



Notes on *Pterygoneurum crossidioides* (Pottiaceae, Bryophyta), a xerophytic species in Turkey

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Abstract

Pterygoneurum crossidioides W. Frey, Herrnstadt & Kürschner (Pottiaceae) is recorded for the second time in Turkey. The species was collected from Bor district (Niğde) in the Central Anatolia Region where the conditions of arid climate dominate. Turkish plants described and illustrated. Ecological characteristics of the species, geographic distribution and identification key to the *Pterygoneurum* species in Turkey are also presented.

Key words: *Pterygoneurum crossidioides*, Mosses, Pottiaceae, Turkey

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Türkiye'deki kurakçıl tür *Pterygoneurum crossidioides* (Pottiaceae, Bryophyta) üzerine Notlar

Özet

Pterygoneurum crossidioides W. Frey, Herrnstadt & Kürschner (Pottiaceae) Türkiye'den ikinci kez kaydedilmiştir. Tür kurak iklim şartlarının hakim olduğu İç Anadolu Bölgesinde Bor (Niğde) ilçesinden toplanmıştır. Türkiye bitkisi tanımlanmış ve resimlendirilmiştir. Türün ekolojik karakteristikleri, coğrafik dağılımı ve Türkiye'deki *Pterygoneurum* türlerinin teşhis anahtarı da verilmiştir.

Anahtar kelimeler: *Pterygoneurum crossidioides*, Karayosunları, Pottiaceae, Türkiye

1. Introduction

The genus *Pterygoneurum* Jur. is widely distributed in arid and semiarid climate regions of five continents (Cano et al., 1994). In the Middle East, *Pterygoneurum crossidioides* was first recorded from the Dead Sea area of Israel (Frey et al., 1990). Also, the species is located on the checklist and the red list of Hungarian bryophytes (Papp et al., 2010). In Turkey, the species was firstly reported from Çankırı-Korgun district (Gündüz Kesim and Ursavaş, 2015). According to the recently literature (Tonguç Yayıntaş, 2009; Ezer and Kara, 2011; Gündüz Kesim and Ursavaş, 2015) to date only four species of the genus (*Pterygoneurum ovatum* (Hedw.) Dixon, *P. subsessile* (Brid.) Jur., *P. squamosum* Segarra & Kürschner, and *P. crossidioides* W. Frey, Herrnstadt & Kürschner) have been recognized for Turkey.

In recent years, significant and remarkable bryophyte records have been determined in Turkey (Ezer et al., 2013; Özenoğlu Kiremit et al., 2014). Presently, description and illustration of the species further contributes to the bryoflora of Turkey.

2. Materials and methods

This study is based on herbarium (Herbarium of Omer Halisdemir University and herbarium of Missouri Botanical Garden (MO)) specimens collected from Central Anatolia (Niğde-Bor) in March 2009. The specimens were identified using appropriate literatures (Frey et al., 1990; Heyn and Herrnstadt, 2004). Latest situation of the species for Turkey have been assessed using the related literature (Gündüz Kesim and Ursavaş, 2015).

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3. Results

3.1. Description

Pterygoneurum crossidioides W. Frey, Herrstadt & Kürschner, Nova Hedwigia 50: 239, 1990. Figure 1 (A-D)

Plants small, bulbiform, forming a loose turf, yellowish green above and turning brown when dry, to 2-2.5 mm in height (Figure 1-A), occasionally dichotomously branched, stem with central strand; leaves strongly imbricate when dry, erectopatient when moist, broadly ovate, 0.7-1.5 mm long, 0.7-1 mm wide, margins entire, apex almost cucullate and weakly serrulate, costa strong, excurrent in hyaline hair-point, hair-point 2/3 the length of lamina to equaling it (Figure 1-B), costa bearing two or three lamellae adaxially (Figure 1-C, D), on lower half of lamina, in upper half of lamina branched filaments develop, gradually increasing in degree of branching and proliferating toward leaf apex, apical cells of filaments smooth and generally conic, laminal cells smooth throughout leaf, chlorophyllous except for hair-point; upper leaf cells quadrate to hexagonal, mid-leaf cells quadrate, rectangular to hexagonal, 9-12 μm wide, 11-13 μm long, base leaf cells hyaline and rectangular (Figure 1-C, D). Autoicous. Archegonia terminal, seta erect, 2-2.5 mm long, capsule brownish, ovoid to subglobose, 0.6-0.9 mm long, peristome absent (Figure 1-A), operculum rostrate, calyptra cucullate, spores papillose, 20-30 μm .

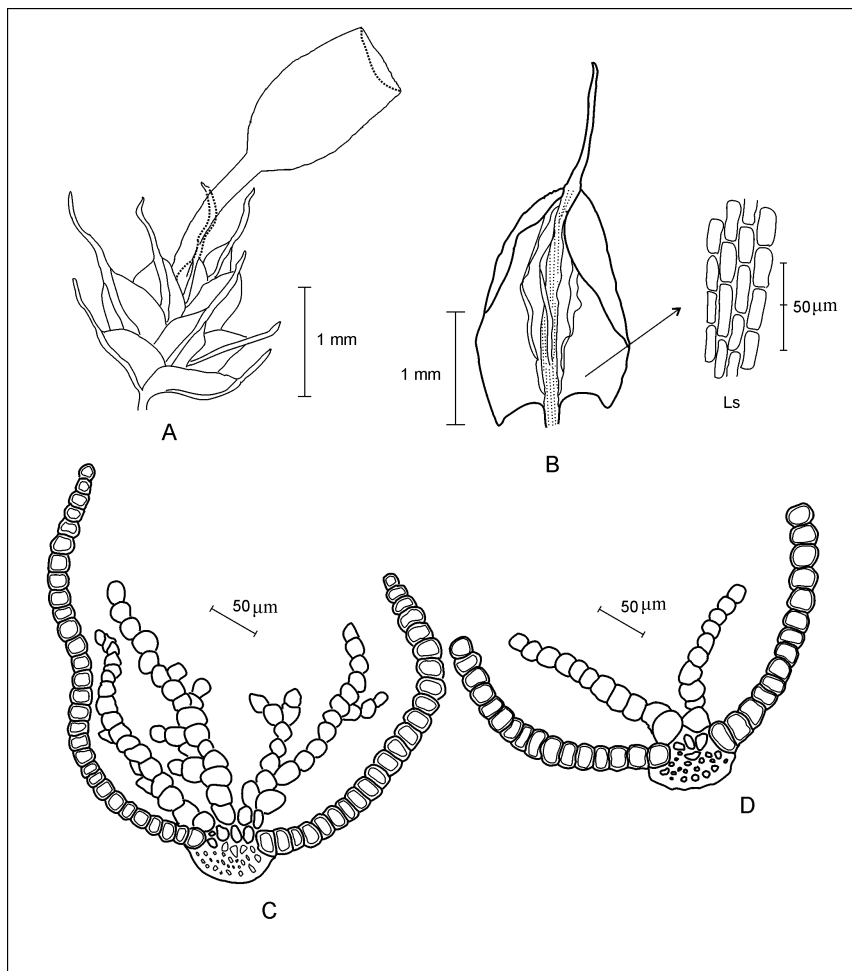


Figure 1. *Pterygoneurum crossidioides* T.E. 1438. A. Habit B. Ventral view of leaf (Ls. Leaf cells of base) C. Upper part of leaf with lamellae and filaments D. Leaf base cross section with two lamellae

3.2. Distribution

Israel (Frey et al., 1990), Hungary (Papp et al., 2010), and Turkey (Gündüz Kesim and Ursavaş, 2015) (Figure 2).



Figure 2. World distribution of *Pterygoneurum crossidioides* (■ Hungary, ▲ Turkey, ● Israel)

3.3. Specimen examined

Turkey. Niğde-Bor: Okçu village, on soil, alt. ca 1085 m, T.E. 1438 (37°51'340" N, 34° 31'010" E), 06 March 2009.

4. Conclusions and discussion

Pterygoneurum crossidioides is one of the characteristic species of the alliance Aloino-Crossidion (Dierssen, 2001), collected on arid soil surface. It is widespread in Bor area (Niğde-Turkey) where steppe and semi-desert species dominate. It has been found together with many associates such as *Encalypta vulgaris* Hedw., *E. spathulata* Müll. Hal., *Syntrichia ruralis* (Hedw.) F.Weber & D. Mohr, *Tortula brevissima* Schiffn. and *Phascum cuspidatum* Hedw.

A key to the *Pterygoneurum* species of Turkey

- 1 Capsules immersed *Pterygoneurum subsessile*
- 1 Capsules exerted 2
- 2 Leaves with 2 lamellae and incised additionally in 3-4 squamulose plates *Pterygoneurum squamosum*
- 2 Leaves with 2 lamellae and not incised additionally in 3-4 squamulose plates.....3
- 3 Leaves with 2-3 lamellae and only in upper half, not bearing photosynthetic filaments..... *Pterygoneurum ovatum*
- 3 Leaves with 2-3 lamellae and starting from the base, bearing branched photosynthetic filaments in upper half..... *Pterygoneurum crossidioides*

One of the diagnostic characters of *Pterygoneurum crossidioides* are the 2-3 lamellae. The subcostal lamellae of *P. crossidioides* are broadly developed reaching the base of the leaf on the ventral side of the costa (Figure 1-C, D), whereas the subcostal lamellae of *P. lamellatum* do not reach the leaf base. Also, *P. crossidioides* is very similar to *P. compactum* (Cano et al., 1994). Both species possess photosynthetic branched filaments on the two supracostal lamellae. The main difference between *P. crossidioides* and *P. compactum* are in the apical cells of the filaments. The cells of *P. compactum* are clearly subspherical and papillose, whilst they are conical or very slightly subspherical and smooth in *P. crossidioides*. In *P. crossidioides* the lamellae are of uniform height throughout the entire length of the nerve, whereas in *P. compactum* they occur only in the upper half of the leaf, are very low at the leaf base, and increase in size progressively up to the midpoint. The lamina cells are smooth in *P. crossidioides* but papillose in *P. compactum*. The leaf margin is usually plane and smooth in *P. crossidioides* and frequently recurved and papillose in *P. compactum* (Cano et al., 1994; Heyn and Herrnstadt, 2004). *P. crossidioides*, a xerophytic species is considered as one of the desert plants due to it spreads in arid regions of world. In Israel, the species found only three xeric localities in Dead Sea area (Heyn and Herrnstadt, 2004). It also found only two localities in Central Anatolia with this study (Çankırı and Niğde). Central Anatolia is one of the regions under the high desertification risk because of semi-arid (steppe) Central Anatolian climate (Böcük et al., 2009). Therefore, *P. crossidioides* can be considered as bioindicator species for determination of desertification risk in Turkey.

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