BIOLOGICAL AND ECOLOGICAL STUDIES ON THE KERNEL OLIVE MOTH (PRAYS OLEELLUS FABR.)

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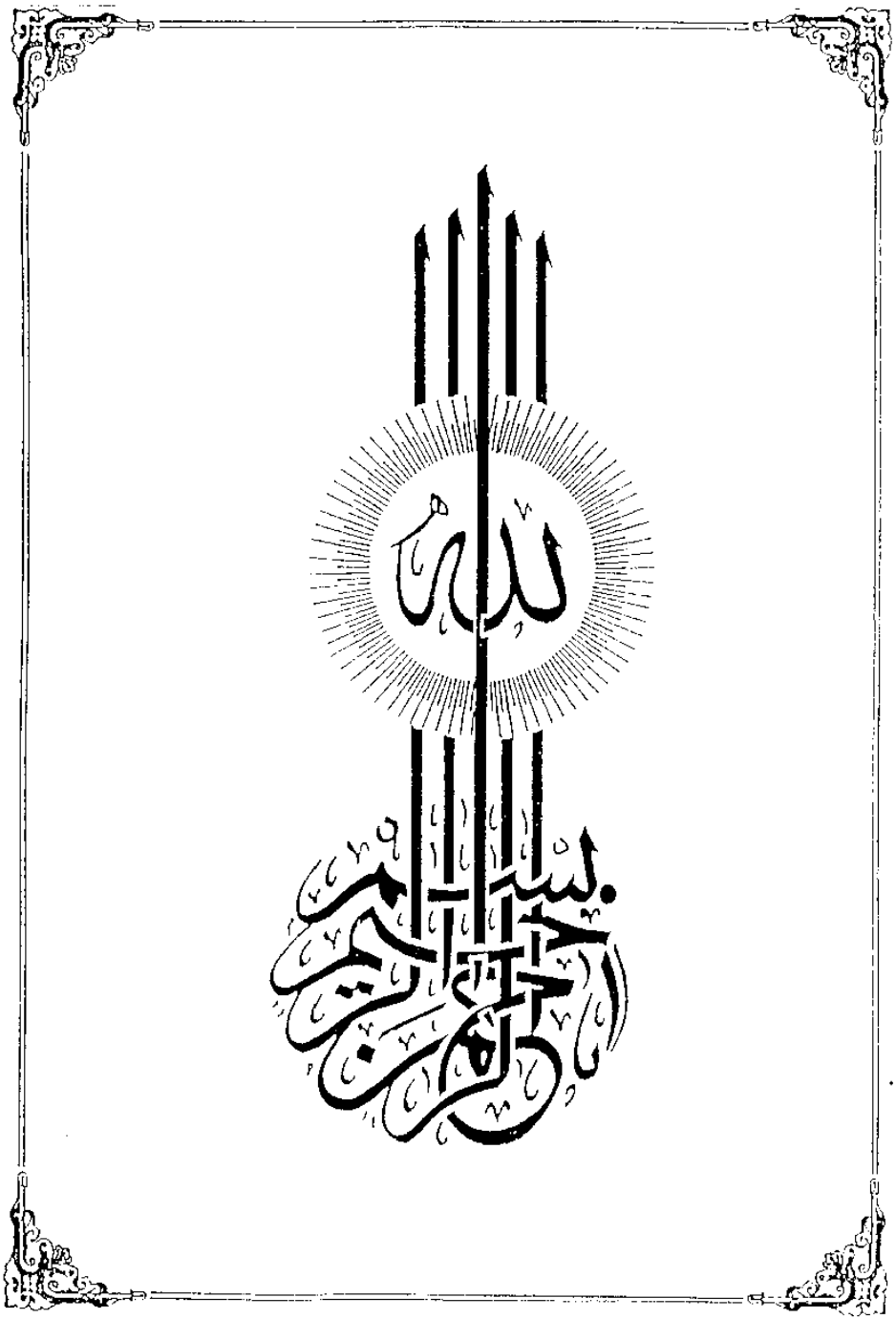

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I- INTRODUCTION

Olive trees are grown in Egypt in an area of about 6000 feddans distributed mainly in Alexandria, Mersa Matrouh, Behaira and Fayoum Provinces. In recent years, two species of leaf moths were recorded as pests of olive trees; Prays oleellus F. and Palpita unionalis Hb. Very few work has been carried out on the latter species, and the former species has received no attention inspite of the fact that its danger is increasing year after year.

The olive moth Prays oleellus Fabr. is an extremely serious pest of olive trees in many parts of the world. It has been recorded to cause much damage and considerable loss in almost all olive growing countries. Larvae of this species prefer feeding on tender leaves and terminal buds and in heavy infestation, they may cause stunted growth of seedlings. Infested flower buds usually fall down before fruit setting. The larvae may produce mines in the newly formed fruits and move towards the kernel, causing them to fall prematurely. They usually form webs under which they feed. Such webs may sometimes join together the terminal parts of young shoots.

The aim of the present work is to throw some light on the biology, ecology and control of this species.

II- REVIEW OF LITERATURE

A- Biological and ecological studies :

Malenotti (1924) in Italy mentioned that P. oleellus had three generations a year on olive trees; the first attacked the foliage, the second attacked the flowers and larvae of the third generation mined in the stones of the fruits. The last generation was considered as the most injurious.

Korol'kov and Savenko (1929) stated that P. oleellus had three generations a year on olives in Jugoslavia. The overwintered larvae fed on the leaves until the end of April or beginning of May, and pupated on the lower surface of the leaves or between two leaves spun together. Moth emergence occurred after 7 - 8 days and oviposition started on May 20th. Larvae of the second generation hatched in 7 - 8 days and attacked the flowers causing them to dry up and fall down. Larvae of the third generation usually mine in the fruits and make their way into the stone. The infested olives often fell down early in September. The adults emerged in the

second half of the same month and oviposited at its end. The newly hatched larvae usually mined into the leaves and moved from one bud to another. Hibernation occurred in galleries.

Baranov (1939) mentioned that P. oleellus had three generations a year on olives in Belgrad. Larval development was interrupted during winter. In spring, larvae were observed to attack the leaves feeding on the lower surfaces beneath webs. Top leaves were also attacked.

Koronees (1939) in Greece reported P. oleellus as being parasitised by Ageniaspis fuscicollis (Fam. Encyrtidae), Elasmus flabellatus (Fam. Elasmidae), Apanteles xanthostigmus (Fam. Braconnidae) and an unidentified Eulophid.

According to Melis (1946), the larvae of this species mined into the leaves or fruits. In the latter case, they usually move towards the kernel, and the damaged olives fall to the ground. Three generations a year were recorded in Italy; the first on leaves, the second on flowers and the third on fruits.

Ruiz Castro (1948) stated that P. oleellus causes considerable damage to olive trees in Spain. He listed the recorded parasites and hyperparasites of P. oleellus and concluded that Ageniaspis fuscicollis (Dalm.) subsp. praysincola Silv., was apparently the most effective primary parasite. He added that although A. fuscicollis was widely distributed in Spain, it had not been observed to attack P. oleellus, possibly owing to the absence of this species.

In 1951, the same author recorded Phloetribus scarabaeoides (Bern.), Dacus oleae (Gmel.), Saiessetia (Coccus) oleae (Bern.), Euphyllura olivina (Costa.) Hysterobterum grylloides (F) Liothrips oleae (Costa.) and Prays oleellus (Fabr.) as pests of olive trees in Spain and considered the latter as the most serious.

Cakillar (1959) stated that in Turkey, P.oleellus had three generations infesting the leaves, flower buds and fruits respectively. He added that adults of the winter generation emerged from late March to late May, and those of the subsequent generations between mid-June and early July and in September and October, respectively. An

average of 108 eggs per female were laid in July in a period of 9 - 10 days and in 10 - 12 days in September. A mean larval duration of 8 days was recorded under laboratory conditions of 25°C and 89 % R.H. and 4 - 8 days for the pupal stage depending on the season.

Sousa Alvim et al.,(1960) in Portugal showed that larvae of the phytophagous generation of P. oleellus, were more abundant on lower branches of trees than on either the middle or upper branches. No significant difference was observed between the population of larvae in the northern or southern sides of the trees.

Pelekassis (1962) mentioned that P. oleellus was a serious pest of olive trees in eastern Greece. He recorded two summer generations infesting the leaves, flowers and small fruits. Females oviposited both on the upper and lower surfaces of the leaves, and the incubation period differed according to temperature. The newly hatched larvae mined in the leaves, and when they come out of their mines, they feed on both surfaces of the leaves. Buds, flowers and small fruits were also liable to be attacked.

Females of this insect were observed by Kovinac (1969) in Jugoslavia to lay their eggs on small olives, as well as on the upper surfaces of the leaves. High temperature and humidity caused the larvae to enter diapause. Two types of diapause were observed; short term and long term diapause, the latter lasted about 10 months.

Arambourg et al., (1970) recorded Ageniaspis fuscicollis var. praysincola Silv., as a parasite of P. oleellus in Southern France. It was successfully reared in the laboratory at Antibes in 1970 on eggs and larvae of Acrolepia assectella (Zell.). The rate of parasitism appeared to be slightly above 50 %. It was thought that further improvements in the rearing technique of this species would possibly enable the release of large numbers of this parasite, and another promising parasite, Chelonus elaephilus Silv. to control this pest. The latter parasite could readily be mass-reared in the laboratory on Ephestia (Anagasta) kuhniella Zell.

B- Control studies :

Korol'kov et al., (1929) in Jugoslavia mentioned that a spray of 1 lb. of sodium arsenite and 1 lb. of zinc

oxide in 100 galls. of water killed a considerable number of P. oleellus larvae. It did not scorch the leaves which were however injured when the amount of zinc oxide was halved. High mortality rates among larvae were obtained by sprays of 1 lb. Zinc oxide per 75 galls of water, or 1 lb. lead arsenate per 60 galls. of water. The foliage was not affected. In view of the frequent rains in spring, the author recommended the application of three sprays at 7 - 10 days intervals, starting as soon as the overwintered larvae appeared on the leaves.

Melis (1946) in Italy stated that spray containing 5 lbs lead, aluminium or zinc arsenate per 100 galls. of water or Bordeaux mixture with an adhesive, and dusts containing lead or aluminium arsenate in an inner carrier gave 20 % kill of overwintered larvae.

In 1948, the same author stated that sprays of 0.5 % lead arsenate and of an unspecified improved arsenical product were applied twice against the larvae of the first generation of P. oleellus, on May 21st. and 24th. Although application of these chemicals was followed by heavy rains, both insecticides gave high mortality rates,

and the improved material was so persistent that it also killed many second generation larvae on the calyces of the young fruits. An increase of 25 % of the crop was recorded, but neither treatment appreciably reduced the percentage of infested fruits. Contact insecticides including DDT, applied against the eggs of the second generation gave poor results.

In 1953, Melis mentioned that sprays of nicotine sulphate alone or accompanied with 0.5 % lead arsenate applied(when eggs of the second generation have just been laid) gave largal mortality percentages of 64 - 83 and 75 - 86 respectively, compared to 5 % for no treatment.

Antongiovanni (1955) in Itally showed that rogor (O,O - dimethyl S- (methylcarbamyl) methyl phosphorodithioate) at the concentration of 0.6 % gave almost complete mortality of the larvae in their mines, 12 days after treatment. No mortality was however observed in the control experiment.

Satisfactory control of this insect was obtained by Pelekassis (1962) in Greece by using low-volume