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The bryophyte flora of Fethiye Babadağ (Muğla/Turkey)

* Mesut KIRMACI¹, Emre AĞCAGİL²

¹Adnan Menderes Üniversitesi, Fen-Edebiyat Fakültesi, Biyoloji Bölümü 09010 Aydın, TÜRKİYE

²Adnan Menderes Üniversitesi, Koçarlı Meslek Yüksekokulu, Kimya ve Kimyasal İşleme Teknolojileri Bölümü 09100 Aydın, TÜRKİYE

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Abstract

In this study was investigated the bryophyte diversity of Fethiye Babadağ (Muğla), was investigated. After identification of approximately 850 bryophyte samples collected from the research area, a total of 171 moss taxa belonging to 24 families and 68 genera, 19 liverwort taxa belonging to 15 families and 15 genera and one hornwort species were reported from the study area. *Weissia armata* (Thér. & Trab.) Fedosov and *Fissidens arnoldii* R. Ruthe were collected from the area as a second record for Turkey among the others. Additionally, *Syntrichia minor* (Bizot) M. T. Gallego, *Pottiopsis caespitosa* (Brid.) Blockeel & A.J.E. Sm., *Weissia breutelii* Müll. Hal, *Lewinskya tortidontia* (F.Lara, Garilleti & Mazimpaka) F.Lara, Garilleti & Goffinet and *Orthotrichum vittii* F. Lara, Garilleti & Mazimpaka which were recorded after 2000 and in very limited known localities in Turkey, were recorded from the study area. Moreover, epiphytic bryophytes of the mountain were also evaluated in this study. At the end, a total of 51 bryophyte taxa (4 liverworts and 47 mosses) were found on 17 different trees.

Key words: Bryophyte, Epiphytic, Fethiye, Babadağ, West Anatolia, Turkey.

Fethiye Babadağ'ın (Muğla) briyofit florası

Öz

Bu çalışmada, Fethiye Babadağ' ın (Muğla) briyofit çeşitliliği araştırılmıştır. Çalışma alanından toplanan yaklaşık 850 briyofit örneğinin teşhisi sonucunda, toplam 24 familya, 68 cins'e ait 171 karayosunu taksonu, 15 familya, 15 cins'e ait 19 ciğerotu taksonu ve sadece 1 boynuzlu ciğerotu türünün alanda yayılış gösterdiği belirlenmiştir. *Weissia armata* (Thér. & Trab.) Fedosov ve *Fissidens arnoldii* R.Ruthe ülkemizden 2 kez kaydı verilen taksonlardır. Ayrıca Türkiye'den 2000'li yıllardan sonra kaydedilen ve çok sınırlı lokalitelerden bilinen *Syntrichia minor* (Bizot) M. T. Gallego, *Pottiopsis caespitosa* (Brid.) Blockeel & A.J.E. Sm., *Weissia breutelii* Müll. Hal *Lewinskya tortidontia* (F.Lara, Garilleti & Mazimpaka) F.Lara, Garilleti & Goffinet ve *Orthotrichum vittii* F.Lara, Garilleti & Mazimpaka de çalışma alanından kayıt edilmiştir. Bunlara ek olarak, bu çalışmada dağın epifitik briyofitler de değerlendirilmiştir.Sonuçta 17 farklı ağaç üzerinde toplamda 51 briyofit taksonu (4 ciğerotu, 47 karayosunu) bulunmuştur.

Anahtar kelimeler: Briyofitler, Epifitik, Fethiye, Babadağ, Batı Anadolu, Türkiye.

* Corresponding author: mkirmaci@gmail.com

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1. Introduction

Studies carried out for determining the potential of bryophytes, which are one of the most important components of ecosystems, are ongoing with an increasing momentum in Turkey (Erdağ and Kürschner, 2017; Dikmen and Keçeli, 2017). Despite Southastern Anatolia being one of the most investigated regions in terms of bryology, there still remain many areas to be researched for bryophytes. Fethiye Babadağ (Muğla) which was selected as the study area is one of the most popular holiday resorts in Turkey for alternative tourism activities such as paragliding, tracking and jeep safari. According to Tuzlacı (2004), a total of 249 flowering plant taxa including 40 endemic ones are distributed in the study area. Babadağ has not been studied in terms of bryophytes so far. The only record provided for this mountain was *Zygodon forsteri* (Erdağ and Kırmacı, 2010). With this study, we aim to reveal bryoflora of this area as well as providing available data for future studies.

1.1. A description of the Study Area. The mount Babadağ which is situated in Southwestern Anatolia is known as the furthest northwestern end of the Taurus Mountains. It is located between 37° 54' N latitude, 28° 41' E longitude and 37° 37' N latitude, 29° 12' E longitude and is surrounded by Fethiye - Kemer in the north, the Kemer - Korkuteli highway in the east, and Aegean Sea in the west and southwest (Figure 1). Mediterranean climate prevails in Babadağ. Precipitation is usually

concentrated in winter. In July and August, there is rarely rainfall and the sky is mostly clear. From November to May, snow and frost can be seen. The snow limit in winter is above 1400 m. although it may be down to 800 m from time to time. In summer, the temperature at sea level is above 40°C (Muğla province environmental situation report, 2013). There is no periodically running water source in the mountain except an irrigation canal in the east, thus causing the mountain to be of a xeric character. Maquis dominates the deforested areas at lower altitudes. *Quercus coccifera* L. is the most prominent member of this community. *Q. coccifera*, *Pistacia lentiscus* L., *Styrax officinalis* L and *Olea europaea* L. are other maquis elements in these zones. Well-known Mediterranean vegetation zones are seen from the sea level up to 1900 m. The first zone is represented by a well-developed *Pinus brutia* Ten. forest and it goes on to 1000 (1200) m. a.s.l. After this zone, the areas taken over by *P. nigra* subsp. *caramanica* (Loudon) Rehder. and *Cedrus libani* A. Rich. forests. The second one is seen all around the study area, mostly in the N, E and NW slopes of the mountain between 250 and 1200 (1650) m. a.s.l. It is one of the healthiest populations in Turkey. This population is accepted as a world genetic heritage. It grows in well-drained, calcareous soils and is tolerant to drought during summer. Higher up, Juniper forests and thorn cushion communities are seen as mixed formations between 1400 and 1600 m. After this zone, pure thorn-cushion vegetation prevails.

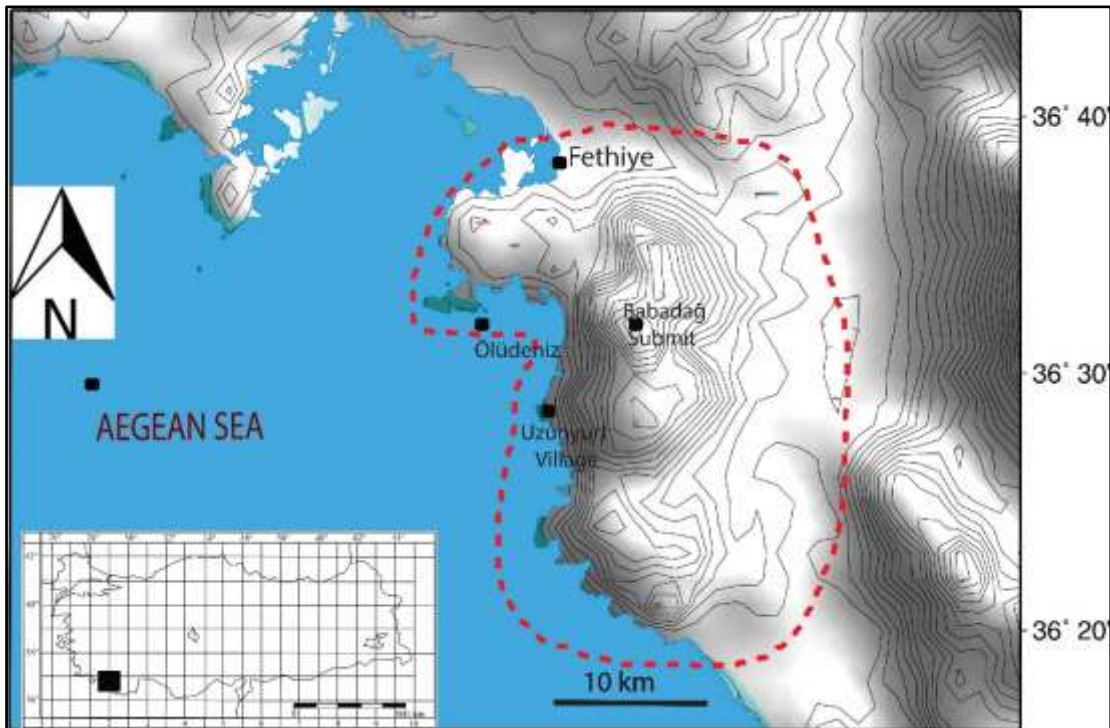


Figure 1. Study area (map drawn using the website of www.seaturtle.org)

2. Material and Methods

850 bryophyte taxa were collected from different localities during field trips between 2009 and 2011. Among these, nearly 250 bryophyte taxa were epiphytic. The occurrence of bryophytes was studied on various heights (on tree base: below 50 cm, on tree trunk: 50 cm and up). The relevant floras and monographs were used for identifications of the specimens. Nomenclature follows Söderström et al. (2015) and Hill et al. (2006). The list of the latest accepted names was checked based on the method by Ros et al. (2013) and Lara et al. (2016) and listed alphabetically. For each taxon, only one collector number was given to avoid repetition in the floristic list, but if the same plants were collected from different localities, they were also indicated as "loc. 1,2,3...".

The specimens were deposited in AYDN (Herbarium of Adnan Menderes University, Aydın, Turkey).

Collector and identifying author abbreviations used in the text and appendix are as follows:

2.1. Abbreviations:

*: second records for Turkish bryoflora

**: Only known locality from Turkey

MKIR: Collection number for Mesut KIRMACI

2.2. List of collection sites

1) MKIR 2998-3020 Menderes hill / Akbel, N36° 31' 82.2'' E029° 10' 85.3'', 1705 m, 25.03.2005

2) MKIR 3021-3043, 4878-4910 Eşek Bayılta locality, N36° 31' 27'' E029° 11' 35'', 1500 m, 25.03.2005/25.06.2009

3) MKIR 4245-4264 Eşen-Derebeyazı district, N36° 25' 27'' E029° 14' 55'', 150 m, 12.10.2008

4) MKIR 4265-4272 Eşen-Boğaziçi village, N36° 27' 12.9'' E029° 12' 00.3'', 250 m, 12.10.2008

5) MKIR 4273-4279 Alınca village, N36° 29' 7.25'' E029° 08' 8.39'', 600 m, 12.10.2008

6) MKIR 4280-4298, 4955-4957 Karaağaç village, N36° 27' 5.85'' E029° 09' 4.72'', 950 m, 12.10.2008/25.06.2009

7) MKIR 4299-4303, 4911-4923 Kirme village, N36° 30' 40.7'' E029° 10' 00.5'', 750 m, 12.10.2008/25.06.2009

8) MKIR 4303-4327 South of Ölüdeniz ~3km N36° 31' 14'' E029° 08' 0.4'', 20 m, 15.10.2008

9) MKIR 4328-4354 Ölüdeniz-Uzunyurt (3 km to Uzunyurt village) N36° 30' E029° 07' , 400 m, 15.10.2008

10) MKIR 4355-4371, 4399-4404 Uzunyurt village, N36° 29' E029° 08' , 310 m, 15.10.2008

11) MKIR 4372-4398 Uzunyurt village -Kabak district (7 km), N36° 28' 00 E029° 07' 49.3, 200 m, 15.10.2008

12) MKIR 4405-4436 Butterfly Valley N36° 29' 46.2'' E029° 07' 33.7'', 20 m, 16.10.2008

13) MKIR 4618-4640 Upper part of Gökben village N36° 34' 11.64'' E029° 15' 26.26'', 470 m 02.06.2009

14) MKIR 4643-4663 Eşenköy (irrigation canal) N36° 37' 20.5'' E029° 12' 19.1'', 170 m, 02.06.2009

15) MKIR 4464-4117 Top of Babadağ (south of top) N36° 31' 49.2'' E029° 10' 51.2'', 1965 m, 03.06.2009

16) MKIR 4718-4735 Gökkuyu locality N36° 31' 29.6'' E029° 10' 52.4'', 1650 m, 03.06.2009

17) MKIR 4736-4737 Karasivri N36° 31' 10.01'' E029° 11' 52.02'', 1705 m, 03.06.2009

18) MKIR 4738-4820 Kuzyaka N36° 33' 06.01'' E029° 10' 13.6'', 810 m, 13.06.2009

19) MKIR 4821-4832 Sakçukuru / Güdüllü N36° 32' 44.5'' E029° 10' 55.7'', 1100 m, 13.06.2009

20) MKIR 4833-4852 Ayıboğazı N36° 34' 01.4'' E029° 11' 53.4'', 1400 m, 13.06.2009

21) MKIR 4853-4858 Mendos Plain N36° 33' 12.7'' E029° 12' 08.1'', 1335 m, 13.06.2009

22) Meke locality N36° 32' 47.8'' E029° 11' 26.6'', 1310 m, 13.06.2009

23) MKIR 4959-4871 on Babadağ road 2. Cistern N36° 33' 13, 78 E029° 10' 07, 12, 310 m 25.06.2009

24) MKIR 4873-4877 N36° 32' 33.2'' E029° 11' 14'', 1220 m, 25.06.2009

25) MKIR 4924-4938 Dokuzgöl N36° 28' 31.9'' E029° 11' 17.7'', 1150 m, 25.06.2009

26) MKIR 4938-4954 3 km to Dokuzgöl N36° 28' 29.7'' E029° 10' 23'', 1150 m, 25.06.2009

27) MKIR 4958-4965 Kabağaç vilage / Eşen N36° 31' 46'' E029° 18' 35.7'', 100 m, 24.09.2009

28) MKIR 4966-4975 Kabağaç vilage / Asar locality N36° 32' 25'' E029° 18' 38.5'', 140 m, 24.09.2009

MKIR 4976-5009 irrigation canal N36° 32' 35.5'' E029° 17' 42.9'', 190 m, 24.09.2009

29) MKIR 5010-5019 between Kabağaç-Çeltiközü villages, 24.09.2009

3. Results

As a result of the identification, 171 moss species belonging to 24 families and 68 genera, 19 liverwort species belonging to 14 families and 15 genera and one hornwort species were found in the area.

ANTHOCEROTOPHYTA

ANTHOCEROTACEAE

Phaeoceros laevis (L.) Prosk.

Loc: 10, 12, epigeic, MKIR 4361

MARCHANTIOPHYTA

CEPHALOZIELLACEAE

Cephaloziella divaricata (Sm.) Schiffn.

Loc:12, epigeic, MKIR 4419b

JUNGERMANNIACEAE

Jungermannia gracillima Sm.

Loc:12, epigeic, MKIR 4405

SOUTHBYACEAE

Southbya tophacea (Spruce) Spruce

Loc: 19, soil-covered rock, MKIR 4819b

FRULLANIACEAE

Frullania dilatata (L.)Dumort.

Loc: 19, epilithic, epiphytic, MKIR 4781

PORELLACEAE

Porella cordaeana (Huebener) Moore

Loc: 12, epiphytic MKIR 4436c

P. pinnata L.

Loc: 26, epiphytic MKIR 4939

P. platyphylla (L.)Pfeiff.

Loc: 19, 20, epilithic, epiphytic, MKIR 4778

METZGERIACEAE

Metzgeria furcata (L.) Dumort.

Loc: 9, epigeic, MKIR 4354b

FOSSOMBRONIACEAE

Fossombronia husnotii Corb.

Loc: 12, epigeic, MKIR 4420b

PETALOPHYLLACEAE

Petalophyllum ralfsii (Wils.) Nees & Gottsche

Loc: 11, 13, epigeic, soil-covered rock, MKIR 4425b

PELLIACEAE

Pellia endiviifolia (Dicks.)Dumort.

Loc: 13, epilithic, epigeic, soil-covered rock, MKIR 4431a

P. epiphylla (L.) Corda

Loc: 13, epilithic, epigeic, MKIR 4425c

LUNULARIACEAE

Lunularia cruciata (L.) Dumort.ex Lindb.

Loc: 7, 9, 11, 13, epilithic, epigeic, MKIR 4314

AYTONIACEAE

Reboulia hemisphaerica (L.) Raddi

Loc: 2, 16, 19, epigeic, MKIR 4705a

CORSINIACEAE

Corsinia coriandrina (Spreng.) Lindb.

Loc: 12, epigeic, MKIR 4418b

RICCIACEAE

Riccia nigrella DC.

Loc: 9, epigeic, MKIR 4344

R. sorocarpa Bisch.

Loc: 12, epigeic, MKIR 4417c

TARGIONIACEAE

Targionia hypophylla L.

Loc: 12, epigeic, MKIR 4427b

SPHAEROCARPACEAE

Sphaerocarpos texanus Austin

Loc: 12, epigeic, MKIR 4408a

BRYOPHYTA

ENCALYPTACEAE

Encalypta ciliata Hedw.

Loc: 1, epilithic, MKIR 3014

E. streptocarpa Hedw.

Loc: 13, epilithic, MKIR 4620

E. vulgaris Hedw.

Loc: 2, 23, epilithic, Stone wall, MKIR 4887

FUNARIACEAE

Entosthodon pulchellus (H.Philib.) Brugués

Loc: 3, soil-covered rock, MKIR 4264a

Funaria hygrometrica Hedw.

Loc: 8, 11, soil-covered rock, MKIR 4390a

Physcomitrium pyriforme (Hedw.)Bruch & Schimp.

Loc: 12, epigeic, MKIR 4416

GRIMMIACEAE

Grimmia anodon Bruch & Schimp.

Loc: 15, 16, epilithic, soil-covered rock, MKIR 4674

G. dissimulata E.Maier

Loc: 3, 23, epilithic, MKIR 4257

G. leavigata (Brid.)Brid.

Loc: 19, 20, epilithic, MKIR 4742b

G. lisae De Not.

Loc: 2, 4, 6, 13, 18, 27, epilithic, epigeic, MKIR 4267

G. ovalis (Hedw.)Lindb.

Loc: 16, 20, epilithic, MKIR 4729

G. pulvinata (Hedw.)Sm.

Loc: 1, 2, 3, 6, 7, 8, 9, 13, 14, 18, 20, 21, 23, 27, 28, epilithic, Stone wall, MKIR 3007

G. trichophylla Grev.

- Loc: 13, epilithic, MKIR 4408b
Schistidium apocarpum (Hedw.) Bruch & Schimp.
 Loc: 19, epilithic, MKIR 4822b
S. confertum (Funck) Bruch & Schimp.
 Loc: 1, 2, 13, 18, soil-covered rock, MKIR 3029
S. flaccidum (De Not.) Ochyra
 Loc: 1, 2, epilithic, soil-covered rock, MKIR 4893
S. rivulare (Brid.) Podp.
 Loc: 2, epiphytic, MKIR 5020b
- FISSIDENTACEAE
**Fissidens arnoldii* R. Ruthe
 Loc: 4, epigeic, MKIR 4266b
F. bryoides Hedw.
 Loc: 8, 28, epilithic, epigeic, MKIR 4304
F. crassipes subsp. *warnstrofii* (M. Fleisch.) Brugg-Nann.
 Loc: 28, on concrete irrigation canal, MKIR 5000
F. crispus Mont.
 Loc: 10, epigeic, MKIR 4363
F. rivularis (Spruce) Schimp.
 Loc: 18, epigeic, MKIR 4817a
F. taxifolius Hedw.
 Loc: 7, epilithic, epiphytic, soil-covered rock, MKIR 4920b
F. viridulus (Sw. ex anon.) Wahlenb.
 Loc: 4, 6, 10, 18, epigeic, soil-covered rock, MKIR 4356
- DITRICHACEAE
Cerotodon purpureus (Hedw.) Brid.
 Loc: 12, epigeic, MKIR 4407
Cheilothela chloropus (Brid.) Broth
 Loc: 4, 12, 13, epigeic, MKIR 4265
Distichium capillaceum (Hedw.) Bruch & Schimp.
 Loc: 7, epigeic, MKIR 4299b
- RHABDOWEISIACEAE
Dicranoweisia cirrata (Hedw.) Lindb.
 Loc: 4, 18, 19, epilithic, epiphytic, MKIR 4269
Hymenoloma crispulum (Hedw.) Ochyra
 Loc: 18, epiphytic, MKIR 4769
- DICRANELLACEAE
Dicranella heteromalla (Hedw.) Schimp.
 Loc: 12, 13, epigeic, soil-covered rock, MKIR 4421
D. howei Renauld & Cardot
 Loc: 6, 10, epigeic, soil-covered rock, MKIR 4285a
D. varia (Hedw.) Schimp.
 Loc: 12, 2, epigeic, MKIR 4418a
- POTTIACEAE
Aloina aloides (Koch ex Schultz) Kindb.
 Loc: 15, 23, 28, soil-covered rock, Stone wall, MKIR 4976b
A. ambigua (Bruch & Schimp.) Limpr.
 Loc: 11, 14, 16, epilithic, MKIR 4652a
Barbula bolleana (Müll. Hal.) Broth.
 Loc: 14, 28, epilithic, on stone wall, on canal wall, MKIR 5005
B. convoluta var. *convoluta* Hedw.
 Loc: 2, 6, 9, 12, 15, epilithic, soil-covered rock, MKIR 3028
B. convoluta var. *sardoa* Schimp.
 Loc: 1, 15, 18, 21, 23, epilithic, epigeic, Stone wall, MKIR 4705c
B. unguiculata Hedw.
 Loc: 6, 12, 15, 18, 28, epigeic, soil-covered rock, MKIR 4289
Bryoerythrophyllum recurvirostrum (Hedw.) P.C. Chen
 Loc: 26, epilithic, MKIR 4946e
Cinclidotus danubicus Schiffn. & Baumgartner
 Loc: 28, on concrete irrigation canal, MKIR 4996
Crossidium squamiferum var. *pottioideum* (De Not.) Mönk.
 Loc: 11, epilithic, MKIR 4375b
C. squamiferum var. *squamiferum* (Viv.) Jur.
 Loc: 8, 9, 11, epilithic, MKIR 4319
Dialytrichia mucronata (Brid.) Broth.
 Loc: 5, 10, 14, epilithic, soil-covered rock, MKIR 4278
Didymodon acutus (Brid.) K. Saito
 Loc: 2, 6, 7, 9, 10, 12, 13, 14, 15, 18, 28, epilithic, epigeic, soil-covered rock, Stone wall, MKIR 4332
D. cordatus Jur.
 Loc: 8, 9, epigeic, soil-covered rock, MKIR 4328
D. fallax (Hedw.) R.H. Zander
 Loc: 13, 23, epilithic, Stone wall, MKIR 4629b
D. insulanus (De Not.) M.O. Hill
 Loc: 2, 3, 6, 10, 13, 15, 18, 26, epilithic, epigeic, soil-covered rock, Stone wall, MKIR 3030
D. luridus Hornsch.
 Loc: 1, 3, 9, 10, 11, 14, 16, 18, 23, 27, 29, epilithic, epiphytic, soil-covered rock, Stone wall, MKIR 4370
D. nicholsonii Culm.
 Loc: 6, 21, epiphytic, soil-covered rock, MKIR 4296
D. rigidulus Hedw.
 Loc: 11, epigeic, soil-covered rock, MKIR 4355b
D. spadiceus (Mitt.) Limpr.
 Loc: 10, epigeic, soil-covered rock, MKIR 4366
D. tophaceus (Brid.) Lisa
 Loc: 5, 6, 12, 13, 28, epilithic, epigeic, MKIR 4279
D. vinealis (Brid.) R.H. Zander
 Loc: 6, 7, 9, 10, 12, 13, 14, 18, 23, epilithic, epiphytic, epigeic, soil-covered rock, Stone wall, MKIR 4409
Eucladium verticillatum (With.) Bruch & Schimp.
 Loc: 12, 27, 28, epilithic, soil-covered rock, Stone wall, MKIR 4411
Gymnostomum calcareum Nees & Hornsch.
 Loc: 9, 18, epilithic, MKIR 4348
G. viridulum Brid.
 Loc: 12, soil-covered rock, MKIR 4414
Gyroweisia tenuis (Hedw.) Schimp.
 Loc: 3, 16, epilithic, soil-covered rock, MKIR 4263
Hymenostylium recurvirostrum (Hedw.) Dixon
 Loc: 12, 23, epilithic, Stone wall, MKIR 4435
Microbryum davallianum (Sm.) R. H. Zander

- Loc: 13, epigeic, MKIR 4427a
M. starckeianum (Hedw.) R. H. Zander
 Loc: 13, epigeic, MKIR 4632b
Pottiopsis caespitosa (Bruch ex Brid.) Blockeel & A.J.E. Sm.
 Basionym: *Weissia caespitosa* Bruch ex Brid.
 Synonyms: *Trichostomum triumphans* De Not; *Weissia triumphans* (De Not.) M. O. Hill; *Weissia tyrrhena* M. Fleisch
 TURKEY: Muğla, Fethiye, Alınca Village, 36°26'0,7" N, 029°08'0,8" E, 590 m; valley, soil-covered rock, 12/10/2008, *leg., det.* M. Kırmacı, *Conf.* Adnan Erdağ (hb. AYDN 3232). Accompanying moss species in this area are *Aloina ambigua* (Bruch & Schimp.) Limpr., *Didymodon luridus* Hornsch., *D. tophaceus* (Brid.) Lisa, *D. vinealis* (Brid.) R. H. Zander, *Tortula muralis* Hedw., *Trichostomum crispulum* Bruch and *Orthotrichum cupulatum* Hoffm. ex Brid. It was recorded from Israel, Iran and Jordan, Europe, Macaronesia (in Part) and North Africa (Hernstadt & Heyn 2004; Kürschner & Frey 2011).
Pseudocrossidium hornschurchianum (Schultz) R.H.Zander
 Loc: 11, epilithic, MKIR 4380
P. revolutum (Brid.) R.H.Zander
 Loc: 13, 16, epilithic, MKIR 4724a
Syntrichia calcicola J.J. Amann
 Loc: 6, epigeic, MKIR 4292
S. caninervis var. *gypsophila* (J.J. Amann ex G. Roth) Ochyra
 Loc: 19, epilithic, MKIR 4822a
S. handelii (Schiffn.) S. Agnew & Vondr.
 Loc: 1, 2, 13, 16, 18, epilithic, epiphytic, soil-covered rock, MKIR 3004
S. laevipila Brid.
 Loc: 3, 15, epilithic, MKIR 4261
Syntrichia minor (Bizot) M.T. Gallego, J. Guerra, M.J. Cano, Ros & Sánchez-Moya
 TURKEY: Muğla, Fethiye, Babadağ, Eşsek Bayıltan locality, 36°31'27" N, 029°11'35" E, 1500 m; slope, on Juniperus root, 25/06/2009, *leg., det.* M. Kırmacı, *Conf.* Jan Kucera (hb. AYDN 3233). Accompanying moss species in this area are *Syntrichia montana* Nees, *Orthotrichum speciosum* Nees, *Habrodon perpusillus* (De Not.) Lindb. and *Bryum* Hedw. sp.
S. montana Nees
 Loc: 1, 4, 5, 6, 7, 9, 13, 15, 18, 21, 25, 27, 29, epilithic, epiphytic, epigeic, MKIR 3020
S. norvegica F. Weber.
 Loc: 15, soil-covered rock, MKIR 4665
S. papillosissima (Copp.) Loeske
 Loc: 1, 2, 18, 20, 23, 25, epilithic, epiphytic, epigeic, soil-covered rock, MKIR 3008
S. princeps (De Not.) Mitt.
 Loc: 18, 25, 28, epilithic, epiphytic, soil-covered rock, MKIR 4932
S. ruralis (Hedw.) F. Weber & D. Mohr
 Loc: 1, 2, 3, 10, 15, 16, 18, epilithic, epiphytic, soil-covered rock, MKIR 3023
S. ruralis var. *ruraliformis* (Besch.) Delogne
 Loc: 1, 2, epilithic, soil-covered rock, MKIR 3015
S. subpapillosissima (Bizot & R.B. Pierrot ex W.A. Kramer) M.T. Gallego & J. Guerra
 Loc: 2, 20, 21, 25, epiphytic, MKIR 4836
S. virescens (De Not.) Ochyra
 Loc: 7, 15, 25, epiphytic, MKIR 4711
Timmiella barbuloides (Brid.) Mönk.
 Loc: 3, 5, 8, 9, 10, 12, 14, 28, epilithic, epigeic, soil-covered rock, MKIR 4262
Tortella squarrosa (Brid.) Limpr
 Loc: 3, 8, 12, 14, 28, epilithic, epigeic, soil-covered rock, MKIR 4309
T. flavovirens (Bruch) Broth.
 Loc: 7, 8, 9, epilithic, soil-covered rock, MKIR 4345
T. inflexa (Bruch) Broth.
 Loc: 9, epilithic, soil-covered rock, MKIR 4337
T. tortuosa (Hedw.) Limpr.
 Loc: 2, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 18, 20, 26, 27, 28, epilithic, epigeic, soil-covered rock, Rock crevices, Stone wall, MKIR 4300
Tortula acaulon (With.) R.H. Zander
 Loc: 15, 16, epigeic, MKIR 4706
T. brevissima Schiffn.
 Loc: 11, epilithic, MKIR 4379A
T. inermis (Brid.) Mont.
 Loc: 6, 13, 18, epilithic, soil-covered rock, MKIR 4637
T. lindbergii Broth.
 Loc: 14, epilithic, MKIR 4662
T. muralis Hedw.
 Loc: 5, 9, 10, 11, 13, 14, 23, 28, epilithic, epigeic, soil-covered rock, Stone wall, MKIR 4273
T. subulata Hedw.
 Loc: 1, 2, 14, 15, 16, 19, 21, 24, epilithic, epiphytic, soil-covered rock, MKIR 4676b
Trichostomum crispulum Bruch
 Loc: 3, 4, 7, 11, 12, 15, 18, 28, epigeic, soil-covered rock, rock crevices, MKIR 4258
 **Weissia armata* (Thér. & Trab.) Fedosov
 Syn: *Weissia condensa* var. *armata* (Thér. & Trab.) M.J. Cano, Ros & J. Guerra
 TURKEY: Muğla, Fethiye, Uzunyurt Village, Kabak District, 36°28'00" N, 029°07'49,3" E, 200 m; soil-covered rock, 12/10/2008, *leg., det.* M. Kırmacı, *Conf.* Adnan Erdağ (hb. AYDN 3231). Accompanying moss species in this area are *Aloina ambigua* (Bruch & Schimp.) Limpr., *Crossidium squamiferum* (Viv.) Jur., *Didymodon luridus* Hornsch. ex Spreng., *Tortella tortuosa* (Hedw.) Limpr., *Tortula muralis* L. ex Hedw., *Tortula subulata* Hedw., *Trichostomum crispulum* Bruch and *Bryum caespiticium* Hedw.. Known distribution

area of *W. armata* is Portugal, Spain, Algeria, Morocco, Balearic Islands, Turkmenia, Tajikistan, Afghanistan, Iraq, Iran and the Lebanon (Kürschner and Frey 2011; Fedosov 2011).

W. breutelii Müll. Hal

Loc: 15, on soil MKIR 4709

W. condensa (Voit) Lindb.

Loc: 15, 16, 20, soil-covered rock, MKIR 4675

W. controversa Hedw.

Loc: 4, 10, 18, 21, 26, epiphytic, epigeic, soil-covered rock, MKIR 4268

ORTHOTRICHACEAE

Lewinskya acuminata (H.Philib.) F.Lara, Garilleti & Goffinet

Loc: 2, epiphytic, MKIR 4909b

L. affinis (Schrad. ex Brid.) F.Lara, Garilleti & Goffinet

Loc: 1, 2, 6, 15, 18, 20, 25, 26, epiphytic, on MKIR 3012

L. rupestris (Schleich. ex Schwägr.) F.Lara, Garilleti & Goffinet

Loc: 2, 18, 19, epilithic, epiphytic, MKIR 4830b

L. speciosa (Nees) F.Lara, Garilleti & Goffinet

Loc: 1, 2, 15, 16, 18, 19, 20, 21, 25, MKIR 4688

L. striata (Hedw.) F.Lara, Garilleti & Goffinet

Loc: 2, 6, 9, 18, 20, 25, 26, epiphytic, MKIR 4775

L. tortidontia (F.Lara, Garilleti & Mazimpaka) F.Lara, Garilleti & Goffinet

Loc: 15, 18, 24, epiphytic, MKIR 4695

Orthotrichum anomalum Hedw.

Loc: 9, 13, epilithic, MKIR 4347b

O. bistratosum (Schiffn.) J.Guerra

Loc: 2, 3, 15, epilithic, epiphytic, soil-covered rock, MKIR 4667

O. cupulatum Brid.

Loc: 1, 2, 6, 9, 13, 15, 16, 18, 19, 21, 25, epilithic, epiphytic, MKIR 3003

O. diaphanum Brid.

Loc: 6, 9, 25, epiphytic, MKIR 4349a

O. pallens Bruch ex Brid.

Loc: 1, 29, epiphytic, MKIR 3000

O. pumilum Sw. ex anon.

Loc: 2, 6, 15, 25, 26, 27, epiphytic, MKIR 4716b

O. scanicum Grönvall

Loc: 3, 15, 18, 19, epiphytic, MKIR 3041

O. vittii F.Lara, Garilleti & Mazimpaka

Loc: 10, epilithic, MKIR 4371

Pulviger a lyellii (Hook. & Taylor) Plášek, Sawicki & Ochyra

Loc: 2, 6, 15, 16, 18, 19, 20, 24, 25, epiphytic, MKIR 3022

Zygodon forsteri (Dicks.) Mitt. TURKEY: Muğla, Fethiye, Babadağ, 3 km to Dokuzgöl, 1150 m, 36°28' 29,7"N; 29°10' 23"E, epiphytic on upper trunk of *Quercus ithaburensis* Decne., leg. M. Kırmacı, det. M. Kırmacı and Adnan Erdağ 25 June 2009, MKIR 4941a

Z. rupestris Schimp. ex Lorentz

Loc: 7, 9, epiphytic, MKIR 4335

Z. viridissimus (Dicks.) Brid.

Loc: 6, 8, 9, 12, 18, epiphytic, MKIR 4282

HEDWIGIACEAE

Hedwigia stellata Hedenäs

Loc: 26, epilithic, MKIR 4946a

BARTRAMIACEAE

Bartramia pomiformis Hedw.

Loc: 12, 15, epigeic, MKIR 4663b

B. stricta Brid.

Loc: 9, 14, epigeic, MKIR 4341

Philonotis marchica (Hedw.) Brid.

Loc: 12, epilithic, MKIR 4432a

BRYACEAE

Bryum argenteum Hedw.

Loc: 1, epilithic, soil-covered rock, MKIR 3006

B. dichotomum Hedw.

Loc: 2, 16, epiphytic, soil-covered rock, MKIR 4898

B. funkii Schwägr.

Loc: 2, epilithic, MKIR 3035

Imbri bryum alpinum (Huds. ex With.) N. Pedersen.

Loc: 12, epilithic, MKIR 4432d

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

Loc: 6, 10, 12, 13, 14, 18, 19, 20, 23, 25, 28, epilithic, epiphytic, epigeic, soil-covered rock, Stone wall, MKIR 4400

P. donianum (Grev.) Holyoak & N. Pedersen.

Loc: 10, 18, epigeic, MKIR 4362

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

Loc: 3, 9, 11, 20, epilithic, epigeic, soil-covered rock, MKIR 4329

P. moravicum (Podp.) Ros & Mazimpaka.

Loc: 2, epiphytic, MKIR 4910

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

Loc: 13, epilithic, MKIR 4634

P. torquescens (Bruch & Schimp.) Ros & Mazimpaka.

Loc: 3, 6, 18, epilithic, soil-covered rock, MKIR 4245

MNIACEAE

Pohlia wahlenbergii var. *calcare a* (Warnst.) E.F.Warb.

Loc: 12, 13, epilithic, MKIR 4627

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

Loc: 10, epigeic, MKIR 4399

FONTINALACEAE

Fontinalis antipyretica Hedw

Loc: 9, 28, on concrete irrigation canal, MKIR 4997b

AMBLYSTEGIACEAE

Cratoneuron filicinum (Hedw.) Spruce

Loc: 12, epilithic, MKIR 4434b

Oxyrrhynchiumhians (Hedw.) Loeske

- Loc: 12, epigeic, MKIR 4630b
O. schleicheri (R. Hedw.) Röhl.
 Loc: 3, 12, 28, epigeic, MKIR 4260
O. speciosum (Brid.) Warnst.
 Loc: 26, 28, epilithic, epigeic, MKIR 4979b
Palustriella commutata (Hedw.) Ochyra
 Loc: 12, 13, epilithic, MKIR 4433
BRACHYTHECIACEAE
Brachythecium erythrorrhizon Schimp.
 Loc: 18, epilithic, MKIR 4757b
B. geheebii Milde
 Loc: 18, epilithic, MKIR 4768
B. glareosum (Bruch ex Spruce) Schimp.
 Loc: 18, soil-covered rock, MKIR 4760
B. mildeanum (Schimp.) Schimp. ex Milde.
 Loc: 28, epigeic, MKIR 4987d
Brachytheciastrum velutinum (Hedw.) Ignatov & Huttunen
 Loc: 2, 13, 15, 18, 19, 26, epilithic, epiphytic, epigeic, MKIR 4710
Cirriphyllum crassinervium (Taylor) Loeske & M.Fleisch.
 Loc: 6, 14, 18, epiphytic, epigeic, MKIR 4298
Homalothecium aureum (Spruce) H.Rob.
 Loc: 2, 18, epilithic, soil-covered rock, MKIR 4762
H. lutescens (Hedw.) H.Rob.
 Loc: 18, 23, soil-covered rock, MKIR 4820b
H. philippeanum (Spruce) Schimp.
 Loc: 1, epilithic, MKIR 3002
H. sericeum (Hedw.) Schimp.
 Loc: 2, 3, 6, 9, 10, 12, 15, 16, 19, 20, 21, 23, 25, 27, epiphytic, epigeic, soil-covered rock, Stone wall, on concrete irrigation canal, MKIR 4338
Kindbergia praelonga (Hedw.) Ochyra
 Loc: 12, epigeic, MKIR 4410
Pseudoscleropodium purum (Hedw.) M. Fleisch.
 Loc: 18, epiphytic, MKIR 4809d
Rhynchostegium alopecuroides (Brid.) A.J.E. Sm.
 Loc: 8, epigeic, MKIR 4317
R. riparioides (Hedw.) Cardot.
 Loc: 13, 28, epilithic, on concrete irrigation canal, MKIR 5002
R. megapolitanum (Blandow ex F. Weber & D. Mohr) Schimp.
 Loc: 8, epilithic, MKIR 4307b
Rhynchostegiella curviseta (Brid.) Limpr.
 Loc: 6, 12, 18, 26, epilithic, epigeic, soil-covered rock, MKIR 4290
R. litorea (De Not.) Limpr.
 Loc: 28, epigeic, MKIR 4969
R. tenella (Dicks.) Limpr
 Loc: 8, 18, 26, epigeic, MKIR 4951
Sciuro-hypnum populeum (Hedw.) Ignatov & Huttunen
 Loc: 16, epigeic, MKIR 4737
S. reflexum (Starke) Ignatov & Huttunen
 Loc: 18, soil-covered rock, MKIR 4748
Scorpiurium circinatum (Bruch) M.Fleisch. & Loeske
 Loc: 7, 8, 9, 11, 12, 14, 18, 28, epilithic, epiphytic, epigeic, MKIR 4303
S. sendtneri (Schimp.) M.Fleisch.
 Loc: 9, 10, 18, epiphytic, epigeic, soil-covered rock, MKIR 4364a
Scleropodium cespitans (Wilson ex Müll. Hal.) L.F. Koch.
 Loc: 18, 20, epilithic, epigeic, soil-covered rock, MKIR 4755
S. touretii (Brid.) L. F. Koch
 Loc: 8, 14, 18, 23, epilithic, Stone wall, MKIR 4651
FABRONIACEAE
Fabronia pusilla Raddi
 Loc: 7, 14, 25, 29, epiphytic MKIR 4911
HYPNACEAE
Hypnum cupressiforme var. *cupressiforme* Hedw.
 Loc: 7, 8, 9, 10, 12, 18, 26, epilithic, epiphytic, epigeic, soil-covered rock, MKIR 4415
H. cupressiforme var. *resupinatum* (Taylor) Schimp.
 Loc: 18, epiphytic, MKIR 4804
PTERIGYNANDRACEAE
Habrodon perpusillus (De Not.) Lindb.
 Loc: 1, 6, 14, 15, 18, 20, epiphytic, epigeic MKIR 3018
Pterigynandrum filiforme Hedw.
 Loc: 1, 2, 15, 18, 19, 20, 21, 24, 26, epiphytic, MKIR 3019
HYLOCOMIACEAE
Rhytidiadelphus squarrosus (Hedw.) Warnst.
 Loc: 8, epilithic, MKIR 4311
LEUCODONTACEAE
Antitrichia californica Sull.
 Loc: 18, 20, epilithic, epiphytic MKIR 4764
A. curtispindula (Hedw.) Brid.
 Loc: 3, 18, epilithic, epiphytic, MKIR 4250
Leucodon sciurooides var. *morensis* (Schwägr.) De Not.
 Loc: 2, epiphytic, MKIR 4902
L. sciurooides var. *sciurooides* (Hedw.) Schwägr.
 Loc: 1, 2, 15, 16, 18, 19, 20, 21, 25, 26, 29, epilithic, epiphytic, epigeic, soil-covered rock, MKIR 3001
Nogopterium gracile (Hedw.) Crosby & W.R. Buck.
 Loc: 3, 5, 7, 8, 9, 14, 18, 26, 29, epilithic, epiphytic, epigeic, MKIR 4773
NECKERACEAE
Neckera menziesii Drumm.
 Loc: 18, epilithic, MKIR 2814
LEPTODONTACEAE
Leptodon smithii (Hedw.) F.Weber & D.Mohr
 Loc: 5, 18, epilithic, epiphytic, MKIR 4277
LEMBOPHYLLACEAE
Isothecium myosuroides var. *brachythecioides* (Dixon) Braithw.
 Loc: 18, epiphytic, MKIR 4802d

I. myosuroides subsp. *myosuroides* Brid.

Loc: 18, epiphytic, MKIR 4801c

3. Discussion

There were some interesting records from Babadağ. *Zygodon forsteri* was collected from the study area and given a new record from Turkey and Southwest Asia (Erdağ and Kırmacı, 2010).

Fissidens arnoldii was collected from the area as a second distributional locality among the others. It was firstly recorded from Kemaliye (Erzincan) by Erdağ and Kürschner (2009). The first collected locality is quite far from our study area. Because it is very tiny and ephemeral, it may have been overlooked. It is a temperate taxon and distributed in Europe [from Belgium, France, and the Netherlands through the lower parts of Central Europe up to Poland and Russia (Frey et al., 2006)] and South-West Asia [Iraq, Israel, Jordan, Kuwait, Oman, Saudi Arabia, United Arab Emirates, Yemen (Kürschner, 2008)].

Syntrichia minor, *Pottiopsis caespitosa*, *Weissia armata*, *W. breutelii*, *Orthotrichum vittii* and *O. tortidontium*, which were recorded in last two decades and in very limited known localities from Turkey, were found in the study area. Some *Pottiopsis caespitosa* members showed great variety in terms of leaf and sporophytic characteristics. Therefore, *Weissia triumphans*, *W. tyrrhena* and *W. caespitosa* were evaluated as completely different species because of their different morphological features. Ros and Werner studied a number of taxa using many morphological characters and supported this study with molecular data. Finally, they decided all these taxa were synonymous to *Pottiopsis caespitosa* (Ros and Werner, 2007). *W. armata* was firstly reported in the bryophyta check-list for B6 Square of Turkey without any details (Keçeliet al., 2011). It was also recorded from Amasya by Canlı and Çetin (2014). *W. armata* has a resemblance to *W. condensata* with its leaf shape, and it was accepted as a new variety (*W. condensata* var. *armata* (Thér. & Trab.) Cano, Ros & J. Guerra) by Cano et al. (2002). But the recent molecular data (Werner et al., 2005) do not support the position of “var. *armata*” within *Weissia condensata*, and the morphological difference seems to be stable enough for recognition of this taxon as a separate species (Fedosov, 2011). We followed Fedosov’s findings and evaluated it as a species.

Babadağ is extremely xerophytic. Except for temporary streams that arise from rainfall and melting snow during the winter and early spring period, there is no active watercourse which flows

permanently during the long and dry summer period in Babadağ. This explains the low number of bryophytes in the mountain. Few liverworts and pleurocarpous mosses from the study area support this case.

The dominant rock structure of the mountain is limestone. For this reason, the CaCO₃ rate is high in the water leaking from the rocks. Tufa formations which are developing with a few bryophytes such as *D. tophaceus*, *Eucladium verticillatum*, *Gymnostomum calcareum*, *Gyroweisia tenuis* and *Hymenostylium recurvirostrum* are the most common bryophytes in these areas.

Upper tree zones (after 1800 m) are represented by very few bryophyte taxa such as *Encalypta vulgaris*, *Tortella tortuosa*, *Didymodon vinealis* and *Homalothecium sericeum*. These taxa are also common everywhere in the mountain.

Additionally, epiphytic bryophytes were also evaluated in this study. According to the result of this assessment, a total of 51 bryophyte taxa (4 liverworts and 47 mosses) were found on 17 different trees (Table 1).

Table I. Epiphytic bryophytes (on tree base: below 50 cm - on tree trunk: 50 cm and up).

	1. <i>Acer undulatum</i> Pojark(5)	2. <i>Arbutus andrachne</i> L. (5)	3. <i>Cedrus libani</i> A. Rich. (10)	4. <i>Cercis siliquastrum</i> L. (3)	5. <i>Crataegus monogyna</i> Jacq. (3)	6. <i>Juniperus foetidissima</i> Willd. (10)	7. <i>Olea europaea</i> L. (5)	8. <i>Phylaria latifolia</i> (2)	9. <i>Pinus brutia</i> Ten. (8)	10. <i>P. nigra</i> subsp. <i>nigra</i> var. <i>caramanica</i>	11. <i>Pistacia lentiscus</i> L. (10)	12. <i>Platanus orientalis</i> L. (5)	13. <i>Populus alba</i> L. (2)	14. <i>Quercus coccifera</i> L. (10)	15. <i>Quercus ithaburensis</i> Decne (3)	16. <i>Salix alba</i> L. (2)	17. <i>Sorbus domestica</i> L. (4)
1. <i>Frullania dilatata</i> (L.) Dumort.					1						1		2				
2. <i>Porella cordaeana</i> (Huebener) Moore												1					
3. <i>Porella pinnata</i> L.					1										1		
4. <i>Porella platyphylla</i> (L.) Pfeiff.			1		1				1								
5. <i>Antitrichia californica</i> Sull.			2		2	1					2		2				
6. <i>Brachytheciastrum velutinum</i> (Hedw.) Ignatov & Huttunen			2	1		2	2				2	1		1			
7. <i>B. dichotomum</i> Hedw.	1																
1. <i>Dicranoweisia cirrata</i> (Hedw.) Lindb.		2						4									
2. <i>Didymodon acutus</i> (Brid.) K. Saito		4						6									
3. <i>D. nicholsonii</i> Culm.														1			
4. <i>D. vinealis</i> (Brid.) R. H. Zander														1			
5. <i>Fabronia pusilla</i> Raddi		1			1					2	2	4	2				
6. <i>Grimmia pulvinata</i> (Hedw.) Sm						4						2	1				
7. <i>G. trichophylla</i> Grev.											2						
8. <i>Habrodon perpusillus</i> (De Not.) Lindb.		2								1			2				
		1											1				

9. <i>Homalothecium sericeum</i> (Hedw.) Schimp.	1				2	2		1		3	1	3	2		
	3		5		3	2		2	2	2	3	2	1		1
10. <i>Hypnum cupressiforme</i> Hedw.						1				1			3	2	
					2	1		2	1	2			2		
11. <i>Isothecium myosuroides</i> Brid.															
					2	5				2		1			
12. <i>I. myosuroides</i> var <i>brachythecioides</i> (Dixon) Braithw.															
						1		2		1	2		1		
13. <i>Leucodon sciuroides</i> (Hedw.) Schwägr.	2				4	4			1	4	3		4	2	
	5		4		4	1			1	4					
14. <i>L. sciuroides</i> var. <i>morensis</i> (Schwägr.) De Not.									1	2					
15. <i>Leptodon smithii</i> (Hedw.) F.Weber & D.Mohr						1				3					
16. <i>Lewinskya acuminata</i> (H.Philib.) F.Lara, Garilleti & Goffinet				1											
17. <i>L. affinis</i> (Schrad. ex Brid.) F.Lara, Garilleti & Goffinet			2		1	2	1			6	2		4	3	1
										1			4		
18. <i>L. rupestris</i> (Schleich. ex Schwägr.) F.Lara, Garilleti & Goffinet			2			1									
	4			1	2					2			2		
19. <i>L. speciosa</i> (Nees) F.Lara, Garilleti & Goffinet	4		4		1	5	1			5	2	2	3	3	1
			4			1							2		
20. <i>L. striata</i> (Hedw.) F.Lara, Garilleti & Goffinet	1		2	1	1	2	1			5			4	2	3
													4		
21. <i>L. tortidontia</i> (F.Lara, Garilleti & Mazimpaka) F.Lara, Garilleti & Goffinet			2	1		2				2			1		1
22. <i>O. cupulatum</i> Hoffm. Ex Brid.	1						1			2			1		
23. <i>O. diaphanum</i> Schrad. Ex Brid.					2	1	4			2	2	2	4		
													1		
24. <i>O. pumilum</i> Sw. ex anon.			2	1	1	3	1		1	2	2	2	4	1	1
										1	2	1	3		1
25. <i>O. scanicum</i> Gronvall (O. lewinskyae Lara, Garilleti & Mazimpaka) Mazimpaka			1										1		
									1						
26. <i>Pulvigerella lyellii</i> (Hook. & Taylor) Plášek, Sawicki & Ochrya	4		6		1	5				1	5		1	4	1
			6							1	1		3	1	1
27. <i>Pterigynandrum filiforme</i> Hedw.			5			2									
			5	1		3			2	2					
28. <i>Ptychostomum capillare</i> (Hedw.) Holyoak & N. Pedersen															
			1				2		1						
8. <i>Ptychostomum moravicum</i> (Podp.) Ros & Mazimpaka															
					1										
29. <i>Nogopterium gracile</i> (Hedw.) Crosby & W.R. Buck						1				2	2		2		
									1	3	1		2		
30. <i>Rhynchostegiella curviseta</i> (Brid.) Limpr.			1				1								
													1		
										1					

31. <i>Scorpirium circinatum</i> (Bruch) M.Fleisch. &			1	1							1	2							
32. <i>S. sendtneri</i> (Schimp.) M. Fleisch.					1														
33. <i>Syntrichia handelii</i> (Schiffn.) S.Agnew & Vondr	2					1					2								
34. <i>S. montana</i> Nees																		1	
35. <i>S. papillosissima</i> (Copp.) Loeske	2																		1
36. <i>S. princeps</i> (De Not.) Mitt.												1							
37. <i>S. ruralis</i> (Hedw.) F.Weber & D.Mohr						2				2	2								
38. <i>S. subpapillosissima</i> (Bizot & R.B.Pierrot ex W.A.Kramer) M.T. Gallego & J.Guerra						2													1
39. <i>S. virescens</i> (De Not.) Ochrya						4	1												1
40. <i>Zygodon rupestris</i> Schimp. ex Lorentz																			1
41. <i>Z. viridissimus</i> (Dicks.) Brid.							2		1		3								3
42. <i>Zygodon forsteri</i> (Dicks. ex With.) Mitt.										1	1								2
																			1

The most important factors affecting the distribution of epiphytic bryophyte species are forest stand age, tree age and tree species, as well as tree bark physical and chemical properties and microclimate (see Mežaka and Znotina, 2006; Mežaka et al., 2008). Dense bark of old trees with cracks where dust and humus has accumulated is more suitable for epiphyte growth (Znotina, 2003), but smooth, bare barks with low air humidity are less suitable (John Dale, 1995). The bark of older trees is porous, it maintains humidity, which is more favorable for better bryophyte growth (Āboliņa, 1968). Among the studied factors, tree bark pH showed the most significant relationship with distribution of bryophyte species, which is consistent with other studies (Āboliņa, 1968; Weibull, 2001; Löbel et al., 2006).

Cedrus libani, *Juniperus foetidissima*, *Olea europaea*, *Pistacia lentiscus*, *Platanus orientalis* and *Quercus coccifera* are the most crowded tree species in terms of epiphytic bryophytes with more than 15 taxa. The trunks of trees are covered (90%) with abundant bryophytes such as *Leucodon sciuroides*, *Pulviger a lyellii* and *Homalothecium sericeum* in these areas. In contrast, *Phyllaria latifolia* and *Arbutus andrachne* which are abundant in our study area do not have any epiphytic

bryophytes because of their smooth bark surfaces. The reason for limited bryophyte taxa on *Pinus* spp. may be explained by the acidic formation of the pine bark and the cone-shaped structure of the plant which prevents rain water from flowing from top to down. For this reason, tree barks remain dry. Species that are found individually on the base of trees may not be epiphytic. The accumulation of soil on tree base have provided suitable environment for these species. For example, species abundance on the lower part of *Pinus brutia* can be explained by these reasons.

It is interesting to see all taxa belonging to the family *Orthotrichaceae* on the same trees. Among these taxa, *Lewinskya affinis*, *L. speciosa*, *Pulviger a lyellii*, *O. pumilum*, and *O. striatum* are the most common species. *L. tortidontia* was reported from Turkey in the Taurus Mountains (Ak Dağlar) by Mazimpaka et al. (2000). It was collected on cedar wood, at 1350 m, on a dead branch of *Cedrus libani*. We also collected this plant from Denizli Babadağ. The third locality is not far from the first one.

This is the first study on epiphytic bryophyte distribution in Fethiye Babadağ (Muğla/Turkey). Further studies are needed on a landscape scale.

Additionally, further research efforts are needed on experimental and survey studies investigating interactions between bryophytes and tree barks' physical and chemical properties, and microclimate.

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