# STUDIES OF CERTAIN ECOLOGICAL FACTORS AND THEIR RELATION TO THE CHEMICAL CONTROL OF THE WAX SCALE INSECT CEROPLASTES FLORIDENSIS (COMSTOCK) ON CITRUS PLANTS IN EGYPT


BY

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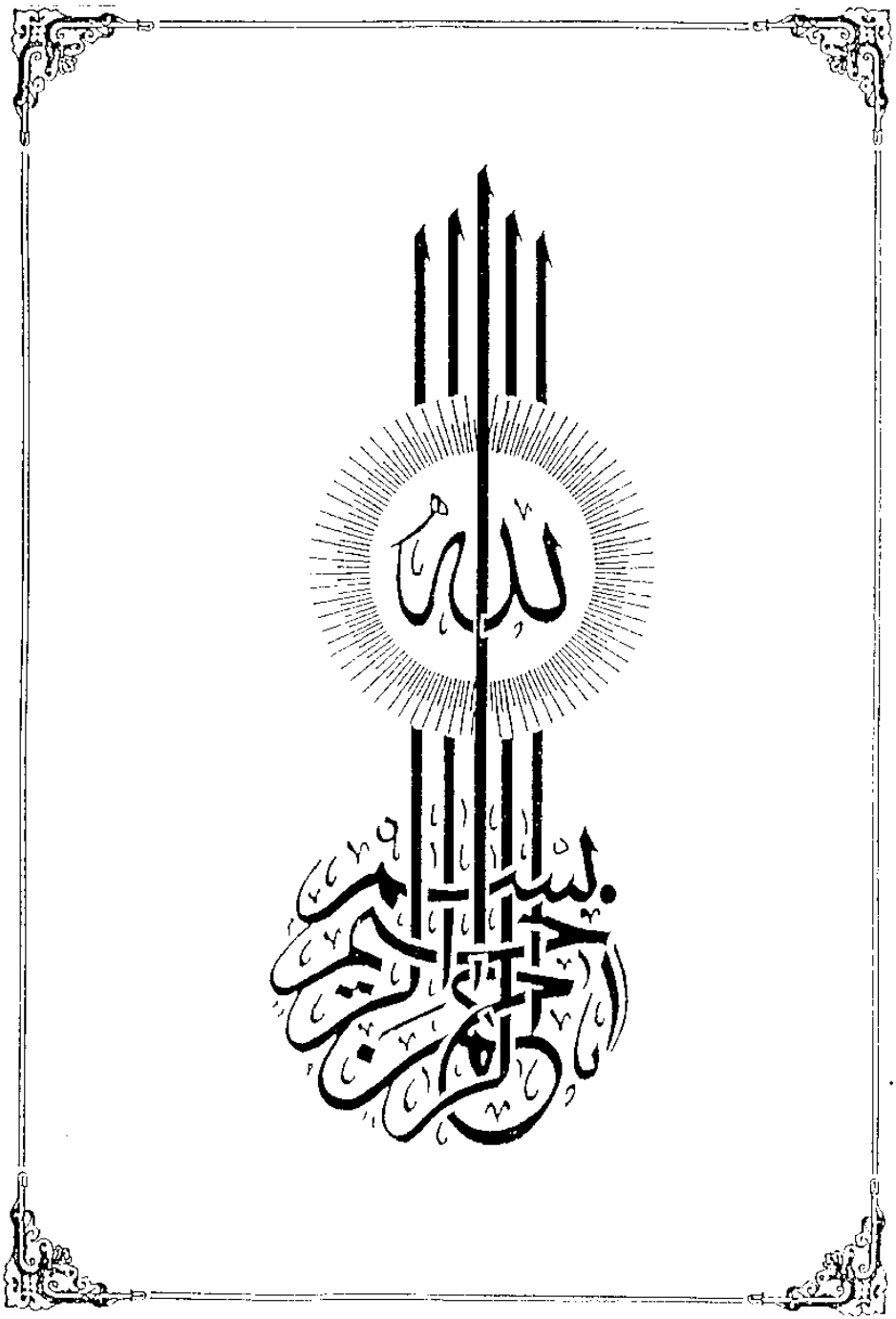

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# INTRODUCTION

# I. INTRODUCTION

Citrus trees represent recently one of the most economically cash crops in Egypt. The cultivated area has rapidly increased and now adays it reached about 198618 feddans revealing yield of approximately 1200507 tons. Throughout the last few years, the citrus wax scale insect, Ceroplastes floridensis (Comstock) became one of the common and serious pests injuring citrus cultivation in Egypt (Swailem et al., 1976). This insect was described by Comstock (1881). It is widely distributed in tropical and subtropical regions around the world. Bodenheimer (1932) at first assumed that, it originated in Florida, however, he postulated later at (1935) that the insect source was somewhere in South-eastern Asia. In Egypt, it was recorded for the first time on orange trees near Alexandria at Kafr El-Dawar, Behera governorate in 1905 (Willcocks, 1922).

The citrus wax scale, Ceroplastes floridensis(Comstock) attack the citrus leaves and green twigs, especially on the outer canopy of the tree, and may cause direct injury by extracting a large amount of sap (Rodoler et al., 1981). However, its main damage is due to the copious production of honey dew, which serves as a substrate for various sooty mould fungi. Severe infestations of citrus may result in culling of the entire crop, reduction of yield and serious injury to the trees.

As to its economic importance, this pest was the object of several studies in Egypt, e.g. Rawhy (1966), Amal, Soliman (1970), Amin (1970), Rawhy et al. (1973), Habib et al. (1974), Swailem et al. (1976) and Ekram, Helmy et al. (1983).

The present investigation aimed to study the following points :

A. The seasonal abundance of the citrus wax scale, Ceroplastes floridensis (Comst.).

B. Response of C. floridensis to certain insecticides under laboratory conditions.

C. Effect of certain insecticides on the population density of C. floridensis under field conditions.

# REVIEW OF LITERATURE

## II. REVIEW OF LITERATURE

### A. The seasonal abundance of the citrus wax scale, Ceroplastes floridensis (Comst.) :

Kawhy (1960) reported that, the citrus wax scale, Ceroplastes floridensis (Comst.) had three overlaping broods in Egypt. The first in spring (March - June), the second in summer (June - September) and the third in autumn (September to December).

Amal, Soliman (1970) stated that, four overlaping broods may be observed in case of Ceroplastes floridensis (Comst.). The first in spring (April - June), the second at the beginning of summer (June - August), the third from the end of summer (August) to the beginning of autumn (October), and the fourth from the beginning of autumn (October) to the beginning of winter (December).

Amin (1970) mentioned that, the citrus wax scale, Ceroplastes floridensis (Comstock) in Egypt had two peaks of seasonal abundance. The highest one was in October and the second in May. Adults and nymphs showed the same trend of abundance.

Habib et al. (1974) studied the seasonal abundance of Ceroplastes floridensis (Comstock) in an orchard of navel orange at Kafr El-Dawar, in the north coastal area of Egypt, and in a mandarin orchard at Barshoum in the

Nile Delta. It was established that Ceroplastes floridensis (Comst.) had two annual generations (May - June and September - October). They started a month earlier in the coastal areas than in the Delta. The coccid was favoured by a humid climate with moderate temperature, and crawlers settle in parts of the canopy exposed to the sun.

Swailem et al. (1976) investigated the population density of citrus wax scale Ceroplastes floridensis (Comstock) on orange groves in seven governorates. They found that the populations density was considerably higher in the two northern Governorates, Alexandria and Beheira, than in Sharkia and Gharbia. However, the insect populations were distinctly low in the southern Governorates of Qalubia, Menofia and Giza. Four peaks of abundance were observed annually during October - December, March - April, May and August - September, respectively. They added that, the populations increased during late summer and autumn and decreased to reach the minimum during winter. The infestation occurred on both leaf surfaces, but mostly on the upper one.

Podoler et al. (1981) studied the population dynamics of the citrus wax scale, Ceroplastes floridensis (Comst.) on citrus in the inner coastal plain of Israel. The pest had two annual generations in the experimental

area. The crawlers and young larvae were found to be the most vulnerable stages in the spring generation, whereas the preovipositing females suffered the highest mortality during the autumn generation. Climatic factors, mainly high temperatures combined with low humidities, were the main lethal factors during the spring generation.

Rosen and Alon (1983) reported that, the females of Ceroplastes floridensis (Comst.) lived for an average of 45 days at 26°C and produced an average of 147 progeny each. The insects tolerated temperatures between 24 and 32°C, but they were very sensitive to low humidity.

B. Response of the scale insects to certain insecticides:

The susceptibility of the scale insects to certain insecticides under laboratory conditions is still in its infancy.

Zidan et al. (1982) studied the effectiveness of certain insecticides against the nymphal stages of the purple scale insect, Lepidosaphes beckii (Newm.). They found that, Dimethoate proved to be the superior toxicant among the tested insecticides followed by Sumithion and Actellic. They added that, the longer the period after treatment, the higher the efficacy of the tested

insecticides and vice-versa. Also, the higher the concentration of insecticides, the higher the mortality obtained against L. beckii and vice-versa.

Mona, Tawfik (1985) tested the susceptibility of adult females having eggs of Parlatoria ziziphus (Lucas) to certain insecticides under laboratory conditions. She reported that the toxicity of the tested insecticides was higher after a long period of treatment. The $LC_{50}$'s changed from 1406.57 after three days in case of Marshal to 993.79 and 435.61 p.p.m. after seven and ten days. However, with Tokuthion the $LC_{50}$'s changed from 1862.09 to 1823.36 and 634.62 p.p.m., while it decreased from 9791.55 to 2793.91 and 61396 p.p.m. in case of Oleosupracide after three, seven and ten days, respectively.

C. Effect of post-treatment temperature and stage of the insects on insecticidal action :

Numerous factors proved significant influences on insecticide toxicity against target insects, i.e. intrinsic and extrinsic factors. Among these factors are the post-treatment temperature and the stage of the insect specificity.

a. Effect of post-treatment temperature :

Many aspects of insect physiology are profoundly