A laboratory colony of the melon fly, *Dacus cucurbitae* Coq. was developed by obtaining the larvae from infested fruits of *Luffa aegyptiaca*, *Citrullus vulgaris* and *Momordica charantia* and rearing them at a temperature of 28 ± 1°C and 70.0 to 80.0 per cent relative humidity on a diet containing sucrose and Protinex. Pieces of Spanish gourd containing the eggs were removed from the cages and were kept in glass jar, 8" x 4" in size and containing sand. When about to pupate the larvae entered the sand and the pupae thus formed were separated from the sand by filling the jars with water and stirring it. They were put on a blotting paper and were later placed in 8" square cloth cages for adults to emerge.

The susceptibility level of adult flies to different concentrations of DDT, γ-HCH, dieldrin, trichlorfon, DDVP and fenthion was evaluated by dissolving the chemical pesticides in acetone and alcohol. Measured drops of the desired insecticide solutions were applied on the dorsum of the individual flies by means of a hypodermic syringe. The size of the drop was kept constant in all the tests and mortality counts were made after 24 hours of the treatments. LC50 values were derived from the dosage mortality regression lines as fitted by eye. It was found that the males were more susceptible to the insecticides
than the females. Organophosphate insecticides DDVP and fenthion were more toxic than the organochlorine compounds DDT, \text{HCH} \text{ and dieldrin, Dieldrin was however found to be more toxic to } D. \text{ cucurbitae} \text{ than trichlorfon. It could therefore be concluded that } \text{HCH}, \text{ DDVP} \text{ and fenthion were effective insecticides for the control of field populations of } D. \text{ cucurbitae.}

The susceptibility of } D. \text{ cucurbitae} \text{ to toxic baits was determined by allowing the flies to feed on sucrose treated with sodium arsenite, sodium arsenate, dieldrin, malathion or Sevin for three consecutive days after emergence. Mortality counts were made on the fourth day and the results obtained showed that baits containing dieldrin were most effective against the melon fly.}

The effects of sublethal doses of toxic baits containing sodium arsenite, sodium arsenate, dieldrin, malathion and Sevin on the reproductive ecology of } D. \text{ cucurbitae} \text{ were also studied. The flies were fed on these baits for three days after emergence and the survivors were paired in } 3'' \text{ x } 3'' \text{ cages. The eggs obtained from them were counted and their rate of hatching was determined. A significant increase in preoviposition period in the case of sodium arsenite, sodium arsenate and malathion treated flies was observed. Fecundity was reduced in all cases and reduced fertility was evident in treatments with sodium arsenite and sodium arsenate. The effects of pesticidal stress were also}
evident from a study of the bionomics of the third generation of dieldrin and Sevin selected adults. The preoviposition period showed an increase, while oviposition period was found to have shortened.

The sterility effects of chemosterilants on flies of different age groups were also investigated. Different concentrations of thiotepa, metepa and apholate were prepared in acetone and mixed with equal quantities of sucrose in a paste mortar and grinded. Such a diet was fed to 1 day, 20 day and 40 day old flies for three consecutive days. Reciprocal crosses were made between the treated and the untreated flies as also between treated males and the treated females. The eggs obtained from such crosses were studied for their rate of hatching and per cent net sterility was calculated after the manner described by Hair and Adkins (1964). Thiotepa proved to be the most effective chemosterilant and one day old flies were more sensitive to the chemosterilants tested than when they were 20 or 40 day old.

The effects of chemosterilants on the bionomics of *D. cucurbitae* were also studied with respect to the incubation period, the larval and the pupal duration. Percentage hatching, pupation and emergence were also recorded. None of the chemosterilants used was found to have any significant effect on the incubation period or on the larval duration of the species. The pupal durations however increased by 34.61, 30.76 and 26.92 per
cent when treatments were made with thiotepa, apholate and metepa respectively. A reduction in the hatching of eggs and the emergence of the adults was also observed.

The effects of sodium arsenite, sodium arsenate and metepa on the reproductive tissues of *D. cucurbitae* was also studied. The flies were fed on the treated diet and were then dissected when 16 days old. Ovaries and testes were removed and fixed in alcoholic bouins for 24 hours, washed in 70.0 per cent alcohol and dehydrated through a graded series of alcohol. These were embedded in wax and the sections were stained in Heidenhein's Iron haemotoxylin and counterstained in eosin. Histological examinations showed a disintegration of the follicular epithelium and the nurse cells. Vacuolation and clumping of chromatin could also be seen. In case of treatments with metepa an almost complete destruction of ovary with big vacuoles could be seen. No histological changes were observed in the testes treated with the arsenical compounds. With metepa the 'zone of transformation' became comparatively smaller when compared to that of the normal testes.

Studies on the geotactic behaviour of *D. cucurbitae* made in a 6 feet long column of 1 foot diameter and covered over with nylon georzette, suggested an inherent geonegative pattern of behaviour.