EVALUATION OF THE BIOLOGICAL ACTIVITY OF CERTAIN PLANT EXTRACTS ON THE BLACK CUTWORM *AGROTIS IPSILON* (Hfn.) (NOCTUIDAE, LEPIDOPTERA)

A Thesis

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By

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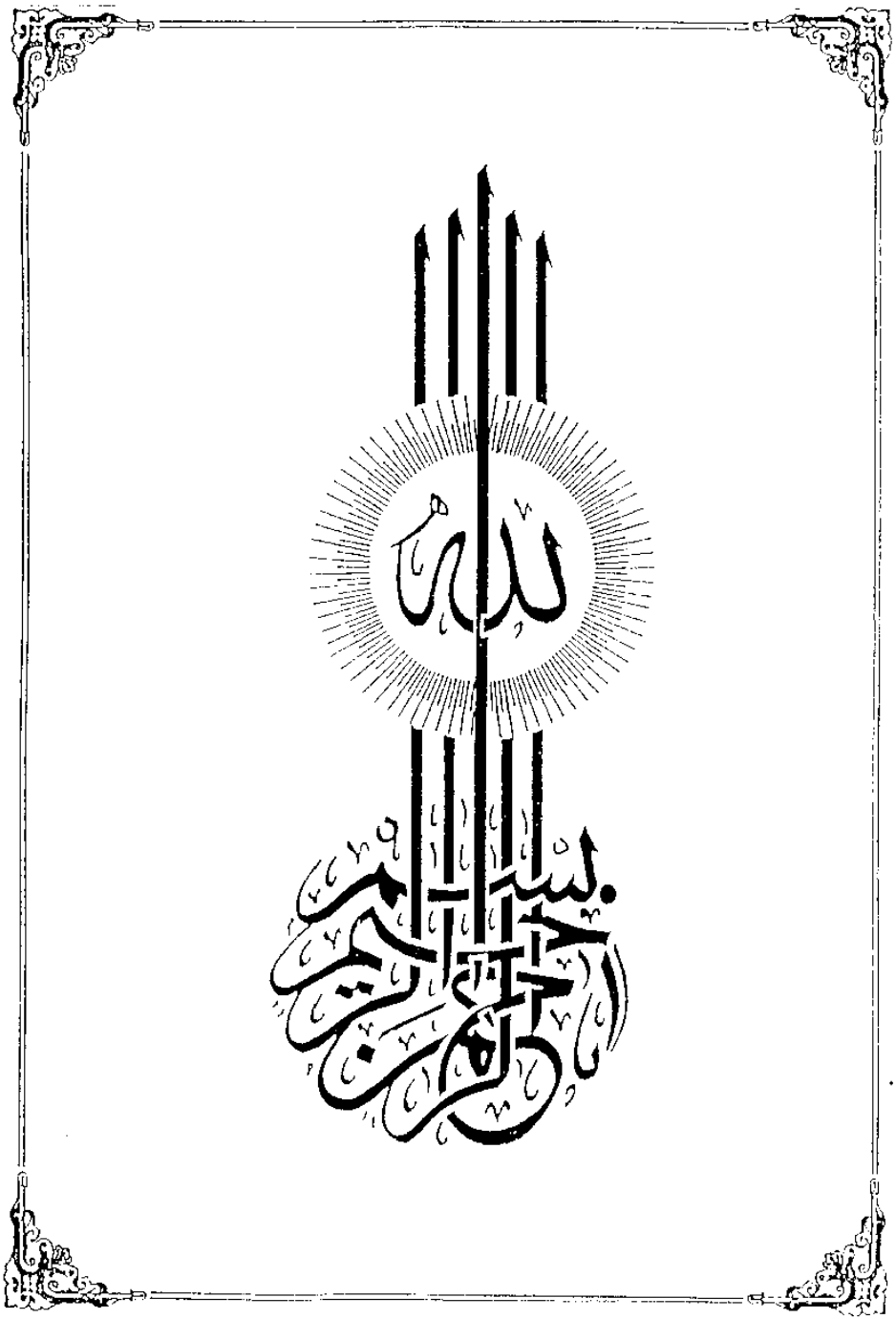

CONTENTS

LIST OF FIGURES

INTRODUCTION

Plant extracts effective against insect pests have been recently recognized as a substitute for chemical insecticides hazardous to man, animals and environment.

In this respect, wild weeds, ornamentals, medicinals and other plants were always considered as a source of such substitutes. Besides safety to the environment, many of these plant chemicals are not effective against predators and parasites which play an important part in integrated pest management. Therefore, the present study was designed to evaluate different extracts of black pepper (***Piper nigrum***) and Hungarian chamomile (***Matricaria chamomil***) against one of the most serious pests in Egypt, the black cut worm, ***Agrotis ipsilon*** which attacks many field crops and vegetables causing serious damage to the seedling.

Aim of the present work:

The present study aimed at revealing the following points:

1- Effect of black pepper and Hungarian chamomile on: egg viability, larval-pupal duration, mortality and weight of larvae.

2- The relative efficacy of five solvents of different polarities namely, petroleum ether, chloroform, acetone, alcohol and water used for extraction.

3- The major chemical components of the plant extracts as determined by colourimetric analysis.

REVIEW OF LITERATURE

I. Insecticidal Activity of Naturally Occurring Plant Extracts:

Hartzell *et al.* (1943), found that extracts of black pepper, ***Piper nigrum*** (L.) were highly toxic to rice weevil, ***Sitophilus oryzae*** (L.) when applied on the surface of wheat grains.

Atwal and Pajni (1964), bioassayed each of 10% alcohol, petroleum ether and water extracts of ***Melia azedarach*** against larvae of ***Pieris brassica*** L. The data showed that water (5.26%) and petroleum ether (3.82%) do not contain appreciable insecticidal fraction. However, alcohol extracts gave (78.3%) mortality of larvae within 40 hrs.

Gayer and Shazly (1968), tested the acetone extracts toxicity of the whole plant of ***Cichorium pumilum*** Jacq., disk flower of ***Matricaria chamomilla*** (L.), seeds of ***Nigella*** sp. and seeds of ***Datura stramonium*** to larvae of ***Culex pipiens***. LC_{50} values of these plant extracts were 45.31±1.04, 28.84±1.36, 105.3±1.09 and 182.0±1.03 ppm, respectively.

Granich *et al.* (1974), found that the ***Gymnena sylvester*** which contains gymnemic acid and the triterpene saponins in leaves acts as feeding deterrent of the larvae of ***Spodoptera eridania***.

Hosozawa *et al.* (1974), bioassayed the chemical resistant factors in plants against ***Spodoptera litura*** (Fab.) larvae. Antifeeding diterpenes were found in 13 species of plants belonging to family Verbenaceae.

Russell *et al.* (1976), reported that dry leaves powder of ***Libocedrus bidwillii*** were toxic to larvae of ***Musca domestica*** L. The most active toxin is the bignan B-peltatin-A-methyl ether and a concentration of 100 ppm added to the diet caused 98% mortality.

Naraia and Satapathy (1977), reported that leaves, stem and root extracts from ***Vinca rosea*** showed antifungal activity against ***Helminthosporium nodulosum, Sclerotium rofsii, Pestalotia*** sp., ***Fusarium oxysporum, Calletrichum*** sp. and ***Aspergillus niger***. The leaves extract was generally the most effective one.

Ahmed *et al.* (1978), bioassayed the acetone extract of ***Melia azedarach, Aegla marmilos, Artemisia arborea, Clerodenderon splendens*** and ***C. inerma*** for the antifeeding properties against ***Spodoptera littoralis*** (Boisd.) larvae in comparison with Du-Ter and Plictran. The five extracts gave significant feeding deterrence especially, ***C. inerma*** which was constantly good deterrent to the 3***rd*** and older instars. Also, the best solvent was ethanol for ***C. inerma*** and benzene for ***C. splendens***.

Su (1978), studied acetone extracts of 3 known varieties and one unidentified variety of black pepper ***Piper nigrum*** L. for their toxicity to adults of 3 species of stored-product insects. Indian malaber extracts had highest oral and contact activity to ***Sitophilus oryzae*** (L.) and the highest contact toxicity to ***Callosobruchus maculatus*** (F.) and ***Lasioderma serricone*** (F.).

Teotia and Tewari (1978), tested the contact and residual toxicity of films of ether and petroleum ether extracts of drupes and dharak, ***Melia azedarach*** and rhizomes of sweet flag, ***Acorus calamus*** to adults of ***Sitotroga cerealella*** (Oliv.), malathion was used for comparison. Malathion was the most toxic followed by dharak petroleum ether extract, sweet flat petroleum ether extract, dharak ether extracts and sweet flat ether extract in last order. The previous plant extracts were 0.001873, 0.001842 and 0.001776 times as toxic as malathion, respectively.