STUDIES ON EPILITHIC ALGAE IN SAINT CATHERINE REGION AND WADI FEIRAN

THESIS

Submitted in partial fulfilment of the Requirement of
M.Sc. Degree in Botany (Microbiology)

PRESENTED BY

ADEL FAHMY HAMED ALY
B.Sc. (HONS.)
(1983)

Ain Shams University
Faculty of Science
Botany Department

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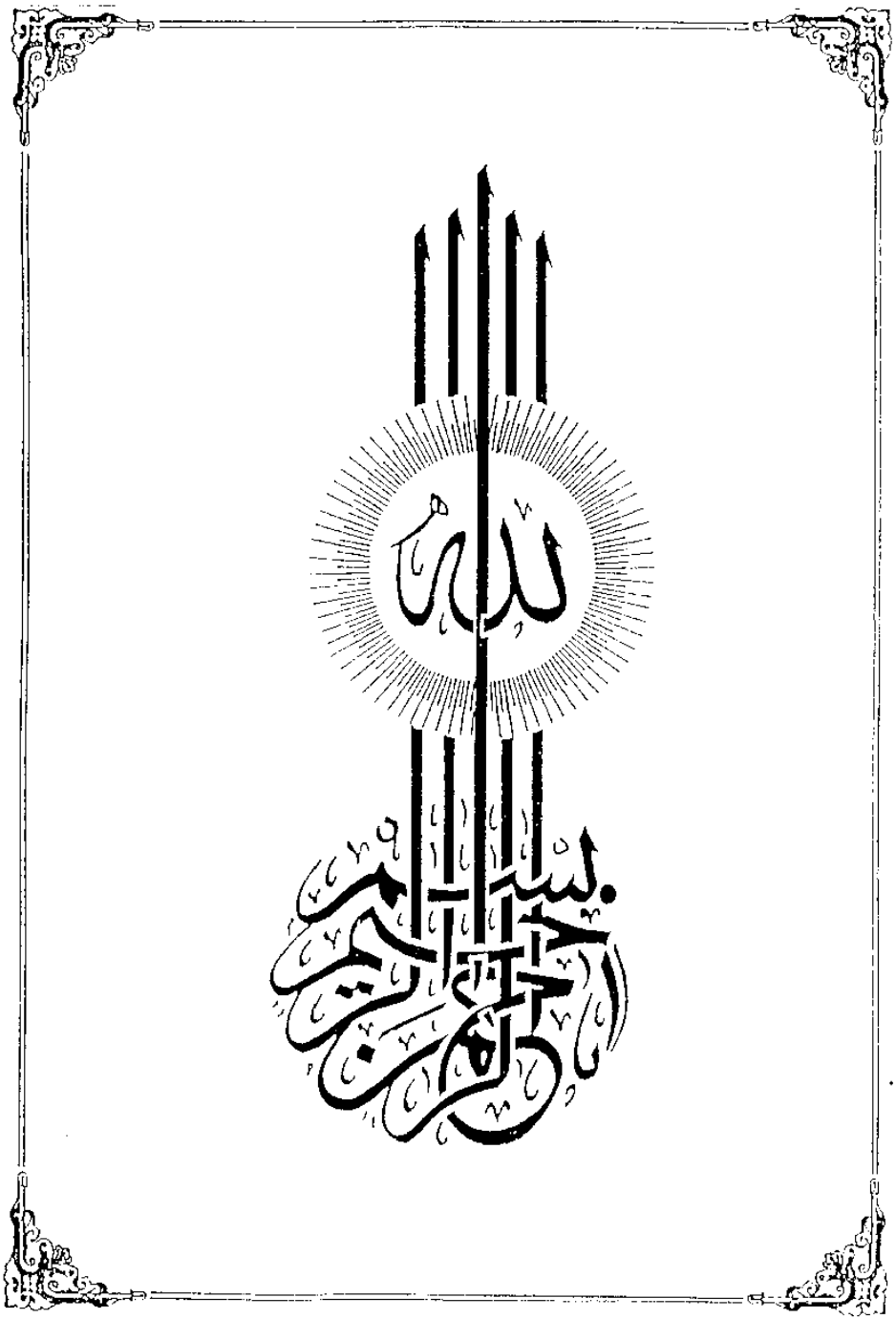

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Name: *ADEL FAHMY HAMED ALY*

Title: *Studies on epilithic algae in Saint Catherine region and Wadi Feiran.*

This thesis has been approved by

1. *Professor Doctor: ABD EL-SALAM SHAABAN* ____

2. *Doctor: AHMED ABD EL-RAHMAN EL-AWAMRI* ____

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This thesis has not been submitted for a degree at this or at any other university. The literature cited shows how far I have availed myself of the work of the others.

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THE THEORITICAL CURRICULA FOR THE DEGREE

The student in addition to this thesis had attended lectures dealing with the branches stated here-after. He passed successefully the examination as well. These courses are:

- *Bacteriology*
- *Mycology*
- *Virology*
- *Hydrobiology*
- *Physiology*

Head of Botany Department

A.S. AL-NOWAIHI

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INTRODUCTION

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"INTRODUCTION"

The term epilithon has been used occasionally to distinguish living associations on the surface of exposed rock on land, especially in mountainous regions, on rocks in flowing and stagnant water, and on rocks along tidal coasts (Gullerbach and Shtina, 1969; Moor, 1979 and 1980 a,b; Broady, 1981; Round, 1981).

Treub (1888), Polinov (1945) and Marathe and Chaudhari (1975) observed that blue green algae and not bacteria were first colonizers over the surface of barren rocks. Such algae promote the corrosion of the rocky substratum (Shields and Durell, 1964). The corroding action of these algae is very slow and gradually results in the formation of a very thin layer of soil, and after a sufficient layer of soil is accumulated other plant communities may appear (Harrison and Aiyer, 1913; Booth, 1941; Tauson, 1948; Marathe and Chaudhari, 1975 and Friedmann and Ocampo 1976).

As regards to study Sinai Peninsula ecosystem, scientits interested to carry out different researches. A lot of them has been done dealing with geology, geomorphology, geography and ecology (Hume, 1904, 1906 and 1929; Ball, 1916; Beadnell, 1927; Awad, 1949, 1951 and 1952; Migahid et al., 1959; Ghallab, 1960; Shata, 1960; Zohary, 1972; Danin, 1973 and 1983; Mobasher and Tawfiq, 1977; Almagor and Hall, 1978; Harga et al., 1979; Batanouny, 1981; Girgis and Ahmad, 1984; Zalat, 1984; Mostafa , 1986).

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Botanical studies on Sinai have almost invariably dealt with higher plants, mosses and lichens (Zohary, 1935; Hassib, 1951; Zohary and Orshansky, 1956; Migahid et al., 1959; Aloni and Orshan, 1972; Halevy and Orshan, 1972; Imam and Ghabbour, 1972; Margalith and Garty, 1972; Orshan et al., 1972; Halevy and Orshan, 1973; Danin, 1974, 1976, 1977 and 1978 a,b; Winter and Troughton, 1978; Girgis et al. 1980; Batanouny, 1981; Girgis and Ahmad, 1984; Abou Salama, 1985 and Mostafa, 1986).

The early references dealing with enumeration of fresh-water algae of Sinai were restricted to certain algologists working on random samples (Hume, 1906; El-Nayal 1935; 1936; & Hustedt, 1949).

Hume, (1906) listed 85 algal taxa from which 58 taxa belonging to diatoms, 24 taxa related to green algae whereas, blue green algae represented only by 3 species. However, El-Nayal (1935, 1936) described the March's algal vegetations of wadis Gharandel, Teba and Feiran and provided accounts of their distribution. He stated that these vegetations composed mainly of blue-green algae (16 taxa) together with 5 taxa of green algae and one belonging to euglenoids.

As regard to diatoms of Sinai Peninsula, Hustedt, (1949) concluded that, most of diatoms recorded in Wadi Tarfa, Wadi Isla, Wadi Tiema, Wadi Gharandel, Wadi Ras-Abu Zeniema and Wadi Aleyat (149 forms related to 122 species belonging to 28

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genera) were cosmopolitants. Tropics represented only by 13 taxa and halophytics (halophilous) formed 22% of total diatoms.

Concerning the recent studies on algae of Sinai Peninsula, Ehrlich, (1975) indicated that the diatom assemblage of surface sediment of the highly saline Bardawil Lagoon has a marine euryhaline-haloeuryhaline character. She concluded also that the very rare fresh water taxa recorded in the lagoon were mainly have allochthonous origin.

The occurance of cyanobacterial bloom in the hypolimnion zone of Solar Lake (northeast Sinai) was explained by the facultative anoxygenic photosynthesis of **Oscillatoria limnetica.** Furthermore, primary production is extremely high during stratification period, and mainly produced in the metalimnion and hypolimnion zones (Cohen et al., 1977a). The distribution, zonation, stratification and taxonomic diversity of microbial and algal populations of this lake and certain coastal brine pools of Sinai Peninsula have been received a high attention and have emphasized by various workers (Cohen et al., 1977b; Krumbein et al., 1977; Ehrlich, 1978; Jorgensen et al., 1979; Potts, 1980; Walsby et al., 1983; Jorgensen et al.,1983 and Jorgensen et al., 1986).

As regards the algal associations in mangroves (Por et al., 1977) and their role in nitrogen input of these mangal, Potts,(1979) concluded that the high rates of acetylene reduction were associated with communities of heterocystous and non-heterocystous blue-

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green algae, which were widespread and abundant in coastal mangrove forests of the Sinai Peninsula.

Concerning the geographical feature, Sinai Peninsula comprises of two zones. The first is desert, which occupies the northern part and the second which occupies southern region formed a complex of high mountains dissected by deep wadis draining to Suez Gulf or to the Agaba Gulf. (Said, 1962; El-Shafey, 1975& Kassim, 1983). The latter author also pointed out that, the beds of wadis are mainly covered with alluvial granite deposites resulted from the disintegration of the surrounding pre-cambrian mountains, and that the main supplies of water in these wadis are rainfall and storms of snow.

From the previous review, it is apparent that little has been published till now on fresh water algae of Sinai. Most of the available studies dealing with random collections.

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AIM OF THE WORK

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The objective of this work is thus to study the species composition, occurrence, distribution and periodicity of epilithic algae inhabite the highest mountainous region in Sinai Peninsula.

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