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Authors: Erata, Hüseyin, Batan, Nevzat, Alataş, Mevlüt, and Özen, Öznur

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Bryophytes records from Maçka District (Trabzon Province-Turkey)

Hüseyin Erata, Nevzat Batan, Mevlüt Alataş and Öznur Özen

H. Erata ✉ (huseyin_erata@hotmail.com), Bayramiç Vocational School, Çanakkale Onsekiz Mart Univ., TR-17700 Çanakkale, Turkey. – N. Batan, Maçka Vocational School, Karadeniz Technical Univ., Trabzon, Turkey. – M. Alataş, Dept of Bioengineering, Engineering Faculty, Munzur Univ., Tunceli, Turkey. – Ö. Özen, Biology Dept, Faculty of Science, Karadeniz Technical Univ., Trabzon, Turkey.

As a result of bryological collecting trips in the Maçka District (Trabzon Province) in Turkey, a total number of 235 bryophytes belonging to 108 genera (17 liverworts and 91 mosses) were determined from 20 different localities. Of these, 26 taxa belong to liverworts and 209 taxa belong to mosses.

Keywords: biodiversity, Black Sea coast, liverworts, mosses, Turkey

Maçka is one of the districts of Trabzon Province and it is located South of Trabzon in the eastern Black Sea Region. The study area is situated in the Euro-Siberian floristic region. It is surrounded by the Gümüşhane province in the south, Trabzon City in the north, the Tonya and Düzköy districts in the west, and the Yomra district and Gümüşhane province in the east (Fig. 1).

The eastern Black Sea region is dominated by alpine, subalpine and forest vegetation and shows close links with the same zones. The area is covered by mixed forests dominated by *Alnus glutinosa* (L.) Gaertner, *Fagus orientalis* Lipsky, *Picea orientalis* (L.) Link, *Castanea sativa* Mill., *Carpinus betulus* L., *Corylus avellana* L., and alpine meadows (Papp 2004).

The climate in the research area has the characteristics of the eastern Black Sea climatic region. The annual average rainfall is 1429 mm and the average temperature is 6.4°C in the area (Akman 1999, Palabaş Uzun and Anşin 2006).

The bedrock in the Maçka region ranges in age from Liassic to Eocene. The oldest part observed in the region has basaltic, andesitic and acitic volcanic rocks at the base. Most of the bedrocks are of volcanic origin (Gülibrahimoğlu 1985).

There have been many bryofloristic studies carried out in the Trabzon Province up to the present (Gökler 1998, Papp 2004, Townsend 2005, Lara et al. 2010, Batan and Özdemir 2011, 2013, Batan et al. 2013, Kırmacı and Kürschner 2013, Kırmacı et al. 2013, Özdemir and Batan 2017, Erata et al. 2018, Erata and Batan 2019). However, there has not been any bryofloristic studies carried out in the Maçka District to date. Papp (2004), collected bryophyte samples from two localities of Altındere valley National Park in Maçka and *Tortula bambergeri* was reported from the Akarsu valley in Maçka by Kırmacı et al. (2013). Therefore, this study provides a contribution to the bryophyte flora of Maçka and Turkey.

Material and methods

The bryophyte samples were collected from Maçka in Turkey. Material was collected from 20 localities (Table 1). The bryophyte samples were examined using light microscope and stereomicroscope. Identifications were made using relevant floras and keys (Crum and Anderson 1981, Ireland 1982, Nyholm 1986, 1989, 1993, 1998, Lewinsky 1993, Blom 1996, Smith 1996, 2004, Paton 1999, Pedrotti 2001, 2006, Greven 2003, Heyn and Herrnstadt 2004, Frey et al. 2006, Guerra et al. 2006, 2014, 2018, Brugués et al. 2007, Kürschner and Frey 2011, Brugués and Guerra 2015, Capparós et al. 2016).

For each taxon, localities and substrate were given in the floristic list. The taxa recorded as new from Maçka distict are indicated with (#), new records for Trabzon with (+). Also new records for the A4 square, according to the grid system of Henderson (Henderson, 1961) are indicated with (*) in the bryofloristic list. Nomenclature of the species follows Ros et al. (2007) and Söderström et al. (2016) for liverworts and Ros et al. (2013), Plášek et al. (2015), Lara et al. (2016) and Hodgetts et al. (2019) for mosses. The species list is arranged according to the system proposed by Goffinet et al. (2009). The new records for Trabzon and the A4 grid-square were determined by reviewing the related literature

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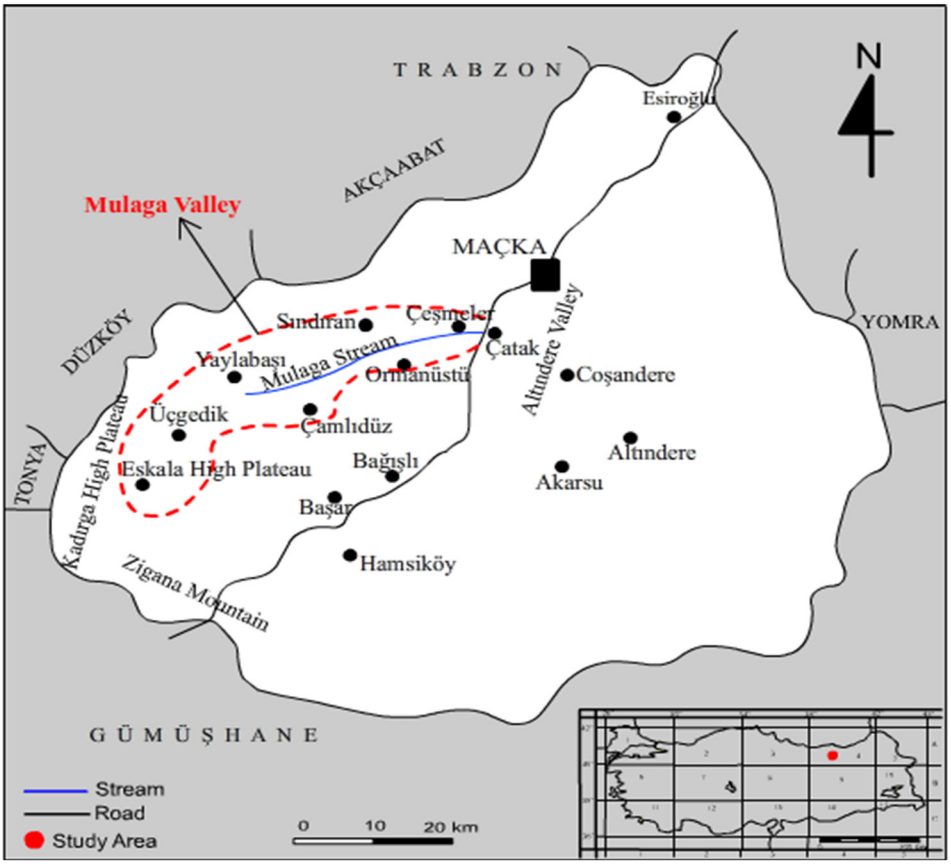


Figure 1. Map of the study area.

(Özenoğlu-Kiremit and Keçeli 2009, Hazer 2010, Özdemir and Batan 2017, Erata et al. 2018). Bryophyte samples are kept at the Biology Department, Faculty of Science, Karadeniz Technical University (Trabzon), Turkey.

In the bryofloristic list the species are in taxonomic order followed by locality numbers and habitats.

Results

In this study, the collected bryoptytes were evaluated and they belong to 14 families, 17 genera and 26 taxa from Marchantiophyta, 32 families, 91 genera and 209 taxa from Bryophyta. Totally 265 specific and infraspecific taxa have been determined.

Bryofloristic list

Liverworts (Marchantiophyta)
Conocephalaceae Müll. Frib. Ex Grolle
Conocephalum conicum (L.) Dumort. – Loc.: 2, 7, 19; on wet rock.
Pelliaceae H. Klinggr.
 # Apopellia endiviifolia (Dicks.) Nebel & D.Quandt. – Loc.: 13; on wet soil.
#Pellia epiphylla (L.) Corda. – Loc.: 7, 11, 19; on wet soil.
Jungermanniaceae Rchb.
#Jungermannia sphaerocarpa Hook. – Loc.: 15; on wet soil.
Pseudolepicoleaceae Fulford & J.Taylor
#Blepharostoma trichophyllum (L.) Dumort. – Loc.: 11; on calcareous rock.
Calypogeiaceae Arnell
#Calypogeia fissa (L.) Raddi. – Loc.: 11; on wet soil.
Lophocoleaceae Vanden Berghen
#Chiloscyphus pallescens (Ehrh. ex Hoffm.) Dumort. – Loc.: 7; on wet soil.
#C. polyanthos (L.) Corda. – Loc.: 19; on wet soil.
Lophoziaceae Cavers
#Tritomaria exsecta Schmidel ex. Schrad.) Loeske. – Loc.: 11; on dead tree trunk.
Scapaniaceae Mig.
#Barbilophozia barbata (Schmidel ex Schreb.) Loeske. – Loc.: 3, 6, 14, 15, 18, 19; on rock, on soil.
#B. hatcheri (A. Evans) Loeske. – Loc.: 7, 13, 19; on rock.
#Diplophyllum taxifolium (Wahlenb) Dumort. – Loc.: 17; on wet soil.
#Scapania irrigua (Ness) Ness. – Loc.: 6; on wet soil.
#S. nemorea (L.) Grolle. – Loc.: 3; on wet soil.
Plagiochilaceae Müll. Frib.
#Pedinophyllum interruptum (Nees). – Loc.: 4, 7, 11; on wet soil, on wet rock.
#Plagiochila asplenioides (L. emend. Taylor) Dumort. – Loc.: 3, 4, 5, 6, 7, 8, 9, 10, 11;15, 17, 20; on soil, on rock, on dead tree trunk.
P. porelloides (Torrey ex Nees) Lindenb. – Loc.: 3, 6, 7, 10, 11; on soil, on rock.
Porellaceae Cavers
Porella platyphylla (L.) Pfeiff. – Loc.: 2, 5, 7, 10; on rock.

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Table 1. Details of study sites.

Locality no.	Date	Altitude (m)	Locality
1	18.05.2018	657	Trabzon Province: Maçka, between Çatak and Çeşmeler 40°47′54.9″N, 39°32′18.1″E
2	18.05.2018	602	Trabzon Province: Maçka, Mulaga Valley, enter the Ocak village 40°47′52.7″N, 39°33′17.8″E
3	18.05.2018	738	Trabzon Province: Maçka, lower part of Sındıran village 40°47′54.02″N, 39°31′15.4″E
4	23.05.2018	698	Trabzon Province: Maçka, Mulaga Valley-3 Harmancık. 40°47′52.6″N, 39°31′51.9″E
5	23.05.2018	1253	Trabzon Province: Maçka, Mulaga Valley-4 40°48′01.3″N, 39°30′08.8″E
6	23.05.2018	1141	Trabzon Province: Maçka, Mulaga Valley-5 40°47′23.4″N, 39°29′59.6″E
7	23.05.2018	1429	Trabzon Province: Maçka, Mulaga Valley-6, Çamlık village 40°46′49.5″N, 39°27′29.1″E
8	26.05.2018	1560–1587	Trabzon Province: Maçka, Mulaga Valleyi-7, Yaylabaşı village 40°46′41.8″N, 39°24′23.9″E
9	26.05.2018	1584	Trabzon Province: Maçka, Mulaga Valley-8, lower part of Yaylabaşı village, 40°46′30.4″N, 39°25′20.1″E
10	26.05.2018	1500–1529	Trabzon Province: Maçka, Mulaga Valley-9, between Çamlık and Yaylabaşı village 40°46′41″N, 39°26′49.2″E
11	26.05.2018	1886	Trabzon Province: Maçka, Mulaga Valley, Çamlıdüz village, Uçarsu located, 40°45′51.5″N, 39°28′01.9″E
12	21.07.2018	2177	Trabzon Province: Maçka, Eskala High Plateau-1 40°44′32.1″N, 39°20′51.8″E
13	21.07.2018	228–2190	Trabzon Province: Maçka, Eskala High Plateau-2 40°44′55.3″N, 39°20′51.3″E
14	21.07.2018	2225	Trabzon Province: Maçka, Eskala High Plateau-3 40°44′44.8″N, 39°20′29.2″E
15	21.07.2018	2217	Trabzon Province: Maçka, Eskala High Plateau-4 40°44′35.2″N, 39°20′30″E
16	22.07.2018	2310	Trabzon Province: Maçka, Eskala High Plateau-5 40°44′46.4″N, 39°20′10,8″E
17	22.07.2018	2253	Trabzon Province: Maçka, Eskala High Plateau, Ali Meydanı 40°44′21.6″N, 39°20′01.2″E
18	22.07.2018	2302	Trabzon Province: Maçka, Eskala High Plateau, Kısır Rock 40°44′28″N, 39°20′11.6″E
19	31.07.2018	2051–2040	Trabzon Province: Maçka, Eskala High Plateau, Gelincik Rock, 40°44′13.1″N, 39°21′54.3″E
20	31.07.2018	2111–2050	Trabzon Province: Maçka, Eskala High Plateau, Codana water 40°44′30″N, 39°21′34.9″E

Radulaceae Müll. Frib.
#*Radula complanata* (L.) Dumort. – Loc.: 6, 9, 10; on rock, on tree bark.
Radula lindenbergiana Gottsche ex C. Hartm. – Loc.: 3, 7, 19, 20; on rock, on tree bark.
Frullaniaceae Lorch
#*Frullania dilatata* (L.) Dumort. – Loc.: 3, 7, 10, 19; on tree bark.
#*F. tamarisci* (L.) Dumort. – Loc.: 3, 6; on rock.
Lejeuneaceae Casares-Gil
#*Lejeunea cavifolia* (Ehrh.) Lindb. – Loc.: 7; on rock.
Metzgeriaceae H. Klinggr.
Metzgeria pubescens (Schrank) Raddi. – Loc.: 7; on soil.
M. conjugata Lindb. – Loc.: 4; on rock.
M. furcata (L.) Dumort. – Loc.: 10; on rock.

Mosses (Bryophyta)
Sphagnaceae Dumort.
#*Sphagnum platyphyllum* (Lindb. ex Braithw.). – Loc.: 17; on wet soil in bog.
Polytrichaceae Schwägr.
Atrichum undulatum (Hedw.) P. Beauv. – Loc.: 11, 14; on wet soil.
Pogonatum urnigerum (Hedw.) P. Beauv. – Loc.: 5, 7, 9, 11; on soil, on rock.
#*Polytrichum commune* Hedw. – Loc.: 10,11, 13, 14, 17, 18, 19, 20; on soil among grass).
P. juniperinum Hedw. – Loc.: 10; on soil.
#*P. piliferum* Hedw. – Loc.: 12, 13 16, 18; on soil.
Encalyptaceae Schimp.
#*Encalypta ciliata* Hedw. – Loc.: 9; on rock.
#*E. streptocarpa* Hedw. – Loc.: 1, 2, 3, 4, 6, 7, 20; on rock.
#*E. vulgaris* Hedw. – Loc.: 4, 12, 13, 14; on rock.
Funariaceae Schwagr.
#*Funaria hygrometrica* Hedw. – Loc.: 2; on rock.
Grimmiaceae Arn.
#*Grimmia anodon* Bruch & Schimp. – Loc.: 12, 13, 14, 16, 19, 20; on calcareus rock.
#*G. dissimulata* E.Maier. – Loc.: 17; on limestone rock.
#*G. elatior* Bruch ex Bals.-Criv. & De Not. – Loc.: 6, 19; on acidic rock.
#*G. funalis* (Schwaegr.) Bruch & Schimp. – Loc.: 3, 4, 6, 7, 19, 20; on siliceous rock.
#*G. hartmannii* Schimp. – Loc.: 3, 6, 7, 9, 10, 14, 16, 19; on acidic rock.
#*G. laevigata* (Brid.) Brid. – Loc.: 14, 17; on acidic rock.
#*G. lisae* De Not. – Loc.: 2, 3, 7; on acidic rock.
#*G. montana* Bruch & Schimp. – Loc.: 1, 4, 15, 17; on acidic rock.
#*G. muehlenbeckii* Schimp. – Loc.: 6; on acidic rock.

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#*G. ovalis* (Hedw.) Lindb. – Loc.: 1, 3, 7, 12, 13, 14, 18, 19; on basalt rock.
#*G. pulvinata* (Hedw.) Sm. – Loc.: 1; on basic rock.
Racomitrium canescens (Hedw.) Brid. – Loc.: 16; on rock.
#*R. ericoides* (Brid.). – Loc.: 11, 12, 13, 15, 16, 18; on rock.
#*R. macounii* Kindb. – Loc.: 17; on rock.
Schistidium apocarpum (Hedw.) Bruch & Schimp. – Loc.: 1, 2, 3, 4, 5, 6, 7; on rock.
#*S. confertum* (Funck) Bruch & Schimp. – Loc.: 1, 4, 6, 7, 9, 13; on rock.
#*S. crassipilum* H.H.Blom. – Loc.: 1, 6, 7, 9; on rock.
#*S. elegantulum* H.H.Blom. – Loc.: 1; on rock.
#*S. flaccidum* (De Not.) Ochyra. – Loc.: 8; on rock.
#*S. papillosum* Culm. – Loc.: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 14; on rock.
#*S. platyphyllum* (Hedw.) Roehl. – Loc.: 1, 3, 4, 6, 7; on rock.
#*S. pruinosum* (Wilson ex Schimp.) G.Roth. – Loc.: 1; on rock.
#*S. rivulare* (Brid.) Podp. – Loc.: 3, 11; on rock.

Fissidentaceae Schimp.

Fissidens dubius P. Beauv. – Loc.: 3, 11; on wet soil, on wet rock.
#*F. taxifolius* Hedw. – Loc.: 13, 19; on wet soil.

Ditrichaceae Limpr.

#*Ceratodon purpureus* (Hedw.) Brid.– Loc.: 12, 13, 14, 16, 18, 19; on soil, on rock.
#*Distichium capillaceum*(Hedw.) Bruch & Schimp. – Loc.: 20; on soil.
#*Ditrichum gracile* (Mitt.) Kuntze. – Loc.: 3, 4, 6, 7, 20; on soil.
#*Saelania glaucescens* (Hedw.) Broth. – Loc.: 19; on rock.

Rhabdoweisiaceae Limpr.

#*Dichodontium palustre* (Dicks.) M. Stech. – Loc.: 14; on soil.
D. pellucidum (Hedw.) Schimp. – Loc.: 3, 7, 11; on soil.
#*Hymenoloma compactum* (Schwägr.) Ochyra. – Loc.: 17; on soil.
#*H. crispulum* (Hedw.) Ochyra. – Loc.: 15, 16, 18, 19; on soil.

Dicranaceae Schimp.

#*Dicranella heteromalla* (Hedw.) Schimp. – Loc.: 14; on soil.
#*Dicranum bonjeanii* De Not. – Loc.: 14; on wet soil grassy slope.
#*D. brevifolium* (Lindb.) Lindb. – Loc.: 14, 15, 16, 17; on soil, on rock.
#*D. polysetum* Sw. ex anon. – Loc.: 6; on soil.
#*D. scoparium* Hedw. – Loc.: 3, 7, 8, 10, 11, 18, 19; on rock, on dead tree trunk.
#*D. spadiceum* J.E.Zetterst. – Loc.: 13, 15, 16, 18, 19, 20; on rock.
#*Dicranum tauricum* Sapjegin. – Loc.: 17; on rock.
#*Kiaeria starkei* (F. Weber & D. Mohr) I. Hagen. – Loc.: 19; on soil.

Leucobryaceae Schimp.

#*Campylopus fragilis* (Brid.) Bruch & Schimp. – Loc.: 20; on wet soil.
#*C. pyriformis* (Schultz) Brid. – Loc.: 15, 16; on soil.

Pottiaceae Schimp.

#*Anoectangium aestivum* (Hedw.) Mitt. – Loc.: 3, 7, 9, 11, 12, 20; on acidic rock.
#*Barbula unguiculata* Hedw. – Loc.: 1; on soil.
+*Cinclidotus fontinaloides* (Hedw.) P.Beauv. – Loc.: 4; on wet soil.
**C. riparius* (Host ex Brid.) Arn. – Loc.: 2; on wet soil.
#*Dialytrichia mucronata* (Brid.) Broth. – Loc.: 18; on soil.
#*Bryoerythrophyllum ferruginascens* (Stirt.) Giacom. – Loc.: 7, 11; on wet soil, on wet rock.
#*B. recurvirostrum* (Hedw.) P.C. Chen. – Loc.: 7, 9, 11; on rock.
Didymodon ferrugineus (Schimp. ex Besch.) M.O.Hill. – Loc.: 2, 3, 4; on soil, on rock.
#*Didymodon fallax* (Hedw.) R.H. Zander. – Loc.: 4; on soil.
#*D. glaucus* Ryan. – Loc.: 2, 4; on soil, on rock.
#*D. nicholsonii* Culm. – Loc.: 15, 18; on soil.
D. rigidulus Hedw. – Loc.: 2, 3, 4, 11; on rock.
#*D. tophaceus* (Brid.) Lisa. – Loc.: 2, 4; on wet rock.
#*D. vinealis* (Brid.) R.H.Zander. – Loc.: 2, 6, 18; on rock.
#*Gymnostomum aeruginosum* Sm. – Loc.: 19, 20; on wet soil.
Oxystegus tenuirostris (Hook. & Taylor) A.J.E.Sm. – Loc.: 2; on rock.
#*Syntrichia montana* Nees. – Loc.: 7, 9, 10, 17; on soil.
**S. papillosissima* (Copp.) Loeske. – Loc.: 19; on rock.
#*S. ruralis* var. *ruraliformis*(Besch.) Delogne. – Loc.: 6, 8, 12, 15, 16, 17, 18, 19; on rock.
#*S. ruralis (Hedw.)* F. Weber & D. Mohr var. *ruralis*. – Loc.: 2, 3, 7, 12, 14, 16, 18, 19; on rock.
#*Tortella fragilis* (Hook. & Wilson) Limpr. – Loc.: 8; on rock.
T. squarrosa (Brid.) Limpr. – Loc.: 1, 2, 3, 4, 6, 9; on soil, on rock.
T. tortuosa (Hedw.) Limpr. – Loc.: 1, 2, 3, 4, 6, 7, 11, 12, 13, 14, 18, 19, 20; on soil, on rock.
#*Tortula inermis* (Brid.) Mont. – Loc.: 1, 15; on rock.
#*T. marginata* (Bruch & Schimp.) Spruce. – Loc.: 7, 11; on rock.
#*T. mucronifolia* Schwägr. – Loc.: 7; on rock.
T. muralis Hedw.– Loc.: 1; on soil.
#*T. subulata* Hedw. – Loc.: 6, 8, 9, 10; on soil.
#*Weissia brachycarpa* (Nees & Hornsch.) Jur. – Loc.: 2; on soil.
W. controversa Hedw. – Loc.: 20; on soil.
#*W. rutilans* (Hedw.) Lindb. – Loc.: 3; on soil.

Bryaceae Schwagr.

#*Bryum argenteum* Hedw. – Loc.: 12; on soil.
#*B. dichotomum* Hedw. – Loc.: 7; on soil.
B. elegans Nees. – Loc.: 1, 9; on soil.
#*B. gemmiparum* De Not. – Loc.: 4; on wet soil.
#*B. subapiculatum* Hampe. – Loc.: 14; on wet soil.
#*Imbribryum alpinum* (Huds. ex With.) N. Pedersen. – Loc.: 19; on soil.
#*I. mildeanum* (Jur.) J.R. Spence. – Loc.: 7; on soil.
#*Ptychostomum archangelicum* (Bruch & Schimp.) J.R. Spence. – Loc.: 13; on soil.
#*P. capillare* (Hedw.) Holyoak & N. Pedersen. – Loc.: 1, 3, 6, 7, 11, 12, 14; on soil, on rock.
#*P. creberrimum* (Taylor) J.R. Spence &H.P. Ramsay. – Loc.: 9, 19: on wet soil.

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#*P. imbricatulum* (Müll. Hal.) Holyoak & N. Pedersen. – Loc.: 1, 6, 12, 13, 16, 19; on soil, on rock.
#*P. moravicum* (Podp.) Ros & Mazimpaka. – Loc.: 8, 10, 11, 14; on soil, on tree bark.
#*P. pseudotriquetrum* (Hedw.) J.R. Spence & H.P. Ramsay var. *pseudotriquetrum*. – Loc.: 3, 12, 13, 14, 15, 16; near stream, on wet soil.
#*Rhodobryum ontariense* (Kindb.) Kindb. – Loc.: 5; on soil.
#*Pohlia wahlenbergii* (F.Weber & D.Mohr) A.L.Andrews. – Loc.: 7; on wet soil.

Mniaceae Schwagr.

#*Mnium marginatum* (Dicks. exWith.) P. Beauv. – Loc.: 4, 7, 11; on wet soil.
M. spinosum (Voit) Schwägr. – Loc.: 15, 19; on wet soil.
#*M. spinulosum* Bruch & Schimp. – Loc.: 17; on wet soil.
#*M. stellare* Hedw. – Loc.: 13; on soil.
#*M. thomsonii* Schimp. – Loc.: 3, 17; on soil.
Plagiomnium ellipticum (Brid.) T.J.Kop. – Loc.: 3; on wet soil.
#*P. rostratum* (Schrad.) T.J.Kop. – Loc.: 6; on wet soil.
#*P. undulatum* (Hedw.) T.J.Kop. – Loc.: 4, 7, 11; on soil, on rock.
#*Pohlia cruda* (Hedw.) Lindb. – Loc.: 11, 12, 19; on wet soil.
#*P. melanodon* (Brid.) A.J. Shaw. – Loc.: 19; on wet soil.
#*P. nutans* (Hedw.) Lindb. – Loc.: 12; on wet soil.
#*Rhizomnium punctatum* (Bruch & Schimp.) T.J.Kop. – Loc.: 11, 13, 19; on wet soil.

Entodontaceae Kindb.

#*Entodon concinnus* (De Not.) Paris. – Loc.: 1, 2, 3, 4, 5, 6, 8, 11, 17; on soil, on rock.
#*E. schleicheri* (Schimp.) Demet. – Loc.: 4, 5; on soil, on rock.

Pterigynandraceae Schimp.

#*Heterocladium dimorphum* (Brid.) Schimp. – Loc.: 17; on rock.
Pterigynandrum filiforme Hedw. – Loc.: 5, 10, 11, 13, 16, 17, 19; on rock, on tree bark.

Bartramiaceae Schwägr.

Bartramia halleriana Hedw. – Loc.: 7, 9, 11, 19; on wet rock.
#*B. ithyphylla* Brid. – Loc.: 9, 12, 17, 19, 20; on rock, on wet rock.
#*Philonotis fontana* (Hedw.) Brid. – Loc.: 13, 16, 19; on soil, near stream.

Orthotrichaceae Arn.

#*Lewinskya rupestris* (Schleich. Ex Schwägr.) F.Lara, Garilleti & Goffinet. – Loc.: 12, 13, 14, 16, 19; on rock, on tree bark.
#*L. speciosa* (Nees) F.Lara, Garilleti & Goffinet. – Loc.: 3, 4, 9; on tree bark.
#*Orthotrichum cupulatum* Brid. – Loc.: 20; on rock.
#*O. pallens* Bruch ex Brid. – Loc.: 2; on rock.
#*O. pumilum* Sw. ex Anon. – Loc.: 1, 6; on tree bark.
#*O. tenellum* Bruch ex Brid. – Loc.: 3; on tree bark.
#*Ulota crispula* Bruch– Loc.: 9; on tree bark.

Hedwigiaceae Schimp.

#*Hedwigia ciliata* (Hedw.) P.Beauv. var. *ciliata*. – Loc.: 2, 3, 5, 6, 10, 12, 14, 16, 18, 19; on soil, on rock.
#*H. ciliata* var. *leucophaea* Bruch & Schimp. – Loc.: 2, 7, 14; on rock.

Climaciaceae Kindb.

#*Climacium dendroides* (Hedw.) F. Weber & D. Mohr. – Loc.: 15, 17, 19, 20; on wet soil.

Amblystegiaceae Kindb.

#*Campyliadelphus chrysophyllus* (Brid.) R.S.Chopra. – Loc: 2, 14; on wet soil, on wet rock.
#*Campylium protensum* (Brid.) Kindb. – Loc.: 14, 15, 19; on wet soil.
Campylophyllum calcareum (Mitt.) Hedenäs. – Loc.: 19; on wet soil
#*Cratoneuron filicinum* (Hedw.) Spruce. – Loc.: 7, 15, 19, 20; on wet soil, on wet rock.
#*Hygrohypnum luridum* (Hedw.) Jenn. – Loc.: 7; on wet soil.
#*H. ochraceum* (Turner ex Wilson) Loeske. – Loc.: 3; on wet soil.
#*Palustriella falcata* (Brid.) Hedenäs. – Loc.: 13, 16, 19, 20; on wet soil.
#*Sanionia uncinata* (Hedw.) Loeske. – Loc.: 11, 15,17; on dead tree trunk.

Pseudoleskeaceae Schimp.

#*Lescuraea mutabilis* (Brid.) Lindb. ex I. Hagen. – Loc.: 16, 17; on wet soil.
#*L. incurvata* (Hedw.) E. Lawton. – Loc.: 17, 19; on rock.
+*L. plicata* (Schleich. ex F. Weber & D. Mohr) Broth.– Loc.: 17; on soil.
#*L. radicosa* (Mitt.) Mönk. – Loc.: 15, 20; on rock.

Leskeaceae Schimp.

#*Pseudoleskeella catenulata* (Brid. ex Schrad.) Kindb. – Loc.: 6 ; on rock.
Pseudoleskeella nervosa (Brid.) Nyholm. – Loc.: 5, 14; on rock.

Thuidiaceae Schimp.

Abietinella abietina (Hedw.) M.Fleisch. var. *abietina*. – Loc.: 2, 5, 12, 14, 15, 17, 18; on rock.
#*A. abietina* var. *hystricosa* (Mitt.) Sakurai. – Loc.: 6, 8, 11, 16, 19; on soil.
#*Thuidium assimile* (Mitt.) A.Jaeger. – Loc.: 1, 2, 3, 4, 5, 6, 7; on wet soil.
#*T. recognitum* (Hedw.) Lindb. – Loc.: 1; on wet soil.
#*T. tamariscinum* (Hedw.) Schimp. – Loc.: 4; on wet soil.

Brachytheciaceae Schimp.

Brachytheciastrum velutinum (Hedw.) Ignatov & Huttunen. – Loc.: 8, 14; on dead tree trunk, on soil.
#*Brachythecium albicans* (Hedw.) Schimp. – Loc.: 4, 11, 12, 18, 20; on soil.
#*B. campestre* (Müll.Hal.) Schimp. – Loc.: 4; on wet soil.
B. glareosum (Bruch ex Spruce) Schimp. – Loc.: 2; on soil.
#*B. laetum* (Brid.) Schimp. – Loc.: 4; on soil.
#*B. rivulare* Schimp. – Loc.: 2, 3, 7, 13, 14, 15, 16, 17; on wet soil, near stream.
B. rutabulum (Hedw.) Schimp. – Loc.: 1, 4, 9, 11; on wet soil, near stream.
#*B. salebrosum* (Hoffm. ex F. Weber & D. Mohr) Schimp. – Loc.: 4; on soil.
#*Cirriphyllum piliferum* (Hedw.) Grout. – Loc.: 2, 3, 7; on soil, on rock.
#*Eurhynchiastrum pulchellum* (Hedw.) Ignatov & Huttunen. – Loc.: 12, 20; on rock.
Eurhynchium angustirete (Broth.) T.J.Kop. – Loc.: 9, 11; on soil.

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#*E. striatum* (Hedw.) Schimp. – Loc.: 1, 4, 6; on soil, on rock.
#*Homalothecium lutescens* (Hedw.) H.Rob. – Loc.: 1, 2, 6, 14, 15, 19; on soil, on rock.
#*H. philippeanum* (Spruce) Schimp– Loc.: 1, 2, 3, 7, 12, 14, 19, 20; on soil, on rock.
#*H. sericeum* (Hedw.) Schimp. – Loc.: 2, 4, 6, 7, 9, 10, 12, 14, 19, 20; on soil, on rock.
#*Kindbergia praelonga* (Hedw.) Ochyra. – Loc.: 9; on soil.
#*Oxyrrhynchium hians* (Hedw.) Loeske. – Loc.: 2, 4, 7; on soil, on rock.
#*O. speciosum* (Brid.) Warnst. – Loc.: 4; on soil.
Palamocladium euchloron (Müll.Hal.) Wijk & Margad. – Loc.: 1, 2, 3, 4, 6; on rock.
#*Pseudoscleropodium purum* (Hedw.) M.Fleisch. – Loc.: 2; on soil.
+*Rhynchostegiella teneriffae* Dirkse & Bouman– Loc.: 7; on soil.
#*Rhynchostegium confertum* (Dicks.) Schimp. – Loc.: 6; on wet rock.
#*R. megapolitanum* (Blandow ex F.Weber & D.Mohr) Schimp. – Loc.: 6; on wet soil.
#*R. riparioides* (Hedw.) Cardo– Loc.: 19; on wet rock.
Sciuro-hypnum flotowianum (Sendtn.) Ignatov & Huttunen. – Loc.: 1, 2, 7, 10; on soil.
#*S. plumosum* (Hedw.) Ignatov & Huttunen. – Loc.: 3, 6; on soil.
S. populeum (Hedw.) Ignatov & Huttunen. – Loc.: 1, 5; on acidic rock.
Hypnaceae Schimp.
#*Calliergonella cuspidata* (Hedw.) Loeske. – Loc.: 2, 12, 13, 14, 15; on wet soil, near stream.
#*C. lindbergii* (Mitt.) Hedenäs. – Loc.: 12; on wet soil.
+*Herzogiella seligeri* (Brid.) Z.Iwats. – Loc.: 11; on dead tree trunk.
#*Homomallium incurvatum* (Schrad. ex Brid.) Loeske. – Loc.: 1; on wet rock.
#*Hypnum andoi* A.J.E.Sm. – Loc.: 1, 4, 5, 6, 7, 8, 9, 10, 18; on rock, on tree bark.
#*H. bambergeri* Schimp. – Loc.: 1, 3, 5, 6, 7, 8, 9; on rock.
H. cupressiforme var. *cupressiforme* Hedw. – Loc.: 1, 3, 5, 9, 10, 12, 13, 15, 16, 19, 20; on soil, on rock.
#*H. cupressiforme* var. *filiforme* Brid. – Loc.: 18, 20; on soil, on tree bark.
#*H. cupressiforme* var. *lacunosum* Brid. – Loc.: 4, 5, 6, 7, 8, 9, 10, 19; on soil, on rock.
#*H. cupressiforme* var. *resupinatum* (Taylor) Schimp. – Loc.: 4, 5, 7, 8, 9, 10, 13, 14, 15, 16, 18, 19; on soil, on tree bark.
+*Hypnum cupressiforme* var. *subjulaceum* Molendo. – Loc.: 7; on soil.
#*H. hamulosum* Schimp. – Loc.: 1; on soil.
#*H. imponens* Hedw. – Loc.: 8; on soil.
#*H. jutlandicum* Holmen & E.Warncke. – Loc.: 2, 9, 16; on soil.
#*H. revolutum* (Mitt.) Lindb. – Loc.: 4, 5, 12, 14, 15, 16, 19, 20; on rock.
+*Isopterygiopsis muelleriana* (Schimp.) Z. Iwats. – Loc.: 11; on wet rock.
Hylocomiaceae M. Fleisch.
Ctenidium molluscum (Hedw.) Mitt. – Loc.: 3, 6, 7, 11; on soil, on rock.
#*Hylocomiastrum pyrenaicum* (Spruce) M. Fleisch. – Loc.: 17; on rock.
#*Hylocomium splendens* (Hedw.) Schimp. – Loc.: 4, 7, 8, 9, 11, 17, 19, 20; on soil.
#*Pleurozium schreberi* (Brid.) Mitt. – Loc.: 8, 14, 15, 17; on soil.
#*Rhytidiadelphus squarrosus* (Hedw.) Warnst. – Loc.: 17; on soil.
#*R. subpinnatus* (Lindb.) T.J. Kop. – Loc.: 17; on soil.
#*R. triquetrus* (Hedw.) Warnst. – Loc.: 1, 4, 6, 7, 8, 9, 11, 13, 15, 17, 19, 20; on soil.
Rhytidiaceae Broth.
#*Rhytidium rugosum* (Ehrh. ex Hedw.) Kindb. – Loc.: 3, 6, 7, 9, 10, 11, 12, 13, 14, 15, 16, 18, 19, 20; on soil.
Plagiotheciaceae (Broth.) M.Fleisch.
#*Plagiothecium latebricola* Schimp.– Loc.: 11; on wet soil.
P. succulentum (Wilson) Lindb. – Loc.: 7, 11; on wet soil.
Leucodontaceae Schimp.
Leucodon sciuroides (Hedw.) Schwägr. – Loc.: 1, 2, 3, 5, 6, 7, 10, 14, 15, 16, 18, 20; on rock, on tree bark.
Neckeraceae Schimp.
Alleniella besseri (Lobarz.) S. Olsson, Enroth & D. Quandt. – Loc.: 2; on rock.
Alleniella complanata (Hedw.) S.Olsson, Enroth & D.Quandt. – Loc.: 1, 4, 7, 9; on rock, on tree bark.
Exsertotheca crispa (Hedw.) S. Olsson, Enroth & D. Quand. – Loc.: 1, 3, 4, 6, 7; on rock, on tree bark.
Thamnobryum alopecurum (Hedw.) Gangulee. – Loc.: 2; on wet soil.
Lembophyllaceae Broth.
Isothecium alopecuroides (Lam. ex Dubois) Isov. – Loc.: 3, 4, 6, 7, 8, 9, 10, 11, 14, 19; on soil, on tree bark.
Anomodontaceae Kindb.
Anomodon attenuatus (Hedw.) Huebener. – Loc.: 7; on soil.
A. rugelii (Müll. Hal.) Keissl. – Loc.: 1, 3, 5; on soil, on rock.
A. viticulosus (Hedw.) Hook. & Taylor. – Loc.: 2, 6; on soil, on rock.

Discussion

As a result of the study, 26 liverwort taxa (belonging to 14 families and 17 genera), 209 moss taxa (belonging to 32 families and 91 genera) and a total of 235 bryophyte taxa (belonging to 46 families and 108 genera) were determined.

The dominant Bryophyta families in the study area were Pottiaceae (31 taxa), Brachytheciaceae, (27 taxa), Grimmiaceae (23 taxa), Hypnaceae (16 taxa), Bryaceae (14 taxa), Mniaceae (12 taxa), Dicranaceae (8 taxa), Amblystegiaceae (8 taxa), Orthotrichaceae (7 taxa) and Hylocomiaceae (7 taxa). These nine families give 73.21% of the total moss taxa in this study and the other families constitute 26.79%. The Pottiaceae is the most species-rich moss family in the study area with 31 taxa in 12 genera.

The genera richest in species: Hypnum (11 taxa), Schistidium (9 taxa), Brachythecium (7 taxa), Dicranum (6 taxa), Didymodon (6 taxa), Ptychostomum (6 taxa), Bryum (5 taxa), Mnium (5 taxa), Syntrichia (4 taxa), Pohlia (4 taxa), Orthotrichum (4 taxa) and Lescuraea (4 taxa). Other genera are represented by 3 or fewer taxa in the area.

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The dominant liverwort families are Scapaniaceae (5 taxa), Plagiochilaceae (3), Metzgeriaceae (3). These three families give 44% of the total liverwort taxa in this study and the other families constitute 56%.

The liverwort genera richest in species: Metzgeria (3 taxa), Pellia (2 taxa), Chiloscyphos (2 taxa), Barbilophozia (2 taxa), Scapania (2 taxa), Plagiochila (2 taxa) and Frullania (2 taxa). Other genera are represented by one taxon in the area.

Polytrichum commune, *Encalypta streptocarpa, Grimmia anodon*, *G. hartmannii*, *Schistidium papillosum*, *Ceratodon purpureus*, *Dicranum scoparium*, *Syntrichia ruralis* var. *ruraliformis*, *Syntrichia ruralis* var. *ruralis*, *Tortella tortuosa*, *Entodon concinnus*, *Hedwigia ciliata* var. *ciliata*, *Abietinella abietina* var. *abietina*, *Homalothecium lutescens*, *H. philippeanum*, *H. sericeum*, *Hypnum cupressiforme* var. *cupressiforme*, *H. cupressiforme* var. *resupinatum*, *H. cupressiforme* var. *lacunosum*, *Hylocomium splendens*, *Rhytidiadelphus triquetrus*, *Rhytidium rugosum*, *Leucodon sciuroides* and *Isothecium alopecuroides* are the most common moss species found in the area. Additionally, *Barbilophozia barbata*, *Plagiochila asplenioides*, *P. porelloides*, *Radula lindenbergiana* and *Frullania dilatata* are the most common liverwort species found in the area.

Cinclidotus fontinaloides, *Rhynchostegiella teneriffae*, *Herzogiella seligeri*, *Hypnum cupressiforme* var. *subjulaceum*, *Lescuraea plicata* and *Isopterygiopsis muelleriana* taxa were reported for the first time from Trabzon province. Also, *Cinclidotus riparius*, *Syntrichia papillosissima* taxa are new for the square A4 according to the Henderson (1961) grid system. One hundred and eighty-eight taxa are new records for Maçka District.

Due to the suitable habitat conditions, high rainfall, acidic bedrock and mixed forests vegetation the bryophyte flora of Maçka is rich. Thus, hygrophyte, xerophyte and mesophyte taxa were observed in the study area. Bryophytes taxa were collected on soils, rocks and trunks of trees in the study area.

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