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The Moss Flora of Ankara – Kızılcahamam – Çamkoru and Çamlıdere Districts

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Abstract: In this study carried out in Ankara-Kızılcahamam Çamlıdere and Çamkoru districts, 82 taxa were identified by the authors. These belong to 20 families and 42 genera of bryophytes. of these, 10 taxa are new for the A2 grid-square adopted by Henderson.

Key Words: Bryophytes, Moss Flora, Kızılcahamam, Çamkoru, Çamlıdere.

Ankara - Kızılcahamam – Çamkoru ve Çamlıdere Karayosunları Florası

Özet: Bu çalışmada, araştırma alanı olan Ankara – Kızılcahamam-Çamkoru ve Çamlıdere bölgelerinden toplanan karayosunu örnekleri değerlendirilerek 20 familya ya ait 42 cins ve bunlara bağlı 82 takson tanımlanmıştır. Bunlardan 10 tanesi Henderson tarafından benimsenen kareleme sistemine göre A2 karesi için yenidir.

Anahtar Sözcükler: Bryophyta, Karayosun, Flora, Kızılcahamam, Çamkoru, Çamlıdere.

Introduction

The study area, Ankara-Kızılcahamam-Çamkoru and Çamlıdere is located in the northwest of the Inner Anatolia region and surrounded by Dörtdivan in the northwest, Güvem in the northeast, Kızılcahamam in the southwest and Çeltikçi in the south (Figure 1). According to the system adopted by Henderson & Prentice (1961) (Figure 1), the study area is in the A2 grid-square ♦No detailed study has been made on the moss flora of Ankara-Kızılcahamam-Çamkoru and Çamlıdere, which was chosen as study area.

The study area stretches across the transitional zone from the steppe of Central Anatolia to the lush and green forested lands of Northern Anatolia. *Pinus nigra* Arn. subsp. *pallasiana* (Lampf.) Holme, *P. sylvestris* L., *Abies nordmanniana* (Stev.) Spach subsp. *bornmuelleriana* (Mattf.) Coode & Cullen, *Quercus petraea* (Matt.) Lieble., *Q. pubescens* Willd., *Populus tremula* L., *Acer campestre* L., *Carpinus betulus* L., and *Crataegus tanacetifolia* (Lam.) Pers. cover the area, preserving their natural looks.

The region has the characteristics of an oceanic as well as a Mediterranean climate (Akman, 1990). In the study area, at higher altitudes, where the oceanic influence can be seen, the amount of annual rainfall is more than that at lower altitudes, where significant summer dryness, characteristic of the Mediterranean climate, occurs. This variety makes the area interesting. In addition, the study area stretches to 1859m and is close to the subalpine region.

The region is very interesting in terms of its natural structure and its climate and this encouraged us to conduct a study on the bryophytes.

It is hoped that this study will contribute to the identification of the moss flora of Turkey be useful as a guide for future studies.

Materials and Methods

The materials for this study were collected during periodic field trips between 1996 and 1998 in different seasons.

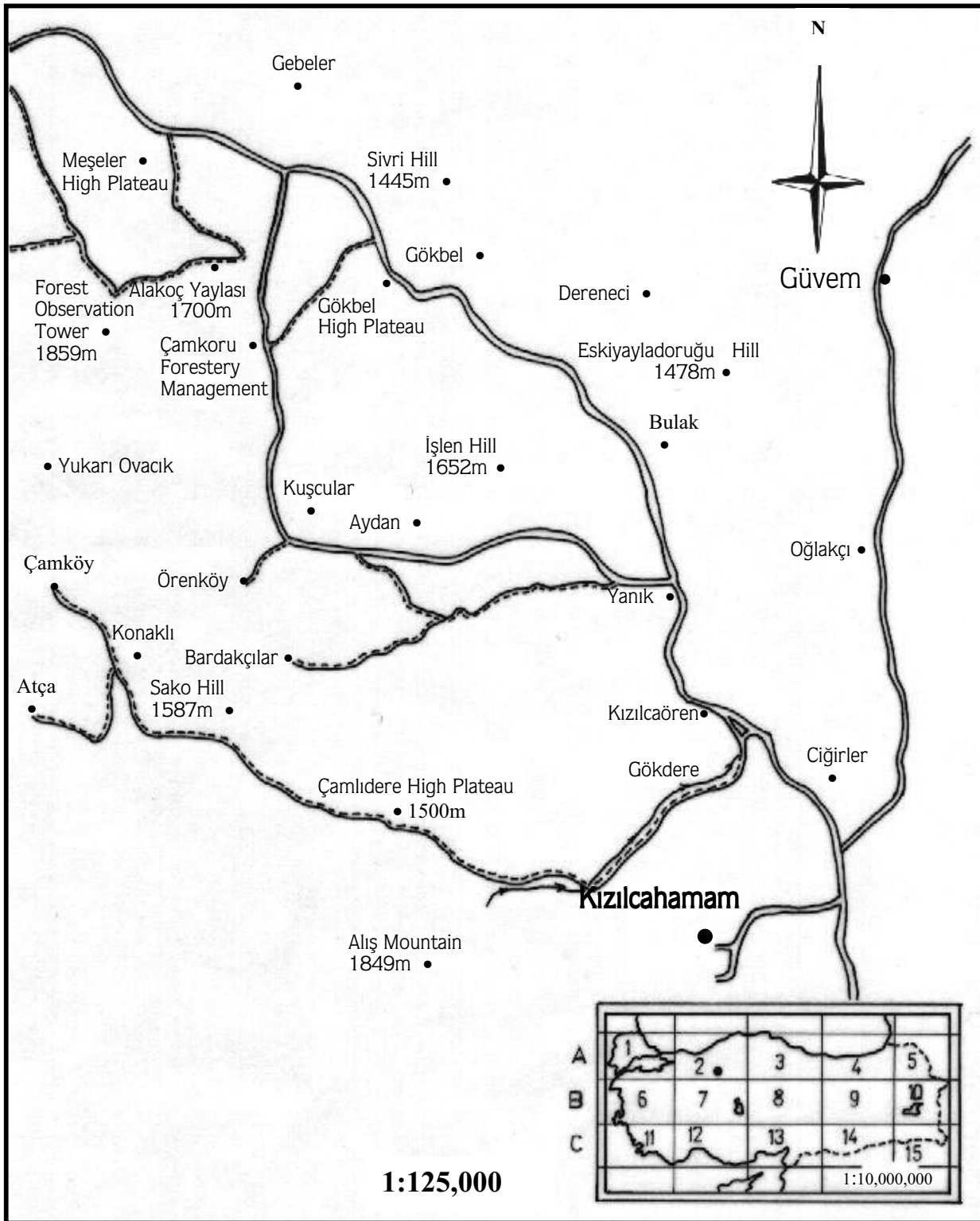


Figure 1. The map of study area and the grid system which is adopted by Henderson & Prentice for Turkey. • Study Area

The identification of the samples was carried out using various books on moss flora (Smith, 1980; Watson, 1981; Nyholm, 1981). In addition, the status of the species for the study area and for Turkey was determined by reviewing the related literature (Çetin, 1988). The plant list is arranged according to the system proposed by Corley et al. (1981). The taxa new for the A2 grid square are indicated with an asterisk.

The samples were deposited within the herbarium of the University of Ankara, Faculty of Science, Department of Biology.

Floristic List

Bryophyta

Musci

Polytrichaceae

Polytrichum Hedw.

1. *P. juniperinum* Hedw.

A2 Ankara: Kızılcahamam-Çamkoru, Çamlidere forestry management's environs, *Pinus sylvestris*, forest, 1300 m, on soil, 20.10.1996 UNÇ 16

Distribution: Sub-cosmopolitan and widespread in temperate regions of both hemispheres.

2. **P. formosum* Hedw.

A2 Ankara: Kızılcahamam-Çamkoru, Alakoç high plateau, *Abies nordmanniana* subsp. *bornmuelleriana*, *Pinus sylvestris*, forest, 1700 m, on soil, 20.10.1996 UNÇ 31

Distribution: Turkey (A1, A4, A5), Europe, Iceland, Asia, N. America, S. Africa.

Dicranaceae Schimp.

Dicranum Hedw.

3. *D. scoparium* Hedw.

A2 Ankara: Çamlidere high plateau, *Pinus sylvestris*, forest, 1450 m, on soil, 12.7.1997 ÇETİN 982

Distribution: Sub-cosmopolitan

4. *D. majus* Turn.

A2 Ankara: Çamlidere high plateau, *Pinus sylvestris*, forest, 1400 m, on soil, 12.7.1997 ÇETİN 981

Distribution: Sub-cosmopolitan

5. *D. tauricum* Sap.

A2 Ankara: Kızılcahamam-Çamkoru, Alakoç high plateau, *Abies nordmanniana* subsp. *bornmuelleriana*,

Pinus sylvestris, forest, 1600 m, on decaying tree trunk, 27.6.1998 UNÇ 44

Distribution: Turkey (A2, A3, B6), Europe, N. America, Greenland.

6. *D. polysetum* Sw.

A2 Ankara: Kızılcahamam-Çamkoru, Alakoç high plateau, *Pinus sylvestris*, *Abies nordmanniana* subsp. *bornmuelleriana*, forest, 1620 m, on tree trunk, 2.11.1997 UNÇ 38

Distribution: Turkey (A2, A4), Europe, N. America, Asia.

Dicranoweisia Milde.

7. *D. crispula* (Hedw.) Lindb.

A2 Ankara: Kızılcahamam-Çamkoru, Alakoç high plateau, *Pinus sylvestris*, *Abies nordmanniana* subsp. *bornmuelleriana*, forest, 1700 m, on soil, 20.10.1996 UNÇ 30

Distribution: Turkey (A2, A4, A5), sub-cosmopolitan.

Dicranella (C.Müll.) Schimp.

8. **D. heteromalla* (Hedw.) Schimp.

A2 Ankara: Çamlidere high plateau, *Pinus sylvestris*, forest, 1400 m, on tree roots, 15.7.1997 ÇETİN 990

Distribution: Turkey (A3, A4, A5), Europe, Asia, N. America.

Ditrichaceae B., S. & G.

Ceratodon Brid.

9. *C. purpureus* (Hedw.) Brid.

A2 Ankara: Kızılcahamam-Çamkoru, Alakoç high plateau, *Pinus nigra*, *Pinus sylvestris* forest, 1500 m, on soil, 20.10.1996 UNÇ 20

Distribution: Sub-cosmopolitan.

Ditrichum Hampe.

11. *D. flexicaule* (Schwaegr.) Hampe

A2 Ankara: Çamlidere high plateau, *Pinus nigra*, forest, 1450 m, on soil, 12.7.1997 ÇETİN 980

Distribution: Turkey (A2, A4, B7, C12), C. Europe, C. Asia, N. America

Encalyptaceae Schimp.

Encalypta Hedw.

12. E. vulgaris Hedw.

A2 Ankara: Çamlidere high plateau, *Pinus nigra*, forest, 1500 m, on soil, 12.7.1997 UYAR 301

Distribution: Sub-cosmopolitan.

Pottiaceae

Tortula Hedw.

13.T. subulata Hedw.var. **subulata**

A2 Ankara: Çamlidere high plateau, *Pinus nigra*, forest, 1400 m, on soil, 12.7.1997 ÇETİN 977

Distribution: Sub-cosmopolitan.

14. T. subulata Hedw. var. **angustata** (Schimp.) Limpr.

A2 Ankara: Kızılcahamam-Çamkoru, Alakoç high plateau, *Abies nordmanniana* subsp. *bornmuelleriana*, forest, 1700 m, on soil, 20.10.1996 UNÇ 27

Distribution: Turkey (A1, A2, B6, B8), Europe, Asia, N. America, N. Africa.

15. T. ruralis (Hedw.) Gaertn. var. **ruralis**

A2 Ankara: Kızılcahamam-Çamkoru, Alakoç high plateau, *Pinus sylvestris* forest, 1450 m, on soil, 20.10.1996 UNÇ 18

Distribution: Sub-cosmopolitan.

16. T. ruralis (Hedw.) Gaertn. subsp. **calcolens** W.Kramer.

A2 Ankara: Kızılcahamam-Çamkoru, Alakoç high plateau, 1600 m, near Ballıpınar stream, on rock, 1.11.1997 UNÇ 43

Distribution: Turkey (A2), N. America, S. Africa, Australia, Greenland.

17. T. norvegica (Web.) Wahl. & Lindb.

A2 Ankara: Kızılcahamam-Çamkoru, Alakoç high plateau, 1550m, *Abies nordmanniana* subsp. *bornmuelleriana*, forest, on soil, 13.7.1996, UNÇ 8

Distribution: Turkey (A1, A2, B9), Europe, N. Asia, N. America.

18. T. ruraliformis (Besch.) Grout.

A2 Ankara: Çamlidere high plateau, *Pinus sylvestris* forest, 1500 m, on soil, 20.10.1996 UYAR 291

Distribution: Turkey (A1, A2, B6, B7, B8, C11), Europe, W. Asia, N. Africa, N. America.

Barbula Hedw.

19. B. convoluta Hedw.

A2 Ankara: Çamlidere high plateau, *Pinus sylvestris* forest, 1400 m, on soil, 20.9.1997 UYAR 310

Distribution: Sub-cosmopolitan

20. B. unguiculata Hedw.

A2 Ankara: Çamlidere high plateau, *Pinus sylvestris* forest, 1500 m, on soil, 20.9.1997 UYAR 309

Distribution: Turkey (A1, A2, A3, B6, B7, C11), Europe, Asia.

Didymodon Hedw.

21. D. fallax Hedw. Zander.

A2 Ankara: Çamlidere high plateau, *Pinus sylvestris* forest, 1550 m, on rock, 12.7.1997 UYAR 300

Distribution: Turkey (A2, B6, B9, C11, C13), Europe, N. America, Asia.

22. D. vinealis (Brid.) Zander.

A2 Ankara: Çamlidere high plateau, *Pinus sylvestris* forest, 1600 m, on rock, 12.7.1997 UYAR 299

Distribution: Sub-cosmopolitan.

Bryoerythrophyllum Chen.

23. B. recurvirostrum (Hedw.) Chen.

A2 Ankara: Çamlidere high plateau, *Pinus nigra* forest, 1300 m, on soil, 12.7.1997 UYAR 298

Distribution: Sub-cosmopolitan.

Weissia Hedw.

24. W. controversa Hedw. var. **crispata** (Nees & Horansch.) Nyh.

A2 Ankara: Çamlidere high plateau, *Pinus sylvestris* forest, 1550 m, on rock, 12.7.1997 UYAR 297

Distribution: Turkey (A2, A3, A4, B6, B9, C12), Europe, N. Africa, N. America.

Tortella Limpr.

25. T. tortuosa (Hedw.) Limpr.

A2 Ankara: Çamlidere high plateau, *Pinus nigra* forest, 1400 m, on soil, 12.7.1997 ÇETİN 976

Distribution: Circumboreal.

GRIMMIALES

Grimmiaceae

Schistidium Brid.

26. S. confertum (Frunck) B., S. & G.

A2 Ankara: amlidere high plateau, *Pinus sylvestris* forest, 1500 m, on rock, 12.7.1997 UYAR 296

Distribution: Turkey (A2, A4, B6, B8, B9, C13, C14), Europe, Asia, Africa, N. America.

27. S. apocarpum (Hedw.) B. & S.

A2 Ankara: amlidere high plateau, *Pinus sylvestris* forest, 1500 m, on tree trunk, 2.11.1997 UYAR 313

Distribution: Cosmopolitan.

Grimmia Hedw.

28. G. anodon Bruch & Schimp.

A2 Ankara: amlidere high plateau, *Pinus sylvestris* forest, 1500 m, on rock, 2.11.1997 UYAR 312

Distribution: Cosmopolitan.

29. G. pulvinata (Hedw.) Sm.

A2 Ankara: amlidere high plateau, *Pinus sylvestris* forest, 1400 m, on rock, 15.7.1997 ÇETİN 986

Distribution: Sub-cosmopolitan.

30.* G. alpestris (Web. & Mohr.) Schleich.

A2 Ankara: Kızılcahamam-amkoru, Alako high plateau, *Abies nordmanniana* subsp. *bornmuelleriana*, forest, 1500 m, on rock, 20.10.1996 UŒ 24

Distribution: Turkey (A4, B8), Europe, N. America, Asia.

31. G. ovalis (Hedw.) Lindb.

A2 Ankara: Kızılcahamam-amkoru, Alako high plateau, *Pinus nigra* forest, 1500 m, on rock, 20.10.1996 UŒ 25

Distribution: Cosmopolitan.

32.*G. affinis Hornsch.

A2 Ankara: Kızılcahamam-amkoru, Alako high plateau, *Pinus nigra* forest, 1500 m, on rock, 20.10.1996 UŒ 22

Distribution: Turkey (A1), Europe, Asia, Africa, N. America.

33. G. trichophylla Grev. var. *trichophylla*

A2 Ankara: Kızılcahamam-amkoru, Alako high plateau, *Pinus nigra* forest, 1500 m, on rock, 20.10.1996 UŒ 23

Distribution: Cosmopolitan.

34. G. decipiens (Schultz) Lindb.

A2 Ankara: amlidere high plateau, *Pinus sylvestris* forest, 1550 m, on rock, 2.11.1997 UYAR 311

Distribution: Turkey (A1, A2, A4, B6, C13), Europe, N. Africa, N. America.

Racomitrium Brid.

35. R. canescens (Hedw.) Brid.

A2 Ankara: Kızılcahamam-amkoru, Alako high plateau, *Abies nordmanniana* subsp. *bornmuelleriana*, forest, 1500 m, on wet soil, 13.7.1996 UŒ 4

Distribution: Turkey (A1, A2, A4), Europe, America, N. Asia.

BRYALES**Bryaceae**

Pohlia Hedw.

36. P. cruda (Hedw.) Lindb.

A2 Ankara: Kızılcahamam-amkoru, Alako high plateau, *Pinus sylvestris*, *Abies nordmanniana* subsp. *bornmuelleriana* forest, 1650 m, on soil, 2.11.1997 UŒ 40

Distribution: Cosmopolitan.

Bryum Hedw.

37. B. alpinum With.

A2 Ankara: amlidere high plateau, *Pinus nigra* forest, 1200 m, on soil, 12.7.1997 UYAR 295

Distribution: Turkey (A2, B6, B7, B8, C11), Europe, Asia, Africa, America.

38. B. capillare Hedw.

A2 Ankara: amlidere high plateau, *Pinus sylvestris* forest, 1450 m, on rock, 12.7.1997 ÇETİN 985

Distribution: Cosmopolitan.

39. B. cernuum (Hedw.) Lindb.

A2 Ankara: Kızılcahamam-amkoru, Alako high plateau, *Pinus sylvestris*, *Abies nordmanniana* subsp. *bornmuelleriana* forest, 1550 m, on wet soil, 13.7.1996 UŒ 11

Distribution: Turkey (A2), Europe, Iceland, E. Siberia, Himalayas.

40. B. torquescens Bruch ex De Not.

A2 Ankara: amlidere high plateau, *Pinus sylvestris* forest, 1500 m, on soil, 12.7.1997 UYAR 294

Distribution: Turkey (A1, A2, B6, B8, C11, C12), sub-cosmopolitan.

41. B. pallescens Schleich. ex Schwaegr.

A2 Ankara: Çamlidere high plateau, *Pinus sylvestris*, *Juniperus communis* subsp. *nana* forest, 1500 m, on soil, 2.9.1997 UYAR 308

Distribution: Turkey (A1, A2, B6, B8), C. Europe, Asia, America, Africa.

42. B. argenteum Hedw.

A2 Ankara: Çamlidere high plateau, *Pinus sylvestris*, forest, 1600 m, on soil, 3.11.1997 UYAR 317

Distribution: Cosmopolitan.

43. B. caespiticum Hedw.

A2 Ankara: Çamlidere high plateau, *Pinus sylvestris*, forest, 1600 m, on rock, 3.11.1997 UYAR 316

Distribution: Cosmopolitan.

44. B. creberrimum Tayl.

A2 Ankara: Kızılcahamam-Çamkoru, Alakoç high plateau, *Abies nordmanniana* subsp. *bornmuelleriana* forest, 1550 m, on wet soil, 13.7.1996 UNÇ 10

Distribution: Turkey (A2, B6, C11), Europe, N. Asia, N. America, Australia, New Zealand.

45. B. pseudotriquetrum (Hedw.) Gaertn., Meyer & Scherb

A2 Ankara: Kızılcahamam-Çamkoru, Alakoç high plateau, *Abies nordmanniana* subsp. *bornmuelleriana*, *Pinus sylvestris* forest, 1600 m, on tree trunk, 27.6.1998 UNÇ 46

Distribution: Cosmopolitan.

Mniaceae

Rhizomnium (Broth.) T.Kop.

46. R. punctatum (Hedw.) T.Kop.

A2 Ankara: Kızılcahamam-Çamkoru, Alakoç high plateau, *Abies nordmanniana* subsp. *bornmuelleriana*, *Pinus sylvestris* forest, 1550 m, on wet soil near Ballıpınar stream, 13.7.1996 UNÇ 13

Distribution: Turkey (A1, A2, A3, A4, B6), C. Europe, Asia, N. America.

Plagiomnium Kop.

47. P. affine (Bland. ex Funck) T.Kop.

A2 Ankara: Kızılcahamam-Çamkoru, *Pinus sylvestris* forest, 1600 m, on wet soil near Ballıpınar stream, 12.11.1997 UNÇ 36

Distribution: Turkey (A1, A2, A4, B6, B8), Europe, Asia.

48. *P. undulatum (Hedw.) T.Kop.

A2 Ankara: Kızılcahamam-Çamkoru, Alakoç high plateau, *Abies nordmanniana* subsp. *bornmuelleriana* forest, 1600 m, on wet soil near Ballıpınar stream, 13.7.1996 UNÇ 14

Distribution: Turkey (A1, A3, A4, B6, C13), Europe, Asia, Africa.

Aulacomniaceae Schimp.

Aulacomnium Schwaegr.

49. * A. androgynum (Hedw.) Schwaegr.

A2 Ankara: Kızılcahamam-Çamkoru, Alakoç high plateau, *Pinus nigra*, *P. sylvestris*, forest 1350 m, on tree roots, 12.7.1997 UNÇ 33

Distribution: Turkey (A1, B6, B8), Europe, N. America, Japan.

Bartramiaceae

Bartramia Hedw.

50. B. ithyphylla Brid.

A2 Ankara: Kızılcahamam-Çamkoru, Alakoç high plateau, *P. sylvestris*, *Abies nordmanniana* subsp. *bornmuelleriana* forest, 1650 m, on soil, 2.11.1997 UNÇ 41

Distribution: Turkey (A1, A2, A4), Europe, Asia, N. & E. Africa, N. America.

Timmiaceae Schimp.

Timmia Hedw.

51. T. austriaca Hedw.

A2 Ankara: Kızılcahamam-Çamkoru, Alakoç high plateau, *Abies nordmanniana* subsp. *bornmuelleriana*, *P. sylvestris* forest, 1700 m, on soil, 27.6.1998 UNÇ 48

Distribution: Turkey (A2), Europe, N. & C.Asia, N. America, Japan, Greenland.

ORTHOTRICHALES

Orthotrichaceae Arnott.

Orthotrichum Hedw.

52. O. affine Brid.

A2 Ankara: amlidere high plateau, *Pinus sylvestris* forest, 1450 m, on tree trunk, 12.7.1997 ETİN 979

Distribution: Turkey (A1, A2, A3, B6), Europe, N. Asia, N. Africa, N. America.

53. O. rupestre Schleich. ex Schwaegr

A2 Ankara: amlidere high plateau, *Quercus pubescens*, *Q. petraea* forest, 1100 m, on rock, 2.9.1997 UYAR 307

Distribution: Cosmopolitan.

54. O. striatum Hedw.

A2 Ankara: Kızılcahamam-amkoru, *Pinus sylvestris* forest, 1350 m, on rock, 13.7.1996, UŇ 1

Distribution: Turkey (A1, A2, A4, B6, C13), Europe, Asia, N. Africa, N. America.

55. O. cupulatum Brid.

A2 Ankara: amlidere high plateau, *Pinus nigra* forest, 1350 m, on rock, 17.10.1998 UYAR 232

Distribution: Sub-cosmopolitan.

Hedwigiaceae Schimp.**Hedwigia** P.Beauv.**56. H. ciliata** (Hedw.) P.Beauv.

A2 Ankara: amlidere high plateau, *Quercus pubescens* forest, 1200 m, on soil, 3.11.1997 UYAR 315

Distribution: Cosmopolitan.

ISOBRYALES**Fontinalaceae** Schimp.**Fontinalis** Hedw.**57. F. antipyretica** Hedw. var. *antipyretica*

A2 Ankara: Kızılcahamam-amkoru, Alako high plateau, on rock in Ballıpınar stream, 1600 m, 2.11.1997, UŇ 37

Distribution: Sub-cosmopolitan.

Leucodontaceae Schimp.**Leucodon** Schwaegr.**58. L. sciuroides** (Hedw.) Schwaegr.

A2 Ankara: amlidere high plateau, *Quercus pubescens* forest, 1100m, on tree trunk, 3.11.1997 UYAR 314

Distribution: Sub-cosmopolitan.

THUIDIALES**Leskeaceae** Schimp.**Lescurea** B., S. & G.**59. *L. incurvata** (Hedw.) Lawt.

A2 Ankara: Kızılcahamam-amkoru, Alako high plateau, *Abies nordmanniana* subsp. *bornmuelleriana*, *P. sylvestris* forest, on soil, 1550 m, 20.10.1996, UŇ 15

Distribution: Turkey (A1, A4, B10, C13), Europe, Asia, Japan, N. America.

Pterigynandrum Hedw.**60. P. filiforme** Hedw.

A2 Ankara: Kızılcahamam-amkoru, Alako high plateau, *Abies nordmanniana* subsp. *bornmuelleriana*, forest, on tree roots, 1500 m, 13.7.1996, UŇ 3

Distribution: Turkey (A2, A3, B6, C11), Europe, Asia, Japan, N. America.

Thuidiaceae Schimp.**Anomodon** Hook. & Tayl.**61. A. viticulosus** (Hedw.) Hook. & Tayl

A2 Ankara: amlidere high plateau, *Pinus sylvestris* forest, 1500m, on tree trunk, 2.9.1997 UYAR 306

Distribution: Turkey (A2, A3, A4, B6, C13), C. Europe, C. Asia, N. America.

HYPNOBRYALES**Amblystegiaceae** (Broth.) Fleish.**Cratoneuron** (Sull.) Spruce**62. C. commutatum** (Hedw.) Roth.

A2 Ankara: amlidere high plateau, *Pinus sylvestris* forest, 1500m, on rock, 2.9.1997 UYAR 305

Distribution: Turkey (A2, B7, B8, B9, C13, C15), C. Europe, N. Africa, C. Asia, N. America.

Amblystegium B., S. & G.**63. A. riparium** (Hedw.) B., S. & G.

A2 Ankara: Kızılcahamam-amkoru, Alako high plateau on rock in Ballıpınar stream, 1500 m, 13.7.1996, UYAR 290

Distribution: Turkey (A2, B6), sub-cosmopolitan.

Drepanocladus (C. Müll.) Roth.

64. * D. aduncus (Hedw.) Loeske.

A2 Ankara: Kızılcahamam-Çamkoru, Alakoç high plateau on rock in Ballıpınar stream, 1600 m, 26.6.1998, UNÇ 35

Distribution: Turkey (A2, B6, C10), sub-cosmopolitan.

Sanionia Loeske.

65. S. uncinata (Hedw.) Kindb.

A2 Ankara: Kızılcahamam-Çamkoru, Alakoç high plateau, *Abies nordmanniana* subsp. *bornmuelleriana*, forest, on soil near Ballıpınar stream, 1550 m, 13.7.1996, UNÇ 9

Distribution: Turkey (A1, A2, A3, A4, A5), sub-cosmopolitan.

Calliergon (Sull.) Kindb.

66. * C. cordifolium (Hedw.) Kindb.

A2 Ankara: Kızılcahamam-Çamkoru, Alakoç high plateau, *Abies nordmanniana* subsp. *bornmuelleriana*, forest, on rock in Ballıpınar stream, 1600 m, 27.6.1998, UNÇ 45

Distribution: Turkey (B6, C10), sub-cosmopolitan.

Brachytheciaceae Schimp.

Homalothecium B., S. & G.

67. H. sericeum (Hedw.) B., S. & G.

A2 Ankara: Çamlidere high plateau, *Pinus nigra* forest, 1350m, on tree roots, 14.7.1997 ÇETİN 987

Distribution: Sub-cosmopolitan.

68. H. lutescens (Hedw.) Robins.

A2 Ankara: Kızılcahamam-Çamkoru, Alakoç high plateau, *Abies nordmanniana* subsp. *bornmuelleriana*, forest, on rock, 1550 m, 13.7.1996, UNÇ 2

Distribution: Sub-cosmopolitan.

Brachythecium B., S. & G.

69. * B. velutinum (Hedw.) B., S. & G. var. *velutinum*

A2 Ankara: Çamlidere high plateau, *Pinus sylvestris* forest, 1500m, on decaying tree trunk, 14.7.1997 UYAR 318

Distribution: Turkey (A1, B6, C12), Europe, Asia, N. America.

70. * B. velutinum (Hedw.) B., S. & G. var. *salicinum* (B., S. & G.) Moenk.

A2 Ankara: Kızılcahamam-Çamkoru, Alakoç high plateau, *Pinus sylvestris* forest, on soil, 1700 m, 20.10.1996, UNÇ 28

Distribution: Turkey (A1, A3, B6, C12), Europe, Asia, N. Africa.

71. B. salebrosum (Web. & Mohr.) B., S. & G.

A2 Ankara: Kızılcahamam-Çamkoru, Alakoç high plateau, *Abies nordmanniana* subsp. *bornmuelleriana* forest on tree trunk, 1700 m, 20.10.1996, UNÇ 29

Distribution: Turkey (A2, A4, B6, C13), Europe, Asia, N. America.

72. B. populeum (Hedw.) B., S. & G.

A2 Ankara: Kızılcahamam-Çamkoru, Alakoç high plateau, *Abies nordmanniana* subsp. *bornmuelleriana*, *Pinus sylvestris* forest, on soil, 1550 m, 20.10.1996, UNÇ 26

Distribution: Turkey (A1, A2, A4, B6), sub-cosmopolitan.

73. B. mildeanum (Schimp.) Schimp. ex Milde.

A2 Ankara: Kızılcahamam-Çamkoru, Alakoç high plateau, *Abies nordmanniana* subsp. *bornmuelleriana*, forest, on wet soil near Ballıpınar stream, 1550 m, 17.7.1996, UNÇ 17

Distribution: Turkey (A2), C. Europe, N. Asia, N. America.

74. B. glareosum (Spruce) B., S. & G.

A2 Ankara: Çamlidere high plateau, *Pinus sylvestris* forest, 1500m, on tree trunk, 12.7.1997 UYAR 293

Distribution: Turkey (A2, A4, B6, B8), Europe, E. Asia, N. America.

75. B. plumosum (Hedw.) B., S. & G.

A2 Ankara: Çamlidere high plateau, *Pinus sylvestris* forest, 1400m, on soil, 12.7.1997 UYAR 292

Distribution: Sub-cosmopolitan.

76. B. rivulare B., S. & G.

A2 Ankara: Çamlidere high plateau, *Pinus sylvestris* forest, 1500m, on wet soil, 2.9.1997 UYAR 304

Distribution: Turkey (A1, A2, A4, B8, B9, C11, C12), Europe, Asia, N. America.

77. B. albicans (Hedw.) B., S. & G.

A2 Ankara: Kızılcahamam-Çamkoru, Alakoç high plateau, *Abies nordmanniana* subsp. *bornmuelleriana*, forest, on soil, 1700 m, 20.10.1996, UŒ 32

Distribution: Turkey (A2, A4), circumboreal.

Eurhynchium B., S. & G.**78. E. praelongum** (Hedw.) B., S. & G.

A2 Ankara: Çamlıdere high plateau, *Pinus nigra* forest, 1400m, on soil, 14.7.1997 ÇETİN 988

Distribution: Turkey (A1, A2, A3, B6, B8), Europe, Asia, N. Africa, N. America.

79. E. pulchellum (Hedw.) Jenn.

A2 Ankara: Çamlıdere high plateau, *Pinus nigra* forest, 1300m, on soil, 14.7.1997 UYAR 302

Distribution: Turkey (A1, A2, A4, B6, B8, B10), Europe, N. & S. America, Asia, Japan.

Rhynchostegium B., S. & G.**80. R. riparioides** (Hedw.) C.Jens.

A2 Ankara: Kızılcahamam, Kızılcaören *Pinus nigra* forest, 1350m, on rock near Gökdere stream, 17.10.1998 UYAR 233

Distribution: Sub-cosmopolitan.

Hypnaceae Schimp.**Hypnum** Hedw.**81. H. cupressiforme** Hedw.

A2 Ankara: Kızılcahamam-Çamkoru, Alakoç high plateau, *Abies nordmanniana* subsp. *bornmuelleriana*, forest, on soil, 1550 m, 13.7.1996, UŒ 12

Distribution: Cosmopolitan.

Hylocomium B., S. & G.**82. H. splendens** (Hedw.) B., S. & G.

A2 Ankara: Kızılcahamam-Çamkoru, Alakoç high plateau, *Abies nordmanniana* subsp. *bornmuelleriana*, forest, on rock, 1550 m, 13.7.1996, UŒ 7

Distribution: Turkey (A2, A3, A4, A5), sub-cosmopolitan.

Results and Discussion

In this study, 42 genera belonging to 20 families and 82 taxa were identified from the moss specimens

collected from Ankara-Kızılcahamam-Çamkoru and Çamlıdere districts between 1996 and 1998.

According to Henderson's grid system, the number of new records in the study area in the A2 square is 10.

The list of families are shown in order below (Table 1). ♦The first 8 families make up 79.4% of the total taxa in the study area and the other 12 families constitute 20.6% (Table 2).♦

In Table 2, a comparison between studies carried out in the Black Sea (Çetin and Yurdakulol, 1985, 1988; Özdemir, 1994; Çetin and Uyar, 1997) and the Mediterranean (Çetin, 1989) shows that the proportion of acrocarpous mosses in the Mediterranean is higher than that in the Black Sea region. In particular, the number of taxa of *Pottiaceae* family members is higher than the number of taxa of *Brachytheciaceae* family members in the study areas, due to the reduced forest in the study areas because of excessive construction. Consequently, pleurocarpous taxa decreased since these taxa need much more humidity than acrocarpous taxa such as *Pottiaceae* family members, which can endure long periods of heat and dryness.

As a result of our efforts to determine the ecological requirements of mosses, the following moss species were found to be abundant in the sublayers of *Quercus pubescens*, *Q. petraea* and *P. nigra*, which appear on soil at an elevation of 1100-1400m: *Hedwigia ciliata*, *Ditrichum flexicaule*, *Encalypta vulgaris* and *Tortella tortuosa*. The species on rocks under the same formation are *Grimmia ovalis*, *G. affinis*, *G. trichophylla*, *Orthotrichum cupulatum*, *O. rupestre*, and *Rhynchostegium riparioides* and on tree trunks and roots, *Leucodon sciuroides*, *Homalothecium sericeum*, and *Aulacomnium androgynum*.

The following species are abundant below the layer of *Pinus nigra* Arn. and *Pinus sylvestris*, which grow on acidic soil at an elevation of 1500m: *Ceratodon purpureus*, and *Bryoerythrophyllum recurvirostrum*.

The following moss species are common below *Pinus sylvestris*, which grows on acidic soil at elevations 1300-1500m; *Polytrichum juniperinum*, *Dicranum scoparium*, *D. majus*, *Tortula ruralis* var. *ruralis*, *T. ruraliformis*, *Barbula convoluta*, *B. unguiculata*, *Bryum pallescens*, *B. torquescens*, *B. argenteum*, *Plagiomnium affine*, *Brachythecium velutinum* var. *salicinum*, *B. plumosum* and *B. rivulare*. On rocks, *Didymodon fallax*, *D. vinealis*,

Table 1. The Distributions of the Taxa According to the Families

Families	Taxa	Percentage of taxa according to total number of taxa
<i>Pottiaceae</i>	14	17.1
<i>Brachytheciaceae</i>	13	15.9
<i>Grimmiaceae</i>	10	12.2
<i>Bryaceae</i>	9	11
<i>Dicranaceae</i>	6	7.3
<i>Amblystegiaceae</i>	5	6.1
<i>Orthotrichaceae</i>	4	4.9
<i>Hypnaceae</i>	4	4.9
<i>Mniaceae</i>	3	3.7
<i>Leskeaceae</i>	2	2.4
<i>Ditrichaceae</i>	2	2.4
<i>Polytrichaceae</i>	2	2.4
<i>Encalyptaceae</i>	1	1.2
<i>Leucodontaceae</i>	1	1.2
<i>Fontinalaceae</i>	1	1.2
<i>Aulacomniaceae</i>	1	1.2
<i>Bartramiaceae</i>	1	1.2
<i>Hedwigiaceae</i>	1	1.2
<i>Thuidiaceae</i>	1	1.2
<i>Timmiaceae</i>	1	1.2

Weissia controversa var. *crispata*, *Grimmia pulvinata*, *G. decipens*, *Bryum capillare*, *B. caespiticum*, *Schistidium confertum*, *S. pulvinatum*, *Orthotrichum striatum* and *Cratoneuron commutatum* are frequent and on tree trunks, *Dicranum tauricum*, *D. polysetum*, *Schistidium apocarpum*, *Orthotrichum affine*, *Anomodon viticulosus*, *Brachythecium velutinum* var. *velutinum* and *B. glareosum*. The following taxa are abundant below the layer of *Pinus sylvestris* and *Abies nordmanniana* subsp.

bornmuelleriana typical of acidic soil at an elevation of 1300-1700m: *Polytrichum formosum*, *Dicranoweissia crispula*, *Tortula subulata* var. *subulata*, *Pohlia cruda*, *Rhizomnium punctatum*, *Batramia ithyphylla*, *Timmia austriaca*, *Lescurea incurvata*, *Brachythecium populeum*.

Bryum pseudotriquetrum is seen especially on tree roots in places where the aforementioned community grows.

Abundant below the layer of *Abies nordmanniana* subsp. *bornmuelleriana* growing on soil at an elevation of 1700m are *Tortula subulata* var. *angustata*, *T. norvegica*, *Rhacomitrium canescens*, *Bryum creberrimum*, *Plagiomnium undulatum*, *Sanionia uncinata*, *Brachythecium albicans*, *Hypnum cupressiforme* var. *cupressiforme*, *Rhytidiadelphus triquetrus*, whereas, on tree trunks and roots, *Brachythecium salebrosum* and *Pterigynandrum filiforme* are found. On rocks characterized by *Grimmia alpestris*, *Drepanocladus aduncus*, *Calliergon cordifolium*, *Homalothecium lutescens* and *Hylocomnium splendens* occur.

Species found in wetlands and near water in places where the aforementioned community grows are *Bryum cernuum*, *Brachythecium mildeanum*, *Tortula ruralis* var. *calcicolens*, *Didymodon tophaceus* and on rocks in water, *Fontinalis antypretica* var. *antipyretica*, as well as *Amblystegium riparium*.

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Table 2. The Comparison of the Taxa Distribution According to the Families

Families	Ankara- K.hamam Çamkoru and Çamlidere		Gerede-Aktaş		Yedigöller National Park		Sinop and Its Environs		Sürmene		Antalya and Its Environs	
	The number of taxa	%	The number of taxa	%	The number of taxa	%	The number of taxa	%	The number of taxa	%	The number of taxa	%
<i>Brachytheciaceae</i>	13	15.9	19	15	15	17.4	23	20.5	9	30	14	15.5
<i>Pottiaceae</i>	14	17.1	16	12	12	13.6	12	10.7	3	10	32	35.5
<i>Bryaceae</i>	9	11	17	12.6	2	2.2	6	5.3	1	3.3	4	4.4
<i>Hypnaceae</i>	4	4.9	11	8	8	9.9	10	8.9	4	13.3	3	3.3
<i>Polytrichaceae</i>	2	2.4	4	3	5	5.7	3	2.6	5	16.6	-	-
<i>Mniaceae</i>	3	3.7	9	6.7	8	9	6	5.3	2	6.6	-	-

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