Contributions to the Moss Flora of Artvin Region (Hatila Valley National Park-Turkey)

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Abstract: Field studies were organized for exploring the moss flora of Hatila Valley National Park of Artvin (Turkey) during spring-summer period in 2005-2006. The taxonomic survey yielded eighty-five moss taxa (comprises of seventy-nine species, six varieties) belonging to 44 genera of 16 families in Hatila Valley National Park of Artvin, Turkey. *Bryum rubens* Mill., *Dicranodontium uncinitum* (Harv.) A. Jaeger., *Eurhynchium hians* var. *rigidum* (Bou.) Düll., *Hynum judaicum* Holmen and Warncke, *Rhynchochilus iacquinii* (Garov.) Limpr. and *Pseudocrassidium hirschuchianum* (Schultz) R. H. Z. ander are new records for A4 grid square (40°-42°N, 38°-42°E) determined. All taxa were found for the first time in Artvin. For each every taxon, the habitat pattern and distribution data are presented.

Key words: Hatila Valley National Park, moss, flora, Artvin

INTRODUCTION

The studies 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 (Abay and Cetin, 2003a, b; Erdag, 2003, Erdag et al., 2003, Everest and Ellis, 2003; Papp and Sabovlevic, 2003; Uyar, 2003; Papp, 2004; Uyar and Cetin, 2004; Kürschner, 2004; Kürschner and Erdag, 2005; Abay, 2006; Abay et al., 2007; Özdemir, 2008; Özdemir and Koç, 2008).

The study area is very interesting in respect to its natural structure, which encouraged us to conduct a study of the Bryophyta (Musc). No musci records have been made in Artvin so far while two papers about liverworts were performed (Gokler and Ozturk, 1989). This province still remains unexplored in respect to Musci. The present study adds further information to our knowledge of the moss flora of this district and of Turkey.

MATERIALS AND METHODS

Field studies were organized for exploring the moss flora of Hatila Valley National Park of Artvin (Turkey) during spring-summer period in 2005-2006. The moss samples were collected from two localities on 17 August 2005 and 07 August 2006 in Artvin Hatila Valley National Park. The bryophyte specimens were incised by knife or spatula from their habitats. After cleaning, the specimens were preserved in plastic bags, each plastic bag has been labelled providing the information about the habitat of the area, such as the location of the collection, the name of the dominating plant in the surrounding vegetation, the medium where the sample was originally found (stone, branch of a tree, streambed, rotten root, etc.). The bryophyte specimens were dried in shadowy and ventilated room conditions in the laboratory. They have been identified by reference books (Watson, 1981; Frey et al., 1995; Cortini-Pedrotti, 2001; Smith, 2004; Jimenez, 2006).

The statuses of taxa for Turkey were determined by reviewing the related literature (Cetin, 1988; Frey and Kürschner, 1991; Keçeli and Cetin, 2000; Uyar and Cetin, 2004; Papp, 2004; Kürschner and Erdag, 2005).

The information about the taxa new to A4 square was determined by investigating the studies about A4 square grid (Özdemir, 1994; Baydar and Özdemir, 1996; Özdemir and Cetin, 2000; Özdemir, 2001a, b; Abay, 2005; Koç and Özdemir, 2005; Özdemir and Koç, 2006; Özdemir and Koç, 2008). Vouchers are deposited in the herbarium of Karadeniz Technical University, Faculty of Science and Arts, Department of Biology.

DESCRIPTION OF THE STUDY AREA

Artvin is located in eastern part of Black Sea region of Turkey. In the east, it is bounded by Georgia and Ardahan, Rize in the west, Erzurum in the South and Black Sea in the north. Artvin has a mountainous area, thus there exists hardly any plain in the area. On the other hand high plateaux and rivers are present.

Hatila Valley National Park is 10 km distance to Artvin. It consists of one of the main branches of Çoruh...
The vegetation has a relic feature hereabouts. There are some plant species with endemic characteristics in the area as well.


The annual average rainfall is 661.03 mm while the average temperature is 12.3 °C (Meteoroloji Bilteni, 1995). The climate type of the area is semi-humid and the main vegetation type is humid forest (Anpin, 1981). The rainfall regime of the study area is winter-spring-autumn-summer (Central Mediterranean) of Mediterranean
Table 3: A comparison the study area with the other National Parks in Turkey

<table>
<thead>
<tr>
<th>National Parks in Turkey</th>
<th>Hatıla Valley NP</th>
<th>Ilgaz mnt NP</th>
<th>Yedigoller NP</th>
<th>Sebzükü NP</th>
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NP: National Park, NT: Number of Taxa

Table 4: A comparison the study area with the other studies in Turkey

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<th>Sakarya province</th>
<th>Bolu province (Çanakkale)</th>
<th>Sünnet Kınım mnt. (Eskişehir)</th>
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NP: National Park, NT: Number of Taxa

origin. The region is in line with the rainfall-heat formula (Q = 89.4) and a low precipitation/cold bioclimate type is seen predominantly.

SITES DETAILS

Turkey, Artvin, Hatıla Valley National Park, Up Hatıla Valley, 41° 30’ N, 41° 31’ E, 2100 m, (Picea orientalis (L.) Link), Abies nordmanniana (Stev.). Spach., Fagus orientalis Lipsky., Alnus glutinosa Garth. subsp. barbata Yalt.) 17.08.2005.


RESULTS AND CONCLUSION

The taxonomic survey yielded 85 taxa (Bryopsida) belonging to 44 genera of 16 families in the region of Artvin Hatıla Valley National Park, Artvin (Turkey).

The families seen in Table 1 with high taxa numbers are Brachytheciaceae (22), Hypnaceae (13), Dicranaceae (7), Polytrichaceae (7), Pottiaceae (5), Grimmaceae (6), Mniumaceae (5), Amblystegiaceae (4), Bryaceae (4) and Thuidiaceae (2). Ninety percent of all moss taxa are included in these families (Table 1).

In the mosses of the Hatıla Valley National Park (Artvin), the families with the highest number of species are Brachytheciaceae (22), Hypnaceae (13) and Dicranaceae (10) respectively (Table 1 and Fig. 2). The most common genera are Brachythecium and Hypnum, with six species each, followed by Eurhynchium with five species.
All taxa are new to Artvin. *Bryum rubens* Milt., *Dicranodontium uncinatum* (Harv.) A. Jaeger., *Eurhynchium hians* var. *rigidum* (Baul.) Ther., *Hypnum julii andicum* Holmen and Warming, *Pseudocrossidium hornschuchianum* (Schultz.) R. H. Zander and *Rynchostegiella jacquinii* (Garov.) Limpr., are new to A4 square depending on the square grid system adopted by Henderson (1961). In the following record the species name is followed by the number of location and substrata. An asterisks (*) indicate designates the new recorded to A4 grid square in Turkey.

This research is compared with both previous studies conducted in the national parks in Turkey (Table 3) and previous studies carried out in Black Sea, Central Anatolia, Aegean and Mediterranean Regions (Table 4).

It was defined that the families with pluricarpic features are more common than the acrocarpic ones 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 bryophyte and with its 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 species are low but they are very common in respect to bryophyte, these results from both the similar area and climate characteristics.

Mediterranean climate prevailing in the study area helps more acrocarpic taxa to grow than those in the previous studies in the Black Sea region of Turkey. Consequently, *Dicranaceae, Polypodiaceae* and *Pottiaceae* families are the most common families with acrocarpic taxa in the area. Habitats patterns of the species in the investigation area are shown in Table 2.

**List of Taxa**

*Amblystegium humile* (P. Beauv.) Crundw., 2, on rock, near the road and stream, bottom of forest, Batan 1.

*Amblystegium varium* (Hedw.) Lindb., 1, 2, on rock, near the road and stream, bottom of forest, Batan 2.

*Bryum unguiculata* Hedw., 1, on rock, near the road, Batan 3.

*Brachythecium albicans* (Hedw.) Schimp., 2, on rock, near the stream and road, bottom of forest, Batan 4.

*Brachythecium glaerosum* (Spruce) Br. Eur., 2, on tree, near the road, bottom of forest, Batan 5.

*Brachythecium mildeanum* (Schimp.) Schimp., 2, on rock, near the road, bottom of forest, Batan 6.

*Brachythecium rivulare* Schimp., 2, on soil, near the road, bottom of forest, Batan 85.

*Brachythecium salebrosum* (F. Web and D. Mohr) Schimp., 2, on rock, near the road, bottom of forest, Batan 7.

*Brachythecium populare* (Hedw.) Schimp., 2, on tree, near the road, bottom of forest, Batan 8.

*Bryum capillare* Hedw., 2, on rock and soil, Batan 9.

*Bryum mildeanum* (Schimp) Schimp., 1, on rock, near the road, Batan 10.

*Bryum pallanscens* Schleich. ex Schwaegr, 1, on rock, near the road, bottom of forest, Batan 11.

*Bryum rubens* Milt., 2, on rock, bottom of forest, Batan 12.

*Campylocalus fragilis* (Brid.) Bruch and Schimp., 2, on rock, near the road, bottom of forest, Batan 13.

*Ctenidium molluscum* (Hedw.) Mitt., 1, 2, on rock, near the road, bottom of forest, Batan 14.

*Ctenidium molluscum* var. *condensatum* (Schimp) E. Britton., 1, 2, on rock, near the road, bottom of forest, Batan 15.

*Dicranella heteromalla* (Hedw.) Schimp., 2, on tree, near the road, bottom of forest, Batan 16.

*Dicranum majus* Turner., 2, on tree root, near the road and stream, bottom of forest, Batan 17.

*Dicranum scoparium* Hedw., 2, on rock, near the road, bottom of forest, Batan 18.

*Dicranum polysetum* Sw., 2, on soil, bottom of forest, Batan 19.

*Dicranodontium uncinatum* (Harv.) A. Jaeger., 1, 2, on soil, near the road, in woods, Batan 20.

*Dicranodonium demudatum* (Brid.) E. Britton., 2, on rock, near the road, bottom of forest, Batan 21.

*Didymodon taphesium* (Brid.) Lisa, 1, on soil, in wood, Batan 82.

*Didymodon rigidulus* Hedw., 2, on rock, near the road, bottom of forest, Batan 83.

*Encalypta streptocarpa* Hedw., 2, on rock, near the road, bottom of forest, Batan 84.

*Eurhynchium striatum* (Schreb. ex Hedw.) Schimp., 2, on rock, near the stream and road, bottom of forest, Batan 22.

*Eurhynchium striatulum* (Spruce) Schimp., 1, 2, on rock, bottom of forest, Batan 23.

*Eurhynchium hians* var. *rigidum* (Baul.) Ther. 2, on tree, near the road and stream, bottom of forest, Batan 24.

*Eurhynchium pulchellum* (Hedw.) Jenn., 2, on soil, near the road, bottom of forest, Batan 25.

*Eurhynchium pulchellum* (Hedw.) Jenn. var. *pulchellum* 2, on soil, near the road, bottom of forest, Batan 26.

*Grimmia hartmanii* Schimp., 2, on rock, near the road, under forest, Batan 27.

*Grimmia donniana* var. *dominana* Sm., 2, on rock, near the road, bottom of forest, Batan 28.
Habrodon perpusillus (De Not.) Lindb., 1, on rock, near the road, bottom of forest, Batan 29.
Hedwigia ciliata (Hedw.) P. Beauv., 2, on rock, near the stream and road, bottom of forest, Batan 30.
Homolothecium lutescens (Hedw.) H. Robins., 2, on rock, near the road, bottom of forest, Batan 31.
Homolothecium sericeum (Hedw.) Schimp., 1, 2, on rock, near the stream and road, bottom of forest, Batan 32.
Hylomniunum brevistore (Brid.) Br. Eur., 2, on rock, near the stream and road, bottom of forest, Batan 33.
Hylomnium splendens (Hedw.) Schimp., 2, on rock, near the road, bottom of forest, Batan 34.
Hypnum cupressiforme Hedw., 1, 2, on rock, under forest, Batan 35.
Hypnum cupressiforme var. cupressiforme Hedw., 1, 2, on rock, near the road, bottom of forest, Batan 36.
Hypnum cupressiforme var. lactuosum (Brid.) G. F. Hoffman ex Brid., 1, 2, on rock, near the road, bottom of forest, Batan Hypnum cupressiforme var. resupinatum Taylor., 2, on tree root, near the road, bottom of forest, Batan 38.
Hypnum jut andicum Holmen and Wakeelke, 2, on rock, near the road, bottom of forest, Batan 39.
Hypnum revolutum (Mitt.) Lindb., 2, on rock, under forest, Batan 40.
Isothecium alopecuroides (Dubois) Isoviita., 2, on rock, near the stream and road, bottom of forest, Batan 41.
Leptobacidium riparium (Hedw.) Warnst., 2, on rock, near the road, bottom of forest, Batan 42.
Leucobryum glaucum (Hedw.) Angstr., on soil, under forest, Batan 42.
Leucodon sciuroides (Hedw.) Schwaeagr., 2, on tree, near the road, bottom of forest, Batan 43.
Mniium hornum Hedw., 2, on rock, near the road, under forest, Batan 44.
Neckera crispa Hedw., 2, on rock, near the stream and road, bottom of forest, Batan 45.
Ozyrrhynchium hians (Hedw.) Lac., 2, on soil, near the road, bottom of forest, Batan 46.
Ozyrrhynchium speciosum (Brid.) Warnst., 2, on soil, near the stream and road, bottom of forest, Batan 47.
Plagiomnium elatum (Bl. and) T. Kop., 2, on tree, near the stream and road, bottom of forest, Batan 48.
Plagiomnium medium (B.S.O.) T. Kop., 2, on rock, near the stream and road, bottom of forest, Batan 49.
Plagiumnium undulatum (Hedw.) Kop., 2, on rock, near the stream and road, bottom of forest, Batan 50.
Plagioteicum cavifolium (Brid.) Z. Iswats., 1, on tree body, bottom of forest, Batan 51.
Plagioteicum nomenclare (Mitt.) A. Jaeger, 2, on soil, bottom of forest, Batan 52.
Plagioteicum succulentum (Wilson) Lindb., 2, on tree body, bottom of forest, Batan 53.

Pleurozium schreberi (Wild ex Brid.) Mitt., 2, on rock, near the stream and road, bottom of forest, Batan 54.
Pogonatum aloides (Hedw.) P. Beauv., 1, 2, on soil, near the road, under forest, Batan 55.
Pogonatum auritum (Hedw.) P. Beauv., 1, 2, on rock, near the road, bottom of forest, Batan 56.
Polytrichastrum formosum (Hedw.) G. L. Sm., 1, 2, on soil, near the road, bottom of forest, Batan 57.
Polytrichastrum longisetum (Sw. ex Brid.) G. L. Sm., 1, 2, on rock, near the road, bottom of forest, Batan 58.
Polytrichium commune Hedw., 1, 2, on soil, near the road, bottom of forest, Batan 59.
Polytrichium juniperinum Hedw., 1, on rock, near the stream and road, bottom of forest, Batan 60.
Polytrichium piliferum Hedw., 2, on soil, under forest, Batan 61.

Pseodoaschroepodium purum (Hedw.) M. M. Fleisch, 2, on rock, near the road, bottom of forest, Batan 62.
Pseodoaschroepodium trifarium (F. W. B. and D. Mohr.) Loeske., 2, on tree, near the road, bottom of forest, Batan 63.

Pseudocrossileum hornschuchianaum (Schult.) R. H. Zander, 2, on rock, bottom of forest, Batan 64.
Racomitrium canescens (Hedw.) Brid., 2, on rock, near the road, bottom of forest, Batan 65.
Racomitrium heterostichum (Hedw.) Brid., 2, on soil, bottom of forest, Batan 66.
Platyhypnidium riparioides (Hedw.) Dixon., 2, on tree, near the road, bottom of forest, Batan 67.
Rhynchothegium murale (Hedw.) Schimp., 2, on tree, near the stream, bottom of forest, Batan 68.

Rhynchothegium jaciunni (Garov.) Limpr., 2, on rock, near the stream, bottom of forest, Batan 69.
Rhynchothegium tenella (Dicks.) Limpr., 2, on rock, near the road, bottom of forest, Batan 70.
Rhynchothegium squarrosus (Hedw.) Warnst., 2, on rock, near the road, bottom of forest, Batan 71.
Rhynchothegium riguestrus (Hedw.) Warnst., 2, on rock, near the road, bottom of forest, Batan 72.
Sanionia uncinita (Hedw.) Loeske., 2, on rock, near the road, under forest, Batan 73.
Schiidia tionocarpum (Hedw.) Bruch and Schimp., 2, on rock, near the road, bottom of forest, Batan 74.
Schiidia trichodon (Brid.) Poelt., 2, on rock, near the road, bottom of forest, Batan 75.
Tortella frigilis (Hock. and Wils.) Limpr., 2, on rock, near the road, bottom of forest, Batan 76.
Tortella tortuosa (Hedw.) Limpr., 1, 2, on tree, bottom of forest, Batan 77.
Tortula subulata Hedw., 1, 2, on rock, near the road, bottom of forest, Batan 78.
Thuidium recognitum (Hedw.) Lindb., 2, on wet soil, near the stream, bottom of forest, Batan 79.
Thuidium tamariscinum (Hedw.) Schimp., 2, on rock, near the stream, bottom of forest, Batan 80.

REFERENCES


