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The Chorology of the Turkish Moss Species of *Andreaeaceae, Archidiaceae, Aulacomniaceae, Amblystegiaceae* and *Anomodontaceae* Families (Review)

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ABSTRACT

The chorology of Turkish moss species of *Andreaeaceae, Archidiaceae, Aulacomniaceae*, *Amblystegiaceae* and *Anomodontaceae* families is given in dotted squares according to Henderson's [1] system in the map of Turkey.

Key words: Flora, Musci, Turkey.

1. INTRODUCTION

This system, which makes it easy for the researchers of plant geography, flora and vegetation, was used for the first time in Davis' "Flora of Turkey" [2].

The chorological studies made on the *Spermatophyta* in Turkey have continued with alphabetical ordered studies, which include members of Donner [3,4] and *Pteridophyta*, *Gymnospermae* and some *Dicotyledoneae* families spreading squares according to Davis' grid system [5-26].

The grid square used for Bryophytes of Turkey has been arranged according to Henderson [1]. In this system, the Turkey map has been divided into 15 equal parts (squares) by 3 horizontal and 5 vertical lines based on the latitudes and longitudes [Fig. 1].

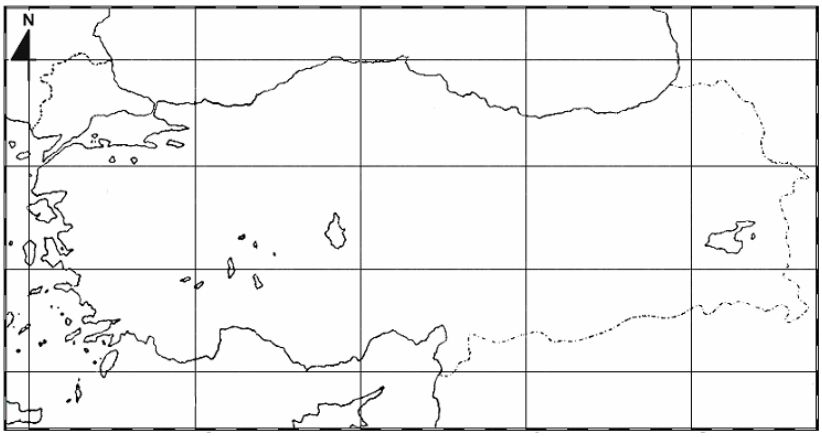

Figure 1. The grid square system of Turkey [1].

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Although Turkey ferns and phanerogamae flora have been written about in 11 volumes, the studies made on the bryophytes haven't reached the required level yet. But the bryological studies have made progress in the last two decades when compared with the past. We have the opinion that both the systematic studies and the chorological publications will contribute to the writing of the required papers about the Bryophyte Flora of Turkey and these studies will be a source for future studies.

2. TAXONOMIC HIERARCHY

The main source of the hierarchy is Goffinet & Buck [27] as used in the check-list entitled "the mosses of Europe and Macaronesia" prepared by Hill et al [28]. According to the latest arrangement, the names of some species have changed. Synonymous are also given in parentheses after the current names in the appendix.

The following abbreviations are used: Syn.:Synonym, Fig.: Figure.

3. DISCUSSIONS AND RESULTS

The chorological publications made for the *Spermatophyta* in Turkey have been a source for the following taxonomic studies.

Setting out from this idea, by scrutinizing the studies about Turkish mosses done up to now, we have tried to reveal the taxa distributions belonging to *Andreaeaceae*, *Archidiaceae*, *Aulacomniaceae*, *Amblystegiaceae* and *Anomodontaceae* families on the Henderson [1] grid system applied on a map of Turkey.

The family *Andreaeaceae* has 1 taxon belonging to 1 genus. In *Archidiaceae* family, there is 1 genus and 1 specimen. In *Aulocomniaceae* family, 1 genus, 2 species are spread. *Amblystegiaceae* family has 11 genera and 24 species. The family *Anomodontaceae* has 3 taxa belonging to 1 genus.

The status of seven species in the *Amblystegiaceae* is added to the different families in the new arrangement of mosses according to Hill et al. [28]. *Calliergonella cuspidata* (Hedw.) Loeske is mentioned in *Hypnaceae* and *Campylium calcareum* Crundw. & Nyholm is also added as *Campylophyllum calcareum* (Crundw. & Nyholm) Hedenäs to the aforementioned family. The six taxa, *Calliergon stramineum* (Brid.) Kindb., *C. cordifolium* (Hedw.) Kindb., *Warnstorfia exannulata* (Bruch, Schimp. & W.Gümbel) Loeske, *W. fluitans* (Hedw.) Loeske, *Hamatocaulis vernicosus* (Mitt.) Hedenäs, *Drepanocladus revolvens* (Sw.) Warnst., are also cited in *Calliergonaceae* family. Two of them were changed: *Calliergon stramineum* (Brid.) Kindb. to *Straminergon stramineum* (Dicks. ex Brid.) Hedenäs and *Drepanocladus revolvens* (Sw.) Warnst. to *Scorpidium revolvens* (Sw. ex anon.) Rubers. In addition, *Tomentypnum nitens* (Hedw.) Loeske in the *Brachytheciaceae* family is transferred to *Amblystegiaceae*.

As determined by Ketenoğlu et al. [29], collecting specimens from different geographic parts for researchs and following them made it easier to study and record the new species. Also, as seen in figure 1, the easy memorization feature of cities' distributions according to squares ensures that they can be remembered and learned. For this reason, the grid square system is very practical and useful for specimen collection and determination, particularly in floral studies. Besides, border changes due to various reasons or the difficulties seen when determining the new cities, borders make the grid system, accepted as a reference system, very useful.

Ketenoğlu et al. [29] stated that the grid system enables one to follow city borders, to distinguish phytogeographic elements and to determine the etymon of a species with an unknown origin. Also it makes it easy to learn a species, phylogenetic position, which phytogeographic region element it is and the connection to other elements, and finally, it facilitates the studies of researchers concerned with chorology.

ACKNOWLEDGEMENTS

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APPENDIX

ANDREAEOPSIDA

Andreaeaceae Dumort

Andreaea Hedw.

1. *A. rupestris* Hedw. (Syn.: *Andreaea rupestris* Hedw. var. *pygmaea* Mönk.) [30, 31, 32] [Fig.2].

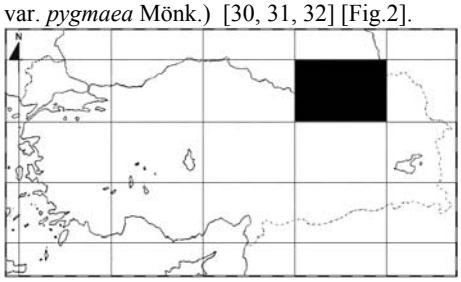

Figure 2. Distribution of *A. rupestris* Hedw. on the map of Turkey.

BRYOPSIDA

Archidiaceae Schimp.

Archidium Brid.

1. *A. alternifolium* (Hedw.) Mitt. [33, 34] [Fig. 3].

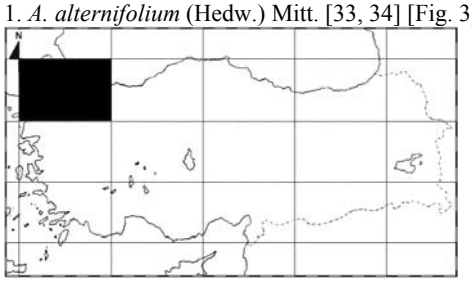

Figure 3. Distribution of *A. alternifolium* (Hedw.) Mitt. on the map of Turkey.

Aulacomniaceae Schimp.

Aulocomnium Schwägr., nom. cons.

1. *A. androgynum* (Hedw.) Schwägr. [35, 36, 37, 38, 39, 40] [Fig. 4].

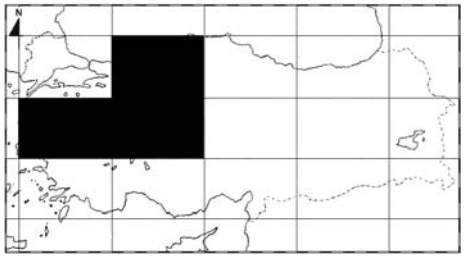

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Figure 4. Distribution of *A. androgynum* (Hedw.) Schwägr. on the map of Turkey.

2. *A. palustre* (Hedw.) Schwägr. [31, 34, 41] [Fig. 5].

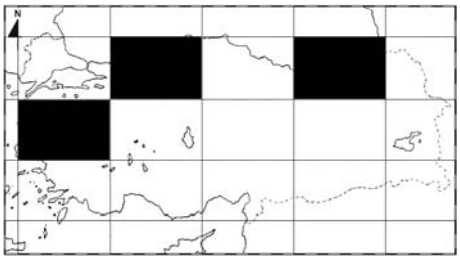

Figure 5. Distribution of *A. palustre* (Hedw.) Schwägr. on the map of Turkey.

Amblystegiaceae Kindb.

Amblystegium Schimp.

1. *A. confervoides* (Brid.) Schimp. (Syn: *Platydictya confervoides* (Brid.) H.A.Crum., *Serpoleskea confervoides* (Brid.) Loeske) [34, 42] [Fig. 6].

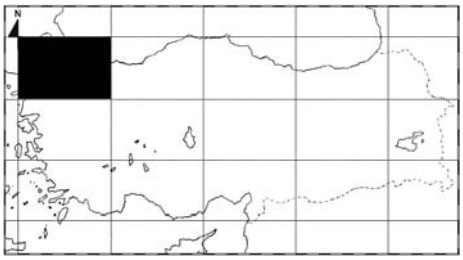

Figure 6. Distribution of *A. confervoides* (Brid.) Schimp. on the map of Turkey.

2. *A. serpens* (Hedw.) Schimp. (Syn: *A. juratzkanum* Schimp.) [30, 31, 32, 33, 34, 38, 39, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61] [Fig. 7].

Figure 7. Distribution of *A. serpens* (Hedw.) Schimp. on the map of Turkey.

3. *A. subtile* (Hedw.) Schimp. (Syn: *Platydictya subtilis* (Hedw.) H.A.Crum, *Serpoleskea subtilis* (Hedw.) Loeske) [32, 36] [Fig. 8].

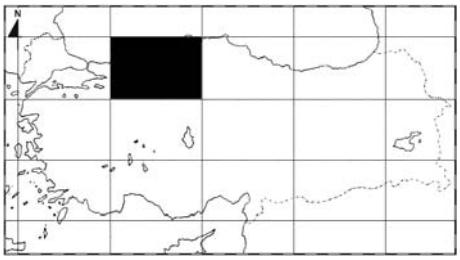

Figure 8. Distribution of *A. subtile* (Hedw.) Schimp. on the map of Turkey.

Campyliadelphus (Kindb.) R.S.Chopra

1. *C. chrysophyllus* (Brid.) R.S.Chopra (Syn: *Campylium chrysophyllum* (Brid.) Lange) [32, 36, 41, 58, 62] [Fig. 9].

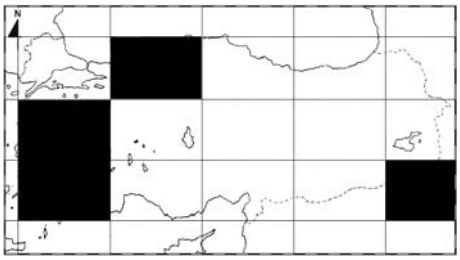

Figure 9. Distribution of *C. chrysophyllus* (Brid.) R.S.Chopra on the map of Turkey.

Campylium (Sull.) Mitt.

1. *C. protensum* (Brid.) Kindb. (Syn: *C.stellatum* subsp. p*rotensum* (Brid.) C.E.O. Jensen, *C.stellatum* var. *protensum* (Brid.) Bryhn) [32, 36, 38, 63] [Fig. 10].

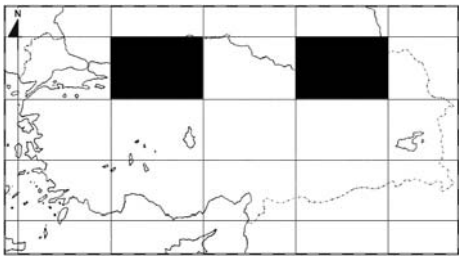

Figure 10. Distribution of *C. protensum* (Brid.) Kindb. on the map of Turkey.

2. *C. stellatum* (Hedw.) Lange & C.E.O. Jensen (Syn: *Campyliadelphus stellatus* (Hedw.) Kanda) [49] [Fig. 11].

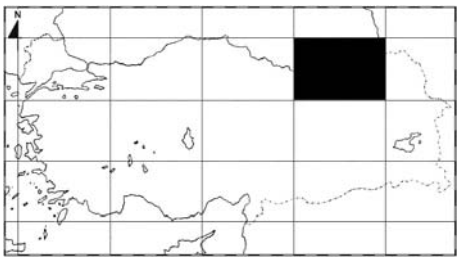

Figure 11. Distribution of *C. stellatum* (Hedw.) Lange & C.E.O. Jensen on the map of Turkey.

Cratoneuron (Sull.) Spruce

1. C. filicinum (Hedw.) Spruce (Syn: *Cratoneuron flicinum* var. *atrovirens* (Brid.) Ochyra) [30, 31, 32, 35, 36, 37, 38, 43, 44, 48, 50, 52, 58, 60, 61, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73] [Fig. 12].

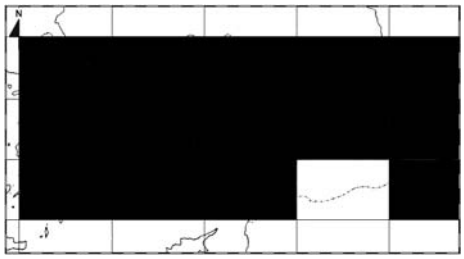

Figure 12. Distribution of *C. filicinum* (Hedw.) Spruce on the map of Turkey.

Drepanocladus (Müll.Hal.) G.Roth, nom. cons.

1. *D. aduncus* (Hedw.) Warnst. (Syn: *D. polycarpos* (Blandow ex Voit) Warnst., *D. simplicissimus* Warnst., *D. stagnatus* Zarnowiec) [31, 32, 35, 36, 40, 44, 74] [Fig. 13].

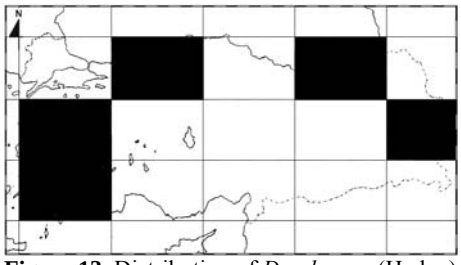

Figure 13. Distribution of *D. aduncus* (Hedw.) Warnst on the map of Turkey.

2. D. longifolius (Mitt.) Paris (Syn: *D. capillifolius* (Warnst.) Warnst.) [32] [Fig. 14].

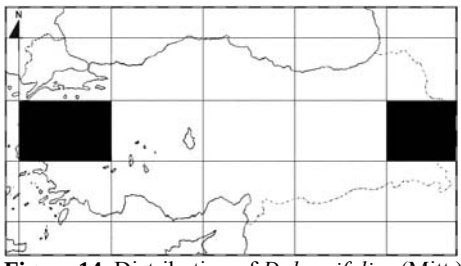

Figure 14. Distribution of *D. longifolius* (Mitt.) Paris on the map of Turkey.

3. *D. polygamus* (Schimp.) Hedenäs (Syn: *Campyliadelphus polygamus* (Schimp.) Kanda, *Campylium polygamum* (Schimp.) Lange & C.E.O. Jensen) [52, 75] [Fig. 15].

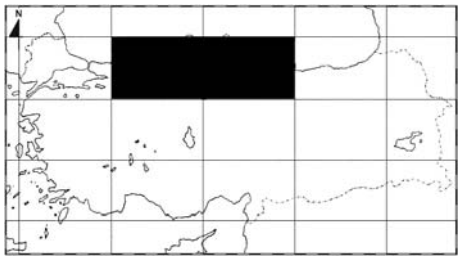

Figure 15. Distribution of *D. polygamus* (Schimp.) Hedenäs on the map of Turkey.

Hygroamblystegium Loeske, nom. cons.

1. H. fluviatile (Hedw.) Loeske (Syn: *Amblystegium fluviatile* (Hedw.) Schimp.) [30, 31, 32, 35, 36, 38, 52, 61, 72, 73] [Fig. 16].

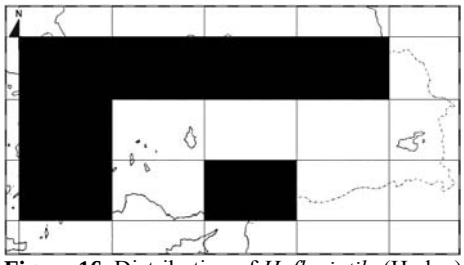

Figure 16. Distribution of *H. fluviatile* (Hedw.) Loeske on the map of Turkey.

2. *H. humile* (P.Beauv.) Vanderp., Goffinet & Hedenäs (Syn: *Amblystegium humile* (P.Beauv.) Crundw., *Leptodictyum humile* (P.Beauv.) Ochyra, *Leptodictyum kochii* (Schimp.) Warnst.) [34, 44, 57, 61, 76, 77] [Fig. 17].

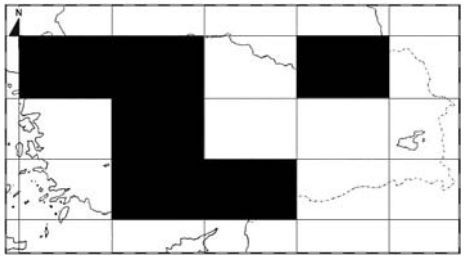

Figure 17. Distribution of *H. humile* (P.Beauv.) Vanderp., Goffinet & Hedenäs on the map of Turkey

3. *H. tenax* (Hedw.) Jenn. (Syn: *Amblystegium tenax* (Hedw.) C.E.O. Jensen) [31, 32, 35, 41, 46, 50, 57, 58, 61, 65, 72, 78] [Fig. 18].

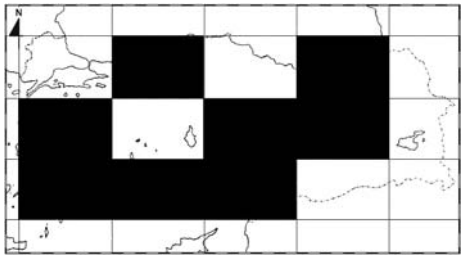

Figure 18. Distribution of *H. tenax* (Hedw.) Jenn.on the map of Turkey.

4. *H. varium* (Hedw.) Mönk. (Syn: *Amblystegium varium* (Hedw.) Lindb., *Orthotheciella varia* (Hedw.) Ochyra) [32, 35, 36, 44, 50, 57, 58, 60, 61, 62, 67, 68, 70, 72, 73, 74, 76, 79, 80] [Fig. 19].

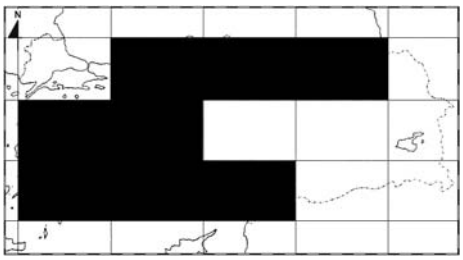

Figure 19. Distribution of *H. varium* (Hedw.) Mönk. on the map of Turkey.

Hygrohypnum Lindb.

1. *H. durisculum* (De Not.) D.W.Jamieson (Syn: *Hygrohypnella duriuscula* (Turner ex Wilson) Ignatov & Ignatova, H.dilatatum (Wilson) Loeske) [81] [Fig. 20].

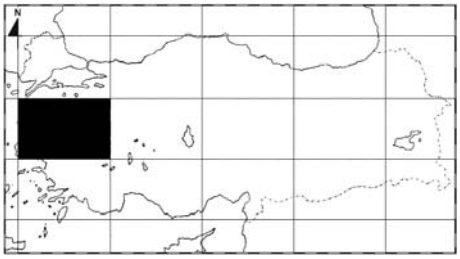

Figure 20. Distribution of *H. durisculum* (De Not.) D.W.Jamieson on the map of Turkey.

2. *H. eugyrium* (Schimp.) Broth. (Syn: *Pseudohygrohypnum eugyrium* (Schimp.) Kanda) [49] [Fig. 21].

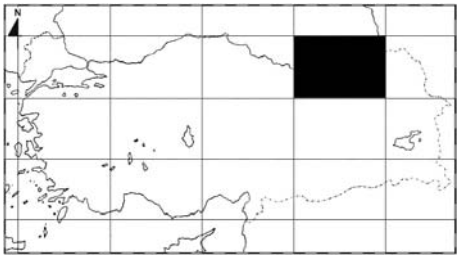

Figure 21. Distribution of *H. eugyrium* (Schimp.) Broth. on the map of Turkey.

3. *H. luridum* (Hedw.) Jenn. (Syn: *Pictus scoticus* C.C.Towns.) [31, 32, 35, 38, 44, 49, 64, 66, 76] [Fig. 22].

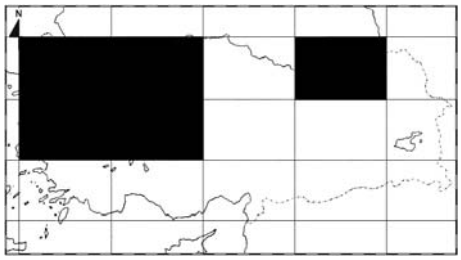

Figure 22. Distribution of *H. luridum* (Hedw.) Jenn. on the map of Turkey.

4. *H. smithii* (Sw.) Broth. (Syn: *Oschyraea smithii* (Sw.) Ignatov & Ignatova) [32, 36] [Fig. 23].

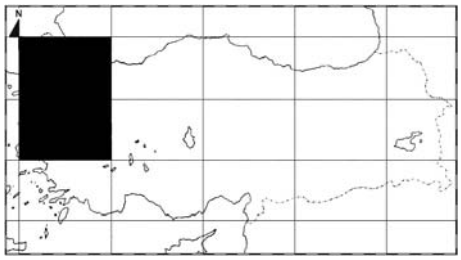

Figure 23. Distribution of *H. smithii* (Sw.) Broth. on the map of Turkey.

Leptodictyum (Schimp.) Warnst.

1. *L. riparium* (Hedw.) Warnst. (Syn: *Amblystegium riparium* (Hedw.) Schimp.) [31, 32, 36, 37, 38, 39, 40, 41, 44, 58, 61, 62, 64, 77, 78, 80, 82, 83] [Fig. 24].

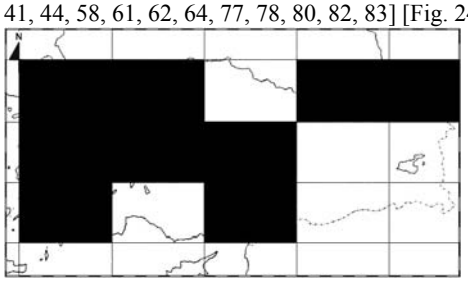

Figure 24. Distribution of *L. riparum* (Hedw.) Warnst. on the map of Turkey.

Palustriella Ochyra

1. *P. commutata* (Hedw.) Ochyra (Syn: *Cratoneuron commutatum* (Hedw.) G.Roth, *P. commutata* var. *fluctuans* (Schimp.) [32, 33, 34, 36, 37, 38, 39, 40, 41, 43, 47, 50, 52, 58, 61, 64, 66, 71, 83, 84] [Fig. 25].

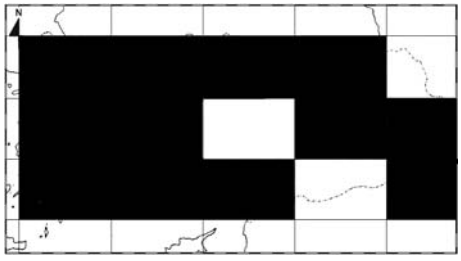

Figure 25. Distribution of *P. commutata* (Hedw.) Ochyra on the map of Turkey.

2. *P. decipiens* (De Not.) Ochyra (Syn: *Cratoneuron decipiens* (De Not.) Loeske) [31, 32, 68, 71] [Fig. 26].

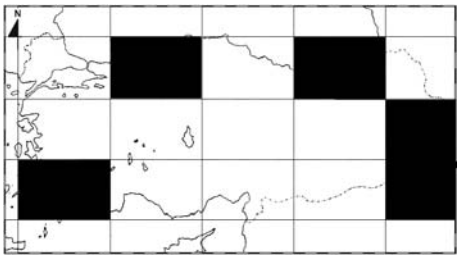

Figure 26. Distribution of *P. decipiens* (De Not.) Ochyra on the map of Turkey.

3. *P. falcata* (Brid.) Hedenäs (Syn: *Cretoneuron falcatum* (Brid.) G.Roth., *P.commutata* var. *falcata* (Brid.) Ochyra, *P.commutata* var. *sulcata* (Lindb.) Ochyra) [30, 32, 35, 36, 44, 47, 51, 52, 58, 60, 70] [Fig. 27].

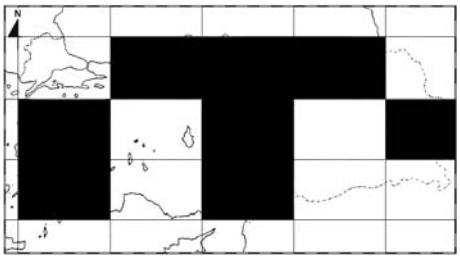

Figure 27. Distribution of *P. falcata* (Brid.) Hedenäs on the map of Turkey.

Sanionia Loeske

1. *S. uncinata* (Hedw.) Loeske (Syn: *Drepanocladus uncinatus* (Hedw.) Warnst.) [31, 32, 36, 40, 41, 43, 46, 52, 63, 66, 70, 74] [Fig. 28].

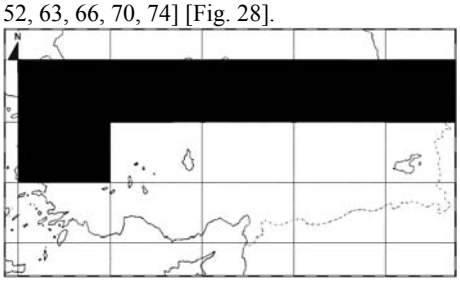

Figure 28. Distribution of *S. uncinata* (Hedw.) Loeske on the map of Turkey.

Tomentypnum Loeske

1. *T. nitens* (Hedw.) Loeske (Syn: *Homalothecium nitens* (Hedw.) H.Rob.) [34, 63, 80, 84] [Fig. 29]

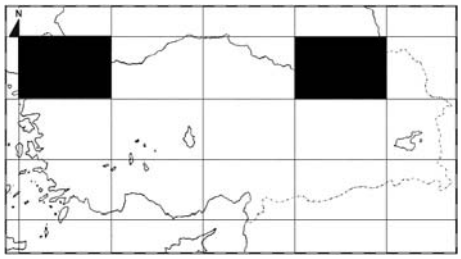

Figure 29. Distribution of *T. nitens* (Hedw.) Loeske on the map of Turkey.

Anomodontaceae Kindb.

Anomodon Hook. & Taylor

1. *A. attenuatus* (Hedw.) Huebener [32, 38, 44, 49, 52, 67, 73, 77, 80, 82, 85, 86, 87] [Fig. 30].

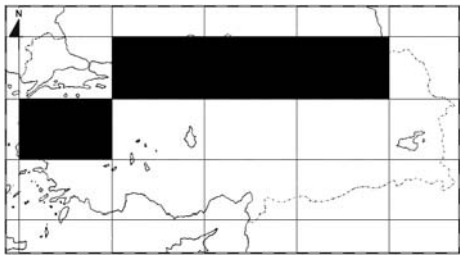

Figure 30. Distribution of *A. attenuatus* (Hedw.) Huebener on the map of Turkey.

2. *A. rugelii* (Müll. Hal.) Keissl. [30, 32, 36, 49,66][Fig.31].

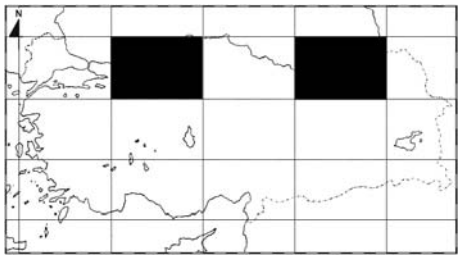

Figure 31. Distribution of *A. rugelii* (Müll. Hal.) Keissl. on the map of Turkey.

3. *A. viticulosus* (Hedw.) Hook. & Taylor [32, 33, 34, 36, 38, 39, 40, 44, 45, 49, 52, 65, 66, 67, 77, 80, 85, 86, 87, 88, 89, 90] [Fig. 32].

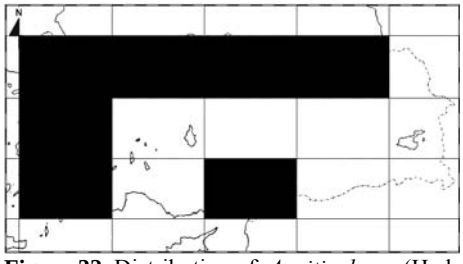

Figure 32. Distribution of *A. viticulosus* (Hedw.) Hook. & Taylor on the map of Turkey.