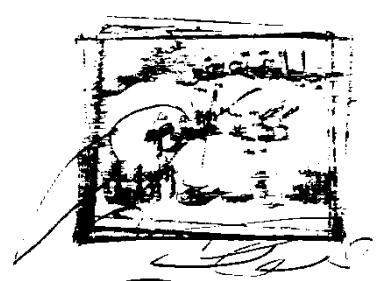
SOME BIOCHEMICAL CHANGES IN THE LARVA OF THE PINK BOLLWORM PECTINOPHORA GOSSYPIELLA SAUNDERS IN DIAPAUSE AND DURING TERMINATION OF DIAPAUSE

A THESIS

Presented to the Faculty of Science
Ain Shams University
For the Award of the
M. Sc. Degree



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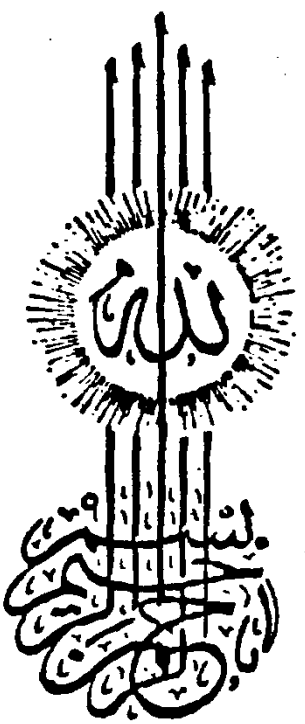
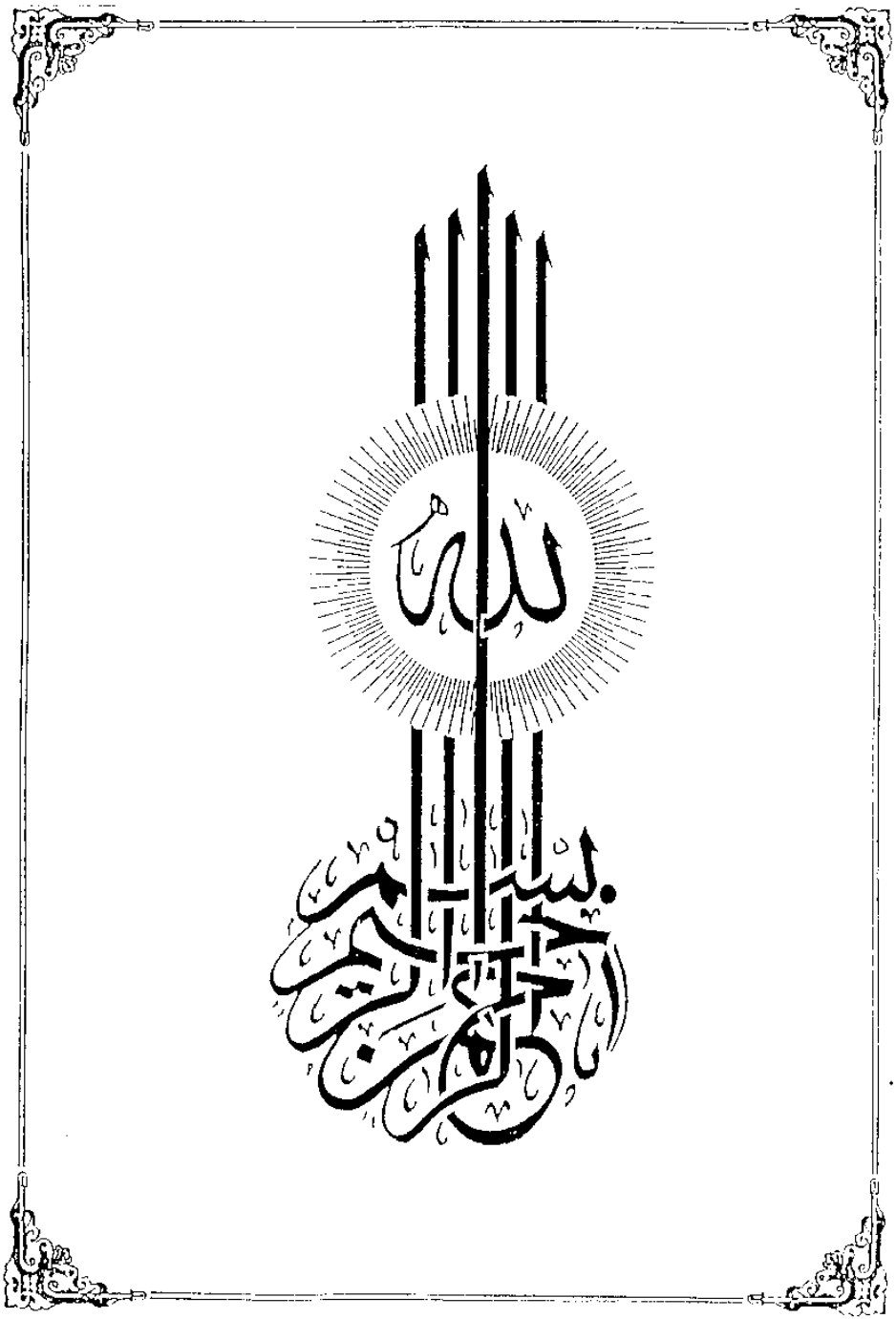


وَقُلِ اعْمَلُوا فَسَيَرَى اللَّهُ عَمَلَكُمْ وَرَسُولُهُ وَالْمُؤْمِنُونَ

صَدَقَ اللَّهُ الْعَظِيمُ



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ABBREVIATIONS.

In the present work the following abbreviations were used:

A = active phase of larvae of Pectinophora gossypiella

Bis = N-N' methylene bis acrylamide.

COBB = coomassie brilliant blue stain.

D_1 = early diapause phase of Pectinophora gossypiella larvae 40 days old.

D2 = late diapause phase of Pectinophora gossypiella larvae 80 days old.

Dist. = distilled.

FAA = free amino acids.

FB = fat body.

H = haemolymph.

JH = juvenile hormone.

MW = molecular weight.

PAS = periodic acid Schiff's stain.

R_f = relative mobility.

SBB = Sudan black B stain.

SDS = sodium dodecyl sulphate.

T_2 = Pectinophora gossypiella larvae at the second day during diapause termination at 34°C.

T_4 = Pectinophora gossypiella larvae at the fourth day during diapause termination at 34°C.

T_6 = Pectinophora gossypiella larvae at the sixth day during diapause termination at 34°C.

T_8 = Pectinophora gossypiella larvae at the eighth day during diapause termination at 34°C.

T_{10}= Pectinophora gossypiella larvae at the tenth day during diapause termination at 34°C.

T_{12}= Pectinophora gossypiella larvae at the twelveth day during diapause termination at 34°C.

T_{14}= Pectinophora gossypiella larvae at the fourteenth day during diapause termination at 34°C.

TCA = trichloroacetic acid.

TEMED = N,N,N',N'-tetramethylene diamine.

TRIS = Tris (hydroxymethyl) amino methane.

CONTENTS

Page

I – INTRODUCTION

I. INTRODUCTION

The pink bollworm Pectinophora gossypiella Saunders, is one of the most destructive world wide distributed pests. It has been introduced into Egypt between 1903-1910 from India (Willcocks, 1916). In 1913 this pest spread to such a degree that it became a real menace to the cotton crop in Egypt. This pest is characterized by a facultative diapause in the last fourth instar larva that is passed usually inside double seeds of cotton. Such diapause larvae represent a very serious source of infestation to the new cotton crop.

The biochemical changes that take place during induction, maintenance and termination of diapause of the pink boll worm have not yet been satisfactorily studied. A promising approach to the understanding of the problem of diapause may be achieved from studying changes of biochemical compounds like simple and conjugated proteins, amino acids, inorganic ions ....etc. Knowledge of these chemical fractions are fundamental in determining metabolic weak points through which the sequence of the physiological events leading to induction,maintenance and termination of diapause may be upset. This might inhibit, minimize or terminate diapause which is a final glorious target.

Most of the available information on changes of chemical constituents during periods of arrested development was obtained from extracts of whole body. Few data, however, are available on either separate haemolymph or fat body fraction.

Aim of the present work

In the present work the haemolymph and fat body of the fourth instar larvae of P. gossypiella were analysed for estimating total proteins, glycoproteins, lipoproteins, free amino acids and the inorganic elements Na^{+}, K^{+}, Ca^{++} and Mg^{++}. Larvae used represented the mature active non-diapause phase, an early and late age of the diapause phase and at seven intervals during termination of diapause. Results on these 10 phases of the larvae were compared together in an attempt to clarify the characteristic changes of the above mentioned biochemical compounds during induction, maintenance and termination of diapause.