STUDIES IN THE BRYOFLORA OF THE NILE DELTA

A THESIS

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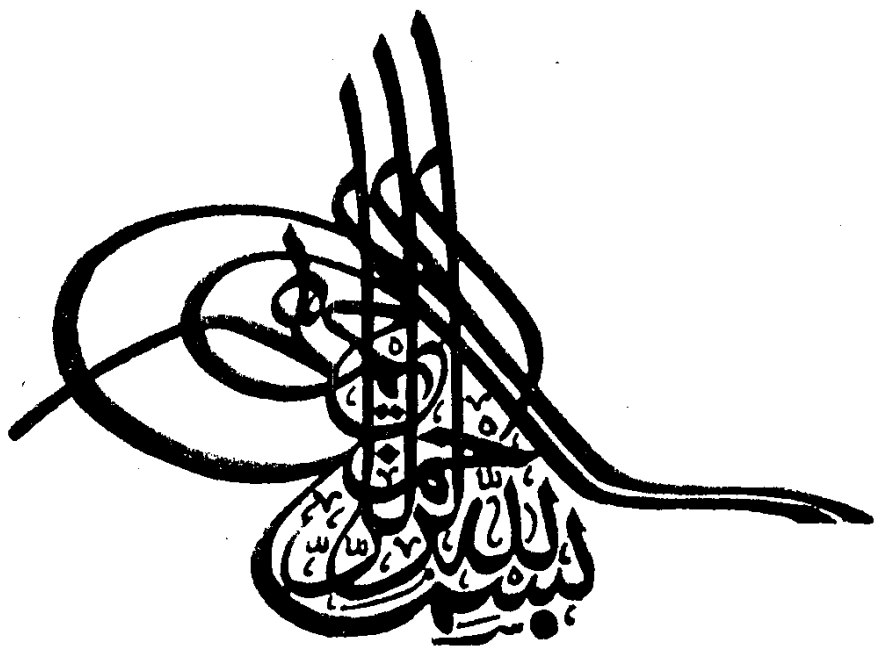
By

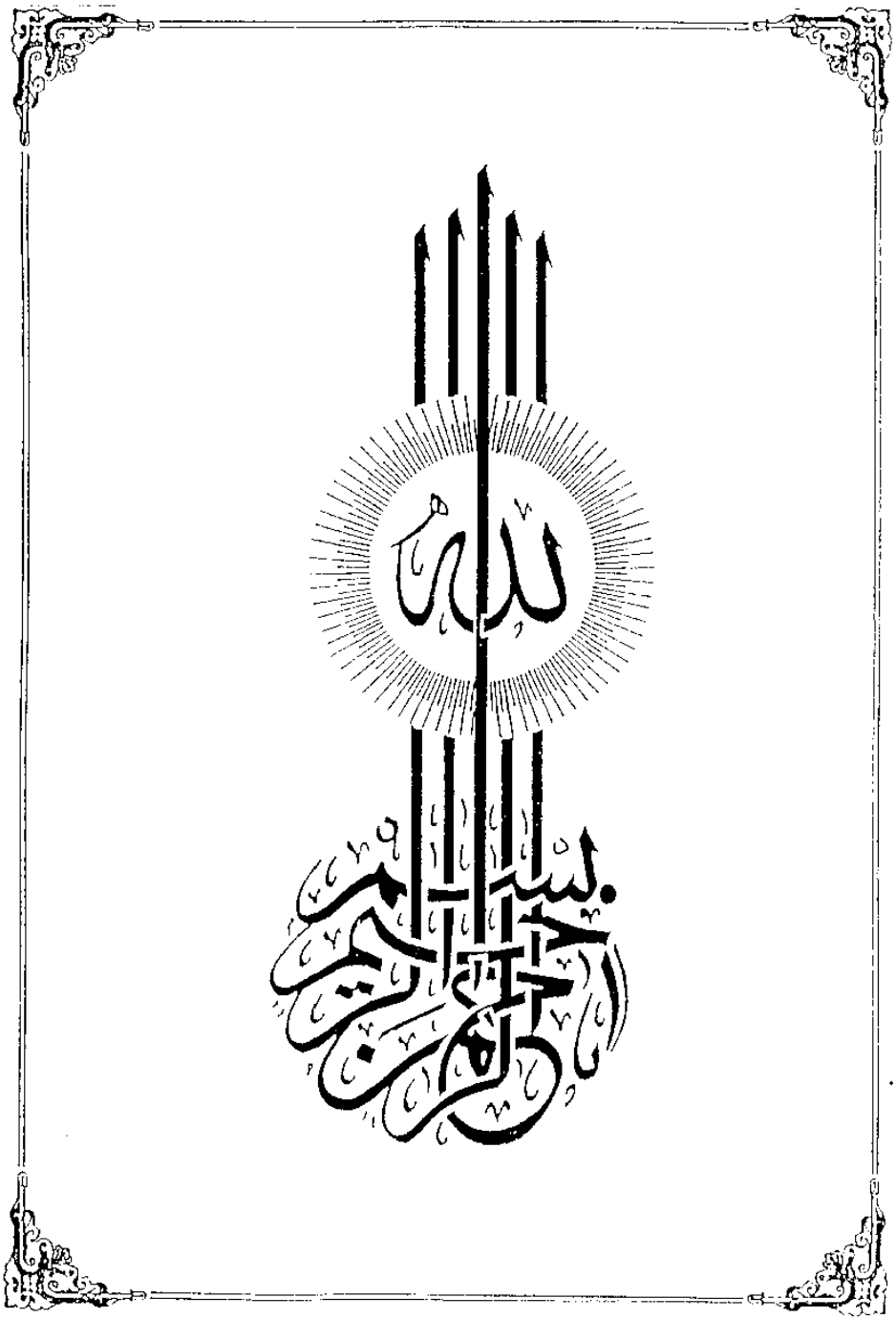
MAHMOUD SAMY MOHAMED REFAI

B. Sc. Ain Shams University, 1977

Department of Botany
Faculty of Science
Ain Shams University

1985





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Signature

Mahmoud Samy Mohamed Refai

This is to certify that this thesis has not been previously submitted for any degree and is not being concurrently submitted in candidature for any other degree at this or at any other University.

M.S.M. Refai

COURSES STUDIED

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

1- Numerical taxonomy.
2- Plant ecology.
3- Plant physiology.
4- Plant microbiology.
5- Cytogenetics.
6- German language.

Head of Botany Department

To my Parents, Brothers and Sister.

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INTRODUCTION

INTRODUCTION

Publications dealing with Egyptian mosses are quite few in number. The oldest work dealing critically with this group of plants is that published by Delile (1812) who referred to the occurrence of three mosses in the Cairo region, namely: Fissidens bryoides, Funaria minor, and Gymnostomum niloticum. Lorentz (1867) gave descriptions provided with detailed drawings of twenty-four moss species collected from Alexandria, Sinai and Upper Egypt by Ehrenberg. Twenty-two of these mosses were then new to the flora of Egypt, these are: Systegium crispum, Pottia venusta, Eucladium verticillatum, Barbula aloides, B. muralis var. incana, B. inermis, B. alexandrina, B. membranifolia, Fissidens alexandrinus, Trichostomum mosis, T. tophaceum f. foliis magis acuminatis, T. aaronis, T. ehrenbergii, Grimmia sinaica, Entosthodon pallescens f. foliis solidioribus, Funaria hygrometrica, F. anomala, Webera carnea, W. sacra, W. sinaitica, Rhynchostegium tenellum and R. rusciforme. Lindberg (1871) established the generic name Micropoma; and stated that mosses described from Egypt under the names: Microstegium niloticum (Lindberg, 1864), Physcomitrium sesostris (Lorentz, 1867), and Aphanorhegma niloticum (Lindberg, 1864); all are Micropoma niloticum. It must be mentioned

in this context, that Gymnostomum niloticum (Delile, 1812), Physcomitrium niloticum (Müller, 1858), and Entosthodon niloticus (Schimper, 1855) are also Micropoma niloticum. Müller (1874) recorded six mosses from Egypt, four of them belong to Upper Egypt and two belong to Dakhla Oasis. Five of them were new to science namely: Entosthodon curvi-apiculatus, Weisia rohlfsiana, Bryum remeli, B. aschersoni and B. korbianum. Klunzinger (1878) added Hypnum klunzingeri to the Egyptian flora, however, the name of this moss could not be detected in the Index Muscorum or any other reference. Sixteen years later Renauld & Cardot (1894) described Grimmia anodon var. sinaitica; a moss which was collected three years earlier by Grote from Sinai. Amann (1895) referred to the occurrence of five mosses in the Cairo region, three of which were then new records. These are: Fissidens crassipes, Amblystegium burnati, and Gymnostomum calcareum. Sickenberger (1901) listed eighteen moss species, two of them from Alexandria and the rest from the Cairo region and Upper Egypt. Nine of them were additions to the Egyptian mosses. These are: Funaria sickenbergeri, F. nubica, Entosthodon schweinfurthii, Bryum glaucum Philonotula nilotica, P. glabriuscula, Barbula muralis var. obovata, B. sickenbergeri and Anacalypta sp.

Kneucker (1903) collected twenty species of mosses from Sinai, fourteen of which were then new records. These are: Barbula gracilis var. viridis, B. vinealis, Tortula atrovirens, T. kneuckeri, T. rigescens, Crossidium geheebii, Encalypta intermedia, Grimmia anodon, G. alpicola, Bryum capillare, B. caespiticium, B. gemmiparum var. sinaica, B. atropurpureum and Brachythecium umbilicatum. Tackholm (1932) made referrence to the results obtained by some of these earlier authors. More than three decades later Boulos (1966) collected three mosses from Egyptian Nubia, two of them were then new records. These are: Bryum alpinum var. viride and Barbula convoluta. El-Saadawi (1972) gave further detailed descriptions of Micropoma niloticum. Imam & Ghabbour (1972) published an alphabetical list including sixty-nine Egyptian mosses. They referred to their localities and phytogeographical regions. Forty-nine of these mosses were then new to the Egyptian flora. These are: Aloina ambigua, A. rigida var. pilifera, Barbula acuta, B. cylindrica, B. tectorum, B. hornschuchiana, B. unguiculata, Amblystegium varium, Brachythecium rivulare, Bryum badium, B. argenteum, B. argenteum var. lanatum, B. atrovirens, B. caespiticium ssp. comense, B. caespiticium var. imbricatum, B. cellular, B. funkii, B. murorum,

B. alpinum var. gemmiparum, B. syriacum var. humile, B. torquescens, Crossidium chloronotos, Dichodontium pellucidum var. fagimontanum, Didymodon tophaceus var humilis, Fissidens arnoldii, F. impar, Funaria calcarea var. mediterranea, F. fascicularis, F. handelii, F. obtusa, F. mediterranea, F. hygrometrica var. patula, F. hygrometrica var. intermedia, Gyroweisia reflexa, Hyophila laxitexta, Gymnostomiella laevis, Leptobryum pyriforme, Philonotis sp., Physcomitrium acuminatum, P. pyriforme, Pottia mutica, P. starkeana, P. wilsonii, Semibarbula orientalis, Timmiella barbula, Tortella inflexa, Tortula muralis, T. muralis var. obcordata & T. vahliana. El-Saadawi & Abou El-Kheir (1973) gave habitat notes of sixteen Egyptian mosses, seven of them were then new records. These are: Fissidens viridulus ssp. bambergeri , Pohlia nutans, Pohlia sp., Leptodictyum riparium, Pleuridium subulatum, Barbula unguiculata f. obtusifolia and Philonotis marchica f. rivularis. Delgadillo (1975) mentioned, without giving reference, that Crossidium aberrans occurs in Egypt. El-Saadawi & Badawi (1977) stated that there are seventy-four species known from Egypt and that the order Pottiales forms more than 40 % of the moss flora of the country. Nine species of the seventy-four were then new records. These are: Fissidens mnevidis, Entosthodon templetoni, Bryum schleicheri, Didymodon trifarious,

Philonotis obtusata, P. evanidinervis, P. hastata, Gyroweisia tenuis and Hymenostomum laxirete. Frahm (1982) recorded ten species from Sinai, three of which were additions to the moss flora of Egypt. These are: Encalypta vulgaris, Cinclidotus pachyloma & Brachymenium sp. El-Bassuoni (1983) collected five species from the Cairo region, but all were old records. Darwish (1984) recorded twenty-one species of which Bryum cf. gedeanum was new to Africa and Fissidens crassipes var. philibertii, Bryum cf. apiculatum & Bryum sp. were new to Egypt.

One can sum up from the above literature that the total number of mosses recorded, up till now, from Egypt is 133 taxa. However, the number should be only 131 taxa because, according to the Index Muscorum Webera sinaitica and Webera sacra (mentioned by Lorentz in 1867) are synonyms of Bryum syriacum; the latter is the valid name. And Funaria mediterranea is a synonym of Funaria calcarea var. mediterranea (both taxa were listed by Imam & Ghabbour in 1972); the latter is the valid name.

It is worth mentioning here also that the Index Muscorum has been followed in accepting heterotypic synonyms, otherwise the number of taxa would rise considerably above 131.