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## The Bryophyte Flora of Ekecik Mountain (Aksaray-Türkiye)

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### Abstract

In this study, the bryophyte flora of Ekecik Mountain was investigated. Based on the examination of bryophyte specimens collected from 20 different localities and habitats, a total of 123 taxa belonging to 16 families and 40 genera were determined. Marchantiophyta was represented by two taxa belonging to two families and two genera, while Bryophyta was represented by 121 taxa belonging to 14 families and 38 genera. Among them, 79 taxa are reported for the first time in the bryophyte flora of Aksaray. According to Henderson's grid-square system of Türkiye, 18 taxa are reported for the first time from the B8 square and 4 taxa from the B7 square. While Pottiaceae (29 taxa), Brachytheciaceae (22) and Bryaceae (18) are the most species-rich families, *Ptychostomum* (12), *Syntrichia* (10), *Orthotrichum* (10) and *Brachythecium* (10) are the most species-rich genera. The taxa in the floristic list are presented in a table.

**Keywords:** Aksaray, Bryophyte, Ekecik Mountain, Flora, Moss

### Ekecik Dağı'nın (Aksaray/Türkiye) Briyofit Florası

#### Öz

Bu çalışmada, Ekecik Dağı'nın briyofit florası incelenmiştir. 20 istasyon ve farklı habitatlardan toplanan briyofit örneklerinin incelenmesi sonucunda; 16 familya ve 40 cinse ait 123 takson tespit edilmiştir. Marchantiophyta bölümü iki familya ve iki cinse ait iki taksonla temsil edilirken; Bryophyta bölümü 14 familya ve 38 cinse ait 121 taksonla temsil edilmiştir. Bunlar arasından 79 takson, Aksaray briyofit florası için ilk kez rapor edilmektedir. Henderson'un Türkiye kareleme sistemine göre; 18 takson B8 karesinden, 4 takson ise B7 karesinden ilk kez bildirilmektedir. Pottiaceae (29 takson), Brachytheciaceae (22) ve Bryaceae (18) en zengin familyalar iken; *Ptychostomum* (12), *Syntrichia* (10), *Orthotrichum* (10) ve *Brachythecium* (10) en çok türe sahip cinslerdir. Floristik liste tablo halinde sunulmuştur.

**Anahtar kelimeler:** Aksaray, Briyofit, Ekecik Dağı, Flora, Karayosunu

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## 1. Introduction

Türkiye is one of the most important countries in terms of floristic biodiversity compared to others in the region. The primary reasons for its rich flora are its climatic, topographic, geological, and geomorphological diversity, as well as the presence of various humid habitats such as seas, lakes, and rivers. Furthermore, Türkiye is situated at the intersection of three phytogeographic regions, namely the Mediterranean, Irano-Turanian, and Euro-Siberian (Davis and Hedge, 1975).

Bryophytes constitute the second largest group of terrestrial plants following vascular plants and are widely distributed across a diverse range of predominantly aquatic and mesic habitats, excluding marine and saline environments. They demonstrate a broad ecological tolerance and are able to persist under varying climatic conditions, extending from tropical to subarctic regions. Bryophytes are represented by approximately 25.000 taxa worldwide. These comprise the classes Marchantiophyta (~7.000-9.000), Anthocerotophyta (~200-250) and Bryophyta (~11.000-13.000) (Goffinet and Shaw, 2009). In Türkiye, bryophytes are represented by 1.295 taxa, comprising 230 Marchantiophyta, 5 Anthocerotophyta, and 1.060 Bryophyta species (Kürschner and Erdağ, 2023; Erdağ and Kürschner,

2024; Aslan et al., 2024; Batan et al., 2024; Ezer et al., 2024; Ezer et al., 2025; Erata et al., 2025; Batan et al., 2026).

Ekecik Mountain, located in the province of Aksaray in the Central Anatolia Region, is notable in terms of biodiversity as it neighbours the Tuz Gölü Basin, which includes many endemic vascular plants. Although there are numerous studies on vascular plants in the vicinity of Ekecik Mountain (Ünal and Dinç, 2000; Başköse and Dural, 2011; Uygur and Karaman Erkul, 2015; Ötgün and Tekşen, 2018), there are no studies on bryophytes. The present paper aims to contribute to the bryophyte flora of Türkiye by reveal the bryophyte flora of Mount Ekecik, which has not previously been studied as bryofloristically.

### 1.1. Study Area

Ekecik Mountain, situated in the Aksaray Province within the Central Anatolian Region, is a volcanic mountain with an altitude of 2.137 m above sea level. It is located approximately 25 km north of Aksaray Province, 10 km south of Ortaköy district, and 18 km east of Tuz Gölü (Ünal and Dinç, 2000). The study area is situated within the Irano-Turanian phytogeographic region and lies at the intersection of B7 and B8 square according to Henderson (1961) (Figure 1).

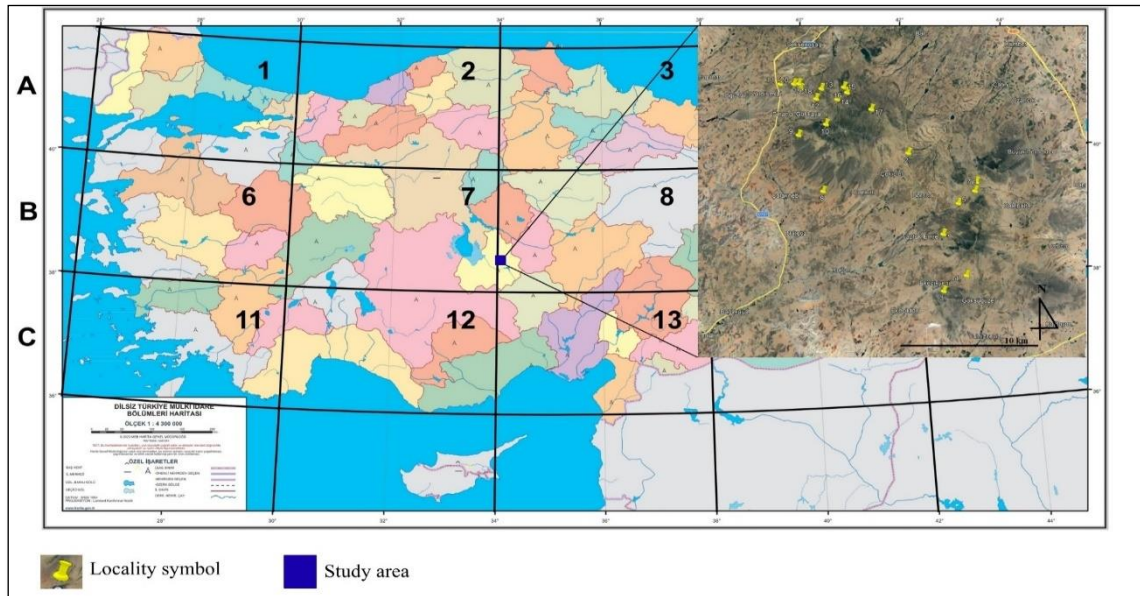


Figure 1. The grid system of Türkiye adopted by Henderson (1961) and a satellite image of study area modified from Google Earth.

Geologically, the study area is dominated by the Ekecik Mountain magmatic unit, which is part of the Central Anatolian Crystalline Complex (a complex composed of metamorphic, granitic, and ophiolitic units). The basement rock units in the

area consist of Precambrian and early Paleozoic metaclastic and meta-magmatic rocks at the base, and Paleozoic and Mesozoic metaclastic rocks, marl-schist and marble at the upper levels (Toksoy Köksal, 2016).

The vegetation of Ekecik Mountain and its surroundings consists of steppe, maquis, forest, and sparse hygrophite vegetation. Maquis shrublands, distributed between altitudes of 1.200 and 1.600 m in the southern and western parts of the study area, are composed of *Quercus pubescens* Willd., *Juniperus oxycedrus* L., and *Cotoneaster nummularius* Fisch. & C.A.Mey. In the northern part, the afforestation areas are characterized by *Cedrus libani* A.Rich. Steppe vegetation predominates and is commonly formed by *Thymus sipyleus* Boiss., *Acantholimon kotschy* (Jaub. & Spach) Boiss., *Astragalus microcephalus* Willd., *A. angustifolius* Lam., *A. plumosus* Willd., *A. kirscheiricus* D.F.Chamb., *Daphne oleoides* Schreb. and *Verbascum cheiranthifolium* Boiss. The hygrophytic vegetation includes *Populus tremula* L., *Salix alba* L., *Ranunculus arvensis* L.,

*R. constantinopolitanus* (DC.) d'Urv., *Mentha spicata* L., *Verbena officinalis* L., *Veronica anagallis-aquatica* L., *Polypogon viridis* (Gouan) Breistr., *Trifolium campestre* Schreb., and *T. pratense* L. (Ünal and Dinç, 2000). A semi-arid Mediterranean climate with very cold winter is observed in the study area (Akman, 2011). According to data from the Aksaray Meteorological Station (URL 1), the mean annual temperature is 12.2 °C and the mean annual precipitation is 357.6 mm.

## 2. Material and Method

The main material for the present study consists of bryophyte specimens collected from various localities of Ekecik Mountain during different vegetation periods in the years 2022, 2023 and 2026 (Table 1).

Table 1. Locality details (Nu: Number, N: north, E: east, m: meter)

| Nu. | Date       | Locality                                                                                                                            | Altitude |
|-----|------------|-------------------------------------------------------------------------------------------------------------------------------------|----------|
| 1   | 04.06.2022 | Aksaray, Tapduk Emre Village, Turbe surroundings, afforestation area, 38° 33' 40.27"N 34° 7' 45.50"E                                | 1450 m   |
| 2   | 04.06.2022 | Aksaray, Ortaköy road, the eastern part of Ekecik Mountains, oak barren, 38° 37' 21.80"N 34° 5' 50.13"E                             | 1453 m   |
| 3   | 05.03.2023 | Aksaray, Ekecik Yeniköy Village, the hill at southern part, 38° 31' 3.756"N 34° 7' 49.138"E                                         | 1470 m   |
| 4   | 05.03.2023 | Aksaray, Ekecik Yeniköy Village, the rocky area at eastern part, 38° 31' 47.62"N 34° 9' 1.56"E                                      | 1463 m   |
| 5   | 05.03.2023 | Aksaray, Merkez, the entrance surrounding of Salmanlı Village, 38° 35' 5.02"N 34° 8' 33.37"E                                        | 1432 m   |
| 6   | 05.03.2023 | Aksaray, Salmanlı Village, The hill at north-eastern part, 38° 35' 39.53"N 34° 9' 25.70"E                                           | 1605 m   |
| 7   | 05.03.2023 | Aksaray, Salmanlı Village, Ahmet Gedik water fountain surrounding, 38° 36' 3.82"N 34° 9' 29.85"E                                    | 1550 m   |
| 8   | 01.05.2023 | Aksaray, between Fatmauşağı Village and Ekecik Gödelers Village, 38° 35' 34.81"N 34° 1' 16.03"E                                     | 1245 m   |
| 9   | 01.05.2023 | Aksaray, Ekecik Mountain road, roadsides surrounding, 38° 38' 8.50"N 33° 59' 55.20"E                                                | 1390 m   |
| 10  | 01.05.2023 | Aksaray, Ekecik Mountain road, roadside surrounding, 38° 38' 38.07"N 34° 1' 24.64"E                                                 | 1660 m   |
| 11  | 01.05.2023 | Aksaray, Ortaköy, Yıldırım Village, graveyard surrounding, 38° 40' 28.63"N 33° 58' 54.07"E                                          | 1410 m   |
| 12  | 11.06.2023 | Aksaray, Ortaköy, Gökkaya Village, Yayla Boğazı site, 38° 39' 48.01"N 34° 0' 51.34"E                                                | 1540 m   |
| 13  | 11.06.2023 | Aksaray, Ortaköy, Gökkaya Village, Yayla site 1, 38° 40' 16.00"N 34° 1' 8.00"E                                                      | 1595 m   |
| 14  | 11.06.2023 | Aksaray, Ortaköy, Gökkaya Village, Yayla site 2, 38° 39' 46.91"N 34° 1' 59.61"E                                                     | 1553 m   |
| 15  | 11.06.2023 | Aksaray, Ortaköy, the northern part of Ekecik Mountain, afforestation area 1, 38° 40' 20.74"N 34° 2' 20.35"E                        | 1508 m   |
| 16  | 11.06.2023 | Aksaray, Ortaköy, the northern part of Ekecik Mountain, afforestation area 2, 38° 40' 6.44"N 34° 2' 30.79"E                         | 1460 m   |
| 17  | 11.06.2023 | Aksaray, Ortaköy, the northern part of Ekecik Mountain, Steppe area, 38° 39' 20.60"N 34° 3' 49.53"E                                 | 1530 m   |
| 18  | 28.03.2026 | Aksaray, Ortaköy, Sinandı Village, the northern part of castle hill road, spring water surrounding, 38° 40' 16.20"N 33° 59' 59.83"E | 1444 m   |
| 19  | 28.03.2026 | Aksaray, Ortaköy, Sinandı Village, the northern part of castle hill, western slope, 38° 40' 29.06"N 33° 59' 54.77"E                 | 1510 m   |
| 20  | 28.03.2026 | Aksaray, Ortaköy, Sinandı Village, The castle hill site, 38° 40' 27.75"N 33° 59' 39.84"E                                            | 1618 m   |

During the land studies carried out on Ekecik Mountain, bryophyte specimens were collected from various substrata, and the collected specimens were identified using relevant literature (Paton, 1999; Smith, 2004; Kürschner and Frey, 2020; Kürschner and Erdağ, 2023). Nomenclature follows Hodgetts et al. (2020) and Fedosov et al. (2023). The status of identified taxa was evaluated by reviewing the studies of Savaroğlu and Tokur (2006), Ursavaş and Çetin (2013), Yücel and Ezer (2018a, 2018b), Ezer et al. (2021), Uyar and Ören (2025), Gökler et al. (2022), and Yücel et al. (2025) for the B7 grid square; and Henderson and Muirhead (1955), Yayıntaş and Yayıntaş (2010), Gözcü et al. (2013), Ören and Keçeli (2014), Kara et al. (2014), Karakaş and Ezer (2017), Kara et al. (2023), and Çulha and Ezer (2025) for the B8 grid square. Additionally, all determined taxa were cross-referenced with Kürschner and Erdağ (2021), which provides a comprehensive data on the

distribution of bryophytes in Türkiye. Voucher specimens are kept in Dr. Ahmet Uygur's private bryophyte collection. Locality data and substrate of each taxon are presented in the floristic list. The new records for B7 and B8 grid square, and Aksaray Province are indicated with black diamond (◆) in the bryofloristic list.

Abbreviations: L.N. (Locality number), S (Substrate), AKS (Aksaray), s (soil), r (rock), scr (soil covered rock), Qp (*Quercus pubescens* Willd.), Sa (*Salix alba* L.).

### 3. Findings

As a result of the identification of 1.231 bryophyte specimens collected from the Ekecik Mountain, a total of 123 taxa (2 liverworts and 121 mosses) were determined (Table 2).

Table 2. Floristic list.

| Families                | Taxa                                                                                     | L. N.                                       | S      | AKS | B7 | B8 |
|-------------------------|------------------------------------------------------------------------------------------|---------------------------------------------|--------|-----|----|----|
| <b>MARCHANTIOPHYTA</b>  |                                                                                          |                                             |        |     |    |    |
| <b>Pelliaceae</b>       | <i>Pellia epiphylla</i> (L.) Corda                                                       | 10                                          | s      | ◆   |    |    |
| <b>Aytoniaceae</b>      | <i>Reboulia hemisphaerica</i> (L.) Raddi                                                 | 1,11                                        | s      | ◆   |    |    |
| <b>BRYOPHYTA</b>        |                                                                                          |                                             |        |     |    |    |
| <b>Encalyptaceae</b>    | <i>Encalypta spathulata</i> Müll.Hal.                                                    | 5,11,13,16,17                               | r,s    | ◆   |    |    |
|                         | <i>E. vulgaris</i> Hedw.                                                                 | 1,3,4,5,6,10,11,12,13,14,15,16,19,20        | r,s    |     |    |    |
|                         |                                                                                          |                                             | scr    |     |    |    |
| <b>Aongstroemiaceae</b> | <i>Calcidicranella howei</i> (Renauld & Cardot) Bonfim Santos                            | 10                                          | s      | ◆   |    | ◆  |
| <b>Ditrichaceae</b>     | <i>Ceratodon conicus</i> (Hampe) Lindb.                                                  | 5,10,13                                     | s      | ◆   |    |    |
|                         | <i>C. purpureus</i> (Hedw.) Brid.                                                        | 3,12,13                                     | r,s    |     |    |    |
| <b>Pottiaceae</b>       | <i>Bryoerythrophyllum recurvirostrum</i> (Hedw.) P.C.Chen                                | 16,17                                       | r,s    |     |    |    |
|                         | <i>Didymodon icmadophilus</i> (Schimp. ex Miill.Hal.) K.Saito                            | 1                                           | r      | ◆   |    | ◆  |
|                         | <i>D. insulanus</i> (De Not.) M.O. Hill                                                  | 1                                           | r,s    |     |    |    |
|                         | <i>D. nicholsonii</i> Culm                                                               | 11                                          | s      |     |    | ◆  |
|                         | <i>D. tophaceus</i> (Brid.) Lisa                                                         | 19                                          | s      |     |    |    |
|                         | <i>D. vinealis</i> (Brid.) R.H. Zander                                                   | 11,13,19                                    | s      |     |    |    |
|                         | <i>Pterygoneurum ovatum</i> (Hedw.) Dixon                                                | 3                                           | s      | ◆   |    |    |
|                         | <i>Syntrichia calcicola</i> J.J.Amann                                                    | 13,16                                       | r,s    | ◆   |    |    |
|                         | <i>S. caninervis</i> var. <i>gyssophila</i> (J.J.Arnran ex G.Roth) Ochyra                | 8                                           | s      | ◆   |    |    |
|                         | <i>S. handelii</i> (Schiffn.) S.Agnew & Vondr.                                           | 20                                          | r      | ◆   |    |    |
|                         | <i>S. laevipila</i> Brid.                                                                | 10                                          | Qp     | ◆   |    |    |
|                         | <i>S. papillosissima</i> (Copp.) Loeske                                                  | 3,8,11,14,18                                | r,s,sc | ◆   |    |    |
|                         |                                                                                          |                                             | r      |     |    |    |
|                         | <i>S. princeps</i> (De Not.) Mitt.                                                       | 2,3                                         | Qp,s   | ◆   |    |    |
|                         | <i>S. ruraliformis</i> (Besch.) Mans.                                                    | 2,13                                        | Qp,s   |     |    |    |
|                         | <i>S. ruralis</i> (Hedw.) F. Weber & D. Mohr                                             | 1,2,3,4,5,6,8,10,11,12,13,14,15,16,17,18,20 | Qp,r   |     |    |    |
|                         |                                                                                          |                                             | s,scr  |     |    |    |
|                         | <i>S. subpapillosissima</i> (Bizot & R.B. Pierrot ex W. Kramer) M.T. Gallego & I. Guerra | 1,3,4,5,6,8,9,10,11,12,13,15,16,18,19,20    | Qp,r,  | ◆   |    |    |
|                         |                                                                                          |                                             | s      |     |    |    |
|                         | <i>S. virescens</i> (De Not.) Ochyra                                                     | 11                                          | r,s    |     |    |    |
|                         | <i>Tortula acaulon</i> (With.) R.H.Zander                                                | 1,4,7,10,11,14,15,16,19                     | r,s    |     |    |    |

|                      |                                                                                       |                                                         |               |   |   |
|----------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------|---------------|---|---|
|                      | <i>T. cuneifolia</i> (Dicks.) Turner                                                  | 19                                                      | s             | ◆ | ◆ |
|                      | <i>T. inermis</i> (Brid.) Mont.                                                       | 1,2,3,4,5,6,10,11,12,1<br>3,14,15 17,18,19,20           | Qp,r<br>s,scr |   |   |
|                      | <i>T. muralis</i> L. ex Hedw.                                                         | 20                                                      | r             |   |   |
|                      | <i>T. protobryoides</i> R.H.Zander                                                    | 7,11,15                                                 | s             | ◆ |   |
|                      | <i>T. subulata</i> Hedw.                                                              | 1,4,5,6,10,11,13,16<br>17,19                            | r,s           |   |   |
|                      | <i>T. truncata</i> (Hedw.) Mitt.                                                      | 13                                                      | Sa            | ◆ | ◆ |
|                      | <i>T. viridifolia</i> (Mitt.) Blockeel & A.J.E.Sm.                                    | 3                                                       | s,scr         | ◆ | ◆ |
|                      | <i>Gymnostomum calcareum</i> Nees & Hornsch.                                          | 18                                                      | r             |   |   |
|                      | <i>Tortella tortuosa</i> (Hedw.) Limpr.                                               | 1,16                                                    | r,s           | ◆ |   |
|                      | <i>Weissia brachycarpa</i> (Nees & Hornsch.) Jur.                                     | 1,4,11,13,14,17                                         | s             | ◆ |   |
|                      | <i>W. controversa</i> Hedw.                                                           | 13                                                      | s             | ◆ |   |
| <b>Grimmiaceae</b>   | <i>Grimmia anodon</i> Bruch & Schimp.                                                 | 4,6,11,12,13                                            | r,s           | ◆ |   |
|                      | <i>G. dissimulata</i> E. Maier                                                        | 3,15                                                    | r,scr         |   |   |
|                      | <i>G. laevigata</i> (Brid.) Brid.                                                     | 1,3,4,5,6,10,11,13,16<br>19,20                          | r,s           |   |   |
|                      | <i>G. montana</i> Bruch & Schimp.                                                     | 10                                                      | r             | ◆ |   |
|                      | <i>G. ovalis</i> (Hedw.) Lindb.                                                       | 1,3,4,10,11,13,14,16<br>17,19,20                        | r,s<br>scr    |   |   |
|                      | <i>G. plagiopoda</i> Hedw.                                                            | 13                                                      | r             |   |   |
|                      | <i>G. pulvinata</i> (Hedw.) Sm.                                                       | 1,3,4,5,10,11,13,13,14<br>15,16,17 18,19,20             | r,s           |   |   |
|                      | <i>G. reflexidens</i> Müll.Hal.                                                       | 10                                                      | r             | ◆ |   |
|                      | <i>G. trichophylla</i> Grev.                                                          | 11,17,20                                                | r,s           |   |   |
|                      | <i>Schistidium apocarpum</i> (Hedw.) Bruch & Schimp.                                  | 13,16                                                   | r             | ◆ |   |
|                      | <i>S. confertum</i> (Funck) Bruch & Schimp.                                           | 10,13,16                                                | r,s           | ◆ |   |
|                      | <i>S. flaccidum</i> (De Not.) Ochyra                                                  | 1,10,11,16,19,20                                        | r             | ◆ | ◆ |
|                      | <i>S. rivulare</i> (Bridel) Podpera                                                   | 1                                                       | r             | ◆ |   |
|                      | <i>S. marginale</i> H.H.Blom, Bednarek-Ochyra & Ochyra                                | 20                                                      | r             | ◆ | ◆ |
| <b>Bartramiaceae</b> | <i>Philonotis rigida</i> Brid.                                                        | 7,13,16                                                 | s             | ◆ |   |
|                      | <i>P. caespitosa</i> Jur.                                                             | 7,10,13,14,16                                           | r,s           | ◆ |   |
|                      | <i>P. calcarea</i> (Bruch & Schimp.) Schimp.                                          | 7,10,16                                                 | r,s           | ◆ |   |
| <b>Bryaceae</b>      | <i>Bryum argenteum</i> Hedw.                                                          | 5,10,12,13,18                                           | r,s           |   |   |
|                      | <i>B. canariense</i> Brid.                                                            | 13                                                      | s             | ◆ |   |
|                      | <i>B. dichotomum</i> Hedw.                                                            | 2,7,9,18,19                                             | s             |   |   |
|                      | <i>Imbriobryum alpinum</i> (Huds. ex With.) N.Pedersen                                | 13,14,16,17,18                                          | r,s           | ◆ |   |
|                      | <i>I. mildeanum</i> (Jur.) J.R. Spence                                                | 5,7,10,18,19                                            | r,s           | ◆ |   |
|                      | <i>I. muehlenbeckii</i> (Bruch & Schimp.) N.Pedersen                                  | 13                                                      | s             | ◆ | ◆ |
|                      | <i>Ptychostomum capillare</i> (Hedw.) Holyoak & N. Pedersen                           | 4,5,8,11,19                                             | r,s<br>Qp     | ◆ |   |
|                      | <i>P. compactum</i> Hornsch.                                                          | 1,3,13,14,16                                            | r,s           |   |   |
|                      | <i>P. creberrimum</i> (Taylor) J.R.Spence & H.P.Ramsay                                | 13                                                      | s             | ◆ | ◆ |
|                      | <i>P. imbricatum</i> (Müll. Hal.) Holyoak & N. Pedersen                               | 1,13,15,17,18                                           | r,s           |   |   |
|                      | <i>P. inclinatum</i> (Sw. ex Brid.) J.R. Spence                                       | 1,2,3,4,5,6,7,8,9,10<br>11,12,13,14,15,16,17<br>8,19,20 | r,s,<br>scr   | ◆ |   |
|                      | <i>P. knowltonii</i> (Barnes) J.R. Spence                                             | 17                                                      | r             | ◆ |   |
|                      | <i>P. moravicum</i> (Podp.) Ros & Mazimpaka                                           | 11,16                                                   | r,s           |   |   |
|                      | <i>P. pallens</i> (Sw.) J.R.Spence                                                    | 18                                                      | s             | ◆ |   |
|                      | <i>P. pallescens</i> (Schleich. ex Schwägr.) J.R.Spence                               | 13,16,17                                                | s             | ◆ |   |
|                      | <i>P. pseudotriquetrum</i> (Hedw.) J.R. Spence & H.P. Ramsay ex Holyoak & N. Pedersen | 10,13,16,17                                             | s             | ◆ |   |
|                      | <i>P. torquescens</i> (Bruch & Schimp.) Ros & Mazimpaka                               | 11,13,17                                                | s             | ◆ |   |

|                         |                                                                           |                              |            |   |   |
|-------------------------|---------------------------------------------------------------------------|------------------------------|------------|---|---|
|                         | <i>P. turbinatum</i> (Hedw.) J.R. Spence                                  | 17                           | s          | ◆ | ◆ |
| <b>Mniaceae</b>         | <i>Plagiomnium rostratum</i> (Schrad.) T.J.Kop.                           | 16                           | s          | ◆ | ◆ |
|                         | <i>Lewinskya acuminata</i> (H. Philib.) F. Lara, Garillet & Goffinet      | 3                            | Qp,s       | ◆ | ◆ |
|                         | <i>L. affinis</i> (Schrad. ex Brid.) F.Lara, Garillet & Goffinet          | 3                            | Qp         |   |   |
|                         | <i>L. laevigata</i> (J.E.Zetterst.) F.Lara, Garilleti & Goffinet          | 14                           | r          | ◆ |   |
|                         | <i>L. rupestris</i> (Schleich. ex Schwägr.) F. Lara, Garilleti & Goffinet | 1,2,3,5,10,11,13,14,16<br>19 | Qp,r<br>s  |   |   |
|                         | <i>L. sordida</i> (Sull. & Lesq.) F.Lara, Garillet & Goffinet             | 2,3                          | Qp         | ◆ | ◆ |
|                         | <i>L. speciosa</i> (Nees) F. Lara, Garilleti & Goffinet                   | 2,3                          | Qp,s       | ◆ |   |
| <b>Orthotrichaceae</b>  | <i>Orthotrichum alpestre</i> Hornsch. Ex bruch & Schimp.                  | 1,6                          | Qp,r       | ◆ |   |
|                         | <i>O. bistratosum</i> (Schiffn.) Guerra                                   | 1,5,10,11,13,19,20           | r,s        | ◆ |   |
|                         | <i>O. cupulatum</i> Hoffm. ex Brid. var. <i>cupulatum</i>                 | 1,2,3,4,5,10,11,13,16<br>20  | Qp,<br>r,s |   |   |
|                         | <i>O. cupulatum</i> var. <i>riparium</i> Huebener                         | 4                            | r          | ◆ | ◆ |
|                         | <i>O. diaphanum</i> Brid.                                                 | 2,3                          | Qp         |   |   |
|                         | <i>O. hispanicum</i> F.Lara, Garilleti & Mazimpaka                        | 10                           | Qp         | ◆ | ◆ |
|                         | <i>O. pallens</i> Bruch ex Brid.                                          | 2                            | Qp         | ◆ |   |
|                         | <i>O. patens</i> Bruch ex Brid.                                           | 2                            | Qp         | ◆ | ◆ |
|                         | <i>O. pumilum</i> Sw. ex anon.                                            | 2,3                          | Qp         |   |   |
|                         | <i>O. tenellum</i> Bruch ex Brid.                                         | 2,3                          | Qp         |   |   |
|                         | <i>Cratoneuron filicinum</i> (Hedw.) Spruce                               | 16,18                        | b,s        |   |   |
|                         | <i>Palustriella commutata</i> (Hedw.) Ochyra                              | 16                           | r,s        | ◆ |   |
|                         | <i>P. falcata</i> (Brid.) Hedenäs                                         | 10,16,17                     | s          | ◆ | ◆ |
|                         | <i>Amblystegium serpens</i> (Hedw.) Schimp.                               | 3                            | scr        |   |   |
|                         | <i>Campylium stellatum</i> (Hedw.) Lange & C.E.O.Jensen                   | 10,13,17                     | s          | ◆ | ◆ |
| <b>Amblystegiaceae</b>  | <i>Drepanocladus aduncus</i> (Hedw.) Warnst.                              | 7,14                         | s          | ◆ |   |
|                         | <i>D. polygamus</i> (Schimp.) Hedenäs                                     | 7,14                         | s          | ◆ |   |
|                         | <i>Hygroamblystegium humile</i> (P.Beauv.) Vanderp., Goffinet & Hedenäs   | 14                           | s          |   |   |
|                         | <i>H. tenax</i> (Hedw.) Jenn.                                             | 7,10,16,17                   | r,s        | ◆ |   |
|                         | <i>H. varium</i> (Hedw.) Monk.                                            | 7                            | s          | ◆ |   |
|                         | <i>Eurhynchium angustirete</i> (Broth.) T.J.Kop.                          | 13,16                        | s,r        | ◆ |   |
|                         | <i>Rhynchostegium megapolitanum</i> (Blandow ex F. Weber & D. Mohr)       | 8                            | s          |   |   |
|                         | <i>R. riparioides</i> (Hedw.) Dixon                                       | 16                           | r,s        |   |   |
|                         | <i>Oxyrrhynchium speciosum</i> (Brid.) Warnst.                            | 16                           | r          |   |   |
|                         | <i>Rhynchostegiella litorea</i> (De Not.) Limpr.                          | 8                            | s          | ◆ |   |
|                         | <i>Brachytheciastrum trachypodium</i> (Brid.) Ignatov & Huttunen          | 2,3,17                       | Qp,s       | ◆ |   |
|                         | <i>B. velutinum</i> (Hedw.) Ignatov & Huttunen                            | 2,3,8                        | Qp,s       | ◆ |   |
|                         | <i>Brachythecium albicans</i> (Hedw.) Schimp.                             | 3,13,14                      | s          |   |   |
|                         | <i>B. capillaceum</i> (F.Weber & D.Mohr) Giacom.                          | 1,2                          | Qp,r       | ◆ |   |
| <b>Brachytheciaceae</b> | <i>B. erythrorrhizon</i> Schimp.                                          | 16                           | s          | ◆ | ◆ |
|                         | <i>B. geheebii</i> Milde                                                  | 3                            | s          | ◆ | ◆ |
|                         | <i>B. glareosum</i> (Bruch ex Spruce) Schimp.                             | 3,13,14,17                   | r,s        | ◆ |   |
|                         | <i>B. laetum</i> (Brid.) Schimp.                                          | 13                           | s          | ◆ | ◆ |
|                         | <i>B. mildeanum</i> (Schimp.) Schimp.                                     | 2,3,13                       | Qp,s       | ◆ |   |
|                         | <i>B. rivulare</i> Schimp.                                                | 10,13,14,16,17               | r,s        |   |   |
|                         | <i>B. salebrosum</i> (Hoffm. ex F.Weber & D.Mohr) Schimp                  | 14                           | r,s        | ◆ |   |
|                         | <i>B. tommasinii</i> (Sendtn. ex Boulay) Ignatov & Huttunen               | 13                           | r,s        | ◆ | ◆ |
|                         | <i>Eurhynchiastrum pulchellum</i> (Hedw.) Ignatov & Huttunen              | 13,14                        | r,s        | ◆ |   |

|                       |                                                |                    |     |   |
|-----------------------|------------------------------------------------|--------------------|-----|---|
|                       | <i>Homalothecium aureum</i> (Spruce) H. Rob.   | 3,17,20            | s   |   |
|                       | <i>H. lutescens</i> (Hedw.) H. Rob.            | 4,16               | r,s |   |
|                       | <i>H. philippeanum</i> (Spruce) Schimp.        | 4,5,11,14,16,19,20 | r,s |   |
|                       | <i>H. sericeum</i> (Hedw.) Schimp.             | 20                 | r   |   |
| <b>Hypnaceae</b>      | <i>Hypnum cupressiforme</i> Hedw.              | 4                  | r   | ◆ |
| <b>Leucodontaceae</b> | <i>Leucodon sciuroides</i> (Hedw.) Schwägr.    | 20                 | r   |   |
| <b>Pylaisiaceae</b>   | <i>Calliergonella cuspidata</i> (Hedw.) Loeske | 7,14,16,17         | r,s | ◆ |

#### 4. Results and Discussion

As a result of the identification of the bryophyte specimens collected from the Ekecik Mountains, a total of 123 taxa belonging to 16 families and 39 genera were determined. Marchantiophyta is represented by 2 taxa belonging to 2 families and 2 genera, while Bryophyta comprises 121 taxa belonging to 14 families and 37 genera.

Pottiaceae (29 taxa) is the most species-rich family in terms of the number of taxa in the study area (Table 3). The members of the Pottiaceae are drought-tolerant taxa capable of adapting to a wide variety of habitat conditions (Zander, 1993). Brachytheciaceae (22 taxa) ranks second, and Bryaceae (18 taxa) ranks third in terms of species richness. These families are followed by Orthotrichaceae (16 taxa), Grimmiaceae (14 taxa) and Amblystegiaceae (10 taxa) respectively. These six families (comprising 109 taxa) account for 89% of all recorded taxa (Table 3).

Table 3. The taxonomic distribution of taxa by family.

| Nu           | Family           | Number of taxa | Proportion of taxa within the total flora |
|--------------|------------------|----------------|-------------------------------------------|
| 1            | Pottiaceae       | 29             | 23,6                                      |
| 2            | Brachytheciaceae | 22             | 17,9                                      |
| 3            | Bryaceae         | 18             | 14,6                                      |
| 4            | Orthotrichaceae  | 16             | 13,0                                      |
| 5            | Grimmiaceae      | 14             | 11,4                                      |
| 6            | Amblystegiaceae  | 10             | 8,1                                       |
| 7            | Bartramiaceae    | 3              | 2,4                                       |
| 8            | Encalyptaceae    | 2              | 1,6                                       |
| 9            | Ditrichaceae     | 2              | 1,6                                       |
| 10           | Pelliaceae       | 1              | 0,8                                       |
| 11           | Aytoniaceae      | 1              | 0,8                                       |
| 12           | Aongstroemiaceae | 1              | 0,8                                       |
| 13           | Mniaceae         | 1              | 0,8                                       |
| 14           | Hypnaceae        | 1              | 0,8                                       |
| 15           | Leucodontaceae   | 1              | 0,8                                       |
| 16           | Pylaisiaceae     | 1              | 0,8                                       |
| <b>TOTAL</b> |                  | <b>123</b>     | <b>100</b>                                |

The genus *Ptychostomum* is the most species-rich with the 12 taxa in the Ekecik Mountain. The genera *Syntrichia*, *Orthotrichum* and *Brachythecium* (each with 10 taxa) rank second, while *Grimmia* (9 taxa) ranks third in terms of species richness. These

genera are followed by *Tortula* (8), *Lewinskya* (6), *Schistidium* (5), *Didymodon* (5), *Homalothecium* (4), *Philonotis* (3), *Bryum* (3), *Imbriobryum* (3), and *Hygroamblystegium* (3) respectively. The proportion of these 14 genera accounts for 74% of all identified taxa. The presence of a semi-arid Mediterranean climate with very cold winter, along with steppe, maquis, rocky, and sparsely hygrophytic habitats, can explain the predominance of genera adapted to arid and heterogeneous environmental conditions in the study area.

There have been several studies conducted in Aksaray Province. Henderson and Muirhead (1955) reported three bryophyte taxa in the Taşpınar village (located in the western part of Mount Hasan). Yayıntaş and Erdağ (1995) reported seven taxa, while Ören and Keçeli (2014) reported 61 taxa from the Ihlara Valley. In addition to these earlier studies, the present paper reports 123 taxa from the Ekecik Mountain. Among these, 78 taxa (indicated with black diamond symbol in the floristic list) are recorded for the first time in Aksaray Province. Thus, the total number of bryophyte taxa in the Aksaray has increased to 148. Of the taxa identified in the Ekecik Mountain, 43 are also found in the Ihlara Valley. This low level of similarity can be attributed to the significant differences in habitat conditions between the Ekecik Mountain and the Ihlara Valley.

The study area is located at the intersection of the B7 grid square (localities 11, 18, 19, and 20) and the B8 grid square, according to Henderson's (1961) grid system for Türkiye.

*Calcidicranella howei*, *Didymodon icmadophilus*, *Tortula truncata*, *T. viridifolia*, *Imbriobryum muehlenbeckii*, *Ptychostomum creberrimum*, *P. turbinatum*, *Plagiomnium rostratum*, *Lewinskya acuminata*, *L. sordida*, *Orthotrichum cupulatum* var. *riparium*, *O. hispanicum*, *O. patens*, *Campylium stellatum*, *Brachythecium erythrorrhizon*, *B. geheebii*, *B. laetum*, and *B. tommasinii* are reported for the first time in the B8 grid square. In addition, *Didymodon nicholsonii*, *Tortula cuneifolia*, *Schistidium flaccidum*, and *S. marginale* are recorded for the first time in the B7 grid square.

**Declaration****Author contributions**

Idea/Concept: AU, TE; Conceptualization and design: AU, TE; Auditing consulting: AU, TE; References: AU, TE; Materials: AU, TE; Data collection and/or processing: AU, TE; Analysis and/or interpretation: AU, TE; Literature search: AU, TE; Writing phase: AU, TE; Critical review: AU, TE.

**Conflict of interest**

It is declared by the authors that no conflict of interest exists concerning the findings and overall content of the study.

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**Ethical approval**

This research does not involve human or animal subjects and therefore does not require ethical approval.

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