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THE EFFECT OF SOME TOXICANTS ON EGGREPRODUCTION OF THE COTTON LEAF- WORM Spodoptera littoralis (Boisd.)

A THESIS

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I- INTRODUCTION

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I- INTRODUCTION

It is hardly necessary to emphasize the importance of the cotton leafworm Spodoptera littoralis (Boisd.), as a source of injury to the cotton crop, in addition to its attack to more than sixty different crops. In years of severe infestation, in addition to various control measures, there is a need for chemical control with organic insecticides. Organochlorine insecticides succeeded in controlling this pest effectively starting 1945 up to 1960. Then the cotton leafworm started to develop resistance to such compounds and hence organophosphorus and carbamate compounds were introduced and were used extensively. Since the appearance of resistance to organophosphorus and carbamate insecticides, newer compounds, including synthetic pyrethroids have been investigated for the control of this pest.

The applied insecticides are acting as a powerful selective agent for concentrating resistant individuals that were present in low frequencies in the original population of the pest. No doubt the study of biological activities of this pest in the presence of the toxic applications may help to clarify many of the unexplained

phenomena concerning resistance. The effect of sub-lethal doses on the reproductive potential seems very important from the economic point of view, since it directly affects the population of the pest. In that respect the real effect of sub-lethal doses of pesticides on the population dynamics of the pest is not clearly known.

With this view point the present work was planned to investigate some of the biological activities of the cotton leafworm.

Aim of the present study:-

- 1- The study of biological activities of the cotton leaf worm during two successive generations following treatment of the larval stage with LD_{50} of cypermethrin and phenovalerate.
- 2- Studying such activities upon treatment of the adult stage with LD_{30} of cypermethrin and phenovalerate.

II- LITERATURE REVIEW

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Moriarty (1969), mentioned that the effects of sub-lethal doses of synthetic insecticides: organochlorine, organophosphorus and carbamate compounds on insects, were often difficult to assess. This is due to apparent differences between treated and untreated individuals which were sometimes caused by selective mortality of the treated ones. The author mentioned that all types of synthetic insecticides can influence reproductive potential by increasing or decreasing the number of eggs produced or by affecting egg fertility or subsequent development, reduced fecundity or fertility. This could be caused either directly by inhibition or distortion of ovary development, or indirectly by reduced feeding. He added that the effects of insecticides on behaviour might include increased activity, reduced feeding and a lowered acceptance threshold for sucrose. He suggested that latent toxicity and some behavioural changes were probably caused by direct effects on the nervous system, but some of the other results might be secondary stress effects. There was also the possibility of direct action of the insecticide on other systems. Latent toxicity,

which is a reduction of life - span or increased tendency to die at particular developmental stages, was found only after organochlorine treatment. It seems to be linked with fat metabolism and showed that sub-lethal effects might occur a long time after contamination with persistent insecticides.

Abdallah and El-Sayed (1979), showed that more than 50 % of larvae of Spodoptera littoralis, surviving the LC_{50} 's of Rup 962, SH_{1479} and CCN_{52} , died at the end of the larval stage. An increase in larval period was evident in all tests. A reduction in fecundity, as a result of larval treatment, ranged between 15.2-43.6 %. Variable but insignificant effects was also expressed on the pupal mortality and the adult emergence. Viability of eggs was not significantly affected by larval treatment. However, up to 11.86 % decrease in hatchability was reached in the Rup 962 treatment.

Awad (1979), studied the biological aspects of Spodoptera littoralis in two successive generations following larval treatments with LD_{25} and LD_{50} of permethrin and cypermethrin. He found that all treatments prolonged the larval period of F_1 and F_2 significantly except

permethrin at LD₂₅, which produced an insignificant effect. Cypermethrin prolonged significantly the pupal period in F₁, while permethrin had no effect. High dose of permethrin prolonged the pupal period of F₂ significantly, while an insignificant effect was noticed for cypermethrin. The percentages of pupation and adult emergence were reduced following larval treatments with these insecticides. The effect was clearly noticed in treated parents than in the progeny and for cypermethrin than for permethrin. All treatments shortened the duration of male and female adults of both two generations. The tested insecticides reduced significantly the number of eggs deposited by adult female of the two generations. There were no significant differences between the effect of LD₂₅ and LD₅₀. Increasing the dose from LD₂₅ to LD₅₀ produced significant reduction in percentage hatchability in both generations, and this is more obvious in treated generations than in the F₁.

El-Deeb et al (1980) stated that the treatment of susceptible, R-curacron and R-cypermethrin larvae of Spodoptera littoralis with LD₅₀ of cypermethrin, caused