

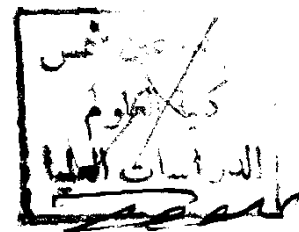
MORPHOLOGICAL STUDIES ON
THE BRYOFLOA OF THE
CAIRO REGION

M.Sc. Thesis

Submitted by

Hanaa El-Awady Mohamed Aly

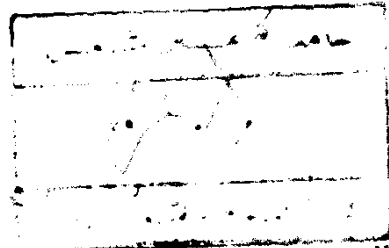
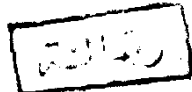
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بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

الرَّحْمَنُ ۝ عَلَّمَ الْقُرْآنَ ۝ خَلَقَ الْإِنْسَانَ ۝
عَلَّمَهُ الْبَيَانَ ۝

صدق الله العظيم



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Signature

Hanane El-Awady M. A.

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INTRODUCTION

INTRODUCTION

The review of literature shows that there are only 19 publications dealing, entirely or partly, with Egyptian mosses. These publications-arranged in chronological order-are:-

Delile, 1812; Schimper, 1855; Muller, 1858; Lindberg, 1864; Lorentz, 1867; Lindberg, 1871; Muller, 1874; Klunzinger, 1878; Renauld & Cardot, 1894; Amann, 1895; Sickenberger, 1901; Kneucker, 1903; Boulos, 1966; El-Saadawi, 1972; Imam & Ghabbour, 1972; El-Saadawi & Abou El-Kheir, 1973; Delgadillo, 1975; El-Saadawi & Badawi, 1977; Frahm, 1982.

In addition to these 19 publications there are 4 other detailed works on Egyptian mosses that are not yet published, namely:-

El-Bassuoni, 1983; Darwish, 1984; Abou Salama, 1985 and Refai, 1985.

The above mentioned 23 works show that mosses known, up till now, from Egypt are 168 taxa as comes below:-

Aloina ambigua, A. rigida var. pilifera, Amblystegium burnati, A. Varium, Anacalypta sp., Barbula acuta, B. alexandrina, B. aloides, B. convoluta, B. cylindrica, B. gracilis, B. hornschuchiana, B. inermis, B. membranifolia,

B. muralis var. incana, B. muralis var. obovata, B.
sickenbergeri, B. tectorum, B. unguiculata, B. unguiculata
forma obtusifolia, B. vinealis, B. sp.1-sp.7, Brachythecium
rivulare, B. umbilicatum, Brachymenium angustirete, B.
longicolle, B. sp., Bryum alpinum var. gemmiparum, B. alpinum
var. viride, B. apiculatum, B. argentum, B. argentum var.
lanatum, B. aschersoni, B. atropurpureum, B. atrovirens,
B. badium, B. caespiticiu, B. caespiticiu var. comens,
B. caespiticiu var. imbricatum, B. capillare, B. cellular,
B. funkii, B. gedeanum, B. gemmiparum var. sinaica, B.
glaculum, B. Korbianum, B. murorum, B. remeli, B. schleicheri,
B. syriacum var. humile, B. torquescens, B. sp.1-sp.9,
Cinclidotus pachyloma, Crossidium aberrans, C. Chloronotos,
C. geheebii, C. squamigerum var. pottioideum, Dichodontium
pellucidum, Didymodon tophaceus var. humilis, D. trifarius,
D. sp., Encalypta intermedia, E. vulgaris, Entosthodon curvi-
apiculatus, E. pallescens, E. schweinfurthii, E. templetonii,
Eucladium verticillatum, Fissidens alexandrinus, F. arnoldii,
F. bryoides, F. crassipes, F. crassipes var. philibertii,
F. impar, F. mnevidis, F. viridulus ssp. bambergeri, F. sp.,
Funaria anomala, F. calcarea var. mediterranea, F. fascicularis,
F. handelii, F. hygrometrica, F. hygrometrica var. intermedia,
F. hygrometrica var. patula, F. minor, F. nubica, F. obtusa,
F. sickenbergeri, Grimmia alpicola, G. anodon, G. anodon var.

sinaica, G. anodon var. nova, G. sinaica, Gymnostomiella
laevis, G. sp., Gymnostomum calcareum, G. niloticum, G. sp.,
Gyroweisia reflexa, G. tenuis, Hymenostomum laxirete, Hyophila
laxitexta, Hypnum Rlunzingeri, Leptobryum pyriforme,
Leptodictyum riparium, Philonotis evanidinervis, P. hastata,
P. marchica var. rivularis, P. obtusata, P. sp., Philonotula
glabriscula, P. nilotica, Physcomitrium acuminatum, P.
pyriforme, Pleuridium subulatum, Pohlia nutans, P. sp.,
Pottia mutica, P. starkeana, P. venusta, P. wilsonii,
Rhynchostegium rusciforme, R. tenellum, Semibarbula orientalis,
Systegium crispum, Timmiella anomala, T. barbula, Tortella
inflexa, T. nitida, I. sp., Tortula atrovirens, T. bistratosa,
T. kneuckeri, T. muralis, T. muralis var. obcordata, T.
rigescens, T. vahlana, T. sp.1-sp.3, Trichostomum aaronis,
T. ehrenbergii, T. mosis, T. tophaceum, T. sp., Webera carnea,
Weisia controversa var. nova, W. rohlfsiana, and Six unidenti-
fied taxa.

According to Brotheru'ss system of classification
(1924, 1925) these 168 taxa belong to 142 species, 43 genera,
13 families and 7 orders.

It must be mentioned that in such compilation, synonyms
as indicated in the Index Muscorum (Wijk, 1959-1969) and
supplements (Crosby, 1977, 1979; Crosby and Bauer, 1981, 1983)

was taken into consideration to avoid mentioning any moss more than once. When the same moss was recorded under various names by various authors, only the firstly recorded name was listed. Heterotypic synonyms were accepted otherwise the number of mosses in the above list would rise considerably above 168. The names in the list are given as they come in the original publications of the authors though they may be invalid according to the Index Muscorum (see the appendix for valid names). Nevertheless, the exact number of taxa, represented in the, so far, known Egyptian moss flora, awaits further critical investigation of 28 mosses referred to by only their generic names and 6 mosses that are not yet identified.

It must be mentioned also that many of the publications referred to above as dealing with Egyptian mosses were too brief or just referring to the name of one or a few Egyptian mosses; being concerned mainly with other subjects. It may be said that the main works on Egyptian mosses are the following ones:-

Lorentz (1867) who gave descriptions provided with detailed drawings of 24 moss species collected from Alexandria, Sinai and Upper Egypt. Muller (1874) who recorded 4 mosses from Upper Egypt and 2 from Dakhla Oasis. Sickenberger (1901)

who listed 18 moss species; 2 from Alexandria and the rest from the Cairo Region and Upper Egypt. Knencker (1903) who collected 20 moss species from Sinai. Imam and Ghabbour (1972) who published an alphabetical list including 69 mosses, referred to their localities, phytogeographical regions and whether capsulated or not. El-Saadawi & Abou El-Kheir (1973) who worked on algal-moss association and gave habitat notes of 16 Egyptian mosses. El-Saadawi & Badawi (1977) who listed 74 species, stated that the order Pottiales forms more than 40% of the moss flora of Egypt, gave a key, natural photographs of 18 members of this order and referred to names of mosses known to fruit in Egypt. Abou Salama (1985) who collected 48 mosses from Southern Sinai, gave full illustrated morphological and anatomical descriptions of them and referred to sterility, fertility, fruiting, polysety and gemmae. Refai (1985) who collected 32 mosses from the Nile Delta, gave detailed illustrated descriptions of them and, as well, referred to sterility, fertility, fruiting, polysety and gemmae.

The literature shows also that the majority of the 168 Egyptian taxa are entirely sterile. A few were recorded with developed sex organs (either antheridia or archegonia or both).

Archegonia were recorded in the following mosses:

Hydrogonium ehrenbergii (Kneucker, 1903). Barbula cf. hornschuchiana, B. sp.1 and Tortula sp. (Abou Salama, 1985).
Bartula sp.1 and Trichostomum sp. (Refai, 1985).

Antheridia were recorded in the following mosses:

Pleuridium subulatum (El-Saadawi & Abou El-Kheir, 1973),
moss 5 (Abou Salama, 1985), and Brachymenium cf. longicolle
(Refai, 1985).

Both kinds of sex organs but no fruits were recorded
in the following mosses:-

Brachymenium cf. longicolle (Abou Salama, 1985). Barbula
unguiculata, Barbula unguiculata forma. obtusifolia, Barbula
sp. 2 and Semibarbula orientalis (Refai, 1985).

Only 34 out of 168 taxa were recorded with sporophytes.
These are: Aloina ambigua, Brachythecium umbilicatum, Bryum
sp.1 -sp.5 , Crossidium chloronotos, C. geheebii, C.
squamigerum var. pottioideum, Didymodon tophaceus, Encalypta
intermedia, Entosthodon curvi-apiculatus, Fissidens
alexandrinus, F. bryoides ssp. viridulus, F. sp., Funaria
calcareo var. mediterranea, F. hygrometrica, F. pallescens,
Grimmia anodon var. nova, G. anodon var. sinaitica, G.
sinaitica, Gyroweisia reflexa, Micropoma niloticum, Physcomitrium
pyriforme, Pottia starkeana, P. venusta, Tortula inermis,

T. Kneuckeri, T. muralis, T. vahliana, T. sp.1, T. sp.2 and Weisia controversa var. nova (see Lorentz, 1867; Muller, 1824; Renauld & Cardot, 1894; Kneucker, 1903; Imam & Ghabbour, 1972; El-Saadawi & Badawi, 1977; Abou Salama, 1985 and Refai, 1985).

Disety was recorded in 3 mosses from the Nile Delta (Refai, 1985) and in 4 mosses from Sinai (Abou Salama, 1985).

The largest family in the Egyptian flora is the Pottiaceae being represented by 67 spp. in 21 genera. The second large family is Bryaceae (41 spp. in 5 genera) then Funariaceae (18 spp. in 4 genera).

The largest genus, concerning the number of species representing it in Egypt, is Bryum (33 spp.) followed by Barbula (19 spp.), then Funaria (14 spp.) and Fissidens (9 spp.).

The most common taxa are:-

1- In the Nile Delta (see Refai, 1985) Barbula unguiculata, Funaria hygrometrica and Fissidens bryoides spp. viridulus.

2- In Southern Sinai (see Abou Salama, 1985) Tortula inermis, Barbula sp. 4, Weisia controversa var. nova and Funaria calcarea var. mediterranea.

The number of taxa recorded from some of the phyto-geographical regions of Egypt, arranged in descending order are:-

a- 68 taxa from the Southern Sinai (see Abou Salama, 1985).

b- 49 taxa from the Cairo Region (see below).

c- 35 taxa from the Nile Delta (see Refai, 1985).

d- 4 taxa from the Nile valley (see Imam & Ghabbour, 1972).

The names of the 49 taxa, hitherto, recorded from the Cairo Region are: Amblystegium burnatii, Barbula unguiculata, B. unguiculata fo. obtusifolia, B. vinealis, Bryum alpinum var. gemmiparum, B. argentum, B. atropurpureum, B. atrovirens, B. caespiticium, B. caespiticium var. comense, B. caespiticium var. imbricatum, B. cellular, B. murorum, Dichodontium pellucidum var. fagimontanum, Didymodon tophaceus, Entosthodon pallescens, E. schweinfurthii, Eucladium verticillatum, Fissidens bryoides, F. crassipes, F. cyprius, F. impar, F. viridulus ssp. bambergeri, Funaria anomala, F. fascicularis, F. handelii, F. hygrometrica, F. mediterranea, F. obtusa, Gymnostomiella laevis, Gymnostomum calcareum, Gyroweisia reflexa, Hydrogonium ehrenbergii, Leptobryum pyriforme, Leptodictyum riparium, Micropoma niloticum, Philonotis hastata,

P. marchica forma rivularis, P. sp, Philonotula nilotica, Physcomitrium acuminatum, P. pyriforme, Pleuridium subulatum, Pohlia nutans, P. sp, Pottia mutica, Semibarbula orientalis, Timmiella sp and Tortula muralis. (see Lorentz, 1867; Amann; 1895; Sickenberger, 1901; Imam & Ghabbour, 1972; El-Saadawi & Abou El-Kheir, 1973 and Darwish, 1984).

Mosses known to fruit in the Cairo Region are: Fissidens cyprius, Funaria hygrometrica, Micropoma niloticum and Physcomitrium pyriforme (see Muller, 1858; Lindberg, 1864; Lorentz, 1867; Imam & Ghabbour, 1972).

The survey of the literature thus shows the necessity of critical studies on the Egyptian mosses. These studies ought to comprise full descriptions, illustrations and natural photographs of all available moss taxa. This is to establish the bases on which a reasonable moss flora of Egypt can, by time, be constructed. To establish such moss flora of Egypt, one should expect that this would take too much effort and time. Meanwhile, any additional descriptions and photographs of any Egyptian mosses should be scientifically appreciated. These descriptions and photographs would no doubt facilitate the task of identification of any interested bryologists, and that would enhance greatly the progress of that branch of science in Egypt. It is also evident from such