

Three New Records for the Marine Algal Flora of Turkey

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Received: 26.04.2000
Accepted: 26.01.2001

Abstract: In this study, three *Cyanophyceae* species new for Turkey are reported. These specimens are *Oscillatoria bonnemaisonii* (P.Crouan & H.Crouan) P.Crouan & H.Crouan, *Microcoleus chthonoplastes* Thuret (*Oscillatoriales*) and *Dichothrix spiralis* Fritsch (*Nostocales*). They were determined to be epiphytic on the other algae which were found at the upper-infralittoral zone of the bay of Iskenderun (Mediterranean Sea, Turkey).

Key Words: *Cyanophyceae*, Mediterranean Sea, Taxonomy, Turkey

Türkiye'nin Deniz Alg Florası İçin Üç Yeni Kayıt

Özet: Bu araştırmada, Türkiye için ilk kez rapor edilen üç *Cyanophyceae* türü verilmektedir. Bu türler, *Oscillatoria bonnemaisonii* (P.Crouan & H.Crouan) P.Crouan & H.Crouan, *Microcoleus chthonoplastes* Thuret (*Oscillatoriales*) ve *Dichothrix spiralis* Fritsch (*Nostocales*). İskenderun Körfezi' nin (Akdeniz, Türkiye) üst-infralittoral bölgesinde bulunan diğer algler üzerinde epifit olarak tespit edilmişlerdir.

Anahtar Sözcükler: *Cyanophyceae*, Akdeniz, Taksonomi, Türkiye

Introduction

Blue-green algae, called *Cyanobacteria*, which are included in Monera, are widely distributed in fresh water, wet soil, hot water springs and seas. It was reported by Hoek et al. (1997) that there were approximately 150 genera and 2000 species belonging to the class *Cyanophyceae*. Recent studies in Turkey showed that there are approximately 93 species of this class in the marine environment. These specimens have been determined by researchers studying İzmir and environs and they especially exist in the bay of İzmir (Dural, 1995).

Aysel et al. (1991) reported 11 taxa, 5 of which were new records for Turkey, in a study on the flora of the Sea of Marmara. Zeybek et al. (1993), in the check-list of Turkish marine algae, reported a total of 26 taxa, of which 8 were in the Sea of Marmara, 10 with specimens

in the Aegean Sea and 17 specimens in the Mediterranean Sea. However, in the studies done at the Black Sea shores, Öztürk and Öztürk (1988) reported 1 species in Sinop and Aysel et al. (1996) reported 12 specimens in Bartın. In addition, in the list which was given by Aysel and Erduğan (1995) for the Black Sea, 13 blue-green algae specimens were reported. In the study performed by Dural (1995) for the Aegean Sea, 67 taxa were reported, 9 of which were new records for Turkey. Moreover, Aysel and Gezerler (1996) reported 50 taxa in the check-list of Mediterranean Sea flora of Turkey.

Results and Discussion

Materials were collected from the bay of Iskenderun, at the East Mediterranean shores of Turkey (Figure 1). Specimens were fixed with 4% formaldehyde-water solution. For identification of *Oscillatoria bonnemaisonii*,

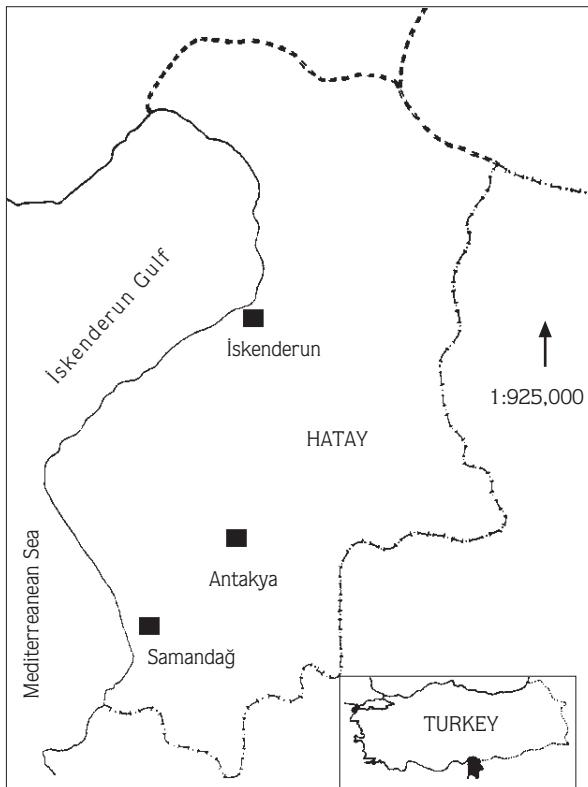


Figure 1. The Area of Collected Specimens (Iskenderun Gulf, Mediterranean, Turkey).

Cl-Zn-I solution was used. For identification of specimens we utilized studies of Pankow (1971), Geitler (1925), Frémy (1934), Fischer et al. (1987), Silva et al. (1996) and Desikachary (1959).

CYANOPHYTA Smith 1930

Cyanophyceae Sachs 1874

Oscillatoriales Anagnostidis & Komárek 1988

Oscillatoriaceae Engler 1898

Oscillatoria bonnemaisonii (P.Crouan & H.Crouan) P.Crouan & H.Crouan 1860

Bas.: *Oscillaria bonnemaisonii* P.Crouan & H.Crouan in Desmazieres 1858

Trichome varies from dark blue-green to dark violet and they are loose. Trichomes are constricted and do not have a calyptra. The trichomes are 18-30 µm in width, and cells are on average 3 (4-6) µm in height. Height is 1/3-1/6 times the width. Filaments are 1.3-1.5 mm long.

It was sampled on *Ceramium flaccidium* (Kütz.) Ardissonne (Ceramiaceae, Rhodophyta) and determined to be epiphytic (Figure 4).

Phormidiaceae Anagnostidis & Komárek 1988

Microcoleus chthonoplastes (Mertens) Zanardini 1840

Bas.: *Conferva chthonoplastes* Mertens in Hornemann 1813

Syn.: *Chthonoblastus salinus* Kützing 1843

Chthonoblastus lyngbyei Kützing 1843

Microcoleus anguiformis Harvey 1846-51

Microcoleus salinus (Kützing) Montagne in Castagne 1851

Microcoleus lyngbyei (Kützing) P.Crouan & H.Crouan 1867

Blue-green or olive green filaments are 8-10 in number, in a mucilage. Cells are 5-6 µm wide and 3.6-10 µm high, so height is one or two times the width. Apex cell is conic, not capitate. When it is dyed with Cl-Zn-I, it does not turn violet. In our investigation region, it was determined to be epiphytic on *Codium vermilara* (Oliv) Delle Chiaje (*Codiaceae*, *Chlorophyta*) (Figure 3).

Nostocales Anagnostidis & Komárek 1989

Rivulariaceae Rabenhorst 1865

Dichothrix spiralis Fritsch 1918

Filaments are irregular, 400-500 (-1500) µm long, fasciculate, widths and lengths of cells are 12 µm. Height is either equal to or shorter than width and filaments are twisted. A heterocyst which has conic or hemispherical shape, is at the base and is 6-7 µm wide. It develops epiphytically on the other algae. In our study it was sampled on *Sargassum* spp. (Figure 2).

Systematic categorization of blue-green algae has varied among researchers. For example, N'Yeurt et al. (1996) categorized the family *Oscillatoriaceae* under the order *Nostocales* but Silva et al. (1996) categorized this family as the order *Oscillatoriales*. The genus *Microcoleus* was included in the family *Oscillatoriaceae* by N'Yeurt et al. (1996) but Silva et al. (1996) put it into the family *Phormidiaceae*.

Despite differences and difficulties in the classification of blue-green algae, 54 *Cyanophyceae* specimens for the Mediterranean Sea shores of Turkey and 99

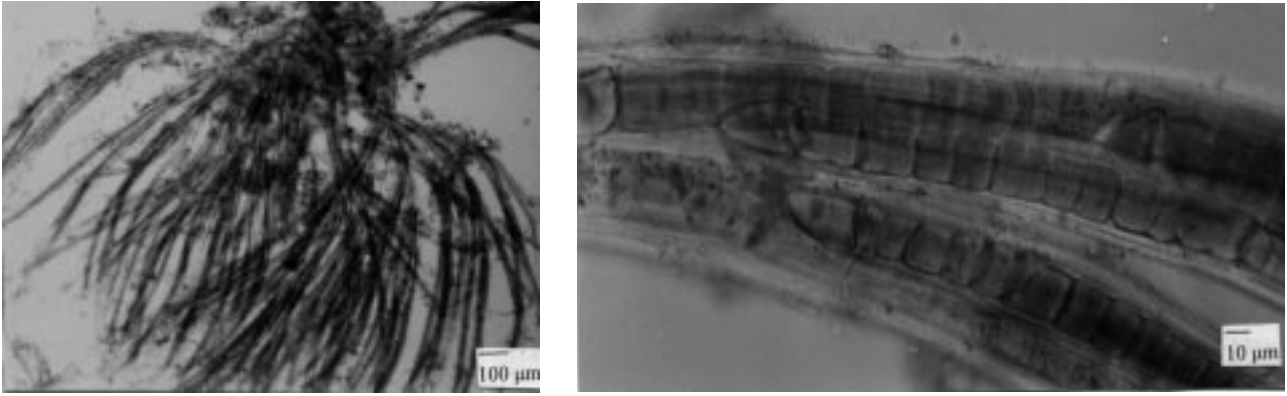


Figure 2. Photographs of *D. spiralis*. a) General view of *D. spiralis*. b) Detailed view of *D. spiralis*.

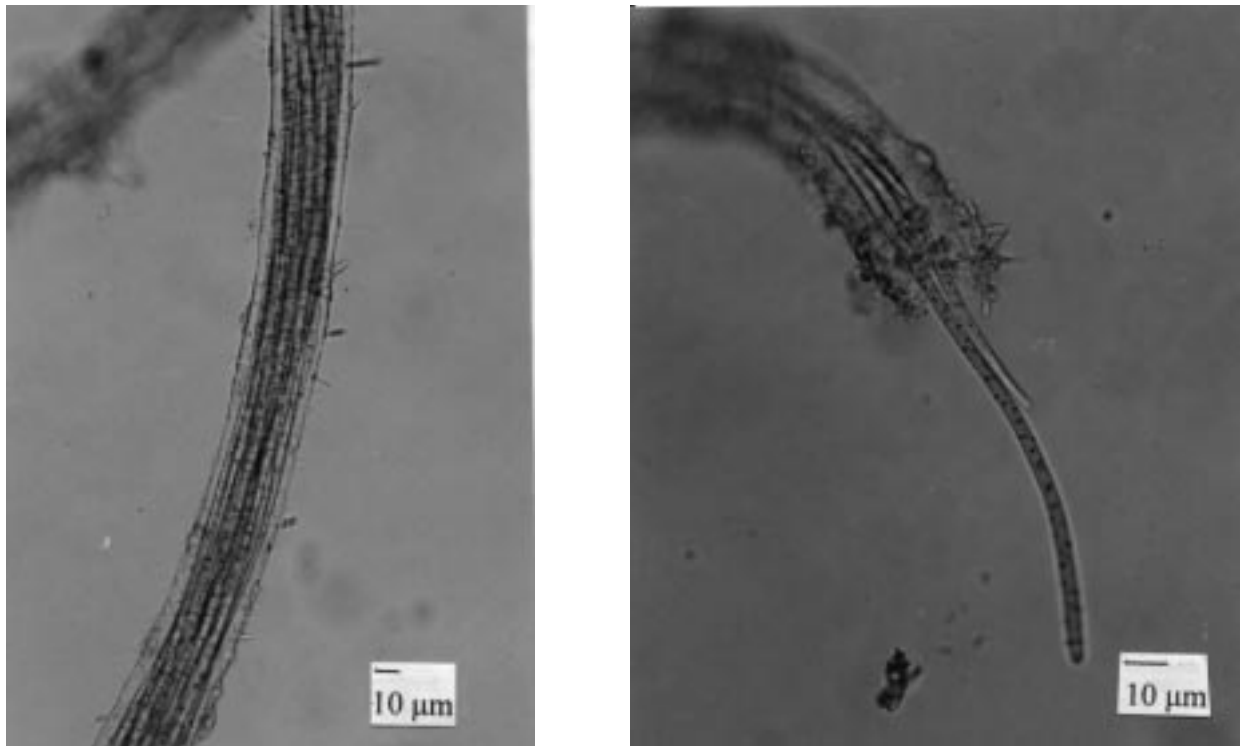


Figure 3. Photographs of *M. chthonoplastes*. a) General view of *M. chthonoplastes*. b) Apex of *M. chthonoplastes*.

Cyanophyceae specimens for the seas of Turkey have been reported by investigators to date. Also marine algae flora of Turkey have been represented by 779 species. By this investigation on the bay of Iskenderun, specimen numbers have reached 57 for the Mediterranean Sea, 102 for Turkish shores and 782 for the total marine flora of Turkey.

Acknowledgement

We gratefully acknowledge the assistance of Prof. Dr. İhsan AKYURT (M.K.Ü. Faculty of Fisheries), Menderes ŞEREFİLİSAN (M.K.Ü. Faculty of Fisheries), Res. Ass. Evrim ÖZKALE (C.B.Ü. Faculty of Arts & Sciences), Res. Ass. Sabiha SORGUN (C.B.Ü. Faculty of Arts & Sciences) and Nihat TAŞKIN.

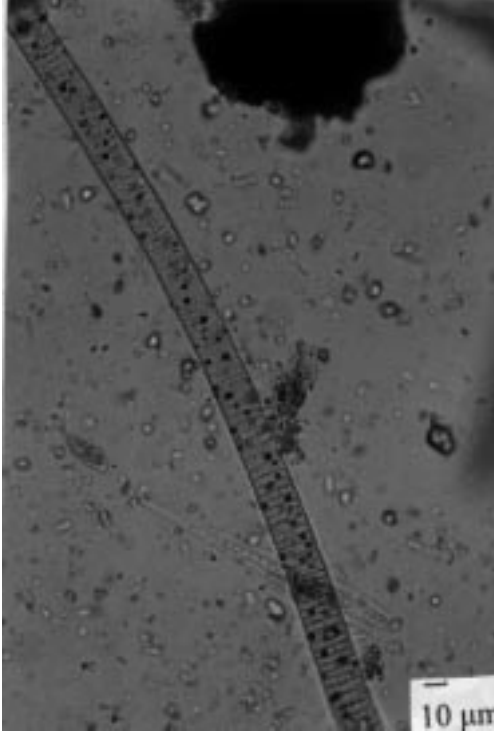


Figure 4. Photograph of *O. bonnemaisonii*.

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