

## Notes on *Campyliadelphus elodes* (Lindb.) Kanda (*Amblystegiaceae*) in Turkey

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### Abstract

*Campyliadelphus elodes* (Lindb.) Kanda was firstly reported from Western Black Sea region (Düzce province) of Turkey by Ezer and Cangül in 2010. Presently, this species has been reported for the first time from East Black Sea region (Artvin province) of Turkey and A5 square with this paper. Description of the specimen was given along with its ecology and collected localities.

**Key words:** Moss flora, biodiversity, *Campyliadelphus*, *Amblystegiaceae*, Turkey

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## Türkiye'deki *Campyliadelphus elodes* (Lindb.) Kanda (*Amblystegiaceae*) üzerine notlar

### Özet

*Campyliadelphus elodes* (Lindb.) Kanda ilk kez 2010 yılında Ezer ve Cangül tarafından Türkiye'nin Batı Karadeniz (Düzce ili) Bölgesi'nden rapor edildi. Şimdi, bu çalışma ile, ikinci kez Türkiye'nin Doğu Karadeniz Bölgesi'nden (Artvin ili) ve A5 karesinden rapor edilmektedir. Türün ayrıntılı tanımlaması ile birlikte onun ekolojisi ve toplandığı lokaliteler verildi.

**Anahtar kelimeler:** Karayosunu florası, biyolojik çeşitlilik, *Campyliadelphus*, *Amblystegiaceae*, Türkiye

### 1. Introduction

Compared to other countries, not many bryophytes studies have been conducted in Turkey, so the bryophyte flora of Turkey remains poorly known. Recently, many bryophytes have been recorded for Turkey (Abay et al., 2007; Keçeli and Abay, 2007 a, b; Kara et al., 2007; Kara et al., 2008; Özdemir, 2008; Özdemir et al., 2008; Özdemir and Uyar, 2008; Keçeli et al., 2008; Kürschner and Parolly, 2008; Tonguç Yayıntaş, 2008; Uyar et al., 2008; Abay et al., 2009; Erdağ and Kürschner, 2009; Kırmacı and Erdağ, 2009; Kırmacı et al., 2009; Tonguç Yayıntaş, 2009 a, b; Tonguç Yayıntaş and Allen, 2009; Tonguç Yayıntaş, 2010; Lara et al., 2010; Ören et al., 2010; Özenoğlu Kiremit and Huggonot, 2010; Keçeli et al., 2011 and Özenoğlu Kiremit, 2011; Ursavaş & Çetin, 2012), but more studies are needed to form a complete bryophyte flora.

To date, two *Campyliadelphus* taxa have been reported from Turkey, Europe and Southwest Asia (Uyar and Çetin, 2004; Kürschner and Erdağ, 2005; Frey et al., 2006; Hill et al., 2006; Ezer and Cangül, 2010; Kürschner and Frey, 2011). These taxa are *C. crysophyllus* (Brid.) R. S. Chopra and the present species.

#### 1.1. Description of the research area

Two parts of Turkey are included in conservation international's 25 world "biodiversity hotspots". Southern and a small part of northeastern Anatolia are included in the "Mediterranean Basin" and "Caucasus" hotspots, respectively. Turkey is also included in 4 Global 200 Ecoregions, including "Caucasus-Anatolian-Hyrcanian Temperate Forests" (Eminağaoğlu et al., 2010).

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The research area is situated in Artvin province of north-east of Turkey. The region is surrounded in the west by Rize, in the east by Ardahan, in the north by Georgia and in the south by Erzurum (Figure 1).

In addition, the area is situated in the Colchis province of the Euro-Siberian floristic region (Zohary, 1973) and in the A5 square adopted by Henderson (Henderson, 1961).

The precipitation regime of the research area is “summer-spring- winter-autumn” of semi-terrestrial origin in Şavşat. Ardanoç has a climate that forms a transition between the terrestrial climate and the climate of the East Black Sea Region. The winters are cold and snowy and the summers are warm and rainy (Akman, 1999).

Vegetation of Ardanoç varies from the bed of the Çoruh Valley upwards. Mainly *Quercus hartwissiana* Stev., populations are visible at the lower sides of the Valley. The upper sides of the Valley are covered by mixed forests of *Ulmus glabra* Huds., *U. minor* Miller, *Alnus glutinosa* (L.) Gaertner, *Carpinus betulus* L., *Abies nordmanniana* (Stev.) Spach. subsp., *nordmanniana*, *Quercus hartwissiana* Stev., *Populus tremula* L. and *Tilia rubra* DC. subsp. *caucasica* (Rupr.) V. Engler up to about 1400 m. From this altitude, up to 2000 m, *Pinus sylvestris* L. forests take place. Above 2000 m, alpinic zone which is composed of mainly steppes covered by mountain meadows (Demirel, 1999).

The main vegetation types are found in Şavşat: *Abies nordmanniana* (Stev.) Spach subsp. *nordmanniana*, *Picea orientalis* (L.) Link, *Pinus sylvestris* L., *Taxus baccata* L., *Juniperus communis* L., *J. oxycedrus* L., *Acer tataricum* L., *A. platanoides* L., *Ilex colchica* Pojark, *Cerasus avium* (L.) Moench, *Rubus saxatilis* L., *R. canescens* DC., *R. caucasicus* Focke, *Ulmus glabra* Huds., *Juglans regia* L., *Fagus orientalis* Lipsky, *Quercus hartwissiana* Steven,

*Q. petraea* (Matt.) Liebl., *Carpinus betulus* L., *Ostrya carpinifolia* Scop., *Corylus avellana* L., *Betula litwinowii* Doluch., *Alnus glutinosa* (L.) Gaertn. subsp., *Salix alba* L., *S. caucasica* Anderson. (Eminağaoğlu et al., 2007).

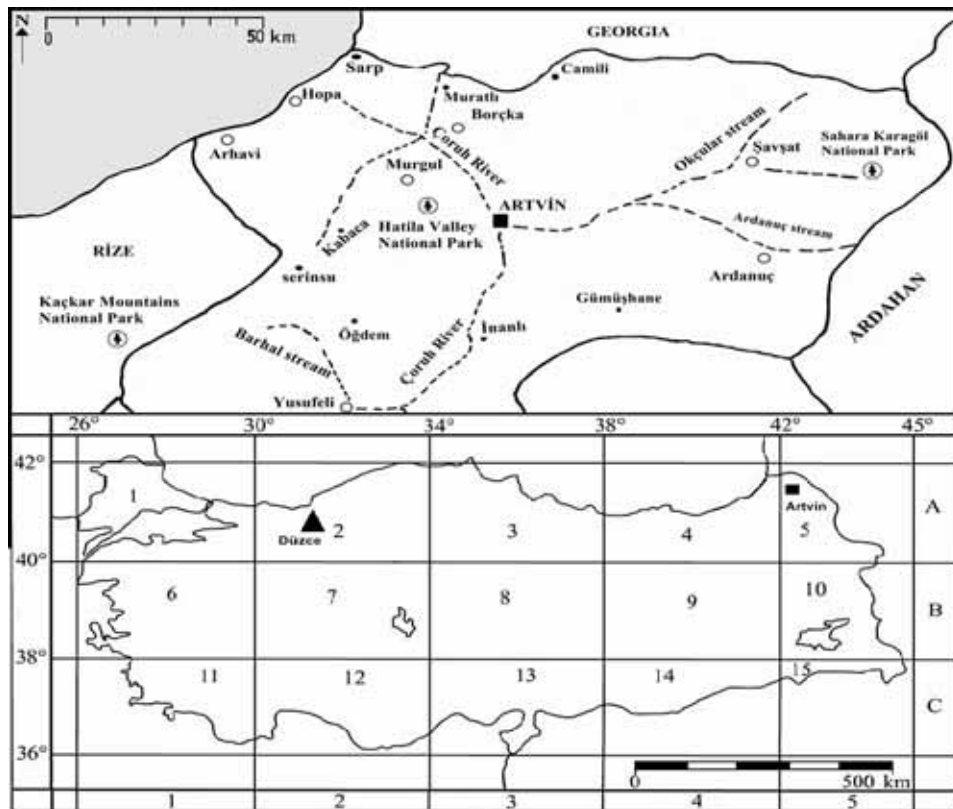


Figure 1. Research area and distribution of *Campyliadelphus elodes* in Turkey and grid system adopted by Henderson (1961). (▲ The first record location of *Campyliadelphus elodes* (Ezer and Cangül, 2010), ■ The second recorded Geographic location)

## 2. Materials and methods

The moss specimens were collected from Artvin region at 18 August 2010 and 20 September 2010. Identifications of the air dried samples were determined by consulting keys (Noguchi et al., 1991; Smith, 2004 and Frey et al., 2006). The status of taxa for Turkey were evaluated by reviewing the related literature (Uyar and Çetin, 2004; Kürschner and Erdağ, 2005; Kürschner and Frey 2011).

The samples are kept in the special collection of Özdemir & Batan in the department of Biology at Karadeniz Technical University.

### 3. Results

During floristic investigations, authors collected some interesting moss specimens from Şavşat and Ardanuç district (Artvin). One of them is *Campyliadelphus elodes* (Lindb.) Kanda. This species was recorded for the first time by Ezer and Cangül in 2010 from (Turkey) Düzce province, Çilimli-Hızardere, on wet soil, 250-311 m, 40° 55' 146" N - 31° 03' 321"E in A2 grid-square (Henderson, 1961) (Figure 1).

*Campyliadelphus elodes* (Lindb.) Kanda was recorded for the second time from Turkey and for the first time from the eastern Black Sea region with this paper.

#### 3.1. *Campyliadelphus elodes* (Lindb.) Kanda= *Campylium elodes* (Lindb.) Kindb.

**3.1.1. Description:** The plants are rather slender, with irregularly and rather loosely branched, have dull green or yellow green shoots. Shoots reach 4-5 cm or more in length (Figure 2). Leaves are very narrowly acute and gradually tapering from base to apex. Leaves are about 1,3-1,5 mm long (Figure 2). Stem leaves are very distant and erect spreading, lanceolate, gradually tapering and not channeled acumen (Figure 2). Leaf margins are obscurely denticulate above (Figure 2). Costa is very long, single and usually extending the apex or near the apex (Figure 2). Median laminal cells are linear, linear-rhomboidal, and scarcely vermicular; basal cells are rectangular and both of them thin walled (Figure 2). The specimens are sterile.

*Campyliadelphus elodes* is differ from *C. chrysophyllus* (S. E. Brigel) H. Kanda with long, single costa and obscurely denticulate leaf margins.

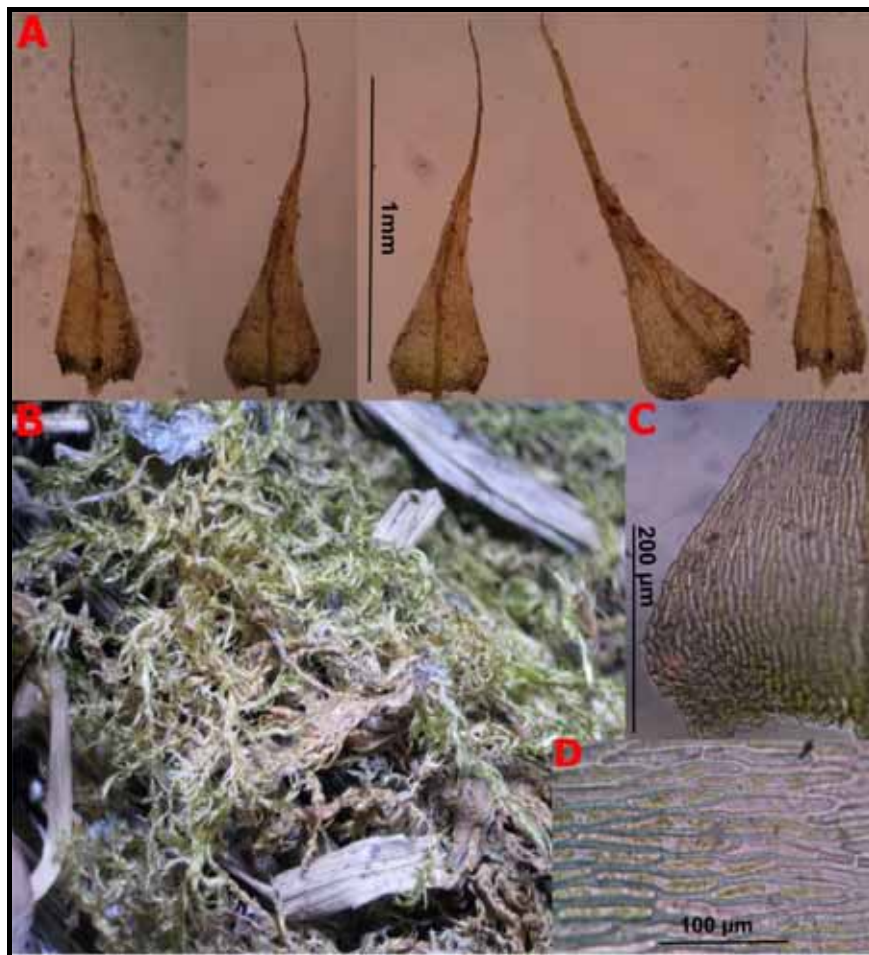


Figure 2. *Campyliadelphus elodes*: A- leaves, B- habitus, C- leaf base, D- mid – leaf cells

**3.1.2. Specimen examined:** *Campyliadelphus elodes* (Lindb.) Kanda Turkey, A5, Artvin province, Ardanuç district, between Ferhatlı and Avcılar villages, 41° 07' 36" N - 42° 00' 10" E, 1027 m. a.s.l., on wet soil, (leg. and det. Batan & Özdemir), 18.08.2010, BAT 1103; Şavşat district, Ciritdüzü Village, 41° 16' 49" N - 42° 23' 44" E, 1260 m a.s.l., on wet soil, (leg. and det. Batan & Özdemir), 20.09.2010, BAT 1104.

**3.1.3. Ecology:** The specimens were collected from marshy area, in the grasses tussocks, associated with *Amblystegium serpens* (Hedw.) Schimp. and *Cratoneuron filicinum* (Hedw.) Spruce.

**3.1.4. Distribution:** This species was known from Bulgaria, China, Iceland, Ireland, United Kingdom and Turkey. (Noguchi et al., 1991; Smith, 2004; Frey et al., 2006; Hájková et al., 2006; Sabovljevic et al., 2008; Ezer and Cangül, 2010 ).

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