BRYOPHYTE CHECKLIST OF RIZE, NORTH-EAST TURKEY
ЧЕКЛИСТ МОХООБРАЗНЫХ ПРОВИНЦИИ РИЗЕ, СЕВЕРО-ВОСТОЧНАЯ ТУРЦИЯ

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Abstract

Bryophytes of Rize Province are listed, basing on data published between 1955 and 2014. This is the first list of Anthocerotophyta, Marchantophyta, and Bryophyta from Rize. The checklist includes 45% of the total hornwort and liverwort flora of Turkey (31 families, 46 genera, 81 species and 2 subspecies), and 42% of its moss flora (44 families, 126 genera, 309 species, 4 subspecies and 14 varieties). The largest number of species have Orthotrichum, Sphagnum, Grimmia, Racemitium, Brachythecium, Dicranum, Psychostomum, and Tortula. In liverworts, Scapania, Jungermannia, and Lophozia are the richest in species number, and in hornworts Anthoceros is the only genus represented in the list. Pottiaceae, Brachytheciaceae, Grimmiaceae, Jungermanniaceae, and Scapaniaceae are largely represented in Rize. In the light of the presented checklist, Rize is one of the most diverse areas for bryophytes in Turkey. The level and number of knowledge on bryophytes occurring in Rize is expected to increase with further investigations in less studied areas of the province.

KEYWORDS: Bryophyte, checklist, hornworts, liverworts, mosses

INTRODUCTION

Bryofloristic studies in Turkey by local bryologists started in 1980s, they continue at present and bring a lot of new data on bryophyte diversity. These studies resulted in several checklists of some provinces and a whole country. The first checklist of liverworts of Turkey was prepared by Gökler et al. (1985–1986). The second detailed checklist of liverworts and hornworts was published by Çetin (1988a). A few years later, Gökler & Öztürk (1991) listed liverworts and hornworts of Turkey according to grid-square system adopted by Henderson (1961a, 1961b). The first checklist of Turkish mosses was published by Çetin (1988b). The time between 1988 and 2004 was one of the greatest periods of intensive bryological studies in the history of Turkish bryology. A major version of the moss checklist for Turkey was published by Uyar & Çetin (2004). Right after, the second major checklist for mosses, liverworts, and hornworts in Turkey was presented by Kürschner & Erdağ (2005). However, the number of bryophytes in the country kept increasing due to discovery of several new species and many new records of bryophytes. Therefore, Özenoğlu Kiremit & Keçeli (2009) listed the liverworts and hornworts of Turkey, also taking into consideration the study of Ros et al. (2007). The latest information about Turkish mosses was cited within the study of Ros et al. (2013).

A year later, Abay (2014) presented the current knowledge about the bryophyte species in Turkey based on the main past and recent checklists and surveys. There are some local checklists based on the grid-squares adopted by Henderson on Turkey’s map (Abay et al., 2009; Şahin et al., 2009a, 2009b; Ursavas & Abay, 2009; Özdemir, 2009; Ursavas et al., 2010; Keçeli et al., 2011; Ursavas & Abay, 2012a, 2012b), but the number of spe-

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Mosses are represented in the present checklist by 44 families, 126 genera, and 327 taxa of infrageneric level (309 species, 14 varieties, and 4 subspecies), that equals 42.00 % of the total moss flora of Turkey. The list of mosses includes one species of Andreaeopsida (Andreaea rapistris Hedw.), 15 taxa Sphagnumspida (Sphagnum spp.), and 311 taxa of Bryopsida. Pottiaceae is the richest family comprising 36 taxa. Some other rich families are Brachytheciaceae (31), Grimmiaaceae (30), Orthotrichaceae (22) and Mniaceae (18). The richest genera include Orthotrichum (17 species), Sphagnum (15), Grimmia (13), and Racemitrium (10). The genera Brachythecium, Dicranum, and Tortula shared the fifth position with eight taxa each.

**New records**

A hornwort and two liverworts not included in the checklist of Özenoğlu Kiremit & Keçeli (2009) were published later: Anthoceros caucasicus Kürmaci et al. (2012), Trichocolea tomentella (Ehrh.) Dumort. (Keçeli & Abay, 2012), and Jubula hutchinsiae (Hook.) Dumort. subsp. caucasicus Konstant. & Vilnet (Kürschner, 2013).

Five species of mosses were reported as new records after checklist by Ros et al. (2013): Pohlia obtusifolia (Vill. ex Brid.) L.F.Koch (Kürmaci et al., 2012), Sphagnum contortum Schultz, S. fallax (H.Klinggr.) H.Klinggr., S. magellanicum Brid. (Kürmaci & Kürschner, 2013), and Sphagnum molle Sull. (Abay & Keçeli, 2014).

**ALPHABETICAL LIST OF BRYOPHYES OF RIZE**

**ANTHOCEROTOPHYTA (Hornworts)**

*Anthoceros caucasicus* Stephani

**MARCHANTIOPHYTA (Liverworts)**

*Aneura pinguis* (L.) Dumort.

*Anthelia julacea* (L.) Dumort.

*Apostemetzia pubescens* (Schrank) Kuwah.

*Barbilophozia barbata* (Schmidel ex Schreb.) Loeske

*B. hoehleri* (A. Evans) Loeske

*Bazzania flaccida* (Dumort.) Grolle

*B. tricrenata* (Wahlenb.) Trevis.

*B. trilobata* (L.) Gray

*Blasia pusilla* L.

*Blepharostoma trichophyllum* (L.) Dumort.

*Calypogea arguta* Nees et Mont.

*C. azurea* Stotler & Crotz

*C. fissa* (L.) Raddi

*Cephalozia bicuspida* (L.) Dumort.

*C. catenulata* (Huebener) Lindb.

*C. pleniceps* (Austin) Lindb.

*C. hamepeana* (Nees) Schiffl.

*Chiloscyphus pallescens* (Ehrh. ex Hoffm.) Dumort.

*C. polyanthos* (L.) Corda

*Cololejeunea rossettiana* (C. Massal.) Schiffl.

*Conocephalum conicum* (L.) Dumort.

*Diplosiuljeunea cavifolia* Steph.

*Diplophyllum albicans* (L.) Dumort.

*Taxifolium* (Wahlenb.) Dumort.
P. longifolium (Hedw.) Loeske
Philonotis caespitosa Jur.
P. calcarea (Bruch & Schimp.) Schimp.
P. capillaris Lindb.
P. fontana (Hedw.) Brid.
P. marchica (Hedw.) Brid.
P. seriata Mitt.
P. tomentella Molendo
Physcomitrella patens (Hedw.) Bruch & Schimp.
Plagiomnium affine (Bladow ex Funck) T.J. Kop.
P. cuspidatum (Hedw.) T.J. Kop.
P. elatum (Bruch & Schimp.) T.J. Kop.
P. pellitum (Bruch & Schimp.) T.J. Kop.
P. rostratum (Schrad.) T.J. Kop.
P. undulatum (Hedw.) T.J. Kop
Plagiochiasum cava (Hedw.) Holyoak & N. Pedersen
P. laetum Schimp.
P. nemorale (Mitt.) A.Jaeger
P. platyphyllum Münn.
P. succulentum (Wilson) Lindb.
Plasteurhynchium meridionale (Schimp.) M. Fleisch.
P. striatum (Spruce) M. Fleisch.
Platygyrium repens (Bruch.) Schimp.
P. subulatum (Hedw.) Rabenh.
P. schreberi (Wild. ex Brid.) Mitt.
Pogonatum aloides (Hedw.) P. Beauv.
P. urnigerum (Hedw.) P. Beauv.
Pohlia cruda (Hedw.) Lindb.
P. elongata Hedw.
P. ludwigii (Spreng. ex Schwaegr.) Broth.
P. nutans (Hedw.) Lindb.
P. obtusifolia (Vill. ex Brid.) L.F. Koch
P. wahlenbergii (F. Weber & D. Mohr) A.L. Andrews
Polytrichastrum alpinum (Hedw.) G.L. Sm.
P. sexangulare (Hedw.) Brid.
P. denticulatum (Hedw.) Brid.
P. capillare (Hedw.) Schimp.
P. curvifolium (Hedw.) Schimp.
P. piliferum (Hedw.) Schimp.
P. juniperinum (Hedw.) Lindb.
P. formosum (Hedw.) Lindb.
P. elongata Ehrh. ex Frisvoll.
R. ericoides (Brid.) Brid.
R. heterostichum (Hedw.) Brid.
R. macounii subsp. macounii Kindb.
R. macounii subsp. alpinum (E.Lawton) Frisvoll
R. microcarpon (Hedw.) Brid.
Rhizomnium punctatum (Hedw.) T.J. Kop.
Rhodobryum ontariense (Kindb.) Kindb.
R. roseum (Hedw.) Limpr.
Rhynchosoriella tenella (Dicks.) Limpr.
Rhynchosoriella murale (Hedw.) Cardot
R. riparioides (Hedw.) Cardot
Rhytidiadelphus squarrosus (Hedw.) Warnst.
R. tricretis (Hedw.) Warnst.
Rhytidium rugosum (Hedw.) Kindb.
Sanionia uncinata (Hedw.) Loeske
Sarmentypnnum exannulatum (Schimp.) Hedenäs
S. sarmentosum (Wahlenb.) Tuom. & T.J. Kop.
Schistidium apocarpum (Hedw.) Bruch & Schimp.
S. atrofuscum (Schimp.) Limpr.
S. confertum (Funck) Bruch & Schimp.
S. crassipilum H.H. Blom
S. flaccidum (De Not.) Ochyra
S. trichodon (Brid.) Poelt
Sciuropsimum plumosum (Hedw.) Ignatov & Huttunen
S. populeum (Hedw.) Ignatov &Huttunen
S. reflexum (Starke) Ignatov & Huttunen
Sphagnum capillifolium (Ehrh.) Hedw.
S. centrale C.E.O. Jensen
S. compactum Lam. & DC.
S. contortum Schultz
S. fallax (H. Klinggr.) H. Klinggr.
S. gigensohnii Russow
S. inundatum Russow
S. magellanicum Brid.
S. molle Sull.
S. palustre L.
S. platyphyllum (Lindb. ex Brathw.) Warnst.
S. squarrosulum Crome
S. subsecundum Nees
S. teres (Schimp.) Ångstr.
S. warnstorffii Russow
Straminergyron stramineum (Dicks. ex Brid.) Hedenäs
Syntrichia laevispila Brid.
S. norvegica F.Weber
S. papillosa (Wilson) Jur.
S. ruralis (Hedw.) F. Weber & D. Mohr
Taxiphyllum densifolium (Lindb. ex Broth.) Reimers
Tetraphis pellucida Hedw.
Thamnobryum alopecurum (Hedw.) Gangleee
Thuidium delicatulum (Hedw.) Schimp.
Timmia austriaca Hedw.
Tortella inclinata (R.Hedw.) Limpr. var. densa (Lorentz & Molendo) Limpr.
T. inflexa (Bruch) Broth.
T. nitida (Lindb.) Broth.
T. tortuosa (Hedw.) Limpr.
Tortula caucasia Broth.
T. hoppeana (Schultz) Ochyra
T. lindbergii Broth.
T. marginata (Bruch & Schimp.) Spruce
T. muralis Hedw.
T. muralis var. aestivalis Brid. ex Hedw.
T. schimperi M.J. Cano, O.Werner & J. Guerra
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T. subulata Hedw.
Trichodon cylindricus (Hedw.) Schimp.
Trichostomum brachydontium Bruch
T. crispulum Bruch
Ulota coarctata (P. Beauv.) Hammar
U. crispa (Hedw.) Brid.
U. rehmannii Lindb.
W. condensa (Voit) Lindb.
W. controversa Hedw.
Zygodon rupestris Schimp. ex Lorentz
Z. viridissimus (Dicks.) Brid.

**CONCLUSIONS**

Bryophyte diversity of Rize Province is the richest among provinces of Turkey. This checklist is one of the essential steps towards the evaluation of the number and conservation status of species. A number of publications on bryophyte flora of the province in regional, national and international journals are currently unavailable to access online; the present checklist summarizes these data for Rize Province. Finally, a cooperation between bryologists from different provinces of Turkey is necessary for better understanding of bryoflora at a regional and province level.

**LITERATURE CITED**

ABAY, G & T KEÇELİ. 2014. Sphagnum molle (Sphagnoaceae, Bryophyta) in Turkey and SW Asia. – Cryptogamie Bryologie 35(1): 105–112.

ABAY, G. 2004. The moss flora of Kuyucak village. – Ot Sistematik Botanik Dergisi 1(1): 149–162.

ABAY, G. 2014. Bryodiversity of Turkey. – Scientific And Technological Cooperation in the Field of Plant Diversity And Biotechnology Between Turkey And Germany, Artvin, Türkiye, 25–27 IX. 2014:15.

ABAY, G., S. URSAVAŞ & A. ŞAHİN. 2009. Türkiye’nin A3 karesinin karayolları (Musci) kontrol listesi. – I. Ulusal Batı Karadeniz Ormanlık Kongresi, Bartın, Türkiye, 5–7 XI. 2009: 613–619.

ABAY, G., S. URSAVAŞ & T. KEÇELİ. 2010. Türkiye’nin B7 karesinin bryophyta kontrol listesi. – 20. Ulusal Biyoloji Kongresi, Denizi, Türkiye, 21–25 VI. 2010: 394–395.

ABAY, G., G. URAY, B. ÇETİN & T. KEÇELİ. 2006a. Fırtına vadisi (Çamlıhemşin, Rize) Buxus sempervirens L. toplumlarının yayılış göstergedileri analizi (Musci) florası. – Suleyman Demirel Üniversitesi Orman Fakültesi Dergisi 2: 37–49.

ABAY, G., G. URAY, B. ÇETİN & T. KEÇELİ. 2006b. New bryofloristic records for the square A4 (Rize, Turkey). – Proceedings of IV BBC, Sofia, 20–26 VI. 2006: 134–139 (publ. 2009).

ABAY, G., G. URAY, B. ÇETİN & T. KEÇELİ. 2007. Bucklandiella microcarpa (Hedw.) Bednareck-Ochyra & Ochyra (Grimmiaceae, Bryopsida) new to the moss flora of Turkey and South-West Asia. – Cryptogamie Bryologie 28: 145–148.

ABAY, G., G. URAY, T. KEÇELİ & B. ÇETİN. 2009a. Sphagnum centrale and other remarkable bryophyte records from the Kaşkar Mountains (Northern Turkey). – Cryptogamie Bryologie 30(3): 399–407.

ABAY, G., G. URAY, T. KEÇELİ & B. ÇETİN. 2009b. Contributions to the bryoflora of the Kaşkar Mts (NE Anatolia, Turkey). – Phytologia Balcanica 15: 317–329.

BRUMMITT, R.K. & C.E. POWELL. 1992. Authors of plant names. A list of authors of scientific names of plants, with recommended standard form of their names including abbreviations. Royal Botanic Gardens, Kew: 732 pp.

ÇETİN, B. 1988a. Checklist of the liverworts and hornworts of Turkey. – Lindbergia 14: 12–14.

ÇETİN, B. 1988b. Checklist of the Mosses of Turkey. – Lindbergia 14: 15–23.

ÇEVRE DURUM RAPORU. 2014. İl Çevre Durum Raporu. – Rize Çevre ve Şehircilik İl Müdürlüğü, 126 pp.

GÖKLER, İ. & M. ÖZTÜRK. 1991. Liverworts of Turkey and their position in South-west Asia. – Candollea 46: 359–366.

GÖKLER, I., M. ÖZTÜRK & T. KESERCİOĞLU. 1985–1986. Checklist of liverworts (Hepaticae) recorded from Turkey. – Ege University Journal of Science Faculty Series B 3: 1–10.

HENDERSON, D.M & C.W. MUIRHEAD. 1955. Contribution to the bryophyte flora of Turkey. – Notes from the Royal Botanic Garden, Edinburgh, 22: 29–43.

HENDERSON, D.M. 1961a. Contributions to the bryophyte flora of Turkey. IV. – Notes from the Royal Botanic Garden, Edinburgh, 23: 263–278.

HENDERSON, D.M. 1961b. Contributions to the bryophyte flora of Turkey. V. Summary of present knowledge. – Notes from the Royal Botanic Garden, Edinburgh, 23: 279–301.

HENDERSON, D.M. 1964. Contributions to the bryophyte flora of Turkey. VI. – Notes from the Royal Botanic Garden, Edinburgh, 25: 279–291.

HILL, M. O., N. BELL, M.A. BRUGGEMAN-NANNEGNA, M. BRUGEES, M.J. CANO, J. ENROTH, K. FLATBERG, J. P. FRAHM, M. T. GALLEGO, R. GARILLETI, J. GUERRA, L. HEDENÄS, D. T. HOLYOAK, J. HYVÖNEN, M. S. IGNATOV, F. LARA, V. MAZIMPAKA, J. MUOZ & L. SÖDERSTRÖM. 2006. An annotated checklist of the mosses of Europe and Macaronesia. – Journal of Bryology 28: 198–267.

KEÇELİ, T., S. URSAVAŞ & G. ABAY. 2011. Türkiye’nin B6 karesinin bryophyta kontrol listesi. – Bartın Orman Fakültesi Dergisi 13: 14–24.

KEÇELİ, T & G. ABAY. 2007a. Pallavicinia iellyi (Hook.) Carruth in Turkey, new to Southwestern Asia. – Cryptogamie Bryologie 28: 249–252.

KEÇELİ, T & G. ABAY. 2007b. Telaranza europaea (Lepidoziaceae, Hepaticae), new to Turkey. – Cryptogamie Bryologie 28: 79–81.

KEÇELİ, T & G. ABAY. 2012. Trichocolea tomentella (Trichocoleaceae, Turkey) Cigerotlar (Marchantiophyta) Florası için yeni kayıt. – 21. Ulusal Biyoloji Kongresi, Bildiri Kitabı, 3–7 IX. 2012, İzmir: 577–578.

KEÇELİ, T & G. ABAY. 2014. Fistiklî (Rize) Cigerotu Florasına Katkılar. – 22. Ulusal Biyoloji Kongresi, Bildiri Özet Kitabı, 23–27 VI. 2014, Eskisehir: Türkiye: 48.

KEÇELİ, T. G. ABAY, G. URAY & B. ÇETİN. 2008. New national and regional bryophyte records, 19. Scapania paludosa (Müll. Frib.) Müll. Frib. – Journal of Bryology 15: 234.

KIRMACI, M & H. KÜRSCHNER. 2013. The genus Sphagnum L. in Turkey with S. contortum, S. fallax, S. magellanicum and S. rubellum, new to Turkey and SouthWest Asia. – Nova Hedwigia 96 (3–4): 383–397.

KIRMACI, M., H. KÜRSCHNER & A. ERDAĞ. 2012. New and noteworthy records to the bryophyte flora of Turkey and Southwest Asia. – Cryptogamie Bryologie 33 (3): 267–270.

KÜRSCHNER, H & A. ERDAĞ. 2005. Bryophytes of Turkey: An annotated reference list of the species with synonyms from the recent literature and an annotated list of Turkish bryological literature. – Türkisch Journal of Botany 29: 95–154.

KÜRSCHNER, H & G. PAROLLY. 2006a. New national and regional bryophyte records, 13. 11. Warnstorfia sarmentosa (Wahlenb.) Hedens. – Journal of Bryology 28: 154.

KÜRSCHNER, H & G. PAROLLY. 2006b. New national and regional bryophyte records, 12. 9. Eremotus myriotrupes (Carrington) Lindb. & Kall. ex Pearson. – Journal of Bryology 28: 69.

KÜRSCHNER, H. 2013. Jubula butchinsiae subsp. caucasica Konstant. & Vilnet (Marchantiophyta: Jubulaceae) – new for the bryophyte flora of Iran and Turkey. – Polish Botanical Journal 58 (1): 211–216.
