Turk J Bot
26 (2002) 171-174

Research Note

A New Record for the Algal Flora of Turkey: *Chaetomorpha crassa* (C.Ag.) Kütz. (*Cladophoraceae, Chlorophyceae*)

Meral APAYDIN YAĞCI, İsmail İ. TURNA
Süleyman Demirel Üniversitesi, Eğirdir Su Ürünleri Fakültesi, Isparta - TURKEY

Received: 19.04.2001
Accepted: 14.12.2001

Abstract: *Chaetomorpha crassa* (C.Ag.) Kütz. was sampled from the brackish water of Beymelek Lagoon (Antalya). During the seasons in which the water temperature is between 18.9°C (autumn) and 23.4°C (summer), the development density of this species in this area is considerably higher than at other times.

Key Words: *Chaetomorpha crassa*, Beymelek Lagoon

Türkiye Alg Florası İçin Yeni Bir Kayıt: *Chaetomorpha crassa* (C.Ag.) Kütz. (*Cladophoraceae, Chlorophyceae*)

Özet: *Chaetomorpha crassa* (C.Ag.) Kütz. Beymelek Lagünü'nün (Antalya) acı su kesimlerinden örneklenmiştir. Su sıcaklığının 18,9 ºC (sonbahar) ve 23,4 ºC (yaz) olduğu mevsimlerde türün daha yoğun gelişme gösterdiği belirlenmiştir.

Anahtar Sözcükler: *Chaetomorpha crassa*, Beymelek Lagünü

Introduction

Approximately 60 species from the green algal genus *Chaetomorpha* Kütz. occur in oceans, brackish water, and fresh water (Gams, 1969; Levring et al., 1969; Gams, 1974). The epilithic and free-floating forms of this species are present in the benthos and on the water surface (Ünal, 1970; Nizamuddin & Begum, 1973; Burrows, 1991). These algae are also utilized as a food and a water purifier in South-east Asia. Species of *Chaetomorpha* are cultivated nowadays (Levring et al., 1969; Delepine et al., 1987). *Chaetomorpha* species and their distribution areas on the coasts of Turkey are listed in Table 1.

Table 1. The distributions of species *Chaetomorpha* on the coasts of Turkey

	BL	MA	AE	ME
Chaetomorpha adrianii J. Feldmann	-	Zeybek et al., 1986; Aysel et al., 1991	-	-
Chaetomorpha linum (Müller) Kütz.	Aysel et al., 1996	Zeybek et al., 1986; Aysel et al., 1991	Güner et al., 1985; Zeybek et al., 1986	-
Chaetomorpha capillaris (Kütz.) Börg.	-		Güner et al., 1985; Zeybek et al., 1986	-
Chaetomorpha tortuosa (Dillwyn) Kütz.	-	Zeybek et al., 1986; Aysel et al., 1991	Zeybek et al., 1986	-
Chaetomorpha aerea (Dillwyn) Kütz.	Zeybek et al., 1986; Aysel et al., 1996	Zeybek et al., 1986; Aysel et al., 1991	Ünal, 1970; Güner et al., 1985; Zeybek et al., 1986	Ünal, 1970; Zeybet et al., 1986
Chaetomorpha melagonium (Weber & Mohr) Kütz.	-	Aysel et al., 1991	Zeybek et al., 1986	

BL: Black Sea Coast MA: Marmara Sea Coast AE: Aegean Sea Coast ME: Mediterranean Sea Coast

Materials and Methods

This investigation was conducted with seasonal samples. The samples taken in spring, summer, autumn and winter for the study were obtained in April and May, August, October and February, respectively. In 1998 and 1999, the samples of *C. crassa* were collected by hand from a depth of 0-2.5 m of Kaynak Lake, which has a brackish character, covers nearly 6 ha and is connected to Beymelek Lagoon on the west of Antalya (Figure 1).

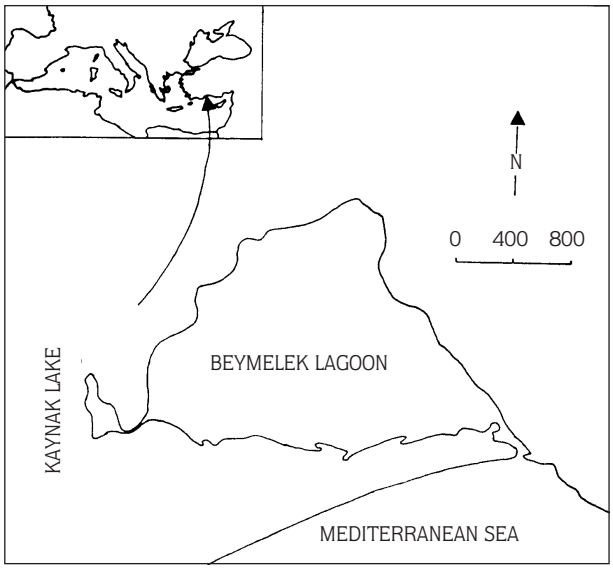

Figure 1. Investigated area

These materials were fixed in 4% formaldehyde solution and kept in the Eğirdir Fisheries Faculty. During the field study, water temperature and salinitiy were measured in the area. The photographs have a scale bar equal to that in Figures 2-4 (100µm).

Discussion

During the study, seasonal measurements showed some variations both in temperature from 16.16ºC (winter) to 23.4ºC (summer) and in salinity from 8.96‰ (autumn) to 12.6‰ (spring). The density of the Phanerogam *Phragmites australis* (Cav.) Trin. ex Steudel. (= *Phragmites communis* Trin.) is high in the coastal area of this region. The green macroalgae form groups on the water surface and on the sandy or muddy part of the benthic zone.

We found that *C. crassa* from Beymelek Lagoon is dark or yellowish-green and is 13-18 cm long. The thalli are unbranched filaments (Figure 2) of cylindical cells which are rectangular and square under the microscope (Figure 3). The cells contain a single reticulate chloroplast with many pyrenoids (Figure 4). The cells of *C. crassa* are 240-440 µm wide, 430-560 µm long and their walls are 50-85 µm thick.

Thalli of this *C. crassa* can occur entangled with the green alga from *Enteromorpha* Link. and Phanerogam, *Potamogeton pectinatus* L. in the lagoon area. *C. crassa* was found in the lagoon in all seasons, but is more

Figure 2. General morphology of *C. crassa*

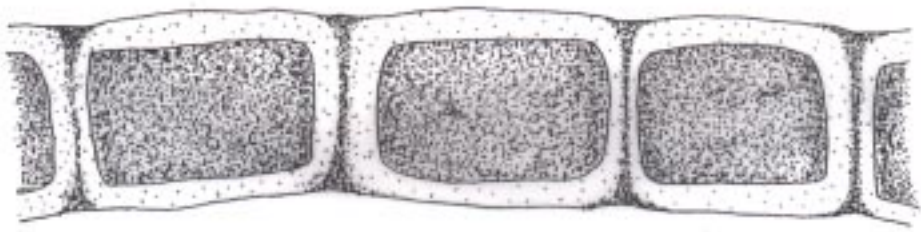

Figure 3. Cells of *C. crassa*

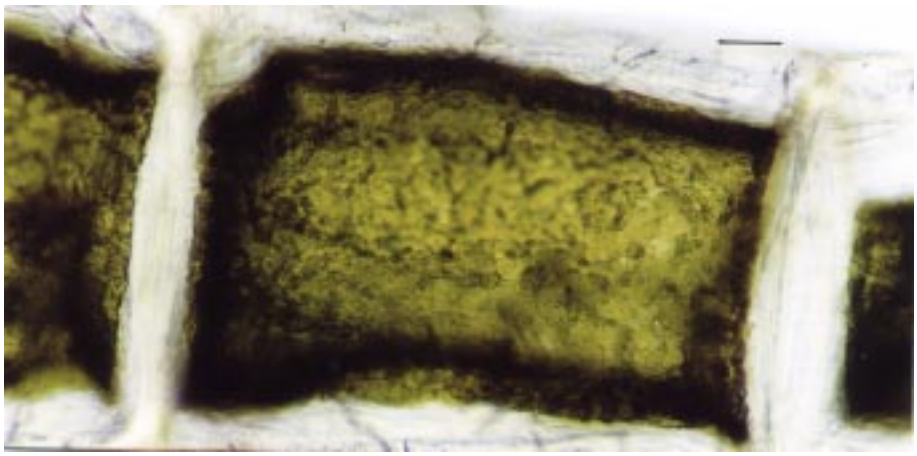

Figure 4. Cell of *C. crassa*

obvious in the summer and autumn than in other seasons. *Chaetomorpha* does not occur in inland waters of Turkey (Demirsoy, 1999). The thickness of the cell wall is an important criterion in the taxanomy of *Chaetomorpha*. The data on the cell diameter for the species of *Chaetomorpha* from the coasts of Turkey are listed in Table 2.

If the cell diameter (240-440 µm) of the *C. crassa* specimens found in the area is taken into consideration, some similarities are observed between *C. crassa* and three other species: *C. aerea, C. linum* and *C. melagonium*. However, *C. aerea* and *C. melagonium* are different from *C. crassa* in that they are marine forms which grow epilithically on hard substrata. On the other hand, *C. linum* occurs both in the sea and in brackish water (Nizamuddin & Begum, 1973; Gams, 1974; Burrows, 1991); and can occur epilithically and be free-floating, as can *Enteromorpha* species (Ünal, 1970; Nizamuddin & Begum, 1973; Burrows, 1991). Therefore, it has been pointed out by some researchers that *C. crassa* may be a synonym of *C. linum*, but this is not certain (Womersley, 1984, pp 171-180; Burrows, 1991, pp 136-141).

The global distribution of *C. crassa* includes the coast of the Red Sea, the Indian Ocean, the Pacific Ocean, the Marshall Islands, the eastern tropical and subtropical coasts of America, and the brackish areas of Mediterranean coasts (Levring et al., 1969, Nizamuddin & Begum, 1973). The cell diameter of *C. crassa* in the samples of the coast at Karachi was 200-500 µm, with unbranched filaments and forming entangled masses with the red alga *Hypnea musciformis* (Wulf.) Lam. and *Enteromorpha* spp. (Gams, 1974). The *C. crassa* found in our investigation area resembles the species on the Karachi coast with respect to growth form and cell dimensions.

We conclude that *C. crassa*, which has been previously found, also occurs as a new report an the algal flora of Turkey. *C. crassa* is consumed as a salad or dessert in far eastern countries due to its character of gelatinization (Levring et al., 1969). *C. crassa* has been shown to occur in all seasons during the study over an area of 6 ha with the largest biomasses occurring in summer and autumn. It is clear that after determining the amount of biomass of this alga it could be evaluated as a food material and might provide an income for the area.

Table 2. Data on the cell diameter of *Chaetomorpha* species from the coasts of Turkey.

	Thickness (µm)	References
Chaetomorpha linum (Müller) Kütz.	80-585	Feldman, 1937; Nizamuddin & Begum, 1973; Womersley, 1984; Burrows, 1991
Chaetomorpha capillaris (Kütz.) Börg.	70-105	Womersley, 1984
Chaetomorpha tortuosa (Dillwyn) Kütz.	30-100	Burrows, 1991
Chaetomorpha aerea (Dillwyn) Kütz.	100-350	Feldman, 1937; Nizamuddin & Begum, 1973; Womersley, 1984
Chaetomorpha melagonium (Weber & Mohr) Kütz.	70-1050	Womersley, 1984; Burrows, 1991

References

Aysel V, Güner H, Dural B (1991). Marmara Denizi Florası 1. *Cyanophyta* ve *Chlorophyta*. *Ege Üniv Su Ürünleri Semp İzmir*, pp. 74-111.

Aysel V, Erduğan H, Sukatar A, Güner H (1996). Bartın Deniz Algleri, Karadeniz, Türkiye. *Tr J of Botany* 20(3): 251-258.

Burrows EM (1991). Seaweeds of the British Isles. Vol: II Chlorophyta. London: Natural History Museum Publications.

Delepine R, Boudouresque CF, Orestano CF, Noailles MC, Asensi A (1987). Algues et Autres Vegetaux Marins. In: Fischer W, Schneider M, Bauchot MI (ed.), Mediterranee et Mer Noire, Zone de Peche 37, Vegetaux et Invertebres, FAO-CEE, Rome. 2-136.

Demirsoy A (1999). Genel ve Türkiye Zoocoğrafyası. "Hayvan Coğrafyası" Ankara. Yayın No: 98-01, 465-471.

Gams H (1969). Makroskopische Süsswasser und Luftalgen. Stuttgart: Gustav Fischer Verlag.

Gams H (1974). Kryptogamenflora. Makroskopische Meeresalgen. Stuttgart: Gustav Fischer Verlag.

Feldman J (1937). Algues Marines de la Cote des Alberes. Revue Algologique. 9: 141-331.

Güner H, Aysel V, Sukatar A, Öztürk M (1985). Türkiye Ege Denizi Florası I. Mavi-Yeşil, Yeşil, Esmer Algler ve Kapalı Tohumlular. *Doğa Bilim Dergisi* 9(2): 273-281.

Levring T, Hoppe H, Schmid OJ (1969). Marine Algae, A Survey of Research and Utilization. Hamburg: Cram, de Gruyter and Co.

Nizamuddin M, Begum M (1973). Revision of the Marine Cladophorales from Karachi. Botanica Marina. Vol. XVI, 1-18.

Ünal A (1970). Türkiye Sahillerinde Yetişen Bazı Deniz Alglerinin Sistematiği. Ankara.

Womersley HBS (1984). The Marine Benthic Flora of Southern Australia. Part I. Department of Botany, University of Adelaide South Australia.

Zeybek N, Güner H, Aysel V (1986). Türkiye Deniz Algleri. Proceed. 5th Optima Meeting, İstanbul. 8-15.