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The genus *Pseudephemerum* and *Schistidium confusum* newly reported from Turkey and Southwestern Asia

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Abstract − *Pseudephemerum nitidum* (Hedw.) Loeske (Ditrichaceae) and *Schistidium confusum* H.H.Blom (Grimmiaceae) were recorded for the first time in Turkey and Southwest Asia. Moreover, the genus *Pseudephemerum* (Lindb.) I.Hagen was recorded as new for this region, whereas *Schistidium confusum* was firstly reported from Mediterranean countries. Site descriptions, illustrations and diagnostic characters, ecology, geographic distribution of these species and brief comparisons with morphologically similar taxa were presented.

Bryophyte diversity / Mosses / Ditrichaceae / Grimmiaceae / distribution / ecology

INTRODUCTION

Bryofloristical knowledge of Turkey is still incomplete, especially for the south and eastern parts of Turkey, which have not been visited by bryologists yet. Although the access to these regions is substantially difficult, many new species and genus records of bryophytes have been added continuously with successful field studies in other parts of Turkey (Uyar & Ören, 2013; Abay & Keçeli, 2014; Karakaş & Ezer, 2016; Özenoglu Kiremit *et al.*, 2016). Further field investigations might be promising to enrich the knowledge of Turkish bryoflora. In this study, moss specimens were collected at Samanlı Mountains in north-western part of Turkey (Fig. 1).

This mountain chain extends from the western edge of the Armutlu Peninsula in Yalova Province to Geyve Strait of Sakarya Province. Although the area is located in Euro-Siberian phytogeographical region, vegetation of Mediterranean origin also exists. The study area is especially covered with deciduous forests at northern slopes, conifers and maquis vegetation in southern slopes and also at the highest elevations of the area. According to the data of Yalova Province Meteorology Station (TSMS, 2016), this locality has a typical semiarid - humid, rainy and warm

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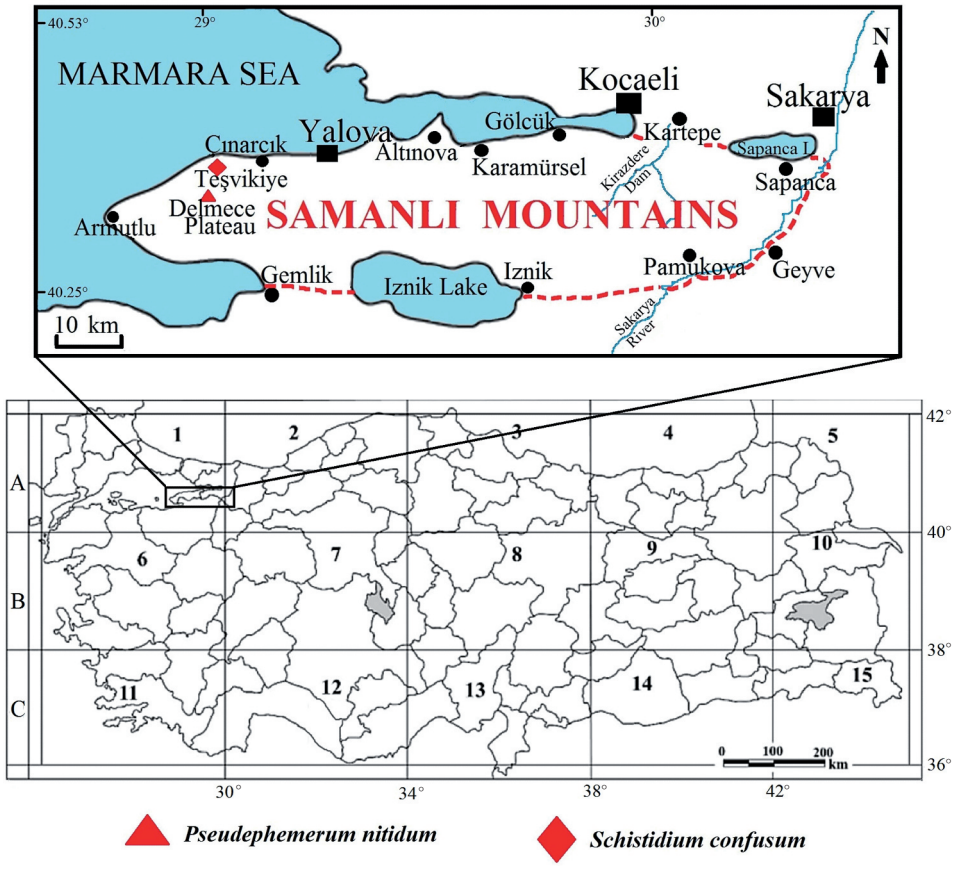


Fig. 1. Distribution of the new moss records in Turkey.

Mediterranean climate. The mean annual temperature is 14.8°C. The highest monthly mean temperature is 24.2°C in August, and the lowest is 6.7°C in February. The mean annual precipitation of the region is 727.7 mm.

Reported here are two remarkable new bryophyte records (*Pseudephemerum nitidum* (Hedw.) Loeske and *Schistidium confusum* H.H.Blom) for the bryoflora of both Turkey and Southwestern Asia, which were found during our field trips in Samanlı Mountains. Although *Pseudephemerum* (Lindb.) I.Hagen is known also from Europe, South America, Africa, Asia, New Zealand, United States and Mexico, it has never been reported from Turkey or Southwest Asia where similar microhabitats probably exist. Moreover, the first record of *Schistidium confusum* from Mediterranean countries was also given in this report (Ros *et al.*, 2013). Hence, these new records contribute to a significant range extension of the distribution of these species toward Southwest Asia. Voucher specimens were deposited in the private bryophyte herbarium of Uyar in the Department of Biology, Polatlı Science and Arts Faculty, Gazi University (GAZI BRY) in Ankara Province and Bryophyte Herbarium of Bülent Ecevit University (ZNG) in Zonguldak Province.

Photographs and diagnostic characters, ecology, geographic distribution of these species and brief comparisons with morphologically similar taxa were given in this report.

RESULTS

Pseudephemerum nitidum (Hedw.) Loeske **Figs 2-3**

Specimen examined: Turkey. Samanlı Mountains, Yalova Province, Çınarcık District, the South of Delmece Plateau (40°32'16"N, 29°00'23"E), on soil in meadow, *ca* 725 m, 29 October 2015, *GAZI BRY 1350.*

At first sight, the genus looks similar to *Pleuridium* Rabenh. However, it differs from *Pleuridium* by the upper leaves whose lengths are same to perichaetial leaves and with more visible capsules (Smith, 2004). In addition, *Pseudephemerum nitidum* is akin to species of *Pohlia*, *Bryum* and *Leptobryum* because of the thin-walled leaf cells and the toothed leaf tips but it is easily distinguished by the serrulate leaf apex, more conspicuous capsules, undifferentiated lax leaf cells (Yip, 2002, 2007).

Although the Turkish specimens match the present descriptions of *Pseudephemerum nitidum,* it differs by its ovate leaves (Fig. 2) and lateral sporophytes (Fig. 3).

Pseudephemerum nitidum is an ephemeral moss. It occurs in summer and autumn, but usually disappears by winter (Atherton *et al.*, 2010). This species generally prefers rocky habitats under deciduous forests within the temperate area in the Holarctic region (Dierβen, 2001).

The specimens were collected on damp soil in *grassland* at 725 m in autumn with *Ptychostomum moravicum* (Podp.) Ros & Mazimpaka, *Ephemerum minutissimum* Lindb., *Philonotis caespitosa* Jur. and *Imbribryum alpinum* (Huds. ex With.) N.Pedersen which grow together.

Distribution: Africa, America, Asia, Europe, and Oceania (Australia, New Zealand) (Yip, 2002, Ros *et al.*, 2013).

Schistidium confusum H.H.Blom **Figs 4-5**

Specimen examined: Turkey. Samanlı Mountains, Yalova Province, Çınarcık Town, Teşvikiye District (40°36'41"N, 29°04'18"E), under *Quercus* forest at deciduous forest edge, on calcareous rocks, *ca* 150 m, 22 April 2016, *GAZI BRY 1502*.

Schistidium Bruch & Schimp. belongs to the widespread family Grimmiaceae Arn., with about 120-150 species distributed from arctic to temperate regions (Smith, 2004). In Turkey, *Schistidium* has been represented by 20 species so far. This report of *S. confusum* from Samanlı Mountains adds a further species to the genus in Turkey (Uyar & Çetin, 2004; Kürschner & Erdağ, 2005). Some species of *Schistidium* are very common and abundant in cold, cool and temperate regions of both hemispheres and at high elevations on tropical mountains. However, *S. confusum* was unknown from Mediterranean countries until this research (Ochyra *et al.*, 2008; Ros *et al.*, 2013).

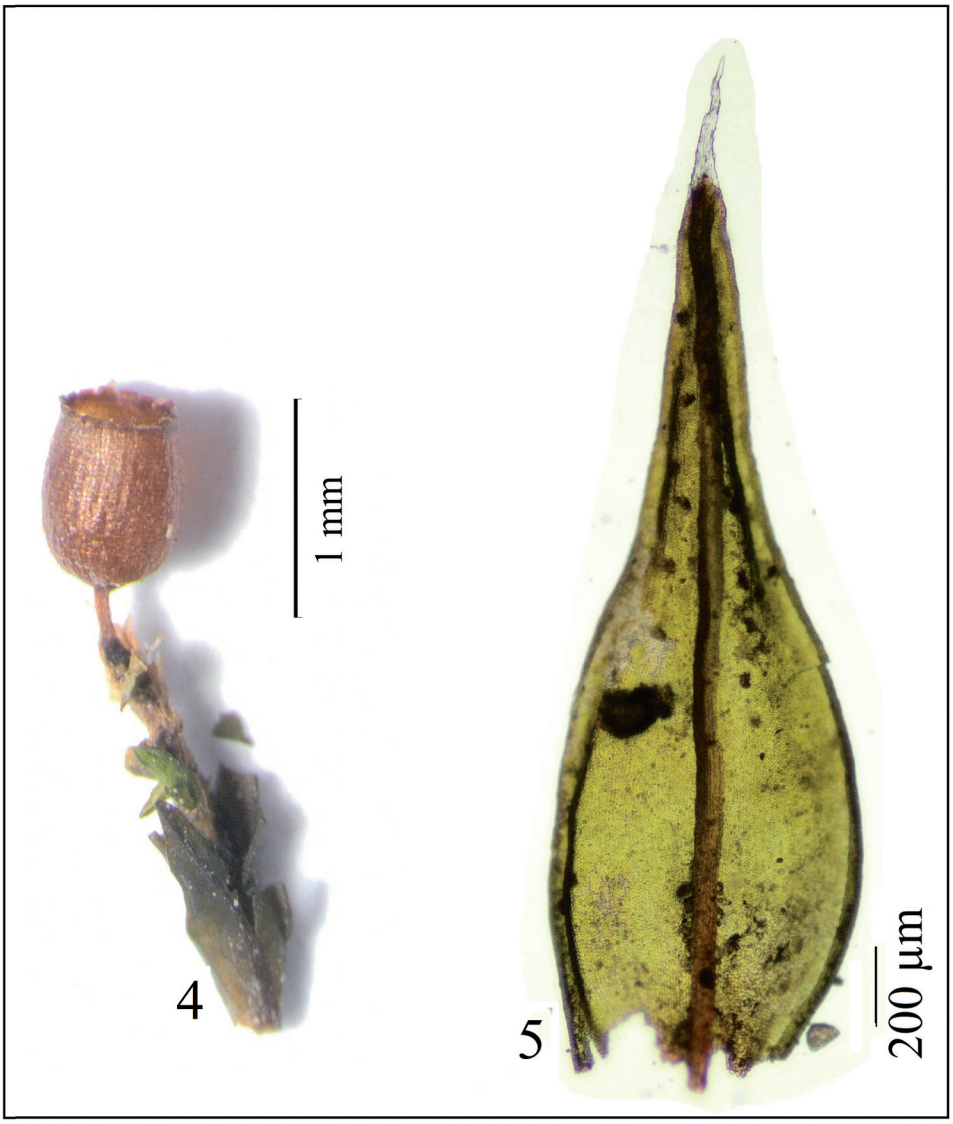
This species is characterised with broadly recurved leaf margins, narrow and stiff hair points, strongly sinuose leaf cells and squarrose peristome teeth. It is distinguished from *Schistidium papillosum* and *S. pruinosum* by its less papillose leaf, strongly sinuose leaf cells, bistratose upper lamina and wide central strand (Nyholm, 1998; Blom, 1996).

Figs 2-3. *Pseudephemerum nitidum*. **2.** Leaf and leaf cells. **3.** The plant with conspicuous capsule. All from *GAZI BRY 1350*.

Our material possesses these characteristics but differs from the most of the published descriptions by having shorter oblong capsules (Fig. 4) and longer leaves (Fig. 5).

Schistidium confusum H.H.Blom. is a thermophilous, calcicolous species. It is often found at calcareous rocks under deciduous forests or sun-exposed areas at forest edges within the temperate area in Holarctic region (Dierβen, 2001; Hallingback, *et al.*, 2006). In this study, *Schstidium confusum* was found on limestone under *Quercus* forests at 150 m altitude together with the moss species; *Orthotrichum anomalum* Hedw., *Ptychostomum capillare* (Hedw.) Holyoak & N.Pedersen and *Grimmia pulvinata* (Hedw.) Sm.

Distribution: Austria, Czech Republic, Estonia, Finland, Hungary, Latvia, Norway, North-Western European Russia and Sweden (Nyholm, 1998; Ignatov *et al.*, 2006).



Figs 4-5. *Schistidium confusum*. **4.** Capsule. **5.** Leaf. All from *GAZI BRY 1502*.

Previously this species has been found in Northern Europe and Russian European countries. This report contributes to a marked range extension of the distribution of this species towards Northwest Turkey (Kürschner & Frey, 2011; Ros *et al.*, 2013).

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