEGREES

The M.S. University of Baroda has awarded the Ph.D. degree in Physics to Shri K. J. Chakoo; Ph.D. degree in Applied Physics to Shri Ravindranath Taniram Chaudhari; Ph.D. degree in Geology to Shri Jaiprakash Madhavrao Shirke; Ph.D. degree in Geology to Shri Shailesh Rameshchandra Naik; Ph.D. degree in Biochemistry to Shri Ashok Balkrishna Kulkarni and Kumari Harsha Vishnu-

prasad Desai; Ph.D. degree in Chemistry to Shri Pradeep Madhavrao Pitke and Shri Ghanshyam Hathibhai Patel and Shri Prashan Vinaykant Thakore; Ph.D. degree in Pharmacology to Shri Venugopal K. Pillai; Ph.D. degree in Microbiology to Kumari Prem Pal Gill; Ph.D. degree in Zoology to Kumari Smriti Iyengar; Ph.D. degree in Botany to Kumari Pushpa Pritamdas Bhagwanani.