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STUDY OF FEEDING BEHAVIOR WITH SPECIAL REFERENCE TO REARING TECHNIQUES AND LIFE TABLE DATA OF *MUSCA DOMESTICA* L. IN LABORATORY

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ABSTRACT

An easy and trouble-free rearing scheme has been developed for reproduction of house flies. The rearing was carried out in the glass cages of 58 cm high, 76 cm long and 46 cm wide. The length wise sides of the cage were covered with glass sheets and the bottom of the cage was also made up of a glass sheet while, on one side, cage was equipped with a long sleeve made up of white muslin cloth which was used to fulfill the cleaning and feeding necessities. To study the feeding behavior of the insects on the opposite end of the muslin cloth a transparent glass was fitted to observe the activities of the adult and larvae of house flies. During the rearing phase a comparative study of rearing medium was also carried out. This technique was particularly supportive for the study of insect behavior. Rearing in the glass cages was so helpful to study the behavior of several flies at the same time. In the present work to study the feeding preferences visits of the house flies were counted carefully. Food comprised of 10 recipes having various compositions of ingredients was provided to batches (marked A to J).

Key Words: Insect behavior, rearing technique, effortless.

INTRODUCTION

House flies are very common creatures. It's ours intelligence to utilize this cosmopolitan creature for the welfare of man kind. House flies larvae and adults have been widely used as an insect model in determining the toxic effects of different chemicals Khan and Ahmad (2000), Naqvi and Tabassum (1992). Larvae of house flies were also frequently used as natural alternate diet of biologically controlling agents Rana and Khan, (2010). Being an alternate natural diet and an excellent test organism in the laboratories of toxicology mass rearing of this insect remains the 3basic requirement for the researchers. Presently along with the food preferences an easy method of house flies rearing is developed to meet such requirement.

MATERIALS AND METHODS

Wild adult house flies were collected from Al-Asif Square, Sohrab Goth, Karachi and brought to M A H Qadri Biological Research Center, University of Karachi, for breeding. The rearing method was adopted after Ashrafi *et al*. (1966) and Khan *et al*. (1995) with minor modifications. The insects were reared at 27- 30ºC in the cages of 58 cm high, 76 cm long and 46 cm wide. The length wise sides of the cage were covered with glass sheets and the bottom of the cage was also made up of glass sheet while on one side cage was equipped with a long sleeved made up of white muslin cloth which was used to fulfill the cleaning and feeding necessities. On the opposite end of the muslin cloth a transparent glass was fitted to observe the activities of the insects and to study the feeding behavior. A wide range of recipes containing a variety of composition of food including: wheat bran, rice bran, sugar, dry milk, fresh milk and water were provided to the house flies (Table 1).

Size of house fly was found in the ranges of 1/5 to 1/3 cm usually color was gray with the females generally larger than the males. Darker stripes were found on thorax of adult house flies. It is observed that gap between the eyes of females was greater than that of male adult flies. After completing the three stages the larvae left the food medium and traveled away in the sack of cool and dry place for pupation and traveled a considerable distance for this purpose (Koâi·ová, *et al*., 1998, 2001). Pupation period varies from 4 days to 6 weeks, depending upon the temperature and humidity. For studying the fertility and breeding of insects all the recipes were kept under keen observation. One pair of house flies was released on each recipe for studying the number of eggs laid, number of larvae developed, number of pupae formed and number of adult emerged Table 2.

RESULTS AND DISCUSSION

During the rearing phase, comparative study of rearing medium was carried out. In wild state house flies often breed on decomposing vegetable matter and in the heaps of garbage, similar observations were also reported by (**B**ugarsky *et al*.1999). One more interesting behavior of house flies was observed that in laboratory conditions they breed and utilize only the balanced nutritional components, otherwise the adult house flies were found to avoid the unbalanced medium. According to the observations Table-1, from the recipes number A to H compositions of nutrients were kept in the preferred ranges and the house flies were showing interest, seen roaming around the food materials and also visiting frequently, while in case of recipes number I and J, recipes were not in the preferred range, so the house flies were not showing interest and nibbling away from the food materials. Similar findings have been reported by Bugarsky *et al.* (1999), Dudriková e*t al.* (2000), Fischer, (1999), (2000), Legáth, (2000), Pistl *et al.* (2001) and Sawicki, *el al.* (1961). Five to ten days old females starts depositing her eggs. She deposited their eggs on the material (Table 1). Female adult house flies found to deposit their eggs in heaps of 60 to 180 eggs and around in eight rounds. Each female was observed to lays more than 1000 eggs in her life time. After 6 to 18 hours the maggots emerged from the eggs in hot weathers and after 10 to 21 hours in cold weather. The duration of emergence of maggots may vary in accordance with the changes in temperature. The emerging larvae undergo three stages known as three instars. These stages may complete in 8 days in warmer weather or up to 8 weeks in severe cold conditions (Dudriková, *et al.* 2000). In the laboratory similar references were repeated. Survival rate of house flies in the laboratory was observed through the life table (table: 3).In the present study probable population studies were considered and the probable mortality is 27.3%, successive survival rate is 74.7%, fraction survival is 0.7% while the k-value 0.2 is the under test population. These findings are an agreement with the findings of Begon *et al*. (1996).

Table 1. Food preference in house flies and record of average number of visits paid to the different recipes.

Recipe code	replicates	Composition of food	Mean Insects visits	S. E.	Visits Range (Min--Max)
A	5	Wheat Bran10 g, milk 10 ml, sugar 5 g	49	0.707	47.0—51.0
B	5	Wheat Bran10 g, milk 8 ml, sugar 5 g	40	0.707	38.0—42.0
C	5	Wheat Bran10 g, milk 6 ml, sugar 5 g	43	0.707	41.0—45.0
D	5	Rice Bran10 g, milk 10 ml, sugar 5 g	54	0.707	52.0—56.0
E	5	Rice Bran10 g, milk 8 ml, sugar 5 g	56	0.707	54.0—58.0
F	5	Rice Bran10 g, milk 6 ml, sugar 5 g	58	0.707	56.0—60.0
G	5	Wheat Bran10 g, milk 20 ml, sugar 10 g	80	0.707	78.0—82.0
H	5	Rice Bran10 g, milk 25 ml, sugar 15 g	54	0.707	52.0—56.0
I	5	Rice Bran10 g,	00	00	00
J	5	Wheat Bran10 g,	00	00	00

Table 2. Evaluation of food nutrients by recording emergence of number of adult house flies.

Recipe No.	No. of eggs laid/ pair	No. of larvae developed	No. of pupae formed	No. of adults emerged	% of emergence
A	100	99	97	95	95%
B	120	118	118	118	98.33%
C	110	108	106	104	94.54%
D	115	113	111	109	94.76%
F	125	122	120	118	94.44%
G	130	128	127	122	93.46%
H	110	109	106	104	94.54%
I	120	118	1115	113	94.16%
J	60	60	00	00	00%
K	80	80	00	00	00%

Table 3. Well preferred recipe is supported through life table of given population in the laboratory.

Line	No of eggs	Larvae emerged	Pupa formed	Adult emerged	----------
Population	1000	930	787	747	----------
Number dying in interval	-----	90	143	40	Sum:273 dead
% Mortality	------	9.00	14.3	4	Sum: 27.3% mortality
Successive % Mortality	------	9	15.3	5	----
Successive % Survival	-------	93	78.7	74.7	------
Fraction Surviving	-------	0.9	0.8	0.7	Product: 0.9 Survival
Log population	3	2.97	2.89	2.87	-----
k- Value	------	0.1	0.1	00	Sum: k = 0.2

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