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Two new records to the bryophyte flora of Turkey: *Crossidium crassinerve* (De Not.) Jur. and *C. laxefilamentosum* Frey *et* Kürschner (*Pottiaceae, Bryophyta*)

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Abstract – *Crossidium crassinerve* and *C. laxefilamentosum* are recorded for the first time to the bryophyte flora of Turkey. Illustrations of these records with ecological and phytogeographical remarks including maps are presented.

Bryophyta / Mosses / Turkey / *Crossidium* / Pottiaceae / Flora / Phytogeography

INTRODUCTION

The genus *Crossidium* Jur. can be distinguished from related xeropottioid taxa by its piliferous leaves (except *C. davidai* Catcheside, *C. laevipilum* Thér. *et* Trab. and *C. woodii* (Delgad.) R. H. Zander) bearing assimilatory filaments on the adaxial surface of the costa. This character clearly differentiates the genus of similar *Aloina* Kindb. species, where filaments can be found on the costa, as well as on the most part of the leaf lamina. The closely related genus *Microcrossidium* Guerra & Cano is separated from *Crossidium* by the presence of a central strand (Cano *et al*., 1993).

Crossidium is a genus of arid zones, showing a xerothermic Pangaean distribution pattern related to a former Permo-Triassic continental Pangaean range (Frey & Kürschner, 1988). It consists of 11 species world wide (Cano *et al.*, 1993; Zander, 1993; Pócs *et al.,* 2004).

In Turkey, at present only one species, *Crossidium squamiferum* (Viv.) Jur. with two varieties, *C. squamiferum* var. *squamiferum* and *C. squamiferum* var. *pottioideum* (De Not.) Mönk. has been recorded (cf. Kürschner & Erdağ, 2005). The new records raise the number of *Crossidium* species in Turkey to three (Fig. 1).

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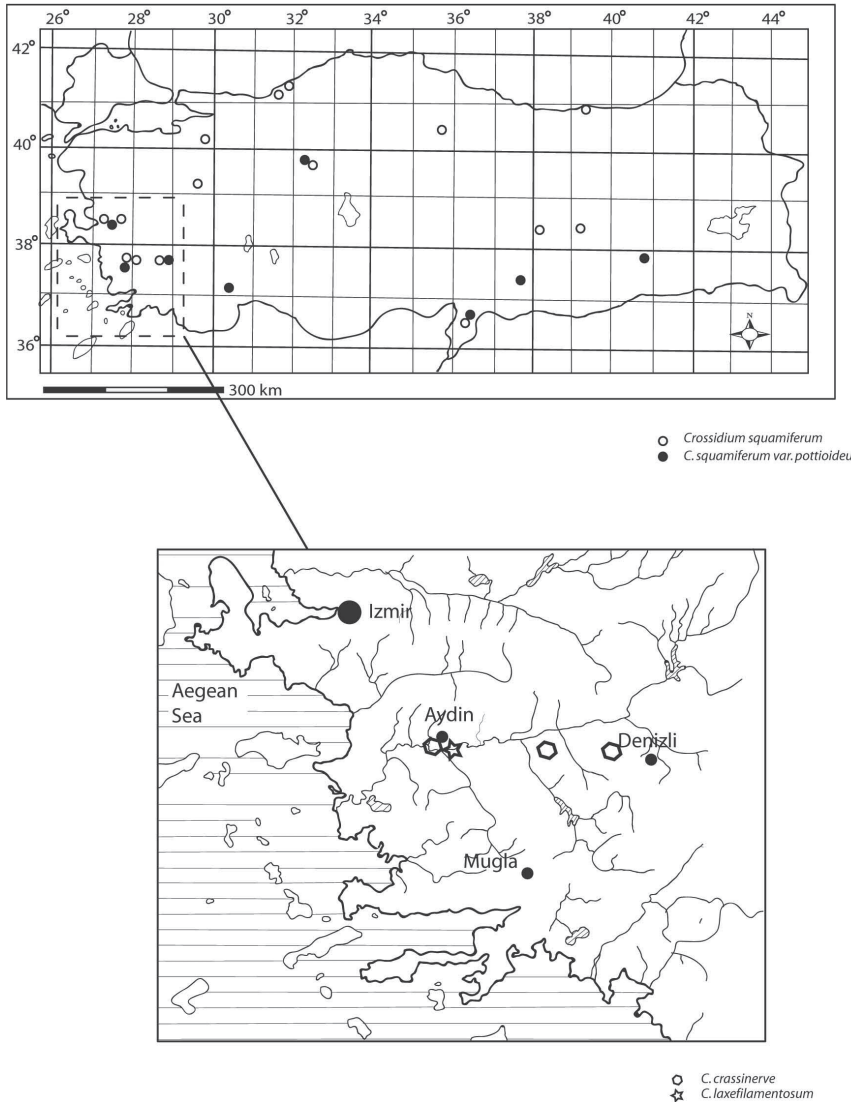
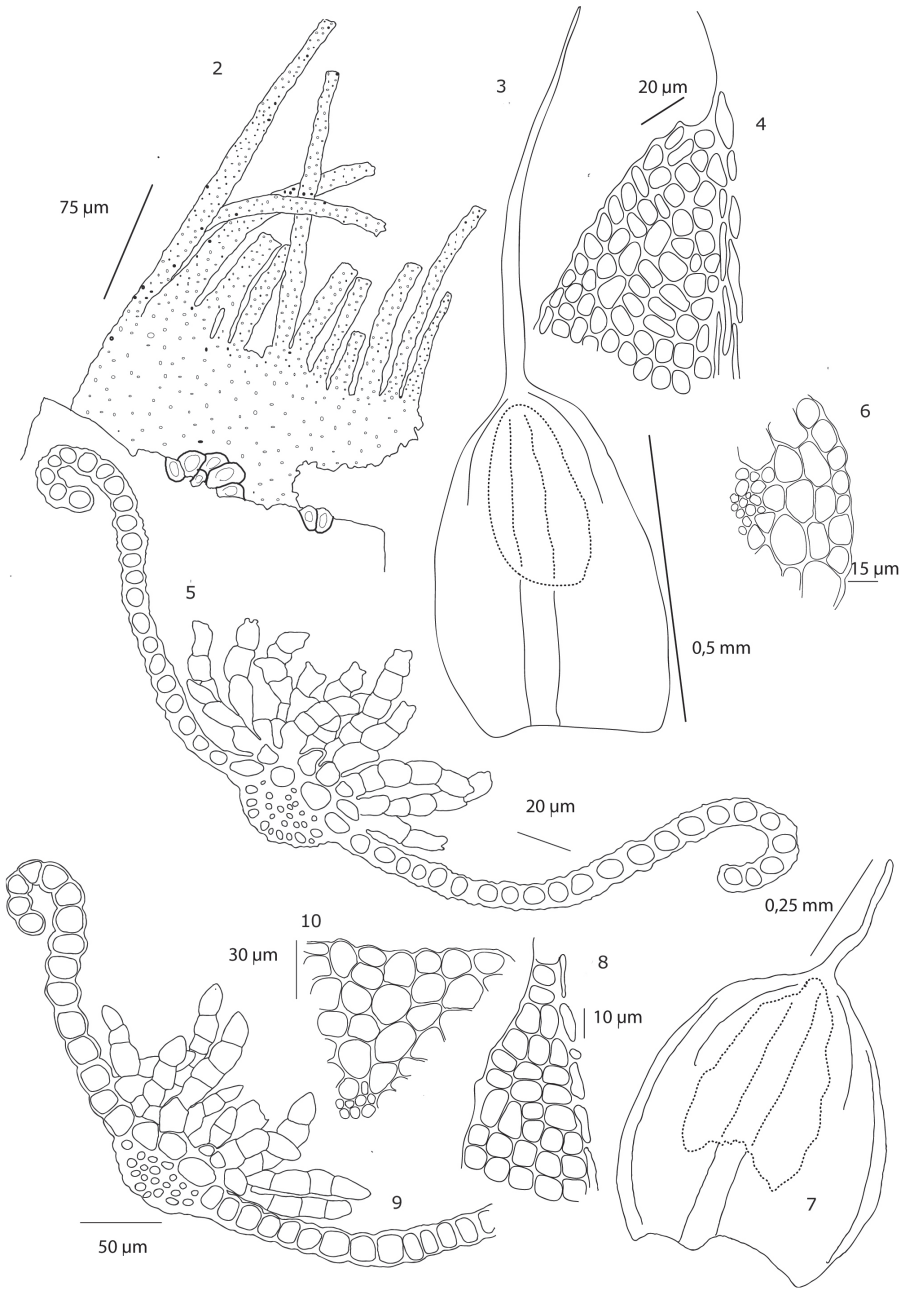


Fig. 1. Distribution map of the *Crossidium* species in Turkey.

Specimen examined:

C. crassinerve (De Not.) Jur. **Figs 2-6**

Turkey: Aydın, Bozdoğan, Amasya locality, on soil, c. 500 m, N 37° 38’ 20’’, E 28° 29’ 18’’, 04.08. 2005, MCet. 569, AYDN!. – Province Aydın, between Yamalak and Aksaz, on soil, c. 340 m, N 37° 52’ 09’’, E 28° 38’ 41’’, 08.07.2005, Mkır. 3741, AYDN!. – Province Denizli, Denizli – Babadağ cross road, on soil, c. 180 m, N 37° 54’ 50.5’’, E 28° 56’ 04,3’’, 23.03. 2006, Mkır. 3741, AYDN!. – Province Aydın, on soil, c. 120 m, N 37° 52’ 05.52’’ E 027° 46’ 26.39’’, 14.03.2008, EMA 182, AYDN!



Figs 2-10. *Crossidium crassinerve* (2-6): **2.** Peristome teeth. **3.** Leaf. **4.** Cells at leaf apex. **5.** Cross section of leaf. **6.** Stem cross section. - *Crossidium laxefilamentosum* (7-10): **7.** Leaf. **8.** Cells at leaf apex. **9.** Cross section of leaf. **10.** Stem cross section.

C. laxefilamentosum Frey & Kürschner **Figs 7-10**

Turkey: Province Aydın, Kepez, Adnan Menderes University main campus area, on soil, c. 160 m, N 37° 51' E 027° 51', 13.10. 2004, MCet. 500, AYDN! – Province Aydın, Kızılcaköy, on soil, c. 120 m, N 37° 52' E 027° 46', 14. 03. 2008, EMA 187, AYDN!

C. squamiferum (Viv.) Jur. var. *squamiferum* **Figs 11-17**

Distribution in Turkey (from the relevant literature and our own collection): **Adıyaman** (Papp, 2007), **Amasya** (Schiffner, 1897; Bornmüller, 1931), **Ankara, Aydın** (Walther, 1967; AYDN 2127!), **Bartın** (Uyar & Çetin, 2006), **Bilecik** (Bornmüller, 1931), **Denizli** (AYDN 2262!), **Elazıg, Iskenderun** (Bornmüller, 1931), **Izmir, Kütahya** (Walther, 1967), **Malatya** (Henderson, 1958), **Manisa** (Walther, 1967), **Trabzon** (Papp, 2004), **Zonguldak** (Uyar & Çetin, 2006) [see Fig. 1].

C. squamiferum (Viv.) Jur. var. *pottioideum* (De Not.) Mönk. **Fig. 18**

Distribution in Turkey (from the relevant literature and our own collection): **Ankara, Antalya** (Bornmüller, 1931), **Aydın** (MCET 294, AYDN!), **Bitlis –incl. Kahta** and **Sason** (Schiffner, 1913), **Denizli** (Walther, 1967; AYDN 2233!), **Iskenderun** (Juratzka & Milde, 1870; Schiffner, 1913), **Izmir** (Walther, 1970), **Nigde** (Walther, 1967) [see Fig. 1].

C. crassinerve (Figs 2-6) is widely distributed in the Northern hemisphere, including North America, North Africa, Europe and Asia (*cf.* Cano *et al.*, 1993). By contrast, *C. laxefilamentosum* (Figs 7-10), a circum Tethyan floral element, was described and for a long time only known from the Arabian Peninsula (Frey & Kürschner, 1991). Meanwhile it was reported from various areas like the Balkan Peninsula, Spain, North Africa, and China (Pocs *et al.*, 2004; Kürschner & Wagner, 2005).

Taxonomically, *C. crassinerve* and *C. laxefilamentosum* are closely related species sharing some common features such as pilose leaves, more or less isodiametric upper laminal cells and a long, twisted peristome. The papillosity and shape of the terminal cells of the supracostal assimilatory filaments is the main distinguishing character between the two species. These two new records can be easily distinguished from *C. squamiferum* by more or less isodiametric upper laminal cells which are oblique in *C. squamiferum* (Fig. 16).

The specimens collected in Turkey come from three different localities of the Menderes massif. Both species typically occur in the understorey of the common Mediterranean shrub vegetation, dominated by *Quercus coccifera* L.*, Cistus creticus* L.*, C. salviifolius* L.*, Asphodelus aestivus* Brot. and *Pinus brutia* Ten.

The soils here are slightly basic or neutral terra rosa type soil (Babadağ) or acidic soils including weathering products from metamorphic rocks (Aydın Mt., Karıncalı Mts). Main annual precipitation during the summer period in the area is 58 mm/y, with a mean maximum temperature of 34,8 °C (in July). (Arslan *et al.*, 2006).

Accompanying moss species in these localities are *Aloina ambigua* (Bruch *et* Schimp.) Limpr.*, Crossidium squamiferum, Didymodon acutus* (Brid.) K. Saito*, D. luridus* Hornsch.*, D. tophaceus* (Brid.) Lisa*, D. vinealis* (Brid.) R. H. Zander*, Tortula muralis* Hedw.*, Trichostomum crispulum* Bruch and some weedy and ruderal species such as *Bryum caespiticium* Hedw. and *Ceratodon purpureus* (Hedw.) Brid. mostly on South faced soils, fully exposed to sun and irradiation resulting strong desiccation during the dry period lasting nearly 7 months in a year.

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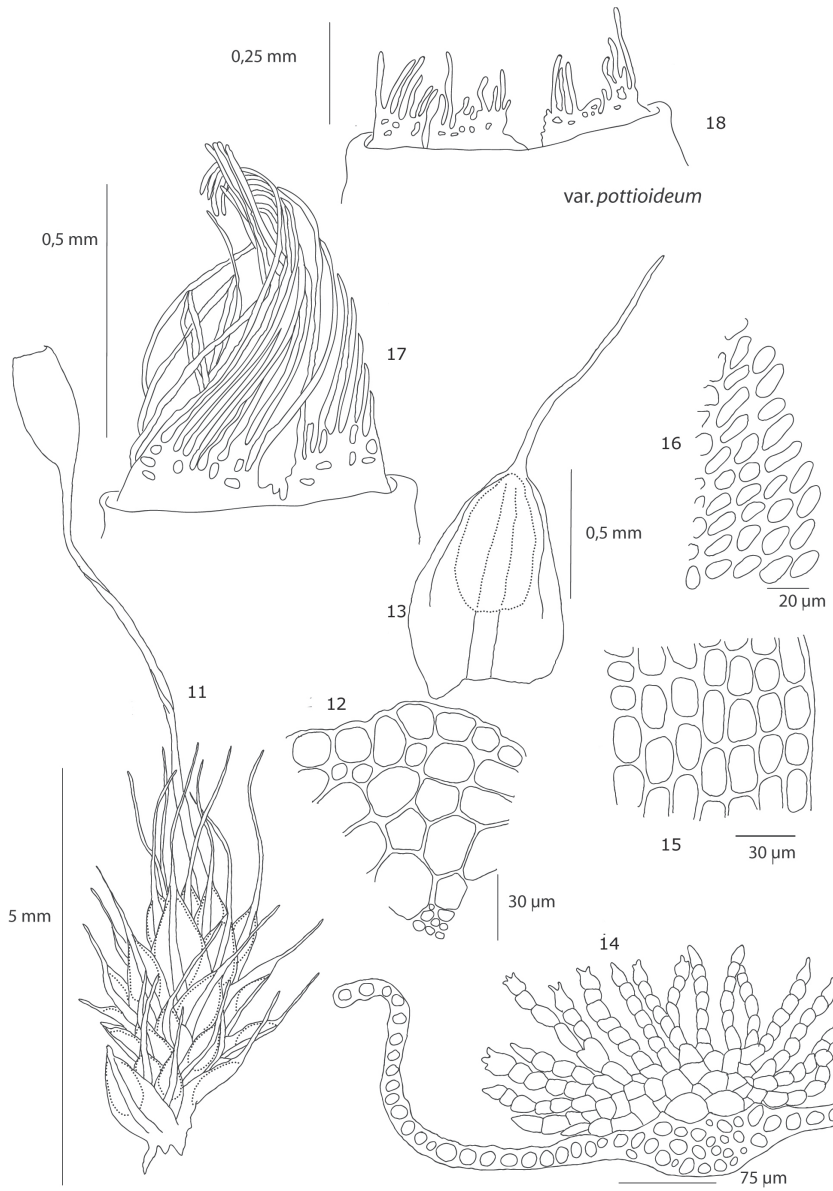

Figs 11-18. *Crossidium squamiferum* var. *squamiferum* (11-17): **11.** Habit. **12.** Stem cross section. **13.** Leaf. **14.** Cross section of leaf. **15.** Basal laminal cells toward margin. **16.** Cells in upper lamina. **17.** Peristome theeth. - *C. squamiferum* var. *pottioideum* (8): **18.** Peristome theeth.

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