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شبكة المعلومات الجامعية

بسم الله الرحمن الرحيم



سامية محمد مصطفى



شبكة المعلومات الجامعية



شبكة المعلومات الجامعية التوثيق الالكتروني والميكروفيلم



سامية محمد مصطفى



شبكة المعلومات الجامعية

جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها
علي هذه الأقراص المدمجة قد أعدت دون أية تغيرات



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تحفظ هذه الأقراص المدمجة بعيدا عن الغبار



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بعض الوثائق الأصلية تالفة



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بالرسالة صفحات لم ترد بالأصل





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بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

﴿قَالَ رَبِّ أَسْرِحْ لِي صَدْرِي وَيَسِّرْ لِي أَمْرِي﴾

﴿وَأَحْلِلْ عُقْرَةً مِنْ لِسَانِي يَفْقَهُوا قَوْلِي﴾

”صدق الله العظيم“

سورة طه آية ٢٥-٢٨

**STUDIES ON ROCKY SHORE MOLLUSCS AS BIOLOGICAL
INDICATORS FOR POLLUTION IN THE COASTAL AREAS
OF ALEXANDRIA**

A Thesis

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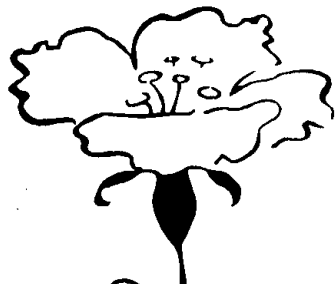
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To my Parents

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CONTENTS

	<i>Page</i>
I. Introduction.	1
II. Material and Methods.	17
III. Results.	
Surveillance study	26
Community structure and seasonal studies of rocky shore molluscs	56
Metal analysis	59
Anatomy of the digestive gland of <i>Mytilus minimus</i>	63
Histological structure of the digestive gland of <i>Mytilus minimus</i> .	64
Electron microscopical studies	69
IV. Discussion	78
V. Summary	108
VI. References	
Tables	
Plates & Figures	
Arabic Summary	

Introduction

INTRODUCTION

Molluscs represent one of the greatest phyla of invertebrate animals. They are among the most abundant of all animals. In the number of species, Mollusca is the second phylum to the Arthropoda (Kotpal, 1979). The plane of the molluscan body has proved to be sufficiently flexible to permit the development of a great variety of types (Gardiner, 1972).

Molluscs have been a dominant group of animals ever since their origin in the Cambrian period over 500 million years ago. Beside the 110,000 existing species, there are over 35,000 fossil molluscs.

Molluscs have successfully adapted to fresh and marine water as well as the terrestrial environment (Webber and Thurman, 1991). There is scarcely any portion of the coastline of the world without molluscan life, except in regions of extreme cold (Kotpal, 1979).

Molluscs, as a whole, constitute an attractive field for biologists. The reason for this choice is that they are of economic importance, since they constitute an important sources of human

food, especially for the population inhabits the sea-shores (Kotpal, 1979). In addition, some molluscs play an important part in the transmission of diseases as the intermediate hosts of parasites (Harmer and Shipley, 1913). They are also considered as valuable indicators of pollution in coastal marine environment and estuaries (for reviews, see Bayne, 1978; Phillips, 1980).

Marine molluscs including rocky shore have been found to be highly responsive indicator species in investigation of pollutant toxicology (Bayne et al., 1979; Moore et al., 1982).

However, the problem of heavy metal pollution is one of the most important problems and it has gained worldwide attention in recent decades (Förstner and Wittman, 1979; Phillips, 1980; Gerlach, 1981; Soria and Theede; 1990).

The World Health Organization (WHO) defined pollution of the marine environment as the introduction by man, directly or indirectly, of substances or energy into the marine environment, including estuaries. It results or is likely to result in such deleterious effects as harm to living resources and marine life, hazards to human health, hindrance to marine activities including fishing and other legitimate uses of the sea, impairment of quality for use of sea water and reduction of amenities (Webber and Thurman, 1991).