

REPTILIAN COMMUNITIES OF HABITAT ISLANDS IN THE WESTERN DESERT OF EGYPT

A THESIS

Submitted in partial fulfillment of the
requirements for the Master Degree of Science
(in Zoology)

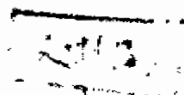


598.112
M.A.

630 71

BY

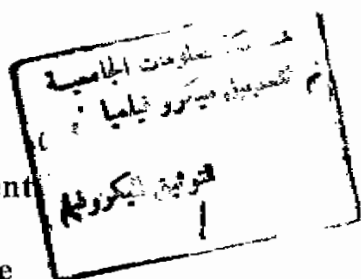
MOHAMED AHMED NOUR EL DIN
B.Sc.(1990)



Zoology Department

Faculty of Science

Ain Shams University



1997



APPROVAL SHEET

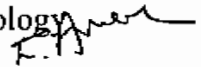
Name: MOHAMED AH .MED NOUR ELDIN AH .MED

Title: REPTILIAN COMMUNITIES OF HABITAT
ISLANDS IN THE WESTERN DESERT OF EGYPT

SUPERVISORS

Prof. Dr. FAWZY IBRAHIM AMER

Emeritus Professor of Vertebrates and Embrology
Department of Zoology
Faculty of Science - Ain Shams University



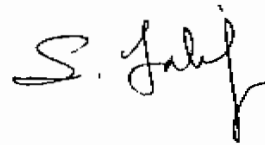
Prof. Dr. MOSTAFA ABBAS SALEH

Professor of Zoology
Department of Zoology
Faculty of Science - Al-Azhar University

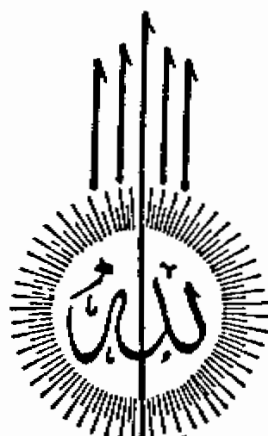


Dr. SAMY ABDAL LATIF SABER

Assistant Professor of Ecology
Department of Zoology
Faculty of Science - Al-Azhar University



Head of Zoology Department
Prof. Dr. Abdallah M. Ibrahim



بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

قَالُوا سُبْحَانَكَ لَا عِلْمَ لَنَا إِلَّا مَا
عَلَّمْتَنَا إِنَّكَ أَنْتَ الْعَلِيمُ الْحَكِيمُ

سُورَةُ الْبَقَرَةِ - آيَةُ ٢٢



TO

**My Father
&
My Mother**



ABSTRACT

In this study, the theory of island biogeography was applied on the reptilian communities inhabiting patches of scattered habitats representing typical habitat islands in the Western Desert of Egypt. These habitat islands vary in area, topographic features and structural diversity, vegetation structure and distance from sources of faunal exchange. According to this theory a number of variables play key roles in determining the number of species inhabiting these habitat islands. Thirteen sites were studied; these include three larger sites of high structural diversity (Wadi El-Natrun, Wadi El-Raiyan and El-Maghra), eight isolated groves of *Acacia raddiana*, and two small patches of desert shrub vegetation. Areas, topographic features and structural diversity, soil type, vegetation cover structure density and type, general climatic conditions and degree of isolation of each island were investigated. A variety of collection techniques were employed to collect all reptilian species inhabiting each habitat island. The results showed that the number of reptilian species of a habitat island is directly proportional to its area. The relationship between log area and log number of reptilian species was positively and strongly correlated ($p < 0.001$). Positive correlation between structural diversity and number of reptilian species was found. This relationship, however, was not significant ($p > 0.05$). Similarly, the relationship between the number of

reptilian species and number of plant species was positive but not significant ($p>0.05$). However, the relationship between the number of reptilian species and percentage vegetation cover was positive and very highly significant ($p<0.001$). On the other hand, the relationship between the number of reptilian species and distance from sources of faunal exchange was negatively correlated and very highly significant ($p<0.001$). The nearest habitat islands to sources of faunal exchange have larger number of reptilian species. To study the effect of isolation on populations of reptilian species standard morphometric measurements of *Acanthodactylus scutellatus* collected from three habitat islands were examined. The results showed that the populations of these lizards appear to have undergone significant morphological differentiation as a result of their long isolation. But a larger sample number and more extensive study is still needed to reach a more definitive conclusion regarding the subspecies status of the three populations. It may be concluded that the theory of island biogeography seems to be valid when applied to reptilian communities of the desert habitat islands covered in this study.

Key words : Acacia groves, Egypt, Geographic isolation, Habitat islands, Island biogeography, Reptilian communities, Western Desert.

ACKNOWLEDGMENTS

I would like to express my sincere thanks and deep appreciation to Prof. Dr. Fawzy Ibrahim Amer, Emeritus Professor of Vertebrates and Embrology, Zoology Department, Faculty of Science, Ain Shams University for his supervising this thesis, his valuable advice throughout the work, for his support, and for critical reading the final manuscript.

My deepest gratitude and sincere thanks are also due to Prof. Dr. Mostafa Abbas Saleh, Prof. of Zoology, Zoology Department, Faculty of Science, Al-Azhar University for suggesting the topic of investigation, supervising the work, providing field facilities and equipments, and transportation and over-seeing preparation of the manuscript.

Thanks are also due to Dr. Samy Abdel-Latif Saber, Assistant Professor, Zoology Department, Faculty of Science, Al-Azhar University for supervising the work and valuable advice.

Thanks are also due to Prof. Dr. Abdalla Ibrahim, head of Zoology Department, Faculty of Science, Ain Shams University for his interest in the work and continuous encouragement.

I would also like to express my deepest thanks to the staff members of the Zoology Department, Faculty of Science, Ain Shams and Al-Azhar Universities for their continuous support. Special thanks are also due to my family for their enthusiasm and encouragement.

CONTENTS

	Page
LIST OF TABLES	I
LIST OF FIGURES	III
LIST OF ABBREVIATIONS	VIII
INTRODUCTION.....	1
REVIEW OF LITERATURE.....	3
MATERIALS AND METHODS.....	36
I. The Study Sites.....	36
II. Ecology of the sites.,.....	38
III. Statistical analysis.....	42
RESULTS AND DISCUSSION.....	45
I. The Study Area.....	45
1. Wadi El-Natrun	
a. Topography and Structural diversity of Wadi El-Natrun.....	47
b. Climate of Wadi El-Natrun.....	52
c. Vegetation cover of Wadi El-Natrun.....	54
2. Wadi El-Raiyan	
a. Topography and Structural diversity of Wadi El-Raiyan.....	57
b. Climate of Wadi El-Raiyan.....	60
c. Vegetation cover of Wadi El-Raiyan.....	61
3. Maghra	
a. Topography and Structural diversity of Maghra.....	69
b. Climate of Maghra.....	71
c. Vegetation cover of Maghra.....	71
4. Medawar El-Beghal	

a. Topography and Structural diversity of Medawar El-Beghal.....	76
b. Climate of Medawar El-Beghal.....	76
c. Vegetation cover of Medawar El-Beghal.....	78
5. Acacia Groves	
a. Topography and Structural diversity of Acacia Groves	79
(i) Acacia Groves of Hatiyat El-Sunt (3 sites).....	81
(ii) Acacia Groves of Hatiyat Ghard El-Rammak (4 sites).....	82
b. Climate of Acacia Groves.....	86
c. Vegetation cover of Acacia Groves.....	90
II. Herpetofauna of The Study Area.....	93
Faunal structure and Zoogeographical Affinities.....	102
Ecological Affinities.....	105
III. Application of The Theory of Island Biogeography.....	121
1- Number of species and Area	121
Faunal Composition of Habitat Islands related to area.....	131
2- Number of species and Structural diversity.....	134
The number of species and Vegetation.....	144
3- Number of species and Distance from source of fauna (Isolation Factor).....	148
Effect of Isolation on Habitat Islands Populations.....	157
SUMMARY.....	164
BIBLIOGRAPHY.....	171
ARABIC SUMMARY	