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TAMER KEÇELİ

BARBAROS ÇETİN

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## The Moss Flora of Çankırı-Eldivan Mountain

Tamer KEÇELİ, Barbaros ÇETİN

Ankara University, Faculty of Science, Department of Biology, 06100 Ankara-TURKEY

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**Abstract:** In this study, 54 taxa out of 145 specimens were identified by the authors. These belong to 14 families and 25 genera of bryophytes. Of these, 15 taxa are new for the A2 grid-square adopted by Henderson (1961).

**Key Words:** Bryophyte, Mosses, Flora

### Çankırı-Eldivan Dağı'nın Karayosunları Florası

**Özet:** Bu çalışmada araştırma alanı olan Çankırı- Eldivan Dağı yöresinden toplanan 145 adet karayosunu örneği değerlendirilerek 14 familyaya ait 25 cins ve bunlara ait 54 takson tanımlanmıştır. Bunlardan 15 tanesi Henderson (1961) tarafından benimsenen kareleme sistemine göre A2 karesi için yenidir.

**Anahtar Sözcükler:** Bryophyta, Karayosunları, Flora

### Introduction

No detailed study had previously been made on the moss flora of Çankırı-Eldivan Mountain, the area chosen for this study. The region has the characteristics of semiarid Mediterranean climate (1,2). These climatic conditions encouraged us to conduct a study on the mosses (Musci).

The study area is in the A2 grid square according to the system adopted by Henderson (3). It is hoped that this study will contribute to the Moss flora of Turkey and will be a guide for future studies.

#### Description of the Study Area

The study area, Eldivan Mountain, is in the district of the city of Çankırı in Central Anatolia. It is surrounded by Korgun in the northwest, Yapraklı in the northeast, Çankırı in the east, Kalecik in the southeast, Çubuk in the southwest and Şabanözü in the west. It is 25km from Çankırı ( Figure).

The study area is at an altitude of 1000-1100m near the lower parts of Eldivan Mountain while the highest part (near the TV transmitter station) is 1809m. Also other higher parts are Akkaya Hill (1795m), Çakmaklı Hill (1636m), PTT transmitter station (1596m) and Katırören Hill (1390m).

Mean annual precipitation levels of Çankırı, Yapraklı and Korgun, which are the closest meteorology stations to the study area, are 397.2 mm, 551.0 mm and 386.9 mm, respectively. At these stations the highest precipitation is recorded in May and the lowest in August. The mean monthly precipitation values of these months are 57.0 mm and 14.4 mm at Çankırı, 78.9 mm and 20.6 mm at Yapraklı and 58.9 mm and 16.3 mm at Korgun, respectively. Precipitation regimes of these stations belong to a transition regime 1 with a Mediterranean tendency, that is, the mean seasonal precipitation from highest to lowest is spring, winter, summer and autumn (4,5).

#### Vegetation of Study Area

Eldivan Mountain from the phytogeographical point of view is considered to be in the Irano- Turanian floristic region and is linked to the preponctic chain of the Black Sea Region (5). The linkage has been observed in the forest vegetation of the mountain.

Pure black pine (*Pinus nigra* Arn. subsp. *pallasiana* (Lamb.) Holmboe) forest, sometimes mixed with *Quercus robur* L. and *Q. pubescens* Wild. is found between altitudes 1000 m and 1600 m on Eldivan Mountain.

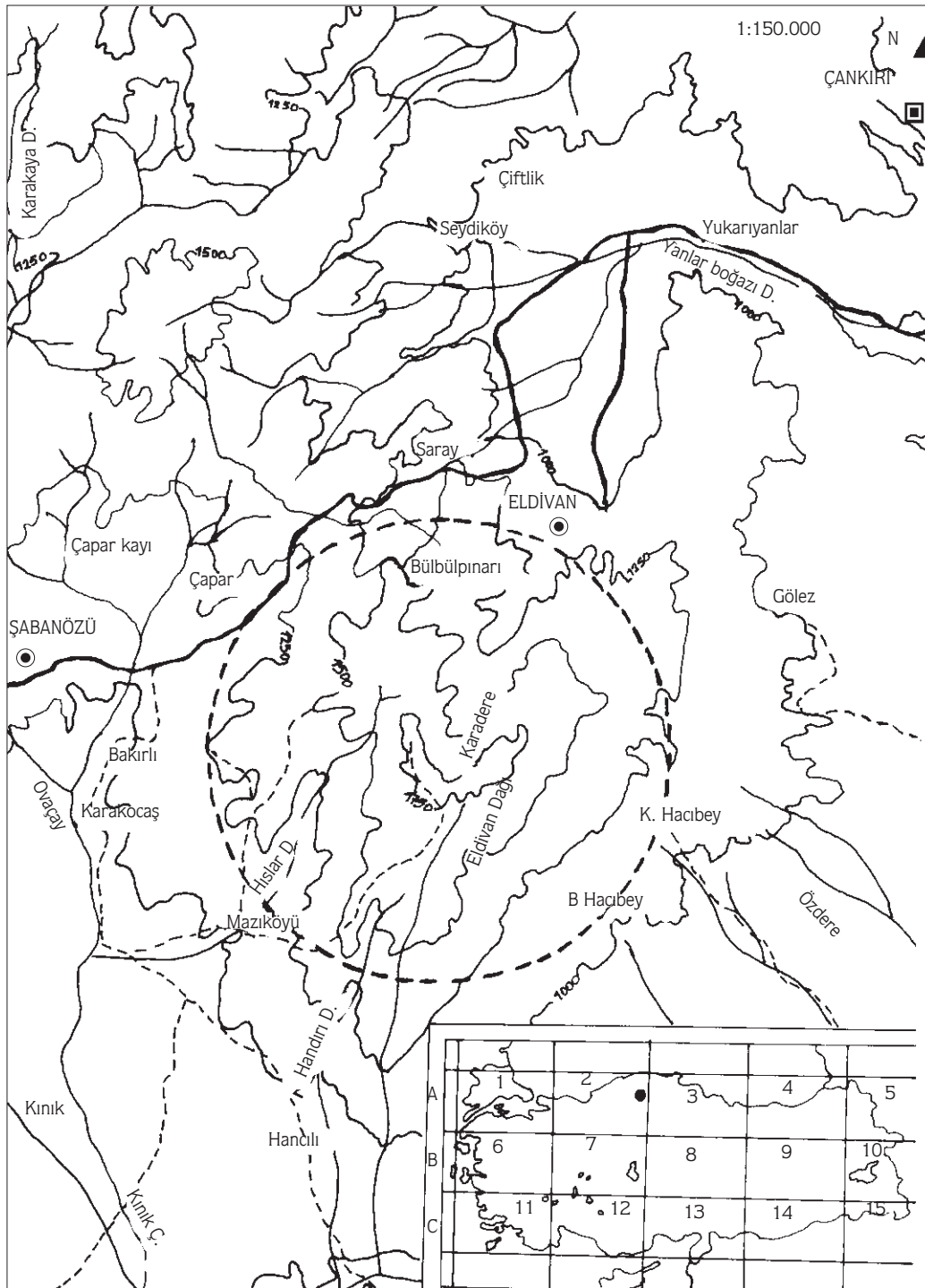


Figure 1. Topographical Map of Research Area.

In the clear and destroyed parts of this forest, some deciduous species such as *Corylus avellana* L., *Crataegus monogyna* Jack., *Quercus petraea* (Mattuschka) Liebl. subsp. *iberica*, *Juniperus oxycedrus* L., *Carpinus betulus* L. and *C. orientalis* Miller. form mixed stands, sometimes with *Populus tremula* L..

The deforested parts of the study area have been represented by a vegetation of Irano-Turanian origin (5). Here, depending on semiarid and very cold variants of a Mediterranean type of climate, steppe vegetation composed of mostly chamaephytes, hemicryptophytes and annual and perennial grasses has been observed. Some xerophytic species of Irano-Turanian origin such as *Astragalus* L., *Acantholimon* Boiss., *Thymus* L., *Achillea* L., *Alyssum* L. are often dominant and form the major physiognomy of the vegetation (5,6).

The floristic composition of the communities has been destroyed due to the effects of overgrazing, fire, clearing etc. and therefore the characteristic species of the associations are relatively poor.

## Materials and Methods

The research materials consisted of plant specimens collected during field studies of Çankırı-Eldivan Mountain on different dates and in different periods of the vegetation from 1997 to 1998.

Moss specimens were collected with a large knife and an iron bar etc. from the area and ultimate care was taken to prevent the specimens losing their natural appearance. These specimens were cleaned and then temporarily placed in previously prepared and wettened nylon bags. Labels, containing collection parameters (date, locality etc.) were put into the bags.

The collected specimens were dried by spreading on paper in the open air in the shade. Then the dried specimens were identified and placed in an envelope to be included in the herbarium of Ankara University, Faculty of Science, Department of Biology (ANK). The plant list is arranged according to the system proposed by Corley et al. (7). All species are listed in the appendix. The taxa new for the A2 grid square are indicated with an asterisk.

The identification of specimens was carried out using various floristical studies (8-10). In addition, the state of the species for the study area and for Turkey was determined by reviewing the related literature (3,11,12).

## APPENDIX

### The Floristic List

#### BRYOPHYTA

#### BRYOPSIDA

#### DICRANALES

#### DICRANACEAE Schimp.

#### Dicranum Hedw.

#### 1. *D. scoparium* Hedw.

A2 Çankırı: Eldivan, Eldivan Mountain, in the vicinity of Bülbülünarı, nursery road, on the stream banks, *Pinus nigra* subsp. *pallasiana-Quercus pubescens* formation, on soil, 1380 m, 30.09.1997, KEÇELİ 210.

Distribution: A1, A2, A3, A4, A5, Central Europe, America, New Zealand.

#### Dicranella (C. Müll.) Schimp.

#### 2. *D. howei* Ren & Card.

A2 Çankırı: Eldivan, Eldivan Mountain, in the vicinity of Bülbülünarı, on the stream banks, on damp soil, 1390 m, 06.08.1998, KEÇELİ 252, Det: B. ÇETİN.

Distribution: A1, A2, A3, B6, C11, C12, Central Europe, North America, North Africa, Central Asia.

#### DITRICHACEAE B., S. & G.

#### Ditrichum Hampe.

\*3. *D. flexicaule* (Schwaegr.) Hampe var. *densum* (B., S. & G.) Kindb.

A2 Çankırı: Eldivan, Eldivan Mountain, Şabanözü road, in the vicinity of Saray, around pond, on the stream banks, on rock, 1220 m, 06.05.1998, KEÇELİ 230.

Distribution: B8, Central Europe, Asia, Algeria, Canaries, Madeira, North America, New Zealand.

#### POTTIALES

#### ENCALYPTACEAE Schimp.

#### Encalypta Hedw.

#### 4. *E. rhabdocarpa* Schwaegr.

A2 Çankırı: Eldivan, Eldivan Mountain, Şabanözü road, in the vicinity of Saray, around pond, on the stream banks, on rock, 1220 m, 06.05.1998, KEÇELİ 231.

Distribution: A2, East and North Scotland, Europe, North, West and Central Asia, Tibet, Himalayas, North Africa.

**POTTIACEAE Schimp.**

**Tortula Hedw.**

\*5. *T. laevipila* (Brid.) Schwaegr.

A2 Çankırı: Eldivan, Eldivan Mountain, in the vicinity of Bülbülpinarı, on the stream banks, on rock, 1390 m, 06.08.1998, KEÇELİ 251.

Distribution: B6, Central Europe, West, Central and East Asia, Algeria, Canaries, North America, Australia, Azores.

\*6. *T. muralis* Hedw. var. *aestiva* Hedw.

A2 Çankırı: Eldivan, Eldivan Mountain, in the vicinity of Bülbülpinarı, nursery road, *Pinus nigra* subsp. *pallasiana* forest, on soil, 1500 m, 30.09.1997, KEÇELİ 217.

Distribution: C14, Europe, Asia, North America.

\*7. *T. obtusifolia* (Schwaegr.) Math.

A2 Çankırı: Eldivan, the east slopes of Eldivan Mountain, on rock, 1260 m, 06.05.1998, KEÇELİ 237, Det: G. UYAR.

Distribution: A4, C13, Central Europe, Algeria, Siberia, Caucasus, Turkestan, Japan, North America.

8. *T. ruralis* var. *ruralis* (Hedw.) Gaertn., Meyer & Scherb.

A2 Çankırı: Eldivan, the east slopes of Eldivan Mountain, on rock, 1250 m, 06.05.1998, KEÇELİ 232.

Distribution : Cosmopolitan

9. *T. ruralis* (Hedw.) Gaertn., Meyer & Scherb. subsp. *calicicolens* W. Kramer

A2 Çankırı: Eldivan, Eldivan Mountain, in the vicinity of Bülbülpinarı, nursery road, on the stream banks, *Pinus nigra* subsp. *pallasiana-Quercus pubescens* formation, on soil, 1380 m, 30.09.1997, KEÇELİ 211.

Distribution: A2, Europe, North Africa, Asia, North America, Greenland.

10. *T. subulata* var. *subulata* Hedw.

A2 Çankırı: Eldivan, Eldivan Mountain, in the vicinity of Bülbülpinarı, *Pinus nigra* subsp. *pallasiana-Quercus pubescens* formation, on tree, 1300 m, 10.07.1997, KEÇELİ 201.

Distribution: Cosmopolitan.

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

A2 Çankırı: Eldivan, Eldivan Mountain, near of Şabanözü road in the vicinity of Saray, around pond, on the stream banks, on rock, 1100 m, 06.05.1998, KEÇELİ 221, Det : B. ÇETİN.

Distribution: A1, A2, Europe, Asia, Kashmir, China, Algeria, Canaries, North America.

\*12. *Tortula vahliana* (Schultz) Mont.

A2 Çankırı: Eldivan, Eldivan Mountain, Şabanözü road, in the vicinity of Saray, *Pinus nigra* subsp. *pallasiana* forest, on rock, 1260 m, 06.08.1998, KEÇELİ 238.

Distribution: B6, C11, South and West Europe, West Asia, Algeria, Canaries, South America.

**Didymodon Hedw.**

13. *D. ferrugineus* (Schimp. ex Besch.) M. Hill

A2 Çankırı: Eldivan, Eldivan Mountain, in the vicinity of Bülbülpinarı, on the stream banks, on rock, 1390 m, 06.05.1998, KEÇELİ 252, Det: B. ÇETİN.

Distribution: A1, A2, B6, C11, Europe, Caucasus, Siberia, Himalayas, China, Tunisia, Algeria, North America.

**Trichostomum Bruch, nom. cons.**

\*14. *T. brachydontium* Bruch.

A2 Çankırı: Eldivan, Eldivan Mountain, in the vicinity of Saray, around pond, on tree, 1260 m, 06.05.1998, KEÇELİ 239.

Distribution: A1, A4, B6, B7, C11, C12, C13, Central Europe, Caucasus, Syria, China, Japan, Africa, New Zealand.

**Weissia Hedw.**

15. *W. controversa* Hedw.

A2 Çankırı: Eldivan, Eldivan Mountain, in the vicinity of Saray, around pond, on the stream banks, on rock, 1100 m, 06.05.1998, KEÇELİ 222.

Distribution: A2, A4, B6, B7, C11, Central Europe, Asia, North and Central America.

16. *W. hedwigii* Crum.

A2 Çankırı: Eldivan, Eldivan Mountain, in the vicinity of Saray, around pond, on the stream banks, on soil, 1150 m, 06.05.1998, KEÇELİ 224.

Distribution: A1, A2, B6, B8, C13, Europe, Caucasus, Algeria.

**Tortella Limpr.**

\*17. *T. nitida* (Lindb.) Broth.

A2 Çankırı: Eldivan, Eldivan Mountain, in the vicinity of Bülbülpinarı, *Quercus pubescens*, *Pinus nigra* subsp. *pallasiana* forest, on soil, 1300 m, 10.07.1997, KEÇELİ 202.

Distribution: B6, C11, C13, Central Europe, Southwest Asia, North Africa, North America.

18. *T. tortuosa* (Hedw.) Limpr.

A2 Çankırı: Eldivan, Eldivan Mountain, near of Bülbülpinarı, *Quercus pubescens-Pinus nigra* forest, on soil, 1300 m, 10.07.1997, KEÇELİ 203.

Distribution: Cosmopolitan.

#### GRIMMIALES

#### GRIMMIACEAE Arnott.

*Schistidium* Brid.

\*19. *S. pulvinatum* (Hedw.) Brid.

A2 Çankırı: Eldivan, east slopes of Eldivan Mountain, on rock, 1250 m, 06.05.1998, KEÇELİ 233.

Distribution: A4, Central Europe, Canaries, Algeria, Caucasus, Canada.

20. *S. trichodon* (Brid.) Poelt.

A2 Çankırı: Eldivan, east slopes of Eldivan Mountain, *Pinus nigra* forest, on rock, 1260 m, 06.05.1998, KEÇELİ 240.

Distribution: A2, A3, Europe, Sweden, Norway.

*Grimmia* (Hedw.)

21. *G. ovalis* (Hedw.) Lindb.

A2 Çankırı: Eldivan, Eldivan Mountain, in the vicinity of Bülbülpinarı, *Quercus pubescens - Pinus nigra* forest, on rock, 1300 m, 10.07.1997, KEÇELİ 204.

Distribution: Cosmopolitan.

22. *G. pulvinata* (Hedw.) Sm.

A2 Çankırı: Eldivan, Eldivan Mountain, in the vicinity of Bülbülpinarı, *Quercus pubescens - Pinus nigra* forest, on rock, 1300 m, 10.07.1997, KEÇELİ 205.

Distribution : Cosmopolitan.

23. *G. trichophylla* Grev.

A2 Çankırı: Eldivan, Eldivan Mountain, near of Şabanözü road, in the vicinity of Saray, around pond, on rock, 1100 m, 06.05.1998, KEÇELİ 223.

Distribution: Cosmopolitan.

#### BRYALES

#### BRYACEAE Schwaegr.

*Bryum* Hedw.

24. *B. caespiticium* Hedw.

A2 Çankırı: Eldivan, Eldivan Mountain, near of Şabanözü road, in the vicinity of Saray, around pond, on soil, 1150 m, 06.05.1998, KEÇELİ 225, Det : B.ÇETİN.

Distribution: Cosmopolitan.

25. *B. capillare* Hedw.

A2 Çankırı: Eldivan, Eldivan Mountain, in the vicinity of Bülbülpinarı, nursery road, on the stream banks, *Quercus-Pinus nigra* forest, on soil, 1380 m, 30.09.1997, KEÇELİ 212.

Distribution: Cosmopolitan.

26. *B. inclinatum* (Brid.) Brand.

A2 Çankırı: Eldivan, Eldivan Mountain, in the vicinity of Bülbülpinarı, nursery road, *Pinus nigra* subsp. *pallasiana* forest, on soil, 1500 m, 30.09.1997, KEÇELİ 219, Det: G. UYAR.

Distribution: A2, A4, Central Europe, Iceland, Asia, Algeria, N. America, Australia, Antarctica.

27. *B. flaccidum* Brid.

A2 Çankırı: Eldivan, north slopes of Eldivan Mountain, *Pinus nigra* forest, on soil, 1250 m, 30.09.1997, KEÇELİ 209, Det: G. UYAR

Distribution: A1, A2, Europe, North America.

\*28. *B. torquescens* B. & S.

A2 Çankırı: Eldivan, Eldivan Mountain, in the vicinity of Bülbülpinarı, nursery road, *Pinus nigra* forest, on soil, 1500 m, 30.09.1997, KEÇELİ 220, Det: G. UYAR.

Distribution: A1, A4, B6, B8, B9, C11, C12, C13, Europe, W. Asia, Pakistan, Nepal, China, N. America, Mexico, Australia, Chile, New Zealand.

#### ORTHOTRICHALES

#### ORTHOTRICHACEAE Arnott.

*Orthotrichum* Hedw.

\*29. *O. affine* Brid. var. *fastigiatum* (Brid.) Hueb.

A2 Çankırı: Eldivan, Eldivan Mountain, in the vicinity of Bülbülpinarı, nursery road, on the stream banks, *Pinus nigra- Quercus pubescens* forest, on tree, 1380 m, 30.09.1997, KEÇELİ 213, Det: G. UYAR.

Distribution : A1, A3, B6, B7, C11, Central Europe, Caucasus, Siberia, North America, North Africa.

30. *O. rupestre* Schleich. ex. Schwaegr.

A2 Çankırı: Eldivan, Eldivan Mountain, near of Şabanözü road, in the vicinity of Saray, northeast slopes, on the stream banks, on rock, 1200 m, 06.05.1998, KEÇELİ 227.

Distribution : A1, A2, A5, B6, B7, B8, C13, Europe, Iceland, Caucasus, India.

## HEDWIGIACEAE Schimp.

*Hedwigia* P.Beauv.

31. *H. ciliata* (Hedw.) P. Beauv.

A2 Çankırı: Eldivan, Eldivan Mountain, Şabanözü road, around pond, east slopes, on the stream banks, on rock, 1200 m, 06.05.1998, KEÇELİ 228.

Distribution: Cosmopolitan.

## ISOBRYALES

### LEUCODONTACEAE Schimp.

*Leucodon* Schwaegr.

32. *L. sciuroides* (Hedw.) Schwaegr.

A2 Çankırı: Eldivan, east slopes of Eldivan Mountain, on soil, 1250 m, 06.05.1998, KEÇELİ 234.

Distribution: Cosmopolitan.

### NECKERACEAE Schimp.

*Metaneckera* Steere

33. *M. menziesii* (Hook.) Steere.

A2 Çankırı: Eldivan, Eldivan Mountain, Şabanözü road, around pond, on the stream banks, on rock, 1200 m, 06.05.1998, KEÇELİ 229, Det: B. ÇETİN.

Distribution: A2, B6, C11, C13, Central Europe, Asia, South America, North Africa.

## THUIDIALES

### THUIDIACEAE Schimp.

*Heterocladium* B.,S. & G.

\*34. *H. heteropterum* B.S. & G.

A2 Çankırı: Eldivan, Eldivan Mountain, around Bülbülünarı, on the stream banks, on rock, 1340 m, 06.08.1998, KEÇELİ 245.

Distribution: A3, C11, North, West and Central Europe, Hungary

*Thuidium* B., S. & G.

35. *T. abietinum* (Brid.) B., S. & G. var. *hystricosum* (Mitt.) Loeske

A2 Çankırı: Eldivan, Eldivan Mountain, in the vicinity of Bülbülünarı, *Quercus-Pinus nigra* formation, on soil, 1300 m, 10.07.1997, KEÇELİ 206.

Distribution: A2, A3, A4, B9, France, Spain, Czechoslovakia, Sweden, Italy, China.

## HYPNOBRYALES

### AMBLYSTEGIACEAE (Broth.) Fleisch.

*Cratoneuron* (Sull.) Spruce

36. *C. commutatum* (Hedw.) Roth. var. *falcatum* (Brid.) Moenk.

A2 Çankırı: Eldivan, Eldivan Mountain, in the vicinity of Bülbülünarı, in the stream, on damp rock, 1380 m, 06.08.1998, KEÇELİ 247.

Distribution : A2, A3, A4, B8, B10, C11, C13, C15, Europe, North America, North Africa, Scandinavia, Iceland.

37. *C. filicinum* (Hedw.) Spruce

A2 Çankırı: Eldivan, Eldivan Mountain, upper part of Bülbülünarı, on the stream banks, on wet rock, 1380 m, 06.08.1998, KEÇELİ 248.

Distribution : Cosmopolitan.

*Amblystegium* B.,S. & G.

38. *A. serpens* (Hedw.) B.,S. & G. var. *juratzkanum* (Schimp.) Rau & Herv.

A2 Çankırı: Eldivan, Eldivan Mountain, Bülbülünarı, on the stream banks, on wet tree trunk, 1340 m, 06.08.1998, KEÇELİ 246, Det : B. ÇETİN.

Distribution: A2, A4, B7, B8, C11, Europe, Azores, North Africa, North and Central Asia, Japan, America, Greenland.

39. *A. varium* (Hedw.) Lindb.

A2 Çankırı: Eldivan, Eldivan Mountain, in the vicinity of Bülbülünarı, on the stream banks, on damp rock, 1380 m, 06.08.1998, KEÇELİ 249, Det : B. ÇETİN.

Distribution: A2, A3, B6, North, West and Central Europe, Asia, North America.

### BRACHYTHECIACEAE Schimp.

*Homalothecium* B., S. & G.

40. *H. lutescens* (Hedw.) Robins.

A2 Çankırı: Eldivan, Eldivan Mountain, in the vicinity of DSİ Karadere pond, *Pinus nigra* subsp. *pallasiana* forest, on soil, 1240 m, 06.08.1998, KEÇELİ 243.

Distribution: A1, A2, A3, B6, B7, C11, C12, C13, Central Europe, Iceland.

41. *H. sericeum* (Hedw.) B., S. & G.

A2 Çankırı: Eldivan, east slopes of Eldivan Mountain, on rock, 1250 m, 06.05.1998, KEÇELİ 235.

Distribution: Cosmopolitan.

**Brachythecium** B., S. & G.

42. **B. glaerosum** (Spruce) B., S. & G.

A2 Çankırı: Eldivan, Eldivan Mountain, in the vicinity of Bülbülpinarı, nursery road, *Quercus-Pinus nigra* forest, on soil, 1380 m, 30.09.1997, KEÇELİ 214.

Distribution: A2, A3, A4, B6, B8, Central Europe, N. Asia, N. America.

43. **B. plumosum** (Hedw.) B., S. & G.

A2 Çankırı: Eldivan, Eldivan Mountain, in the vicinity of DSİ Karadere pond, *Pinus nigra* subsp. *pallasiana* forest, on rock, 1300 m, 06.08.1998, KEÇELİ 244.

Distribution: A2, A3, Europe, Hungary, Algeria, Asia, Japan, North and Central America, Hawaii, New Zealand.

\*44. **B. populeum** (Hedw.) B., S. & G.

A2 Çankırı: Eldivan, Eldivan Mountain, in the vicinity of Bülbülpinarı, nursery road, on soil, 1500 m, 30.09.1997, KEÇELİ 218.

Distribution: A1, A4, Europe, Azores, Asia, Japan, North America.

45. **B. salebrosum** (Web. & Mahr.) B., S. & G.

A2 Çankırı: Eldivan, Eldivan Mountain, in the vicinity of Bülbülpinarı, nursery road, on the stream banks, *Pinus nigra-Quercus* forest, 1380 m, 30.09.1997, KEÇELİ 215.

Distribution: A2, A3, A4, B6, C13, North and Central Asia, Europe, North America.

46. **B. velutinum** (Hedw.) B., S. & G.

A2 Çankırı: Eldivan, Eldivan Mountain, in the vicinity of Bülbülpinarı, nursery road, on the stream banks, *Pinus nigra-Quercus* forest, on tree, 1380m, 30.09.1997, KEÇELİ 216.

Distribution: A1, A2, A3, A5, B6, B10, C11, C13, Central Europe, North Asia, Japan, North America.

**Eurynchium** B., S. & G.

47. **E. hians** (Hedw.) Sande Lac.

A2 Çankırı: Eldivan, Eldivan Mountain, in the vicinity of Bülbülpinarı, on the stream banks, on damp soil, 1390 m, 06.08.1998, KEÇELİ 253.

Distribution: A1, A2, A3, B6, C11, C13, Central Europe, Asia, North Africa, North America.

48. **E. pulchellum** var. **pulchellum** (Hedw.) Jenn.

A2 Çankırı: Eldivan, Eldivan Mountain, in the vicinity of Bülbülpinarı, *Pinus nigra-Quercus* forest, on the

stream banks, on tree, 1300 m, 10.07.1997, KEÇELİ 207.

Distribution: A1, A2, A3, A4, A5, B6, B8, B10, Europe, Central and East Asia, Japan, North America, Scandinavia.

49. **E. pulchellum** (Hedw.) Jenn. var. **diversiifolium** (B., S. & G.) C Jens.

A2 Çankırı: Eldivan, Eldivan Mountain, Şabanözü road, in the vicinity of Saray, around pond, on rock, 1260 m, 06.05.1998, KEÇELİ 241.

Distribution: A2, Europe, Iceland, Caucasus, North America, Greenland.

\*50. **E. pumilum** (Wils.) Schimp.

A2 Çankırı: Eldivan, Eldivan Mountain, in the vicinity of Bülbülpinarı, on the stream banks, on rock, 1390 m, 06.08.1998, KEÇELİ 254.

Distribution: A1, A3, B6, Central Europe, Algeria, Hungary, England.

**HYPNACEAE** Schimp.

**Hypnum** Hedw.

51. **H. cupressiforme** var. **cupressiforme** Hedw.

A2 Çankırı: Eldivan, Eldivan Mountain, Şabanözü road, in the vicinity of Saray, on soil, 1150 m, 06.05.1998, KEÇELİ 226.

52. **H. cupressiforme** Hedw. var. **lacunosum** Brid.

A2 Çankırı: Eldivan, Eldivan Mountain, Şabanözü road, in the vicinity of Saray, on tree, 1270 m, 06.05.1998, KEÇELİ 242.

Distribution: A1, A2, A3, B6, West and Central Europe, Central America, Asia, Africa.

\*53. **H. cupressiforme** Hedw. var. **resupinatum** (Tayl. ex. Spruce) Hartm.

A2 Çankırı: Eldivan, east slopes of Eldivan Mountain, in the vicinity of Şabanözü road, on rock, 1250 m, 06.05.1998, KEÇELİ 236.

Distribution: A1, Europe, Azores, Madeira.

**Ptilium** De Not

\*54. **P. crista** –**castrensis** (Hedw.) De Not.

A2 Çankırı: Eldivan, Eldivan Mountain, in the vicinity of Bülbülpinarı, *Pinus nigra* forest, on the stream banks, on tree, 1300 m, 10.07.1997, KEÇELİ 208.

Distribution: A3, Europe, Caucasus, North and Central Asia, Greece, North America, Greenland.



**Results and Discussion**

In this study, 25 genera belonging to 14 families and 54 taxa were identified from the moss specimens collected from Çankırı-Eldivan Mountain in different vegetation periods from 1997 to 1998. The families richest in species are shown in order below (Table 1). The first 6 families make up 80 % of the total taxa in the study area and the other 8 families constitute 20 %.

According to Henderson's grid system, the number of new records in the study area in the A2 square is 15.

The taxa below, previously known to exist in Turkey only in the squares stated, have now been identified in the A2 square: *Ditrichaceae* family, *Ditrichum flexicaule* var. *densum* from B8; *Pottiaceae* family, *Tortula laevipila* from B6 and *Tortula muralis* var. *aestiva* from C14; *Grimmiaceae* family, *Schistidium pulvinatum* from A4; *Hypnaceae* family, *Hypnum cupressiforme* var. *resupinatum* from A1.

In this study, comparison with the studies of Black Sea Region and Mediterranean Region yielded the following results. In Table 2, a comparison between the studies carried out in the Black Sea Region and the Mediterranean Region shows the number of taxa of Pottiaceae family members, which in turn shows acrocarpous development in the Mediterranean Region (13-17).

The families that have the most taxa in the Black Sea Region are the Brachytheciaceae and Hypnaceae that show pleurocarpous growth. Generally the acrocarpous taxa have quill-like projecting parts (hair point) on the ends of their leaves. The acrocarpous taxa are more enduring to a long dry period because they display a close pad shaped growth.

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

Family	Species	Percentage of taxa according to the number of total taxa
Pottiaceae	14	26.0
Brachytheciaceae	11	20.5
Grimmiaceae	5	9.3
Bryaceae	5	9.3
Amblystegiaceae	4	7.4
Hypnaceae	4	7.4
Dicranaceae	2	3.7
Orthotrichaceae	2	3.7
Thuidiaceae	2	3.7
Ditrichaceae	1	1.8
Encalyptaceae	1	1.8
Hedwigiaceae	1	1.8
Leucodontaceae	1	1.8
Neckeraceae	1	1.8

The study area is in the northwest of Central Anatolia. Pottiaceae family that displayed acrocarpous growth and have the largest number of taxa (14 taxa) and a rich group determined the study area. Second in terms of number of taxa was the Brachytheciaceae (11 taxa) family and this family displayed acrocarpous growth. Since forest vegetation is dominant in the study area, the variety of species showing branching (pleurocarpous) and carpet form under tree level numbers are high due to the ecological conditions.

Table 2. The Comparison of the Taxa Distribution According to the Families (13-17).

Families	Study areas, taxon number and percentages											
	Eldivan Mointain		Gerede-Aktaş		Yedigöller National Park		Around Antalya		Sürmene National Park		Sinop and around	
	Taxon number	%	Taxon number	%	Taxon number	%	Taxon number	%	Taxon number	%	Taxon number	%
Pottiaceae	14	26.0	16	12.0	12	13.6	32	35.5	3	10.0	12	10.7
Brachytheciaceae	11	20.5	19	15.0	15	17.4	14	15.5	9	30.0	23	20.5
Bryaceae	5	9.3	17	12.0	2	2.2	4	4.4	1	3.3	6	5.3
Hypnaceae	4	7.4	11	8.0	2	2.2	-	-	4	13.3	10	8.9

In the study area, which has a semiarid and very cold Mediterranean bioclimate (1,2), the species with acrocarpous growth have a high distribution ratio, in contrast with the studies corresponding to the Black Sea Region. This difference is related with long arid periods and high summer temperature that are evident properties of this area's bioclimate. Also, since in the region the relative humidity is higher than that of Central Anatolia, the presence of forest vegetation and the presence of hygrophylous pleurocarpic species indicate that the region shows, albeit small, oceanic climate properties. According to the findings, the Brachytheciaceae family showing pleurocarpous growth has the second highest number of taxa after the acrocarpous Pottiaceae family.

In the study area, the following moss species were found to be abundant in the sublayers of *Pinus nigra* subsp. *pallasiana* forest; on rock: *Brachythecium plumosum*; on soil: *Homalothecium lutescens* and on trees: *Ptilium crista-castrensis*. The following moss species were found to be abundant in the sublayers of *Pinus nigra* subsp. *pallasiana* communities at the degraded areas; on rock: *Tortula obtusifolia*, *T. subulata* var. *angustata*, *T. vahliana*, *Schistidium trichodon*, *Heterocladium heteropterum*, *Hedwigia ciliata*, *Metaneckera menziesii*, *Homalothecium sericeum*, *Eurynchium pulchellum* var. *diversiifolium*, *E. pumilum*; on soil: *Brachythecium populeum*, *Bryum flaccidum*, and on trees: *Hypnum cupressiforme* var. *cupressiforme* and *H. cupressiforme* var. *resupinatum*.

The following moss species were found to be abundant under *Pinus nigra* subsp. *pallasiana* forest together with *Quercus petraea*, *Q. pubescens* or *Q. robur*; on rock: *Tortula laevipila*, *Didymodon ferrugineus*, *Grimmia ovalis*, *G. pulvinata*, *Cratoneuron commutatum* var. *falcatum*, *C. filicinum*, *Amblystegium varium*; on soil: *Tortula muralis* var. *aestiva*, *T. ruralis* var. *calcicolens*,

*Tortella nitida*, *T. tortuosa*, *Bryum capillare*, *B. torquescens*, *Thuidium abietinum* var. *hystricosum*, *Brachythecium glaerosum*, *Eurynchium hians* and on trees: *Tortula subulata* var. *subulata*, *Trichostomum brachydontium*, *Orthotrichum affine* var. *fastigiatum*, *Amblystegium serpens* var. *juratzkanum*, *Brachythecium salebrosum*, *B. velutinum*, *Eurynchium pulchellum* var. *pulchellum*.

The following moss species were found to be abundant outside the forest, the bush areas and the sublayers of *Corylus avellana*, *Crataegus* sp., *Quercus* sp. together with *Pinus nigra* subsp. *pallasiana*; on rock: *Tortula ruralis* var. *ruralis*, *Schistidium pulvinatum*, *Grimmia trichophylla*, *Orthotrichum rupestre*; and on soil: *Bryum caespiticium*, *B. inclinatum*, *Leucodon sciuroides* and *Brachythecium populeum*.

The species found to be abundant in wet lands and near water were; on rock: *Ditrichum flexicaule* var. *densum*, *Encalypta rhabdocarpa*, *Tortula subulata* var. *angustata*, *Didymodon ferrugineus*, *Weissia controversa*, *Orthotrichum rupestre*, *Hedwigia ciliata*, *Metaneckera menziesii*, *Heterocladium heteropterum*, *Eurynchium pulchellum* var. *diversiifolium*; in streams and on wet rock: *Cratoneuron commutatum* var. *falcatum*, *C. filicinum*, *Amblystegium varium*; on soil: *Dicranum scoparium*, *Bryum capillare*, *Eurynchium hians*; on damp soil: *Dicranella howei*; on trees: *Orthotrichum affine* var. *fastigiatum*, *Amblystegium serpens* var. *juratzkanum*, *Brachythecium salebrosum*, *B. velutinum*, *Eurynchium pulchellum* var. *pulchellum*, *Ptilium crista-castrensis*.

The distribution according to habitats of taxa that we found in the study area was: on rock: 45%, on soil: 38%, on trees: 17%. Furthermore, the rate of taxa in the sublayers of forests was: 45%; the rate of taxa in the sublayers of the degraded forest: 30%; the rate of taxa in the outside of forest and the bush areas: 25%.

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