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Two New Records for the Freshwater Algae of Turkey

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Abstract: *Gonatozygon aculeatum* Hastings and *Cosmarium quadratum* Ralfs ex Ralfs were recorded for the first time in the freshwater algal flora of Turkey.

Key Words: Desmids, new record, Turkey

Türkiye'nin Tatlısu Algleri İçin İki Yeni Kayıt

Özet: *Gonatozygon aculeatum* Hastings ve *Cosmarium quadratum* Ralfs ex Ralfs Türkiye'nin tatlısu alg florası için ilk kez kaydedilmektedir.

Anahtar Sözcükler: Desmid, yeni kayıt, Türkiye

Introduction

Among aquatic micro-organisms, desmids (a group of unicellular green algae) lend themselves particularly well to the assessment of water quality and nature conservation value, not only because of their specific ecological demands but also as their species-specific regional distribution patterns are well known compared to those of many other groups of micro-organisms (Coesel, 2003).

Turkey is rather unique among the European countries in that it still contains rich freshwater areas. The country has 906,118 ha of lakes, 18,000 ha of dam lakes and a water network 145,000 km long (Ertan & Morkoyunlu, 1998). A number of lakes, pools and rivers are situated in high mountain areas, offering good conditions for the development of a rich desmid flora because they are largely ecologically intact and remote from the industrial and agricultural centres of Turkey. High mountain areas, with relatively high precipitation, potentially offer suitable desmid habitats. In particular, there are a number of high mountain lakes in the Eastern Black Sea region of Turkey.

Among numerous floristic papers about desmids from European countries there is relatively little information about Turkey's desmids. In Turkey, the first specialised taxonomic studies on desmids were published by Öztürk et al. (1995a, 1995b). They described 2 new taxa: *Closterium kuetzingii* Bréb. var. *kuetzingii* and *Pleurotaenium trabecula* (Ehr.) Nägeli. Other species of desmids have been only listed in several general studies about freshwater algae in Turkey. Şahin made the most substantial contribution to the Turkish desmid flora. He added 4 genera (*Netrium*, *Micrasterias*, *Roya* and *Spondylosium*) and 22 species to the list of Turkey's desmids (Şahin, 1998, 2000, 2002, 2007). In addition, a preliminary checklist of desmids of Turkey was published by Şahin (2005). According to this article, the desmid flora of Turkey is represented by 165 taxa. Therefore, it was decided to carry out a more focused investigation of the desmid flora of high mountain lakes in the Eastern Black Sea region of Turkey.

The aim of the present study was to make a contribution to the desmid flora of Turkey. *Gonatozygon aculeatum* Hastings and *Cosmarium quadratum* Ralfs ex

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Ralfs are recorded for the first time in the freshwater algal flora of Turkey (Aysel, 2005; Şahin, 2005). These taxa are described in this paper.

Materials and Methods

Limni Lake is located in Gümüşhane in the Eastern Black Sea region of Turkey. Its surface area is approximately 952 m². The average depth of the lake is 1 m. The elevation of the lake is 1850 m a.s.l. Uzungöl Lake is located in Trabzon province in the Eastern Black Sea region of Turkey. The lake, measuring 1 km in length and 0.5 km in width, has a maximum depth of 15 m. The elevation of the lake is 1250 m a.s.l. (Figure 1).

Collections were performed in 1993 and 2005. The samples were collected and analysed as suggested by Round (1953). Taxonomic determinations were carried out using the works by Coesel (1982, 1991), Förster (1982), Lenzenweger (1996, 1999) and Lind & Brook (1980). The systematic classification of the desmids was performed according to Christiansen (1994). Photographs were taken with an Olympus BH-2 microscope.

Samples preserved in 4% formaldehyde were deposited at the Biology Laboratory of Fatih Faculty of Education, Karadeniz Technical University, Trabzon.

All dimensions are given in micrometres and the following abbreviations are used: L = Cell length, W = Cell width, I = Breadth of isthmus.

Results

Familia Peniaceae

Genus Gonatozygon De Bary 1856

Gonatozygon aculeatum Hastings (Figure 2a)

Coesel 1982, p. 22, pl. 4, fig 5.

Förster 1982, p. 43, pl. 2, figs 1-4.

Lenzenweger 1996, p. 15, pl. 1, fig. 3.

Cell 242.5-272.5 µm L, 10 µm W, 24-27 times longer than wide, cylindrical, apices truncate, without spines and angles slightly rounded. The cell wall possesses dense tapered spines. The length of the spines is variable. Chloroplast has a spiral band-shaped. There are numerous pyrenoids on the chloroplast.

Habitat: Epipellic.

Lake: Limni Lake.

Distribution: Austria, Cameroon, Sudan, South Africa, Mali, Netherlands, Sierra Leone, Uganda, Zimbabwe, Madagascar.

Familia Desmidiaceae

Genus Cosmarium Corda ex Ralfs 1848

Cosmarium quadratum Ralfs ex Ralfs (Figure 2b)

Lind and Brook 1980, p. 58, fig 85.

Coesel 1991, p. 49, pl. 2, figs 3-6.

Lenzenweger 1999, p. 83, pl. 51, fig 35.

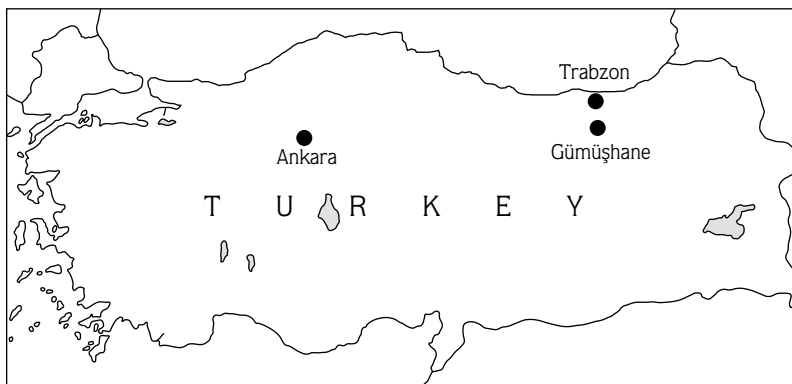


Figure 1. Map of the study area.

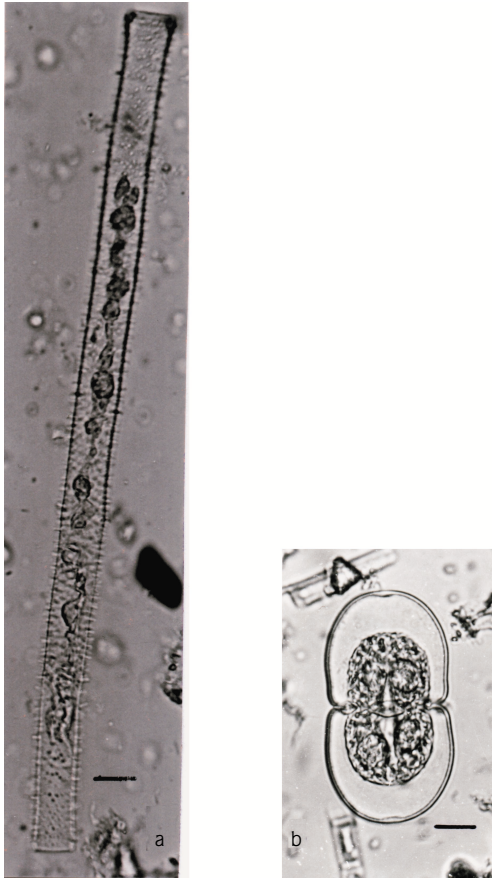


Figure 2. a. *Gonatozygon aculeatum* Hasting, b. *Cosmarium quadratum* Ralfs ex Ralfs (scale: 10 µm).

Cell 61.6 µm L, 31.6 µm W, 6.6 µm I. Cell slightly constricted, sinus shallow, semicells subrectangular with rounded angles. Apex convex. Cell wall smooth. Chloroplast possesses 2 pyrenoids.

Habitat: Epipelic.

Lake: Uzungöl Lake.

Distribution: Austria, England, Netherlands.

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