

An updated list of Egyptian mosses

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An updated list provides information concerning the, hitherto, known Egyptian mosses (168 taxa). Reference is made to new records (20 taxa), phytogeographical territory(ies) from which each moss has been recorded, and other relevant data.

An annex to the main list includes the excluded taxa, which are 16 entities and are either **nomina nuda**, misidentified or, hitherto, recorded from only greenhouses and gardens or from beyond Egyptian boundaries.

An appendix including 67 reference works dealing entirely or partly with Egyptian mosses is also provided.

Key words: Bryoflora, Egypt, Mosses.

Introduction:

Many works dealing entirely or partly with Egyptian mosses have appeared (see Appendix 1) since the publication of the basic list by El-Saadawi & Badawi (1977) which then included 74 taxa. Records naturally increased, and the reported number, reached at present 424 taxa: 19 hepatics and 405 mosses. More than half the number of reported mosses, however, still requires careful investigation to reach precise identifications.

Earlier works on Egyptian mosses (all given in Appendix 1) included 16 taxa that should be excluded from the moss flora of Egypt, being misidentifications, **nomina nuda**, not collected from Egyptian territories or grow only in greenhouses and gardens. These 16 taxa are given at the end of this text.

The present account is an updated list of the Egyptian mosses, based on our present knowledge for the moss flora of Egypt. It is hoped to be a basic step towards a comprehensive future work. It includes 148 taxa from earlier publications together with 20 new records, i.e. a total of 168 entities. These 168 entities represent 139 species belonging to 44 genera, 14 families and 9 orders; all under class **Bryopsida**. All entities, except those marked with #, are represented by specimens at CAIA and/or CAI.

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Synonyms given in the present list are only those reported in the publications dealt with mosses from Egypt. The accepted names and the classification system used here are based mainly on Wijk *et al.* (1959-69); Crosby (1977, 1979), Corely *et al.* (1981), Crosby & Bauer (1981, 1983), Anderson *et al.* (1990), Herrstadt *et al.* (1991), Crosby *et al.* (1992), Zander (1993) and Crosby & Magill (1994). Abbreviations of names of authors of plant names are as given in Brummitt & Powell (1992). The presented list includes also the phytogeographical territory(ies) from which each moss has been recorded. These phytogeographical territories (Fig.1) are partially after Täckholm (1974) and El-Hadidi & Fayed (1994/95). These territories are arranged according to date of publication for each record and are given in an abbreviated form. Explanations of these abbreviations are given in Figure 1, other abbreviations used in the list are as follows:

Eg: Egypt (unknown locality) including Sinai; E: Egypt (unknown locality) excluding Sinai; (R?): Species not certain; *: New record; #: Specimens not at CAIA and/or CAI; ♥: Collected mainly once before 1904; ⚡: Not detected in any source of reference including indices.

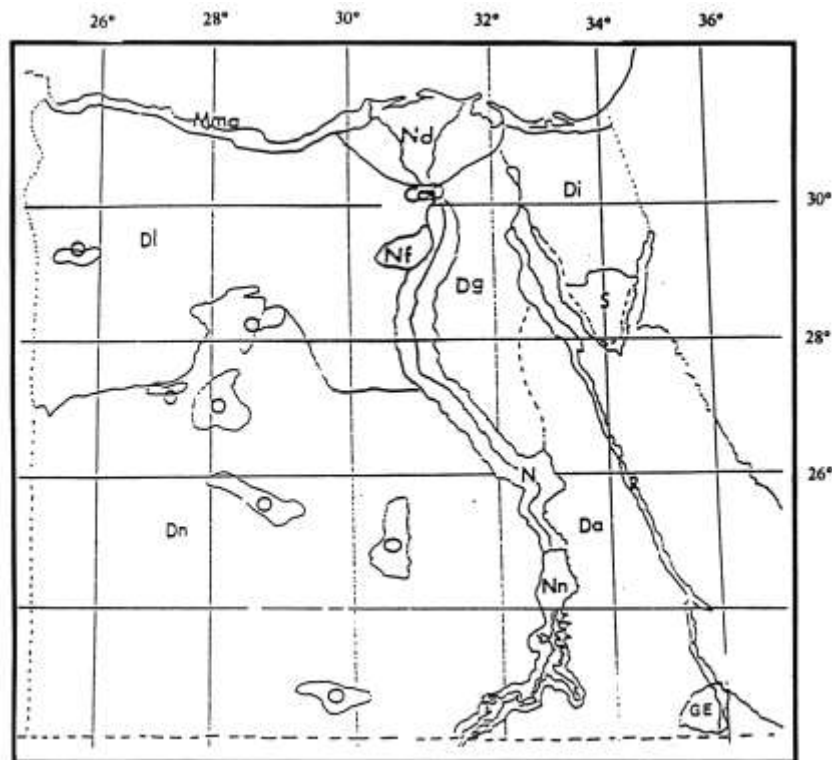


Fig.1. Phytogeographical territories in Egypt (After Täckholm, 1974; El-Hadidi & Fayed 1994/95). **Cai:** Cairo area; **Da:** Arabian Desert; **Dg:** Galala Desert; **Di:** Isthmic Desert; **Dl:** Libyan Desert; **Dn:** Nubian Desert; **GE:** Gebel Elba; **Mma:** Western Mediterranean coastal land; **Nd:** Nile Delta; **Nf:** Nile Faiyum; **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:** Oases of Western Desert; **R:** Red Sea coastal plains; **S:** Southern Sinai massive (Sinai proper i.e. relatively high mountains, south of Isthmic desert).

CLASS: Bryopsida

Order: Fissidentales

Family: Fissidentaceae Schimp.

1. *Fissidens arnoldii* R. Ruthe, Hedwigia 9: 178. 1870.
Syn. *F. obtusifolius* Wilson, 1845.
GE; S.
2. *F. bryoides* Hedw., Spec. Musc. 153. 1801.
Cai, Nd; Dg.
3. *F. bryoides* Hedw. var. *gymnandrus* (Büse) R. Ruthe, Hedwigia 9:178. 1870.
Nf.
- ♥ # 4. *F. crassipes* Wilson ex Bruch, Schimp. & W. Gümbel, Bryol. Eur. 1: 197. 100. 1849.
Cai.
5. *F. crassipes* Wilson ex Bruch, Schimp. & W. Gümbel ssp. *warnstorffii* (M. Fleisch.) Brugg.- Nann., Proceedings of the Koninklijke Nederlandse Akademie van Wetenschappen, series C 85: 59- 104. 1982
Syn. *F. mnevidis* J.J. Amann, 1922.; *F. crassipes* Wilson ex Bruch, Schimp. & W. Gümbel var. *philibertii* Besch., 1882.
E, Eg; Nd.
6. *F. limbatus* Sull., Rep. Expl. Surv. Railr. R. Bot. 4 (5): 185.1. 1856.
Syn. *F. alexandrinus* Lorentz, 1867; *F. cyprius* Jur., 1865.
Mma, Nv (R?), Cai; S.
7. *F. viridulus* (Sw.) Wahlenb., Fl. Lapp. 334. 1812.
Syn. *F. impar* Mitt., 1885; *F. bryoides* Hedw. ssp. *viridulus* (Sw.) Kindb., 1897.
Cai, Nd, Nf, Dg, Mma, Nv, Nn; GE.
8. *F. viridulus* (Sw.) Wahlenb. var. *bambergeri* (Schimp.) Waldh. in Weim., Foert. Skand. Vaext. Moss2: 18. 1937.
Syn. *F. viridulus* ssp. *bambergeri* (Schimp.) Kindb., 1897.
Cai.
- ♥ # 9. *F. fontanus* (Bach. Pyl.) Steud., Nom. Bot. 2: 166. 1824.
Syn. *F. julianus* (Sav.) Schimp., 1838.
E.

Order: Dicranales

Family: Ditrichaceae Limpr.

10. *Ceratodon purpureus* (Hedw.) Brid. var. *rotundifolius* Berggr., K. Svensk. Vet. Ak. Handl. 13 (7): 44. 1875.
Syn. *C. purpureus* (Hedw.) Brid. var. *obtusifolius* Limpr., 1887.
Nf.

Family: Dicranaceae Schimp.

← Subfamily: Anisothecioideae

11. *Dicranella rufescens* (With.) Schimp., Coroll. 13. 1856.
Syn. *Anisothecium rufescens* (With.) Lindb. 1879.
Nf.

↑ Subfamily: Cynodontoideae

12. *Dichodontium pellucidum* (Hedw.) Schimp., Coroll. 12. 1856.
Syn. *D. pellucidum* (Hedw.) Schimp. var. *fagimontanum* (Brid.) Schimp., 1856;
D. pellucidum (Hedw.) Schimp. fo. *fagimontanum* C.E.O. Jensen, 1939.
Cai.

Order: Encalyptales

Family: Encalyptaceae Schimp.

13. *Encalypta intermedia* Jur., Verh. Zool. Bot. Ges. Wien 20: 595. 1870.
Syn. *E. vulgaris* Hedw. var. *mediolanensis* Warnst., 1899.
S.
- # 14. *E. vulgaris* Hedw., Spec. Musc. 60.1801.
S.

Order: Pottiales

Family: Pottiaceae Schimp.

← Subfamily: Timmielloideae

15. *Timmiella barbuloides* (Brid.) Mönk., Laubm. Eur. 273. 1927.
Syn. *T. barbula* (Schwägr.) Limpr., 1888.
[As *T. anomala* by Abou Salama 1985: 99]
GE; S.

↑ Subfamily: Trichostomoideae

16. *Eucladium verticillatum* (Brid.) Bruch, Schimp. & W. Gümbel, Bryol. Eur. 1: 9.
40. 1846.
Syn. *E. verticillatum* forma [Lorentz 1867: 15]; *Hymenostylium verticillatum* [Hart
1891: 169]; *Eucladium verticillatum* (L.) Bryol. eur.[Brotherus 1924:
258].
S, Cai; R.
17. *Tortella inflexa* (Bruch) Broth., Nat. Pfl. 1 (3): 397. 1902.
Mma.
18. *T. nitida* (Lindb.) Broth., Nat. Pfl. 1 (3): 397. 1902.
Syn. *Barbula alexandrina* Lorentz, 1867; *Barbula muralis* var. *alexandrina* Müll.
Hal. [Sickenberger 1901:317]; *Barbula nitida* Lindb. [Sickenberger 1901: 317]
Mma,GE; Nv.
- * 19. *T. tortuosa* (Hedw.) Limpr., Laubm. 1: 604. 1888.
Dg.
- * 20. *Trichostomum crispulum* Bruch in F.A.Müll., Flora 12: 395. 4. 1829.
S.

→ Subfamily: Merceyoideae

21. *Barbula convoluta* Hedw., Spec. Musc. 120. 1801.
Syn. *Streblotrichum convolutum* (Hedw.) P. Beauv., 1805.
Nn, Dg; S.
22. *B. ehrenbergii* (Lorentz) M. Fleisch., Musci Arch. Indic. ser. 4:n. 161.1901.
Syn. *Trichostomum ehrenbergii* Lorentz, 1867; *Didymodon ehrenbergii* (Lorentz)
Kindb.,1897; *Hydrogonium ehrenbergii* (Lorentz) A. Jaeger, 1880; *Barbula
bolleana* (Müll.Hal.) Broth., 1924 [cf. Ros *et al.* 1999].
S, Cai, Nd, Nf, Nv; Nn.
23. *B. indica* (Hook.) Spreng. in Steud., Nomencl. Bot. 2: 72. 1824.
Syn. *Semibarbula orientalis* (F. Weber) Wijk & Margad., 1959.
Cai, Nd; Nv.
24. *B. unguiculata* Hedw., Spec. Musc. 118.1801.
Cai, Nd, Nf, Dg; Nv.
25. *B. unguiculata* Hedw. fo. *cuspidata* (Schultz) Mönk., Laubm. Eur.286. 1927.
Syn. *B. unguiculata* Hedw. var. *cuspidata* (Schultz) Brid. 1826.
Nf; Dg
26. *B. unguiculata* Hedw. fo. *obtusifolia* Mönk., Laubm. Eur. 286.1927.
Cai; Nd.

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27. *B. unguiculata* Hedw. fo. *robusta* (Lindb.) Podp., Consp. 214. 1954.
Syn. *B. unguiculata* Hedw. var. *robusta* Lindb. 1929.
Nf.
28. *Didymodon aaronis* (Lorentz) J. Guerra in J. Guerra & Ros, Cryptogamie
Bryol. Lichénol. 8: 55. 1987.
Syn. *Trichostomum aaronis* Lorentz, 1867; *Barbula aaronis* (Lorentz) Hilp., 1933;
Gyroweisia aaronis (Lorentz) Par. [cf. Hume 1906: 229]; *Trichostomopsis*
aaronis (Lorentz) S. Agnew & Tonwnsend, 1970.
[As *Barbula* sp.4 by Abou Salama 1985: 93]
S; Dg.
29. *D. fallax* (Hedw.) R.H. Zander, Phytologia, 41: 28. 1978.
[As *Barbula acuta* by Abou Salama 1985: 87, as *Didymodon acutus* by Shabbara
1986: 52; Badawi *et al.* 1987b: 359; El- Saadawi *et al.* 1987b: 334.]
S; Nf.
- * 30. *D. fallax* (Hedw.) R.H. Zander var. *reflexus* (Brid.) R.H. Zander, Bryologist
83:230. 1980.
Syn. *Barbula reflexa* (Brid.) Brid., 1819
Mma.
31. *D. luridus* Hornsch. in Spreng. Syst. Veg. 4 (1): 173. 1827.
Syn. *D. trifarius* (Hedw.) Röhl., 1813.
S, Mma; Dg.
- * 32. *D. rigidulus* Hedw. ,Spec. Musc.104.1801.
Syn. *Barbula bescherellei* Sauerb.,1880
S.
33. *D. rigidulus* Hedw. var. *gracilis* (Schleich. ex Hook. & Grev.) R.H. Zander ,
Cryptogamie Bryol. Lichénol. 2 : 393. 1981.
Syn. *B. gracilis* (Schleich.) Schwägr. var. *viridis* Br. eur.[Geheeb 1903: 187];
Barbula acuta (Brid.) Brid.,1819; *Didymodon acutus* (Brid.) K. Saito.,1975;
Didymodon acutus (Brid.) K. Saito f. *viridis* (Bruch, Schimp. & W. Gümbe)l
Podp. [Vana 1988].
S, Mma; Nf.
34. *D. sinuosus* (Mitt.) Delogne. Bull. Soc. Roy. Bot. Belg., 12: 423. 1873.
Syn. *Barbula sinuosa* (Mitt.) Grav., 1874.
Nf; Mma.
- * 35. *D. spadiceus* (Mitt.)Limpr., Laubm. Deutschl. 1:556. 1888.
S; Dg.
- # 36. *D. tectorum* (Müll. Hal.) K. Saito.,J. Hattori Bot. Lab. 39:516. 1975.
Syn. *Barbula tectorum* Müll. Hal., 1896.
Mma.
37. *D. tophaceus* (Brid.) Lisa, Elenco. Muschi Torino, 31. 1837.
Syn. *Trichostomum tophaceum* forma *foliis magis acuminatis* [Lorentz 1867:21] ;
Barbula tophacea (Brid.) Mitt.,1859.
S, Cai, Nd, Mma, Dg, Nf, Nv; Nn.
- * 38. *D. tophaceus* (Brid.) Lisa var. *brevifolius* (Bruch, Schimp. & W. Gümbe)l Paris,
Ind. Bryol.ed. 2,2: 77.1904.
S.
- # 39. *D. tophaceus* (Brid.) Lisa var. *humilis* (Schimp.) Warnst. Krypt. Fl. Brandenburg
2: 230.1904.
S; GE.

- # 40. *D. tophaceus* (Brid.) Lisa fo. *lingulatus* (Boulay) Mönk., Süßwasserfl. 14:67.1914.
Syn. *Barbula tophacea* fo. *lingulata*. [El-Saadawi & Badawi 1977: 182]
Eg.
41. *D. vinealis* (Brid.) R.H. Zander, Phytologia 41: 25. 1978.
Syn. *Barbula vinealis* Brid., 1827; *Barbula cylindrica* (Taylor) Schimp., 1872;
Barbula vinealis (Brid.) ssp. *cylindrica* (Taylor) Podp., 1954.
[As *Barbula* 1 by Shabbara 1986: 51; Badawi *et al.* 1987b: 359; El Saadawi *et al.*
1987b: 334]
S, Mma, Nd, Cai, Nf; Di.
42. *Gymnostomum aeruginosum* Sm., Fl. Brit. 3: 1163. 1804.
Syn. *Hymenostylium rupestre* Schwägr. [Hart 1891: 169]
[As *Hymenostylium recurvirostre* by Abou Salama 1991: 85]
S, Nf; Cai.
43. *G. calcareum* Nees & Hornsch., Bryol. Germ. 1: 153. 10 f. 15. 1823.
Nv, Dg, GE, S, Nd, Nf; Mma.
- # 44. *G. calcareum* Nees & Hornsch. var. *muticum* Boulay, Musci France 556. 1884.
S.
45. *G. mosis* (Lorentz) Jur. & Milde, Verh. Zool. Bor. Ges. Wien. 20: 590. 1870.
Syn. *Trichostomum mosis* Lorentz, 1867; *Gyroweisia mosis* (Lorentz) Paris 1896
[As *Gymnostomum* sp. 5 by Abou Salama 1991: 92]
S.
46. *G. viridulum* Brid. fid. Whitehouse & Crundw., J. Bryol. 16: 563. 1991.
Syn. *Weissia rohlfsiana* Müll. Hal., 1874; *Gymnostomum calcareum* Nees &
Hornsch. var. *viridulum* (Brid.) Br. eur., 1846; *Gyroweisia rohlfsiana* (Müll. Hal.)
Paris, 1896.
[As ? *Gymnostomiella* sp. by Abou Salama 1985: 114, as *Gymnostomiella orcuttii*
by Shabbara 1990: 179]
Nv, Cai, Mma, Dg; S.
47. *Gyroweisia reflexa* (Brid.) Schimp., Syn. ed. 2: 39. 1876.
[As *G. tenuis* by Yousef 1987: 20; by Lashin 1990:32]
Cai, S, Nd; Dg.
48. *G. tenuis* (Hedw.) Schimp., Syn. ed. 2: 38.1876.
S.
49. *Hymenostylium recurvirostrum* (Hedw.) Dixon, Rev. Bryol. Lich.6: 96. 1934.
Syn. *Gymnostomum recurvirostre* Hedw., 1801.
[As Moss 2 by Abou Salama 1985: 128]
S.
50. *Pseudocrossidium hornsichianum* (Schultz) R.H. Zander, Phytologia 44: 205.
1979.
Syn. *Barbula hornsichiana* Schultz, 1822.
Mma, S; Nv.
- ↓ Subfamily: Pottioideae
51. *Aloina aloides* (Schultz) Kindb., Bih. K. Svensk. Vet. Ak. Handl. 7 (9): 136.1883.
Syn. *Barbula aloides* [Lorentz 1867:31]
S; Mma.

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52. *A. aloides* (Schultz) Kindb. var. *ambigua* (Bruch, Schimp. & W. Gümbel) E.J. Craig in Grout, Moss Fl. N. Am. 1(4):214. 1939.
Syn. *A. ambigua* (Bruch & Schimp.) Limpr., 1888; *A. rigida* (Hedw.) Limpr. var. *ambigua* (Bruch, Schimp. & W. Gümbel) E.J. Craig., 1940.
Mma; S.
53. *A. bifrons* (De Not.) Delgad., Bryologist 76: 273. 1973.
Syn. *A. rigida* (Hedw.) Limpr. var. *pilifera* (De Not.) Limpr., 1888; *A. pilifera* (De Not.) H.A. Crum & Steere, 1959.
Mma.
- *** 54. *A. rigida* (Hedw.) Limpr., Laubm. Deutschl. 1: 637. 1888.
Mma.
55. *Crossidium aberrans* Holz. & E.B. Bartram, Bryologist 27: 4. 2f. 1. 1924.
[As *C. chloronotos* by Abou Salama 1985: 101, as *C. crassinerve* by Abou Salama 1991: 107]
S, Mma; Di.
56. *C. crassinerve* (De Not.) Jur., Laubmoosfl. Oest. Ungarn 128. 1882.
[As *C. chloronotos* (Brid.) Limpr., 1888 by Imam & Ghabbour 1972: 520; cf. Ros *et al.* 1999].
Mma.
- ♥ # 57. *C. geheebii* (Broth.) Broth., Nat. Pfl. Fam. 1(3): 426. 1902
[As *C. aberrans* by Delgadillo 1975: 271; cf. Frey & Kürschner 1988 a,b]
S.
- * 58. *C. laevipilum* Thér. & Trab., Bull. Soc. Hist. Nat. Afr. Nord., 22: 161. 3. 1931
Mma.
- # 59. *C. squamiferum* (Viv.) Jur., Laubmoosfl. Oest. Ungarn. 127. 1882.
Syn. *Barbula membranifolia* [Lorentz 1867: 31]; *Barbula membranifolia* Hook. [Sickenberger 1901: 317].
S; Di.
- * 60. *C. squamiferum* (Viv.) Jur. var. *pottioideum* (De Not.) Mönk., Laubm. Eur. 315. 1927.
S.
- * 61. *Hennediella stanfordensis* (Steere) Blockeel, J. Bryol. 16: 191, 1991.
Syn. *Hyophila stanfordensis* (Steere) Smith & Whitehouse, 1974.
Nd.
62. *Microbryum starckeanum* (Hedw.) R.H. Zander, Bull. Buffalo. Soc. Nat. Sc. 32: 313. 1993
Syn. *Pottia starckeanum* (Hedw.) Müll. Hal., 1849.
Mma; S.
63. *M. starckeanum* (Hedw.) R.H. Zander var. *brachyodus* (Bruch, Schimp. & W. Gümbel) R.H. Zander, Bull. Buffalo. Soc. Nat. Sc. 32: 313. 1993.
Syn. *Pottia mutica* Venturi, 1869; *Pottia starckeanum* agg. (Hedw.) Müll Hal. [cf. Ros *et al.*, 1999]
Cai; S.
- # 64. *Pterygoneurum subsessile* (Brid.) Jur., Laubmoosfl. Oest. Ungarn 96. 1882.
Di.

*** Not a new record any more, see Gallego *et al.* 1999.

65. *Syntrichia inermis* (Brid.) Bruch in Huebener, *Musc. Germ.* 335. 1833.
Syn. *Barbula inermis* [Lorentz 1867: 32]; *Tortula inermis* Mont., [Hart 1891: 169]
S.
- ♥ # 66. *S. rigescens* (Broth. & Geh. in Broth.) Ochyra, *Fragm. Florist. Geobot.* 37: 212. 1992.
Syn. *Tortula rigescens* Broth. & Geh., 1909.
S.
67. *Tortula atrovirens* (Sm.) Lindb., *Oefv. K.Vet. Ak. Foerh.* 21 (4): 236. 1864.
Syn. *Desmatodon convolutus* (Brid.) Grout, 1939.
S; Mma.
- * 68. *T. brevissima* Schiffn., *Ann. Naturh. Hofmus. Wien* 27:481.23-33. 1913.
S.
- # 69. *T. canescens* Mont., *Arch. Bot.* 1 (2): 133. 4f. 3. 1833.
S.
- ♥ # 70. *T. kneuckeri* Broth. & Geh., *Nat. Pfl. Fam. ed.* 2, 10: 297.1924.
S.
- * 71. *T. marginata* (Bruch & Schimp.) Spruce, *London J. Bot.* 4: 192. 1845.
Mma.
- * 72. *T. modica* R.H. Zander, *Bull. Buffalo. Soc. Nat. Sc.* 32: 333.1993.
Syn. *Pottia intermedia* (Turner) Fűrnr., 1829.
Mma.
73. *T. muralis* Hedw., *Spec. Musc.* 123. 1801.
[As *T. muralis* Hedw. var. *aestiva* Brid. ex Hedw. by Shabbara 1990: 157]
Cai, Mma, Nd; Dg.
74. *T. muralis* Hedw. fo. *incana* (Bruch, Schimp. & W. Gümbe) Sapjegin, *Bot. Jahrb. System.* 46 (Beibl.105) :14, 1911.
Syn. *Barbula muralis* var. *incana* Bruch, Schimp. & W. Gümbe, 1842;
Tortula muralis Hedw. var. *incana* Br. eur. [Imam & Ghabbour 1972: 522]
Mma.
75. *T. muralis* Hedw. var. *obcordata* (Schimp.) Limpr. *Laubm. Deutschl.* 1: 666. 1888.
Syn. *T. muralis* Hedw. fo. *obcordata* (Schimp.) Mönk., 1927.
Mma.
76. *T. pallida* (Lindb.) R.H. Zander var. *longicuspis* (Warnst.) R.H. Zander, *Bull. Buffalo. Soc. Nat. Sc.* 32: 319.1993.
Syn. *Pottia venusta* Jur. [Lorentz 1867: 21]; *Pottia pallida* Lindb. var. *longicuspis* Warnst., 1916; *Pottia pallida* Lindb., 1864 [cf. Ros *et al.* 1999]
Mma
77. *T. plinthobia* (Sull. & Lesq.) Austin, *Musci Appalach. Suppl.* 1:10. 1878. cf. R.H. Zander, *Bryologist* 82: 551. 1979.
Syn. *Desmatodon plinthobius* Sull. & Lesq., 1856.
Mma.
78. *T. vahliana* (Schultz) Mont., in Gay, *Hist. Fis. Polit. Chil. Bot.* 7:153.1850.
Mma.
79. *T. wilsonii* (Hook.) R.H. Zander, *Bull. Buffalo. Soc. Nat. Sc.* 32: 320. 1993.
Syn. *Pottia wilsonii* (Hook.) Bruch, Schimp. & W. Gümbe, 1843.
Mma.
- * 80. *Weissia controversa* Hedw., *Spec. Musc.* 67.1801.
S.

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- ♥ # 81. *W. longifolia* Mitt. fid. Crundw. & Nyholm, J. Bryol. 7: 13. 1972.
Syn. *Systegium crispum* (Hedw.) [Lorentz 1867: 15]; *Astomum crispum* (Hedw.)
Hampe, 1837.
Mma.

Family: Cinclidotaceae (Broth.) Mönk.

- # 82. *Cinclidotus mucronatus* (Brid.) Guim., Cat. Descr. Briol. Portug. 57. 1919.
S.
* 83. *C. riparius* (Brid.) Arn., Mem. Soc. Linn. Paris 7 : 247. 1827.
S.

Order : Grimmiales

Family: Grimmiaceae Arnold

84. *Grimmia anodon* Bruch & Schimp. , Bryol. Eur. 3: 110. 236. 1845.
S.
♥ # 85. *G. anodon* Bruch & Schimp. var. *sinaïtica* Renaud & Cardot, Bull. Herb.
Boiss. 2:33. 1894.
S.
86. *G. crinita* Brid., Spec. Musc. 1: 95. 1806.
Syn. *G. sinaïca* Hampe. [Lorentz 1867: 35; Geheeb 1903: 204]
S.
♥ # 87. *G. laevigata* (Brid.) Brid., Bryol. Univ., 1: 183.1826.
Syn. *G. campestris* Burch ex Hook. 1819; *G. leucophaea* Grev. [Hart 1891: 169]
S.
88. *G. orbicularis* Bruch in Wilson, Engl. Bot. Suppl. 4: n. 288. 1844.
S.
♥ # 89. *Racomitrium aciculare* (Hedw.) Brid., Mant. Musc. 80 .1819.
Syn. *Trichostomum aciculare* P. Beauv. [Decaisne 1834 cf. Hart 1891: 171].
S.
90. *Schistidium agassizii* Sull. & Lesq., Musci Bor. Am. 31. 1856.
Syn. *Grimmia alpicola* Sw. [Geheeb 1903: 203]; *Schistidium alpicola* (Hedw.)
Limpr. , 1889.
[As *Grimmia* (*Schistidium*) *alpicola* Sw. fo. *sinaïtica* by Geheeb 1903: 203].
S.
♥ # 91. *S. apocarpum* (Hedw.) Bruch & Schimp., Bryol. Eur. 3: 99. 233. 1845.
Syn. *Grimmia apocarpa* L. [Hart 1891: 168]
S.

Order: Funariales

∘Suborder: Funariineae

Family: Funariaceae Schwägr.

- ♥ # 92. *Entosthodon attenuatus* (Dicks.) Bryhn, K.Norsk. Vid. Selsk. Skrift. 1908
(8): 25. 1908.
Syn. *E. templetonii* Schwägr. [Schimp. 1876: 380; Hart 1891: 170]; *Funaria*
attenuata Dicks.) Lindb., 1870.
S; E.
♥ # 93. *E. curvi-apiculatus* Müll. Hal., Flora 57: 483. 1874.
Syn. *Funaria curvi-apiculata* (Müll.Hal.) Broth.,1903.
Nv.

94. *E. durieui* Mont., Ann. Sc. Nat. Bot. Ser. 3, 11:33. 1849.
Syn. *E. pallescens* Jur. fo. *foliis solidioribus* [Lorentz 1867:38]; *Funaria pallescens* (Jur.) Lindb., 1888., *Entosthodon pallescens* Jur., 1865
Cai, GE; S.
- # 95. *E. fascicularis* (Hedw.) Müll. Hal., Syn. 1: 120. 1848.
Syn. *Funaria fascicularis* (Hedw.) Lindb., 1865.
Cai.
- # 96. *E. niloticus* Schimp., Bot. Zeit. 13: 747. 1855.
Syn. *F. nilotica* Broth., 1903. [*Entosthodon niloticus* (Delile) Schimp. = *Physcomitrium niloticum* (Delile) Müll. Hal. et pp. non typ. *Entosthodon niloticus* Schimp.]
Cai; Dg
- # 97. *E. obtusus* (Hedw.) Lindb., Oefv. K. Vid. Ak. Foerh. 21: 221. 1865.
Syn. *Funaria obtusa* (Hedw.) Lindb., 1870.
Cai.
98. *E. plano-convexus* (E.B. Bartram) Grout, Moss. Fl. N. Am. 2: 80. 34. 1935.
Di.
- ♥ # 99. *Funaria anomala* Jur. in Ung. & Kotschy, Ins. Cypren 170. 1865.
Cai.
- * 100. *F. convexa* Spruce, Musc. Pyren. no. 149. 1847.
[As *F. calcarea* var. *mediterranea* by Abou Salama 1985:111; Abou Salama 1991: 126]
S.
- # 101. *F. handelii* Schiffn., Ann. Naturh. Hofmus Wien 27: 493. 61- 69. 1913.
Cai; Dg.
102. *F. hygrometrica* Hedw., Spec. Musc. 172. 1801.
Cai, Nv, Nn, Nd, Dg, S, Nf, Mma; Di.
103. *F. hygrometrica* Hedw. var. *calvescens* (Schwägr.) Mont., Ann. Sc. Nat. Bot. ser. 2, 12: 54. 1839.
Di.
104. *F. hygrometrica* Hedw. var. *intermedia* Warnst., Verh. Bot. Ver. Branden. 42: 200. 1901.
Dg.
- ♥ # 105. *F. hygrometrica* Hedw. var. *minor* (Delile) Brid., Bryol. Univ. 2: 738. 1827.
Syn. *F. minor* Delile, 1813.
Cai.
- # 106. *F. hygrometrica* Hedw. var. *muralis* Huebener, Musc. Germ. 497. 1833.
Syn. *F. hygrometrica* Hedw. var. *patula* Br. eur., 1846 [Imam & Ghabbour 1972: 521].
Dg.
- ♥ # 107. *F. microstoma* Bruch ex Schimp., Flora 23: 850. 1840.
Eg.
108. *F. muhlenbergii* Turner, Ann. Bot. 2 (1): 198, 1805.
Syn. *Funaria dentata* Crom. var. *mediterranea* (Lindb.) Limpr., 1891; *F. calcarea* Wahlenb. var. *mediterranea* (Lindb.) C. E. O. Jensen & Medelius, 1929; *F. mediterranea* Lindb. 1863.
E, GE; Cai.
- ♥ # 109. *F. nubica* Müll. Hal., Hedwigia 38: 61. 1899.
Nn.

110. *F. pulchella* H. Philib., Rev. Bryol. 11: 41. 1884.
E; GE “new record to GE”.
- ♥ # 111. *F. sickenbergeri* Müll. Hal., Gen. Musc. Fr. 105. 1900.
O.
112. *Micropoma niloticum* (Delile) Lindb. in Broth., Nat. Pfl. 1 (3): 518. 372. 1903.
Syn. *Gymnostomum niloticum* Delile, 1813; *Physcomitrium niloticum* Lindb. [Müll. Hal., 1858: 154]; *Microstegium niloticum* (Delile) Lindb., 1865; *Physcomitrium sesostris* Lorentz, 1867; *Physcomitrium niloticum* (Delile) Brid. [Sickenberger 1901: 316].
Cai, Nv, Nd, GE, Nf; Dg.
- # 113. *Physcomitrium eurystomum* Sendtn. Denkschr. Bayer. Bot. Ges. Regensburg 3: 142. 1841
Syn. *P. acuminatum* (Schleich.) Bruch, Schimp. & W. Gümbel, 1841;
Physcomitrium eurystomum Sendtn. fo. *acuminatum* (Bruch, Schimp. & W. Gümbel) Löske, 1929.
Cai; Dg.
114. *P. immersum* Sull., in Gray, Man. Bot. N. U. States 648. 1848.
Di.
115. *P. pyriforme* (Hedw.) Brid., Bryol. Univ. 2: 815. 1827.
Cai, Nn, Nd.; Dg.
- **Suborder : Splachineae**
Family: Splachnobryaceae A. Kop.
- * 116. *Splachnobryum limbatum* D.H. Norris & R.H. Zander, The Bryologist 84 (3): 404. 1981.
Mma.
- * 117. *S. obtusum* (Brid.) Müll. Hal., Verh. Zool. Bot. Ges. Wien 19: 504. 1869.
[As *Philonotis gracillima* by Shabbara, 1986: 71; Badawi *et al.* 1987b: 359; El-Saadawi *et al.* [1987b: 349]
Nf.
- Order: Bryales**
Family: Bryaceae Schwägr.
118. *Brachymerium* cf. *angustirete* Ochi, Fac. of Education, Tottori Univ., 23 (1): 24. 1972.
Nd.
- # 119. *B. exile* (Dozy. & Molck.) Bosch & Sande Lac., Bryol. Jav. 1: 139. 1860.
[As *Bryum* (?) *comense*, cf. Ochi 1972: 8.; as *Bryum caespiticium* L. by Geheeb 1904: 4, rev. Ochi cf. Vana 1988.]
S; Mma.
120. *B.* cf. *longicolle* Thér., Bull. Soc. Bot. Geneve, 26: 85. ic. 1936.
Nd.
121. *B.* cf. *sikkimense* Renaud & Cardot, Bull. Soc. R. Bot. Belg. 38 (1): 12. 1900.
S.
122. *Bryum alpinum* Huds. ex With., Syst. Arr. Brit. Pl. ed. 4,3: 824. 1801.
[As *B. alpinum* ssp. *gemmaiparum* by El-Awadi 1985: 64; El-Saadawi *et al.* 1987a: 301].
Cai, Nf; S.
- # 123. *B. alpinum* Huds. ex With. var. *viride* Husn., Musc. Gall. 297.67 f. 6. 1889.
Nn.

124. *B. cf. apiculatum* Schwägr., Spec. Musc. Suppl. 1 (2): 102. 72. 1816.
Nd.
125. *B. argenteum* Hedw. Spec. Musc. 181. 1801.
Cai, Mma; S.
126. *B. argenteum* Hedw. var. *lanatum* (P. Beauv.) Hampe 1839.
Dg; S.
127. *B. bicolor* Dicks., Pl. Crypt. Brit. fasc. 4: 16. 1801.
Syn. *Bryum dichotomum* Hedw. 1801.
S, Cai, Nv, Mma, Dg, Nd; Nf.
128. *B. caespiticium* Hedw., Spec. Musc. 180. 1801.
Cai, Mma, S; Nd.
129. *B. caespiticium* Hedw. var. *badium* Brid., Bryol. Univ. 1: 850. 1827.
Syn. *B. badium* (Brid.) Schimp., 1876.
Cai, Dg, Mma; S.
130. *B. capillare* Hedw., Spec. Musc. 182. 1801.
Syn. *B. aschersonii* Müll. Hal. 1874.
[As *B. syriacum* Lorentz, cf. Ochi 1972: 91].
O, S, Cai; Dg.
- # 131. *B. cellulare* Hook. in Schwägr., Spec. Musc. Suppl. 3 (1): 214a. 1827.
Cai; Dg.
132. *B. comense* Schimp. Syn. ed. 2: 444. 1876.
Syn. *B. caespiticium* Hedw. var. *comense* (Schimp.) Husn., 1889; *B. caespiticium*
Hedw. ssp. *comense* (Schimp.) J.J. Amann, 1893.
Mma, Cai; Nd.
- * 133. *B. creberrimum* Taylor, London J. Bot. 5: 54. 1846.
S.
134. *B. elegans* Nees in Brid., Bryol. Univ. 1: 849. 1827.
Syn. *B. capillare* Hedw. ssp. *elegans* (Nees) Lindb., 1879.
[As *B. capillare* by Abou Salama 1985: 117].
S; Nf.
135. *B. funkii* Schwägr., Spec. Musc. 1(2): 89. 69. 1816.
Dg; S.
136. *B. cf. gedeanum* Bosch & Sande Lac., Bryol. Jav. 1: 147. 120. 1860.
Nd.
137. *B. gemmiparum* De Not., Cronac. Briol. Ital. 1: 26. 1866.
Syn. *B. gemmiparum* De Not. var. *sinaica* Geh., 1904; *B. alpinum* ssp.
gemmiparum f. *sinaica* Podp. 1953; *B. alpinum* With var. *gemmiparum* (De
Not.) Lindb; *B. alpinum* Huds. ex With ssp. *gemmiparum* (De Not.) Kindb.
1897.
S, Cai ; Nf.
138. *B. kunzei* Hornsch., Flora 2 (1): 90. 1819.
Syn. *B. caespiticium* Hedw. var. *imbricatum* Bruch , Schimp. & W. GümbeL,
1839.
Cai; Mma.
- * 139. *B. pseudotriquetrum* (Hedw.) P. Gaertn., G. Mey. & Scherb., Oek. Techn. Fl.
Wetterau 3: 102. 1802.
[As *B. syriacum* by Geheeb 1904: 4, rev.Ochi, cf. Vana 1988]
S.

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- * 140. *B. pseudotriquetrum* (Hedw.) P. Gaertn., G. Mey. & Scherb. var. *bimum* (Brid.) Lilj., Utkast Svensk. Fl. ed. 3: 553. 1816.
[As *Bryum* sp. 6 by Abou Salama 1985: 124]
S.
141. *B. radiculosum* Brid., Spec. Musc. 3: 18.1817.
Syn. *B. murorum* (Schimp.) Berk., 1863.
Cai, Mma, S; Nd.
- ♥ # 142. *B. remelei* Müll. Hal., Flora 57: 484. 1874.
Nv.
- # 143. *B. sacrum* (Lorentz) Müll. Hal., Gen. Musc. Fr. 222.1900.
Syn. *Webera sacra* Lorentz, 1868. [This may be *B. syriacum* cf. Geheeb 1904:4].
S.
- ♥ # 144. *B. schleicheri* Lam. & Dc.[cf. Ros *et al.* 1999].
S.
145. *B. syriacum* Lorentz, Abhandl. Ak. Wiss. Berlin 1867: 45. 2. 1868.
Syn. *Webera sinaitica* Lorentz, 1868.
S.
- # 146. *B. syriacum* Lorentz var. *humile* Schiffn., Ann. Naturh. Hofmus. Wien 27: 497. 1913.
Mma.
- # 147. *B. torquescense* Bruch ex De Not., Syll. N. 163. 1838.
Syn. *B. capillare* Hedw. ssp. *torquescens* (De Not.) Kindb., 1897.
Dg.
148. *B. turbinatum* (Hedw.) Turner, Musc. Hib. 127. 1804.
Syn. *B. turbinatum* Sw. [Decaisne 1834, cf. Hart 1891: 171]; *B. turbinatum* Hedw.[Hart 1891:170]
[As *B. syriacum* by Geheeb 1904: 4, rev. Ochi, cf. Vana 1988; as *B.sp.4* by Abou Salama 1985: 122].
S.
149. *Leptobryum pyriforme* (Hedw.) Wilson, Bryol. Brit. 219. 1855.
Cai, Nd; Mma.
- # 150. *Pohlia atropurpurea* (Wahlenb.) Lindb., Acta Soc. F. Fl. Fenn. 16: 14. 1899.
Syn. *Bryum atropurpureum* Wahlenb., 1829.
S.
- ♥ # 151. *P. korbiana* (Müll. Hal.) Wijk & Margad., Taxon 8: 74. 1959.
Syn. *Bryum korbianum* Müll. Hal., 1874.
O.
- ♥ # 152. *P. melanodon* (Brid.) A.J. Shaw. [cf. Ros *et al.* 1999].
Syn. *Webera carnea* [Lorentz 1867: 45] ; *Pohlia carnea* (Schimp.) Lindb., 1879;
Mniobryum carneum (L.) Limpr. [Brotherus 1924: 363]; *Mniobryum delicatulum* (Hedw.) Dixon, 1934.
Mma.
153. *P. nutans* (Hedw.) Lindb., Musci Scand. 18. 1879.
Cai; Mma.
- Family: Bartramiaceae Schwägr.**
154. *Philonotis evanidinervis* M. Fleisch., Musci Fl. Buitenzorg 2: 612. 116. 1904.
Nf, Nd; Dg.

- ♥ # 155. *P. fontana* (Hedw.) Brid., Bryol. Univ.2: 18. 1827.
Syn. *Philonotula glabriuscula* Müll. Hal. [Sickenberger 1901:317]. [*Philonotis glabriuscula* kindb. In Macoun = pp. *Philonotis fontana* (Hedw.) Brid. et pp. *Philonotis marchica* (Hedw.) Brid.]
Cai.
156. *P. hastata* (Duby) Wijk & Margad., Taxon 8: 74. 1959.
Syn. *P. obtusata* Müll. Hal. ex Renauld & Cardot 1896.
Cai, Nd, Nf, O; Dg.
157. *P. marchica* (Hedw.) Brid., Bryol. Univ. 2: 23. 735. 1827.
Syn. *Philonotula glabriuscula* Müll. Hal.[Sickenberger 1901: 317]
Cai; Nf.
158. *P. marchica* (Hedw.) Brid. fo. *rivularis* (Warnst.) Mönk., Laubm. Eur. 582. 1927.
Cai.
- Order: Orthotrichales**
Family: Orthotrichaceae Arnold
159. *Zygodon obtusifolius* Hook., Musci Exot. 2: 159. 1819.
Nf.
- Order: Hypnales**
Family: Amblystegiaceae G. Roth
160. *Amblystegium riparium* (Hedw.) Bruch, Schimp.& W. Gumbel Bryol. Eur. 6: 58. 570. 1853.
Syn. *Leptodictyum riparium* (Hedw.) Warnst., 1906.
Cai; S.
- ♥ # 161. *Drepanocladus aduncus* (Hedw.) Warnst., Beih. Bot. Centralbl. 13:400. 1903.
Syn. *Hypnum aduncum* L. [Decaisne 1834, cf.Hart 1891: 171.]
S.
- Family: Brachytheciaceae Schimp.**
162. *Brachythecium rivulare* Bruch, Schimp.& W. Gumbel Bryol. Eur. 6: 17. 546. 1853.
Cai; Nd.
- ♥ # 163. *B. umbilicatum* Jur. & Milde, Verh. Zool. Bot. Ges. Wien 20: 600. 1870.
S.
- ♥ # 164. *B. velutinum* (Hedw.) Bruch, Schimp.& W. Gumbel Bryol. Eur. 6: 9. 538. 1853.
Syn. *Hypnum velutinum* L. [Hart 1891: 170]
S.
- # 165. *B. velutinum* (Hedw.) Bruch, Schimp.& W. Gumbel var. *venustum* (De Not.) Arcang. Nuov. Giorn. Bot. Ital. 21: 471.1889.
Syn. *B. venustum* (De Not.) De Not., 1867.
S.
- ♥ # 166. *Eurhynchium pumilum* (Wilson) Schimp., Coroll. 119. 1856.
Syn. *Amblystegium burnatii* J.J. Amann.,1895.
Nv; Cai.
- ♥ # 167. *Rhynchostegiella tenella* (Dicks.) Limpr., Laubm. Deutschl. 3: 209. 1890.
Syn. *Rhynchostegium tenellum* [Lorentz 1867:53]; *Hypnum tenellum* Dicks.,1801; *Rhynchostegiella algeriana* (Brid.) Broth.[Brotherus 1925: 377].
S.

168. *Rhynchostegium riparioides* (Hedw.) Cardot, in Turrett, Bull. Soc. Bot. France 60: 231.1913.
Syn. *Hypnum rusciforme* Neck. [Decaisne 1834, cf. Hart 1891:171];
Rhynchostegium rusciforme [Lorentz 1867:53]; *Hypnum ruscifolium* Neck.
[Hart 1891:170]; *Platyhypnidium rusciforme* (Neck.) Fleisch. [Brotherus
1925:347].
[As *Brachythecium rivulare* by Imam & Ghabbour 1972: 519; cf. Vana 1988; El-
Saadawi & Badawi 1977: 184; Abou Salama 1985: 126 and Frey & Kürchner
1991: 151]
S.

Excluded taxa:

a) Misidentified taxa:

Triquetrella papillata (Hook. & Wilson.) Broth. Nf (App.1; 7, 25)

b) Taxa collected from beyond Egyptian boundaries:

- ☐ *Hyophila laxitexta* Froelich, nomen nudum, GE, Sudanese territory (App.1; 38).
Hymenostomum laxirete (Broth.) Broth., GE, Sudanese territory, misidentified (App.1;
22).

c) Greenhouse and garden taxa:

- Amblystegium varium* (Hedw.) Lindb., Mma (App.1; 22, 38, 57).
Bryum atrovirnes Vill. ex Brid., Cai, Nv (App.1; 38), Cai (App.1; 22).
B. sauteri Bruch, Schimp. & W. Gumbel, Cai (App.1; 63).
Hymenostomum laxirete (Broth.) Broth., Cai misidentified (App.1; 23).
Oxystegous sp., Cai, misidentified (App.1; 23)
Pleuridium subulatum (Hedw.) Rabenh., Cai (App.1; 20); Mma (App.1; 22) .
Pohlia sp., Cai (App.1; 20).
Splachnobryum sp., Cai (App.1; 17).
☐#*Gymnostomiella laevis* Fröhlich , nomen nudum, Cai (App.1; 22, 38).

d) Nomina nuda:

- # *Barbula sickenbergeri* Müll. Hal., Mma (App.1; 60).
Bartramia nilotica Müll. Hal. (=☐ *Philonotula nilotica*), Cai (App.1; 60)
Bryum glauculum Müll. Hal. ex Sickenb., Nv, Nn (App.1, 60)
Entosthodon schweinfurthii Müll. Hal., Cai (App.1; 60)
☐#*Hypnum klunzingeri* Müll. Hal., R (App.1; 39)

In addition to the above 16 taxa Sickenberger (1901), reported
☐#*Barbula muralis* var. *obovata* Schimp. from Mariout (Mma, App. 1; 60). This
moss is either a **nomen nudum** or the author ment to say var. *obcordata* which is
a synonym of *Toutula muralis* var. *obcordata* (cf. also Ros *et al.* 1999).

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Appendix 1: works dealing entirely or partly with Egyptian mosses:

- 1- Abou Salama, U.Y. 1985. Morphological studies on some Egyptian bryophytes in Southern Sinai. *M.Sc. Thesis. Botany Department. Faculty of Science. Ain Shams University. Cairo.*
- 2- Abou Salama, U.Y. 1991. Studies on the bryoflora of Egypt (Southern Sinai) with special reference to genus *Bryum*. *Ph.D. Thesis. Botany Department. Faculty of Science. Ain Shams University. Cairo.*
- 3- Abou Salama, U.Y. 1999. Mosses of the Egyptian conservation Areas: 1- Gebel Elba Protectorate. *Phytomorphology* (In press).
- 4- Amann, J.J. 1895. Une Mousse Nouvelle d' Egypte. *Bull. Herb. Boissier*, **3** (8): 442-444.
- 5- Amann, J.J. 1922. *Fissidens Mnevidis* Amann. *Revue Bryologique* **49**: 51.
- 6- Badawi, A., El-Saadawi W. & Refai M. 1987a. The Moss flora of Egypt. 2- The Nile Delta. *Ain Shams Science Bulletin* **26B**: 183- 230.
- 7- Badawi, A., El-Saadawi W. & Shabbara H. 1987b. On the mosses of El Fayum region, Egypt. *Ibid.*, **26B**: 357-3 72.
- 8- Bilewsky, F. 1965. Moss flora of Israel. *Nova Hedwigia* **9**: 335-434.
- 9- Bilewsky, F. 1974. Some notes on the distribution of mosses in Israel and Palestine. *Rev. Bryol. Lichenol* **40**: 245-261.
- 10- Boulos, L. 1966. Flora of the Nile Region in Egyptian Nubia. *Feddes Repertorium* **73**: 184- 215.
- 11- Brotherus, V.F. 1924-1925. In Engler, A. & Prantle K. *Die Natürlichen Pflanzenfamilien*. **10**, 1924; **11**, 1925. Duncker and Humblot, Berlin.
- 12- Bruggeman-Nannenga, M.A. 1982. The section *Pachylomidium* (genus *Fissidens*) III. The *F. crassipes*- subcomplex (*F. bryoides*- complex), *F. sublineaeifolius* (Pot. Varde) Brugg.-Nann. and *F. fluitans* (Pot. Varde) Brugg.-Nann. *Proceedings of the Koninklijke Nederlandse Akademie van Wetenschappen, series C* **85**: 59- 104.
- 13- Crundwell A.C. & Nyholm E. 1974. *Funaria muhlenbergii* and related European species. *Lindbergia* **2**: 222 - 229.
- 14- Decaisne, J. 1834. Florula Sinaica. Enumeration des plantes recueillées par M. Bove dans les deux Arabies, la Palestine, la Syrie et l' Egypt. *Ann. Sci. Nat.* **2**, ser.2: 5- 18.
- 15- Delgadillo, C.M. 1975. Taxonomic revision of *Aloina*, *Aloinella* and *Crossidium* (Musci). *The Bryologist* **78**: 243- 303.
- 16- Delile, R. 1813. Flora Aegyptica Illustratio Description de L'Egypte. *Histoire Naturelle Paris* **2**. 289.

- 17- El-Awadi, H. 1985. Morphological studies on some Egyptian bryophytes in Cairo region. *M.Sc. Thesis. Botany Department. Faculty of Science. Ain Shams University. Cairo.*
- 18- El-Saadawi, W.E. 1972. Illustrated description of *Micropoma niloticum* (R. Delile) Lindb. *Proceeding of the Egyptian Acad. of Sci.* **25**: 217- 219.
- 19- El-Saadawi, W. 1995. Bryophytes and Pteridophytes. *Publications of National Biodiversity unit* **3**: 59-60. United Nations Environment Programme (UNEP).
- 20- El-Saadawi, W. & Abou El- Kheir, W.S. 1973. On some Egyptian mosses and the algal flora in their habitats. *Ibid.*, **26**: 125- 136.
- 21- El-Saadawi, W., Abou El-Kheir W.S. & Darwish M.H. 1986a. Notes on Egyptian mosses with one new record. *Lindbergia* **12**: 129- 131.
- 22- El-Saadawi, W. & Badawi A. 1977. The moss flora of Egypt 1-Order Pottiales. *Public. Cairo University Herbarium* **7-8**: 181- 206.
- 23- El-Saadawi, W., Badawi A. & El-Awadi H. 1987a. The moss flora of Egypt 3. The Cairo Region. *Ain Shams Science Bulletin* **26 B**: 295- 320.
- 24- El-Saadawi, W., Badawi A. & Refai M.S. 1986b. Mosses of the Nile Delta. *Lindbergia* **12**: 106- 110.
- 25- El-Saadawi, W., Badawi A. & Shabbara H. 1987b. The moss flora of Egypt. IV. El-Fayum Province. *Ain Shams Sci. Bull.* **26B**: 321- 356.
- 26- Frahm, J.P. 1982. Personal communication
- 27- Frey W. & Kürschner H. 1988a. Bryophytes of the Arabian Peninsula and Socotra. Floristics, Phytogeography and definition of the Xerothermic Pangaeian element. *Studies in Arabian bryophytes* **12. Nova Hedwigia** **46**: 37-120.
- 28- Frey W. & Kürschner H. 1988b. Re-evaluation of *Crossidium geheebii* (Broth.) Broth. (Pottiaceae) from Sinai, a Xerothermic Pangaeian element. *Journal of Bryology* **15**: 123- 126.
- 29- Frey, W. & Kürschner, H. 1991. *Conspectus Bryophytorum Orientalum et Arabicorum, an annotated catalogue of the bryophytes of southwest Asia.* J. Cramer. Berlin. Stuttgart.
- *30- Gallego M.T., Cano M.J., Ros R.M. & Guerra J. 1999. The genus *Aloina* (Pottiaceae, Musci) in the Mediterranean region and neighbouring areas. *Nova Hedwigia* **69** (1-2): 173- 194.
- 31- Geheeb A. 1903. Bryophyta.- In Kneucker A., *Botanische Ausbeute einer Reise durch die Sinaihalbinsel vom 27. März bis 13. April 1902.*- *Allg. Bot. Z. Syst.* 1903: 185- 189, 203-204
- 32- Geheeb A. 1904. Bryophyta.- In Kneucker A., *Botanische Ausbeute einer Reise durch die Sinaihalbinsel vom 27. März bis 13. April 1902.*-*Ibid.*, 1904: 4-5
- 33- Hart, H.C. 1891. *Some Account of the Fauna and Flora of Sinai, Petra, and Wady Arabah.* London.
- 34- Hedwig, I. 1816. *Species Muscorum Frondosorum suppl. Vol. II.*
- 35- Herranstadt, L., Heyn C.C., Ben- Sasson R. & Crosby M.R. 1982. New records of mosses from Israel. *The Bryologist* **85**: 214-217.
- 36- Hooker J.D. & Hart H.C. 1861-1885. *Syrian Botany.* London.

* This publication appeared shortly before the present paper went to press.

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