

Comparative Study of the Moss Flora of Ismailia Governorate with Other Territories of Egypt

Yasmin M. Hassan^{1*}, Usama Y. Abou-Salama², Wafaa M. Kamel¹, Elsayeda M. Gamal Eldin¹

¹ Botany Department, Faculty of Science, Suez Canal University, Ismailia, Egypt

² Botany Department, Faculty of Science, Ain Shams University, Cairo, Egypt



ABSTRACT

This study was conducted to held comparisons between moss flora of Ismailia governorate and the different territories in Egypt. The last study done on this governorate was carried out three decades before. Fifteen excursions were set out for this purpose. Three hundred and ten moss samples were collected from Ismailia governorate. The study revealed that floral similarity was largest between Ismailia governorate and the Southern Sinai massive (S). On the other hand, both Nile Nubia (Nn) and Gebel Elba (GE) showed the lowest species similarity in comparison with the study area

Keywords: Moss, Flora, Ismailia, Territories, Egypt.

INTRODUCTION

Bryological work in Egypt has been concerned mainly with the enumeration and description of moss species encountered during excursions of researchers in different regions of the country. El-Saadawi and colleagues published a large number of papers including six important checklists: El-Saadawi and Badawi (1977), El-Saadawi *et al.* (1986), El-Saadawi *et al.* (1999), El-Saadawi *et al.* (2003), El-Saadawi *et al.* (2013) and El-Saadawi *et al.* (2015). All the previous studies until 2015 showed that the total number of moss taxa reported from Egypt is 181 and is classified into 56 genera, 17 families and 10 orders.

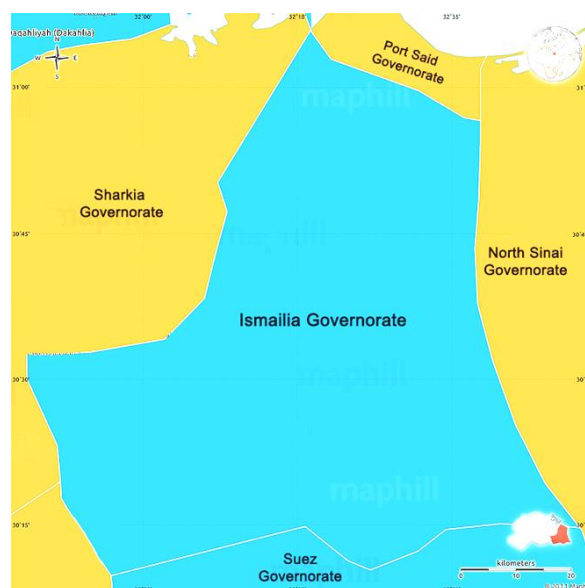
The Ismailia governorate is located in the eastern part of Egypt at the middle part of Suez Canal. It is a part of the East Nile Delta region (Nd), Galala Desert (Dg) and Isthmic Desert (Di). It is bounded at the east by North Sinai and Suez Canal (that penetrates Tamsah Lake and Bitter Lake), Sharkia governorate at the west, Port Said governorate at the north and Suez governorate at the south. The Ismailia governorate is located between 31° 40' to 32° 40' E Longitude, and 30° 15' to 30° 57' N Latitude (Map 1). The total area of Ismailia governorate is about 5,067 km² and consists of seven regions (marākiz). These are Ismailia, Fayed, El Tal El Kabier, Abou Sweir and El Kassaseen, East Kantara and West Kantara.

According to the Köppen-Geiger classification (BWh) and the Holdridge life zones system of bioclimatic classification, Ismailia governorate has a subtropical desert / low-latitude arid hot climate. Also it is situated in or near the subtropical desert biome (<http://www.ismailia.climateemps.com>).

Ismailia governorate is located mainly in Galala desert. Since 1972, only three studies of mosses had been done from Galala desert. These are Imam and Ghabbour (1972), Lashin (1990) and Shabbara (2006). They recognized 30 species belonging to 14 genera (including genus *Leptobarbula* Schimp. which was recorded only in this territory), 5 families and 4 orders. Lashin (1990)

in his study on the bryoflora of Suez Canal Region reported 29 moss taxa, out of these 26 taxa identified to the specific level and 3 entities only to generic level (*Barbula sp*, *Semibarbula sp* and *Funaria sp*).

The present study aims to held comparisons between moss flora of Ismailia governorate and the different territories in Egypt. This will help to draw conclusions about various factors that affect the distribution of moss species across Egypt.



Map (1): The location of Ismailia governorate.

MATERIALS AND METHODS

To achieve the aim of the present study, three hundred and ten samples were collected during 15 excursions covering the period from November 2014 to August 2016 from cities, marākiz, villages, sub-villages and ezbeets in Ismailia governorate. Mosses were mostly collected from shaded and sunny places borders of irrigation canals, water wheels, water reservoirs, water basins and walls of bridges. They occurred mainly on

* Corresponding author-mail: yasmin_ibrahim@science.suez.edu.eg

Comparative Study of the Moss Flora

red bricks, walls covered by cement and/or mud.

Specimens were examined, sectioned according to Abou Salama (1985) and Wilson (1990). The studied specimens were identified by being matched with the pre-identified Egyptian moss specimens from different phytogeographical territories of Egypt. In addition, moss floras of different countries of the world were used. Adaptation to diverse habitats was taken into consideration in determining precise identification. Detailed information about all collected samples were available in herbarium packets kept at the Herbarium of the Suez Canal University (SCU-I) Ismailia, Faculty of Science, Botany Department (Appendix 1).

RESULTS

The updated species list of the moss flora of Ismailia governorate includes 29 species. These species belong to 13 genera, 4 families and 4 orders. The present study

according to El-Saadawi *et al.* (2015) added *Bryoerythrophyllum* and *Oxystegus* as a new genera to the moss flora of Egypt and added 3 species as new records to Egypt namely; *Bryoerythrophyllum inaeq-ualifolium*, *Oxystegus tenuirostris* and *Trichostomum planifolium*, raising the number of mosses recorded in Egypt to 184 species.

It is obvious from the distribution of the studied species (Table 1 and Figure 1) that, *Barbula unguiculata* had the highest percentage of occurrence of all recorded species in the study area, followed by *Funaria hygrometrica*. Abou Sweir region is characterized by high diversity due to the presence of 18 species, followed by Ismailia region and El Tal El Kabier region (11 species each). This is due to favourable climatic conditions, good soil with low salinity and the first start of Ismailia canal as the fresh water source. But East Kantara region was poor in mosses (6 species) due to the high salinity and gypsum soil apparently hinder the growth of mosses.

Table (1): Distribution of the 29 studied moss species in the study area and number of their specimens.

| Recorded Species | Region | No. of specimens | Total |
|-------------------------------------------|------------------|------------------|-------|
| <i>Fissidens bryoides</i> | Fayed | 2 | 2 |
| <i>Barbula bolleana</i> | El Kassaseen | 7 | 7 |
| <i>B. convoluta</i> | Abou Sweir | 3 | 3 |
| <i>B. indica</i> | El Kassaseen | 11 | 12 |
| | West Kantara | 1 | |
| <i>B. unguiculata</i> | El Kassaseen | 43 | 99 |
| | Abou Sweir | 23 | |
| | El Tal El Kabier | 9 | |
| | West Kantara | 4 | |
| | Ismailia | 18 | |
| <i>Bryoerythrophyllum inaequalifolium</i> | Fayed | 2 | 3 |
| | El Tal El Kabier | 3 | |
| <i>Didymodon fallax</i> | Abou Sweir | 3 | 6 |
| | West Kantara | 2 | |
| | East Kantara | 1 | |
| | El Kassaseen | 5 | |
| <i>D. luridus</i> | Abou Sweir | 2 | 11 |
| | El Tal El Kabier | 1 | |
| | West Kantara | 2 | |
| <i>D. spadiceus</i> | Fayed | 1 | 4 |
| | El Kassaseen | 4 | |
| <i>D. tophaceus</i> | El Kassaseen | 4 | 4 |
| <i>D. vinealis</i> | Abou Sweir | 2 | 3 |
| | East Kantara | 1 | |
| <i>Gymnostomum aeruginosum</i> | Abou Sweir | 3 | 4 |
| | East Kantara | 1 | |
| <i>G. calcareum</i> | Abou Sweir | 3 | 3 |
| <i>G. viridulum</i> | Ismailia | 1 | 1 |
| <i>Splachnobryum obtusum</i> | El Tal El Kabier | 1 | 1 |
| | Abou Sweir | 8 | |
| <i>Oxystegus tenuirostris</i> | El Tal El Kabier | 2 | 17 |
| | West Kantara | 1 | |
| | Ismailia | 6 | |
| | El Kassaseen | | |
| <i>Trichostomum brachydontium</i> | Abou Sweir | | 20 |
| | El Tal El Kabier | 13 | |
| | Ismailia | | |
| <i>T. crispulum</i> | Fayed | | 5 |
| | El Kassaseen | 2 | |
| | Fayed | 3 | |

| Recorded Species | Region | No. of specimens | Total |
|----------------------------------|------------------|------------------|-------|
| <i>T. planifolium</i> | Abou Sweir | 7 | 26 |
| | El Tal El Kabier | 5 | |
| | West Kantara | 3 | |
| | Ismailia | 5 | |
| | Fayed | 5 | |
| <i>Entosthodon fascicularis</i> | East Kantara | 1 | 8 |
| | Abou Sweir | 7 | |
| | Ismailia | 1 | |
| <i>Funaria hygrometrica</i> | Abou Sweir | 34 | 45 |
| | El Tal El Kabier | 4 | |
| | West Kantara | 2 | |
| | Ismailia | 3 | |
| | Fayed | 1 | |
| <i>Bryum argenteum</i> | East Kantara | 1 | 5 |
| | Abou Sweir | 1 | |
| <i>B. funkii</i> | Ismailia | 4 | 3 |
| <i>B. gemmiparum</i> | Abou Sweir | 3 | 3 |
| <i>B. radiculosum</i> | Abou Sweir | 18 | 40 |
| | El Kassaseen | 18 | |
| | Abou Sweir | 7 | |
| | El Tal El Kabier | 4 | |
| | West Kantara | 8 | |
| <i>B. subapiculatum</i> | Ismailia | 7 | 10 |
| | El Tal El Kabier | 2 | |
| | West Kantara | 1 | |
| | Fayed | 4 | |
| <i>Imbricarium alpinum</i> | El Kassaseen | 2 | 28 |
| | Abou Sweir | 14 | |
| | El Tal El Kabier | 2 | |
| | West Kantara | 5 | |
| <i>Ptychostomum imbricatulum</i> | Ismailia | 1 | 5 |
| | East Kantara | 2 | |
| | Abou Sweir | 2 | |
| <i>P. pseudotriquetrum</i> | Ismailia | 3 | 1 |
| | Fayed | 1 | 1 |

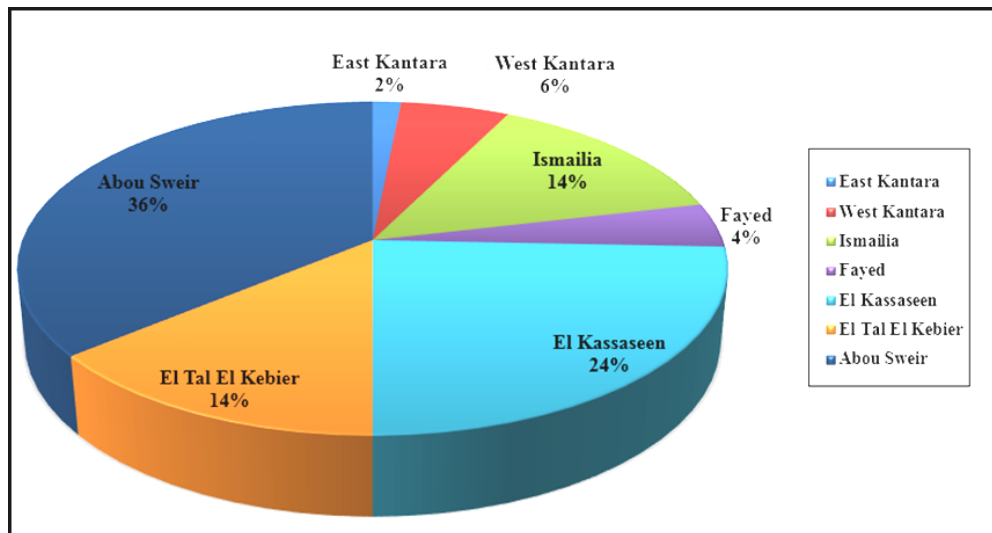


Figure (1): Percentage of occurrence of species recorded in each region.

A comparison between the species recorded in Ismailia governorate with those of other territories of Egypt (Table 2 and Map 2) show that floral similarity was largest between Ismailia governorate and the Southern Sinai massive (S); there are 21 species

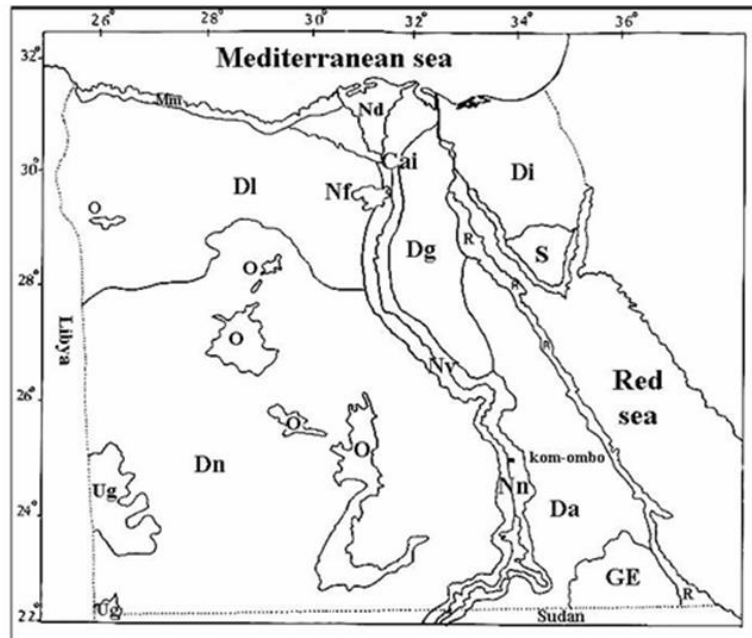
common to both areas, followed by Nile Delta (Nd) sharing 17 species. On the other hand, both Nile Nubia (Nn) and Gebel Elba (GE) showed the lowest species similarity (5 and 2 species respectively) in comparison with the study area. (El-Saadawi *et al.* 2015).

Comparative Study of the Moss Flora

Table (2): Occurrence of species recorded in the present study in other territories of Egypt. (For explanation of abbreviations see map 2)

| Recorded Species in Present Study | Nn | Nv | Nd | Nf | Cai | Dg | Di | S | GE | O | Mma | Territories |
|----------------------------------------------------|----------|----------|-----------|-----------|-----------|-----------|-----------|-----------|----------|-----------|-----------|-------------|
| <i>Fissidens bryoides</i> | | | + | | + | + | | | | | + | 5 |
| <i>Barbula bolleana</i> | + | + | + | + | + | | | + | | | + | 7 |
| <i>B. convoluta</i> | | | + | | | + | | + | | | | 4 |
| <i>B. indica</i> | | + | + | | + | | | | | | | 3 |
| <i>B. unguiculata</i> | | + | + | + | + | + | | | | | + | 6 |
| * <i>Bryoerythrophyllum inaequalifolium</i> | | | | | | | | | | | | - |
| <i>Didymodon fallax</i> | | | + | + | | | + | + | | + | + | 6 |
| <i>D. luridus</i> | | | + | + | + | + | | + | | | + | 6 |
| <i>D. spadiceus</i> | | | | | | + | | + | | | | 2 |
| <i>D. tophaceus</i> | + | + | + | + | + | + | | + | + | + | + | 10 |
| <i>D. vinealis</i> | | | + | | | | + | + | | + | + | 5 |
| <i>Gymnostomum aeruginosum</i> | | | + | + | + | | | + | | + | | 5 |
| <i>G. calcareum</i> | | + | + | + | | + | | | + | | + | 7 |
| <i>G. viridulum</i> | | + | | | + | + | + | + | | | + | 6 |
| <i>Splachnobryum obtusum</i> | | | + | | | | | | | | | 1 |
| * <i>Oxystegus tenuirostris</i> | | | | | | | | | | | | - |
| <i>Trichostomum brachydontium</i> | | | + | | | | + | | | | | 2 |
| <i>T. crispulum</i> | | | + | | | | + | + | | | + | 4 |
| * <i>T. planifolium</i> | | | | | | | | | | | | - |
| <i>Entosthodon fascicularis</i> | | | | | + | | + | + | | | | 3 |
| <i>Funaria hygrometrica</i> | + | + | + | + | + | + | + | + | | + | + | 10 |
| <i>Bryum argenteum</i> | | | | | + | + | + | + | | + | + | 6 |
| <i>B. funkii</i> | | | | | | + | + | + | | + | | 4 |
| <i>B. gemmiparum</i> | | | | + | + | | + | + | | + | + | 5 |
| <i>B. radiculosum</i> | | | + | | + | | + | + | | + | + | 6 |
| <i>B. subapiculatum</i> | | + | | | + | | + | + | | + | | 4 |
| <i>Imbricobryum alpinum</i> | + | | | + | + | | | + | | | | 4 |
| <i>Ptychostomum imbricatum</i> | | | + | | + | + | + | + | | + | + | 7 |
| <i>P. pseudotriquetrum</i> | | | | | | | | + | | + | | 2 |
| Total Moss Species | 5 | 8 | 17 | 10 | 16 | 12 | 12 | 21 | 2 | 12 | 15 | |

(*) New record to Egypt.



Map (2): The phytogeographical territories of Egypt (after El-Saadawi *et al.* 2015; with little modification). Cai: Cairo area; Da: Arabian desert; Dg: Galala Desert; Di: Isthmic Desert; Dl: Libyan Desert; Dn: Nubian Desert; GE: Gebel Elba; Mma: western Mediterranean coastal land (Mareotic sector); Nd: Nile Delta; Nf: Nile Fayoum; Nn: Nile Nubia, from Kom Ombo southwards to Egyptian boundaries with the Sudan including the areas now inundated by the waters of Lake Naser since 1965; Nv: Nile Valley, from Cairo-Giza to Kom Ombo; O: Oasis of the Nubian and Libyan Desert; R: Red Sea coastal plains; S: Southern Sinai massive (Sinai proper i.e. relatively high mountains, south of Isthmic desert); Ug: Gebel Uweinat.

DISCUSSION

Established taxa are those widely distributed in more or less similar ecosystems in an area. Distribution of moss species is mainly affected by edaphic and climatic factors especially rain and wind which carry propagules across long distances (Show and Gonffinet, 2000). A warmer and dryer climate resulting from global warming will undoubtedly cause changes in vegetation and landforms. Many bryophytes are sensitive to the increase in temperature (Dennis and Dale, 1994). The short-term effect of a simulated environmental change (increased temperature) was a decreased bryophyte growth and abundance (Jägerbrand, 2006).

Sinai and Ismailia governorate fall in the same biogeographical region (part of the Saharo-Arabian deserts) therefore affected by the same environmental factors. This explains the highest degree of floral similarity between the two regions (McGinnies *et al.*, 1968; Danin, 1983).

Water borne propagules of mosses coming from the south and from countries of Nile basin may explain the strong relationship between moss flora of Ismailia governorate and Nile Delta (El-Saadawi *et al.*, 2003).

On the other hand, Nile Nubia and Gebel Elba regions fall in the Sudano-Saharan biogeographical region. Thereby, those two regions showed less similarity in comparison with the study area.

CONCLUSION

Environmental factors governing the geographical distribution of moss flora in Egypt are climatic and edaphic factors.

REFERENCES

- ABOU SALAMA, U.Y. 1985. Morphological Studies on some Egyptian Bryophytes in Southern Sinai. M.Sc. Thesis, Ain Shams University, Cairo, Egypt.
- DANIN, A. 1983. Desert Vegetation of Israel and Sinai. Jerusalem, Israel: Cana Publishing House.
- DENNIS, L., AND H. DALE. 1994. Responses of Northern Peatlands to climate change: Effects on Bryophytes. *J. Hattori Bot. Lab. No.*; **75**:119-132.
- EL-SAADAWI, W., AND A. BADAWI. 1977. The moss flora of Egypt. I. Order Pottiales. Public. Cairo University Herbarium, No. **7 & 8**: 181-206.
- EL-SAADAWI, W., W.S. ABOU EL-KHEIR, AND M.H. DARWISH. 1986. Notes on Egyptian mosses with one new record. *Lindbergia* **12**: 129-131.
- EL-SAADAWI, W.E., A. BADAWI, H.M. SHABBARA, U.Y. ABOU SALAMA, AND M. REFAI. 1999. An updated list of Egyptian mosses. *Taeckholmia* **19**: 77-96.
- EL-SAADAWI, W.E., H.M. SHABBARA, M.K. IBRAHIM, AND M.A. TAHA. 2015. An annotated checklist of Egyptian mosses. *Taeckholmia* **35**: 1-23. <http://www.ismailia.climatemps.com/> (Accessed in 31/12/2016).
- EL-SAADAWI, W.E., H.M. SHABBARA, S.M. REFAI, AND U.Y. ABOU SALAMA. 2003. Mosses of different phytogeographical territories of Egypt. *Bocconea* **16(1)**: 133-146.
- EL-SAADAWI, W.E., U.Y. ABOU SALAMA, H.M. SHABBARA, R.M. ROS, AND V. MAZIMPAKA. 2013. Mosses of the Mediterranean, an annotated checklist. *Cryptogamie Bryologie* **34(2)**: 99-283.
- IMAM, M. AND S. GHABBOUR. 1972. A contribution to the moss flora of Egypt; *Botaniska Notiser*, **125**: 518-522.
- JÄGERBRAND, A.K. 2006. Effects of Global Climate Change on Tundra Bryophytes. *Botanical Society of America*; **3**: 235-242.
- LASHIN, G.M.A.S. 1990. Studies on bryoflora Suez Canal Region. M. Sc. Thesis, Zagazig University, Zagazig, Egypt.
- MCGINNIES, W.G., B.J. GOLDMAN, AND P. PAYLORE. 1968. *Deserts of the World*. Tucson: University of Arizona Press. pp. 788.
- SHABBARA, H.M. 2006. Rare but interesting moss records from Egypt. *Taeckholmia* **26**: 121-129.
- SHOW A. J. AND GOFFINET B. 2000. *Bryophyte Biology*. Cambridge University. Press.
- WILSON, P. 1990. How to make thin free sections. *Evansia*, **7 (1)**:16

Comparative Study of the Moss Flora

APPENDIX (1) :All information about samples collected from Ismailia governorate; region and site of collection, habitat, date of collection, herbarium number and GPS data, N.B. YM (Yasmin Mohamed) collector's Name, Zeer: large porcelain porous drinking pot.

| Region Name | Site of collection | Serial No. of samples | Habitat | Date of collection | Herbarium No. | GPS data |
|-------------|--------------------|-----------------------|----------------------------------------------------------------|--------------------|---------------|-----------------------------|
| El Kassasen | Ezbet El-oomdah | 1 | | 8/11/214 | YM101 | N 30° 33' 07" |
| | | 2 | On a wet red brick water basin covered by cement, shaded area. | | YM102 | E 31° 56' 49" |
| | | 3 | | | YM103 | 19m |
| | | 4 | | | YM104 | N 30° 33' 07" |
| | | 5 | On a wet red brick water basin covered by cement, shaded area. | | YM105 | E 31° 56' 49" |
| | | 6 | | | YM106 | 12m |
| | | 7 | On a wet red brick water basin covered by cement, shaded area. | | YM107 | N 30° 33' 08" |
| | | 8 | | | YM108 | E 31° 56' 49" |
| | | 9 | | | YM109 | 13m |
| | | 10 | On margin of water canal on red brick, shaded area. | | YM110 | N 30° 33' 08" |
| | | 11 | | | YM111 | E 31° 56' 48" |
| El Kassasen | Ezbet El Waburat | 12 | On a wet red brick water basin covered | 8/11/2014 | YM112 | N 30° 33' 07" E 31° 56' 48" |
| | | 13 | | | YM113 | 14 m |
| | | 14 | On margin of water canal on red brick, shaded area. | | YM114 | N 30° 33' 18" |
| | | 15 | | | YM115 | E 31° 56' 45" |
| | | 16 | | | YM116 | 12m |
| | | 17 | On wet red brick, shaded area | | YM117 | N 30° 33' 18" |
| | | 18 | | | YM118 | E 31° 56' 45" |
| | | 19 | | | YM119 | 17m |
| | | 20 | Under bridge , On a wet red brick wall shaded area | | YM120 | N 30° 33' 33" |
| | | 21 | | | YM121 | E 31° 56' 11" |
| | | 22 | | | YM122 | 15m |
| | | 23 | Under bridge , On a wet red brick wall | | YM123 | N 30° 33' 32" |
| | | 24 | | | YM124 | E 31° 56' 10" |
| | | 25 | | | YM125 | 15m |
| | | 26 | Under bridge, on a wet red brick wall | | YM126 | N 30° 32' 26" |
| | | 27 | | | YM127 | E 31° 57' 04" |
| | | 28 | | | YM128 | 12m |
| | | 29 | On a wet red brick water basin covered by cement, shaded area. | | YM129 | N 30° 32' 19" |
| | | 30 | | | YM130 | E 31° 57' 00" |
| El Kassasen | Ezbet El Gamaeza | 31 | | 14/11/2014 | YM131 | 21m |
| | | 32 | On a wet red brick wall beside hand water pump, shaded area. | | YM132 | N 30° 32' 39" |
| | | 33 | | | YM133 | E 31° 57' 59" |
| | | 34 | | | YM134 | 18m |
| | | 35 | | | YM135 | N 30° 32' 39" |
| | | 36 | On a wet red brick water basin covered by cement, shaded area. | | YM136 | E 31° 57' 59" |
| | | 37 | | | YM137 | 18m |
| | | 38 | On a wet red brick water basin covered by cement, shaded area. | | YM138 | N 30° 32' 39" |
| | | 39 | | | YM139 | E 31° 57' 59" |
| | | 40 | | | YM140 | 18m |

| Region Name | Site of collection | Serial No. of samples | Habitat | Date of collection | Herbarium No. | GPS data |
|-------------|----------------------------------------------------------------------------|-----------------------|----------------------------------------------------------------|--------------------|---------------|---------------|
| El Kassasen | Ezbet El Gamaeza | 41 | | 14/11/2014 | YM141 | |
| | | 42 | On a wet red brick water basin covered by cement, shaded area. | | YM142 | N 30° 32' 32" |
| | | 43 | | | YM143 | E 31° 57' 02" |
| | | 44 | | | YM144 | 13 m |
| | | 45 | | | YM145 | |
| | | 46 | On margin of water canal on red brick, shaded area. | | YM146 | N 30° 32' 32" |
| | | 47 | | | YM147 | E 31° 57' 02" |
| | | 48 | | | YM148 | 10m |
| | | 49 | | | YM149 | N 30° 32' 18" |
| | | 50 | On red brick water basin covered by cement. | | YM150 | E 31° 57' 01" |
| | | 51 | | | YM151 | 12m |
| | | 52 | | | YM152 | |
| | | 53 | | | YM153 | |
| | | 54 | On a wet red brick water basin covered by cement, shaded area. | | YM154 | N 30° 32' 17" |
| | | 55 | | | YM155 | E 31° 57' 06" |
| 56 | | YM156 | 17m | | | |
| 57 | | YM157 | | | | |
| 58 | | YM158 | | | | |
| 59 | On a wet red brick wall beside hand water pump. | YM159 | N 30° 32' 32" | | | |
| 60 | | YM160 | E 31° 57' 01" | | | |
| 61 | | YM161 | 10 m | | | |
| 62 | On a wet red brick water basin covered by cement. | YM162 | | | | |
| 63 | | YM163 | N 30° 32' 30" | | | |
| 64 | On a wet red brick water basin covered by cement. | YM164 | E 31° 57' 08" | | | |
| 65 | Shady place | YM165 | 12m | | | |
| 66 | | YM166 | | | | |
| 67 | | YM167 | N 30° 32' 32" | | | |
| 68 | On a wet red brick water basin covered by cement, shaded area. | YM168 | E 31° 57' 00" | | | |
| 69 | | YM169 | 11m | | | |
| 70 | | YM170 | | | | |
| 71 | | YM171 | N 30° 32' 39" | | | |
| 72 | Under El Gamaeza bridge, on a wet red brick wall. | YM172 | E 31° 57' 59" | | | |
| 73 | | YM173 | 18 m | | | |
| 74 | | YM174 | | | | |
| 75 | Under El-oomdah bridge , mud on red brick wall, very moist and shaded area | YM175 | N 30° 32' 40" | | | |
| 76 | | YM176 | E 31° 57' 60" | | | |
| 77 | | YM177 | 14m | | | |
| 78 | | YM178 | N 30° 33' 05" | | | |
| 79 | On a wet red brick wall beside water pump, shaded area. | YM179 | E 31° 56' 49" | | | |
| 80 | | YM180 | 22m | | | |
| 81 | Wet mud on red brick of water canal, shaded area. | YM181 | | | | |
| 82 | | YM182 | N 30° 33' 06" | | | |
| | | | E 31° 56' 48" | | | |
| | | | 17 m | | | |

Comparative Study of the Moss Flora

| Region Name | Site of collection | Serial No. of samples | Habitat | Date of collection | Herbarium No. | GPS data | | |
|-------------|-------------------------------|-----------------------|----------------------------------------------------------------------------------------|--------------------|---------------|---------------------------------------------------------|---------------|---------------|
| Abou Sweir | Al-Manaayef village, Canal 5 | 83 | On a wet red brick water basin covered by cement, shaded area | 16/11/2014 | YM183 | N 30° 33' 11" | | |
| | | 84 | | | YM184 | E 31° 56' 39" | | |
| | | 85 | Beside small irrigation water canal | | YM185 | N 30° 31' 57" | | |
| | | 86 | On a wet red brick water basin covered by cement | | YM186 | E 32° 08' 46" | | |
| | | 87 | | | YM187 | 12m | | |
| | | 88 | | | YM188 | N 30° 32' 02" | | |
| | | 89 | On a wet red brick wall of irrigation water canal ,sunny | | YM189 | E 32° 09' 52" | | |
| | | 90 | | | YM190 | 11m | | |
| | | 91 | | | YM191 | N 30° 32' 06" | | |
| | | 92 | | | YM192 | E 32° 09' 09" | | |
| | | 93 | Thin layer of mud on a wall of an irrigation water canal shady | | 21/11/2014 | YM193 | 15m | |
| | | 94 | | | | YM194 | N 30° 32' 06" | |
| | | 95 | | | | YM195 | E 32° 09' 09" | |
| | | 96 | | | | Mud on cement wall of an irrigation water canal - shady | YM196 | N 30° 32' 07" |
| | | 97 | | | | YM197 | E 32° 09' 10" | |
| | | 98 | | | | On a thin layer of mud of red brick wall | YM198 | 35m |
| | | 99 | | | | | YM199 | N 30° 33' 06" |
| | | 100 | | | | | YM200 | E 32° 08' 55" |
| | | 101 | | | | On sand, beside electric water pump room, dry & sunny | YM201 | 12m |
| 102 | YM202 | N 30° 33' 06" | | | | | | |
| 103 | YM203 | E 32° 08' 55" | | | | | | |
| 104 | Sand on red brick wall, sunny | YM204 | 12m | | | | | |
| Abou Sweir | Al-Manaayef village, Canal 5 | 105 | On a thin layer of mud of red brick wall wet and shady | 21/11/2014 | YM205 | N 30° 33' 06" | | |
| | | 106 | | | YM206 | | | |
| | | 107 | On wet red brick wall of electric water pump room, shady | | YM207 | E 32° 09' 13" | | |
| | | 108 | | | YM208 | 12m | | |
| | | 109 | | | YM209 | N 30° 33' 07" | | |
| | | 110 | | | YM210 | | | |
| | | 111 | YM211 | | | | | |
| | | 112 | YM212 | | | | | |
| | | 113 | On a thin layer of mud of red brick wall, beside diesel water pump, very moist – shady | | YM213 | E 32° 09' 12" | | |
| | | 114 | | | YM214 | 13m | | |
| | | 115 | | | YM215 | N 30° 32' 07" | | |
| | | 116 | YM216 | | | | | |
| | | 117 | YM217 | | | | | |
| | | 118 | YM218 | | | | | |
| | | 119 | On a thin layer of mud on Zeer, wet and shady place | | YM219 | E 32° 09' 20" | | |
| | | 120 | | | YM220 | 15m | | |
| | | 121 | | | YM221 | N 30° 32' 07" | | |
| | | | | | | E 32° 09' 20" | | |
| | | | | | | 15m | | |

| Region Name | Site of collection | Serial No. of samples | Habitat | Date of collection | Herbarium No. | GPS data |
|-------------|-----------------------------------|---------------------------------------|-----------------------------------------------------------------------|--------------------|---------------------------------------|---------------------------------------|
| Abou Sweir | Al-Manaayef village, Canal 5 | 122 | On a thin layer of mud on base of Zeer, wet and shady | 21/11/2014 | YM222 | N 30° 32' 06" E 32° 09' 09" 13m |
| | | 123 | | | YM223 | |
| | | 124 | | | YM224 | |
| | | 125 | | | YM225 | |
| | | 126 | | | YM226 | |
| | | 127 | | | YM227 | |
| | | 128 | | | YM228 | |
| | | 129 | YM229 | | | |
| | | 130 | YM230 | | | |
| | | 131 | YM231 | | N 30° 31' 56" E 32° 08' 44" 20m | |
| | | 132 | YM232 | | | |
| | | 133 | YM233 | | | |
| | | 134 | YM234 | | N 30° 32' 08" E 32° 08' 18" 15m | |
| | | 135 | YM235 | | | |
| 136 | YM236 | | | | | |
| 137 | YM237 | | | | | |
| 138 | YM238 | | | | | |
| 139 | YM239 | N 30° 32' 08" E 32° 08' 18" 15m | | | | |
| 140 | YM240 | | | | | |
| 141 | YM241 | | | | | |
| 142 | YM242 | | | | | |
| 143 | YM243 | N 30° 33' 16" E 32° 11' 29" 10m | | | | |
| 144 | YM244 | | | | | |
| 145 | YM245 | | | | | |
| 146 | YM246 | N 30° 33' 16" E 32° 11' 29" 8m | | | | |
| Abou Sweir | Al-Manaayef village, Ei-aaly area | 147 | On a thin layer of mud on red brick wall of water basin wet and shady | 27/11/2014 | YM247 | N 30° 33' 18" E 32° 10' 29" 10m |
| | | 148 | On wet mud land of margin of small water canal, shady | | YM248 | N 30° 33' 17" E 32° 11' 30" 5m |
| | | 149 | On wet red brick wall of water basin. | | YM249 | N 30° 33' 33" E 32° 05' 40" 19m |
| | | 150 | Mud on red brick wall of small irrigation water canal | | YM250 | N 30° 33' 32" E 32° 05' 36" 39m |
| | | 151 | Mud on red brick wall of small irrigation water canal | | YM251 | N 30° 33' 32" E 32° 05' 36" 19m |
| | | 152 | Mud on red brick wall of small irrigation water canal | | YM252 | |

Comparative Study of the Moss Flora

| Region Name | Site of collection | Serial No. of samples | Habitat | Date of collection | Herbarium No. | GPS data |
|-------------|---------------------|-----------------------|-----------------------------------------------------------------------------------------|--------------------|---------------|---------------------------------------|
| Abou Sweir | Ezbet Roud Eskandar | 153 | Mud on red brick wall of small irrigation water canal | 27/11/2014 | YM253 | N 30° 33' 32" E 32° 05' 36" 17m |
| | | 154 | Mud on red brick wall of small irrigation water canal | | YM254 | N 30° 33' 32" E 32° 05' 36" 15m |
| | | 155 | Mud on red brick wall of small irrigation water canal | | YM255 | N 30° 33' 33" E 32° 05' 34" 13m |
| | | 156 | Mud on red brick wall of small irrigation water canal | | YM256 | N 30° 33' 33" E 32° 05' 35" 14m |
| | | 157 | Sand on red brick wall of dry small irrigation water canal shady place | | YM257 | N 30° 33' 31" E 32° 05' 32" 19m |
| | | 158 | On wet brick wall beside electric water pump room, sunny | | YM258 | N 30° 33' 29" E 32° 05' 31" 13m |
| | | 159 | On wet brick wall beside electric water pump room, sunny | | YM259 | N 30° 33' 29" E 32° 05' 31" 15m |
| | | 160 | On a wet red brick wall of irrigation water canal-shady | | YM260 | N 30° 33' 29" E 32° 05' 31" 10m |
| | | 161 | On a wet red brick wall of irrigation water canal-shady | | YM261 | N 30° 33' 30" E 32° 05' 32" 25m |
| | | 162 | On wet brick wall beside electric water pump room, away from sun | | YM262 | N 30° 33' 30" E 32° 05' 31" 23m |
| | | 163 | On wet brick wall , shady place | | YM263 | N 30° 33' 29" E 32° 05' 31" |
| | | 164 | On wet brick wall beside diesel water pump, very moist, shady place | | YM264 | N 30° 33' 29" E 32° 05' 31" 22m |
| | | 165 | On a wet red brick water basin covered by cement, exposed to sun | | YM265 | N 30° 33' 25" E 32° 05' 30" 26m |
| | | 166 | On a thin layer of mud on red brick wall of water basin covered by cement, shady place. | | YM266 | N 30° 33' 25" E 32° 05' 30" 10m |
| | | 167 | Thin layer of mud on red brick wall of small irrigation water canal shady place | | YM267 | N 30° 33' 24" E 32° 05' 30" 37m |

| Region Name | Site of collection | Serial No. of samples | Habitat | Date of collection | Herbarium No. | GPS data | |
|------------------|---------------------|--------------------------------------------------------|---------------------------------------------------------------------------------------------|----------------------------------------------------------------|--------------------------------------|---------------------------------------|---------------------------------------|
| Abou Sweir | Ezbet Roud Eskandar | 168 | On wet red brick wall of basin of rotary water wheels, shady place | 27/11/2014 | YM268 | N 30° 33' 25" E 32° 05' 27" 17m | |
| | | 169 | On wet red brick wall of small water bridge. | | YM269 | N 30° 33' 24" E 32° 05' 20" 8m | |
| | Ezbet Abo- Gresh | 170 | On wet red brick wall of small water bridge | | YM270 | N 30° 33' 28" E 32° 05' 21" 8m | |
| | | 171 | On wet red brick wall of small water bridge | | YM271 | N 30° 33' 28" E 32° 05' 12" 7m | |
| | Alwasfia Station | 172 | On wet red brick wall beside water tap, shady place. | 29/11/2014 | YM272 | N 30° 34' 55" E 32° 10' 22" 14m | |
| | | | | | | | 173 |
| | | 174 | YM274 | 17m | | | |
| | | Alwasfia, Ezbet Badran | 175 | On a wet red brick water basin covered by cement, shaded area. | 29/11/2014 | YM275 | N 30° 34' 44" E 32° 09' 19" 15m |
| | | | 176 | On a wet red brick water basin covered by cement, shaded area. | | YM276 | N 30° 34' 45" E 32° 09' 17" 10m |
| | | Alwasfia, Ezbet Abu Shanab | 177 | On a wet red brick water basin covered by cement, shaded area | 5/12/2014 | YM277 | N 30° 35' 14" E 32° 09' 50" 11m |
| 178 | | | On a thin layer of mud of red brick wall, beside diesel water pump, very moist, shady place | YM278 | | N 30° 35' 14" E 32° 09' 52" 10m | |
| 179 | | | On wet red brick wall of small water bridge | YM279 | | N 30° 30' 51" E 31° 48' 31" | |
| 180 | YM280 | | | 9m | | | |
| El Tal El Kebier | Ezbet Mansour | 181 | On a dry red brick water basin covered by cement. | 5/12/2014 | YM281 | N 30° 30' 52" E 31° 48' 03" 7m | |
| | | 182 | On wet red brick wall of water basin. | | YM282 | | |
| | 183 | On a thin layer of mud of red brick wall, shaded area. | YM283 | | N 30° 30' 52" E 31° 49' 17" 8m | | |
| | 184 | On a wet red brick water basin covered by cement. | YM284 | | N 30° 30' 52" E 31° 49' 17" | | |
| | 185 | | YM285 | | 9m | | |
| | 186 | | YM286 | | N 30° 30' 52" | | |

Comparative Study of the Moss Flora

| Region Name | Site of collection | Serial No. of samples | Habitat | Date of collection | Herbari-um No. | GPS data |
|-------------|----------------------------|-----------------------|---------------------------------------------------------------------------------|--------------------|----------------|-------------------|
| | | | | | | E 31° 49' 18" 10m |
| | | 187 | | | YM287 | |
| | | 188 | On wet brick wall beside diesel water pump, shady place | | YM288 | N 30° 30' 52" |
| | | 189 | | | YM289 | E 31° 49' 17" |
| | | 190 | | | YM290 | 10m |
| | | 191 | On wet mud land beside diesel water pump | 5/12/2014 | YM291 | N 30° 30' 53" |
| | | 192 | | | YM292 | E 31° 49' 16" |
| | | 193 | On wet brick wall beside diesel water pump. | | YM293 | 7m]I |
| | | 194 | | | YM294 | N 30° 30' 53" |
| | | 195 | On a thin layer of mud of red brick wall, beside diesel water pump, shady place | | YM295 | E 31° 49' 16" |
| | | 196 | | | YM296 | 9m |
| | | 197 | | | YM297 | |
| | | 198 | On wet brick wall shady place | | YM298 | N 30° 30' 53" |
| | | 199 | | | YM299 | E 31° 49' 17" |
| | | 200 | | | YM300 | 9m |
| | Ezbet Mansour | 201 | On a wet red brick water basin covered by cement. | | YM301 | N 30° 30' 53" |
| | | 202 | | | YM302 | E 31° 49' 16" |
| | | 203 | On a wet red brick water basin sunny | | YM303 | 6m |
| | | 204 | | | YM304 | N 30° 30' 53" |
| | | 205 | On a wet red brick wall of irrigation water canal | 5/12/2014 | YM305 | E 31° 49' 19" |
| | | 206 | | | YM306 | 6m |
| | | 207 | | | YM307 | N 30° 33' 03" |
| | | 208 | On thin layer of mud on wet cement wall | | YM308 | E 31° 53' 17" |
| | | 209 | | | YM309 | 24m |
| | | 210 | On wet brick wall beside water pump room | | YM310 | N 30° 33' 02" |
| | Ezbet Fareed Badran | 211 | On wet brick wall beside | | YM311 | E 31° 53' 17" |
| | | 212 | On thin layer of mud on wet wall | | YM312 | 10m |
| | | 213 | On a wet red brick wall of water well, shady place. | 13/12/2014 | YM313 | N 30° 33' 02" |
| | Ezbet Abo Rajah | 214 | On a wet red brick wall of water well, shady place. | | YM314 | E 31° 53' 18" |
| | | | | | | 14m |
| | | | | | | N 30° 33' 02" |
| | | | | | | E 31° 53' 19" |
| | | | | | | 10m |
| | | | | | | N 30° 34' 20" |
| | | | | | | E 32° 07' 12" |
| | | | | | | 13m |
| | | | | | | N 30° 34' 20" |
| | | | | | | E 32° 07' 12" |
| | | | | | | 13m |

| Region Name | Site of collection | Serial No. of samples | Habitat | Date of collection | Herbarium No. | GPS data |
|-------------|-----------------------------------------------------|----------------------------|--------------------------------------------------------------------|--------------------|---------------------------------------|-----------------------------------------------------|
| Abou Sweir | Ezbet Abo Omar | 215 | On a wet red brick wall beside water well, shady place. | 13/12/2014 | YM315 | N 30° 34' 20" E 32° 07' 11" 12m |
| | | 216 | On a wet red brick rocks, shady place. | | YM316 | N 30° 34' 20" E 32° 07' 11" 12m |
| | | 217 | Mud on red brick wall of small irrigation water canal, shady place | | YM317 | N 30° 34' 19" E 32° 07' 33" 14m |
| | | 218 | Mud on red brick wall of small irrigation water canal, shady place | | YM318 | N 30° 34' 19" E 32° 07' 33" 14m |
| | | 219 | Mud on red brick wall of small irrigation water canal, | | YM319 | N 30° 34' 19" E 32° 07' 33" 14m |
| | | 220 | On a wet red brick rocks, shady place. | | YM320 | N 30° 34' 19" E 32° 07' 32" |
| | | 221 | On a wet red brick wall of irrigation water canal, shady | | YM321 | 13m |
| | | 222 | On a wet red brick water basin covered by cement, shady | | YM322 | N 30° 34' 20" E 32° 07' 33" 12m |
| | | 223 | On wet mud of margin of small irrigation water canal, shady place. | | YM323 | N 30° 34' 20" E 32° 07' 33" 12m |
| | | 224 | On wet mud of margin of small irrigation water canal, shady place. | | YM324 | N 30° 34' 20" E 32° 07' 33" 12m |
| | | 225 | On wet mud of margin of small irrigation water canal, shady place. | | YM325 | N 30° 34' 20" E 32° 07' 33" 12m |
| | | 226 | On a wet red brick water basin covered by cement, shady | | YM326 | N 30° 34' 18" E 32° 07' 34" 16m |
| | | 227 | On a wet red brick water basin covered by cement, shaded area. | | YM327 | N 30° 34' 18" E 32° 07' 34" 16m |
| | | 228 | On a wet red brick wall of irrigation water canal | | YM328 | N 30° 34' 19" E 32° 07' 35" |
| | | 229 | On a wet red brick water basin covered by cement | | YM329 | 16m |
| | | Behind the Railway station | | | 230 | On a wet red brick wall of water well, shady place. |
| 231 | On a wet red brick wall of water well, shady place. | | | YM331 | N 30° 33' 56" E 32° 07' 12" 12m | |
| 232 | On a wet red brick wall of irrigation water canal | | | YM332 | N 30° 33' 56" E 32° 07' 12" 11m | |

Comparative Study of the Moss Flora

| Region Name | Site of collection | Serial No. of samples | Habitat | Date of collection | Herbarium No. | GPS data | | |
|---------------|-----------------------------------------------------|-------------------------------|---------------------------------------------------------------------------|--------------------|---------------------------------------------------------------------------|--------------------------------------|-------|--------------------------------|
| West Kantara | Abu Khalifa, El Manshiya El gdeda | 233 | On a wet red brick water basin, shady | 20/12/2014 | YM333 | N 30° 45' 42" E 32° 16' 00" 8m | | |
| | | 234 | On a wet red brick wall beside a water tap, shady | | YM334 | N 30° 45' 47" E 32° 15' 30" | | |
| | Abu Khalifa Mosque | 235 | On mud Land beside water tap, shady | | YM335 | 10m | | |
| | | 236 | On a thin layer of mud on a red brick wall of water reservoir | | YM336 | N 30° 46' 37" E 32° 15' 15" | | |
| | | 237 | | | YM337 | 9m | | |
| | | 238 | On mud land, beside water reservoir | | YM338 | N 30° 46' 37" E 32° 15' 15" 9m | | |
| | West Kantara | Abu Khalifa, Ezbet El Saaidah | 239 | | On a thin layer of mud on yellow rock wall of irrigation water canal | 20/12/2014 | YM339 | N 30° 46' 37" |
| | | | 240 | | Sunny place | | YM340 | E 32° 15' 15" |
| | | | 241 | | | | YM341 | 10m |
| | | | 242 | | On a wet red brick wall of water tap basin covered by cement, shady place | | YM342 | N 30° 46' 36" E 32° 15' 18" |
| 243 | | | | YM343 | 10m | | | |
| 244 | | | On wet mud of margin of irrigation water canal, shady | YM344 | | | | |
| 245 | | | On wet red brick wall of small irrigation water canal, shady place | YM345 | | | | |
| 246 | | | | YM346 | N 30° 47' 04" E 32° 13' 25" | | | |
| 247 | | | On a thin layer of mud on a red brick wall of a small bridge, shady place | YM347 | 6m | | | |
| 248 | | | | YM348 | | | | |
| Ismailia City | Farm of agriculture's Collage Suez Canal University | 249 | | 24/1/2015 | YM349 | | | |
| | | 250 | | | YM350 | N 30° 46' 59" | | |
| | | 251 | On mud on wall of small irrigation water canal shady | | YM351 | E 32° 15' 35" | | |
| | | 252 | | | YM352 | 6m | | |
| | | 253 | On a wet red brick wall of water basin covered by cement Shady place | | YM353 | N 30° 37' 18" | | |
| | | 254 | | | YM354 | E 32° 16' 03 " | | |
| | | 255 | | | YM355 | 22m | | |
| | | 256 | On wet red brick wall, shady place | | YM356 | N 30° 37' 13" E 32° 15' 45 " | | |
| | | 257 | | | YM357 | 13m | | |
| | | 258 | On a wet red brick wall of water basin covered by cement Shady place | | YM358 | N 30° 37' 13" E 32° 15' 45 " | | |
| Ismailia City | Farm of agriculture's Collage Suez Canal University | 259 | On mud Land beside water pump, Shady place | 24/1/2015 | YM359 | 13m | | |
| | | 260 | On a wet red brick water basin covered by cement Shady place | | YM360 | | | |
| | | 261 | | | YM361 | N 30° 37' 12" E 32° 14' 44 " | | |
| | | 262 | | | YM362 | 12m | | |
| | | 263 | On a tree beside water basin, Shady place | | YM363 | | | |
| | | 264 | On a wet red brick wall of water basin covered by cement Shady place | | YM364 | | | |
| | | 265 | | | YM365 | N 30° 37' 16" E 32° 15' 56 " | | |
| | | 266 | | | YM366 | | | |
| | | 267 | | | YM367 | 14m | | |
| | | 268 | | | YM368 | | | |

| Region Name | Site of collection | Serial No. of samples | Habitat | Date of collection | Herbarium No. | GPS data | | | |
|---------------|----------------------------------------------------|-----------------------|-----------------------------------------------------------------------|----------------------------------------|-------------------------------------------------------------------------|----------------------------------------------------|-----------|-------|---------------------------------------|
| Ismailia City | Ein Ghoseen village Ezbet El Karnak | 269 | On mud Land beside water pump | 13/2/2015 | YM369 | N 30° 37' 08" E 32° 15' 38" 24m | | | |
| | | 270 | On sand & on red brick wall beside water basin, sunny | | YM370 | N 30° 37' 06" E 32° 15' 37" 32m | | | |
| | | 271 | | | YM371 | N 30° 37' 07" E 32° 15' 37" 21m | | | |
| | | 272 | | | On a wet red brick wall of water basin covered by cement Shady place | | YM372 | | |
| | | 273 | YM373 | | | N 30° 37' 08" E 32° 15' 37" 17m | | | |
| | | 274 | On a wet red brick water basin covered by cement Shady place | | YM374 | | | | |
| | | 275 | | | YM375 | N 30° 37' 09" E 32° 15' 37" 32m | | | |
| | | 276 | On a wet red brick wall of water basin | | YM376 | | | | |
| | | 277 | On a wet red brick wall of water basin | | YM377 | | | | |
| | | 278 | On wet mud land of small water canal | | YM378 | N 30° 30' 53" E 32° 15' 35" 6m | | | |
| | | 279 | On a tree trunk, shady | | YM379 | | | | |
| | | 280 | On a wet red brick wall of water basin | | YM380 | | | | |
| | | 281 | | | YM381 | | | | |
| | | 282 | On red brick wall of water basin covered by cement shady place | | YM382 | N 30° 31' 07" E 32° 16' 57" 6m | | | |
| | | 283 | | | YM383 | | | | |
| | | 284 | Mud on wet cement wall of small irrigation water canal shady place | | YM384 | N 30° 31' 06" E 32° 16' 57" 10m | | | |
| | | 285 | | | YM385 | | | | |
| | | 286 | | | YM386 | | | | |
| | | 287 | On a thin layer of mud on Zeer, wet and shady place | | YM387 | N 30° 31' 08" E 32° 17' 00" 11m | | | |
| | | 288 | | | YM388 | | | | |
| | | 289 | | | YM389 | | | | |
| | | Fayed city | Dabeiah village, Hoad Ezzat | | 290 | On a wet red brick wall of water basin | 15/3/2015 | YM390 | N 30° 31' 08" E 32° 17' 00" 6m |
| | | | | | 291 | On wet cement wall of small irrigation water canal | | YM391 | N 30° 31' 08" E 32° 17' 01" 10m |
| | | | | | 292 | | | YM392 | |
| | | | | | 293 | | | YM393 | |
| | | | | | 294 | On wet cement wall of small irrigation water canal | | YM394 | N 30° 31' 08" E 32° 17' 03" 8m |
| | | | | | 295 | | | YM395 | |
| | 296 | | | YM396 | | | | | |
| | 297 | | | On a wet red brick wall of water basin | YM397 | N 30° 28' 32" E 32° 18' 24" 10m | | | |
| 298 | On a wet red brick wall, shaded area. | | | YM398 | | | | | |
| 299 | Under bridge , on a wet red brick wall shaded area | | | YM399 | | | | | |
| | | | | 20/12/2015 | | N 30° 27' 14" E 32° 19' 56" 15m | | | |

Comparative Study of the Moss Flora

| Region Name | Site of collection | Serial No. of samples | Habitat | Date of collection | Herbarium No. | GPS data |
|--------------|----------------------------------------------------------|-----------------------------------------------------|---------------------------------------------------------------------|--------------------|---------------|----------------|
| East Kantara | Abou Soutan village, Ezbet El Shahid Ahmed Alqrali | 300 | On a wet red brick wall of water well, shady place. | 8/8/2016 | YM400 | N 30° 27' 15" |
| | | 301 | On margin of wall of water canal, shady place. | | YM401 | E 32° 20' 00 " |
| | | 302 | Mud on wet cement wall of small irrigation water canal, shady place | | YM402 | 13m |
| | | 303 | | | YM403 | N 30° 25' 15" |
| | | 304 | | | YM404 | E 32° 18' 08 " |
| | Ezbet Al saadya | 305 | On a thin layer of mud on a wall of water basin Shady place | | YM405 | 11 m |
| | | 306 | On a wet red brick wall of water basin shady place | | YM406 | N 30° 32' 11" |
| | Eastern lakes, El- ahwad area | 307 | On a wet red brick wall of water basin | | YM407 | E 32° 29' 12" |
| | | 308 | On a wet red brick wall of water basin, shady place | | YM408 | 15 m |
| | | 309 | On a wet red brick wall of water basin, shady place | | YM409 | N 30° 32' 04" |
| 310 | | On a wet red brick wall of water basin, shady place | YM410 | E 32° 23' 56 " | | |
| | | | | | | 19 m |
| | | | | | | N 30° 32' 03" |
| | | | | | | E 32° 23' 55 " |
| | | | | | | 27m |
| | | | | | | N 30° 32' 00" |
| | | | | | | E 32° 23' 59 " |
| | | | | | | 20m |

دراسة مقارنة فلورا الحزازيات بمحافظة الأسماعيلية مع بعض المناطق الجغرافية الاخرى في جمهورية مصر العربية

ياسمين محمد حسن¹، اسامة يحيى ابو سلامة²، وفاء محمد كامل¹، السيدة محمد جمال الدين¹

¹ قسم النبات، كلية العلوم، جامعة قناة السويس، الاسماعيلية، مصر

² قسم النبات، كلية العلوم، جامعة عين شمس، القاهرة، مصر

الملخص العربي

أجريت هذه الدراسة لمقارنة فلورا الحزازيات التي تم جمعها من محافظة الأسماعيلية بالفلورا الحزازية لباقي مناطق مصر الجغرافية. وتتبع أهمية هذه الدراسة من كونها دراسة حديثة لهذه المحافظة التي لم تشهد أي دراسة من هذا النوع منذ ثلاثة عقود. ويتمثل الشق العملي في الدراسة في صورة خمسة عشر رحلة علمية وقد وصل عدد العينات المجمع من تلك الرحلات إلى ٣١٠ عينة حزازية تم تجميعها من سبعة مراكز بمحافظة الإسماعيلية. ومن خلال دراسة الشكل الظاهري للنباتات دراسة دقيقة وكذلك دراستها تشريحياً وعمل مقاطع عرضية في الساق والأوراق لجميع العينات المدروسة. تم تعريف الأنواع المختلفة تعريفاً علمياً كاملاً عن طريق الاستعانة بمراجع عديدة متخصصة ومزودة بصور فوتوغرافية ورسومات توضيحية. وقد اظهرت النتائج ان العينات المدروسة تتضمن ٢٩ نوعاً من الحزازيات القائمة وهذه الأنواع تنتمي الي ١٣ أجناس و ٤ الفصائل و ٤ رتب. و عند مقارنة الفلورا الحزازية التي تم جمعها من محافظة الأسماعيلية بالفلورا الحزازية لباقي مناطق مصر الجغرافية قد تبين من ذلك ان: منطقة جنوب سيناء هي أكثر المناطق قرباً من ناحية فلورا الحزازيات لمحافظة الأسماعيلية، بينما اقلها تشابهاً هما منطقتي نوبة النيل وجبل علبة.