

## **SUMMARY**

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A study was carried out, in the laboratory, to investigate the effect of four of the commonly used insecticides on cotton and vegetable plants (trichlorphon, chlorpyrifos, monocrotophos and methomyl) on the honey bee (Apis mellifera L.) workers, and also the effect of offering three antidotes (sodium barbiturate, Atropine sulphate and ascorbic acid) to the poisoned bees, in a trial to find out a step towards a balance between insecticidal use for pest control and bee production. The effect of some other conditions for maintaining bees in the laboratory for bioassay experiments; i.e., crowding of bee workers, illumination, ventilation and some anaesthetics, on the honey bee workers were also investigated. In all cases, young honey bee workers of F<sub>1</sub> cross between Egyptian and Carneolian bees were collected from the apiary of the Faculty of Agriculture (Moshtohor) and used in the desired experiments. The obtained results can be summarized as follows :

### A. Effect of holding conditions :

1. Crowding at two population densities of bee workers (25 and 50 bees/cage) had no effect on the mortality rate after 24 hrs. After 48 hrs., crowded bees

min.), diethyl ether (16.54 min.), cooling (11.22 min.) and ethyl chloride (11.03 min.).

3. Mortalities in other treatments were slightly higher than control.

4. Diethyl ether was considered the most suitable anaesthetic as it gave reasonable mean time of recovery without increasing, after treatments, mortalities appreciably.

C. Effect of insecticides :

1. All of the four tested insecticides, when applied topically, caused mortalities amongst treated bees and the rate of mortality, in all cases, was a dose dependent.

2. According to the LD<sub>50</sub> values obtained, trichlorphon was the least toxic with an LD<sub>50</sub> value (1.23 ug./bee) which was 37-folds less toxic than chlorpyrifos, 41-folds less toxic than monocrotophos and 45-folds less toxic than methomyl.

3. When the LD<sub>20</sub> was taken into consideration, the same ascending order of toxicity was obtained; i.e., trichlorphon, chlorpyrifos, monocrotophos and methomyl.

4. The same arrangement of toxicity was again encountered on the basis of the  $LD_{50}$ , in spite of differences in slope.

D. Effect of antidotes :

1. When the honey bee workers were offered different antidotes incorporated in their food, data indicated that low concentrations of antidotes were, mostly, associated with lower mortality rate than control. The highest concentration of atropine sulphate or sodium barbiturate caused high mortality rate (100 and 97.5 %, respectively).

Ascorbic acid, however, appeared to be completely safe, even when used in high concentrations, and the limiting factor for the concentrations to be used was the willingness of the bees to take up syrup containing these concentrations.

2. The recorded mortality percentages amongst bees offered food contaminated with trichlorophon, chlorpyrifos and monocrotophos and containing antidotes indicated, generally, lower mortality percentages than those offered contaminated food without antidotes, but the differences were statistically insignificant. The depression in mortality percentage more obvious in case of using ascorbic acid.

3. In case of methomyl treated food, it was found that incorporating ascorbic acid, as antidote, with the treated food depressed, highly significantly, the percentage mortality amongst bee workers than that recorded in bees fed on contaminated food without the antidote (37.5 and 64.3 %, respectively).

Although the mortality percentages with other antidotes; i.e., atropine sulphate and sodium barbiturate and atropine sulphate combination (56.6 and 60.8 %, respectively) were higher than those recorded with ascorbic acid, these percentage were significantly lower than treatment without antidotes (64.3 %).