THE BIOTIC POTENTIAL OF THE MEDITERRANEAN FRUIT FLY, CERTITIS CAPITATA (WIED) AS AFFECTED BY CERTAIN CHEMICALS

BY

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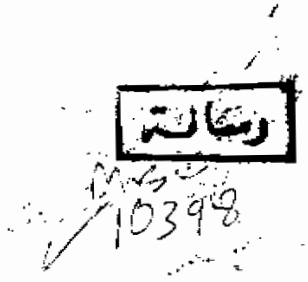

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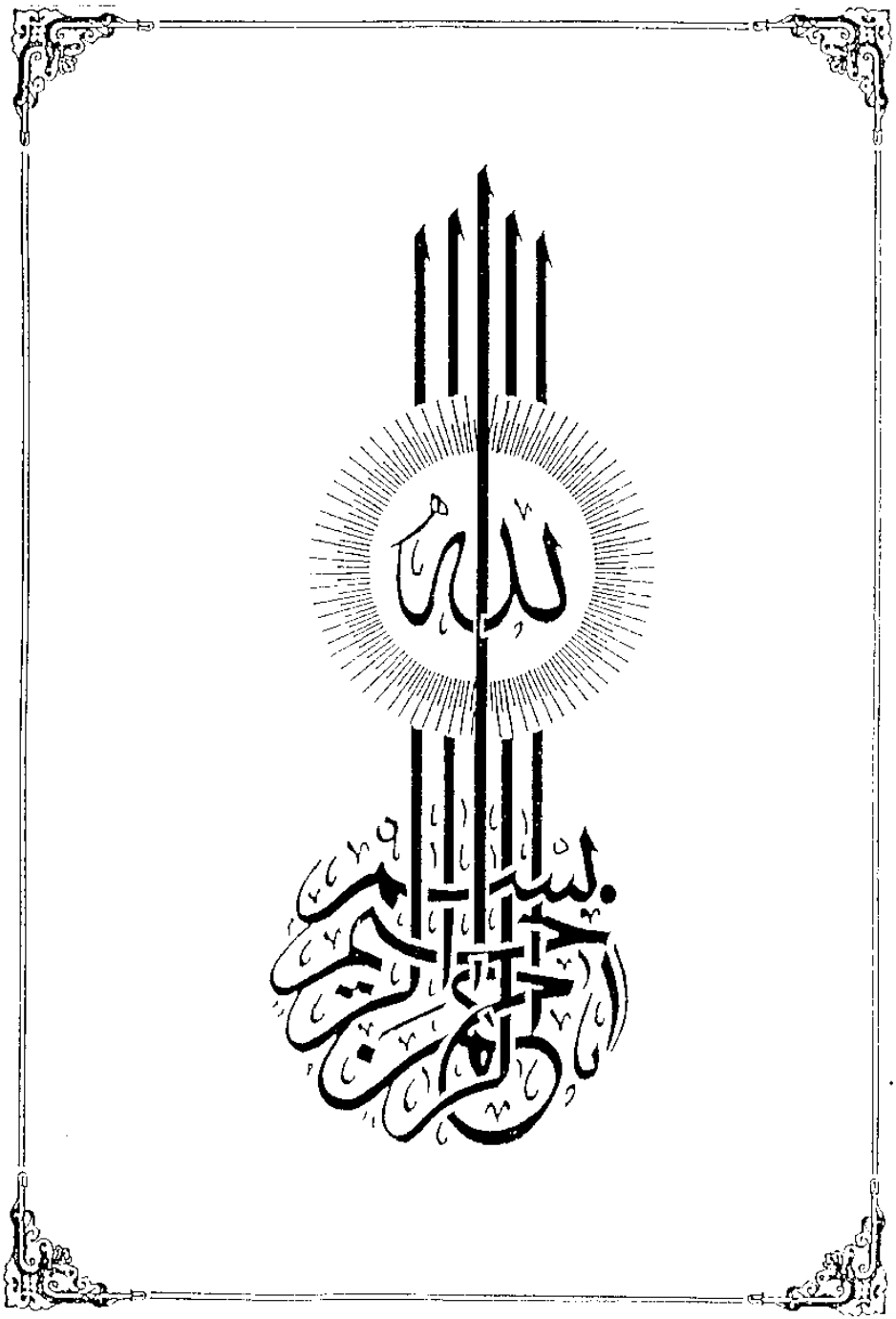

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CONTENTS

INTRODUCTION

I - INTRODUCTION

The Mediterranean fruit fly, *Ceratitis capitata* (Wied.), is one of the most and serious insect pests of most citrus and deciduous fruits in the Arab Republic of Egypt. The maggots develop in the pulp of the fruits, devouring it and favoring the development of bacterial and fungus diseases.

Different methods of control had been used against this pest all over the world. Of these methods, the insect sterilization technique (IST) proved to be a successful and practical approach for its control, but, up till now the chemical control is still the main measure currently used against it. Certain group of insecticides are now used efficiently for this purpose, including chlorinated hydrocarbons, organophosphates, synthetic pyrethroids, antifeedant compounds..... etc. The effect of these materials have been the subject of study by many workers. World and local literature is very rich in such studies, i.e. Ryan (1950), Sherman (1958), El Samarah (1973 , 1977) and El Hakim (1977).

The present work is of somewhat different nature from these convential studies. It aims at the study of the effects of two compounds; namely, Fenvalerate

"Sumicidin" representing the synthetic pyrethroids and Triphenyltin hydroxide "Du-Ter" representing the antifeedant group, on the following points:

1. Toxicity of both compounds on eggs, larvae and pupae.

2. Effect of the two chemicals on the development and certain biological aspects of larvae, pupae and adult stages treated as larvae.

3. The effects on gonads and reproductive potential of the insect, i.e., no. of oocytes, length of ovarioles, size of testes, no. of eggs and hatchability percent.

4. The effect on certain biochemical constituents of larvae and pupae, i.e., free and protein amino acids, reducing sugars, organic acids and total lipids.

These points aim to evaluate the reflection of larval treatment of the two mentioned compounds on the reproductive potential of the female flies. Furthermore, the widespread use of the successful sterility compounds through the integrated control programme will help in reducing the population density of this insect after releasing the low fertile flies.

REVIEW OF LITERATURE

II - REVIEW OF LITERATURE

A- Biological effectiveness of insecticides and antifeedants:-

Tamashiro and Sherman (1955) found that when larvae of the oriental fruit fly, Dacus dorsalis Hendel, were treated with certain chlorinated hydrocarbon insecticides, many of the survivors developed to the adult stage and then exhibited typical poisoning symptoms and died. On the other hand, when the larvae treated with Parathion noneof the emerging flies died. Therefore, the phenomenon of "latent toxicity" appeared to be associated with the chemical structure of insecticide.

Blum and Bower (1957) Found that Triethyltin hydroxide induced paralysis quickly and caused death to house fly, Musca domestica l. at very low dosage level. Triethyltin hydroxide was somewhat more toxic to susceptible flies than to DDT resistant flies.

Sherman (1958), found that Aldrin, Chlordane, Dieldrin, Endrin, Isodrin, Strobane, and Lindane exhibited strong properties of latent toxicity to the larvae of the Mediterranean fruit fly, Ceratitis capitata Wied. in the soil.

No latent toxicity was exhibited by Dilan, Malathion, Pyrenone or Pyrolan.

Desmoras (1961) Found that the order of decreasing effectiveness of the tested insecticides against the larvae of the Mediterraneen fruit fly, Ceratitis capitata Wied. was Parathion, Endothion, Malathion, Diazinon, Trichlorphon, Phosphamidon and Methyldemeton.

Puzzi et al. (1963), reported that Fenthion proved to be the most effective larvicide against C. capitata.

Hays (1968) reported that Triphenyltin acetate and Triphenyltin chloride produced excessive mortality to house fly, Musca domestica l. when offerred in the diet at rates above 0.25 mg. per gram diet. Male flies were less affected than females at tolerable dosage rate.

Keiser and Schneider (1969) in Hawaii stated that the oriental fruit fly, Dacus dorsalis Hendel, melon fly, Dacus Cucurbitae Coquillett, and Mediterranean fruit fly, Ceratitis capitata Wied., sterilized with Tepa or Radiation, required more DDT or Malathion to achieve comparable mortalities at the LD_{50} and LD_{95} levels than the nonsterilized ones.

Servas (1971) found that chlorinated hydrocarbons (Aldrin, Dieldrin, Heptachlor, and Heptachlor epoxide) had little larvicidal action on the Mediterranean fruit fly, Ceratitis capitata Wied. These compounds revealed latent toxicity which was realized later, Just before, during or soon after emergence. All organophosphorus compounds gave excellent larval action, whereas the adults of Drosophila melanogaster were less sensitive. The carbamates differed greatly in their effects on D. melanogaster. The most effective was Methiocarb followed by Promocarb and Isolan, while Carbaryl was effective only after repeated high doses.

Abdallah (1972) found that Metepa and Hempa are toxic to larvae and pupae of the Mediterranean fruit fly, Ceratitis capitata Wied.

El-Samarah (1973) Studied the effect of some insecticides against the medfly, Ceratitis Capitata Wied. and found that Bidrin was the most effective chemical against the eggs, where Gardona was the least effective one. LC_{50}' S for Bidrin, Lebaycid, Murfotox, Rogor, and Gardona were 23.2, 51.6, 106.5, 264.8 and 854.9 ppm, respectively. He also found that Lebaycid was the best in