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STUDIES ON THE FOSSIL MANGROVES OF THE WESTERN DESERT OF EGYPT

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إِنَّ فِي خَلْقِ السَّمَوَاتِ وَالْأَرْضِ وَاختِلَافِ اللَّيْلِ وَالنَّهَارِ
قَالَ تَعَالَى: وَاختِلَافِ اللَّيْلِ وَالنَّهَارِ

لآيَاتٍ لِّأُولِي الْأَلْبَابِ ﴿١٩٠﴾

صدق الله العظيم

[آل عمران].

This thesis entitled:

Studies on the fossil mangroves of the Western Desert of Egypt

Written by: Hussien Abd El- Rhman Bkhat

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The final copy of this thesis has been examined by the signatories, and we find that both the content and the form meet acceptable presentation standards of scholarly work in the above mentioned discipline.

To My Mother and Father

*I can't repay the lessons that you taught when I was
small. Or give you gift for gift the daily treasures I
recall... I can't return encouragement and loving words of
praise. In quite the way you did for me through all my
childhood days. But there is one gift that I can give; it's
all the love you've earned.*

For love is what you always taught...

And love is what I learned.

Hussien Abd El- Rhman Bkhat

I hereby declare that the work contained in this thesis, now submitted for the degree of Doctorate of the Philosophy of Science (Botany) to Ain Shams University, is the result of my own investigations.

_____Candidate (Hussien Bkhat)

_____Supervisor (Prof. Wagieh El- Saadawi)

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_____Supervisor (Dr. Marwa El-Faramawi)

I hereby certify that the work embodied in this thesis has not already been accepted in substance for any degree, and is not currently being submitted for any other degree.

_____Candidate (Hussien Bkhat)

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ABSTRACT

The present study was carried at areas situated throughout the epochs: Cretaceous, Eocene and Oligocene of Western Desert of Egypt. These areas are Bahariya Oasis, Wadi El-Hitan and Gebel Qatrani respectively.

The floral diversity and ecological characteristics of mangrove plant fossils suggest the existence of mangroves correlated with the climate change and the fluctuation of the sea-shore line from the Cretaceous (Bahariya) to the Oligocene (Gebel Qatrani). The fossils of mangrove plants are compared to modern mangrove species.

A re-examination of fossil evidence of *Avicennia*, *Nypa*, *Rhizophora* and *Osmunda* reveals that the modern mangrove flora was pantropic by the Eocene in Wadi El-Hitan, and appears to have originated during Cretaceous times. The associated invertebrates, especially mollusks and foraminifera, further support the assertion that a modern mangrove ecosystem was established only during the earliest Eocene times in Wadi El-Hitan.

INTRODUCTION

In a broad sense, the term "mangrove" often refers to both the plants and the forest community. Thus, in order to avoid confusion (Macnae, 1968) suggested a new term; "Mangal" that should refer to the forest community while in his opinion "mangrove" should refer to the individual plant species.

And in an attempt for a further definition (Duke, 1992) defined a mangrove as, "...a tree, shrub, palm or ground fern, generally exceeding half a meter in height, and which normally grows above mean sea level in the intertidal zone of marine coastal environments, or estuarine margins." while according to (Blasco *et al.*, 1996) the term is considered an ecological term that refers to a taxonomically diverse assemblage of trees and shrubs that form the dominant plant communities in tidal, saline wetlands along sheltered tropical and subtropical coasts.

Chapman (1976) mentioned that looking for the origin of the word itself revealed that the term "mangrove" is also used as an adjective, as in "mangrove tree" or "mangrove fauna." Mangrove forests are sometimes called "tidal forests", "coastal woodlands", or "oceanic rain forests." And that the word "mangrove" is usually considered a compound of the Portuguese word "mangue" meaning "man made" and the English word "grove" meaning "garden". Hence mangrove would mean "man made garden".