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Contributions to the Moss Flora of Western Turkey: Biga Peninsula (Canakkale) and Thrace Region of Turkey

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I. INTRODUCTION

Turkey-in-Europe (Thrace, European Turkey) occupies the south-eastern extension of the Balkan Peninsula, towards Asia, from which it is separated by two canals -the Bosphorus and the Dardanelles - and the Sea of Marmara. It covers an area of 23.500 km², and surrounded by sea in the northeast, east and south.

Turkey is one of the most floristically rich countries in the world, with very high levels of plant diversity, with 3504 endemic (30%), and 1096 non-endemic (9%) species in the flora (Ekim *et al.* 2000). Kaz Mountain (1796 m), formerly known as Ida Mountain, is the highest peak of the Biga Peninsula, separating the Aegean and Marmara regions (Fig.1). The national park (39°40'N - 26°45'E) consists of many deep valleys. The canyons are situated within the highlands of Kaz Mountain, and continue in a north-south direction towards the vicinity of Edremit. This region supports a diverse and distinct flora and fauna, consisting mainly of fir forests at elevations higher than 1000 m and pine forests at lower elevations. There are about 800 natural plant taxa in Kaz Mountain National Park and 68 of them are endemic to Turkey (Özhatay and Özhatay, 2005). About 30 of the endemic taxa grow only in this park (Satil *et al.*, 2006). For that reason, the area was

classified as a European "Important Plant Area" (www.plantlife-ipa.org). Although the climate of the area is similar to the Mediterranean temperate zone, it is in a transition zone between the Mediterranean and Black Sea climates (Uysal, 2010). The combination of geographical isolation, an unusual range of climatic conditions, and the meeting of Mediterranean and Euro-Siberian floristic regions have resulted in exclusive vegetation in this area. The study area on Kaz Mountain is in the Aegean region of Northwest Turkey and includes elements of the Euro-Siberian, Mediterranean and Irano-Turanian floras. Species of trees and bushes coexisting with *Pinus nigra* are as follows: *Fagus orientalis*, *Castanea sativa*, *Carpinus betulus*, *Quercus cerris* var. *cerris*, *Q. petraea* ssp. *iberica*, *Q. frainetto*, *Carpinus betulus*, *Tilia argentea*, *Populus tremula*, *Corylus avellana*, *Sorbus aucuparia*, *Crataegus monogyna*, *Prunus divaricata*, *Juniperus foetidissima*, *Cornus mas*, *Acer platanoides*, and *Platanus orientalis*. *Abies nordmanniana* ssp. *equi-trojani* is found together with the following trees and bushes: *Carpinus betulus*, *Acer platanoides*, *A. campestre*, *Quercus cerris* var. *cerris*, *Q. frainetto*, *Q. petraea* ssp. *iberica*, *Populus tremula*, *Castanea sativa*, *Fagus orientalis*, and *Crataegus monogyna*. The *Fagus orientalis* is found together with the following trees and bushes; *Abies nordmanniana* ssp. *equi-trojani*, *Pinus nigra* ssp. *pallasiana*, *Castanea sativa*, *Carpinus betulus*, *Acer platanoides*, *Quercus cerris* var. *cerris*, *Q. frainetto*, *Taxus baccata*, *Populus tremula*, *Platanus orientalis*, and *Corylus avellana*. *Carpinus betulus* is commonly found; *Corylus avellana*, *Taxus baccata*, *Quercus cerris* var. *cerris*, *Cornus mas*, *Sorbus aucuparia*, *Malus sylvestris*, *Prunus divaricata*, *Castanea sativa*, *Rosa canina*, *Pinus brutia*, *Fagus orientalis*. (Gemici *et al.*, 1998; Öner, 2009; Uysal, 2010).

Another part of the study area, Thrace region, occupies a small portion of Turkey (Fig.2), covering ~23,500 km² that lies at the southeastern extremity of Europe, with the Aegean Sea to the west and the Black Sea to the east. It is separated from the rest of Turkey in mainland Asia to the south by the Sea of Marmara and the Canakkale and Bosphorus straits that, respectively; connect to the Aegean and Black seas. In comparison with the rest of Turkey, the topography in Thrace is commonly lower in elevation. The Yıldız Mountains

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(Istranca Mountains) lie in north-eastern Thrace, the highest point being Mahya Mountain (1,035 m). This mountain range borders the Black Sea and represents an extension of Anatolia's northern Black Sea Mountains, extending into southeastern Bulgaria. The range is composed of forest vegetation, the humid northern slopes supporting *Fagus orientalis* forest and *Rhododendron ponticum* scrub (YMBP 2010). Generally, humid oceanic climate is seen in the study area. As known, oceanic climate is characterized without a dry period. Bioclimatically, the climate in the study area is very suitable for growing of the taxa mainly originated in the Euro-Siberian region, including *Corylus avellana* L var. *avellana*, *Fagus orientalis* Lipsky, *Quercus frainetto* Ten., *Q.infectoria* Oliver subsp. *infectoria*, *Carpinus betulus* L.

Bryophytes tend to be highly specific with regard to particular micro-environmental factors such as temperature, light and water availability, substrate chemistry etc., making them good ecological indicator species. They are ecologically significant in playing a key role in ecosystem dynamics (Vanderpoorten and Goffinet, 2009). In Turkey, bryological studies were mostly performed by Turkish bryologists after 1988. The most recent bryophyte studies focused on the western part of Turkey as follows: Erdag, 2002; Erdağ and Kürschner, 2001, 2002; Erdağ *et al.*, 2003; Tonguc Yayintas, 2000, 2009, 2010; Natcheva *et al.*, 2008; Kirmaci and Agacagil, 2009; Kirmaci and Erdağ, 2009, 2010; Ursavas *et al.*, 2009. To date, 760 mosses, 171 liverworts and 3 hornworts have been recorded in Turkey (Frey and Kürschner, 2011).

The bryophyte flora of the European part (Turkish Thrace) remains poorly documented with respect to both species diversity and distribution. There are some records dealing with restricted regions (Yayintaş & Tonguc 1994, 1996; Yayintaş & al.1996; Tonguc-Yayintas 2010, 2013; Gökler & Öztürk 1996; Papp & Sabovljevic 2003; Natcheva *et al.*2008). The Turkish Thrace comprises 3 % (23. 764 km²) of the territory of Turkey. The latest checklist of the species diversity of the Turkish Thrace includes 217 mosses (Sabovljevic & al. 2008) and 27 hepatics (Sabovljevic & Natcheva 2006).

The author made collections as part of bryophyte research studies (2010-2012) in the Biga Peninsula and Thrace region (Fig.2), which is located in northern and northwestern Turkey, in the Kaz Mountain area and Yildiz Mountain (Fig.1). According to the Turkish checklists (Uyar and Cetin, 2004; Kürschner and Erdag, 2005) among these collections, *Rhabdoweisia crispata* (Dicks.) Lindb, *Schistidium robustum* (Nees & Hornsch.) H.H.Blom, and *Scorpidium cossonii* (Schimp.) Hedenäs are reported for the first time from Turkey. In addition to the Biga Peninsula area records, *Mielichhoferia elongata* (Hoppe&Hornsch. ex Hook.) Hornsch. and *Meesia uliginosa* Hedw. were given as

new records from the Thrace region for Turkey. New records of taxa are a noteworthy first step towards a flora for Turkey and Southwest Asia. In this regard, the following two new records are a further contribution to reach this ambitious aim.

Collections were made between June 2010 and June 2012 from different localities and habitat types. All collected specimens are kept in the special collection of Ozlem TONGUC YAYINTAS at Canakkale Onsekiz Mart University and also in New York Botanical Garden (NYBG) and Duke University Herbarium (DUKE). Collection numbers for the Tonguc Yayintas are preceded by a T. Specimens were identified by using relevant literature (Casas *et al.*, 2009; Crum and Anderson, 1981; Greven, 2003; Guerra *et al.*, 2006; Guerra and Cros, 2007; Heyn and Herrstadt, 2004; Nyholm, 1981; Kürschner and Frey 2011; Lewinsky, 1993; Smith, 2004; Pedrotti, 2001; Zander, 1993). The floristic list is arranged according to the system proposed by Goffinet and Shaw (2009). In addition, the new records for A1 grid-square determined by reviewing the related literature (Cetin 1999; Oren *et al.* 2007; Ursavas *et al.*2009; Savaroglu *et al.* 2011). The new records for A1 grid square are indicated with (▲), and new record for Turkish bryophyte flora with (***) in the bryofloristic list presented in the appendix.

II. RESULTS

a) Bryophyta

Sphagnaceae Dumort.

1. ▲ *Sphagnum fimbriatum* Wilson: Canakkale, Can, Söğütalan village, peat bog Ciğer gölü (Liver Lake), on a wet rocky bank, 650 m, 39°52'37" N 26°55'40" E, June 16, 2010, T. 2684, det. J. Shaw (given as a new record from Turkey, in press).

Polytrichaceae Schwägr.

2. *Pogonatum aloides* (Hedw.) P.Beauv.: Canakkale, Biga, Abdiaga village, in valley, Abdiaga creek, 45 m, on humus rich soil, N 40°19'73.6", E 027°25'98.4", 10.05.2012, T. 4024; Biga, Arabaalani and Kurşunlutepe, valley on soil, 542 m, N 40°13'61.3" E 027°29'28.3", *Platanus orientalis* forests, 10.06.2012, T. 4050; on soil, 554 m, T. 4051; Biga, between Elmali and Arabaalani villages, 504 m, roadside, on gravel, N 40°13'55.9", E 027°26'26.3", 16.06.2012, T. 4065; Biga, Hosaba creek and environs, on soil, 458 m, mixed forest of *Platanus orientalis*, *Quercus* sp. and *Acer platanooides*, 16.06.2010, T. 2621.
3. *Pogonatum nanum* (Hedw.) P.Beauv.: Canakkale, Biga, Armutcuk Hill, N 40°07'41", E 027°22'33", 452 m, mixed forest of *Quercus* sp., *Carpinus betulus*, and *Tilia tomentosa*, 16.06.2010, T. 2593, 2594, 2596, 2602; Biga, Armutcuk Hill, 466 m, on soil, 40°07'39.5", E 027°22'20.6", under *Castanea sativa*, 16.06.2010, T. 2688; Biga, between Elmali and

- Arabaalani villages, on roadside, 504 m, near bank, N 40°13'55.9", E 027°26'26.3", 10.06.2012, T.4057, 4063.
4. **Polytrichastrum formosum** (Hedw.) G.L.Smith.: Canakkale, Biga, between Elmali and Arabalani villages, in moorland, 500 m, N 40°13'56.2", E 027°28'24.1", 16.06.2012, T. 4064.
 5. **Polytrichum commune** Hedw. var. **commune**: Canakkale, Biga, between Elmali and Arabalani villages, 839 m, mixed forest of *Quercus petraea*, *Carpinus betulus* and *Fagus orientalis*, N 40°13'55.9", E 027°26'26.3", on roadside, on soil, 10.06.2012, T.4066.
 6. **Polytrichum juniperinum** Hedw.: Canakkale, Biga, 458 m, on soil, N 40°07'42", E 27°22'33", 458m, *Quercus* sp., *Carpinus* sp., and *Tilia tomentosa*, 16.06.2010, T. 2597; Canakkale, Biga, between Elmali and Arabalani villages, 542 m, N 40°06'31.6", E 027°21'66.0", humus cliff soil, mixed forest of *Quercus* sp., 10.06.2012, T 4054, 4055; Canakkale, Yenice, between Beyoglu wood store and Yolindi village, 193 m, N 40°06'79.6", E 027°20'32.0", on boulder, 10.06.2012, T. 5009.
 7. **Polytrichum piliferum** Schrab.ex Hedw.: Canakkale, Biga, Kirkgecit, valley, on roadside, 71 m, N 40°07'76.8", E 027°13'11.5", mixed forest of *Platanus orientalis*, *Quercus* sp., *Cistus creatiquis*, *Rubus* sp., 16.06.2012, T.5047.
 8. **Polytrichum strictum** Menzies. ex Brid.: Canakkale, Biga, mixed forest of *Quercus* sp., *Carpinus* sp., *Tilia tomentosa*, N 40°07'42", E 27°22'33", 458 m, in bogs, 16.06.2010, T. 2590.
- Timmiaceae** Hedw.
9. **Timmia austriaca** Hedw.: Canakkale, Biga, between Elmali and Arabalani villages, Armutcuk hill, *Quercus petraea*, *Carpinus betulus*, *Fagus orientalis*, and *Rhododendron flavum* forests, on soil, 839 m, 16.06.2010, T. 2502.
- Grimmiaceae** Arn.
10. **Grimmia anodon** Bruch & Schimp.: Canakkale, Biga, Kirkgecit thermal spring, roadside, 45 m, N 40°09'52.7", E 027°12'49.4", 16.06.2012, on boulder, T. 5036.
 11. **Grimmia pulvinata** (Hedw.) Sm.: Canakkale, Biga, 42 m, forest, on rock, N 40° 01'19.8", E 027° 02'06.1", 16.06.2010, T.2690, 2695; Biga, Abdiağa village, Abdiağa creek, inner valley, forest, on rock, 78 m, N 40°18'07.1", E 027°26'06.1", 10.05.2012, T. 4001; Biga, Kirkgecit thermal spring, roadside, on boulder, 45 m, N 40°09'52.7", E 027°12'49.4", 16.06.2012, T. 5037; on slope, on soil, 44 m, N 40°09'51.9", E 027°12'49.1", 16.06.2012, T. 5040.
 12. **Schistidium apocarpum** (Hedwig) Bruch & Schimper: Canakkale, Biga, between Kursunlutepe and Arabaalan, on boulder, N 40°13'73.6", E 027°29'72", 10.06.2012, T.4060.
 13. **Schistidium atrofusum** (Schimp.) Limpr.: Canakkale, Biga, Kirkgecit, valley, on boulder, 198 m, N 40°06'02.5", E 027°14'09.2", 16.06.2012, T.5054.
 14. **Schistidium dupretii** (Thér.) W.A. Weber.: Canakkale, Yenice, between Beyoglu wood store and Yolindi village, on boulder, forest area, 171 m, N 40°06'81.9", E 027°20'01.1", 16.06.2012, T. 5005.
 15. **Schistidium robustum** (Nees & Hornsch.) H.H.Blom: Canakkale, Biga, on calcareous rocks, 870 m, N 40°05'53.3", E 27°22' 33.9", 16.06.2010, T. 2633.
- Archidiaceae** Schimp.
16. **Archidium alternifolium** (Dickson ex Hedwig) Mitten: Canakkale, Biga, Hosoba Creek and environs, on wet soil, 40°07'41.9", E 027°22'33.7", 452 m, 16.06.2010, 2605.
- Fissidentaceae** Schimp.
17. **Fissidens adianthoides** Hedw.: Canakkale, Biga, near by the waterfalls, on wet rock faces, 70 m, N 40°11'99", E 027°20'59", 16.06.2010, T. 2663.
 18. **Fissidens exilis** Hedw.: Canakkale, Biga, at nearby the river, on soil, 70 m, N 40°11'99", E 027°20'59", 16.06.2010, T. 2655; Canakkale, Biga, Abdiağa village, in valley, nearby Abdiağa creek, 45 m, N 40°19'73.6", E 027°25'98.4", on humus rich soil, 10.05.2012, T. 4007.
 19. **Fissidens crispus** Mont.: Canakkale, Yenice, Yolindi village, on humus rich soil, forest area consists of *Acer* sp. and *Juglans regia*, 140 m, N 40°07'90.3", E 027°21'51.4", 16.06.2012, T. 4093.
 20. **Fissidens monguillonii** Thér.: Canakkale, Yenice, Yolindi village, 165 m, N 40°07'90.2", E 027°21'50.9", on humus rich soil, forest area consists of *Acer* sp. and *Juglans regia*, 16.06.2012, T. 5002.
- Rhabdoweisiaceae** Limpr.
21. **Dichodontium pellucidum** (Hedw.) Schimp. var. **flavescens** (Dicks.) Moore: Canakkale, Biga, Kirkgecit, 53 m, valley, on rock wet in the stream, N 40°09'97.6", E 027°12'84.3", *Quercus* sp., 16.06.2012, T. 5053.
 22. **Dicranoweisia cirrata** (Hedw.) Lindb.: Canakkale, Biga, 569 m, epiphyte on *Pinus nigra*, N 40°06'05", E 27°21'06", 16.06.2010, T. 2678.
 23. **Rhabdoweisia crispata** (Dicks.) Lindb. : Canakkale, Biga, between to Arabaalan village and Kurşunlutepe, inner valley, on soil in humid slope, 591 m, N 40°13'73", E 27°29'87", 16.06.2012, T. 4062.
- Dicranaceae** Schimp.
24. **Dicranella heteromalla** (Hew.) Schimp.: Canakkale, Biga, Arabaalan village and environs, on gravel, 342 m, N 40°15'50.6", E 017°35'72.7", 16.06.2012, T. 4040.

25. ▲*Dicranum fuscescens* Sm.: Canakkale, Biga, on tree bases, 445 m, N 40°07'39", E 27°22'20", 16.06.2010, T. 2593, 2594, 2595, 2597.
26. ▲*Dicranum leioneuron* Kindb. : Canakkale, Biga, between Arabaalani and Kurşunlutepe villages, mine area, mixed forest *Quercus petraea* ssp. *iberica* and *Q. frainetto*, 600 m, N 40°13'61.3", E 027°29'28.3", 16.06.2012, T. 4062.
27. *Dicranum majus* Sm.: Canakkale, Biga, 458 m, on soil, mixed forest of *Quercus* sp., *Carpinus* sp., and *Tilia tomentosa*, N 40°07'42", E 27°22'33", 16.06.2010, T. 2592; Biga, epiphyte on *Castanea sativa*, 466 m, N 40°07'39.5", E 027°22'20.6" GPS: 5311364441200, 16.06.2010, T. 2635; Biga, mixed forest of *Castanea sativa*, on soil, 466 m, N 40°07'39.5", E 027°22'20.6", 16.06.2010, T. 2687; Biga, 870 m, epiphytic on *Fagus orientalis*, N 40°05'53.2", E 027°22'33.9", 16.06.2010, T. 2681.
28. ▲*Dicranum polysetum* Sw. ex anon.: Canakkale, Biga, Kirkgecit thermal spring, on slope, on boulder, 77 m, N 40°07'76.5", E 027°13'10.5", 16.06.2012, T. 5042.
29. *Dicranum scoparium* Hedw.: Canakkale, Biga, mixed forests of *Fagus orientalis*, *Quercus* sp., *Carpinus betulus*, ferns, *Rubus* sp., on soil and tree, 800 m, N 40°06', E 27°21', 16.06.2010, T. 2590, 2591; Biga, between Elmali and Arabalani villages, 504 m, near bank, on soil, N 40°13'55.9", E 027°26'26.3", 16.06.2012, T. 4054.
30. ▲*Dicranum tauricum* Sapjegin: Canakkale, Biga, Kirkgecit, valley, at *Juniperus* sp. bases, 71 m, N 40°07'76.8", E 027°13'11.5", 16.06.2012, T. 5047.
- Leucobryaceae Schimp.**
31. ▲*Dicranodontium uncinatum* (Hedw.) A. Jaeger.: Canakkale, Biga, between Elmali and Arabalani villages, 500 m, on humus cliff, N 40°13'56.2", E 027°28'24.1", 16.06.2012, T. 4056; Yenice, Yolindi village, on humus rich soil, forest area, 165 m, N 40°07'90.2", E 027°21'50.9", 16.06.2012, T. 4098.
- Pottiaceae Schimp.**
32. ▲*Anoetangium sendtnerianum* Bruch & Schimp.: Canakkale, Biga, Kirkgecit thermal spring, on slope, on boulder, 77 m, N 40°07'76.5", E 027°13'10.5", 16.06.2012, T. 5042.
33. *Barbula unguiculata* Hedw.: Canakkale, Biga, Yolindi village and environs, 500 m, UTM 5316344443134, 16.06.2010, T.2641; Yenice, Yolindi village, on humus rich soil, forest area 140 m, N 40°07'96.3", E 027°21'51.4", 16.06.2012, T. 4092; Yenice, Yolindi village, 165 m, *Acer* sp. and *Juglans regia* mixed forest area, on humus rich soil, N 40°07'90.2", E 027°21'50.9", 16.06.2012, T. 5002.
34. ▲*Cinclidotus danubicus* Schiffn. & Baumgartner: Canakkale, Biga, near waterfalls, exposed to wet rock, 70 m, N 40°11'99", E 027°20'59", 16.06.2010, T. 2671.
35. ▲*Cinclidotus fontinaloides* (Hedw.) P. Beauv.: Canakkale, Biga, near river, on submerged rocks, 70 m, N 40°11'99", E 027°20'59", 16.06.2010, T. 2623.
36. ▲*Cinclidotus riparius* (Host ex Brid.) Arn.: Canakkale, Biga, near river, on submerged rocks, 70 m, N 40°11'99", E 027°20'59", 16.06.2010, T. 2626.
37. *Dialytrichia mucronata* (Brid.) Broth.: Canakkale, Biga, Abdiağa village, in valley, Abdiağa creek, on tree root, 78 m, N 40°18'95.1", E 027°26'15.4", 16.06.2012, T. 4032.
38. *Didymodon luridus* Hornsch.: Canakkale, Biga, Yolindi village and environs, 500 m, UTM 5316344443134, 16.06.2010, T.2642; Yenice, between Beyoglu wood store and Yolindi villages, on boulder, 193 m, N 40°06'79.6", E 027°20'32", 16.06.2012, T. 4090.
39. *Didymodon rigidulus* Hedw.: Canakkale, Biga, Abdiağa village, in valley, Abdiağa creek, on humus rich soil, *Platanus orientalis*, 45 m, 40°19'73.1" N, E 027°25'98.4", 16.05.2012, T. 4004.
40. ▲*Didymodon vinealis* (Brid.) R. H. Zander var. *flaccidus* (Bruch & Schimp.) R. H. Zander: Canakkale, Biga, Abdiağa village, in valley, Abdiağa creek, 80 m, *P. orientalis* trunk, N 40°18'94.2", E 027°26'13", 16.05.2012, T. 4013.
41. ▲*Tortella flavovirens* (Bruch) Broth.: Canakkale, Biga, sandy soil, 42 m, N 40°11'98", E 027°20'61", 16.06.2010, T. 2696.
42. *Tortula muralis* Hedw.: Canakkale, Biga, Kirkgecit thermal spring, on slope, on soil, 44 m, N 40°09'51.9", E 027°12'49.1", 16.06.2012, T. 5032.
43. *Tortula obtusifolia* (Schwägr.) Mathieu: Canakkale, Biga, Kalafat village, nearby Nilufer Pond, on soil, 77 m, UTM 5258994451753, 16.06.2012, T. 4081.
44. *Trichostomum brachydontium* Bruch: Canakkale, Biga, on rocks and soil, 445 m, N 40°07' 42.1", E 027°22'33.5", 16.06.2010, T. 2693.
45. *Trichostomum crispulum* Bruch: Canakkale, Biga, Abdiağa village, in valley, nearby Abdiağa creek, on wet boulder, 78 m, N 40°18'95.1", E 027°26'15.4", 16.06.2012, T. 4033.
46. *Syntrichia ruralis* (Hedw.) F. Weber & D. Mohr.: Canakkale, Biga, Kirkgecit thermal spring, on slope, on soil and rock, 45 m, N 40°09'52.8", E 027°12'49.4", 16.06.2012, T. 5035, 5038.
- Bryaceae Schwägr.**
47. ▲*Bryum algovicum* Sendtn. ex Müll. Hal.: Canakkale, Biga, on soil, in mixed forests, 70 m, N 40°11'99", E 27°20'59", 16.06.2010, T. 2631, 2634.
48. *Bryum caespiticium* Hedw.: Canakkale, Biga, *Quercus cerris*, *Carpinus betulus* and *Tilia tomentosa*, on soil, 452 m, N 40°07'41.9", E 027°22'33.7", 16.06.2010, T. 2601.

49. **Bryum creberrimum** Taylor: Canakkale, Biga, Kirkgecit, inner valley, on boulder, nearby stream, 212 m, N 40°06'02.8", E 027°14'10", 16.06.2012, T. 5050.
50. **Bryum pallescens** Schleich. ex Schwägr.: Canakkale, Biga, *Abies nordmanniana* subsp. *equi-trojana* and *Fagus orientalis* mixed forests, 680 m, N 40°06'31.6", E 027°21'66.1", 16.06.2010, T. 2680; Biga, Kirkgecit, inner valley, on clay, 214 m, N 40°06'02.6", E 027°14'10.2", 16.06.2012, T. 5051.
51. **Bryum pseudotriquetrum** (Hedw.) P. Gaertn., E. Mey. & Scherb. var. **bimum** (Schreb.) Lilj.: Canakkale, Biga, Abdiağa village, inner valley, Abdiağa creek, on root of *Platanus orientalis*, 62 m, N 40°19'53.5", E 027°26'06", 16.05.2012, T. 4023.
52. **Bryum torquescens** Bruch & Schimp.: Canakkale, Biga, Arabaalani village and environs, epiphytic on *Quercus* sp., 350 m, 40° 15'50.6" N, E 027°35'72.7", 16.05.2012, T. 4044.
53. **▲Bryum uliginosum** (Brid.) Bruch & Schimp.: Canakkale, Biga, Abdiağa village, inner valley, Abdiağa creek, on humus rich soil, 45 m, N 40°19'73.6", E 027°25'98.4", 16.05.2012, T. 4009.
54. **▲Plagiobryum zierii** (Hedw.) Lindb.: Canakkale, Biga, Abdiağa village, inner valley, Abdiağa creek, on humus rich soil, *Platanus orientalis* forest, 45 m, 40°19'73.1" N, E 027°25'98.4", 16.05.2012, T. 4004.
55. **▲Ptychostomum capillare** (Hedw.) D. T. Holyoak & N. Pedersen Canakkale, Biga Kurşunlutepe, mixed forest *Pinus nigra*, and *Abies nordmanniana* ssp. *equi-trojani*, on rocks, 542 m, N 40°13'60.6", E 027°29'46.4", 16.06.2012, T. 4049; Biga, Kirkgecit thermal spring, roadside, on boulder, 44 m, N 40°09'69.9", E 027°12'28.4", 16.06.2012, T. 5039, 5041.
- Mielichhoferiaceae** Schimp.
56. **Pohlia nutans** (Hedw.) Lindb.: Canakkale, Biga, Kirkgecit, inner valley, on wet soil, 214 m, N 40°06'02.6", E 027°14'10.2", 16.06.2012, T. 5048.
- Mniaceae** Schwägr.
57. **Mnium hornum** Hedw.: Canakkale, Biga, under *Fagus orientalis* forest, on rock crevices, 870 m, N 40°06' 11.1", E 027°21' 75.1", 16.06.2010, T. 2683.
58. **Plagiomnium affine** (Blandow ex Funck) T.J.Kop.: Canakkale, Biga, Abdiağa village, inner valley, Abdiağa creek, on soil, 78 m, N 40°18'07.1", E 027°26'06.1", 16.05.2012, T. 4027; Yenice, Yolindi village, on humus rich soil, 165 m, N 40°07'90.2", E 027°21'50.9", 16.06.2012, T. 4095.
59. **Plagiomnium elatum** (Bruch & Schimp.) T.J.Kop.: Canakkale, Biga, Kirkgecit thermal spring, roadside, on soil, 39 m, N 40°09'90.3", E 027°12'64.6", 16.06.2012, T. 5028; Biga, Kirkgecit thermal spring, roadside, forest area, on soil, 46 m, N 40°09'90.5", E 027°12'64.7", 16.06.2012, T. 5029.
60. **Plagiomnium ellipticum** (Brid.) T.J.Kop.: Canakkale, Biga, between Arabaalani and Kurşunlutepe villages, under *Carpinus betulus* forests, soil covered rocks, 542 m, N 40°13'61.3", E 027°29'28.3", 16.06.2012, T. 4061; Yenice, Yolindi village, on humus rich soil, 165 m, N 40°07'90.2", E 027°21'50.9", 16.06.2012, T. 4096; Biga, Kirkgecit thermal spring, roadside, forest area, on soil, 46 m, N 40°09'90.5", E 027°12'64.7", 16.06.2012, T. 5030.
61. **Plagiomnium medium** (Bruch & Schimp.) T.J. Kop.: Canakkale, Biga, Hosoba Creek and environs, 458 m, on *Quercus* sp., UTM 531722441624, 16.06.2010, T. 2613.
62. **▲Plagiomnium rostratum** (Schrad.) T.J.Kop.: Canakkale, Biga, near by the waterfalls, on wet rocks, N 40°11'98.8", E 027°20'61", 16.06.2010, T. 2620.
63. **Plagiomnium undulatum** (Hedw.) T.J.Kop.: Canakkale, Biga, Hosoba Creek and environs, , 439 m, UTM 531722441624, 16.06.2010, T. 2603; Biga, Abdiağa village, inner valley, Abdiağa creek, on wet soil near stream bed, 75 m, N 40°19'02.2", E 027°26'04.4", 16.05.2012, T. 4002; Yenice, Yolindi village, on humus rich soil, forest area, 165 m, N 40°07'90.2", E 027°21'50.9", 16.06.2012, T. 4095, 4097, 5003, 5018; Yenice, between Beyoglu wood store and Yolindi village, on boulder, forest area, 171 m, N 40°06'81.9", E 027°20'01.1", 16.06.2012, T. 5008; Biga, Kirkgecit, inner valley, on rock wet in the stream, *Quercus* sp., 53 m, N 40°09'97.6", E 027°12'84.3", 16.06.2012, T. 5027.
- Orthotrichaceae** Arn.
64. **▲Amphidium mougeotii** (Bruch & Schimp.) Schimp.:Canakkale, Biga, between Arabaalani and Kurşunlutepe villages, mixed forest *Pinus nigra*, *Abies nordmanniana* ssp. *equi-trojani*, on tree trunk, 542 m, N 40°13'60.6", E 027°29'46.4", 16.05.2012, T. 4048.
65. **Orthotrichum affine** Schrad. ex Brid.: Canakkale, Biga, mixed forest of *Platanus orientalis*, and *Juniperus oxycedrus*, on tree trunk, N 40°07'44.6", E 027°22'41.8", 542 m, 16.06.2010, T. 2676; Yenice, between Asagiinova village and Beyoglu wood store, *Quercus* sp. forest, on tree trunk and rock, 204 m, N 40°06'81.9", E 027°20'01.1", 16.06.2012, T. 4087, 4088; Biga, between Arabaalani and Kurşunlutepe villages, 543 m, on *Platanus orientalis* trunk, N 40°13'61.3", E 027°29'28.3", 16.05.2012, T. 4059.
66. **Orthotrichum anomalum** Hedw.: Canakkale, Biga, on rock, 391 m, N 40°07'90", E 27°22'43", 16.06.2010, T. 2691; Biga, Abdiağa village, inner valley, nearby Abdiağa creek, on trunk of *P. orientalis*, 62 m, N 40°19'53.5", E027°26'06", 16.05.2012, T. 4022.

67. **Orthotrichum diaphanum** Schrad. ex Brid.: Canakkale, Biga, epiphytic on *Carpinus betulus* trunk, 439 m, 16.06.2010, T. 2630; Biga, on *Fagus orientalis* trunk, 391 m, N 40°07'90", E 27°22'43", 16.06.2010, T. 2690.
68. **Orthotrichum laevigatum** E. Zetterst.: Canakkale, Yenice, between Asagiinova village and Beyoglu wood store, forest area, on tree brunch, 224 m, N 40°05'10.9", E 27°17'93.6", 16.06.2012, T. 5013.
69. **Orthotrichum rupestre** Schleich. ex Schwägr.: Canakkale, Biga, Hosoba Creek and environs, on rocks, 452 m, N 40°07'41.9", E 27°22'33.7", 16.06.2010, T. 2614; Biga, between Arabaalani and Kurşunlutepe villages, mixed forest *Pinus nigra*, *Abies nordmanniana* ssp. *equi-trojani*, on tree trunk, 542 m, N 40°13'60.6", E 27°29'46.4", 16.05.2012, T. 4048; Yenice, between Asagiinova village and Beyoglu wood store, 204 m, *Quercus* sp. forest, on tree trunk, N 40°06'81.9", E 27°20'01.1", 16.06.2012, T. 5004.
70. **▲Orthotrichum scanicum** Grönv.: Canakkale, Biga, on tree trunk of *Fagus orientalis*, *Quercus* sp., *Carpinus betulus*, 870 m, N 40°05'53.3", E 27°22'33.9", 16.06.2010, T. 2694.
71. **▲Orthotrichum sordidum** Sull. et Lesq.: Canakkale, Biga, Hosoba Creek and environs, on *Platanus orientalis* trunk, 452 m, N 40°07'41.9", E 27°22'33.7", 16.06.2010, T. 2611.
72. **Orthotrichum speciosum** Nees: Canakkale, Biga, Arabaalani and Kurşunlutepe, mine area, on tree trunk, *Quercus petraea* ssp. *iberica* and *Q. frainetto*, 600 m, N 40°13'73.6", E 27°29'87.2", 16.06.2012, T. 4058.
73. **▲Orthotrichum sprucei** Mont.: Canakkale, Biga, Arabaalani and Kurşunlutepe, mixed forest *Quercus petraea* ssp. *iberica* and *Q. frainetto*, on tree trunk, 600 m, N 40°13'73.6", E 27°29'87.2", 16.06.2012, T. 5022.
74. **Orthotrichum striatum** Hedw.: Canakkale, Yenice, between Asagiinova village and Beyoglu wood store, on *Quercus* sp. tree trunk, forest area, 230 m, N 40°05'10.4", E 27°17'93.6", 16.06.2012, T. 5014.
75. **▲Orthotrichum urnigerum** Myrin: Canakkale, Yenice, between Asagiinova village and Beyoglu wood store, on rock, 198 m, N 40°05'84.6", E 27°18'76.4", 16.06.2012, T. 5023.
- Amblystegiaceae** Kindb.
76. **Amblystegium serpens** (Hedw.) Schimp.: Canakkale, Biga, mixed forest of *Platanus orientalis*, and *Juniperus oxycedrus*, on tree trunk, 110 m, N 40°11'84.8", E 27°19'76.8", 16.06.2010, T. 2600; Biga, Hosoba Creek and environs, on *Quercus* sp. trunk, 452 m, N 40°07'41.9", E 27°22'33.7", 16.06.2010, T. 2622; Biga, under *Tilia tomentosa*, on tree trunk, 59 m, N 40°11'84.9", E 27°20'40.2", 16.06.2010, T. 2666.
77. **▲Hygrohypnum luridum** (Hedw.) Jenn.: Canakkale, Biga, between Elmali and Arabalani villages, on *Fagus sylvestris*, 350 m, N 40°13'56.2", E 27°28'24.1", 16.05.2012, T. 4043.
78. **Tomentypnum nitens** (Hedw.) Loeske: Canakkale, Biga, Kalafat village, nearby Nilufer Pond, on log, fen, 77 m, UTM 5258994451753, 16.06.2012, T. 4080.
- Campyliaceae**
79. **Pseudocalliergon turgescens** (T. Jensen) Loeske: Canakkale, Biga, mixed forest of *Fagus orientalis*, *Quercus* sp., *Carpinus betulus*, ferns, and *Rubus* sp., 700-800m, 40°06'N - 27°21'E, 16.06.2010, T. 2679.
80. ****Scorpidium cossonii** (Schimp.) Hedenäs: Canakkale, Can, Söğütalan village, nearby peat bog Ciğer gölü (Liver Lake), mixed forest of *Quercus* sp., *Pinus nigra* and *Abies nordmanniana* subsp. *equi-trojan*, *Equisetum* sp., and *Carex* sp., on a wet rocky bank, 650 m, 39°52'37" N, 26°55'40" E, June 16, 2012, T. 4086
- Leskeaceae** Schimp.
81. **Pseudoleskea incurvata** (Hedw.) Loeske var. **incurvata** (Hedw.) Loeske: Canakkale, Biga, Abdiağa village, inner valley, nearby Abdiağa creek, *Platanus orientalis*, on humus rich soil, 45 m, N 40°19'73.1", E 27°25'98.4", 16.05.2012, T. 4007.
- Brachytheciaceae** Schimp.
82. **Brachytheciastrum velutinum** (Hedw.) Ignatov & Hutten: Canakkale, Biga, Hosoba Creek and environs, mixed forest of *Quercus cerris*, *Carpinus betulus* and *Tilia tomentosa*, on boulders, 452 m, N 40°07'41.9", E 27°22'33.7", 16.06.2010, T. 2604.
83. **Brachythecium albicans** (Hedw.) Schimp.: Canakkale, Biga, at nearby the river, on soil, 70 m, N 40°11'99", E 27°20'59", 16.06.2010, T. 2628.
84. **Brachythecium erythrorrhizon** Schimp.: Canakkale, Biga, Abdiağa village, inner valley, nearby Abdiağa creek, on *Platanus orientalis* root, 50 m, N 40°19'71.4", E 27°25'97.7", 16.05.2012, T. 4010; Biga, Arabaalani village and environs, trunk on the *Tilia tomentosa*, 350 m, N 40°15'48.2", E 27°30'76.4", 16.05.2012, T. 4041; Biga, Arabaalani and Kurşunlutepe village and environs, *Pinus nigra* forest, on soil, 350 m, N 40°15'54.8", E 27°30'81.0", 16.05.2012, T. 4046.
85. **Brachythecium rutabulum** (Hedw.) Schimp.: Canakkale, Biga, *Abies nordmanniana* subsp. *equi-trojana* and *Fagus orientalis* mixed forests, N 40°06'11.1", E 27°21'75.1", 16.06.2010, T. 2621; Yenice, between Asagiinova village and Beyoglu wood store, frequently *Quercus* sp forest, on soil, 198 m, N 40°05'84.6", E 27°18'76.4", 16.06.2012, T. 4089.

86. **Cirriphyllum crassinervium** (Taylor) Loeske & M. Fleisch.: Canakkale, Biga, Hosoba Creek and environs, mixed forest of *Quercus cerris*, *Carpinus betulus* and *Tilia tomentosa*, on rock, 452 m, N 40°07'41.9", E 027°22'33.7", 16.06.2010, T. 2619; Biga, on rock, 42 m, N 40°11'98", E 027°20'61", 16.06.2010, T. 2625; Biga, Abdiağa village, inner valley, nearby Abdiağa creek, on boulder, 75 m, N 40°19'02.2", E 027°26'04.4", 16.05.2012, T. 4003.
87. **Eurhynchiastrium pulchellum** (Hedw.) Ignatov. var. **diversifolium** Ochyra & Zarnowiec: Canakkale, Biga, Abdiağa village, inner valley, nearby Abdiağa creek, *Platanus orientalis*, on humus rich soil, 45 m, N 40°19'73.1", E 027°25'98.4", 16.05.2012, T. 4019; Biga, Abdiağa village, inner valley, nearby Abdiağa creek, on soil, 78 m, N 40°18'07.1", E 027°26'06.1", 16.05.2012, T. 4026.
88. **Homalothecium sericeum** (Hedw.) Schimp.: Canakkale, Biga, Arabaalani village and environs, trunk on the *Tilia tomentosa*, 350 m, N 40°15'48.2", E 027°30'76.4", 16.05.2012, T. 4039; Yenice, between Asagiinova village and Beyoglu wood store, on tree trunk, forest area, 230 m, N 40°05'10.4", E 027°17'93.6", 16.06.2012, T. 5021; Biga, Kirkgecit thermal spring, roadside, on boulder, 48 m, N 40°09'70.5", E 027°12'28.6", 16.06.2012, T. 5033; Biga, Kirkgecit thermal spring, on tree trunk, 40 m, N 40°09'96.5", E 027°12'83.5", 16.06.2012, T. 5043, 5044.
89. **Kindbergia praelonga** (Hedw.) Ochyra: Canakkale, Biga, Kalafat village, Nilufer Pond, on rotten, 125 m, UTM 5258994451753, 16.06.2012, T. 4083.
90. **Oxyrrhynchium hians** (Hedw.) Loeske: Canakkale, Biga, Abdiağa village, inner valley, nearby Abdiağa creek, on soil, 76 m, N 40°18'07.1", E 027°26'06.1", 16.05.2012, T. 4038.
91. **Oxyrrhynchium schleicheri** (R.Hedw.) Röll.: Canakkale, Biga, Abdiağa village, inner valley, nearby Abdiağa creek, on boulder, 75 m, N 40°19'02.2", E 027°26'04.4", 16.05.2012, T. 4018; Yenice, Yolindi village, on humus rich soil, forest area, 165 m, N 40°07'90.2", E 27°21'50.9", 16.06.2012, T. 5001.
92. **Platyhypnidium riparioides** (Hedw.) Dixon: Canakkale, Biga, on soil, 569 m, N 40°06'05.8", E 027°21'06.6", 16.06.2010, T. 2673, 2674; Biga, near by the waterfalls, on wet rocks, 350 m, N 40°11'99", E 027°20'59", 16.06.2010, T. 2607, 2608; Biga, Abdiağa village, inner valley, nearby Abdiağa creek, under *Platanus orientalis*, on soil, 45 m, N 40°19'73.1", E 027°25'98.4", 16.05.2012, T. 4005; Biga, Abdiağa village, inner valley, nearby Abdiağa creek, on boulder, 75 m, N 40°19'02.2", E 027°26'04.4", 16.05.2012, T. 4018; Biga, Abdiağa village, inner valley, nearby Abdiağa creek, *Platanus orientalis* forest, 45 m, on rocks, N 40°19'73.1", E 027°25'98.4", 16.05.2012, T. 4031; Biga, Abdiağa village, inner valley, nearby Abdiağa creek, on rock and on tree root, 78 m, N 40°18'95.1", E 027°26'15.4", 16.05.2012, T. 4033, 4037; Biga, between Arabaalan and Kurşunlutepe villages, *Platanus orientalis* forests, on tree roots, 554 m, N 40°13'61.3", E 027°29'28.3", 16.05.2012, T. 4051; Yenice, Yolindi village, forest area, upper surface of rock, 165 m, N 40°07'90.2", E 027°21'50.9", 16.06.2012, T. 4099; Yenice, between Beyoglu wood store and Yolindi village, on boulder, forest area, 171 m, N 40°06'81.9", E 027°20'01.1", 16.06.2012, T. 5008; Biga, Kirkgecit, valley, on boulder, nearby stream, 212 m, N 40°06'02.8", E 027°14'10.0", 16.06.2012, T. 5050.
93. **Pseudoscleropodium purum** (Hedw.) M. Fleisch.: Canakkale, Biga, Hosoba Creek and environs, mixed forest of *Quercus cerris*, *Carpinus betulus* and *Tilia tomentosa*, on boulders, 452 m, N 40°07'41.9", E 027°22'33.7", 16.06.2010, T. 2603; Yenice, Yolindi village, on humus rich soil, forest area, 165 m, N 40°07'90.2", E 027°21'50.9", 16.06.2012, T. 4096.
94. **Rhynchostegium confertum** (Dicks.) Schimp.: Canakkale, Biga, Arabaalani village and environs, trunk on the *Tilia tomentosa*, 350 m, N 40°15'48.2", E 027°30'76.4", 16.05.2012, T. 4041; Canakkale, Yenice, Yolindi village, forest area, on humus rich soil, 140 m, N 40°07'90.3", E 027°21'51.4", 16.06.2012, T. 5002; Biga, Kirkgecit thermal spring, on slope, on boulder, 77 m, N 40°07'76.5", E 027°13'10.5", 16.06.2012, T. 5055.
95. **Rhynchostegium megapolitanum** (F. Weber & D.Mohr) Schimp.: Canakkale, Biga, at nearby the river, humus rich soil, 70 m, N 40°11'99", E 027°20'59", 16.06.2010, T. 2627, 2667; Biga, Kurşunlutepe village, mixed forest *Pinus nigra*, *Abies nordmanniana* ssp. *equi-trojani*, on soil banks, 542 m, N 40°13'60.6", E 027°29'46.4", 16.05.2012, T. 4053, 4061; Yenice, Yolindi village, on humus rich soil, forest area, 165 m, N 40°07'90.2", E 027°21'50.9", 16.06.2012, T. 4094.
96. **Rhynchostegium murale** (Hedw.) Schimp.: Canakkale, Biga, near by the waterfalls, on rocks, 350 m, N 40°11'99", E 027°20'59", 16.06.2010, T. 2610; Biga, Yolindi village and environs, nearby creek and covered by diatoms, 391 m, N 40°07'90", E 27°22'43.4", 16.06.2010, T. 2643; Biga, Abdiağa village, inner valley, nearby Abdiağa creek, on rock, 78 m, N 40°18'95.1", E 027°26'15.4", 16.05.2012, T. 4027, 4034; Yenice, Yolindi village, on humus rich soil, forest area consists of *Acer* sp. and *Juglans regia*, 165 m, N 40°07'90.2", E 027°21'50.9", 16.06.2012, T. 5018.
97. **▲Rhynchostegiella curviseta** (Brid.) Limpr.: Canakkale, Biga, Abdiağa village, inner valley, nearby Abdiağa creek, on damp soil, 78 m, N 40°18'07.1", E 027°26'06.1", 16.05.2012, T. 4027.

98. **Sciuro-hypnum populeum** (Hedw.) Ignatov & Huttunen: Canakkale, Biga, Abdiağa village, inner valley, nearby Abdiağa creek, on humus rich soil, 75 m, N 40°19'53.5", E 027°26'06", 16.05.2012, T. 4021.
99. **Sciuro-hypnum reflexum** (Starke) Ignatov & Huttunen: Canakkale, Biga, Abdiağa village, inner valley, nearby Abdiağa creek, on tree root, 76 m, N 40°18'07.1", E 027°26'06.1", 16.05.2012, T. 4023; Biga, Kalafat village, nearby Nilufer Pond, on log, 125 m, UTM 5258994451753, 16.06.2012, T. 4082.
100. **Scleropodium caespitans** (Müll. Hal.) L. F. Koch.: Canakkale, Biga, on rocks, 569 m, N 40°06'05.8", E 027°21'06.6", 16.06.2010, T. 2640; Biga, Abdiağa village, inner valley, nearby Abdiağa creek, on boulders, 75 m, N 40°19'02.2", E 027°26'04.4", 16.05.2012, T. 4036.
101. **Scleropodium touretii** (Brid.) L.F.Koch.: Canakkale, Biga, Hosoba Creek and environs, on rock, 210 m, N 40°08'26.9", E 027°22'27.9", 16.06.2010; T. 2618; Biga, Kirkgecit thermal spring, roadside, on boulder, 44 m, N 40°09'69.9, E 027°12'28.4", 16.06.2012, T. 5031; Biga, Kirkgecit thermal spring, roadside, on soil, 39 m, N 40°09'90.3", E 027°12'64.6", 16.06.2012, T. 5046.
102. **Scorpiurium circinatum** (Bruch) M. Fleisch. & Loeske: Canakkale, Biga, *Quercus* sp., *Fraxinus* sp., *Arbutus* sp., *Rubus* sp. and *Tilia tomentosa*, at nearby the river, humus rich soil, 70 m, N 40°11'99", E 027°20'59", 16.06.2010, T. 2664, 2667, 2669.
- Hypnaceae** Schimp.
103. **▲Hypnum andoi** A. J. E. Smith: Canakkale, Biga, Kalafat village, nearby Nilufer Pond, on tree trunks, 125 m, UTM 5258994451753, 16.06.2012, T. 4082.
104. **Hypnum callichroum** Brid.: Canakkale, Biga, Kalafat village, nearby Nilufer Pond, on rotten, 125 m, UTM 5258994451753, 16.06.2012, T. 4083.
105. **Hypnum cupressiforme** Hedw.var. **cupressiforme**: Canakkale, Biga, Abdiağa village, inner valley, nearby Abdiağa creek, *Platanus orientalis* trunk, 80 m, N 40°18'94.2", E 027°26'13.0", 16.05.2012, T. 4008; Biga, Abdiağa village, inner valley, nearby Abdiağa creek, mixed forest *Carpinus betulus*, *Cornus mas* and *Fraxinus angustifolia*, on boulder, 542 m, N 40°18'95.1", E 027°26'15.3", 16.05.2012, T. 4028, 4029; Biga, Kalafat village, Nilufer Pond, on log, fallen, 75 m, UTM 5258994451753, 16.06.2012, T. 4080; Yenice, between Asagiinova village and Beyoglu wood store, *Quercus* sp. forest, on tree trunk, 204 m, N 40°06'81.9", E 027°20'01.1", 16.06.2012, T. 5011; Biga, Kirkgecit thermal spring, roadside, on tree trunk, 53 m, N 40°09'92.6", E 027°12'84.3", 16.06.2012, T. 5052.
106. **Hypnum cupressiforme** Hedw.var. **lacunosum** Brid.: Canakkale, Biga, *Laurus nobilis*, *Fraxinus* sp. and ferns area, 439 m, N 40°07'44", E 027°22'40", 16.06.2010, T. 2633, 2668; Biga, mixed forests of *Abies nordmanniana* subsp. *equi-trojana* and *Fagus orientalis*, on tree trunk, 730 m, N 40°05'66.1, E 027°21'77.5", 16.06.2010, T. 2681; Biga, Abdiağa village, inner valley, nearby Abdiağa creek, on boulder, 75 m, N 40°19'02.2", E 027°26'04.4", 16.05.2012, T. 4017.
107. **Hypnum cupressiforme** Hedw.var. **resupinatum** (Taylor) Schimp.: Canakkale, Biga, between Arabaalani and Kurşunlutepe villages, on *Pinus nigra* trunk, 350 m, N 40°15'54.8", E 027°30'81.0", 16.05.2012, T. 4042; Biga, Kurşunlutepe, mixed forest *Pinus nigra*, *Abies nordmanniana* ssp. *equi-trojani*, on tree trunk, 542 m, N 40°13'60.6", E 027°29'46.4", 16.05.2012, T. 4045.
108. **Hypnum imponens** Hedw.: Canakkale, Biga, Kalafat village, Nilufer Pond, on log, on tree root, 125 m, UTM 5258994451753, 16.06.2012, T. 4084.
109. **Hypnum jutlandicum** Holmen & E. Warncke: Canakkale, Yenice, between Asagiinova village and Beyoglu wood store, forest area, on tree brunch, 224 m, N 40°05'10.9", E 027°17'93.6", 16.06.2012, T. 5012; Yenice, between Asagiinova village and Beyoglu wood store, 199m, epiphytic on *Quercus* sp., N 40°05'84.6", E 027°18'76.7", 16.06.2012, T. 5016.
110. **▲Hypnum revolutum** (Mitt.) Lindb.: Canakkale, Biga, on rock, 42 m, N 40°11'98", E 027°20'61", 16.06.2010, T. 2625.
- Leucodontaceae** Schimp.
111. **Antitrichia curtispindula** (Hedw.) Brid.: Canakkale, Biga, Armutcuk Hill, *Pinus nigra* and *Castanea sativa* forest, on tree trunks, 676 m, N 40°06'07.4", E 027°21'70.7", 16.06.2010, T. 2600; Biga, *Abies nordmanniana* ssp. *equi-trojana* and *Fagus orientalis* forest, 870 m, N 40°05'66.1", E 027°21'77.5", 16.06.2010, T. 2680, 2682.
112. **▲Leucodon sciuroides** (Hedw.) Schwägr. var. **morensis** (Schwägr.) De Not: Canakkale, Biga, mixed forest of *Platanus orientalis* and *Juniperus oxycedrus*, 731 m, N 40°05'66.2", E 027°21'75.9", 16.06.2010, T. 2598; Biga, Abdiağa village, inner valley, nearby Abdiağa creek, on trunk of *P. orientalis*, 62 m, N 40°19'53.5", E 027°26'06", 16.05.2012, T. 4011, 4012; Biga, Kurşunlutepe, mixed forest *Pinus nigra*, *Abies nordmanniana* ssp. *equi-trojani*, on tree trunk, 542 m, N 40°13'60.6", E 027°29'46.4", 16.05.2012, T. 4045; Yenice, between Asagiinova village and Beyoglu wood store, 198 m, epiphytic on *Quercus* sp., N 40°05'11.2", E 027°17'93.2", 16.06.2012, T. 5015.
- Neckeraceae** Schimp.
113. **▲Homalia trichomanoides** (Hedw.) Brid.: Canakkale, Biga, Hosoba Creek and environs, mixed forest of *Quercus cerris*, *Carpinus betulus* and *Tilia tomentosa*, on boulders, 452 m, N 40°07'41.9", E 027°22'33.7", 16.06.2010, T. 2619.

114. **Leptodon smithii** (Hedw.) F. Weber & D. Mohr.: Canakkale, Biga, Armutcuk hill, 870 m, epiphytic on *Carpinus betulus*, N 40°05'53.3", E 027°22' 33.9", 16.06.2010, 2609, 2629; Canakkale, Biga, mixed forest of *Fagus orientalis*, *Quercus* sp., *Carpinus betulus*, ferns, *Rubus* sp., on tree trunk, 724 m, N 40°06' 67.2", E 027°21'79.8", 16.06.2010, T. 2670.
115. **Neckera complanata** (Hedw.) Huebener: Canakkale, Yenice, between Beyoglu wood store and Yolindi village, on boulder, 193 m, N 40°06'79.6", E 027°20'32.0", 16.06.2012, T. 4092.
116. **▲Neckera pennata** Hedw.: Canakkale, Yenice, between Asagiinova village and Beyoglu wood store, 198 m, epiphytic on *Quercus* sp., N 40°05'11.2", E 027°17'93.2", 16.06.2012, T. 5025 (Second record)
117. **Thamnobryum alopecurum** (Hedw.) Gangulee: Canakkale, Biga, near by the waterfalls, on wet rocks, 350 m, N 40°11'99", E 027°20'59, 16.06.2010, T. 2605, 2606; Biga, Abdiaga village, inner valley, nearby Abdiaga creek, *Platanus orientalis* forest area, on humus rich soil, 45 m, N 40°19'73.1", E 027°25'98.4", 16.05.2012, T. 4007; Yenice, Yolindi village, on humus rich soil, mixed forest *Acer* sp. and *Juglans regia*, 165 m, N 40°07'90.2", E 027°21'50.9", 16.06.2012, T. 5000.

Lembophyllaceae Broth.

118. **Isothecium alopecuroides** (Lam. ex Dubois) Isov.: Canakkale, Biga, on *Fagus orientalis* trunk, 731 m, N 40°06'66.2", E 027°21'75.9", 16.06.2010, T. 2636.

Anomodontaceae Kindb.

119. **Anomodon viticulosus** (Hedw.) Hook. & Taylor: Canakkale, Biga, Arabaalani and Kurşunlutepe, *Platanus orientalis* forests, on tree trunk, 543 m, N 40°13'61.3", E 027°29'28.3", 16.06.2012, T. 4052; Yenice, between Beyoglu wood store and Yolindi village, on boulder, 193 m, N 40°06'79.6", E 027°20'32.0", 16.06.2012, T. 4091, 4092; Yenice, between Beyoglu wood store and Yolindi village, river side and forest area, on tree root, 171 m, N 40°06'81.9", E 027°20'01.1", 16.06.2012, T. 5006, 5007, 5019; Yenice, between Beyoglu wood store and Yolindi village, on roadside, on boulder, 193 m, N 40°06'72.7", E 027°19'91.3", 16.06.2012, T. 5010.

b) *New National Records from Biga Peninsula, Canakkale.*

Rhabdoweisia crispata (Dicks.) Lindb. (Fig.3 A-H).

TURKEY: Canakkale, Biga, between to Arabaalan village and Kurşunlutepe, inner valley, on soil in humid slope, 591 m, N 40°13'73", E 27°29'87", 16.06.2012, T. 4062.

Rhabdoweisia was treated in the family Rhabdoweisiaceae by Magill and Schelpe (1979) but most authors place the genus in the Dicranaceae (Rooy 1991). *Rhabdoweisia crispata* has the small size and

bears resemblance to the genus *Weissia*. Plants form bright yellowish- green to green tufts or cushions up to 1.5 cm tall. Stems are erect, forked by innovations, red-brown, without central strand, with smooth rhizoids at base of stem. Leaves are oblong-lanceolate to narrowly lanceolate, obtuse to acute, keeled, strongly divergent when moist, and crisped when dry, leaf margin irregularly denticulate at the apex, costa ending below apex, mid leaf cells towards to upper cells rounded quadrate to quadrate hexagonal, 7.5-12.5 µm wide; basal cells rectangular. Capsule ovoid, and peristome teeth linear to linear-lanceolate. *Rhabdoweisia crispata* was growing in humid shaded rock crevices. This species is rare and difficult to identify in the field and requires a qualified expert to make a positive identification.

According to checklists of the moss flora of Turkey (Uyar and Cetin 2004; Kürschner and Erdağ 2005), the present report is the first for *Rhabdoweisia crispata* in Turkey. At present, the species is known from Lebanon and Southwest Asia (Frey and Kürschner 2011). *Rhabdoweisia crispata* is known from throughout Europe, the Faroes, Greenland, North and South America, Juan Fernandez, Hawaii, Java, Japan, and eastern Asia, Kazakhstan and Africa (Nyholm 1965; O'Shea 1999; Smith 2004; Sabovljevic et al. 2008).

c) **Grimmiaceae**

Schistidium robustum (Nees et Hornsch.) H. H. Blom (Fig. 4. A-G).

TURKEY: Canakkale, Biga, Armutcuk hill, on calcareous rocks, 870 m, N 40°05'53.3", E 27°22'33.9", 16.06.2010, T. 2633; Biga, Kirkgecit, inner valley, on boulder, 214 m, N 40°06'02.6", E 027°14'10.2", 16.06.2012, T. 5045.

Schistidium Bruch & Schimp. is a large genus with about 120 species (Crosby et al. 2000) distributed throughout the world. The taxonomy of *Schistidium* is at present extremely unsettled. Bremer (1980a, 1980b, 1981) in a world revision of the genus reduced *Schistidium* to 12 species. In contrast, Blom (1996) in a revision of the *Schistidium apocarpum* (Hedw.) Bruch & Schimp. complex in Norway and Sweden recognized 31 species. Nearly all moss taxonomists agree that the genus is extremely complex and contains many more species than recognized by Bremer. Indeed, a recent molecular study (Goryunov et al. 2007) of eight *Schistidium* species from Russia and northwest Europe found strong support for the narrower species concepts of Blom. For many regions of the world, however, the number of *Schistidium* species present and the names associated with them remains an open question. The genus is perhaps best known in Europe where Hill et al. (2006) reported 42 species of *Schistidium* in Europe and Macaronesia. Blom (1998) and Smith (2004) divided European *Schistidium* into the following 5 groups and 3 subgroups: *Apocarpum* group (*Rivulare* subgroup,

Aporcarpum subgroup, and *Strictum* subgroup), *Robustum* group, *Confertum* group, *Atrofuscum* group, and *Umbrosum* group. Kürschner & Erdağ (2005) reported 13 species of the genus *Schistidium* in Turkey. Townsend (2005) tentatively identified another species (*Schistidium submuticum* Zickendr.ex Blom) in the country and Yayintas (2009) was given new report of *S. agassizii* Sull. & Lesq. from Turkey. The following report of *S. robustum* (Nees et Hornsch.) H. H. Blom from Turkey increases the total number of species in that country to 16. Until now, this plant was only known from Europe, North America, Russia, and West Caucasus; this new record in Turkey fills both the bryological and distributional gap (Smith 2004; Ignatov *et al.* 2006; Lüth 2007).

Plants medium-sized to large, forming small group, characteristically noticeably hoary tufts. Central strand distinct, mostly broad. Hair-point coarse, mostly long and noticeable, 0.4–0.8 (–1.1) mm, rigid and straight, decurrent, densely spinulose and sharp. Costa and margins smooth. Lamina smooth, unistratose or less frequently with bistratose spots. Lamina cells mostly elongated and becoming shorter towards apex, 9–10(–11) μm wide in upper, 8–11 μm wide in central and lower parts of leaf, sinuose to strongly sinuose with incrassate walls. K+ red. Sporophytes common, and immersed; peristome patent to squarrose, sometimes twisted, 300–430 μm , red or orange-red, densely papillose, entire or weakly perforated. Spores 8–11 μm , smooth.

d) *Amblystegiaceae*

Scorpidium cossonii (Schimp.) Hedenäs (Fig. A-E)

TURKEY: Canakkale, Can, Söğütalan village, nearby peat bog Ciğer gölü (Liver Lake), mixed forest of *Quercus* sp., *Pinus nigra* and *Abies nordmanniana* subsp. *equi-trojan*, *Equisetum* sp., and *Carex* sp., on a wet rocky bank, 650 m, 39°52'37" N, 26°55'40" E, 16.06.2012, T. 4086 (CNH, DUKE Herbarium).

Scorpidium cossonii grows in mineral-rich and often calcareous habitats in fens, springs, and periodically water-filled depressions, or sometimes on shores. It is widespread and often common in temperate to sub-polar areas of the northern and southern hemispheres, and in the Andes (Š t e c h o v á *et al.*, 2008). According to some authors (Wynne, 1944; Mårtensson, 1956; Smith, 1978; Steere, 1978), *S. cossonii* and *S. revolvens* are so similar at a superficial examination that especially many earlier authors recognized only one or one species with two varieties (Nyholm, 1965; Crum & Anderson, 1981; Frey *et al.*, 1995). Hedenäs & Eldenäs, according to their study in 2008, showed that the molecular data strongly support a clade including *S. cossonii* and *S. scorpioides* with *S. revolvens* as sister to this clade. According to checklists of the moss flora of Turkey (Kürschner & Erdağ, 2005; Uyar & Cetin, 2004), the present report is the first for

Scorpidium cossonii in Turkey. At present, the species is known from Lebanon from Southwest Asia (Frey & Kürschner, 2011). According to the Ha'jkova' and Ha'jek (2006) in central Europe, *S. cossonii* is more common than *S. revolvens*, which is restricted to relic stands in the mountains (Kučera and Va'n'a, 2003). *Scorpidium cossonii* is known from throughout Europe, North and South America, Canada, Eurasia, Kazakhstan, Bosnia-Herzegovina, Bulgaria, Montenegro, Romania and Slovenia and (Nyholm, 1965; Smith, 2004; Sabovljevic *et al.* 2008).

The collecting area is placed on Can (Canakkale) (Fig.1) and the combination of geographical isolation, an unusual range of climatic conditions, and the meeting of Mediterranean and Euro-Siberian floristic regions have resulted in unique vegetation in this area. Depending on the elevation and slope-aspect, two vegetation types are common. At lower elevations and on south-facing slopes, Mediterranean vegetation is most prevalent and at higher elevations and on north-facing slopes the Black Sea vegetation type is abundant.

Scorpidium cossonii shows similar appearance to *S. revolvens* such as dark green to red colors, upright and abundant short branches, slender to robust patches, and upland plants. But *S. cossonii* is dioicous, the mid-leaf cells shorter in the stem leaves and the ends of these cells are square to shortly fusiform-narrowed in the first species whereas they are shortly to long fusiform-narrowed in *S. revolvens* (Smith, 2004; BFNA/bfnamenu). *Scorpidium cossonii* was gathered with *Fissidens adianthoides*, *Bryum pseudotriquetrum* and *Sphagnum fimbriatum*.

e) Additional New National Records from Thrace Region, Kırklareli.

i. *Mniaceae*

Mielichhoferia elongata (Hoppe & Hornsch. ex Hook.) Hornsch. (Fig. 5. A-H).

Turkey, Kırklareli, between Derekoy and Sukrupasa forest, *Fagus orientalis* and *Quercus petraea* forests, on soil, 453 m, 41°9'39.16" N, 027°51'38.8" E, 08.09.2011, T. 3468, Conf. J. Shaw.

Plant slender, forming yellow-green patches, and brown below, up to 1.5 cm high. Individual stems are slender and very delicate, with small, erect, and overlapping leaves that are 0.4–1.1 mm long, finely and toothed above and have an acute tip, leaf margin plane; nerve thin and ending below apex; upper leaf cells wide, elongate rhomboid, median cells 10 x 40.5 μm and thin walled, basal cells 10 x 38 μm and rectangular. Seta cygneous; capsule pyriform, spores 16 μm .

The moss *Mielichhoferia elongata* belongs to a small group of specialists occurring on substrates with high copper concentrations. It has been termed a "copper moss" (Mårtensson & Berggren, 1954;

Shacklette, 1967) and used as a geobotanical indicator plant to mineralization (Url, 1956; Brooks, 1971; Sassmann *et al.* 2010). As stated by Shaw (2000), the family Mielichhoferiaceae includes species that were traditionally classified in the Bryaceae, but are phylogenetically closer to the Mniaceae and molecular evidence showed that multiple loci suggest that the Mielichhoferiaceae may form early diverging lineages within the broader Mniaceae clade and the family may therefore be paraphyletic. The three genera of Mielichhoferiaceae were commonly classified in the Bryaceae till Cox and Hedderson (2003) published their phylogenetic study in which they showed that these genera are more closely related to Mniaceae than Bryaceae (BFNA/bfnamenu.htm).

According to checklists of the moss flora of Turkey (Uyar & Cetin, 2004; Kürschner & Erdağ, 2005; Kürschner & Frey, 2011), the present report is the first for *Mielichhoferia elongata* in Turkey. *Mielichhoferia elongata* is known from throughout west and central Europe, Spain, Pyrenees, Italy, Yugoslavia, North and South America, New Zealand, Australia, Caucasus, Russia, Asia, and east Africa (Ignatov *et al.* 2011; Nyholm, 1993; Smith, 2004).

Mielichhoferia and *Pohlia* grow in similar habitats. When saw this *Mielichhoferia* species are gametophytically similar to small species of *Pohlia*, but they can be distinguished by a characteristic whitish color and very small size. The main differences between the two genera are gametangia borne style; on short lateral shoots are seen in *Mielichhoferia* and terminal shoots are observed in *Pohlia*. Secondly differences are occurred the perichaetial leaves which are as long as or longer than vegetative leaves in *Pohlia* but are smaller, with more lax cells and shorter costa in *Mielichhoferia*. *Mielichhoferia elongata* differs from the *M. mielichhoferiana* in rather thin-walled laminal cells; less sharply acute leaves, and smooth scattered papillose rhizoids.

f) Meesiaceae

Meesia uliginosa Hedw. (Fig. A-K).

Turkey, Kirklareli, Demirköy, Yıldız Mountain, below Mahya hill, *Fagus orientalis* associated with *Quercus petraea* subsp. *iberica*, *Q. cerris*, and *Carpinus betulus*, 857 m, on damp soil, 41°78'33.3" N - 027°60'00" E, 09.09.2011, T 3688. *Conf. J. Shaw.*

The peak is Mahya Mountain (1,031 m), which is located between Demirköy and Kirklareli. Mahya Mountain and its surroundings annually receive 1500 mm precipitation, reflecting altitude and humid Black Sea influences.

Plants 0.1 – 2.5 cm long, blackish-green to dark green above, light brown to brownish-green below, branched, and rhizoids highly papillose. Leaves not in distinct rows, linear-ligulate to linear-lanceolate, non-decurrent or shortly decurrent, 1.5-4.0 mm long, 0.3-0.7

mm wide near leaf base, erect or erect-spreading when wet; apex obtuse or rounded; margin entire, strongly revolute at least in lower half; upper cells sub-quadrate to shortly rectangular, 13 x 5 μm , mid-leaf cells narrowly rectangular and smooth, 19 x 7 μm , basal cells rectangular, thin-walled, longer than mid-leaf cells; costa strong, usually more than 0.4 the width of leaf at base, 80 μm wide at base, usually ending below the apex; setae 0.6-5.0 cm long. Capsules pale brown and darker when old, asymmetrical and pyriform.

At first sight you can take it as a *Pohlia* or *Bryum* species. The ligulate leaves and strongly revolute leaf margins are distinctive structures of *Meesia uliginosa*. Among the most abundant moss species found in these fens are *Aulacomnium palustre*, *Bryum pseudotriquetrum*, *Drepanocladus aduncus*, and *Leptobryum pyriforme*.

Meesia uliginosa has a continuous circumpolar boreal distribution. Twelve species are distributed in North, Central, and South America; Europe; Asia; Africa; Australia; Pacific Islands (New Zealand). *Meesia uliginosa* occurred on calcareous soil banks, on wet soil or peaty humus and in rich fens in boreal, alpine, and Arctic circumstances (Smith, 2004). According to checklists of the moss flora of Turkey (Uyar & Cetin, 2004; Kürschner & Erdağ, 2005; Kürschner & Frey, 2011), the present report is the first for *Meesia uliginosa* in Turkey. *Meesia uliginosa* is known from throughout Europe, Spain, Pyrenees, North America, Caucasus, Russia, Siberia, China, Kazakhstan, Mongolia, Greenland (Nyholm, 1993; Ochyra and Smith, 1999; Smith, 2004; Casas *et al.*, 2006).

III. DISCUSSION

As a result of the study 119 moss taxa belonging to 23 families and 60 genera have been found in the area. Among them, according to the grid-square of Henderson (1961) (Fig.1) 37 moss taxa are new records for the A1 grid-square. These are as follows: *Sphagnum fimbriatum*, *Polytrichum strictum*, *Timmia austiaca*, *Schistidium atrofusum*, *S. dupretii*, *Fissidens crispus*, *F. monguilloni*, *Dichodontium pellucidum* var. *flavescens*, *Dicranum fuscescens*, *D. leioneuron*, *D. polysetum*, *D. tauricum*, *Dicranodontium uncinatum*, *Anoetangium sendtnerianum*, *Cinclidotus danubicus*, *C. fontinaloides*, *C. riparius*, *Tortella flavovirens*, *Bryum algovicum*, *B. uliginosum*, *Plagiobryum zierii*, *Plagiomnium rostratum*, *Amphidium mougetii*, *Orthotrichum laevigatum*, *O. scanicum*, *O. sordidum*, *O. sprucei*, *O. urnigerum*, *Hygrohypnum luridum*, *Rhynchostegiella curviseta*, *Hypnum andoi*, *H. revolutum*, *Leucodon sciuroides* var. *morensis*, *Homalia trichomanoides*, *Pseudocalliergon turgescens*, *Scorpidium cossonii* and *Neckera pennata*. Three new moss taxa (*Rhabdoweisia crispata*, *Schistidium robustum* and *Scorpidium cossonii*) are also reported as

new records for Turkey. Moreover *Rhabdoweisia* is a new genus record for the moss flora of Turkey. Although the climate of the area is similar to the Mediterranean temperate zone, it is in a transition zone between the Mediterranean and Black Sea climates, so acrocarpous mosses contribute 60.5% and pleurocarpous mosses contribute 39.5% to total bryoflora.

The abundance of families in terms of moss species in the study area is as follows; Brachytheciaceae (21 taxa) and Pottiaceae (15 taxa), Orthotrichaceae (12 taxa), Bryaceae (9 taxa), Hypnaceae (8 taxa), Dicranaceae (7 taxa), Mniaceae (7 taxa), Polytrichaceae (7 taxa), Grimmiaceae (6 taxa), Neckeraceae (5 taxa) (Table 1). However, five families are represented monotypically in the area. Almost all pleurocarpous families have mesophytic or hygrophytic groups, especially Brachytheciaceae, Amblystegiaceae and Neckeraceae. Brachytheciaceae family is higher in our area because of forest vegetation is dominant in the north and northwest Biga peninsula, transition climatic conditions, in habitat having abundant water and many creeks and these contribute to the humidity.

The most species-rich genera are as follows: *Orthotrichum* (11 taxa), *Hypnum* (8 taxa), *Bryum* (8 taxa), *Plagiomnium* (6 taxa), *Dicranum* (6 taxa), *Polytrichum* (4 taxa), *Brachythecium* (4 taxa), *Schistidium* (4 taxa), *Fissidens* (4 taxa), *Cinclidotus* (3 taxa), *Didymodon*, (3 taxa) and *Rhynchostegium* (3 taxa) (Table 2). Other genera are represented by fewer than 3 taxa in the study area. This is the second record for *Neckera pennata* from Turkey. The first record was given from Kayseri - Yahyali, Hacer Forest (in press) and also *Sphagnum fimbriatum* is given as a new record from Turkey (in press).

In the north parts of the study area covered by *Platanus orientalis* forest, there occur *Pogonatum aloides*, *Didymodon rigidulus*, *D. vinealis* var. *flaccidus*, *Bryum pseudotriquetrum* var. *bimum*, *Plagiobryum zierii*, *Orthotrichum sordidum*, *Pseudoleskea incurvata*, *Brachythecium erythrorrhizon*, *Eurhynchiastrium pulchellum* var. *diversifolium*, *Platyhypnidium riparioides*, *Hypnum cupressiforme*, *Anomodon viticulosus*. Likewise in the north side of the study area covered by *Platanus orientalis*, *Quercus* sp., *Juglans regia* and *Acer platanooides* forest there occur *Pogonatum aloides*, *Fissidens crispus*, *F. monguillonii*, *Barbula unguiculata*, *Orthotrichum affine*, *Orthotrichum anomalum*, *Rhynchostegium murale* and *Thamnobryum alopecurum* on tree trunks and soil.

In the *Quercus* sp., *Carpinus betulus*, *Castanea sativa* and *Tilia tomentosa* forest area *Pogonatum nanum*, *Polytrichum juniperinum*, *P. strictum*, *Dicranum majus*, *D. fuscescens*, *Bryum caespiticium*, *Amblystegium serpens*, *Brachyheciastrium velutinum*, *B. erythrorrhizon*, *Cirriphyllum crassinervium*, *Homalothecium sericeum*, *Psedoscleropodium purum*,

Rhynchostegium confertum, *Scorpiurium circinatum*, *Homalia trichomonaides* occur.

North side of study area covered by *Quercus petraea*, *Carpinus betulus*, *Fagus orientalis*, *Rubus* sp. and ferns mixed forest there occur *Polytrichum commune* var. *commune*, *P. piliferum*, *Dicranum scoparium*, *D. majus* and *Orthotrichum diaphanum* epiphytic on *Fagus orientalis*, *Timmia austriaca*, *Mnium hornum*, *Plagiomnium ellipticum*, *Hygrohypnum luridum*, *Orthotrichum diaphanum*, *O. scanicum*, *Oxyrrhynchium schleicheri*, *Hypnum jutlandicum*, *Hypnum cupressiforme* var. *cupressiforme*, *Leptodon smithii*, *Isothecium alopecuroides*, *Thamnobryum alopecurum*, *Neckera pennata* and epiphytic on *Quercus petraea* var. *iberica* and *Q. frainetto*.; *Dichodontium pellucidum*, *Dicranum leioneuron*, *Bryum torquescens*, *Plagiomnium undulatum*, *Orthotrichum affine*, *O. rupestre*, *O. spruce*, *O. striatum*, *Brachythecium rutabulum*; epiphytic on *Pinus nigra*: *Dicranoweisia cirrata*.

Towards to southern part of the study area covered by *Pinus nigra*, *Fagus orientalis* and *Abies nordmanniana* ssp. *equi-trojani* mixed forest area there occur *Bryum capillare*, *B. pallescens*, *Amphidium mougeotii*, *Orthotrichum rupestre*, *Brachythecium rutabulum*, *Rhynchostegium megapolitanum*, *Leucodon sciuroides* var. *morensis*, *Hypnum cupressiforme* var. *lacunosum*, *H. cupressiforme* var. *resupinatum* and *Antitrichia curtispindula*; covered by *Platanus orientalis* and *Juniperus oxycedrus* mixed forest area there occur *Dicranum tauricum*, *Orthotrichum affine*, and *Leucodon sciuroides* var. *morensis*.

The following bryophyte species were found to be abundant on rocks near stream beds and submerged or wet rock and soil: *Archidium alternifolium*, *Fissidens exilis*, *Dichodontium pellucidum* var. *flavescens*, *Cinclidotus danubicus*, *C. fontinaloides*, *C. riparius*, *Dialytrichia mucronata*, *Bryum creberrimum*, *Pohlia nutans*, *Plagiomnium rostratum*, *P. undulatum*, *Platyhypnidium riparioides*, *Rhynchostegium murale*, *Oxyrrhynchium hians* and *Sphagnum fimbriatum*, *Polytrichum strictum*, *Tomentypnum nitens*, *Kindbergia praelonga*, *Sciuro-hypnum reflexum*, *Hypnum andoi*, and *H. callichroum* were found near pond and bogs.

Our research shows that the northwest Anatolia is relatively rich in moss flora, when it is compared to other regions of Turkey respectively in Table 3 and Table 4, Kaz Dag (Erdag and Yayintas, 1999), Uludag (Cetin, 1999), Erdek-Bandirma (Oren *et al.*, 2007), and Osmaniye district (Savaroglu *et al.*, 2011).

It is hoped that further study will contribute more species to the knowledge of moss flora in Turkey and that this study will be useful as a guide for future research.

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Table 1 : The distribution and percentage of the taxa according to the families.

Families	Number of Species	Rate (%)
Brachytheciaceae	21	17.64
Pottiaceae	15	12.60
Orthotrichaceae	12	10.08
Bryaceae	9	7.56

Hypnaceae	8	6.72
Polytrichaceae	7	5.88
Mniaceae	7	5.88
Dicranaceae	7	5.88
Grimmiaceae	6	5.04
Neckeraceae	5	4.20
Fissidentaceae	4	3.36
Rhabdoweisiaceae	3	2.52
Amblystegiaceae	3	2.52
Leucodontaceae	2	1.68
Campyliaceae	2	1.68
Sphagnaceae	1	0.84
Timmia	1	0.84
Leskeaceae	1	0.84
Lembophyllaceae	1	0.84
Anomodontaceae	1	0.84
Archidiaceae	1	0.84
Leucobryaceae	1	0.84
Melichhoferiaceae	1	0.84
Total: 23	119	100

Table 2 : The distribution and percentages of the taxa according to the genera.

Genera	No. of taxa	Rate (%)
<i>Orthotrichum</i>	11	9.24
<i>Hypnum</i>	8	6.72
<i>Bynum</i>	8	6.72
<i>Plagiomnium</i>	6	5.04
<i>Dicranum</i>	6	5.04
<i>Polytrichum</i>	4	3.36
<i>Schistidium</i>	4	3.36
<i>Fissidens</i>	4	3.36
<i>Rhynchostegium</i>	3	2.52
<i>Didymodon</i>	3	2.52
<i>Brachythecium</i>	3	2.52
<i>Pogonatum</i>	2	1.60
<i>Grimmia</i>	2	1.60
<i>Tortula</i>	2	1.60
<i>Trichostomum</i>	2	1.60
<i>Oxyrrhynchium</i>	2	1.60
<i>Scleropodium</i>	2	1.60
<i>Sciuro-hypnum</i>	2	1.60
<i>Neckera</i>	2	1.60
<i>Sphagnum</i>	1	0.84
<i>Polytrichastrum</i>	1	0.84
<i>Dichodontium</i>	1	0.84
<i>Dicranoweisia</i>	1	0.84
<i>Rhabdoweisia</i>	1	0.84
<i>Archidium</i>	1	0.84
<i>Timmia</i>	1	0.84
<i>Dicranella</i>	1	0.84
<i>Dicranodontium</i>	1	0.84
<i>Anoetangium</i>	1	0.84
<i>Barbula</i>	1	0.84
<i>Dialytrichia</i>	1	0.84
<i>Tortella</i>	1	0.84
<i>Syntrichia</i>	1	0.84
<i>Plagiobryum</i>	1	0.84
<i>Pohlia</i>	1	0.84
<i>Mnium</i>	1	0.84
<i>Amphidium</i>	1	0.84

<i>Amblystegium</i>	1	0.84
<i>Hygrohypnum</i>	1	0.84
<i>Pseudoleskea</i>	1	0.84
<i>Brachytheciastrum</i>	1	0.84
<i>Cirriphyllum</i>	1	0.84
<i>Homalothecium</i>	1	0.84
<i>Eurhynchiastrum</i>	1	0.84
<i>Kindbergia</i>	1	0.84
<i>Platyhypnidium</i>	1	0.84
<i>Pseudoscleropodium</i>	1	0.84
<i>Rhynchostegiella</i>	1	0.84
<i>Scorpiurium</i>	1	0.84
<i>Tomentypnum</i>	1	0.84
<i>Antitrichia</i>	1	0.84
<i>Leucodon</i>	1	0.84
<i>Homalia</i>	1	0.84
<i>Leptodon</i>	1	0.84
<i>Thamnobryum</i>	1	0.84
<i>Isothecium</i>	1	0.84
<i>Anomodon</i>	1	0.84
<i>Scorpidium</i>	1	0.84
<i>Pseudocalliergon</i>	1	0.84
Total: 60	119	100

Table 3 : Comparison of the largest families in the study area and neighboring areas (taxa count and distribution percentage).

Largest families	Biga Peninsula (Biga, Yenice)	Kaz Dagi (Balikesir)	Uludag (Bursa)	Bandirma-Erdek (Balikesir)	Osmaneli (Bilecik)
Brachytheciaceae	21 (17.64)	27 (19.2)	10 (11.8)	23 (17.2)	15 (16.66)
Pottiaceae	15 (12.60)	25 (17.9)	10 (11.8)	20 (14.9)	21 (23.33)
Orthotrichaceae	12 (10.08)	6 (4.3)	5 (5.9)	7 (5.2)	5 (5.55)
Bryaceae	9 (7.56)	9 (6.4)	8 (9.5)	7 (5.2)	6 (6.66)
Hypnaceae	8 (6.72)	6 (4.3)	2 (2.4)	6 (4.5)	7 (7.77)
Polytrichaceae	7 (5.88)	4 (2.8)	8 (9.5)	4 (3.0)	-
Mniaceae	7 (5.88)	7 (5.0)	4 (4.7)	3 (2.2)	5 (5.55)
Dicranaceae	7 (5.88)	3 (2.1)	4 (4.7)	2 (1.5)	1 (1.11)
Grimmiaceae	6 (5.04)	15 (10.7)	11 (12.9)	8 (6.0)	10 (11.11)
Neckeraceae	5 (4.20)	4 (2.8)	-	2 (1.5)	4 (4.44)

Table 4 : Comparison of the largest genera in the study area and neighboring areas (taxa count and distribution percentage).

Largest genera	Biga Peninsula (Biga, Yenice, Can)	Kaz Dagi (Balikesir)	Uludag (Bursa)	Bandirma-Erdek (Balikesir)	Osmaneli (Bilecik)
<i>Orthotrichum</i>	11	5	5	6	5
<i>Hypnum</i>	8	5	2	4	6
<i>Bryum</i>	8	7	7	7	6
<i>Plagiomnium</i>	6	4	1	3	5
<i>Dicranum</i>	6	1	2	1	1
<i>Polytrichum</i>	4	1	5	2	-
<i>Schistidium</i>	4	2	2	2	3
<i>Fissidens</i>	4	4	-	6	-
<i>Cinclidotus</i>	3	1	-	-	-
<i>Rhynchostegium</i>	3	2	1	2	1
<i>Didymodon</i>	3	-	1	4	3
<i>Brachythecium</i>	3	7	7	4	4

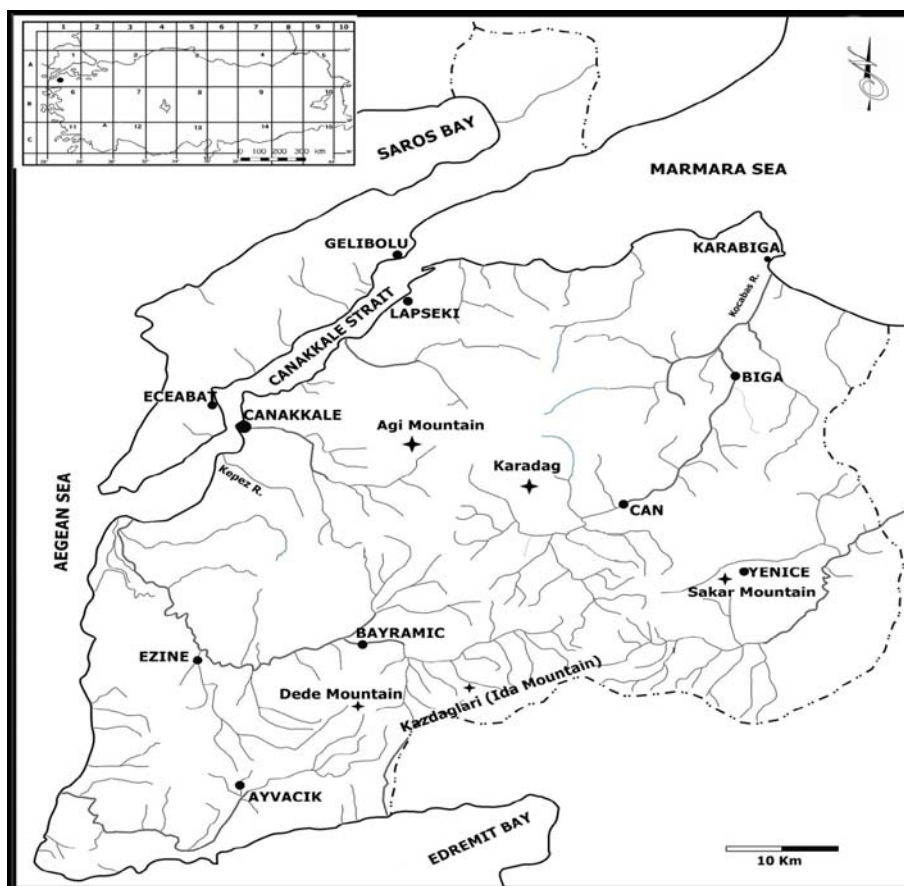


Figure 1 : Henderson grid system and study area – Biga Peninsula map.

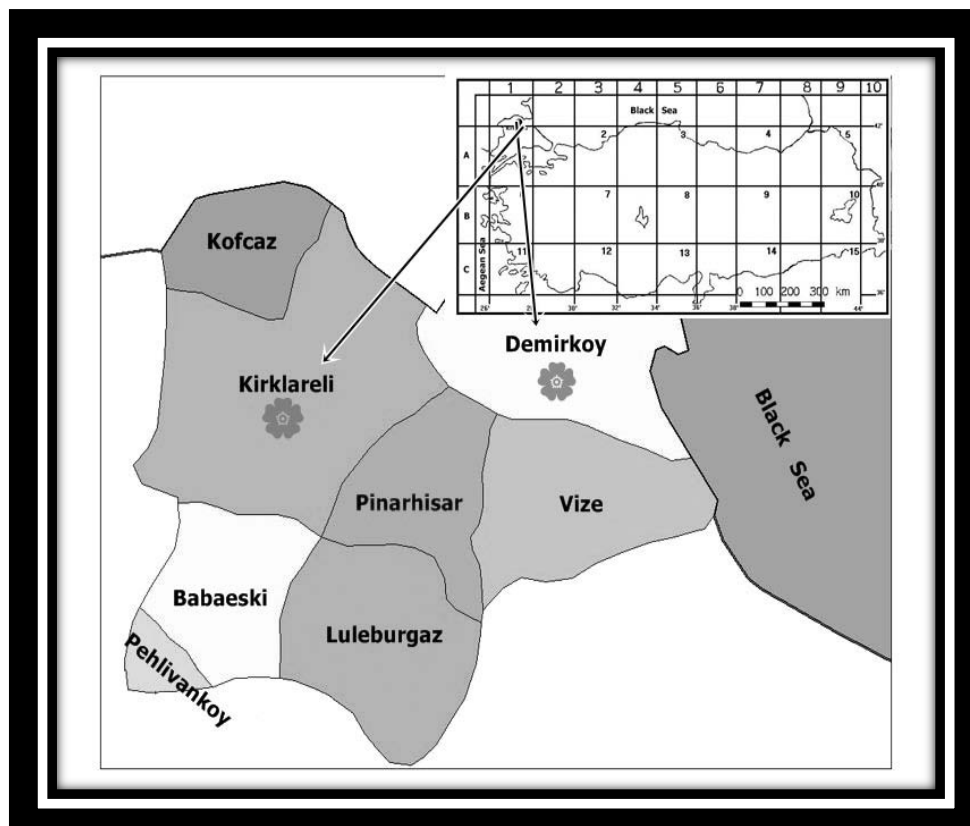


Figure 2 : Henderson grid system and study area – Thrace Region map.

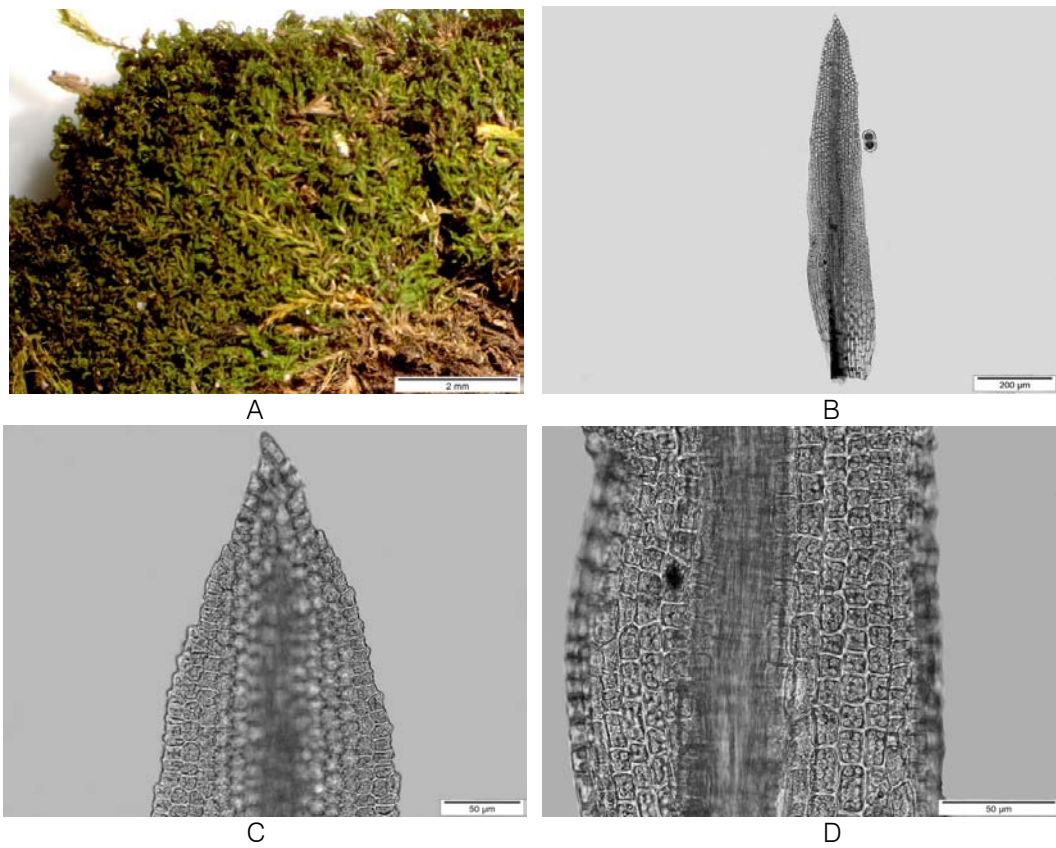


Figure 3 : *Rhabdoweisia crispata* (Dicks.) Lindb (A) Habitat; (B) whole leaf; (C) upper leaf cells; (D) mid-leaf cells.

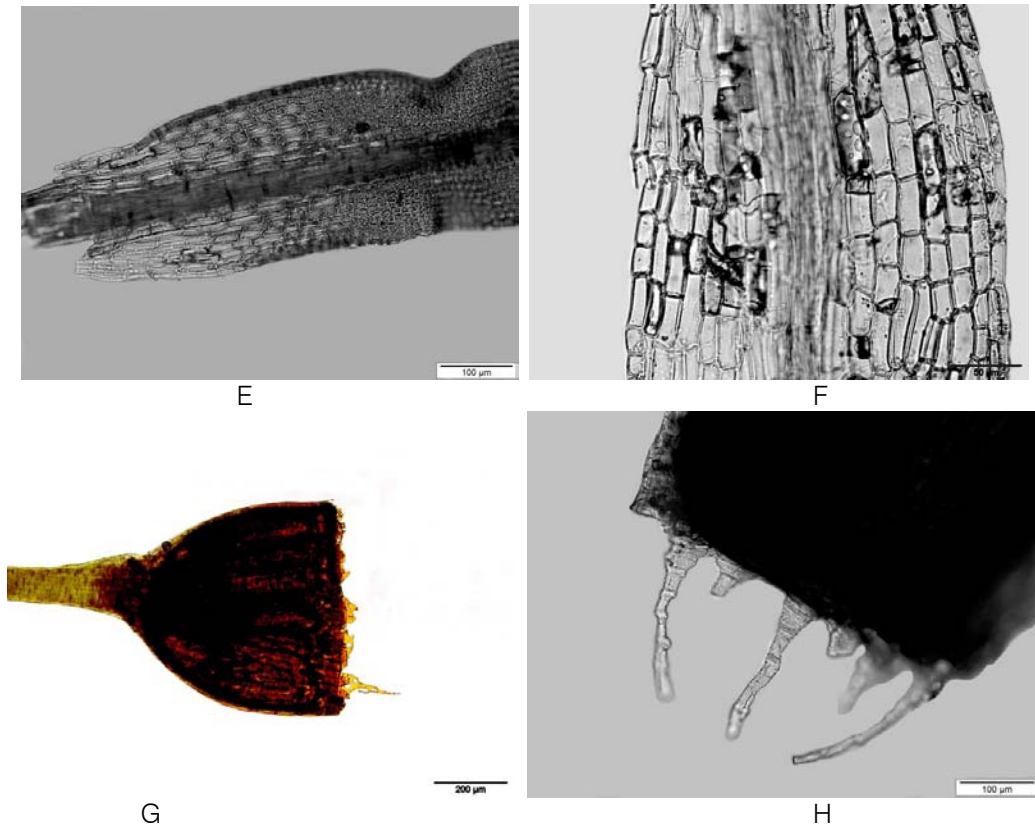


Figure 3 : *Rhabdoweisia crispata* (Dicks.) Lindb (E-F) leaf base cells; (G) sporophyte; (H) peristome teeth.

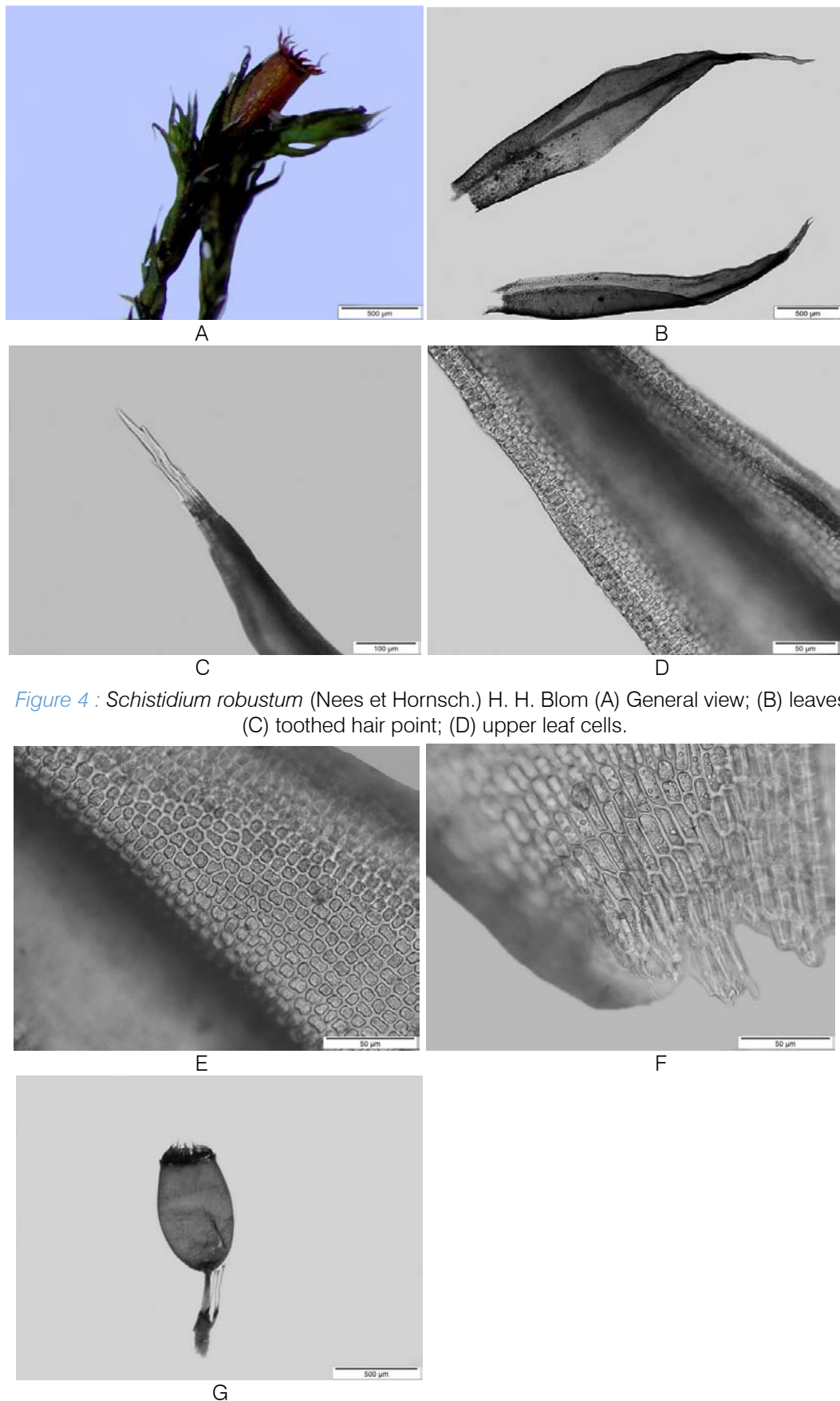


Figure 4 : *Schistidium robustum* (Nees et Hornsch.) H. H. Blom (A) General view; (B) leaves; (C) toothed hair point; (D) upper leaf cells.

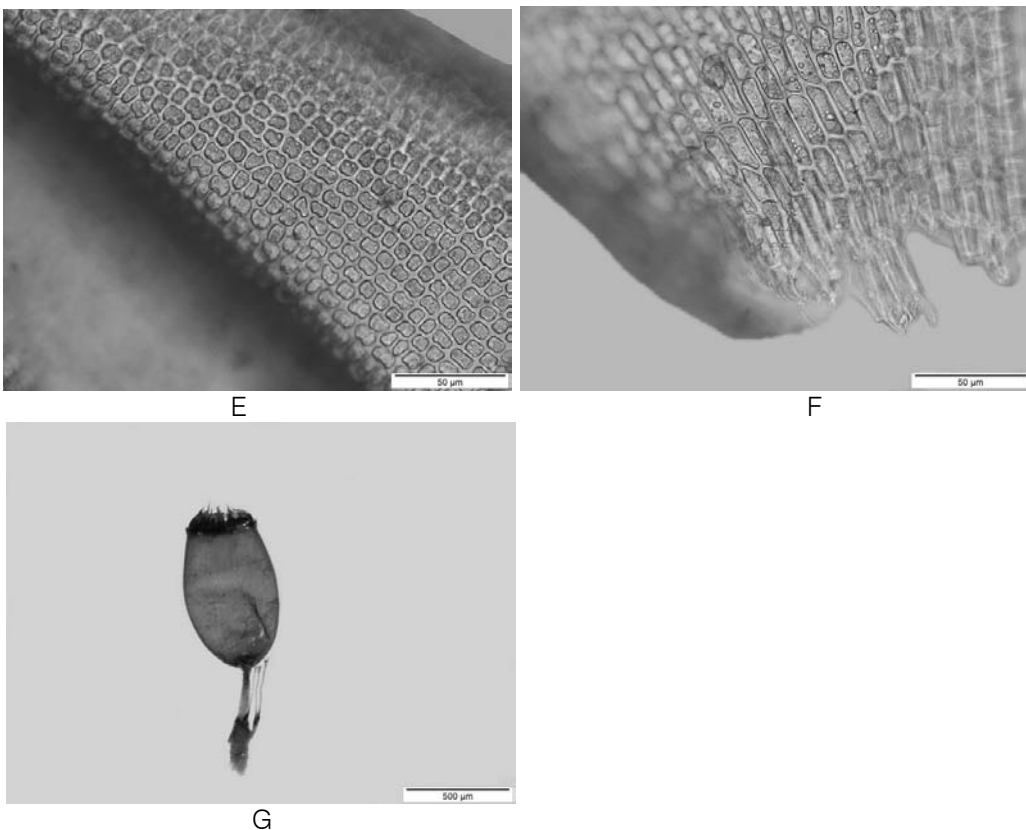


Figure 4 : *Schistidium robustum* (Nees et Hornsch.) H. H. Blom (E) mid-leaf cells; (F) leaf base cells; (G) sporophyte.

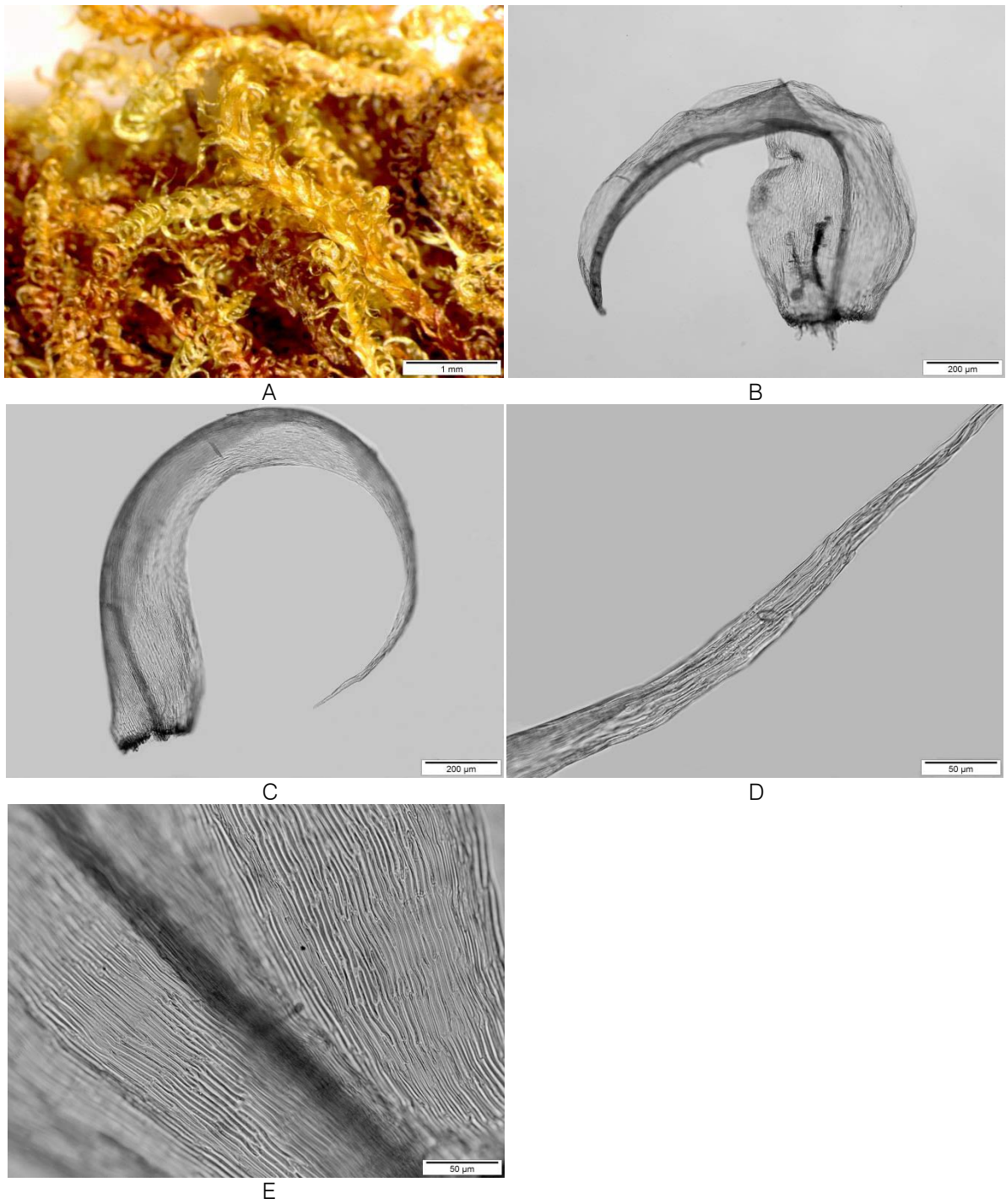


Figure 5 : *Scorpidium cossonii* (Schimp.) Hedenäs (A) Whole plant; (B-C) leaves; (D) long leaf tip; (E) nearby mid leaf and basal cells.

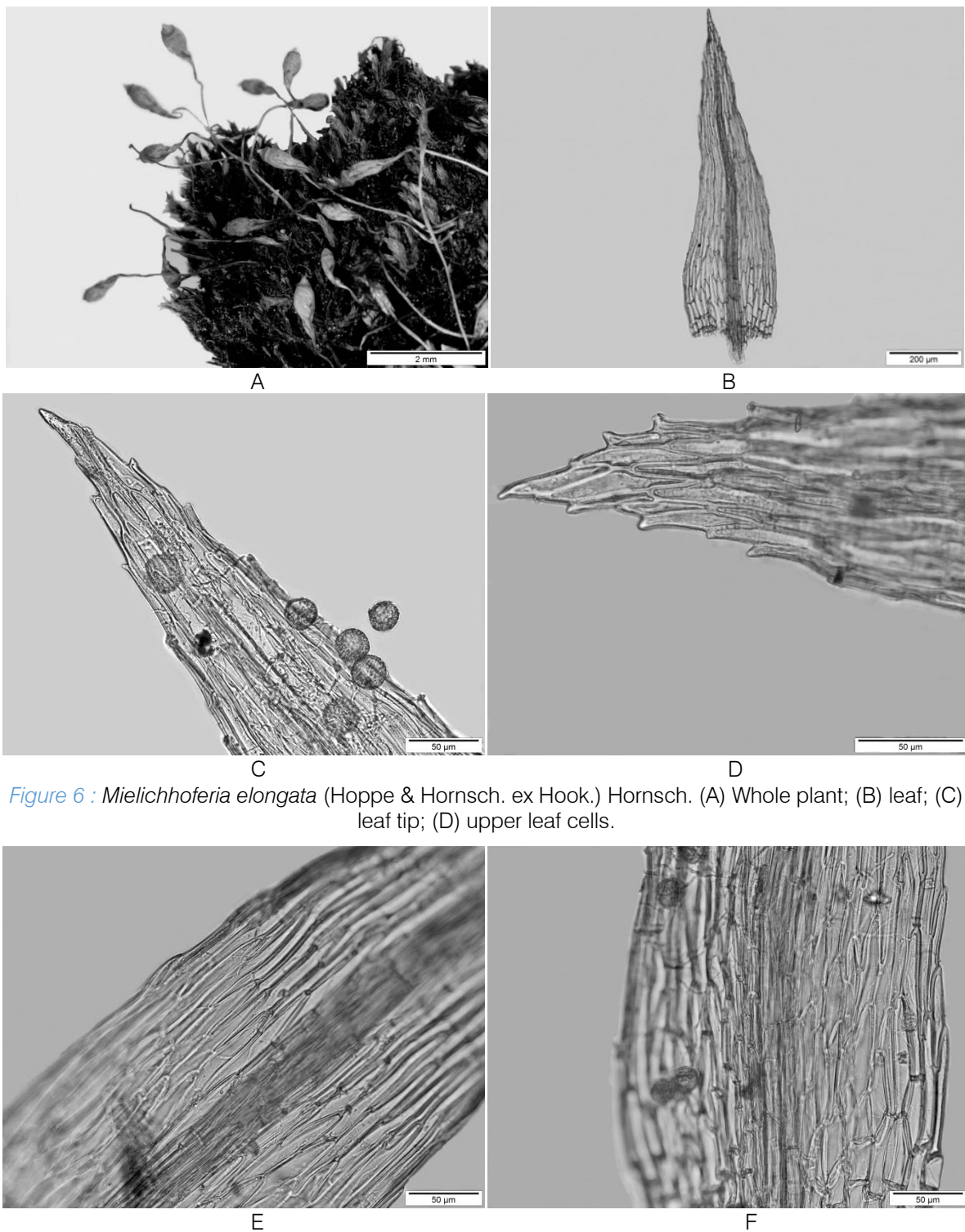


Figure 6 : *Mielichhoferia elongata* (Hoppe & Hornsch. ex Hook.) Hornsch. (A) Whole plant; (B) leaf; (C) leaf tip; (D) upper leaf cells.

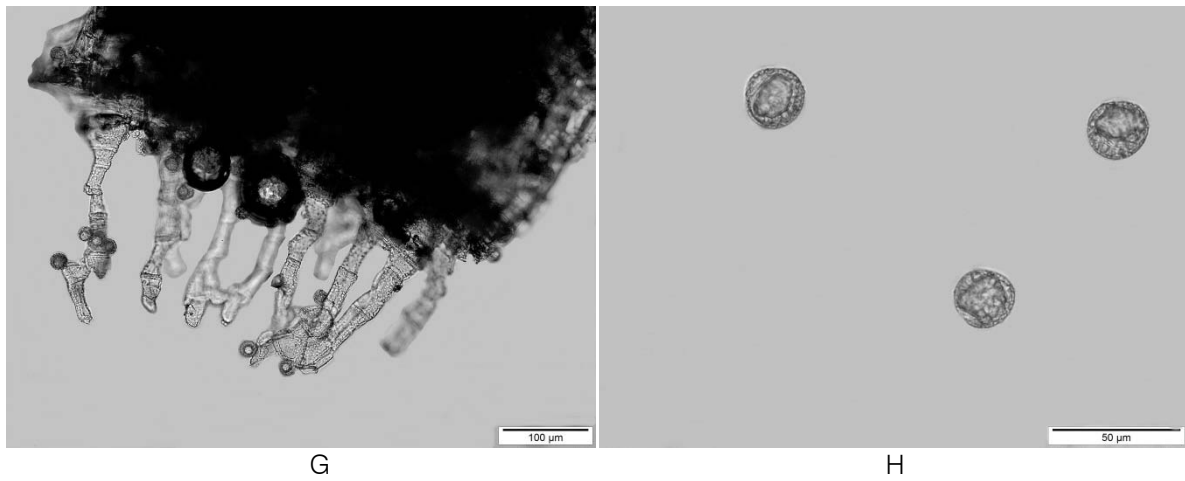


Figure 6 : *Mielichhoferia elongata* (Hoppe & Hornsch. ex Hook.) Hornsch. (E) mid-leaf cells (F) leaf base cells; (G) peristome teeth; (H) spores.



Figure 7 : *Meesia uliginosa* Hedw. (A) Leaf; (B) leaf tip; (C) upper leaf cells; (D) mid-leaf cells

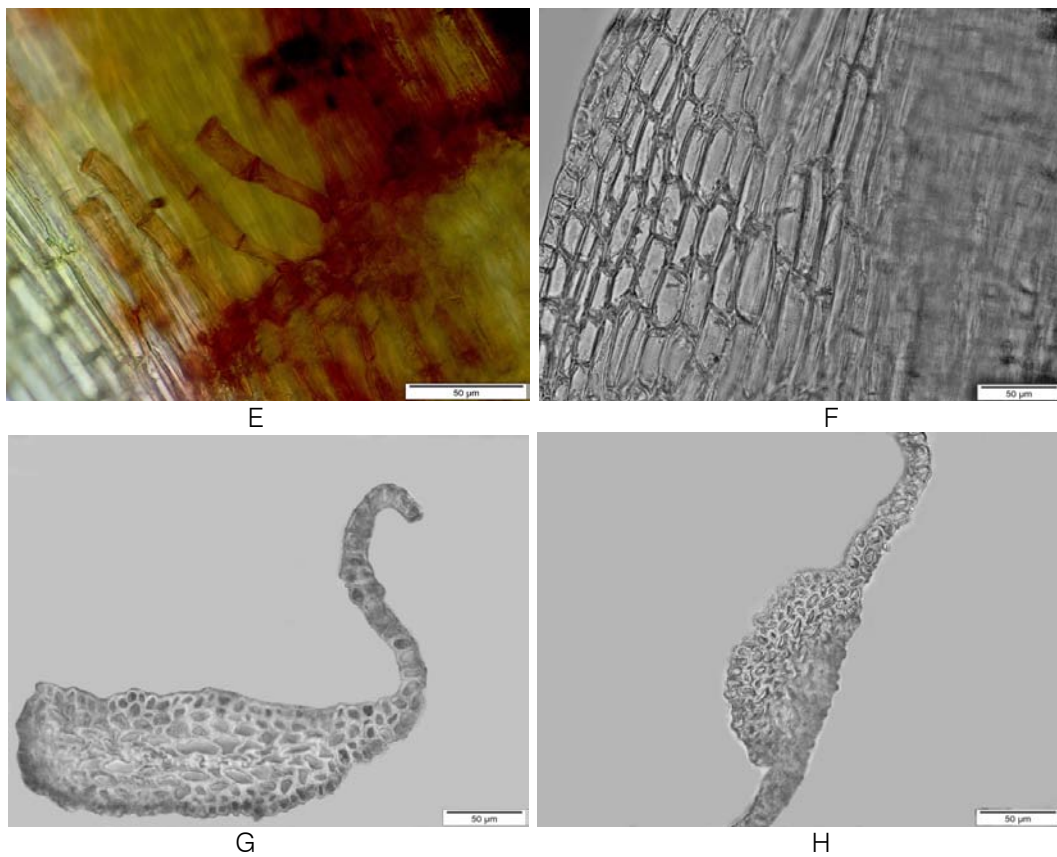


Figure 7 : *Meesia uliginosa* Hedw. (E) leaf base cells with rhizoids; (F) leaf base cells; (G-H) cross section of leaves.

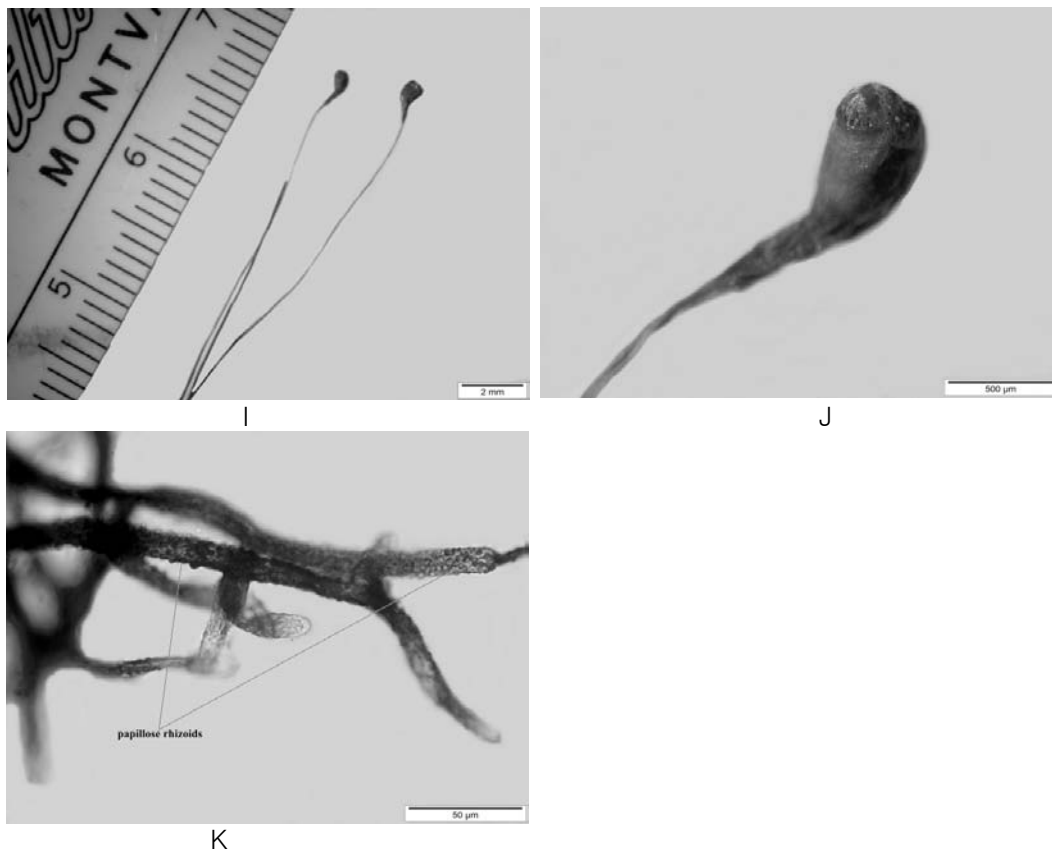


Figure 7 : *Meesia uliginosa* Hedw. (I-J) sporophytes; (K) papillose rhizoids.

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