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Contributions to the Moss Flora of Gümüşhane Province (Torul and Kürtün Districts, Turkey)

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Abstract: Some moss specimens were collected from Gümüşhane Province between September and October 2008. As a result of field and laboratory studies, 92 taxa belonging to 22 families were identified. These taxa are presented in a list. All taxa are new to the study area (Gümüşhane Province). Eight taxa are (*Ditrichum flexicaule* (Schwaegr.) Hampe, *Ditrichum pusillum* (Hedw.) Hampe, *Grimmia lisae* De Not., *Grimmia montana* Bruch and Schimp., *Herzogiella seligeri* (Brid.) Z. Iwats., *Leskea polycarpa* Hedw., *Pohlia melanodon* (Brid.) J. Shaw, *Trichostomum tenuirostre* (Hook and Taylor) Lindb. var. *tenuirostre*) new records for A4 Square (40-42° N, 38-42° E) were determined. The aim of the study was to determine the moss taxa growing in Gümüşhane Province (Torul and Kürtün districts) and to make a contribution to the moss flora of Turkey.

Key words: Moss flora, musci, kürtün, torul, Gümüşhane

INTRODUCTION

Mosses are important components of forest ecosystems. They have important contributions on biological diversity providing wet habitats for much type of living organisms. The study on mosses in Turkey are not extensive as in many other countries, thus the moss flora of Turkey is still largely unknown. But in recent years there has been a substantial increase in the number of moss papers referring to the moss flora of Turkey (Blockeel *et al.*, 2003; Erdağ *et al.*, 2003; Papp and Sabovljević, 2003; Uyar, 2003; Papp, 2004; Uyar and Çetin, 2004; Koz and Ozdemir, 2005; Ozdemir and Koz, 2006; Kürschner, 2004; Kürschner and Erdağ, 2005; Abay, 2006; Abay *et al.*, 2006, 2007; Ozdemir, 2008a, b; Ozdemir and Batan, 2008; Batan and Ozdemir, 2008; Ozdemir and Koz, 2008; Ozdemir *et al.*, 2008).

The study area is very interesting in respect to its natural structure, which encouraged us to conduct a study of the mosses (*Musci*). No moss records have been made in Gümüşhane so far. The present study adds further information to the knowledge of the moss flora of this district of Turkey.

MATERIALS AND METHODS

The material for the study was collected during the period of September-October of 2008 in Gümüşhane

Province in Turkey. The moss samples were incised by knife or spatula from the habitats. After cleaning, the specimens were preserved in bags, each plastic bag has been labeled a providing the information about the habitat of the area, such as the location of the collection, the name of the predominating plant in the surrounding vegetation, the medium where the samples was originally found (stone, branch of a tree, streambed, rotten, etc.).

Moss specimens identified according to the literature (Watson, 1981; Frey *et al.*, 1995; Cortini-Pedrotti, 2001; Smith, 2004; Jýmenez, 2006). Species status was evaluated for the region and Turkey by reviewing the related literature (Uyar and Cetin, 2004; Kürschner and Erdağ, 2005; Ozdemir, 2008b; Handel-Mazzetti, 1909; Henderson, 1961, 1963; Baydar and Ozdemir, 1996; Ozdemir and Çetin, 1999; Ozdemir, 2001a, b; Abay and Çetin, 2003; Papp, 2004; Uyar and Çetin, 2004; Kürschner and Erdağ, 2005).

In the floristic list for each taxon, the numbers of the sites where they have been found are given, followed by the description of the habitat occupied in the study area. The samples were deposited at the Herbarium of Department of Biology at the Karadeniz Technical University.

Description of the study area: Gümüşhane is a transitional area between the Black Sea and East Anatolia regions and this is reflected in its vegetation. *Fagus* L. sp., *Pinus* L. sp., *Quercus* L. sp. and *Juniperus* L. sp. forests are

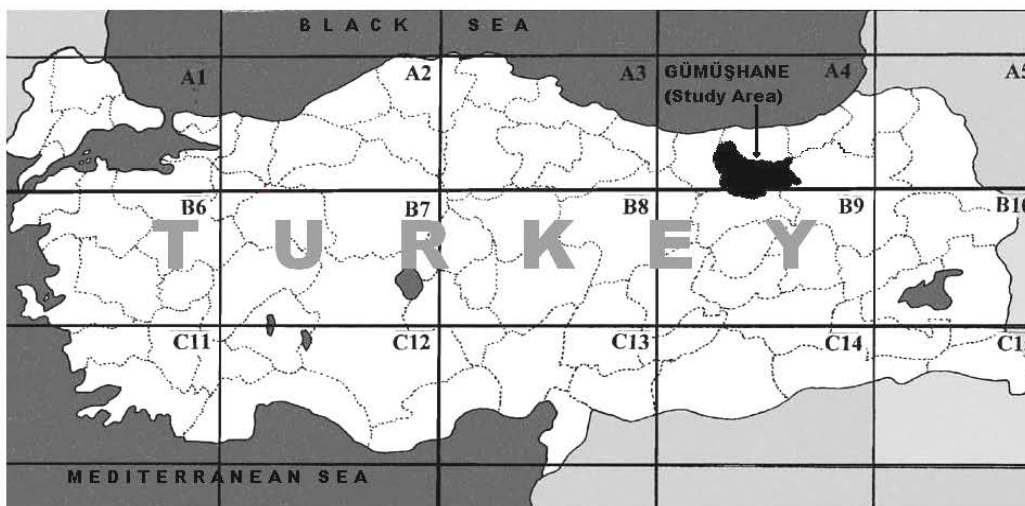


Fig. 1: The study area (Gümüşhane-Turkey) and the grid system adopted by Henderson (1961)

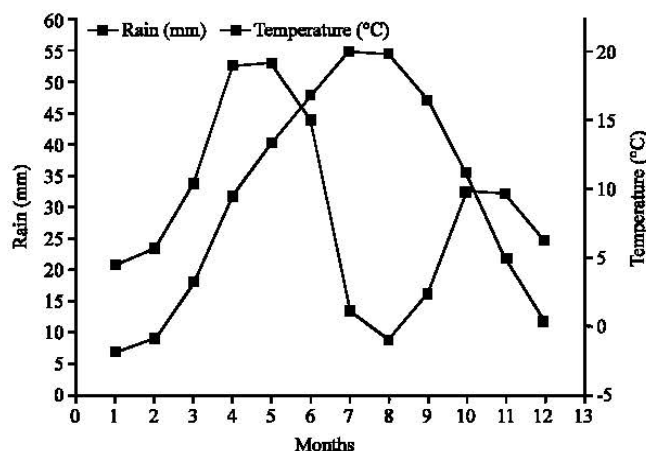


Fig. 2: Climatic diagram of the study area (Gümüşhane Province)

Table 1: Details of the study area

Station No.	Localities	Stations	Altitudes (m)	Latitude-longitude	Collected date
1	Gümüşhane-Torul	Zigana village	1700	40° 60' 329 N 39° 36' 569 E	29.10.2008
2	Gümüşhane-Torul	Zigana mount, Tunnel district	1287	40° 58' 642 N 39° 39' 023 E	30.10.2008
3	Gümüşhane-Torul	Kösdere village	1100	40° 57' 950 N 39° 32' 541 E	29.10.2008
4	Gümüşhane-Torul	Zigana mount, the Limni lake region	2200	40° 59' 844 N 39° 43' 334 E	30.10.2008
5	Gümüşhane-Kürtün	Örümcek forests	1700	40° 39' 44 N 39° 01' 31 E	21.11.2008
6	Gümüşhane-Kürtün	Küçükdere village	1250	40° 59' 31 N 39° 07' 176 E	22.11.2008

dominant above 1500 m altitude. Gümüşhane is located in the East Black Sea region and is surrounded by Bayburt, Giresun, Trabzon and Erzincan. The geographical position of Gümüşhane is 38° 45'-40° 12' East longitude, 39° 45'-40° 50' North latitude and its altitude is about 1210 m. It covers 6575 km² consisting of 60% mountainous, 29% plateau and 11% lowland areas (Fig. 1).

In general, the climate is quite dry in summer, rainy in autumn and spring and snowy in winter. The annual average temperature in Gümüşhane and its

surroundings is 10°C and its climate has characteristics between the Eastern Anatolia and eastern Black Sea region climates. It can be seen the climatic data of Gümüşhane (Fig. 2).

Sites details: The Moss specimens were collected in different localities in the study area (Table 1).

List of the moss taxa: Names of taxa are arranged alphabetically, the nomenclature is according to Smith

(2004). After the name of each taxa information about its altitudinal distribution in the research area is given. For common and rare species, all localities in the area from which they are known are listed. The list comprises 48 genera, 89 species and 3 varieties (total 92 taxa) of Musci.

In the following records the taxa name is followed by the number of locations and substrate. The plant list is given according to the system proposed by Smith (2004). Species new to the A4 square are indicated with an asterisk (Table 2).

Table 2: List of taxa (Alphabetically)

NT	Species	Ecology	HN
1	<i>Annomodon attenuatus</i> (Hedw.) Hueb.	2, in the forest, on soil	Öz-Bat:300
2	<i>Anomodon viticulosus</i> (Hedw.) Hook. and Taylor	3, in the forests, on rock	Öz-Bat:301
3	<i>Atrichum undulatum</i> (Hedw.) P. Beauv.	5, on rock	Öz-Bat:302
4	<i>Barbula unguiculata</i> Hedw.	2, in the forest, on soil	Öz-Bat:303
5	<i>Bartramia halleriana</i> Hedw.	6, near the road, on rock	Öz-Bat:304
6	<i>Bartramia ithyphylla</i> Brid.	1, in the forests, on soil	Öz-Bat:305
7	<i>Brachythecium albicans</i> (Hedw.) Schimp.	3, in the forests, on soil	Öz-Bat:306
8	<i>Brachythecium glærosun</i> (Spruce) Schimp.	3, in the forest, on rock	Öz-Bat:307
9	<i>Brachythecium mildeanum</i> (Schimp.) Schimp.	1, in the forest, on soil	Öz-Bat:308
10	<i>Brachythecium populeum</i> (Hedw.) Schimp.	5, on death tree body	Öz-Bat:309
11	<i>Brachythecium trachypodium</i> (Brid.) Schimp.	1, in the forest, on soil	Öz-Bat:310
12	<i>Bryum capillare</i> Hedw.	1, in the forest, on rock	Öz-Bat:311
13	<i>Bryum dichotomum</i> Hedw.	1, in the forest, on soil	Öz-Bat:312
14	<i>Bryum imbricatum</i> (Schwaegr.) Bruch and Schimp.	5, near the stream, on wet rock	Öz-Bat:313
15	<i>Bryum laevifilum</i> Syed.	2, in the forest, on wet soil	Öz-Bat:314
16	<i>Bryum pallescens</i> Schleich. Ex Schwaegr.	5, on wet soil	Öz-Bat:315
17	<i>Calciogonella cuspidata</i> (Hedw.) Loeske	1, near the stream, on soil	Öz-Bat:316
18	<i>Climacium dendroides</i> F. Weber and D. Mohr.	5, near the stream, on wet rock	Öz-Bat:317
19	<i>Ctenidium molluscum</i> (Hedw.) Mitt.	1, in the forest, on wet rock	Öz-Bat:318
20	<i>Dicranella heteromalla</i> (Hedw.) Schimp.	1, in the forest, on wet rock	Öz-Bat:319
21	<i>Dicranum flexicanle</i> Brid.	2, in the forest, on rock	Öz-Bat:320
22	<i>Dicranum majus</i> Turner	4, in the forest, on soil	Öz-Bat:321
23	<i>Dicranum scoparium</i> Hedw.	4, in the forest, on soil	Öz-Bat:322
24	<i>Didymodon iusulanus</i> (De Not.) M. O. Hill	1, in the forest, on wet rock	Öz-Bat:323
25	<i>Didymodon rigidulus</i> Hedw.	1, in the forest, on tree body	Öz-Bat:324
26	<i>Didymodon tophaceus</i> (Brid.) Lisa	5, near the stream, on rock	Öz-Bat:325
27	<i>Didymodon vinealis</i> (Brid.) R. H. Zander	3, in the forest, on rock	Öz-Bat:326
28	* <i>Ditrichum flexicaule</i> (Schwaegr.) Hampe	6, near the road, on soil	Öz-Bat:327
29	* <i>Ditrichum pusillum</i> (Hedw.) Hampe	4, in the forest, on rock	Öz-Bat:328
30	<i>Epipitrygium tozeri</i> (Grew.) Lindb.	1, in the forest, on dead tree body	Öz-Bat:329
31	<i>Eucladium verticillatum</i> Brid.	3, in the forest, on rock	Öz-Bat:330
32	<i>Eurhynchium diversifolium</i> Schimp.	1, in the forest, on soil	Öz-Bat:331
33	<i>Eurhynchium striatum</i> (Schreb. ex Hedw.) Schimp.	6, in the forest, on tree body	Öz-Bat:332
34	<i>Fissideus adianthoides</i> Hedw.	5, on wet soil	Öz-Bat:333
35	* <i>Grimmia lisæ</i> De Not.	5, on soil	Öz-Bat:334
36	<i>Grimmia longirostris</i> Hook.	4, in the forest, on soil	Öz-Bat:335
37	* <i>Grimmia montana</i> Bruch and Schimp.	1, in the forest, on soil	Öz-Bat:336
38	<i>Grimmia ovalis</i> (Hedw.) Lindb.	1, near the stream, on rock	Öz-Bat:337
39	<i>Grimmia pulvinata</i> (Hedw.) Sm.	1, in the forest, on soil	Öz-Bat:338
40	<i>Grimmia trichophylla</i> Grew.	4, in the forest, on rock	Öz-Bat:339
41	* <i>Herzogiella seigeri</i> (Brid.) Z. Iwats.	5, on dead tree body	Öz-Bat:340
42	<i>Homalothecium philippeanum</i> Schimp.	4, in the forest, on tree body	Öz-Bat:341
43	<i>Homalothecium sericeum</i> (Hedw.) Schimp.	4, in the forest, on soil	Öz-Bat:342
44	<i>Homalothecium lutescens</i> (Hedw.) H. Rob.	3, in the forest, on soil	Öz-Bat:343
45	<i>Hylacomium splendens</i> (Hedw.) Schimp.	2, in the forest, on soil	Öz-Bat:344
46	<i>Hypnum cupressiforme</i> Hedw.	1, in the forest, on soil	Öz-Bat:345
47	<i>Hypnum cupressiforme</i> Brid var. <i>tectorum</i>	4, in the forest, on rock	Öz-Bat:346
48	<i>Hypnum jutlandicum</i> Holmen and Warncke	1, near the stream, on soil	Öz-Bat:347
49	<i>Hypnum lacunosum</i> (Brid.) G. F. Holffman	6, in the forest, on wet rock	Öz-Bat:348
50	<i>Hypnum resupinatum</i> Taylor	1, in the forest, on soil	Öz-Bat:349
51	<i>Isoetecium alopecuroides</i> (Dubois) Isoviita	4, in the forest, on tree body	Öz-Bat:350
52	* <i>Leskea polycarpa</i> Hedw.	1, in the forest, on soil	Öz-Bat:351
53	<i>Leucodon sciuroides</i> Hedw. var. <i>sciuroides</i>	5, in the forest, on tree body	Öz-Bat:352
54	<i>Mnium thomsonii</i> Schimp.	5, near the stream, on rock	Öz-Bat:353
55	<i>Neckera crispa</i> Hedw.	3, in the forest, on tree body	Öz-Bat:354
56	<i>Philonotis fontana</i> (Hedw.) Brid.	6, in the forest, on wet rock	Öz-Bat:355
57	<i>Philonotis tomentella</i> Molendo	1, in the forest, on wet soil	Öz-Bat:356
58	<i>Plagiommium elatum</i> (Bruch. and Schimp.) T.J. Kop.	4, in the forest, on soil	Öz-Bat:357
59	<i>Plagiommium undulatum</i> (Hedw.) T. J. Kop.	5, near the stream, on soil	Öz-Bat:358

Table 2: Continued

NT	Species	Ecology	HN
60	<i>Plagiothecium succulentum</i> (Wilson) Lindb.	5, on soil	Öz-Bat:359
61	<i>Plagiothecium undulatum</i> (Hedw.) Schimp.	6, in the forest, on wet rock	Öz-Bat:360
62	<i>Platyhypnidium riparioides</i> (Hedw.) Dixon	1, near the stream, on wet rock	Öz-Bat:361
63	<i>Pleurochaete squarrosa</i> (Brid.) Lindb.	4, in the forest, on soil	Öz-Bat:362
64	<i>Pogonatum urnigerum</i> (Hedw.) P. Beauv.	2, in the forest, on soil	Öz-Bat:363
65	<i>Pohlia cruda</i> (Hedw.) Lindb.	6, in the forest, on rock	Öz-Bat:364
66	* <i>Pohlia melanodon</i> (Brid.) J. Shaw	1, in the forest, on rock	Öz-Bat:365
67	<i>Polytrichastrum formosum</i> (Hedw.) G. L. Sm.	6, in the forest, on soil	Öz-Bat:366
68	<i>Polytrichum alpinum</i> Hedw.	6, in the forest, on wet rock	Öz-Bat:367
69	<i>Polytrichum commune</i> Hedw.	2, in the forest, on soil	Öz-Bat:368
70	<i>Pseudoleskea patens</i> (Lindb.) Kindb.	1, near the stream, on wet rock	Öz-Bat:369
71	<i>Racomitrium aquaticum</i> (Brid. ex Shrad) Brid.	2, in the forest, on rock	Öz-Bat:370
72	<i>Racomitrium elongatum</i> Ehrh. ex Frisvoll	1, in the forest, on soil	Öz-Bat:371
73	<i>Racomitrium ericoides</i> (F. Weber ex Brid.) Brid.	1, near the stream, on rock	Öz-Bat:372
74	<i>Rhizomnium punctatum</i> (Hedw.) T. J. Kop.	5, near the stream, on rock	Öz-Bat:373
75	<i>Rhynchostegium murale</i> (Hedw.) Schimp.	5, near the stream, on rock	Öz-Bat:374
76	<i>Rhytidiadelphus squarrosus</i> (Hedw.) Warnst.	1, in the forest, on soil	Öz-Bat:375
77	<i>Rhytidiadelphus triquetris</i> (Hedw.) Warnst.	4, in the forest, on soil	Öz-Bat:376
78	<i>Scorpidium revolvens</i> (Sw.) Hedenas	3, in the forest, on soil	Öz-Bat:377
79	<i>Syntrichia intermedia</i> Brid.	3, in the forest, on rock	Öz-Bat:378
80	<i>Syntrichia ruralis</i> (Hedw.) F. Weber and D. Mohr	3, in the forest, on rock	Öz-Bat:379
81	<i>Syntrichia virescens</i> (De. Not.) Ochyra	4, in the forest, on soil	Öz-Bat:380
82	<i>Thamnobryum alopecurum</i> (Hedw.) Gangulee	3, in the forest, on dead tree body	Öz-Bat:381
83	<i>Thuidium abietinum</i> (Hedw.) Schimp.	1, near the stream, on rock	Öz-Bat:382
84	<i>Thuidium assimile</i> (Mitt.) A. Jaeger	5, on soil	Öz-Bat:383
85	<i>Thuidium delicatulum</i> (Hedw.) Schimp.	4, in the forest, on soil	Öz-Bat:384
86	<i>Thuidium tamariscinum</i> (Hedw.) Schimp.	5, on soil	Öz-Bat:385
87	<i>Tortella fragilis</i> (Hook and Wilson) Limpr.	1, in the forest, on soil	Öz-Bat:386
88	<i>Tortella tortuosa</i> (Hedw.) Limpr.	4, in the forest, on soil	Öz-Bat:387
89	<i>Tortula princeps</i> De. Not.	6, near the road, on rock	Öz-Bat:388
90	<i>Tortula subulata</i> var. <i>subulata</i> Hedw.	3, in the forest, on soil	Öz-Bat:389
91	<i>Trichostomum brachydontium</i> Bruch.	1, near the stream, on soil	Öz-Bat:390
92	* <i>Trichostomum tenuirostre</i> (Hook and Taylor) Lindb. var. <i>tenuirostre</i>	1, in the forest, on soil	Öz-Bat:391

NT: Number of Taxa, Number of Station, HN: Herbarium Number

RESULTS AND DISCUSSION

On various types of habitats in the areas of Gümüşhane, we recorded the presence of 93 species and varieties of mosses. All species belong to the class of mosses (Bryopsida) and are classified into 48 genera and 22 families. In the mosses in the areas of Gümüşhane province, the families with the highest number of taxa such are Pottiaceae (16 taxa) (17.4% of all taxa), Brachytheciaceae (13 taxa) (14.1% of all taxa), Grimmiaceae (9 taxa) (9.8% of all taxa), Bryaceae (8 taxa) (8.7% of all taxa), Hypnaceae (7 taxa) (7.6% of all taxa), Polytrichaceae (5 taxa) (5.4% of all taxa) and others families (35 taxa) (Table 3).

The genera with the highest number of taxa are *Grimmia*, with 6 taxa, *Bryum*, *Brachythecium* and *Hypnum*, with 5 taxa followed by the genera *Didymodon* and *Thuidium*, with 4 taxa. The remaining 7 genera are represented by only one species each (Table 4).

All taxa are new to Gümüşhane Province. Eight taxa (*Ditrichum flexicaule* (Schwaegr.) Hampe, *Ditrichum pusillum* (Hedw.) Hampe, *Grimmia liseae* De Not., *Grimmia montana* Bruch and Schimp., *Herzogiella seligeri* (Brid.) Z. Iwats., *Leskea polycarpa* Hedw.,

Table 3: The distributions of the taxa according to the families

NF	Familia	NT	(%)
1	Pottiaceae	16	17.4
2	Brachytheciaceae	13	14.1
3	Grimmiaceae	9	9.8
4	Bryaceae	8	8.7
5	Hypnaceae	7	7.6
6	Polytrichaceae	5	5.4
7	Bartramiaceae	4	4.3
8	Dicranaceae	4	4.3
9	Mniaceae	4	4.3
10	Thuidiaceae	4	4.3
11	Hylocomiaceae	3	3.3
12	Anomodontaceae	2	2.2
13	Ditrichaceae	2	2.2
14	Leskeaceae	2	2.2
15	Plagiotheciaceae	2	2.2
16	Amblystegiaceae	1	1.1
17	Campyliaceae	1	1.1
18	Climaciaceae	1	1.1
19	Fissidentaceae	1	1.1
20	Leucodontaceae	1	1.1
21	Neckeraceae	1	1.1
22	Thamnobryaceae	1	1.1
Total		92	100.0

NF: Number of Family, NT: Number of taxa, %: Percentage of taxa according to the total number of taxa

Pohlia melanodon (Brid.) J. Shaw, *Trichostomum tenuirostre* (Hook and Taylor) Lindb. var. *tenuirostre*) are new to A4 square of Turkey depending on the square grid

Table 4: The distribution of taxa in habitats

NH	Habitat	NT	%
1	On rocks	24	26.09
2	On wet rocks	11	11.96
3	On soil	43	46.74
4	On wet soil and mud	4	4.35
5	On fresh tree body	6	6.52
6	On died tree body	4	4.35

NH: Number of Habitat, NT: Number of taxa

system adopted by Henderson (1961). In the record the species name is followed by the number of location and substrata.

Forty three taxa were found growing on soil. The samples growing on soil are 46.74% all samples. These are *Annomodon attenuatus* (Hedw.) Hueb., *Barbula unguiculata* Hedw., *Bartramia ithyphylla* Brid., *Brachythecium albicans* (Hedw.) Schimp., *Brachythecium mildeanum* (Schimp.) Schimp., *Brachythecium trachypodium* (Brid.) Schimp., *Bryum dichotomum* Hedw., *Calliergonella cuspidata* (Hedw.) Loeske, *Dicranum majus* Turner, *Dicranum scoparium* Hedw., *Ditrichum flexicaule* (Schwaegr.) Hampe, *Eurhynchium diversifolium* Schimp., *Grimmia lisae* De Not., *Grimmia longirostris* Hook., *Grimmia montana* Bruch and Schimp., *Grimmia pulvinata* (Hedw.) Sm., *Homalothecium sericeum* (Hedw.) Schimp., *Homalothecium lutescens* (Hedw.) H. Rob., *Hylocomium splendens* (Hedw.) Schimp., *Hypnum cupressiforme* Hedw., *Hypnum jutlandicum* Holmen and Warncke, *Hypnum resupinatum* Taylor, *Leskea polycarpa* Hedw., *Plagiomnium elatum* (Bruch. and Schimp.) T.J. Kop., *Plagiomnium undulatum* (Hedw.) T. J. Kop., *Plagiothecium succulentum* (Wilson) Lindb., *Pleurochaete squarrosa* (Brid.) Lindb., *Pogonatum urnigerum* (Hedw.) P. Beauv., *Polytrichastrum formosum* (Hedw.) G. L. Sm., *Polytrichum commune* Hedw., *Racomitrium elongatum* Ehrh. ex Frisvoll, *Rhyntidiadelphus squarrosus* (Hedw.) Warnst., *Rhyntidiadelphus triquetrus* (Hedw.) Warnst., *Scorpidium revolvens* (Sw.) Hedenas, *Syntrichia virescens* (De. Not.) Ochyra, *Thuidium assimile* (Mitt.) A. Jaeger, *Thuidium delicatulum* (Hedw.) Schimp., *Thuidium tamariscinum* (Hedw.) Schimp., *Tortella fragilis* (Hook and Wilson) Limpr., *Tortella tortuosa* (Hedw.) Limpr., *Tortula subulata* var. *subulata* Hedw., *Trichostomum brachydontium* Bruch., *Trichostomum tenuirostre* (Hook and Taylor) Lindb. var. *tenuirostre* (Table 4).

Twenty-four taxa were found growing on the rocks and stones depending on data obtained from the study area. These are 26.09 % of all samples. These are *Anomodon viticulosus* (Hedw.) Hook. and Taylor, *Atrichum undulatum* (Hedw.) P. Beauv., *Bartramia halleriana* Hedw., *Brachythecium glaerosum* (Spruce) Schimp., *Bryum capillare* Hedw., *Dicranum flexicaule*

Brid., *Didymodon tophaceus* (Brid.) Lisa, *Didymodon vinealis* (Brid.) R. H. Zander, *Ditrichum pusillum* (Hedw.) Hampe, *Eucladium verticillatum* Brid., *Grimmia ovalis* (Hedw.) Lindb., *Grimmia trichophylla* Grew., *Hypnum cupressiforme* Brid var. *tectorum*, *Mnium thomsonii* Schimp., *Pohlia cruda* (Hedw.) Lindb., *Pohlia melanodon* (Brid.) J. Shaw, *Racomitrium aquaticum* (Brid. ex Shrad) Brid., *Racomitrium ericoides* (F. Weber ex Brid.) Brid., *Rhizomnium punctatum* (Hedw.) Kop., *Rhynchostegium murale* (Hedw.) Schimp., *Syntrichia intermedia* Brid., *Syntrichia ruralis* (Hedw.) F. Weber and D. Mohr, *Thuidium abietinum* (Hedw.) Schimp., *Tortula princeps* De. Not. (Table 4).

Eleven taxa were found growing on wet rock and stones. These are 11.96 % of all samples. These are *Bryum imbricatum* (Schwaegr.) Bruch and Schimp., *Climacium dendroides* Weber and Mohr., *Ctenidium molluscum* (Hedw.) Mitt., *Dicranella heteromalla* (Hedw.) Schimp., *Didymodon insulanus* (De Not.) Hill, *Hypnum lacunosum* (Brid.) Holffman, *Philonotis fontana* (Hedw.) Brid., *Plagiothecium undulatum* (Hedw.) Schimp., *Platyhypnidium riparioides* (Hedw.) Dixon, *Polytrichum alpinum* Hedw., *Pseudoleskea patens* (Lindb.) Kindb. (Table 4).

Six specimens were detected on fresh tree body (*Didymodon rigidulus* Hedw., *Eurhynchium striatum* (Schreb. ex Hedw.) Schimp., *Homalothecium philippeanum* Schimp., *Isothecium alopecuroides* (Dubois) Isoviita, *Leucodon sciuroides* Hedw. var. *sciuroides*, *Neckera crispa* Hedw.) These are 6,52 % in all samples (Table 4).

Four taxa were found growing on wet soil (*Bryum laevifilum* Syed., *Bryum pallescens* Schleich. ex Schwaegr., *Fissidens adianthoides* Hedw., *Philonotis tomentella* Molendo.) These are 4.35% of all taxa (Table 4).

Four taxa were detected growing on died tree body (*Brachythecium populeum* (Hedw.) Schimp., *Epipterygium tozeri* (Grew.) Lindb., *Herzogiella seligeri* (Brid.) Iwats., *Thamnobryum alopecurum* (Hedw.) Gangulee). The taxa growing on tree body are 4.35 of all taxa (Table 4).

It can be seen a comparison the present study with the other studies (Contributions to the Moss flora of Giresun region (Ebinjarahisar and Alucra district) (Ozdemir and Batan, 2008), The Bryophyte flora of Yenice Forest (Karabük, Turkey) (Uyar *et al.*, 2007), Contribution to the Moss Flora of Western Turkey: Moss Flora of the Kaz Mountain (Balıkesir, Turkey) (Erdağ and Yayıntaş, 1999) and Contributions to the Moss flora of Giresun region (Hatila Valley National Park-Turkey) (Batan and Ozdemir, 2008) in Table 5. As shown in Table 5, Pottiaceae, Brachytheciaceae, Grimmiaceae and

Table 5: A comparison of the study according to species with the other some studies in Turkey

Families	NT				
	1	2	3	4	5
Pottiaceae	16	17	20	25	5
Brachytheciaceae	13	15	26	27	22
Grimmiaceae	9	14	9	15	6
Bryaceae	8	11	9	9	4
Hypnaceae	7	5	9	6	13
Polytrichaceae	5	0	4	4	7
Bartramiaceae	4	3	4	3	0
Dicranaceae	4	2	6	3	7
Mniaceae	4	1	3	7	5
Thuidiaceae	4	4	3	0	2
Hylocomiaceae	3	0	1	0	0
Anomodontaceae	2	0	2	0	0
Ditrichaceae	2	0	6	2	0
Leskeaceae	2	0	1	1	0
Plagiotheciaceae	2	0	1	1	3
Other Families	7	13	49	36	11
Total Families	92	85	153	139	85

NT: Number of taxa, 1: Present study, 2: Contributions to the Moss flora of Giresun region (Ebinkekarahisar and Alucra district, 3: The Bryophyte flora of Yenice Forest (Karabük, Turkey), 4: Contribution to the Moss Flora of Western Turkey: Moss Flora of the Kaz Mountain (Balıkesir, Turkey), 5: Contributions to the Moss flora of Giresun region (Hatila Valley National Park-Turkey)

Table 6: A comparison of the study according to the genera with the other some studies in Turkey

Genera	NT				
	1	2	3	4	5
<i>Grimmia</i>	6	9	5	11	2
<i>Bryum</i>	5	11	8	7	4
<i>Brachythecium</i>	5	6	7	7	6
<i>Hypnum</i>	5	2	4	5	6
<i>Dicymodon</i>	4	5	5	0	2
<i>Thuidium</i>	4	2	1	0	1
<i>Homalothecium</i>	3	4	3	2	2
<i>Syntrichia</i>	3	4	2	0	0
<i>Dicranum</i>	3	2	4	1	3
<i>Racomitrium</i>	3	1	0	2	2
<i>Anomodon</i>	2	1	2	0	0
<i>Bartramia</i>	2	0	2	1	0
<i>Philonotis</i>	2	3	2	2	0
<i>Eurhynchium</i>	2	3	1	7	5
<i>Pohlia</i>	2	0	2	2	0
<i>Ditrichum</i>	2	0	4	0	0
<i>Rhytidiacladophus</i>	2	1	1	0	2
<i>Plagiothecium</i>	2	0	3	1	3
<i>Polytrichum</i>	2	0	0	1	3
<i>Plagiommium</i>	2	0	3	4	3
<i>Tortella</i>	2	0	1	2	2
<i>Tortula</i>	2	2	2	10	1
<i>Trichostomum</i>	2	0	0	0	0
Other genera	25	29	91	74	38
Total genera	92	85	153	139	85

NT: Number of taxa, 1: Present study, 2: Contributions to the Moss flora of Giresun region (Ebinkekarahisar and Alucra district), 3: The Bryophyte flora of Yenice Forest (Karabük, Turkey), 4: Contribution to the Moss Flora of Western Turkey: Moss Flora of the Kaz Mountain (Balıkesir, Turkey), 5: Contributions to the Moss flora of Giresun region (Hatila Valley National Park-Turkey)

Bryaceae have the highest number of taxa. Hylocomium, Anomodontaceae, Leskeaceae and Plagiotheciaceae have the limited number of taxa in all studies (Table 5).

Grimmia, *Bryum*, *Brachythecium* and *Hypnum* have highest number of species in all studies in Table 6.

It was defined that the families with pleurocarpic features are more common than the acrocarpics as a result of comparing with both the samples in the study area and also the previous studies in the Black Sea region of Turkey. This is because the fact that the region has a rainy climate and vast forest lands. Although Black Sea region of Turkey is very adaptable for the development of Bryophytes and with their convenient ground and climatic conditions, the numbers of taxa are not rich as to be expected. It means that in the Black Sea region the numbers of the taxa are low but they are very common in respect to Bryophytes, these results from both the similar area and climate characteristics (Table 5, 6).

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