



International Journal of Botany

ISSN: 1811-9700

science
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The Bryophyte Flora of Honaz Mountain (Denizli/Turkey)

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Abstract: The bryophyte flora of Honaz Mountain of Aegean Region (Western Turkey) has been investigated. One hundred and seventy five moss species belonging to 24 families and 64 genera, 20 liverwort species belonging to 14 families and 16 genera and one hornwort species were found on the area. *Orthotrichum rivulare* Turner and *Weissia breutelii* Müll. Hal. which was recently recorded from Turkey are collected from the area as a second distributional locality. And also some interesting taxa which are *Didymodon validus*, *Orthotrichum cupulatum* var. *bistratosum* and *Phascum cuspidatum* var. *schreberianum* collected from study area and discussed in the text.

Key words: Bryophyta, flora, bryogeography, West Anatolia, Turkey

INTRODUCTION

Honaz Mountain which is the highest mountain of Aegean Region (2528 m) is located between 37° 40'-37° 45' N and 29° 11'-29° 19' E. The study area is limited by Denizli-Ankara highway in the North, the Denizli-Tavas highway in the West, the Tavas-Acıpayam highway in the South and a plateau between Honaz Mountain and Kırtas Tepe in the East (Fig. 1). It was declared as a national park on 21 April 1995. The national park covers nearly 10.000 hectares with elevations vary between 400 and 2528 m. The main summits of Honaz Mountain are Kılıç Tepe (2528 m), Baba Tepe (2514 m), Kozaklı Tepe (2021 m), Honaz (2016 m), Yüksekçeğrel Tepe (1941 m) and Kırılı Tepe (1758 m). Although, there are many watercourses active in winter and early spring, Gökpınar, Menekşeli and Gölarası streams flow permanently flowing during the long and dry summer period.

Meteorological data are available only from one station present in the area and data belong the years between 2001 and 2005 from Honaz town (DMI, 2005). The average annual temperature is 15.9°C and the annual precipitation is 505.6 mm. It should be taken into consideration that the temperature decreases and the rainfall increases with the increasing altitude. The annual rainfall in different altitudes were calculated using Sezer's formula (Table 1), adapted from Schreiber and Erinç's formula to Aegean Region (Sezer, 1993).

The Honaz Mountain harbours two of 122 important plant areas of Turkey (Özhatay *et al.*, 2003) as a reliable indication of its highly diversified flora. It is located in a transitional zone of the Mediterranean and continental climate. In accordance with its transitional location, Irano-

Turanian and Mediterranean flora elements are dominant in the area. The Northern side of Honaz mountain is covered by dense vegetation and the foothills of this side are limited by Menderes lowland. The Western part is extremely steep and limestone outcrops can be seen among the well developed *Pinus brutia* Ten. and *P. nigra* subsp. *nigra* var. *caramanica* (Loudon) Rehder forests, while the eastern and Southern parts of mountain are less steep with poorly developed forest vegetation. Macchie elements are dominant especially in the deforested areas at lower altitudes. *P. brutia* forms well developed forests all around the study area mostly on the N, NW and W slopes of the mountain between 450 and 1000 (1200) m. From 1200-1400 m it is replaced by *P. nigra* subsp. *caramanica*. At the higher altitudes, between 1400 and 1600 m, *Juniper* forests and thorn cushion communities are found as mixed or pure formations depend on increasing altitude. Overall vegetational zonation is not drastically different from the remaining high mountains of the Western and partly SW Anatolian Mountains.

Boissier and Davis were the pioneer botanists who visited the area and the later has decided to edit the Flora of Turkey (Davis *et al.*, 1965-1988) after his visit to the area (Ekim, 2004). The recent studies on flowering plants of the mountain Tuzlacı (1977) and Çelik *et al.* (2002) are studied in Honaz mountain the higher plants. There are few bryological data from the study area. Henderson (1958) has published 3 moss taxa collected by Polunin and Davis from Çukurköy. Walther (1967) has reported 60 bryophyte taxa from Honaz Mountain.

To date, nearly thirty studies have been deal with the bryophyte ecology and flora of Western Turkey e.g., Walther (1967, 1970, 1975, 1979), Walther and Leblebici

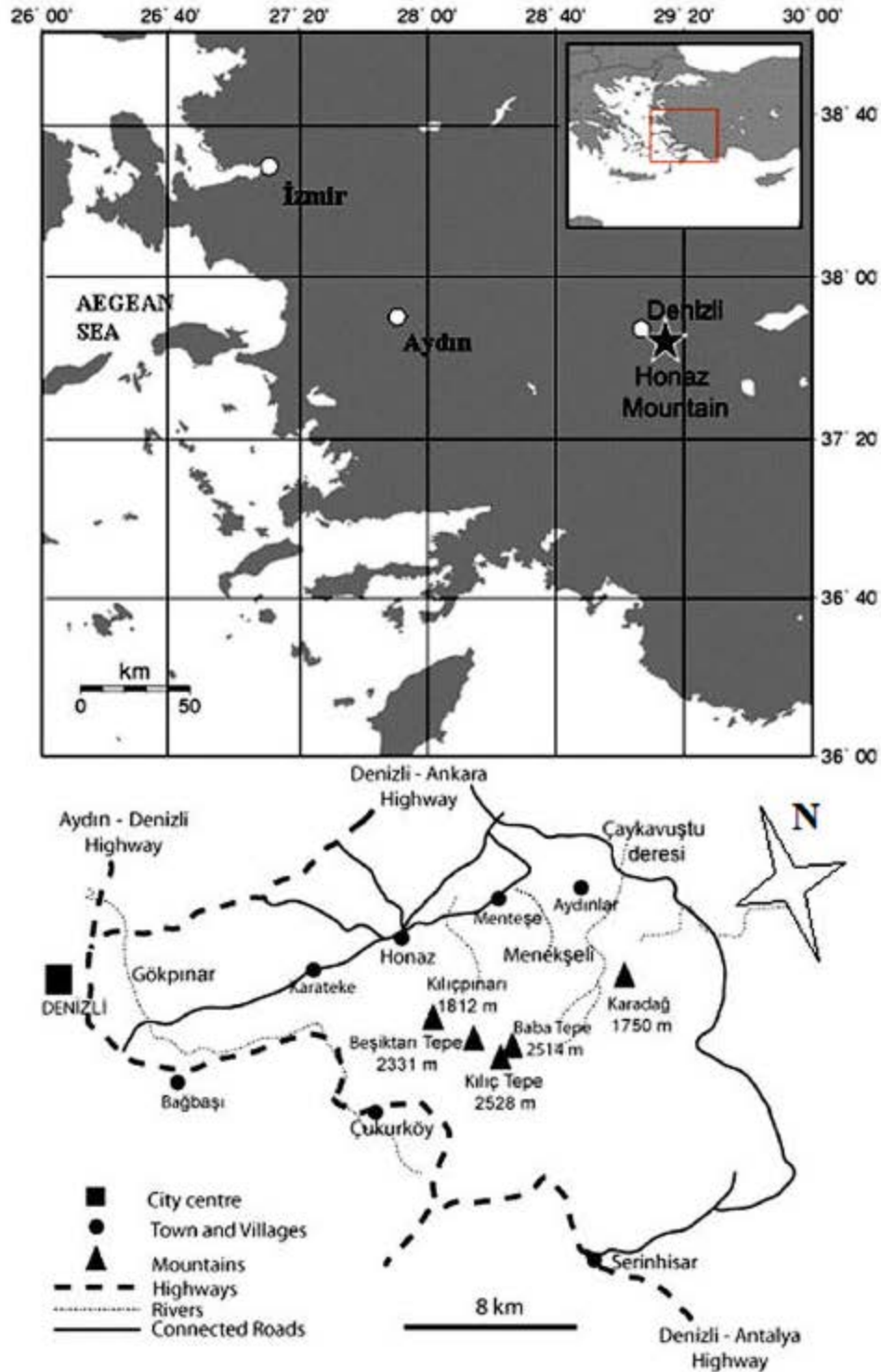


Fig 1: Study area

Table 1: According to altitude calculated annual rainfall Sezer (1993)

Stations	Mean annual precipitation	1000 m	1500 m	2000 m	2300 m	2500
Honaz (550 m)	505.6	614.1 mm	734.6 mm	851.1 mm	927.4 mm	975.55 mm

(1969), Leblebici (1974), Çetin (1988), Yayıntaş and Iwatsuki (1988), Gökler and Öztürk (1991), Gökler (1993ab, 2001), Çetin (1993), Tonguç (1996), Kürschner and Parolly (1999), Yayıntaş (2001), Özenoğlu (2001), Gökler (2001), Özenoğlu and Gökler (2002), Erdağ (2002), Kürschner (2004), Özenoğlu *et al.* (2007), Kürschner *et al.* (2007), Kürschner and Erdağ (2008) and Kırmacı and Ağcagil (2009). In spite of these investigations, important parts of the area are still bryologically poorly known such as the Aydın Mountains, major parts of The Mentese Mountains and most of the mountain ranges around Denizli province.

The aim of this study was to explore the bryophyte flora of Honaz mountain. We hope that this study will serve as a valuable contribution to the knowledge of the bryoflora of Turkey and gives a base for future biodiversity and nature conservation surveys.

MATERIALS AND METHODS

In all, 25 localities and their environs were explored and nearly 2000 bryophyte specimens were collected in different seasons between 2003 and 2006. The collecting localities are presented in the following list with their coordinates (if it is available) and altitudes.

The plant samples were collected using special spatula and were kept in standard collecting envelopes including information of their collection number, moisture, exposure, substratum, the date of collecting, etc. All specimens are deposited in AYDN and some duplicates are deposited in Hungarian Natural History Museum (Budapest/Hungary).

Moss taxa are listed adopting the taxonomy and nomenclature of the checklist of Hill *et al.* (2006) an higher taxonomical ranks is based on the system Goffinet and Buck (2004). The treatment of hornworts and liverworts genera follows Grolle (1983). The species and subspecific taxa are listed alphabetically.

Collector and identifying author abbreviations used in the text and appendix are as follows: Mkr. (Mesut Kırmacı), Aerd. (Adnan Erdağ), Kursc. (Harald Kürschner), Oz. (Hatice Özenoğlu), W (moss taxa collected by Walther). For each taxon, only one collector number was given to avoid repetition in the floristic list but if the same plants were collected different localities were also indicated as loc. 1,2,3. etc.

List of collection sites:

- Honaz Mountain National Park, picnic area. N 37° 39' E 24° 14', Alt. 1200 m, 23.11.2003
- Honaz Mountain National Park, along the road going from Denizli-Tavas highway towards the park. N 37° 40' E 29° 13', Alt. 600-800 m, 23.11.2003
- Honaz town, Şelale Valley. N 37° 44' E 029° 16', Alt. 800 m, 31.05.2005
- West foot of Honaz Mountain, east of Cankurtaran hill. N 37° 44' E 029° 13', Alt. 800 m, 31.05.2005
- West foot of Honaz Mountain. N 37° 42' E 29° 14', Alt. 1200-1600 m, 31.05.2005
- West foot of Honaz Mountain. N 37° 41', E 029° 15', Alt. 1370 m, 31.05.2005
- Northwest foot of Honaz Mountain, between Karateke village and Honaz town. N 37° 45' E 29° 15', Alt. 400 m, 02.06.2005
- North of Honaz Mountain, Yayla locality. N 37° 44', E 029° 18', Alt. 1000-1170 m, 02.06.2005
- Honaz town-Lalebağları locality. N 37° 44', E 029° 14', Alt. 1000 m, 09.07.2005
- Honaz town-Kayapınarı locality. Alt. 1600 m, 09.07.2005
- Arpacık Plateu, upper part of Şelale locality. N 37° 43', E 029° 16', Alt. 1350 m, 09.07.2005
- Banazlı-Kızılpınar locality. N 37° 43', E 029° 16' Alt. 1300 m, 09.07.2005
- Between Tozluca and Selmece hill. N 37° 42', E 029° 16', Alt. 1320 m, 02.06.2005
- Akçaalanı locality. N 37° 42', E 029° 17', Alt. 1360 m. 02.06.2005
- Honaz Mountain, Atalanı locality. *Pinus nigra* forest. N 37° 43', E 029° 18', Alt. 1500 m, 02.06.2005
- Honaz Mountain, Çatılı locality. *Pinus nigra* forest. N 37° 42', E 029° 19', Alt. 1670 m, 02.06.2005
- Honaz town, Kaletepe village. *Pinus nigra* forest, along a stream. N 37° 44', E 029° 20', Alt. 1170 m, 02.06.2005
- Honaz Mountain National Park (6 km of the summit). *Pinus nigra* forest. N 37° 39', E 029° 15', Alt. 1550 m, 10.07.2005
- Honaz Mountain National Park (3 km of the summit). *Pinus nigra*, *Juniperus* sp. mixed forest. N 37° 41', E 029° 15', Alt. 1780 m, 10.07.2005
- Honaz Mountain summit. Thorn cushion communities Alt. 2500 m, 10.07.2005
- Honaz Mountain, northern part of the summit. Between subalpine and *Juniperus* spp. zones. N 37° 41', E 029° 17' Alt. 1850-2100 m, 10.07.2005
- Denizli-Tavas highway (ca17 km of Denizli), Son Kayalar service area. Alt. 1100 -1170 m, 10.07.2005
- Gerikaya-Uyuzpınarı locality. *Pinus nigra* forest. N 37° 42', E 029° 18', Alt. 1500 m, 10.07.2005
- Honaz Mountain National Park. *Pinus nigra* forest. N 37° 39' E 029° 14', Alt. 1300 m, 22.11.2003

- Honaz town, cultivated field with *Cerasus avium* L. N 37° 45', E 029° 16', Alt. 630 m, 10.07.2005
- Southeast of Honaz Mountain. N 37° 44', E 029° 17', Alt. 860 m, 10.07.2005

RESULTS

As a result of the identification, 175 moss species belonging to 24 families and 64 genera, 20 liverwort species belonging to 14 families and 16 genera and one hornwort species were found in the area.

List of the species:

Anthocerotophyta
Anthocerotaceae
Phaeoceros laevis (L.) Proskauer-Loc: 4, on soil, MKIR 3751c
Hepaticophyta
Sphaerocarpaceae
Sphaerocarpos texanus Austin-Loc: 4, on soil, MKIR 3763
Targioniaceae
Targionia hypophylla L.-Loc: 1,10, on soil-soil covered rock, MKIR 3263
Aytoniaceae
Mannia androgyna (L.) A. Evans-Loc: 4,8, on soil-soil covered rock, MKIR 2943b
Plagiochasma rupestre (J. R. Forst. and G. Forst.) Steph.-Loc: 7,8, epilithic-soil covered rock-on soil, MKIR 2866b
Reboulia hemisphaerica (L.) Raddi-Loc: 4,6,8, epilithic-on soil-soil covered rock, MKIR 2803
Conocephalaceae
Marchantia polymorpha L. subsp. *montivagans* Bischl. and Boisselier-Loc: 4,14, on soil, MKIR 3744
Lunulariaceae
Lunularia cruciata (L.) Dumort. ex Lindb.-Loc: 4,8, epilithic-on soil-soil covered rock, MKIR 2757
Corsiaceae
Corsinia coriandrina (Spreng.) Lindb.-Loc: 4, epiphytic-on soil, MKIR 3751b
Oxymitracaeae
Oxymitra incrassata (Brotero) Sérgio and Sim-Sim-Loc: 9, on soil, MKIR 2996
Ricciaceae
Riccia sorocarpa Bisch.-Loc: 4, on soil, MKIR 2760
Aneuraceae
Aneura pinguis (L.) Dumort.-Loc: 4,8, epilithic-on soil, MKIR 2761b
Pelliaceae
Pellia endiviifolia (Dicks.) Dumort.-Loc: 4,7, epilithic-on soil-soil covered rock, MKIR 2767
Pellia epiphylla (L.) Corda-Loc: 4, epilithic-on soil-soil covered rock, MKIR 2861b

Lophoziaceae
Leiocolea turbinata (Raddi) H. Buch-Loc: 4, soil covered rock, MKIR 3758b
Arnelliaceae
Southbya nigrella (De Not.) Henriq.-Loc: 8,10, on soil-epilithic, MKIR 3272
Southbya tophacea (Spruce) Spruce-Loc: 8, soil covered rock, MKIR 2911
Cephaloziellaceae
Cephaloziella baumgartneri Schiffn.-Loc: 4, epilithic, MKIR 3752
Cephaloziella divaricata (Sm.) Schiffn.-Loc: 8, epilithic, MKIR 2870
Porellaceae
Porella cordaeana (Huebener) Moore-Loc: 14, epilithic-epiphytic-soil covered rock, MKIR 3384
Porella platyphylla (L.) Pfeiff.-Loc: 6,10,11, epilithic-epiphytic-soil covered rock-on soil, MKIR 2811
Bryophyta
Timmiaceae
Timmia norvegica J. E. Zetterst.-Loc: 21, soil covered rock, MKIR 3534
Encalyptaceae
Encalypta rhamnoides Schwägr.-Loc: 8, epilithic, MKIR 2904
Encalypta streptocarpa Hedw.-Loc: 9,17,19, epilithic-soil covered rock, MKIR 2996
Encalypta vulgaris Hedw.-Loc: 4,5,6,7,8,9,11,13,17,18,19, epilithic-on soil-soil covered rock, MKIR 2743
Funariaceae
Entostodon muehlenbergii (Turner) Fife-Loc: 8, epilithic, MKIR 2946b
Funaria hygrometrica Hedw.-Loc: 4,8,9,25, on soil-soil covered rock, MKIR 2759
Grimmiaceae
Coscinodon cribrosus (Hedw.) Spruce-Loc: 4,22, epilithic, MKIR 2769
Grimmia alpestris (F. Weber and D. Mohr) Schleich.-Loc: 11, epilithic, MKIR 3309
Grimmia anodon Bruch and Schimp.-Loc: 6,11,13,19,20,21,22, epilithic, MKIR 2796a
Grimmia dissimulata E. Maier-Loc: 4,8,9,10,12, epilithic, MKIR 2978
Grimmia funalis (Schwägr.) Bruch and Schimp.-Loc: 9, epilithic, MKIR 2992
Grimmia laevigata (Brid.) Brid.-Loc: 3,4,5,7,8, epilithic, MKIR 1462a
Grimmia montana Bruch and Schimp.-Loc: 4, soil covered rock, MKIR 2711
Grimmia orbicularis Bruch ex Wilson-Loc: 5,6,7,8,9,19, epilithic, MKIR 2770
Grimmia ovalis (Hedw.) Lindb.-Loc: 6,7,15,22, epilithic, MKIR 2837

- Grimmia poecilostoma* Cardot and Sébille-Loc: 4, epilithic, MKIR 2714
- Grimmia pulvinata* (Hedw.) Sm.-Loc: 1,4,5,6,8,9,10,12,13,14,17,18,19,20, epilithic-epiphytic-on soil MKIR 1410
- Grimmia trichophylla* Grev.-Loc: 8, epilithic-on soil-soil covered rock, MKIR 2915
- Schistidium apocarpum* (Hedw.) Bruch and Schimp.-Loc: 4,10,11,17,18,20, epilithic, MKIR 2747
- Schistidium atrofusum* (Schimp.) Limpr.-Loc: 6,7,9, epilithic, MKIR 2787
- Schistidium confertum* (Funck) Bruch and Schimp.-Loc: 6,14, epilithic, MKIR 3379
- Schistidium pruinosum* (Wilson. ex Schimp.) G. Roth-Loc: 14, on soil, MKIR 3381b
- Schistidium rivulare* (Brid.) Podp.-Loc: 8,19,21, epilithic-on soil-soil covered rock, MKIR 2929
- Fissidentaceae
- Fissidens adianthoides* Hedw.-Loc: 4, on soil-soil covered rock, MKIR 3757a
- Fissidens viridulus* (Sw. Ex anon.) Wahlenb.-Loc: 4, on soil, MKIR 3743
- Ditrichaceae
- Ceratodon conicus* (Hampe) Lindb.-Loc: 19, soil covered rock, MKIR 3445
- Ceratodon purpureus* (Hedw.) Brid.-Loc:6, epilithic-on soil-soil covered rock, MKIR 2820
- Distichium capillaceum* (Hedw.) Bruch and Schimp. var. *capillaceum*-Loc: 1,7,8,9,17, epilithic-soil covered rock, MKIR 2857
- Distichium capillaceum* (Hedw.) Bruch and Schimp. var. *compactum* (Huebener) Torre and Sarnth.-Loc: 21,22, epilithic-soil covered rock, MKIR 3531
- Ditrichum flexicaule* (Schwägr.) Hampe-Loc: 19, epilithic, MKIR 3481
- Rhabdoweisiaceae
- Dicranoweisia cirrata* (Hedw.) Lindb.-Loc: 1,9, epilithic-on soil-soil covered rock, MKIR 2973
- Dicranaceae
- Dicranella heteromalla* (Hedw.) Schimp.-Loc: 22, soil covered rock, MKIR 3547
- Dicranella howei* Renauld and Cardot-Loc: 7, on soil, MKIR 2867
- Dicranella varia* (Hedw.) Schimp.-Loc: 14,19,21, on soil-soil covered rock, MKIR 3765
- Leucobryaceae
- Campylopus* Brid. sp.-Loc: 17, soil covered rock, MKIR 3408
- Pottiaceae
- Aloina aloides* (Koch ex Schultz) Kindb.-Loc: 8, on soil, MKIR 2916a
- Barbula convoluta* Hedw. var. *convoluta*-Loc: 1,22, soil covered rock, MKIR 1442d
- Barbula convoluta* var. *sardoa* Schimp.-Loc: 19, epilithic, MKIR 3486b
- Barbula unguiculata* Hedw.-Loc: 4,8,9,25, epilithic-on soil-soil covered rock, MKIR 2942
- Bryoerythrophyllum recurvirostrum* (Hedw.) P. C. Chen-Loc: 4,10,12,13,17, epilithic-soil covered rock, MKIR 3342
- Crossidium squamiferum* (Viv.) Jur. var. *pottioideum* (De Not.) Mönk.-Loc: 8,19, epilithic, MKIR 2897b
- Crossidium squamiferum* (Viv.) Jur. var. *squamiferum*-Loc: 4,5,6,8,19, epilithic-on soil-soil covered rock, MKIR 2710
- Didymodon acutus* (Brid.) K. Saito-Loc: 8,25, on soil, MKIR 2935
- Didymodon cordatus* Jur.-Loc: 4, epilithic, MKIR 2766
- Didymodon fallax* (Hedw.) R. H. Zander-Loc: 14, epilithic-epiphytic, MKIR 3371
- Didymodon ferrugineus* (Schimp. ex Besch.) M. O. Hill-Loc: 4,9,10, epilithic, MKIR 3258b
- Didymodon insulanus* (De Not.) M. O. Hill-Loc: 4,6,9,25, epilithic-epiphytic, MKIR 2791
- Didymodon luridus* Hornsch. ex Spreng.-Loc: 4,5,6,8,11,12,17,19, epilithic-on soil-soil covered rock, MKIR 3452
- Didymodon rigidulus* Hedw.-Loc: 6,8,13,22, epilithic-soil covered rock, MKIR 2931
- Didymodon sinuosus* (Mitt.) Delogne-Loc: 21, epilithic-on soil, MKIR 3536
- Didymodon spadiceus* (Mitt.) Limpr.-Loc: 25, epilithic-on soil, MKIR 3780a
- Didymodon tophaceus* (Brid.) Lisa-Loc: 7,8,18,25, epilithic-epiphytic-on soil, MKIR 2895
- Didymodon vinealis* (Brid.) R. H. Zander-Loc: 1,6,12,18,19, epilithic-epiphytic-soil covered rock, MKIR 2814
- Eucladium verticillatum* (Hedw.) Bruch and Schimp.-Loc: 4,18, epilithic, MKIR 2731
- Gymnostomum calcareum* Nees and Hornsch.-Loc: 8, soil covered rock, MKIR 2898
- Gymnostomum viridulum* Brid.-Loc: 10, epilithic, MKIR 3262
- Phascum cuspidatum* Schreb. ex Hedw. var. *cuspidatum*-Loc: 4,19,21,25, on soil, MKIR 3769
- Phascum cuspidatum* var. *piliferum* (Hedw.) Hook. and Taylor-Loc: 4, on soil, MKIR 3762c
- Phascum cuspidatum* var. *schreberianum* (Dicks.) Brid.-Loc: 4, on soil, MKIR 3760
- Pleurochaete squarrosa* (Brid.) Lindb.-Loc: 5,8, epilithic-on soil-soil covered rock, MKIR 2777
- Pseudocrossidium hornschurchianum* (Schultz) R. H. Zander-Loc: 8,14,19, epilithic-on soil, MKIR 2889
- Pseudocrossidium revolutum* (Brid.) R. H. Zander-Loc: 4,19, epilithic-on soil-soil covered rock, MKIR 2699
- Syntrichia hadacii* Vondr.-Loc: 8,19, epilithic, MKIR 2886
- Syntrichia handelii* (Schiffn.) S. Agnew and Vondr.-Loc: 6,8,10,17, epilithic-epiphytic, MKIR 2794

- Syntrichia laevipila* Brid.-Loc: 5, epiphytic, MKIR 2776
Syntrichia latifolia (Bruch ex Hartm.) Huebener-Loc: 5, epiphytic, MKIR 2783
Syntrichia montana Nees-Loc: 1,4,6,7,8,10,11,12,15,17,18, 19,20, epilithic-epiphytic-on soil-soil covered rock, MKIR 2694
Syntrichia norvegica F. Weber-Loc: 11,22, soil covered rock, Alt. MKIR 3287
Syntrichia papillosissima (Copp.) Loeske-Loc: 7, epilithic-on soil, MKIR 2852
Syntrichia princeps var. *echinata* (Schiffn.) Bizot-Loc: 1,8, epilithic, MKIR 2894
Syntrichia princeps (De Not.) Mitt. var. *princeps*-Loc: 1,6,7,8,18,19, epilithic-epiphytic-on soil, MKIR 2802
Syntrichia pseudohandelii (J. Froehl.) S. Agnew and Vondr.-Loc: 6,10,12,15, epilithic, MKIR 3256b
Syntrichia ruraliformis (Besch.) Cardot-Loc: 1,9,12,14,17, epilithic-on soil, MKIR 2975
Syntrichia ruralis (Hedw.) F. Weber and D. Mohr-Loc: 1,4,5,6,7,8,9,11,18,19,22,25,epilithic-epiphytic-soilcovered rock, MKIR 1415
Syntrichia subpapillosissima (Bizot and R. B. Pierrot ex W. A. Kramer) M. T. Gallego and J. Guerra-Loc: 1,10,15,19, epilithic, MKIR 3250
Syntrichia virescens (De Not.) Ochyra-Loc: 3,5,8,10, epilithic-epiphytic, MKIR 2783a
Tortella flavovirens (Bruch) Broth.-Loc: 5,25, on soil, MKIR 3792
Tortella fragilis (Hook. and Wilson) Limpr.-Loc: 25, epilithic, MKIR 3791
Tortella inclinata (R. Hedw.) Limpr.-Loc: 8, epilithic, MKIR 2950
Tortella inflexa (Bruch) Broth.-Loc: 6,8, on soil, MKIR 2806b
Tortella tortuosa (Hedw.) Limpr.-Loc: 1,7,8,9,10,11,14,17,18,19,21,22, epilithic-onsoil-soil covered rock, MKIR 1428
Tortula atrovirens (Sm.) Lindb.-Loc: 4,8,13,19, epilithic-on soil-soil covered rock, MKIR 3347
Tortula canescens Mont.-Loc: 4,25, on soil, MKIR 2696
Tortula hoppeana (Schultz) Ochyra-Loc: 12,19, epilithic-soil covered rock, MKIR 3337
Tortula inermis (Brid.) Mont.-Loc: 18, soil covered rock, MKIR 3429b
Tortula marginata (Bruch and Schimp.) Spruce-Loc: 4, soil covered rock-on soil, MKIR 2730
Tortula muralis Hedw.-Loc: 1,6,8, epilithic-on soil, MKIR 2829
Tortula revolvens (Schimp.) G. Roth var. *obtusata* Reimers-Loc: 4, on soil, MKIR 2700
Tortula subulata (Hedw.) F. Weber and D. Mohr var. *subulata*-Loc: 1,4,6,7,8,9,11,14,17,18,19,20,22, on soil-epilithic-epiphytic-soil covered rock, MKIR 2821
Tortula truncata (Hedw.) Mitt.-Loc: 4, on soil, MKIR 3754a
Tortula vahliana (Schultz) Mont.-Loc: 1,4, on soil, MKIR 1437
Trichostomum crispulum Bruch -Loc: 8, epilithic-on soil-soil covered rock, MKIR 2933
Weisia controversa Hedw.-Loc: 5,25, epilithic, MKIR 3788
Weissia breutelii Müll. Hal.-Loc: 19, soil covered rock, MKIR 3768
Weissia longifolia Mitt.-Loc: 21, on soil, MKIR 3769
Orthotrich Aceae
Orthotrichum affine Schrad. ex Brid.-Loc: 2,4,6,15,20,22, epiphytic, MKIR 1455
Orthotrichum anomalum Hedw.-Loc: 4,11, epilithic-epiphytic, MKIR 2627
Orthotrichum cupulatum Hoffm. ex Brid. var. *bistratosum* Schiffn.-Loc: 5,7, epilithic, MKIR 2842 (confirm KURSC.)
Orthotrichum cupulatum Hoffm. Ex Brid. var. *cupulatum*-Loc: 1,4,6,8,9,11,12,19,20, epilithic-epiphytic-on soil, MKIR 1408
Orthotrichum diaphanum Schrad. ex Brid.-Loc: 2,3,4,8,20, epiphytic, MKIR 1452a
Orthotrichum lyellii Hook. and Taylor-Loc: 1,7,20, epiphytic, MKIR 1434
Orthotrichum macrocephalum F. Lara, Garilleti and Mazimpaka-Loc: 3,9,19,20, epiphytic, MKIR 1463
Orthotrichum pallens Bruch ex Brid.-Loc: 11,20, epilithic-epiphytic, MKIR 3281
Orthotrichum pumilum Sw. ex Anon.-Loc: 2,3,4,6,20,22, epiphytic, MKIR 1458
Orthotrichum rivulare Turner-Loc: 19,20, epiphytic, MKIR 3480
Orthotrichum rupestre subsp. *franzonianum* (De Not.) Mönk.-Loc: 9,14, epiphytic, MKIR 2986
Orthotrichum rupestre Schleich. ex Schwaegr. subsp. *rupestre*-Loc: 1,6, epilithic-epiphytic, MKIR 1444a
Orthotrichum speciosum Nees-Loc: 2,6,15,19,20, epiphytic, MKIR 1455
Orthotrichum stramineum Hornsch. ex Brid.-Loc: 11,15, epiphytic, MKIR 3280a
Orthotrichum striatum Hedw.-Loc: 1,6,8,9,19,25, epiphytic, MKIR 1451
Hedwigiaceae
Hedwigia stellata Hedenäs-Loc: 9, epilithic, MKIR 2974b
Bartramiaceae
Anacolia webbii (Mont.) Schimp.-Loc: 4,10, on soil-soil covered rock, MKIR 2760a
Bartramia stricta Brid.-Loc: 4, epilithic-on soil-soil covered rock, MKIR 2708
Philonotis arnellii Husn.-Loc: 22, on soil, MKIR 3551a
Philonotis caespitosa Jur.-Loc: 14, epilithic-on soil, MKIR 3368
Philonotis calcarea (Bruch and Schimp.) Schimp.-Loc: 19, epilithic, MKIR 3488

- Philonotis tomentella* Molendo-Loc: 14, on soil, MKIR 3367
Bryaceae
Bryum alpinum Huds. ex With.-Loc: 9, epilithic-on soil-soil covered rock, MKIR 2960
Bryum archangelicum Bruch and Schimp.-Loc: 4,7, epilithic-on soil, MKIR 2762a
Bryum argenteum Hedw. var. *argenteum*-Loc: 4,6,8,9,11,19,21, epilithic-on soil, MKIR 2693
Bryum argenteum var. *lanatum* (P. Beauv.) Hampe-Loc: 11, epilithic-on soil, MKIR 3288
Bryum caespiticium Hedw.-Loc: 1,4,8,11,12, epilithic-on soil-soil covered rock, MKIR 1435b
Bryum canariense Brid.-Loc: 8, on soil, MKIR 2878
Bryum capillare Hedw.-Loc: 1,4,8,9,10, epilithic-epiphytic-on soil, MKIR 2694
Bryum creberrimum Taylor-Loc: 22,25, on soil, MKIR 3742
Bryum dichotomum Hedw.-Loc: 19, on soil, MKIR 3478
Bryum donnianum Grev.-Loc: 5,8, epiphytic-on soil, MKIR 2778a
Bryum imbricatum (Schwägr.) Bruch and Schimp.-Loc: 4,19, epilithic-on soil, MKIR 3489
Bryum pallescens Schleich. ex Schwägr.-Loc: 14,20, epilithic, MKIR 3364a
Bryum pseudotriquetrum (Hedw.) P. Gaertn. et al.-Loc: 14,19,25, epilithic-on soil-soil covered rock, MKIR 3359
Bryum turbinatum (Hedw.) Turner-Loc: 20, epilithic, MKIR 3504
Epipterygium tozeri (Grev.) Lindb.-Loc: 4,8, epilithic-on soil, MKIR 2726
Pohlia melanodon (Brid.) A. J. Shaw-Loc: 4,14, on soil, MKIR 2729
Pohlia wahlenbergii (F. Weber and D. Mohr) A. L. Andrews var. *calcareae* (Warnst.) E. F. Warb.-Loc: 4,7,14, on soil, MKIR 2733
Pohlia wahlenbergii (F. Weber and D. Mohr) A. L. Andrews var. *wahlenbergii*-Loc: 4,15,20,22, epilithic, MKIR 3388
Plagiomniaceae
Plagiomnium undulatum (Hedw.) T. J. Kop.-Loc: 4, epilithic-on soil, MKIR 3758c
Aulacomniaceae
Aulacomnium androgynum (Hedw.) Schwägr.-Loc: 19, on soil-soil covered rock, MKIR 2075b
Amblystegiaceae
Cratoneuron filicinum (Hedw.) Spruce-Loc:20, epilithic, MKIR 3509
Hygroamblystegium tenax (Hedw.) Jenn.-Loc: 4,10,14,19,20, epilithic, MKIR 2748
Hygrohypnum eugyrium (Schimp.) Broth.-Loc: 22, soil covered rock, MKIR 3546
Leptodictyum riparium (Hedw.) Warnst.-Loc: 11, epiphytic, MKIR 3292b
Palustriella commutata (Hedw.) Ochyra-Loc: 4,7,8,13,14,19,22, epilithic-on soil, MKIR 3491
(W) *Palustriella falcata* (Brid.) Hedenäs-Alt. 1300 m, 15.06.1965, Col. No: 2662
Leskeaceae
Pseudoleskeella catenulata (Brid. ex Schrad.) Kindb.-Loc: 11, epiphytic, MKIR 3281
(W) *Pseudoleskeella tectorum* (Funck ex Brid.) Kindb. ex Broth.-epiphytic, Alt. 1400 m, 15.06.1965, Col. No: 2679
Brachytheciaceae
Brachytheciastrum velutinum (Hedw.) Ignatov and Huttunen-Loc: 1,7,9,19,25, epilithic-epiphytic-on soil-soil covered rock, MKIR 1423b
Brachythecium albicans (Hedw.) Schimp.-Loc: 21, epilithic, MKIR 3532
Brachythecium glareosum (Bruch ex Spruce) Schimp.-Loc: 11, epilithic, MKIR 3307
Brachythecium rivulare Schimp.-Loc: 18,19,20, epiphytic-epilithic-on soil, MKIR 3432
Brachythecium salebrosum (Hoffm. ex F. Weber and D. Mohr) Schimp.-Loc: 6, epilithic, MKIR 2791
(W) *Brachytheciastrum velutinum* subsp. *salicinum* (Schimp.) Ochyra and Zamowiec-Alt. 1500 m, 15.06.1965, Col. No: 2700a
Cirriphyllum crassinervium (Taylor) Loeske and M. Fleisch.-Loc: 4,10, epilithic, MKIR 3271b
Homalothecium lutescens (Hedw.) H. Rob.-Loc: 1,6,11, on soil, MKIR 2812
Homalothecium sericeum (Hedw.) Schimp.-Loc: 1,4,6,7,8,9,10,11,12,17,19, epilithic-epiphytic-on soil-soil covered rock, MKIR 1409
Oxyrrhynchium hians (Hedw.) Loeske-Loc: 8, on soil, MKIR 2881
Plasteurhynchium striatulum (Spruce) M. Fleisch.-Loc: 4, on soil, MKIR 2766c
Platyhypnidium riparioides (Hedw.) Dixon-Loc: 4, epilithic, MKIR 2749
Rhynchostegiella litorea (De Not.) Limpr.-Loc: 7,25, on soil, MKIR 3781
Sciuro-hypnum plumosum (Hedw.) Ignatov and Huttunen-Loc: 8, on soil, MKIR 2920
Scleropodium purum (Hedw.) M. Fleisch.-Loc: 15, on soil, MKIR 3386
Scleropodium touretii (Brid.) L. F. Koch-Loc: 10, epilithic, MKIR 3270
Scorpiurium circinatum (Brid.) M. Fleisch. and Loeske-Loc: 10, epilithic, MKIR 3261
Scorpiurium sendtneri (Schimp.) M. Fleisch.-Loc: 11,21,25, epilithic-epiphytic-soil covered rock, MKIR 3300
Fabroniaceae
Fabronia pusilla Raddi-Loc: 8, epilithic-epiphytic, MKIR 2913
Hypnaceae

Ctenidium molluscum (Hedw.) Mitt.-Loc: 7, epilithic-on soil, MKIR 2863

Hypnum cupressiforme Hedw. *cupressiforme*-Loc: 7,8,25, epilithic-epiphytic-on soil, MKIR 2839

Hypnum cupressiforme subsp. *lacunosum* Brid.-Loc: 1, epiphytic, MKIR 1442b

Hypnum cupressiforme subsp. *resupinatum* (Taylor) Schimp.-Loc: 9,22, epilithic-epiphytic, MKIR 2991c

Hypnum jutlandicum Holmen and E. Warncke-Loc: 9, on soil, MKIR 2979

Pterygandraceae

Habrodon perpusillus (De Not) Lindb.-Loc: 20, epiphytic, MKIR 3518

Pterygandrum filiforme Hedw.-Loc: 7,11,14,20, epiphytic, MKIR 2846

Plagiotheciaceae

Myurella tenerrima (Brid.) Lindb.-Loc: 11, epiphytic, MKIR 3279b

Leucodontaceae

Leucodon sciuroides (Hedw.) Schwägr. var. *sciuroides*-Loc: 1,4,8,10,20, epilithic-epiphytic-on soil, MKIR 1414

Leucodon sciuroides var. *morensis* (Schwägr.) De Not.-Loc: 9,22, epilithic, MKIR 2967

Pterogonium gracile (Hedw.) Sm.-Loc: 9,10, epilithic, MKIR 2995

DISCUSSION

The first study on the bryophytes of the Honaz Mountain was published by Henderson (1958). He listed 8 taxa collected by Polunin and Davis (26.08.1956) from Çukurköy. All of his taxa (*Encalypta vulgaris* Hedw., *Syntrichia inermis* (Brid.) Mont., *S. ruralis* (Hedw.) F. Weber and D. Mohr, *Didymodon insulanus* (De Not) M. O. Hill, *Tortella tortuosa* (Hedw.) Limpr., *Grimmia pulvinata* (Hedw.) Sm., *Pterogonium gracile* (Hedw.) Sm. and *Homalothecium sericeum* (Hedw.) Schimp.) were also collected by us. In the "Beitrage Moosflora Westanatoliens I by Walther (1967), he reported 60 mosses from Honaz Mountain. Only three of his taxa could not collect during the excursions. These are *Brachythecium velutinum* (Hedw.) Schimp. var. *salicinum* (Schimp.) Mönk., *Palustriella falcata* (Brid.) Hedenäs and *Pseudoleskeella tectorum* (Funck ex Brid.) Kindb. ex Broth. We added these taxa to our list with an indication of W.

There are some interesting taxa collected from the study area. *Weissia breutelii* Müll. Hal. reported as new to Turkish bryoflora from Musa Mount/Tekepinari Village-Hatay (Yayıntaş, 2009) was collected for the second time from our study area. A *Campylopus* Brid. specimen was not identified because of bearing no

sporophytes. *Didymodon validus* (=D. *acutus* var. *valida* or D. *acutus* fo. *valida*) (also collected from Babadağ/Denizli) has been treated as a different taxon in some floras (Kucera and Vana, 2003). It was not included in our list because the taxonomical status of the taxon has remained unclear. *Orthotrichum cupulatum* Hoffm. ex Brid. var. *bistratosum* Schiffn. was known only from its type locality (Schiffner, 1913) and from Spain (Guerra, 1985). This taxon was collected from three localities in Honaz Mountain and also collected from Babadağ/Denizli (91 years later) but Kürschner and Erdağ recently collected the species (pers. comm.) from the volcanic Afyon area (western Turkey) in the summer of 2008. *Phascum cuspidatum* var. *schreberianum* (Dicks.) Brid. can be distinguished by its branching styles from other related taxa (branched above into two or three branches) as a unique character for the variety. This taxon was recorded as a synonym of *Phascum cuspidatum* by Kürschner and Erdağ (2005) but Hill *et al.* (2006) accepts it as a different taxon. Additionally, *Orthotrichum rivulare* Turner, a recently recorded hygrophytic species from the country (Erdağ and Kürschner, 2002) was also collected from the area.

Due to the local climate which is a less rainy variant of Mediterranean climate (Akman, 1990) acrocarpous mosses contribute with 77.1% and pleurocarpous mosses contribute with 22.9% to total bryoflora. The representational ratio of acrocarpous mosses found on the study area is higher than in other neighbouring regions studied previously such as Bozdağ/Izmir (65.4% acrocarpous; 34.6% pleurocarpous; Leblebici, 1974), Çal Mountain/Manisa (69.4% acrocarpous; 31.6% pleurocarpous; Tonguç and Yayıntaş, 1996), Madran Mountain/Aydın (73% acrocarpous; 27% pleurocarpous; Erdağ, 2002).

Mountain springs, tributaries and other tiny streams harbour a number of hygrophytic bryophytes and comprises the 20% of total the bryoflora. *Platyhypnidium riparioides*, *Pallustriella commutata*, *Bryum* sp., *Pohlia* sp. and *Philonotis* sp., *Brachythecium* sp., *Didymodon tophaceus*, *Eucladium verticillatum*, *Fissidens viridulus*, *Pellia endiviifolia*, *P. epiphylla* and *Plagiommium undulatum* are frequently distributed taxa in such habitats.

The present study was a part of the ongoing researches on the bryophytes of the Caria region of south-west Anatolia which will be available in near future by the authors. The present study focused on the bryophyte flora of Honaz Mountain which is bryologically poorly known. This is thought to be a valuable contribution for understanding bryophyte flora of Turkey. And also, Honaz Mountain can be considered as one of

the bryologically most important areas of the country especially for xerophytic bryophytes.

ACKNOWLEDGMENTS

We are very grateful to Adnan Menderes University (BAP/05-003) for their financial support and special thanks to TUBITAK for providing a post doctoral scholarship to the first author. We are also very grateful to Beata PAPP (Hungarian Natural History Museum, Budapest) for her valuable comments on the manuscript. Field studies could not be realized without the help of Mithat Çetin, M. Evrim Demir, Ömer Yamaner, Emre Ağcagil, Sebahattin Mutlu and Murat Turan.

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