STUDIES OF CERTAIN FACTORS AFFECTING PREVALENCE OF THE SPINY BOLLWORM

By

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B. Sc. (Agriculture)

THESIS

Submitted in Partial Fulfilment of the Requirements for the Degree

Of

MASTER OF SCIENCE

in

ENTOMOLOGY

Plant Protection Department

Faculty of Agriculture

Ain-Shams University

Cairo

1975

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A C K N O W L E D G M E N T

The writer wishes to express his great indebtedness to Professor Dr. A. Khalifa, Dean, Faculty of Agriculture, Ain Shams University; who suggested the line of work, for his most valuable guidance, kind encouragement and keen interest in the progress of the work. Thanks are also due to Professor Dr. M.A. El-Banby, who supervised the work from March 14, 1972 to September 16, 1972. Deep gratitude to Dr. E.K. Hussein , Assistant Professor in the Department of Plant Protection and Dr. M. Abdel-Megeed, Lecturer in the same Department for their supervision, interest and constructive criticism.

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C O N T E N T S

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I. INTRODUCTION

The spinybollworm, Earias insulana Boisd. is considered as an economic pest in Egypt and certain parts of the world. It is found generally in the humid areas between lat. 40° N. and 40° S. i.e. Phillippine islands, Indo-China, Indian Peninsula, South western Asia except the Arabian arid zones, Spain & Southern Balakan, most of the mediterranean islands and all Africa except the Great Desert and Kalahari desert Fig. (1) Its importance is due to the attack on the tender shoots which is characterized by tunnelling the growing point. As the cotton plants grow the attack is directed towards the flowers, buds and bolls. In Egypt the most important studies on the spinybollworm were carried out by Willcocks & Bahgat (1937), Megahed & El-Nahal (1958), Abdel-Megeed (1967), Mabrouk (1967) and Abul-Nasr et al. (1972).

The aim of the present investigation was mainly to study the development of the spinybollworm on certain host-plants, rate of infestation of both spiny and pinkbollworms on different hosts and the nature of distribution of infestation in cotton fields. The effect of feeding on different host plants on the susceptibility of the larvae to Cytrolane and Dursban was also studied.

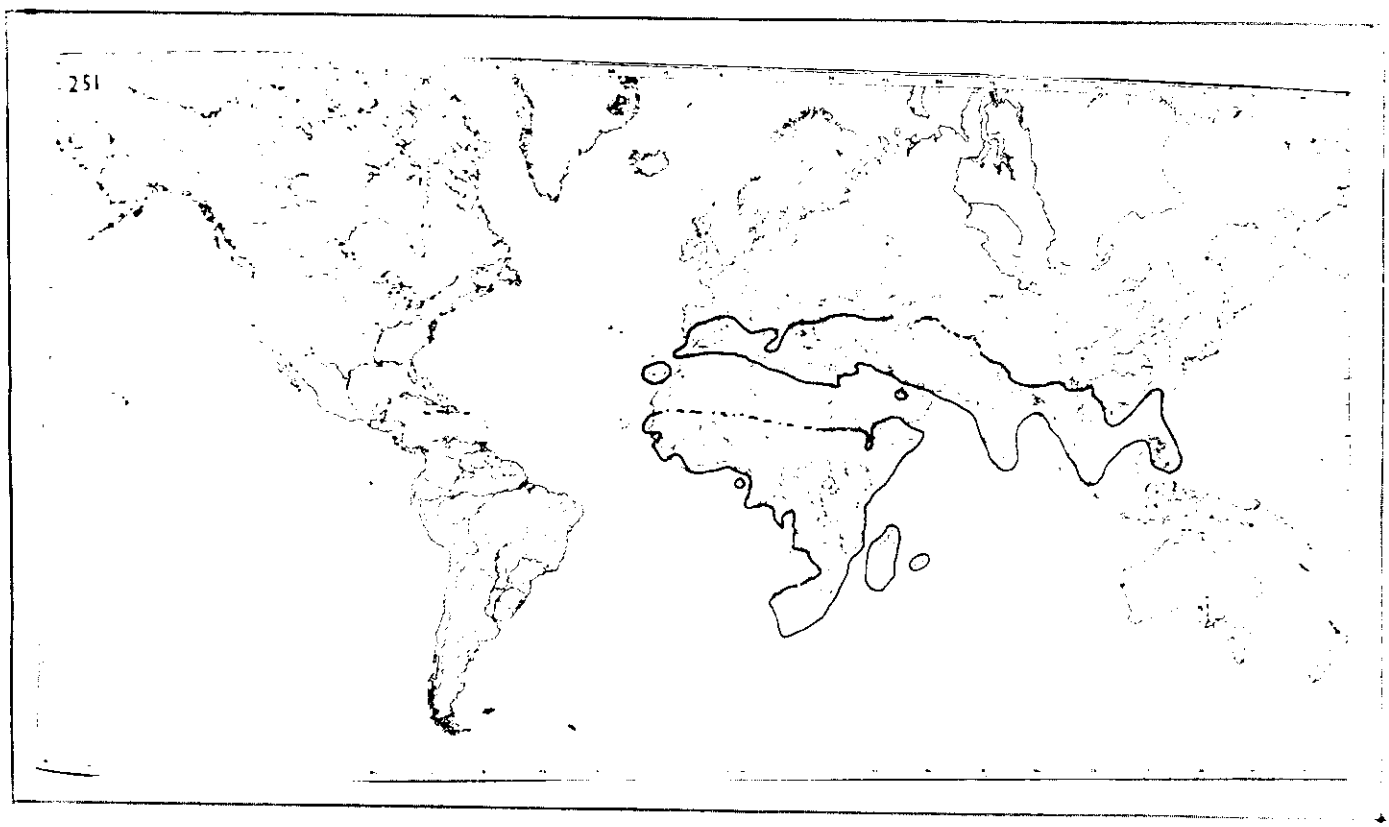

Fig. (1): Distribution of Earias insulana Boisd. in the world. (Commonwealth Institute of Entomology, 1968).

II. REVIEW OF LITERATURE

A- Development :

Studies of host plants of spinybollworm have been carried out by many investigators in different parts of the world. The major host plants of the spinybollworm belong to certain groups of plants, namely : Malvaceae, Tiliaceae , Bomacaceae, Convolvulaceae, Graminae , Leguminosae, Moraceae and Solanaceae.

Gowdey (1914) found that the spinybollworm prefers to lay its eggs on cotton bolls, particularly in the grooves near the apex. The female moth laid 210 eggs in five consecutive nights decreasing from 87 at the first to 7 at the fifth night. Husain and Lal (1923) reported that the female laid as many as 259 eggs in 4 days on cotton plants. The duration of the egg, larval and pupal period was 2-4, 10-16 and 4-9 days in summer, respectively.

Mihra (1935) indicated that Earias fabia Stoll., and Earias insulana Boisd., attacked cotton plants in India. The eggs were laid only at night on tender shoots, branches,stalks of flowers, buds and bolls and hatched after 4-7 days. The larvae enter shoots, flower buds or bolls and feed in them for 9-16 days, while the pupal period lasted 8-14 days. The adult

lived about 8-22 days and oviposition principally occurred during the first week. The female moth laid about 423 eggs.

Cherian and Kylasam (1947) in their studies on Earias fabia Stoll., and Earias insulana Boisd. in India, found similar bionomics for the two species. The egg, larval,prepupal and pupal stages lasted 2.5-3, 10-12, 1-1.5 and 7-10 days , respectively. The longevity of adults was 15 days and the female moth laid about 385 eggs.

Planes (1948) studied the influence of temperature on the development of Earias insulana on cotton. He showed that the egg lasted from 4-5 days at about 28°C. and 17 days at 14.5°C., while the larval stage lasted from 9 days at about 26°C. to 28 days at 13.5°C. The pupal stage lasted from 6-7 days at about 29°C. to 14 days at 16°C.

Yathom (1956) studied the bionomics of the spinyboll-worm under laboratory conditions (26-29°C.) and recorded that the egg, larval, pupal stages and the preoviposition period lasted 3, 9-16, 8-10 and 3-6 days,respectively. Moderate temperature (25-28°C.) were recorded as optimum temperature for oviposition where the average number of eggs per female was about 136 as compared with 54 at 29°C. The female moths lived rather larger than the males.

Pearson (1958) concluded that the number of eggs of Earias insulana Boisd. was greatly affected by larval food.

Moths reared on cotton shoots gave only 66 eggs as compared with 399 eggs on cotton flowers. With buds, cotton bolls and okra pods, the numbers were 196, 345 and 451 eggs per female, respectively.

Abdel-Megeed (1967) reported that under laboratory conditions (25-30°C. and 50-70% R.H.) the longest larval period of E. insulana occurred on cotton bolls followed by okra and til. The pupal period on til, okra and cotton were 8.85, 8.67 and 8.35 days, respectively. The larvae fed on cotton bolls gave heavier pupae and moths than those fed on other plants. The female moths lived longer than the males. Female moths received 20% honey solution and fed as larvae on cotton laid the highest number of eggs (271.40) when compared with those fed on okra (215.20) and til (175.00).

Haidari (1967) reported that the optimum temperature for development of the spinybollworm was 25-29°C., at which life-cycle lasted about 23 days, while below 16°C., the developmental period was very long. In the same year Mabrouk found that okra pods and green maize cobs were suitable hosts for rearing the spiny bollworm. The larval, prepupal and pupal stages lasted 9-11, 1-3 and 9-12 days, respectively.

Megahed et al. (1972) stated that the incubation period of, E. insulana lasted 2.05 days at 32.0°C. and 11.9 days at 16.4°C. larval development required 8.1 and 40.8 days at 29.7

and 17.6°C., respectively. The pupal stage lasted 7.2 and 35.8 days at 31.7 and 18.0°C. The mean number of eggs per female averaged from 164-422 eggs at 31.5 and 26.6°C., respectively.

B- Rate and distribution of infestation :

Gough (1916) observed that the infestation of the pinkbollworm increased rapidly throughout the season, whereas the spinybollworm appeared to be a minor pest in Egypt. Gomez (1926) found that at the end of the season there may be as many as 8 larvae of Pectinophora gossypiella in one boll.

Abul-Nasr (1960) recorded that the number of the pinkbollworm was about 10 times than that of the spinybollworm. Abdel-Megeed (1967) reported that the percentage of infestation of Earias insulana reached the maximum level in the second half of August, whereas, that of P. gossypiella steadily increased throughout the season. But the spinybollworm was much less than the pinkbollworm at any observation period. Moreover, when the number of larvae was considered, E. insulana was much less than P. gossypiella and the ratio was about 1 : 12. A more or less even distribution of bollworms occurred throughout the observation area.

Shehata (1965) stated that none of okra varieties was resistant to attack of P. gossypiella and E. insulana. The attack of E. insulana was heavier throughout the season on

all varieties than that of P. gossypiella.

Badawi (1966) studied the rate of infestation of the bollworms throughout the cotton season in Sudan. He found that 85% of the infested bolls contained only one larva from the spiny or the pinkbollworm. Early in the season the number of P. gossypiella was found relatively higher than that of E. insulana.

Abul-Nasr et al. (1971a) mentioned that infestation of cotton by E. insulana was highest in Upper Egypt, relatively moderate in Middle Egypt and lowest in lower Egypt. The intensity of infestation on terminal shoots and flowers was lower than that on green bolls.

Abul-Nasr et al. (1971 b) recorded that the infestation of maize ears by E. insulana was restricted to the crop when sown in July and August. The infestation started with a very low rate in early September (on milky ears), reached its peak by mid-October (on doughy ears), then decreased considerably by late October (on ripe ears).

Shehata (1973) found that cotton bolls carried on sympodial branches below node no. 6 represented 1.2% of the total crop; and the infestation by the pink and spinybollworms reached 33%. Those originated from nodes no. 6-19 represented 96.6% of tne crop and infestation was 38%. On the upper part