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Towards the bryophyte flora of Greece, studies in Chalkidiki area (North Greece)

Marko SABOVLJEVIĆ[a,], Evdoxia TSAKIRI[b] and Aneta SABOVLJEVIĆ[a]*

[a]Institute of Botany and Botanical Garden, Faculty of Biology, University of Belgrade, Takovska 43, 11000 Belgrade, Serbia

[b]Laboratory of Systematic Botany and Phytogeography, Department of Botany, School of Biology, Aristotle University of Thessaloniki, Thessaloniki 541 24, Greece

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Abstract – The bryophyte flora of the Chalkidiki Prefecture (*Nomos*) in Greece has been studied, yielding a record of 138 bryophytes, (22 liverwort and 116 mosses).
Twenty three species are newly recorded for Chalkidiki, 18 for north-east floristic region of Greece, 3 for the Greek mainland and one for Greece.

Bryophytes / Flora / Distribution / Chalkidiki / Greece

Résumé – La flore bryophytique de la Préfecture Chalkidiki (Nomos) en Grèce a été étudiée. Au total, 138 bryophytes (22 hépatiques et 116 mousses) ont été censées. Vingt-trois espèces représent de nouveaux registres pour Chalkidiki, 18 pour la région floristique du NE de la Grèce, 3 pour la Grèce continentale et une pour la Grèce.

Bryophytes / Flore / Distribution / Chalkidiki / Grèce

INTRODUCTION

Although Greece is bryologically one of the best known regions of South Eastern Europe, it is among the worst known regions of Southern Europe (Sabovljević, 2004). The knowledge of its bryophyte flora remains insufficient, and it is believed that there is still a lot to be found (ECCB, 1995; Düll, 1996; Söderström *et al.*, 1998; Sabovljević *et al.*, 2001). Most of the bryophyte records were due to foreign researchers who mostly visited Greece on holidays. Thus some islands, such as, *e.g.*, the island of Crete, are incomparably bryologically better known than the mainland of Greece.

Few bryophyte checklists have been published for Greece (Preston, 1981, 1984a-b; Düll, 1995a; Ros *et al.*, 2007). Additionally, new records and floristic contributions have been recently reported for the country (Mavrommatis, 1972;

* Correspondence and reprints: marko@worldpost.eu

Athanasiadis, 1977; Giannitsaros & Koumpli-Sovantzi, 1990; Blockeel, 1991, 2001; Turland & Wilson, 1995; Carratello & Aleffi, 1998; Gallego & Cano, 1998; Papp *et al.*, 1998a-b; Papp, 1998, 2002, 2003; Blockeel *et al.*, 2002; Maier, 2002; Lüth, 2002, 2003; Tsakiri & Babalonas, 2002; Lara *et al.*, 2003; Tsakiri *et al.*, 2005, 2006; Hedderson & Blockeel, 2006; Blockeel & Ramel, 2006; Parent & De Zuttere, 2006).

The first publication concerning Chalkidiki was the "Florae Graecae Prodromus" (Sibthorp & Smith, 1806-1813) on a collection from Athos Mt. Since then, more data were published by Podpěra (1922), Ganiatsas (1938), Taylor (1952), Politis (1953), Reimers (1957), Vajda (1959), Geissler (1977), Zoller *et al.* (1977), Gamisans & Hébrard (1980), Düll (1995b), Sauer (1995), Papp & Babalonas (1996) and Erzberger (2006). Nowadays *ca* 252 taxa are mentioned to occur in Chalkidiki areas, among the *ca* 740 taxa reported so far from the country (*ca* 520 of them in North Greece), which suggests that much floristic and ecological investigation is still to be done in this area to define its bryophyte flora.

MATERIAL AND METHODS

Study area

The Chalkidiki peninsula is situated in the southern part of Central Macedonia District (North Greece). The peninsula has specific shape of a three-fingered hand spreading out in a north-south direction into the Aegean Sea, and is attached to the mainland of Macedonia at its northern part. Each of the three fingers of Chalkidiki peninsula consists in a small sub-peninsula named from west to east Kassandra, Sithonia and Athos (Fig. 1). The maximum elevations of the 3 sub-peninsulas increase from west to east: 353m in Kassandra, 817m in Sithonia, and 2033m in Athos.

Geologically, Chalkidiki is mainly basic with calcareous rocks, but other geological formations can be found around the peninsula, from sand to crystalline rocks, granodiorite or schists (Mountrakis, 1985). The climate is Eu-Mediterranean, with dry summers and most precipitation during winter period. Mean annual temperature varies from *ca* 15.9°C by the sea areas (*e.g.* Agios Mamas) to *ca* 12.7°C on the mountain (*e.g.* Arnea). The average annual precipitation varies accordingly between 500-800 mm (Balafoutis 1977). With the exception of urban and cultivated areas, the peninsula is mostly covered by *Pinus halepensis* forest with Mediterranean maquis, frequently dominated by *Erica* shrubs, with many areas in different degradation stages.

The easternmost sub-peninsula (Athos) is probably the most interesting area. The elevation of Athos Mt (2033m) together with the lack of urbanisation, form a unique environmental status that promises interesting findings. However, it is bryologically still unexplored, since the area south of the Ouranoupolis village, is closed for visitors (*Holly Athos Mt. Monastery Community*). The *Natura 2000* sites within the study area are (areas at the sea are not included here): *Oros Cholomontas, Oros Itamos-Sithonia, Limnohalassa Agiou Mama, Oros Stratonikon* (Chalkidiki Prefecture), and *Limnothalassa Epanomis, Limnothalassa Angelochoriou* (Thessaloniki Prefecture) on the way from Thessaloniki to Chalkidiki (Dafis *et al.*, 1996).

Field work was conducted at the Chalkidiki peninsula (excluding closed Athos area, south of Ouranoupolis) and southeastern area of Thessaloniki prefecture in late autumn during the years 2002-2006.

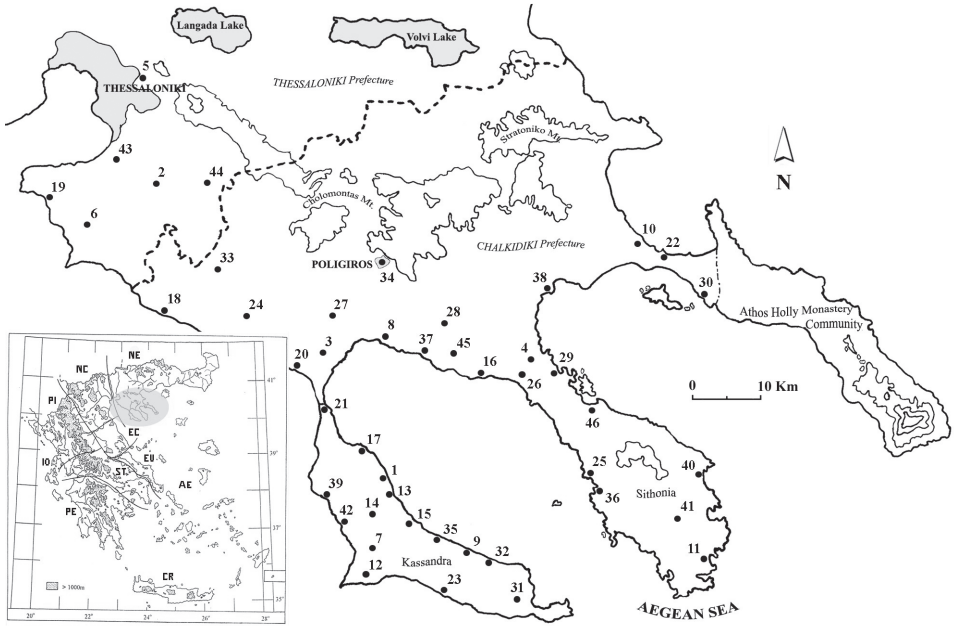

Fig. 1. North Greece and the location of the study area: Chalkidiki Prefecture and part of Thessaloniki Prefecture (the shady area at the smaller map of Greece). The smaller map shows also the Greek floristic regions (for abbreviations and their definitions see the text).
Circles (•) indicate the collection sites. Altitudinal lines are at 600, 1,000 and 1,400m a.s.l.

Methodology

In total 46 localities with wider surroundings have been prospected, and collections were made focusing on all habitat types. The locality names are given in groups according to the sub-peninsula where they are situated. Most of the sites are included in Chalkidiki Prefecture, while only six sites (N^{o}: 2, 5, 6, 19, 43, 44) are situated in Thessaloniki Prefecture (Table 1, Fig. 1). The voucher specimens are kept at the Herbarium of the Belgrade University (BEOU).

The nomenclature for liverworts follows Sabovljević & Natcheva (2006), while that of mosses follows Hill *et al.* (2006), and for each taxon, the localities where it was recorded have been expressed by the corresponding numbers in Table 1.

RESULTS AND DISCUSSION

A total of 138 bryophyte taxa were recorded from the collection sites; 22 of which are liverworts, while 116 are mosses.

The taxa are listed alphabetically, first hepatics and then mosses. For each taxon, data on the habitat (substratum), and locality numbers are given (for details, see Table 1 and Fig. 1).

Table 1. The investigated localities with geographical coordinates and altitude, sorted regionally and alphabetically (see also Fig.1).

	Locality N°	*N*	*E*	*Altitude (m)*
Region of Thessaloniki				
Agia Paraskevi	**2**	40°28′53″	23°03′	230
East of Thessaloniki	**5**	40°38′	22°58′05″	*ca* 200
Epanomi	**6**	40°25′41″	22°55′45″	50
Nea Michaniona	**19**	40°28′	22°51′45″	30
South-East of Thessaloniki	**43**	40°30′30″	22°58′36″	10
Vasilika	**44**	40°28′53″	23°08′15″	75
Chalkidiki mainland & 3rd peninsula				
Agios Mamas	**3**	40°15′42″	23°20′	15
Gerakini	**8**	40°16′47″	23°26′53″	20
Ierissos	**10**	40°23′48″	23°52′34″	10
Nea Kallikratia	**18**	40°19′	23°03′56″	20
Nea Moudania	**20**	40°15′32″	23°17′	20
Nea Roda	**22**	40°22′51″	23°55′25″	10
Nea Triglia	**24**	40°18′24″	23°12′36″	90
Olynthos (antiq.)	**27**	40°17′05″	23°21′17″	40
Ormilia	**28**	40°17′42″	23°32′45″	40
Ouranoupoli	**30**	40°19′33″	23°59′	10
Petralona	**33**	40°22′06″	23°09′42″	270
Pirgadikia	**38**	40°20′20″	23°43′34″	20
Poligiros	**34**	40°23′37″	23°26′25″	530
Psakoudia	**37**	40°15′47″	23°29′28″	10
Vatopedi	**45**	40°15′34″	23°33′32″	20
Kassandra Peninsula (1st peninsula)				
Afitos	**1**	40°06′	23°26′10″	50
Fourka - village	**7**	40°00′21″	23°25′	40
Hanioti	**9**	40°00′05″	23°34′30″	10
Kalandra	**12**	39°58′18″	23°20′07″	60
Kalithea	**13**	40°04′13,5″	23°26′47″	50
Kassandria	**14**	40°03′	23°24′40″	50
Kriopigi	**15**	40°02′09″	23°28′21″	130
Nea Fokea	**17**	40°08′	23°23′49″	20
Nea Potidea	**21**	40°11′43,5″	23°19′38,5″	20
Nea Skioni	**23**	39°56′52″	23°32′	10
Paliouri	**31**	39°56′35″	23°39′49″	125
Pefkochori	**32**	39°59′17″	23°36′40″	20
Polichrono	**35**	40°01′	23°31′40″	20
Sani	**39**	40°14′	23°20′	5
Siviri	**42**	40°02′09″	23°21′41″	5
Sithonia Peninsula (2nd peninsula)				
Agios Nikolaos	**4**	40°15′	23°41′54″	100
Kalamitsi	**11**	39°59′19″	23°59′	15
Metamorfosi	**16**	40°14′	23°34′21″	20
Neos Marmaras	**25**	40°05′40″	23°47′08″	20
Nikiti	**26**	40°13′48″	23°40′21″	40
Ormos Panagias	**29**	40°13′48″	23°44′21″	10
Porto Carras	**36**	40°04′29″	23°47′30″	10
Sarti	**40**	40°05′50″	23°58′36″	10
Sikia	**41**	40°02′23″	23°57′	40
Vourvourou	**46**	40°11′11″	23°47′34″	20

The following symbols apply:
+ : taxa new to NE floristic region of Greece
(**a**) : taxa new to Chalkidiki (already reported for NE floristic region of Greece)

Liverworts

1. *Calypogeia fissa* (L.) Raddi – deep soil – 25, 30
2. + *Cephaloziella baumgartneri* Schiffn. – wet soil in slopes and cliffs – 1, 9, 13, 17, 23, 28, 38, 42
3. *Conocephalum conicum* (L.) Dumort. – wet rocks and soil – 2, 5, 13, 21, 22, 24, 27, 30, 33, 37, 41, 46
4. + *Conocephalum salebrosum* Szweykowski, Buczkowska & Odrzykoski – wet rocks-34
5. *Corsinia coriandrina* (Spreng.) Lindb. – soil – 2, 25, 37, 29, 41
6. *Frullania dilatata* (L.) Dumort. – tree bark – 3, 4, 15, 26, 36
7. *Frullania tamarisci* (L.) Dumort. – soil in macchia – 40
8. *Gongylanthus ericetorum* (Raddi) Nees – soil - 26
9. *Lejeunea cavifolia* (Ehrh.) Lindb. – wood – 27, 29, 46
10. *Lophocolea bidentata* (L.) Dumort. – soil - 25
11. *Lophocolea heterophylla* (Schrad.) Dumort. – wood – 25, 40, 45
12. *Lunularia cruciata* (L.) Lindb. – soil – 7, 10, 11
13. *Marchantia polymorpha* L. subsp. *ruderalis* Bischl. & Boisselier – wet soil by the leaking water – 2, 13
14. *Metzgeria furcata* (L.) Dumort – schistous rocks – 34, 37
15. *Pellia endiviifolia* (Dicks.) Dumort. – rock and soil by the water – 2, 3, 18, 23
16. *Reboulia hemisphaerica* (L.) Raddi – soil – 6, 8, 19, 31, 33, 43
17. *Riccia ciliifera* Link *ex* Lindenb. – soil – 11, 16, 36
18. *Riccia nigrella* DC. – soil – 11, 36
19. *Riccia sorocarpa* Bisch. – soil – 40
20. *Scapania compacta* (A. Roth) Dumort. – soil – 25, 41
21. *Scapania undulata* (L.) Dumort. – soil - 25
22. *Southbya tophacea* (Spruce) Spruce – soil – 7, 26

Mosses

1. *Aloina aloides* (Koch ex Schulz) Kindb. – soil and slopes – 3, 7, 15, 17, 18, 20, 35, 44
2. *Aloina ambigua* (Bruch & Schimp.) Limpr. – soil – 10, 15, 24, 31, 32, 33, 36, 42, 44, 46
3. *Aloina rigida* (Hedw.) Limpr. – soil – 2, 4, 5, 6, 9, 16, 21, 30, 43, 46
4. *Amblystegium serpens* (Hedw.) Schimp. – rocks – 11, 16, 19, 22, 28
5. *Anomodon viticulosus* (Hedw.) Hook. & Taylor – tree base – 25, 45
6. *Atrichum undulatum* (Hedw.) P. Beauv. – soil – 10, 14, 25, 37,
7. *Barbula convoluta* Hedw. – soil – 4, 12, 33, 44
8. *Barbula commutata* Jur. – soil – 17, 21, 29, 39

9. *Barbula unguiculata* Hedw. – soil – all sites
10. *Bartramia stricta* Bruch & Schimp. – soil – 46
11. *Brachytheciastrum velutinum* (Hedw.) Ignatov & Huttunen – soil and tree bark – 11, 18, 30, 42, 46
12. *Bryoerythrophyllum recurvirostrum* (Hedw.) P.C. Chen – soil – 5, 8, 14, 19, 31
13. *Bryum argenteum* Hedw. – soil – all
14. + *Bryum argenteum* var. *lanatum* (P.Beauv.)Hampe – soil – 15, 24, 32, 39
15. + *Bryum canariense* Brid. – soil - 25
16. *Bryum capillare* Hedw. – soil – 3, 4, 10, 11, 13, 14, 15, 19, 30, 35, 36, 37, 43, 44
17. *Bryum dichotomum* Hedw. – soil – 11, 24, 26, 31
18. *Bryum moravicum* Podp. – wood – 8, 27, 39, 40, 41
19. *Bryum pseudotriquetrum* (Hedw.) P. Gaertn. *et al.* – soil by water – 25
20. *Campylophyllum calcareum* (Crundw. & Nyholm) Hedenäs – soil among rocks – 26, 37
21. *Campylopus oerstedianus* (Müll. Hal.) Mitt. – soil on schistous rocks – 25
22. *Ceratodon purpureus* (Hedw.) Brid. – soil – 25
23. + *Crossidium crassinerve* (De Not.) Jur. – soil and slopes – 15
24. *Crossidium squamiferum* (Viv.) Jur. – soil among rocks and boulders – 23
25. *Dicranella heteromalla* (Hedw.) Schimp. – soil - 27
26. *Dicranella howei* Renauld & Cardot – soil – 6, 12, 15, 36
27. *Dicranella varia* (Hedw.) Schimp. – soil – 7, 13
28. *Dicranum scoparium* Hedw. – soil - 10
29. *Didymodon acutus* (Brid.) K. Saito – soil – 33, 34
30. *Didymodon insulanus* (De Not.) M. O. Hill – soil – 8, 9, 14, 22, 38, 43
31. *Didymodon luridus* Hornsch. – soil – 1, 2, 3, 6, 14, 15, 16, 17, 19, 20, 21, 22, 28, 30, 35, 37, 42, 45, 46
32. *Didymodon rigidulus* Hedw. – soil – 4, 7, 9, 14, 16, 22, 27, 29 39, 41
33. + *Didymodon sicculus* M. J. Cano, Ros, Garcia-Zamora & J. Guerra –soil – 25, 31
34. + *Didymodon umbrosus* (Müll.Hal.) R. H. Zander –soil – 9, 15, 32
35. *Didymodon vinealis* (Brid.) K. Saito – soil – 1, 3, 4, 8, 12, 19, 22, 23, 31, 32, 42
36. *Encalypta streptocarpa* Hedw. – rocks and walls 33, 34
37. *Encalypta vulgaris* Hedw. – soil – 13, 39
38. *Eucladium verticillatum* (With.) Bruch & Schimp. – wet rocks – 13, 23
39. *Fissidens bryoides* Hedw. – soil - 31
40. *Fissidens dubius* P. Beauv. – soil – 16, 25
41. + *Fissidens serrulatus* Brid. – soil - 26
42. *Fissidens taxifolius* Hedw. – soil – 25
43. *Fontinalis antipyretica* Hedw. – in water – 25
44. *Funaria hygrometrica* Hedw. – on soil – 8, 14, 17, 19, 22, 39
45. + *Funariella curviseta* (Schwägr.) Sérgio – rocky wall – 16

46. *Grimmia decipiens* (Schultz) Lindb. – siliceous rock – 25, 26
47. + *Grimmia dissimulata* E. Maier – rock – 10
48. *Grimmia lisae* De Not. – siliceous rock – 25, 26, 29, 37
49. *Grimmia pulvinata* (Hedw.) Sm. – rocks – 4, 11, 12, 15, 28, 36, 42
50. *Grimmia trichophylla* Grev. – rocks – 9, 11, 32
51. *Gymnostomum calcareum* Nees & Hornsch. – wet rocks – 13
52. + *Gymnostomum lanceolatum* M. J. Cano, Ros & J. Guerra – shaded rock – 23
53. *Gyroweissia tenuis* (Hedw.) Schimp. – rock – 35, 42
54. *Hedwigia ciliata* (Hedw.) P. Beauv. – siliceous rock – 26
55. *Homalothecium aureum* (Spruce) H. Rob. – rocks – 27
56. *Homalothecium lutescens* (Hedw.) H. Rob. – rocks – 12, 18, 29
57. *Homalothecium sericeum* (Hedw.) Schimp. – rocks – 16, 21, 28, 37, 38
58. *Hypnum cupressiforme* Hedw. – tree bark and soil – 3, 6, 8, 11, 12, 17, 22, 32, 35, 40
59. *Isothecium alopecuroides* (Lam. ex Dubois.) Isov. – tree base – 46
60. *Isothecium myosuroides* Brid. – siliceous rock – 46
61. *Kindbergia praelonga* (Hedw.) Ochyra – stones and soil – 25, 26
62. *Leptodon smithii* (Hedw.) F. Weber & D. Mohr – tree trunk – 25, 34
63. *Leucodon sciuroides* (Hedw.) Schwägr. – tree trunk – 25
64. (**a**) *Microbryum starckeanum* (Hedw.) R. H. Zander – soil – 15
65. *Neckera complanata* (Hedw.) Huebener – tree base – 46
66. *Orthotrichum affine* Schrad. ex Brid. – tree bark – 16
67. *Orthotrichum anomalum* Hedw. – rock and concrete fence – 8, 17
68. *Orthotrichum cupulatum* Hoffm. ex Brid. – rock – 15, 27
69. *Orthotrichum lyellii* Hook. & Taylor – tree bark – 24
70. *Orthotrichum tenellum* Bruch ex Brid. – tree bark – 25
71. *Oxyrrhynchium hians* (Hedw.) Loeske – soil – 32
72. *Phascum cuspidatum* Hedw. – soil – 12, 15, 19, 20, 33, 43
73. *Plagiomnium undulatum* (Hedw.) T. J. Kop. – soil – 25
74. *Plagiothecium nemorale* (Mitt.) A. Jaeger – soil – 16
75. *Platyhypnidium riparioides* (Hedw.) Dixon – in and by the water – 1, 13, 25, 35
76. *Pleurochaete squarrosa* (Brid.) Lindb. – soil – 3, 8, 11, 16, 17, 21, 22, 24, 26, 32, 38, 43, 44
77. *Pogonatum aloides* (Hedw.) P. Beauv. – soil – 25, 26
78. *Pohlia melanodon* (Brid.) A. J. Shaw – soil by the water – 13
79. *Polytrichum juniperinum* Hedw. – soil – 25
80. *Polytrichum piliferum* Hedw. – soil – 26
81. (**a**) *Protobryum bryoides* (Dicks.) J. Guerra & M. J. Cano – soil – 15, 24
82. *Pseudocrossidium hornschuchianum* (Schultz) R. H. Zander – soil – 1, 2, 3, 5, 6, 12, 13, 18, 19, 22, 23, 27, 29, 35, 36, 38, 42, 46
83. *Pseudocrossidium revolutum* (Brid.) R. H. Zander – soil – 26, 33, 38, 46

84. *Pseudoscleropodium purum* (Hedw.) M. Fleisch – soil – 16
85. *Pterogonium gracile* (Hedw.) Sm. – rock – 25
86. (**a**) *Pterygoneurum ovatum* (Hedw.) Dixon – soil – 13
87. *Racomitrium canescens* (Hedw.) Brid. – siliceous rock – 25
88. *Rhynchostegiella curviseta* (Brid.) Limpr. – wet rocks – 26
89. + Rhynchostegiella litorea (De Not.) Limpr. – wet rocks – 25
90. *Rhynchostegiella tenella* (Dicks.) Limpr. – shaded rock crevices – 33, 34
91. *Schistidium apocarpum* (Hedw.) Bruch & Schimp. – rocks – 16, 24
92. + *Schistidium brunnescens* Limpr. – rock – 33
93. *Schistidium crassipilum* H. H. Blom – rock, concrete – 33, 37, 46
94. *Schistidium elegantulum* H. H. Blom – rock – 30
95. + *Schistidium helveticum* (Schkuhr) Deguchi – rock – 17, 34
96. *Scleropodium touretii* (Brid.) L. F. Koch – soil and slopes – 11, 12, 16, 23, 24, 25, 26, 27, 28, 29, 30, 31, 37, 45
97. + *Syntrichia calcicola* J. J. Amann – soil and rocks – 32, 36, 46
98. *Syntrichia princeps* (De Not.) Mitt. – soil – 40
99. *Syntrichia ruralis* (Hedw.) F. Weber & D. Mohr – 7, 8, 9, 14, 25, 29, 33, 40, 43
100. + *Syntrichia ruralis var. ruraliformis* (Besch.) Delogne – soil – 17, 21, 45
101. *Thamnobryum alopecurum* (Hedw.) Gangulee – tree base – 25
102. *Tortella flavovirens* (Bruch) Broth. – soil – 16
103. *Tortella nitida* (Lindb.) Broth. – rocks – 26
104. *Tortella tortuosa* (Hedw.) Limpr. – rocky slope – 35
105. (**a**) *Tortula inermis* (Brid.) Mont. – soil – 25
106. (**a**) *Tortula lanceola* R. H. Zander – soil – 18, 36, 37
107. *Tortula muralis* Hedw. – rocks, concrete – all
108. + *Tortula muralis* var. *aestiva* Hedw. – rock – 26
109. *Tortula subulata* Hedw. – soil – 25
110. + *Tortula schimperi* M. J. Cano, O.Werner & J. Guerra – soil – 10
111. *Trichostomum brachydontium* Bruch – soil – 6, 9, 11, 17, 29, 31, 32, 38, 40, 44
112. *Trichostomum crispulum* Bruch – 4, 5, 8, 13, 14, 23, 39
113. *Weissia brachycarpa* (Nees & Hornsch.) Jur. – soil – 16
114. *Weissia controversa* Hedw. – soil – 26
115. *Weissia longifolia* Mitt. – soil – 16
116. *Zygodon rupestris* Schimp. ex Lorentz – tree bark and base – 16

Among the 138 bryophytes recorded in the study area, one species (*Conocephalum salebrosum*) is newly recorded for Greece. Three taxa are new for the mainland of Greece: *Fissidens serrulatus* (previously reported only from Rhodos island), *Rhynchostegiella litorea* and *Schistidium helveticum* (both previously reported only from the island of Crete). *Didymodon umbrosus* represents here the second record for Greece, since it has been only reported from Sterea Hellas (Athens, around Acropolis; Blockeel *et al.*, 2002).

Eighteen taxa are new to the north-eastern floristic region of Greece (marked with a + in the list), and 23 are first reported from Chalkidiki (marked with an "**a**" or + in the list).

Some species common in other parts of the Mediterranean, but with limited reports in Greece and SE Europe were recorded: *Crossidium crassinerve*, previously reported from Crete (Düll, 1966), Peloponnisos (Blockeel, 1991), and Sterea Hellas (Unger, 1862; Haussknecht, 1899; Rungby, 1971); *Protobryum bryoides*, reported from the Ionian islands and Sterea Hellas (Hararas, 1976), and recently from another site in NE Greece (Strymon river delta; Papp *et al.*, 2002); *Pterygoneurum ovatum*, here first reported from Chalkidiki, and earlier reported from the Ionian islands (Mazziari, 1851), Sterea Hellas (Geheeb, 1886) and North East Greece (near Xanthi; Taylor, 1952); *Schistidium brunnescens*, confirmed only from Crete (Düll, 1966), although it was included but only as synonym in Preston (1984b); *Tortula muralis* var. *aestiva*, previously reported from different islands (Crete, the Aegean islands and Rhodos *in* Düll, 1995a, the Ionian islands *in* Hararas, 1976), and in the mainland only from Sterea Hellas (Schiffner & Baumgartner, 1919). *Schistidium elegantulum*, after its first and unique report for Greece from Chalkidiki (Cholomontas Mt area; Lüth, 2003) is again recorded in Chalkidiki, but by the sea area of Ouranoupolis. Finally *Weissia longifolia*, recorded in this study at Metamorfosi area (sea level) confirms its presence in Chalkidiki. It had been previously reported from the Ionian islands (Düll, 1995a: Damm *et al.* pers. comm.), and from NE Greece as cf. at Cholomontas Mt area/ Chalkidiki (Erzberger, 2006).

Some of the recorded taxa also deserve special attention due to their threat status and rareness.

Conocephalum conicum is a common and wide-spread species, and the newly described sister species *C. salebrosum* (Szweykowski *et al.*, 2005) is easy to overlook. Among the 13 recorded populations of *Conocephalum* in the study area, only one specimen belonged to *C. salebrosum*. In SE Europe it is known to occur in Romania and Bosnia-Herzegovina (Sabovljević & Natcheva, 2006).

Barbula commutata (syn. *B. sardoa* Schimp., *B. convoluta* var. *commutata*) is a well defined taxon (Frahm & Ahmed, 2004a, b), considered to be either a variety of *B. convoluta* or a separate species better adapted to drought (Frahm, 2000; Hill *et al.*, 2006). In the study area both species occur and are easily overlooked in dry state.

Campylopus oerstedianus is a relict circum-tethian species (Frahm, 1984) with only some 12 populations known in Europe, of which only one, including two subpopulations, was found in the study area and in SE Europe. Previous collections were from the area of Cholomontas Mt. area, Vourvourou (Düll, 1995b), and Neos Marmaras-Parthenon (Erzbeger, 2006). In this study a new locality in Chalkidiki area is added. Its status in Europe is rare (R) with insufficient knowledge on its population stages (ECCB, 1995). The species deserves a special conservation status in Greece as well.

Gymnostomum lanceolatum, has been described from Spain (Cano *et al.*, 1994) and later recorded in other Mediterranean countries: Italy (Aleffi *et al.*, 2004), Croatia (Sabovljević, 2006), Turkey (Kučera, 1998), and southern Greece: Peloponnisos, Sterea Hellas and East Central Greece (Blockeel *et al.*, 2002). Some authors consider it a variety of *G. calcareum* Nees & Hornsch. (Sérgio, 2006). Similarly, *Didymodon sicculus* appears to turn from a Spanish endemic (Cano *et al.*, 1996) to a Mediterranean species by its records in other Mediterranean countries: Montenegro (Cvetić & Sabovljević, 2004), Italy (Aleffi *et al.*, 2003a-b, Puglisi *et al.*, 2004), Turkey (Papp & Sabovljević, 2003). In Greece it was recorded

in Peloponnisos and Sterea Hellas (Blockeel *et al.*, 2002) and this is the second record for the country. It is likely to occur in other areas in Greece. Finally, *Tortula schimperi* recently separated from *T. subulata* complex (Cano *et al.*, 2005) is recorded as new for NE Greece.

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