

## ACTA BIOLOGICA TURCICA

© 1950-1978 Biologi, Türk Biologi Dergisi, Türk Biyoloji Dergisi, Acta Biologica

E-ISSN: 2458-7893, http://www.actabiologicturcica.com

## Research article

## The bryophyte flora of Samsun Mountain (Aydın/Turkey)

Emre AĞCAGİL<sup>1,\*</sup>, Mesut KIRMACI<sup>2</sup>, Hatice ÖZENOĞLU<sup>3</sup><sup>1</sup>Aydın Adnan Menderes Üniversitesi, Koçarlı Meslek Yüksekokulu, Kimya ve Kimyasal İşleme Teknolojileri Bölümü 09100 Aydın, Türkiye<sup>2</sup>Aydın Adnan Menderes Üniversitesi, Fen-Edebiyat Fakültesi, Biyoloji Bölümü 09010 Aydın, Türkiye<sup>3</sup>Aydın Adnan Menderes Üniversitesi, Eğitim Fakültesi, Matematik ve Fen Eğitimi Bölümü 09010 Aydın, Türkiye

\*Corresponding author e-mail: emre.agcagil@adu.edu.tr

**Abstract:** The bryofloristic structure of Samsun Mountain, which also includes the Dilek Peninsula and Büyük Menderes Delta National Park was planned to reveal with this study. At the end of the study; only one hornwort, 43 liverwort taxa (under 24 genera and 21 families) and 174 moss taxa (under 70 genera and 26 families); totally, 218 taxa (under 95 genus belonging to 48 families) have been identified as the bryoflora of Samsun Mountain. Among the identified mosses, *Zygodon catarinoides* and *Acaulon fontiquerianum* have been recorded from the study area as second distributional locality. It is very important to reveal the biodiversity of National Parks. The bryophyte flora of Dilek Peninsula and Büyük Menderes Delta National Park was determined as 161 taxa (hornworts only one taxon, liverworts 34 taxa and mosses 126 taxa). We hope that, the present study will contribute to the understanding of Western Anatolia and Turkish bryophytes.

**Keywords:** Bryophytes, Samsun Mountain, National Park, West Anatolia, Turkey

**Citing:** Ağcagil, E., Kırmacı, M., & Özenoğlu, H. 2020. The bryophyte flora of Samsun Mountain (Aydın/Turkey). *Acta Biologica Turcica*, 33(4): 193-204.

## Introduction

In recent years, a significant increase in the floristic studies carried out on Turkish bryophytes (mosses, liverworts and hornworts) are remarkable Şimşek and Çetin, (2016); Gökler (2017); Gürsu and Çetin (2017); Erata et al (2018); Sanalp and Keçeli (2018); Gökler (2018); Kırmacı and Ağcagil (2018); Sarıoğlu and Keçeli (2018); Işın and Ursavaş (2018); Yücel and Ezer (2018); Keçeli and Ursavaş (2019).

In this sense, Western Anatolia is one of the most intensive research areas. (Özenoğlu Kiremit, 2007; Özenoğlu Kiremit and Hugonnot, 2010; Özenoğlu Kiremit, 2011; Özenoğlu and Kırmacı, 2012; Kırmacı et al, 2013; Kırmacı and Erdağ, 2016; Kırmacı and Ağcagil, 2018). Two studies have been completed on the mosses and liverworts in Dilek Peninsula and Büyük Menderes Delta National Park within the study area. The first one is the work titled "Flora of the Dilek Peninsula National Park" completed by Çetin in 1988. In this study, 29 moss

taxa (22 genera belonging to 11 families) collected from short term field studies were presented. The other study is the work carried out by Özenoğlu and Gökler in 2002. In this study to determine the liverworts of the Dilek Peninsula National Park, 26 taxa belonging to 18 families were given. Also, *Riccia crozalsii* (Gökler, Özenoğlu and Kiremit, 2000), *Orthotrichum philibertii* Venturi (Kırmacı and Ağcagil, 2016) and *Riccia beyrichiana* Hampe ex Lehm. (Özenoğlu et al, 2016) have been presented as new records from the study area.

With this study, the bryofloristic composition of Samsun Mountain, which also includes the Dilek Peninsula and Büyük Menderes Delta National Park, was revealed. The study will contribute to the determination of Western Anatolia and Turkey.

## Material and Methods

Samsun Mountain, which is designated as the study area, is located on a peninsula extending by drawing a bow to the Aegean Sea at the western most end of the Aydın Mountains. While the Söke Plain lies on the east of the mountain, the Aydın-Çamlık-Kuşadası road forms the northern border (Figure 1). Samsun Mountain is extremely important in terms of hosting one of the best protected national park of Turkey. The region was declared National Park in 1966 as the Dilek Peninsula National Park, and later in 1994 it was named as Dilek Peninsula and Menderes Delta National Park with the addition of the Menderes Delta. Dilek Tepe (Mykale), which is the highest place of the peninsula with an average height of 650 m., is 1237 m. In addition, the hills higher than 1000 m. are respectively; Karaoluk (1007 m), Pınar Hill (1048 m) and Dayıoğlu Hill (1214 m). The biggest flat area in the research area is the Dipburun region at the western end of the peninsula. The peninsula, which shows surface shapes broken down by valleys and canyons, also has many beaches and bays. The streams in the north of the national park, which are rich in underground and surface waters, flow despite the decrease in the flow rates throughout the year. In the south east of the mountain, the streams generally active in early spring dry out of the rainy period (Durmuşkahya, 2000).



**Figure 1.** Study Area.

(<https://www.google.com.tr/maps/@37.6704696,27.2159331,12.25z>)

The study area is under the influence of the Mediterranean climate. Considering the 42-year data, the highest temperatures were measured as 42.8 °C degrees (Söke), 42.4 °C (Kuşadası); the lowest -4.2 °C (Söke), -6.9 °C (Kuşadası) were determined to be (Aydın İli Çevre Raporu, 2011).

The general rock formation of mountain are marbles, schists and calcschists and shows a homogeneous structure. To the south of Güzelçamlı, local andesitic volcanic rocks, terrestrial pebbles and sand stones are

seen. In the west of Söke (between Akçakonak and Söke) there are mica schists, and in the west of Söke, there are locally clayey limestone (Özel, 1996).

The research area, especially the Dilek Peninsula part of the National Park, is very well preserved and contains the best examples of Mediterranean vegetation in its real sense. These areas, which have dense cover, which cannot be entered, are maquis formation that develops on siliceous rocks and is based on the dominance of *Quercus ilex* L. (Seçmen, 1996). The most common taxa are; *Quercus ilex*, *Q. coccifera* L., *Arbutus unedo* L., *Cersis siliquastrum* L., *Phillyrea latifolia* L., *Styrax officinalis* L., *Ceratonia siliqua* L., *Laurus nobilis* L., *Olea europaea* L., *Myrtus communis* L., *Tamus* sp., *Smilax* sp., *Ruscus* sp.. Another taxon seen in parallel with the increase of humidity in the northern part of the mountain is *Quercus frainetto* Ten. The southern slope of the mountain was damaged more than the north. Especially in areas exposed to fire, garic formations based on the dominance of *Quercus coccifera* L. on limestone rocks are noteworthy, while frigana formations have developed on siliceous rocks. The taxa that make up this formation; *Erica arborea* L., *Cistus creticus* L., *Sarcopoterium spinosum* L. (Spach) such as 1 m are bushes that do not exceed. Especially in deep and closed valleys in the north of the mountain, *Platanus orientalis* L. trees are frequently seen and the trunk of these trees create a suitable environment for many epiphytic bryophytes (Durmuşkahya, 2000).

The research material consists of bryophyte samples collected from field studies conducted in different seasons between 2012-2013. (Table 1.) While the samples were taken from the substrate (rock, soil, tree, etc.) from which they were kept, records of various ecological and topographic data related to the environment and taxa were kept, and the coordinates of the localities were obtained with GPS. Relevant flora books and revision studies were used in the determination of taxa. Determined taxa are kept in the Herbarium of Aydın Adnan Menderes University (AYDN). Only one collector numbers are given for every taxon in the study. The second records are shown with the sign (\*), taxa collected national park (#). Collector and identifying author abbreviations are EMA (Emre AĞCAGİL), ÇETİN (Barbaros ÇETİN) and ÖZENOĞLU (Hatice ÖZENOĞLU) and the others Substr: Substrat, R: Rock, S: Soil, SCR: Soil Covered Rock, E: Epiphytic.

**Table 1.** List of collection sites.

No	Date	Lat.	Long.	Altitude (m)	Locality	
1	10.03.2012	N37° 53' 38,8"	E027° 28' 08,8"	100	Aydın-Selçuk road, between Germencik-Çamlık (5 km. to Havutçulu)	
2	10.03.2012	N37° 52' 46"	E027° 25' 56,81"	150	Aydın-Selçuk road, between Germencik-Çamlık (3 km. to Havutçulu )	
3	10.03.2012	N37° 51' 59,5"	E027° 23' 15,4"	190	Between Çamlık-Kirazlı (1 km. south of Çamlık)	
4	23.03.2012	N37° 37' 10,25"	E027° 10' 16,37"	18	Doğanbey / Söke	
5	23.03.2012	N37° 37' 16,9"	E027° 11' 58,7"	1	Güllübahçe - Doğanbey road (5 km. to Doğanbey)	
6	13.04.2012	N37° 53' 50,"	E027° 28' 37,8"	100	Between Ortaklar and Selçuk	
	06.05.2012	N37° 53' 50,"	E027° 28' 37,8"	100		
7	06.05.2012	N37° 43' 58,36"	E027° 19' 15,77"	195	Davutlar	
8	06.05.2012	N37° 44' 27,64"	E027° 20' 38,09"	200		
	12.06.2012	N37° 44' 37,46"	E027° 21' 20"	250	Ağaçlı Village	
	24.03.2013	N37° 44' 20,05"	E027° 20' 26,9"	120		
9	25.11.2012	N37° 41' 33,94"	E027° 11' 01,59"	185	Oluklu Canyon	Kuşadası,
	27.12.2012	N37° 41' 51,02"	E027° 11' 11,38"	80	2 km from the main entrance	Dilek Peninsula and Büyük
	27.12.2012	N37° 39' 51"	E027° 0,2' 52"	138	Bademlik Location (traffic-free section)	Menderes Delta National Park
	21.04.2013	N37° 41' 33,94"	E027° 11' 01,59"	185	Oluklu Canyon	
10	07.02.2013	N37° 42' 18,89"	E027° 21' 42,51"	105		
	07.02.2013	N37° 42' 20,16"	E027° 21' 40,81"	110	Akçakonak	
11	07.02.2013	N37° 43' 42,14"	E027° 23' 14,43"	150	Yenidoğan	
12	08.02.2013	N37° 39' 32,01"	E027° 17' 51,89"	85	Priene Ancient City	
	11.05.2013	N37° 39' 32,43"	E027° 17' 48,03"	85		
13	24.03.2013	N37° 46' 19,4"	E027° 22' 43,8"	115	Northwest of Söke	
14	24.03.2013	N37° 44' 00"	E027° 19' 28"	120	Between Ağaçlı Village - Güzelçamlı	
15	24.03.2013	N37° 42' 46,4"	E027° 13' 57,5"	45	Panionion Ancient City	
16	26.03.2013	N37° 44' 36,02"	E027° 21' 17,10"	265	Ağaçlı Village	
17	26.03.2013	N37° 47' 43,81"	E027° 27' 48,12"	80	Sazlı / Söke (Su Gözü Location)	
18	26.03.2013	N37° 42' 06"	E027° 14' 09,7"	155	Upper part of Panionion Ancient City (Duru Stream)	
19	03.04.2013	N37° 41' 11,6"	E027° 13' 39,1"	430		
	12.04.2013	N37° 41' 06,2"	E027° 15' 36,1"	415		
	12.04.2013	N37° 40' 26,3"	E027° 13' 06,8"	620	Güzelçamlı	
	12.04.2013	N37° 40' 11,3"	E027° 12' 59,5"	750		
	12.04.2013	N37° 39' 52,3"	E027° 13' 0,2"	890		
20	30.04.2013	N37° 42' 36,05"	E027° 18' 33,19"	260	Kayabaşı Location - Kurşunlu Monastery / Davutlar	
21	30.04.2013	N37° 42' 19,09"	E027° 16' 57,24"	485	Kurşunlu Monastery	
22	01.05.2013	N37° 44' 32,21"	E027° 21' 49,63"	300	Şeytan Kayası Location	

**List of collection sites**

The localities number of 4-5-9-15-16-18-19 belongs to Dilek Peninsula and Büyük Menderes Delta National Park.

**Results and Discussion**

With the present study, hornworts only one taxon, liverworts 43 taxa (under 24 genera and 21 families) and mosses 174 taxa (under 70 genera and 26 families); totally, 218 taxa (under 95 genera belonging to 48 families) have been identified as the bryoflora of Samsun Mountain.

**Floristic List:****ANTHOCEROTOPHYTA****ANTHOCEROTACEAE**

#*Phaeoceros laevis* (L.) Prosk.

Loc: 2, 9, 15, 18, 19, Substr: S, EMA 1159a

**MARCHANTIOPHYTA****SPHAEROCARPACEAE**

#*Sphaerocarpos michelii* Bellardi

Loc: 3, 15, 17, 18, Substr: S, EMA 657

#*S. texanus* Austin

Loc: 15, 18, Substr: S, EMA 1045b

**AYTONIACEAE**

#*Mannia androgyna* (L.) A. Evans

Loc: 6, Substr: S, EMA721b

#*Plagiochasma rupestre* (R. & G. Forst) Steph.

Loc: 9, Substr: S, Özenoğlu C11/39

#*Reboulia hemisphaerica* (L.) Raddi

Loc: 4, 6, 8, 17, 19, Substr: S, EMA 1179

**CONOCEPHALACEAE**

#*Conocephalum conicum* (L.) Dumort.

Loc: 19, Substr: S, EMA 1195

CORSINIACEAE

#*Corsinia coriandrina* (Spreng.) Lindb.

Loc: 6, 9, Substr: S, EMA 737b

LUNULARIACEAE

#*Lunularia cruciata* (L.) Dumort. ex Lindb.

Loc: 1, 2, 4, 7, 8, 9, 15, 17, 18, 19, 20, 22, Substr: S, R, EMA 976

OXYMITRACEAE

*Oxymitra incrassata* (Brotero) Sérgio & Sim-Sim

Loc: 6, Substr: S, EMA 725

RICCIACEAE

#*Riccia beyrichiana* Hampe ex Lehm.

Loc: 5, 15, 17, 19 Substr: S, EMA 703

*R. bicarinata* Lindb.

Loc: 17, Substr: S, EMA 1087

*R. bifurca* Hoffm.

Loc: 1, 6, Substr: S, EMA 625

#*R. crozalsii* Lev.

Loc: 1, 15, Substr: S, EMA 621

#*R. crystallina* L.

Loc: 15, 17, 18, Substr: S, EMA1034

*R. gougetiana* Durieu & Mont.

Loc: 3, Substr: S, EMA 654

#*R. lamellosa* Raddi

Loc: 5, Substr: S, EMA 704a

*R. michelii* Raddi

Loc: 1, Substr: S, EMA 561

#*R. nigrella* DC.

Loc: 15, Substr: S, EMA 1048

#*R. sorocarpa* Bisch.

Loc: 1, 2, 6, 15, 17, 18,19, Substr: S, EMA 563

TARGIONIACEAE

#*Targionia hypophylla* L.

Loc: 4, 8, 9, 13, 15, 17, 19, Substr: S, R, EMA 881

#*T. lorbeeriana* K. Müll.

Loc: 9, Substr: S, Özenoğlu C11/37

FOSSOMBRONIACEAE

#*Fossombronia angulosa* (Dicks.) Raddi

Loc: 2, 8, 9, 15, 17, 18, 19, Substr: S, EMA 1079b

*F. caespitiformis* De Not. ex Rabenh.

Loc: 6, Substr: S, EMA 738

#*F. echinata* Macvicar

Loc: 9, Substr: S, EMA 842

#*F. pusilla* (L.) Nees

Loc: 6, 7, 9, 17, Substr: S, EMA 743a

PETALOPHYLLACEAE

#*Petalophyllum ralfsii* (Wils.) Nees & Gottsche

Loc: 9, Substr: S, EMA 856

PELLIACEAE

#*Pellia endiviifolia* (Dicks.) Dumort.

Loc: 9, 19, Substr: R, EMA 1188b

#*P. neesiana* (Gott.) Limpr.

Loc: 9, Substr: R, Özenoğlu C11/150

ARNELLIACEAE

#*Southbya nigrella* (De Not.) Henriques

Loc: 1, 9, Substr: R, EMA 570

#*S. tophaceae* (Spruce) Spruce

Loc: 8, 9, 18,19, Substr: S, EMA 1177

CALYPOGEIACEAE

*Calyptogeia muelleriana* (Schiffn.) Müll. Frib.

Loc: 8, Substr: S, EMA 979

#*C. sphagnicola* (H. Arn & J. Perss.) Warnst. & Loeske

Loc: 9, Substr: E, Özenoğlu C11/157

CEPHALOZIELLACEAE

#*Cephaloziella hampeana* (Nees) Schiffn.

Loc: 1, 4, 8, Substr: S, EMA 985b

FRULLANIACEAE

#*Frullania dilatata* (L.) Dumort.

Loc: 9, 19, Substr: E, EMA 1170a

LEJEUNEACEAE

#*Lejeunea lamacerina* (Steph.) Schiffn.

Loc: 8, 9, Substr: R, E, EMA 404

LOPHOZIACEAE

#*Gymnocolea acutiloba* (Schiffn.) Müll. Frib.

Loc: 9, Substr: R, Özenoğlu C11/51

#*Leiocolea turbinata* (Raddi) H. Buch

Loc: 19, 22, Substr: R, EMA 1188a

PORELLACEAE

*Porella platyphylla* (L.) Pfeiff.

Loc: 20, Substr: S, R, EMA 1297

**RADULACEAE**

- #*Radula complanata* (L.) Dumort.  
 Loc: 9, 19, Substr: E, EMA 1170b  
 #*R. lindenbergiana* Gottsche ex C. Hartm.  
 Loc: 9, Substr: R, Özenoğlu C11/48

**SOLENOSTOMATACEAE**

- #*Solenostoma crenulatum* (Sm.) Mitt.  
 Loc: 9, Substr: R, Özenoğlu C11/71  
 #*S. hyalinum* (Lyeell) Mitt.  
 Loc: 9, Substr: S, Özenoğlu C11/75

**METZGERIACEAE**

- #*Metzgeria furcata* (L.) Dumort.  
 Loc: 19, Substr: E, EMA 1200b

**BRYOPHYTA**

**ENCALYPTACEAE**

- #*Encalypta rhaptocarpa* Schwägr  
 Loc: 9, Substr: S, Çetin 407  
 #*E. vulgaris* Hedw.  
 Loc: 9, Substr: SCR, EMA 1198a

**FUNARIACEAE**

- #*Entosthodon convexus* (Spruce) Brugués  
 Loc: 18, Substr: S, EMA 1099  
 #*E. pulchellus* (H. Philib.) Brugués  
 Loc: 15, 19, Substr: S, SCR, EMA 1223e  
 #*Funaria hygrometrica* Hedw.  
 Loc: 1, 6, 18, Substr: S, EMA 577  
 #*Physcomitrium pyriforme* (Hedw.) Bruch & Schimp.  
 Loc: 1, 15, 18, Substr: S, EMA 626c

**SELIGERACEAE**

- Seligeria acutifolia* Lindb.  
 Loc: 20, Substr: R, EMA 1286

**GRIMMIACEAE**

- Grimmia anodon* Bruch & Schimp.  
 Loc: 20, Substr: R, EMA 1281  
 #*G. decipiens* (Schultz) Lindb.  
 Loc: 9, Substr: R, Çetin 422  
 #*G. dissimulata* E. Maier  
 Loc: 8, 19, Substr: R, SCR, EMA 838  
*G. laevigata* (Brid.) Brid.  
 Loc: 20, Substr: R, EMA 1287

- #*G. lisae* De Not.

Loc: 9, Substr: R, EMA 883

- #*G. longirostris* Hook.

Loc: 9, Substr: R, Çetin 420

- #*G. pulvinata* (Hedw.) Sm.

Loc: 8, 18, 19, 22, Substr: R, SCR, EMA 1095a

- G. trichophylla* Grev.

Loc: 21, Substr: R, EMA 1307

- Schistidium apocarpum* (Hedw.) Bruch & Schimp.

Loc: 8, Substr: R, EMA 963

**DITRICHACEAE**

- #*Ceratodon purpureus* (Hedw.) Brid.

Loc: 9, Substr: S, EMA 866

- #*Cheilothea chloropus* (Brid.) Broth.

Loc: 9, 12, Substr: S, EMA 1232c

- #*Pleuridium acuminatum* Lindb.

Loc: 15, Substr: S, EMA 1022c

**DICRANELLACEAE**

- Dicranella heteromalla* (Hedw.) Schimp.

Loc: 12, Substr: S, EMA 1348a

- #*D. howei* Renauld & Cardot

Loc: 16, Substr: S, EMA 1066b

- #*D. varia* (Hedw.) Schimp.

Loc: 12, 16, 18, 19, Substr: S, EMA 1057

**RHABDOWEISSIACEAE**

- #*Dicranoweisia cirrata* (Hedw.) Lindb.

Loc: 19, 22, Substr: R, E, EMA 1141

**FISSIDENTACEAE**

- Fissidens adianthoides* Hedw.

Loc: 8, Substr: S, EMA 972a

- #*F. bryoides* Hedw.

Loc: 17, 18, Substr: S, EMA 1096

- #*F. crispus* Mont.

Loc: 9, Substr: S, EMA 1264a

- #*F. taxifolius* Hedw.

Loc: 9, 19, Substr: S, EMA 1171

- #*F. viridulus* (Sw. ex anon.) Wahlenb.

Loc: 9, 19, Substr: R, EMA 1214b

**POTTIACEAE**

- #*Acaulon fontiquerianum* Casas et Sérgio

Loc: 15, Substr: S, EMA 1042a

- Aloina aloides* (Koch ex Schultz) Kindb.  
Loc: 2, Substr: S, EMA 641
- A. ambigua* (Bruch & Schimp.) Limpr.  
Loc: 3 Substr: S, EMA 659
- #*Barbula convoluta* var. *convoluta* Hedw.  
Loc: 4, 12, Substr: S, EMA 1349a
- #*B. convoluta* var. *sardoa* Schimp.  
Loc: 15, 18, Substr: S, EMA 1032a
- #*B. unguiculata* Hedw.  
Loc: 6, 12, 18, Substr: S, R, E, EMA 1348b
- Crossidium squamiferum* (Viv.) Jur. var. *pottioideum*  
(De Not.) Mönk.  
Loc: 12, Substr: S, EMA 1337d
- C. squamiferum* (Viv.) Jur. var. *squamiferum*  
Loc: 12, Substr: R, EMA 926
- Dialytrichia mucronata* (Brid.) Broth.  
Loc: 22, Substr: R, EMA 1331
- #*Didymodon acutus* (Brid.) K. Saito  
Loc: 8, 12, 18, 19, Substr: S, R, EMA 839
- #*D. cordatus* Jur.  
Loc: 19, Substr: S, EMA 1240
- D. fallax* (Hedw.) R. H. Zander  
Loc: 22, Substr: S, EMA 1328
- #*D. ferrugineus* (Schimp. ex Besch.) M. O. Hill  
Loc: 19, 22, Substr: S, EMA 1164a
- #*D. insulanus* (De Not.) M. O. Hill  
Loc: 12, 19, Substr: S, R, EMA 1197b
- #*D. luridus* Hornsch.  
Loc: 6, 15, 16, 19, 20, Substr: S, R, E, SCR, EMA 1197a
- #*D. rigidulus* Hedw.  
Loc: 19, Substr: S, EMA 1233
- #*D. sinuosus* (Mitt.) Delogne  
Loc: 16, Substr: E, EMA 1049
- #*D. spadiceus* (Mitt.) Limpr.  
Loc: 4, Substr: SCR, EMA 694a
- #*D. tophaceus* (Brid.) Lisa  
Loc: 12, 18, 19, Substr: S, R, SCR, TUFA, EMA 1320
- #*D. umbrosus* (Müll. Hal.) R.H. Zander  
Loc: 19, Substr: S, EMA 1232a
- D. vinealis* (Brid.) R. H. Zander  
Loc: 12, Substr: S, EMA 1346c
- #*Eucladium verticillatum* (With.) Bruch & Schimp.  
Loc: 4, 19, Substr: R, SCR, TUFA, EMA 1133
- #*Gymnostomum calcareum* Nees & Hornsch.  
Loc: 9, Substr: R, EMA 1259a
- #*G. aeruginosum* Sm.  
Loc: 19, Substr: S, EMA 1121
- #*Gyroweisia reflexa* (Brid.) Schimp.  
Loc: 8, 19, Substr: R, EMA 985a
- #*Gyroweisia tenuis* (Hedw.) Schimp.  
Loc: 19, Substr: SCR, EMA 1199
- #*Microbryum davallianum* (Sm.) R. H. Zander  
Loc: 16, 17, 19, Substr: S, SCR, EMA 1065
- #*M. starckeanum* (Hedw.) R. H. Zander  
Loc: 1, 4, 5, 17, 19, Substr: S, EMA 1075
- Pseudocrossidium hornschuchianum* (Schultz) R. H.  
Zander  
Loc: 1, 8, 12, Substr: S, EMA 552
- P. revolutum* (Brid.) R. H. Zander  
Loc: 12, Substr: R, EMA 1342c
- #*Syntrichia laevipila* Brid.  
Loc: 12, 19, Substr: E, EMA 1340
- #*S. montana* Nees  
Loc: 9, Substr: R, E, EMA 890c
- #*S. papillosissima* (Copp.) Loeske  
Loc: 19, Substr: R, EMA 1219
- #*S. princeps* (De Not.) Mitt.  
Loc: 19, 20, Substr: R, E, EMA 1204d
- #*S. ruralis* (Hedw.) F. Weber & D. Mohr var.  
*ruraliformis* (Besch.) Delogne  
Loc: 19, Substr: S, EMA 1257
- S. ruralis* var. *ruralis* (Hedw.) F. Weber & D. Mohr  
Loc: 8, Substr: R, EMA 991c
- #*S. virescens* (De Not.) Ochrya  
Loc: 9, Substr: R, EMA 1259d
- #*Timmia barbuloides* (Brid.) Mönk.  
Loc: 1, 2, 4, 8, 9, 12, 15, 19, 22, Substr: S, EMA 1236
- #*Tortella flavovirens* (Bruch) Broth.  
Loc: 19, Substr: S, EMA 1160c
- #*T. humilis* (Hedw.) Jenn.  
Loc: 9, 19, Substr: S, R, EMA 1174
- #*T. inclinata* var. *densa* (Lorentz & Molendo) Limpr.  
Loc: 9, Substr: S, EMA 845a
- #*T. squarrosa* (Brid.) Lindb.  
Loc: 1, 6, 8, 9, 12, 19, Substr: S, EMA 811
- #*T. tortuosa* (Hedw.) Limpr.  
Loc: 8, 9, 12, 15, 18, 19, 20, 22, Substr: S, R, EMA 818
- #*Tortula acaulon* (With.) R. H. Zander  
Loc: 3, 15, Substr: S, EMA 664
- T. atrovirens* (Sm.) Lindb.  
Loc: 17, Substr: S, EMA 1074
- T. brevissima* Schiffn.  
Loc: 12, Substr: R, EMA 938
- T. inermis* (Brid.) Mont.  
Loc: 12, Substr: R, EMA 946

*T. lindbergii* Broth.

Loc: 8, Substr: R, EMA 778

#*T. muralis* Hedw.

Loc: 16, 18, Substr: R, EMA 1063

#*T. subulata* Hedw.

Loc: 8, 19, Substr: R, EMA 808

#*T. truncata* (Hedw.) Mitt.

Loc: 15, Substr: S, EMA 1044

*T. vahliana* (Schultz) Mont.

Loc: 12, Substr: R, EMA 939

#*Trichostomum brachydontium* Bruch

Loc: 2, 9, Substr: R, EMA 637

#*T. crispulum* Bruch

Loc: 12, 13, 17, 19, Substr: S, SCR, EMA 953

#*Weissia brachycarpa* (Nees & Hornsch.) Jur.

Loc: 19, Substr: S, EMA 1164b

*W. condensata* (Voit) Lindb.

Loc: 8, 12, Substr: S, EMA 829

#*W. controversa* Hedw.

Loc: 19, Substr: R, EMA 1256

#### EPHEMERACEAE

#*Ephemerum serratum* (Hedw.) Hampe

Loc: 15, Substr: S, EMA 1046a

#### BARTRAMIACEAE

#*Anacolia menziesii* (Turner) Paris

Loc: 19, Substr: S, R, EMA 1222

#*A. webbii* (Mont.) Schimp.

Loc: 19, Substr: SCR, EMA 1223a

*Bartramia pomiformis* Hedw.

Loc: 12, Substr: S, EMA 930

#*B. stricta* Brid.

Loc: 1, 3, 19, Substr: S, EMA 1160b

#### BRYACEAE

*Bryum argenteum* Hedw.

Loc: 12, Substr: S, EMA 935

#*B. canariense* Brid.

Loc: 4, 19, Substr: R, SCR, EMA 701b

#*B. dichotomum* Hedw.

Loc: 1, 4, 6, 12, 15, 18, 19, 22, Substr: S, SCR, EMA 575

*B. gemmilucens* R. Wilczek & Demaret

Loc: 6, Substr: S, EMA 754

#*Ptychostomum capillare* (Hedw.) Holyoak & N. Pedersen

Loc: 1, 6, 9, 14, 19, Substr: R, E, SCR, EMA 610

*P. imbricatulum* (Müll. Hal.) Holyoak & N. Pedersen

Loc: 8, 12, Substr: S, EMA 1346b

*P. pseudotriquetrum* (Hedw.) J.R. Spence & H.P.

Ramsay

Loc: 6, Substr: S, EMA 763

#*P. torquescens* (Brunch & Shimp.) Ros & Mazimpaka

Loc: 9, Substr: S, E, EMA 875a

#### MNIACEAE

*Epipterygium tozeri* (Grev.) Lindb.

Loc: 12, Substr: S, EMA 929

#*Plagiomnium ellipticum* (Brid.) T. J. Kop.

Loc: 9, Substr: S, SCR, EMA 1278d

#*P. undulatum* (Hedw.) T. J. Kop.

Loc: 9, 18, 22, Substr: S, R, SCR, EMA 840

#*Pohlia cruda* (Hedw.) Lindb.

Loc: 9, Substr: R, Çetin 432

*P. ludwigii* (Spreng. ex Schwägr.) Broth.

Loc: 22, Substr: R, EMA 1332b

*P. wahlenbergii* (F. Weber & D. Mohr) A. L. Andrews var. *calcareo* (Warnst.) E. F. Warb.

Loc: 13, Substr: R, EMA 952

#*P. wahlenbergii* (F. Weber & D. Mohr) A. L. Andrews *wahlenbergii*

Loc: 4, Substr: R, TUFA, EMA 686

#### ORTHOTRICHACEAE

#*Lewinskya acuminata* (H. Philib) F. Lara, Gariletti & Goffinet

Loc: 19, Substr: E, EMA 1175a

#*L. affinis* (Schrad ex Brid.) F. Lara, Gariletti & Goffinet

Loc: 9, 19, Substr: E, EMA 1172b

#*L. rupestris* (Schleich. ex Schwägr.) F. Lara, Gariletti & Goffinet

Loc: 9, 19, Substr: R, E, EMA 1148

#*L. speciosum* (Ness) F. Lara, Gariletti & Goffinet

Loc: 19, Substr: E, EMA 1216

#*L. striata* (Hedw.) F. Lara, Gariletti & Goffinet

Loc: 19, Substr: E, EMA 1172c

*Orthotrichum anomalum* Hedw.

Loc: 8, Substr: R, EMA 999

#*O. cupulatum* Hoffm. ex Brid. var. *bistratosum* Schiffn.

Loc: 19, Substr: E, EMA 1173

#*O. cupulatum* Hoffm. ex Brid. var. *cupulatum*

Loc: 9, 22, Substr: R, EMA 1212

#*O. diaphanum* Schrad. ex Brid.

Loc: 9, 19, Substr: E, EMA 1175c

#*O. philibertii* Venturi

Loc: 9, 19, Substr: E, EMA 889

#*O. pumilum* Sw. ex Anon.

Loc: 19, Substr: E, EMA 1248

#*O. scanicum* Grönvall

Loc: 9, 19, Substr: E, EMA 1267

#*Pulviger a lyellii* (Hook. & Taylor) Plasek, Sawicki & Ochyra

Loc: 9, 19, Substr: E, EMA 1178

#*Zygodon catarinói* C. Garcia, F. Lara, Sérgio & Sim-Sim

Loc: 19, Substr: E, EMA 1215a

#*Z. rupestris* Schimp. ex Lorentz

Loc: 9, 18, 19, Substr: E, EMA 1272

#*Z. viridissimus* (Dicks.) Brid.

Loc: 19, Substr: E, EMA 1200a

## FABRONIACEAE

*Fabronia pusilla* Raddi

Loc: 1, 6, Substr: E, EMA 611

## PTERGYNANDRACEAE

#*Pterigynandrum filiforme* Hedw.

Loc: 9, Substr: E, EMA 1268

## HABRODONTACEAE

#*Habrodon perpusillus* (De Not.) Lindb.

Loc: 19, Substr: E, EMA 1246a

## AMBLYSTEGIACEAE

*Amblystegium serpens* (Hedw.) Schimp.

Loc: 22, Substr: R, EMA 1334

*Campylium stellatum* (Hedw.) J. Lange & C. E. O. Jensen

Loc: 8, Substr: R, EMA 831

#*Cratoneuron filicinum* (Hedw.) Spruce

Loc: 9, 19, Substr: R, TUFA, EMA 854

#*Hygroamblystegium tenax* (Hedw.) Jenn.

Loc: 19, Substr: R, EMA 1275

#*Palustriella commutata* (Hedw.) Ochyra

Loc: 19, Substr: TUFA, EMA 1129

#*P. falcata* (Brid.) Hedenäs

Loc: 9, 19, Substr: TUFA, EMA 1131

## BRACHYTHECIACEAE

*Brachytheciastrum dieckii* (Röll) Ignatov & Huttunen

Loc: 14, Substr: E, EMA 1008b

#*B. velutinum* (Hedw.) Ignatov & Huttunen

Loc: 19, Substr: S, EMA 1159

#*Brachythecium albicans* (Hedw.) Schimp.

Loc: 9, Substr: S, Çetin 409

#*B. rivulare* Schimp.

Loc: 9, Substr: S, Çetin 433

#*Eurhynchium angustirete* (Broth.) T. J. Kop.

Loc: 9, Substr: R, EMA 870

#*E. striatum* (Hedw.) Schimp.

Loc: 19, 22, Substr: SCR, EMA 1312

*Homalothecium aureum* (Spruce) H. Rob.

Loc: 18, Substr: R, EMA 1094

*H. lutescens* (Hedw.) H. Rob.

Loc: 18, Substr: E, EMA 1112a

#*H. sericeum* (Hedw.) Schimp.

Loc: 1, 9, 18, 19, 22, Substr: S, E, SCR, EMA 1091

#*Microeurhynchium pumilum* (Wilson) Ignatov & Vanderp.

Loc: 9, Substr: S, EMA 1278c

*Oxyrrhynchium hians* (Hedw.) Loeske

Loc: 22, Substr: R, EMA 1330a

#*O. schleicheri* (R. Hedw.) Röll

Loc: 9, Substr: S, EMA 872

#*O. speciosum* (Brid.) Warnst.

Loc: 9, Substr: S, EMA 1266

#*Kindbergia praelonga* (Hedw.) Ochyra

Loc: 9, Substr: E, EMA 1276

#*Plasteurhynchium meridionale* (Schimp.) M. Fleisch.

Loc: 8, 19, Substr: R, SCR, EMA 972b

*P. striatulum* (Spruce) M. Fleisch.

Loc: 22, Substr: R, EMA 1323a

*Rhynchostegiella curviseta* (Brid.) Limpr.

Loc: 22, Substr: R, EMA 1323b

#*R. litorea* (De Not.) Limpr.

Loc: 19, Substr: E, EMA 1140a

#*R. tenella* (Dicks.) Limpr.

Loc: 9, Substr: E, EMA 1265

#*R. teneriffae* (Mont.) Dirkse & Bouman

Loc: 9, 22, Substr: R, EMA 1316

*Rhynchostegium confertum* (Dicks.) Schimp.

Loc: 12, Substr: S, EMA 1338

*R. lusitanicum* (Brid.) A. J. E. Sm.

Loc: 22, Substr: R, EMA 1309



#*R. megapolitanum* (Blandow ex F. Weber & D. Mohr) Schimp.

Loc: 9, 18, Substr: S, EMA 868

*R. murale* (Hedw.) Schimp.

Loc: 22, Substr: R, EMA 1311

#*R. riparioides* (Hedw.) Dixon

Loc: 9, 22, Substr: R, EMA 1274

#*Scleropodium cespitans* (Wilson ex Müll. Hal.) L. F. Koch

Loc: 19, Substr: E, EMA 1254

#*S. touretii* (Brid.) L. F. Koch

Loc: 8, 9, 18, 19, Substr: S, R, EMA 1005

#*Scorpiurium circinatum* (Bruch) M. Fleisch. & Loeske

Loc: 1, 9, 19, Substr: S, R, E, EMA 585

*S. deflexifolium* (Solms) M. Fleisch. & Loeske

Loc: 20, Substr: R, EMA 1294

#*S. sendtneri* (Schimp.) M. Fleisch.

Loc: 1, 8, 9, 18, 22, Substr: S, R, EMA 825

#### HYPNACEAE

#*Hypnum andoi* A. J. E. Sm.

Loc: 9, Substr: E, Çetin 430

#*H. cupressiforme* var. *cupressiforme* Hedw.

Loc: 1, 19, Substr: E, R, EMA 1166

*H. cupressiforme* var. *filiforme* Brid.

Loc: 8, 22, Substr: E, EMA 834

#*H. cupressiforme* var. *lacunosum* Brid.

Loc: 9, Substr: S, Çetin411

#*H. cupressiforme* var. *resupinatum* (Taylor) Schimp.

Loc: 19, Substr: E, EMA 1250

#*H. cupressiforme* var. *subjulaceum* Molendo

Loc: 19, Substr: SCR, EMA 1143

#### HYLOCOMIACEAE

*Ctenidium molluscum* (Hedw.) Mitt.

Loc: 18, Substr: S, EMA 1098

#### LEUCODONTACEAE

#*Leucodon sciuroides* (Hedw.) Schwägr.

Loc: 9, 19, 22, Substr: E, SCR, EMA 850a

#*Nogopterium gracile* (Hedw.) Crosby & W. R. Buck

Loc: 1, 8, 15, 18, 19, 22, Substr: R, E, SCR, EMA 830

#### ANTITRICHACEAE

#*Antitrichia curtispindula* (Timm ex Hedw.) Brid.

Loc: 19, Substr: E, EMA 1205a

#### NECKERACEAE

*Alleniella complanata* (Hedw.) S. Olsson, Enroth & D.

Quandt

Loc: 20, Substr: R, EMA 1291

#### LEPTODONTACEAE

#*Leptodon smithii* (Hedw.) F. Weber & D. Mohr

Loc: 8, 9, 19, 22, Substr: R, EMA 998

#### LEMBOPHYLLACEAE

#*Isothecium alopecuroides* (Lam. ex Dubois) Isov.

Loc: 9, Substr: R, Çetin 427

#*I. myosuroides* Brid. var. *brachythecioides* (Dixon) Braithw.

Loc: 9, Substr: R, EMA 850

*Ricciaceae* (10 taxa belonging to 1 genus), *Fossombroniaceae* (4 taxa belonging to 1 genus) and *Aytoniaceae* (3 taxa belonging to 3 genera) families with 5 genera and 17 taxa constitute 39,53 % of the liverworts in study area. The families *Sphaerocarpaceae*, *Targioniaceae*, *Pelliaceae*, *Solenostomataceae*, *Calypogeiaceae*, *Lophoziaceae* and *Arnellaceae* contain 2 taxa each. Also other families contain only one takson.

*Ricciaceae* is the family that have collected the most species in the study area with 10 samples. *Riccia* is the largest genus among Turkish Liverwort Flora with 25 species and 2 varieties (Özenoğlu et al., 2019). Because of *Riccia* genus prefers Mediterranean-type localities, it is quite common in our study area.

*Pottiaceae* (57 taxa belonging to 17 genera), *Brachytheciaceae* (16 taxa belonging to 3 genera), *Orthotrichaceae* (19 taxa belonging to 3 genera), *Grimmiaceae* (8 taxa belonging to 2 genera), *Bryaceae* (6 taxa belonging to 5 genera), *Amblystegiaceae* (6 taxa belonging to 1 genus), *Hypnaceae* (5 taxa belonging to 1 genus) ve *Fissidentaceae* (5 taxa belonging to 11 genera) are the most crowded family among the other families. These families constitute 78.73 % of the mosses in our research area with a total of 44 genera and 137 taxa.

*Didymodon* with 12, *Tortula* with 9, *Grimmia* with 8, *Orthotrichum* and *Syntrichia* with 7, *Hypnum* and *Tortella* with 6, *Fissidens*, *Lewinskya* and *Rhynchostegium* with 5 is the most crowded genera among the flora.

Among the identified mosses, *Zygodon catarinoides* and *Acaulon fontiquerianum* have been recently registered from Turkey (Vigalando et al., 2012; Kırmacı and Erdağ,

2014). *Zygodon catarinoides* was collected from sweetgum forests in Marmaris and given as a new record for the first time for Turkey. This taxon has been found very common in the recent study in the field where the first record was made (Kırmacı, pers. com.). This study shows that it can be common in suitable habitats in Western Anatolia. The second taxa *Acaulon fontiquerianum* was firstly found in Bozdağ (Denizli/Turkey). It was collected among grasses of a mountain meadow on calcareous soil at an altitude of 2100 m. a.s. l. In our study, it was collected from sea level like previously European records (Cogoni and Scrugli, 2000; Casas et al., 1990; Sérgio et al., 1993) and given second distributional locality from Turkey.

It is very important to reveal the biodiversity of National Parks. One of the best-preserved national park of Turkey, Dilek Peninsula and Büyük Menderes Delta National Park, is located in our field of study. Totally, 161 taxa, hornworts only one taxon, liverworts 34 taxa and mosses 126 taxa were collected from national park in the present study. *Targionia lorbeeriana* and *Gymnocolea acutiloba* on the list of Özenoğlu and Gökler (2002) could not be collected in this study. *G. acutiloba* may be overlooked because it is a very small leafy liverwort. Nine taxa (*Encalypta raptocarpa*, *Grimmia decipiens*, *G. longirostris*, *Pohlia cruda*, *Brachythecium albicans*, *Hypnum andoi*, *H. cupressiforme* var. *lacunosum* and *Isothecium alopecuroides*) on the list of Çetin could not be collected during our study. As we mentioned above, it is possible to overlook some bryophyte taxa during the floristic studies because of the very small size but the fact that 9 of the 28 taxa given in the Çetin list (Çetin, 1988) could not be collected suggests that some taxa may have been misidentified. For example, *Isothecium myosuroides* Brid. var. *brachythecioides*, which is very common in Oluk Canyon, is not on Çetin's list. This taxon has probably been identified as *Isothecium alopecuroides*. The lack of sufficient literature and researchers at that time is the biggest factor in this negativity. Unfortunately, we did not have a chance to check these examples. For this reason, we included them in the flora with Çetin's collection number.

On the north-facing slopes of the mountain especially in the national park, there is a mixed forest of *Quercus frainetto*, *Pinus brutia*, which shows good development to 1000 m. a.s. l. *Quercus frainetto* stem and lateral branches are very rich in terms of bryophytes which are *Orthotrichum* ssp., *Leptodon smithii*, *Antitrichia curtispindula*, *Frullania dilatata*, *Hypnum* ssp., *Metzgeria*

*furcata*, *Zygodon viridissimus*, *Habrodon perpusillus* and *Leucodon sciuroides*. Especially *Leptodon smithii*, *Antitrichia curtispindula* and *Hypnum cupressiforme* are stand out as the dominant taxa. Over 1000 meters, these formations are replaced by sparse forests dominated by *Crataegus* sp. They are rich in terms of epiphytic bryophytes which are *Frullania dilatata*, *Habrodon perpusillus*, *Leucodon sciuroides*, *Zygodon viridissimus*, *Syntrichia* ssp., *Orthotrichum* ssp. *Homalothecium sericeum* and *Soutbya* ssp. Although the flow rate decreases throughout the summer, deep valleys in the northern part of the mountain rich in water host taxa known from a single locality on the list. Similar areas appear as the main factor in the increase in the number of taxa. *Platanus orientalis* is one of the taxa that provide a substrate to the bryophytes at these moments. The most common epiphytic taxa on *P. orientalis* are *Homalothecium sericeum*, *Scorpiurium circinatum*, *Rhynchostegiella* ssp., *Bryum* ssp., *Soutbya nigrella* and *Southbya tophaceae*. The rocks on the edge of the stream are covered by *Porella platyphylla*, *Homalothecium sericeum*, *Platyhypnidium riparioides*, *Eurhynchium* ssp., *Leiocolea turbinata*, *Alleniella complanata*, *Scorpiurium sendtneri*, *Gymnostomum calcereum*, and *Rhynchostegiella* ssp., *Fissidens* ssp., *Plagiomnium* ssp., *Weissia condensa*, *Timmiella barbulooides*. *Targionia* spp., *Reboulia hemisphaerica*, *Lunularia cruciata*, *Pellia neesiana* and *P. epiphylla* belong to liverworts are the most common taxa covering on substrates. *P. neesiana* and *P. epiphylla* cannot be separated when sterile but the flap-like involucre of the latter species is very different in appearance from the shortly cylindrical toothed involucre of *P. neesiana* and can usually be found *P. endiviifolia* differs in the narrower thallus lacking thickening bands in the cells, the production of repeatedly dichotomously branched, fragile shoots and in its occurrence in basic habitats.

The slopes of the mountain facing south and east which are very poor in terms of water supplies exposure to the sun throughout the day. As a reflection of this, vegetation is weak in this part of the mountain. When heavy damaging effects such as cutting, burning and grazing are added to this, the vegetation of this part of the mountain has become represented by patches of frigana and garik in patches. As a natural consequence of this, the area is poor in term of bryophytes. Ephemeral communities are seen in the early spring in especially under olive plantations and on paths used by people. As mentioned above, the taxa

belonging to the genus *Riccia* are at the top of these taxa. *Sphaerocarpos texanus*, *S. michelii*, *Pottia* ssp. and *Barbula unguiculata* are other common taxa. *Fabronia pusilla* and *Ptychostomum capillare* are the most common taxa on olive trees. In addition, taxa which have high drought resistance can be seen throughout the year and very good represents for like areas. *Nogopterium gracile*, *Tortula muralis*, *Grimmia* ssp., *Syntrichia ruralis*, *Tortella tortuosa*, *Scorpiurium sendtneri*, *Tortella squarrosa*, *Bartramia stricta*, *Crossidium squamiferum* and *Aloina* ssp. are the best-known taxa for these habitats.

The completion of floristic studies on Turkish bryophytes is extremely important to spell out our understanding of the bryophyte flora of Turkey. Similarly, revealing the flora of protected areas will contribute to the identification of conservation strategies. Therefore, we believe that the study will complete a deficiency in this area.

### Ethical Approval

The authors don't declare ethical approval.

### Conflicts of Interest

The authors declare that they have no conflict of interest.

### Funding Statement

This study was funded by Aydın Adnan Menderes University, scientific research projects (BAP) for financial support to our project (FEF-12004).

### Acknowledgements

Many thanks to the Aydın Adnan Menderes University, scientific research projects (BAP) for financial support to our project, to Republic of Turkey Ministry of Agriculture and Forestry General Directorate of Nature Conservation and National Parks (Aydın), Prof. Dr. Fatih ŞİMŞEK, Dr. Ferhat KİREMİT, Gurbet ASLAN, Muhyettin ŞENTÜRK, Gözde ASLAN and Mehmet TURAL for helping during the field trips and Dr. Evrim DEMİR for drawing map.

### References

Aydın Çevre ve Şehircilik İl Müdürlüğü. 2011. Aydın İli Çevre Durum Raporu. Available from: [www.csb.gov.tr/turkce/dosya/ced/icdr2011/aydin\\_icdr2011.pdf](http://www.csb.gov.tr/turkce/dosya/ced/icdr2011/aydin_icdr2011.pdf) Retrieved 22/07/2013.

- Casas C., Sérgio C., Cros R.M., Brugués M. 1990. Datos sobre el género *Acaulon* en la Peninsula Ibérica. *Cryptog. Bryol. Lichénol*, 11: 63-70.
- Cogoni A., Scrugli A. 2000. *Acaulon fontiquerianum* Casas et Sérgio (Musci, Pottiaceae) new to Sardinia. *Cryptogamie Bryologie*, 21: 285-288.
- Çetin B. 1988. Dilek yarımadası Milli Parkı Karayosunları (Musci): I. Doğa, *Türk. Botanik Dergisi*, 12: 207-213.
- Durmuşkahya C. 2000. Dilek Yarımadası-Büyük Menderes Deltası Milli Parkı (Kuşadası-Aydın) Biyoçeşitliliği Üzerine İncelemeler. Yüksek Lisans Tezi, Ege Üniversitesi Fen Bilimleri Enstitüsü, İzmir.
- Erata H., Batan N., Özdemir T. 2018. The Bryophyte Flora of Sis Mountain (Giresun-Trabzon, Turkey). *Anatolian Bryology*, 4: 46-64.
- Gökler İ. 2017. Contributions to the Liverworts Flora of Uşak Province. *Anatolian Bryology*, 3: 19-24.
- Gökler İ., Özenoğlu H., Kiremit F. 2000. A new liverwort for the flora of Turkey. *Turkish Journal of Botany*, 10: 81-83.
- Gökler İ. 2018. Kütahya İli Ciğerotu (Marchantiophyta) Florasına Katkılar (Türkiye). *Anatolian Bryology*, 4: 31- 35.
- Gürsu G., Çetin B. 2017. Karasu (Sakarya/Türkiye) ve Civarının Karayosunu (Briyofit) Florası. *Anatolian Bryology*, 3: 68-74.
- Işın Z., Ursavaş S. 2018. The Moss Flora of İğneada Floodplain Forests National Park (Demirköy, Kırklareli) Turkey. *Anatolian Bryology*, 4: 92-106.
- Kırmacı M., Ağcagil E. 2016. New national and regional bryophyte records, 49. 21. *Orthotrichum philiberti* Venturi. *Journal of Bryology*, 38: 335.
- Kırmacı M., Ağcagil E. 2018. The bryophyte flora of Fethiye Babadağ (Muğla/Turkey). *Anatolian Bryology*, 4 17-30.
- Kırmacı M., Erdağ A. 2014. *Acaulon fontiquerianum* (Pottiaceae), a new species to the bryophyte flora of Turkey and Sw Asia. *Polish Botanical Journal*, 59: 229-233.
- Kırmacı M., Erdağ A. 2016. Subice Dağı (Aydın) Karayosunları Florası. *Anatolian Bryology*, 1: 9-20.
- Kırmacı M., Ağcagil E., Aslan G. 2013. The Bryophyte Flora of Ancient Cities of Aydın Province (Turkey). *Botanica Serbica*, 37: 31-38.
- Özel N. 1996. Beşparmak Dağları ve Dilek Yarımadası Bitki Örtüsü Üzerine Araştırmalar, İzmir, Ege Ormancılık Araştırma Müdürlüğü Teknik Bülten Serisi, Yayın No: 1.
- Özenoğlu H., Gökler İ. 2002. Liverworts (Marchantiopsida) of the Dilek Peninsula National Park. *Turk Journal of Botany*, 26: 297-301.
- Özenoğlu Kiremit H. 2007. Investigation on the flora of hornworts (Antocerotopsida) and liverworts (Marchantiopsida) of Bafa Lake National Park (C11). *Pakistan Journal of Biological Sciences*, 10: 2048-2055.

- Özenoğlu Kiremit H. 2011. *Riccia subbifurca* Warnst. ex Croz. (Ricciaceae) new to Turkey. *Cryptogamie Bryologie*, 32: 83-86.
- Özenoğlu Kiremit H., Hugonnot V. 2010. *Riccia perennis* Steph. (Ricciaceae, Hepaticae) new to South-West Asia. *Cryptogamie Bryologie*, 31: 297-302.
- Özenoğlu Kiremit H., Kırmacı M., Kiremit F. 2016. The findings of *Riccia* species (Marchantiophyta) in Turkey and Southwest Asia. *Cryptogamie Bryologie*, 37: 19-25.
- Özenoğlu Kiremit, H., Kırmacı M. 2012. Notes on *Riccia fluitans* and *Riccia lamellosa* (Ricciaceae, Hepaticae) in Turkey. *Biological Diversity and Conservation*, 5: 81-84.
- Özenoğlu H, Kırmacı M, Kiremit F. 2019. Contributions to the genus *Riccia* L. (Ricciaceae) in Turkey. *Turk Journal of Botany*, 43: 253-261.
- Sanalp G.T., Keçeli T. 2018. Contribution to the Liverworts (Marchantiophyta) Flora of the Kadınçayırı Nature Park (Ilgaz-Çankırı) and Environment. *Anatolian Bryology*, 4: 36-45.
- Sarioğlu S., Keçeli T. 2018. Contributions to the Liverwort (Marchantiophyta) Flora of Acarlar Lake Floodplain Forest (Sakarya). *Anatolian Bryology*, 4: 107-121.
- Seçmen Ö. 1996. Türkiye Florası (Ders Notları). Ege Üniversitesi Fen Fakültesi Kitaplar Serisi No:120, 84 sayfa.
- Sérgio C., Hébrard J.P. & Casas C. 1993. *Acaulon fontiquerianum* Casas et Sérgio (Musci, Pottiaceae) nouveau pour la bryoflore du Portugal, de France et de Corse. *Orsis*, 8: 11-19.
- Şimşek Ö., Çetin B. 2016. Bolu Dağları Ciğerotları (Marchantiophyta) Florası. *Anatolian Bryology*, 1: 56-69.
- Ursavaş S., Keçeli T. 2019. The Moss Flora of Kocaçay Delta (Karacabey-Bursa) Floodplain Forests in Turkey. *Anatolian Bryology*, 5: 22-34.
- Vigalando B., Lara F., Draper I., Garilleti R. 2012. *Zygodon catarinói* C.A. Garcia, F. Lara, Sérgio & Sim-Sim In: New national and regional bryophyte records, 33. *Journal of Bryology*, 33: 288.
- Yücel E., Ezer T. 2018. Kütahya İli (Türkiye) Briyofit Florasına Katkıları. *Anatolian Bryology*, 4: 65-71.