TEST INSECT:- *Musca domestica nebulo* is the predominant form of housefly in the plains of India. It is a constant nuisance and occurs in multitudes in nearly all parts of the Country. It not only affects the health and well-being of the people but also serves as a vector of disease pathogens, such as those of Cholera and dysentry. It is smaller in size than *Musca domestica domestica* and has narrower thoracic bands and lighter colouration of the abdomen. Both sexes possess four thoracic "stripes." In male flies, the median abdominal stripe expands anteriorly on the first apparent segment to form a dark band across the anterior half, tergum 3, in addition to a silvery stripe, has silvery patches at the margins on tergum 4 silvery stripes and silvery patches are more prominent. The female vertex and cheeks are creamy white and the abdomen is light orange in colour. Silvery stripes and spots in the remaining segments are well marked (Foy and Brown, 1954).

Rearing Technique:— The flies were reared on cotton pads soaked in diluted buffalo milk at a temperature of 28 ± 1°C and 60-70 % relative humidity. The rearing medium was prepared by diluting the milk with an equal amount of water. Adults were kept in 8 x 8" cages constructed of wire frames and covered over by meshed cloth. Small petri-
dishes containing the food were placed in each cage. The flies readily oviposited on cotton pads and the dishes containing the eggs were removed after every twenty-four hours. The eggs were embedded in glass jars containing rarified layers of cotton wool soaked in diluted milk. About 200 eggs were seeded in each glass jar, 8 x 4" in size. The jars were covered with meshed cloth in order to prevent the larvae from escaping out and to avoid oviposition by outside flies. A layer of dry cotton wool was added on the third day of the embedding of the eggs in each jar in order to allow the mature larvae to migrate to the dry cotton wool. The pupae were sorted out and kept in small petridishes. Later on, dishes containing the pupae were placed in meshed cloth cages, having some sugar cubes for the flies to feed on emergence.

The mating behaviour of the flies in relation of chemosterilants was studied by applying measured drops of the desired chemosterilant solution on the dorsum of each fly by means of a hypodermic syringe. The syringes, after being washed with acetone and filled with the desired solution of the chemosterilant was held in between the two arms of a metallic clamp fitted in the U-of a screw-gauge. Before applying the chemical, the flies were given a slight dose of carbon dioxide which greatly facilitated their handling during testing operations. Each fly so
anaesthetized was held by its wing with a fine forceps and brought to the tip of the needle. A measured drop of the desired solution was placed on the dorsum of the thorax, the size of the drop being controlled by means of a screw gauge fitted against the head of the syringe. The treated flies were kept in 4 x 2 " cages made of rice paper and cardboard. A circular hole was cut in the top of each cage through which the flies were released in. This was latter plugged with moist cotton wool which not only checked the flies from escaping out, but also provided suitable moisture conditions during the post treatment period. After twenty four hours of treatments, the flies were released in wire frame cages. A cloth sleeve was fitted in the netting of the front side of each cage to facilitate handling of the insects. Small petri-dishes containing normal fly food was placed in the cages and percentage hatching of the eggs was determined. Percent sterility and percent net sterility was calculated from the following formula of Fair and Adkins (1964).

\[
\% \text{ Sterility} = \frac{\text{Total number of untreated eggs}}{\text{Total number of eggs laid}} \times 100
\]

\[
\% \text{ net Sterility} = \frac{\% \text{ sterility in tests} - \% \text{ sterility in normal}}{100 - \% \text{ sterility in normal}}
\]
The measurement of locomotor activity of *M. a. nebulos* was determined by means of an apparatus after the manner earlier described by Brown and Evans (1960). The apparatus consisted of four cardboard boxes measuring 12x8" in size and covered with cellophane at the top. These boxes were kept in a row and connected with the next by a stemless glass funnel. In this way the flies introduced in the first box gradually moved to other boxes as a result of their random movement. A light source was situated beyond the last box and the desired number of flies were introduced into the first box through an opening in its side. In order that they might recover from handling and adopt to the new environment, the flies were held in box one for two hours. The box was then connected with other boxes. The number of flies in each box was counted at different intervals as also the number of funnel passages in a given period. This was used as a measurement of locomotor activity. The locomotor activity was measured for various groups of fed and unfed flies. An attempt was also made to study the locomotor activity in the case of a DDT-resistant strain of the species.

Studies on the colour preference of the *M. a. nebulos* were made under natural conditions. Three sites, a confectioners shop, a dinning hall and a garbage were selected for conducting the tests. 6 x 6" papers of white, green, blue,
black, yellow and red colours were pasted on a cardboard sheet which was placed at the fixed test spot one hour before the start of the experiment. The number of flies visiting any particular colour was counted for predetermined period of time. The time was recorded with the help of a stop watch. On each day, observations were recorded in the morning, at noon and in the evening. Ten replicates were made and as the number of flies visiting any colour of their choice was small, a sum total of ten momentary counts taken at an interval of 30 seconds during a counting period of five minutes each was taken as an unit. These observations for each series of tests lasted for thirty minutes.

Laboratory studies on the preference of the resting sites of *M. nabulo* were made in a specially designed one meter cube cage made of wooden frame and covered over with netted wire. The cage was provided with a sliding door through which the flies were released in the cage. The temperature of the room where the tests were performed varied from 24°C to 28°C. In all series of tests 3 day old flies were used and the number of flies released in the cage was 200 comprising of 100 males and 100 females. The experimental cage received the illumination from an electric bulb of 60 watt, 250 volts from the upper side.
The flies which were released in the cage were left undisturbed for two hours so that they could habituate themselves in the new environment. The number of flies visiting a selected object was compared with the number of flies which were found sitting on the floor of the cage. Each counting period lasted for 60 minutes and consisted of 12 such periods of five minutes each. The twelve five minutes counting periods corresponded to the following time intervals: (i) 0-5, (ii) 5-10, (iii) 10-15, (iv) 15-20, (v) 20-25, (vi) 25-30, (vii) 30-35, (viii) 35-40, (ix) 40-45, (x) 45-50, (xi) 50-55, (xii) 55-60.

In each series of tests three replicates were made and the materials tested during the present studies were wood, glass, sand, brick, soil, aluminium, iron, coal and rubber.

The phenomenon of geotaxis was studied in a specially designed cellophane cage, 6 foot in height and 1 foot in diameter. A hole was made in the centre of the cage for releasing the flies in it. The flies which were found sitting in the lower half of the cage were collected and transferred to cloth cages to produce the next generation. In this way selection was continued for fourteen generations.

**Chemicals:** The technical grade of DDT used during the present studies was obtained through the courtesy of W/S Bharat Pulverising Mills Pvt. Ltd. Bombay, while thiotepa
(Triethylene thio-phosphoramid) EMT-24916, WSC-6396, was obtained from Dr. A.R. Borkovec, Incharge, Pesticides Research Branch, U.S. Dept. of Agriculture, Beltsville, Maryland, U.S.A.