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The effect of rearing the cotton leafworm *S. littoralis* on natural and artificial diets on its biology as well as its response to insecticides was investigated. Castor bean leaves was selected as a natural diet and two artificial diets broad bean, kidney bean were prepared in the laboratory for rearing *S. littoralis* larvae.

Part 1: Biological study.

Comparative study for some biological aspects of the Egyptian cotton leafworm *S. littoralis* reared on castor bean leaves and artificial diets.

The biological studies were carried out during five generations for larvae reared on castor bean leaves, broadbean diet and kidneybean diet.

The most suitable diet for rearing *S. littoralis* larvae was found to be broadbean diet followed by kidneybean diet and castor bean leaves in all criteria evaluated.

1- The incubation periods of *S. littoralis* eggs produced from rearing on different diets in all studied generations could be arranged as: broad bean diet < kidney bean diet < castor bean leaves.

2-The duration of larval stage varied significantly according to the diet used. The shortest larval duration was obtained for larvae fed on broadbean diet, where the general means were

17.6, 16.3, 15.6, 14.3 and 12.3 days in the five generations respectively. Moderate larval durations were obtained when using kidney bean diet, while longer durations were obtained in case of rearing on castor bean leaves.

3- The results were obtained with diet broad bean as indicated by lower percentage mortality. Approximately from 2 to 18.57% .Results for diet kidney bean showed intermediate results, while the lowest percentage mortality were obtained from rearing *S. littoralis* larvae on castor bean leaves.

4- In general, the longest pupal duration resulted by feeding larva on castor bean leaves, while the shortest feeding on diet broad bean.

5- High percentages of larval pupation were obtained in diet broad bean, followed by diet kidney bean and the lowest was obtained in castor bean leaves.

6- The highest weight of pupae in the five studied generations was obtained from larvae fed on diet broad bean, followed by those fed on diet kidney bean, while lowest pupal weight resulted from feeding on castor bean leaves.

7- The percentages of adult emergence were higher in diet broad bean, followed by diet kidney bean, and lowest was obtained in castor bean leaves.

8- The female moths emerging from larvae fed on diet broad bean laid the highest number of eggs followed by that of diet kidney bean. The lowest number of eggs was obtained from moths emerged from larvae fed on castor bean leaves.

Some biological aspects of *S. Littoralis* reared on kidney bean and broad bean diets at 27°C and 65±5 R.H. for three successive generations:

1-The larval duration were a highly significant according to the diet used. The shortest larval duration was obtained for larvae fed on diet broad bean, where the general means were 19.3, 16.6 ad 15.3 days. In the three generations respectively, while it was 26.6, 21.6 and 18.6 days, on kidney bean respectively.

2- In general, the longest pupal male duration resulted by feeding larva on broad bean, while the shortest pupal female feeding on diet broad bean

- 3- The adult longevity of female for the three generations. The male longevity showed only a significant difference for the sixth generations in favor of kidney bean medium.
- 4- The sex ratio for the pupae on kidney bean medium was higher than on broad bean medium,

Part 2: Toxicological study

Development of resistance to hexaflumuron

The rate of development of resistance in Egyptian cotton leafworm to hexaflumuron during 12 successive generations is dependent upon the time for recording the mortalities (after 3 or 5 days from treatment). Resistant ratios determined after three days from treatment were gradually increased from G_1 - G_8 then there was a rapid increase to 18.59 fold in G_9 and to 49.32 fold in G_{12} . Resistant ratios derived from selection at day five showed gradual increase from G_1 - G_{12} reaching 13.71 fold in G_{12} . It was concluded that hexaflumuron selected strain has the potential to build up a detectable resistance.

Biochemical studies on Resistance *S.littoralis*

The levels of AChEs and total proteins (either in the whole bodies of larvae or in the adults heads) for hexaflumuron

Selected strains were increased compared to the susceptible strains throughout the studied generation.

Cross-resistance in hexaflumuron-selected strain of *S.littoralis* (Boisd) to certain insecticide.

During the 12 successive generations of selection to hexaflumuron selected strain showed different levels of cross-resistance to five insecticides. At G₅, G₉ and G₁₂, the selected strain was more sensitive to Curacron and Cascade treatments. Therefore, Curacron and Cascade could be used successfully against hexaflumuron selected strain as a way to overcome or delay its resistance.