

RE-APPEARANCE OF *CAULERPA SCALPELLIFORMIS* (R. BROWN EX TURNER) C.AG. WEBER VAN BOSSE (CAULERPACEAE, CAULERPALES) IN THE GULF OF ANTALYA, TURKEY

Mehmet Gökoglu ^{1*}, Beylem Banbul Acar ¹ and Halil Çolak ¹
¹ Akdeniz University, Faculty of Fisheries - gokoglu@akdeniz.edu.tr

Abstract

Caulerpa scalpelliformis is an alien species for Turkish coastline. Its first record was reported in 1995 from the Gulf of Antalya. At that time it was not considered as a serious threat for Antalya coastlines due to its disappearance from observed areas. However, its more distribution and re-appearance in the same area was observed in summer 2009. The present study provides new and more data related to *Caulerpa scalpelliformis* invasion in the Gulf of Antalya-Turkey in 2009.

Keywords: Alien species, Eastern Mediterranean, Phytobenthos

Introduction

The first record of *Caulerpa scalpelliformis* (Brown ex Turner) C. Agardh 1817 from Turkey coastline was reported from Antalya Marina in summer 1995 [1]. Subsequently, presence of this species at the same area was investigated by Aysel et al. (2002). In that study, it was also found locally out of the Marina [2]. *C. scalpelliformis* is originated from tropical waters of Syria, Israel, Lebanon, Palestine and Egypt in the Mediterranean [3]. Its indo-Pacific distribution [4][5] in the Indian Ocean are reported in Aldabra Islands, Australia, India, Kenya, Madagascar, Mauritius, Mozambique, Oman, Pakistan, South-Africa, Sri Lanka, Tanzania and Yemen [2]. Local announcement of *C. scalpelliformis* from out of the Antalya Marina supports the belief that this species is transported by means of the ships or their hoes. This green algae species has only been reported from the coasts of Turkey, however there is no study except two papers. Therefore, event of *C. scalpelliformis* is not known until yet. The purposes of this study is to determine distribution of *C. scalpelliformis* and its ecological parameters.

Materials and Methods

Distribution of *Caulerpa scalpelliformis* in the Gulf of Antalya was investigated by SCUBA dives. Two SCUBA equipments were used for dives. Depth and temperature of the water were measured using the underwater computer (Suunto Stinger). Skimmer net with 5 mm mesh size was used to collect the samples; SONY Cyber-Shot 40 m/132 ft marine pack housing and SONY DSC-T9 6.0 mega pixels camera were used to record the underwater movies and pictures. Many dives were conducted between the depths 0-40 m from Side (36°46'22."N,31°23'21."E) to Çirali (31°24'56."N,30°29'08."E) in the Gulf of Antalya.

Results

Caulerpa scalpelliformis was found exclusively in the areas between Antalya Marina (36°53'01"N, 30°42'02"E) and Antalya Great Harbour (36°50'16"N, 30°37'05"E). Species has covering and spreadable characteristics. The lowest water depth recorded for the species was 15 m outside the Yacht Harbour. Distribution of the species in the other area (Konyaalti beaches) ranged from 15 to 30 m depth. Species was not found on rocky bottoms. It was determined that *C. scalpelliformis* was available on the gravelly, sandy, slimy and gravelly-sludgy bottoms. However it was abundant on gravelly-sludgy and silty compact bottoms and frequently found at 2-10 m intervals. It has been also determined that stolons were aggregated in the area of 1-10 m², but the encounter frequency of *C. scalpelliformis* was decreased to 20-50 m on the sandy bottoms (Antalya Great Harbour). Aggregation on the sandy bottoms occurs with accumulation of a few stolons in 1-2 m². Species on sandy bottoms has poor vegetation and underdeveloped fronds. The peak vegetation was observed in the period of May-June. Deaths of the stolons of *C. scalpelliformis* were observed in July with increase in water temperature (26.5-27°C). In August at 28-30°C, the species completely died in certain areas while disappearance of 50% of stolons was observed at some areas. Distribution of the species was maximum at a depth of 20-22 m. Abundance of *Udotea petiolata* at the same depth is remarkable.

Discussion

The first record for *Caulerpa scalpelliformis* from the coasts of Turkey has been reported by Ertan et al. (1998). In that study this species has been found in the entrance of Antalya Marina. Ertan et al. (1998) collected the samples from tough substrate at 0.5-2m between August and September at the same area in the period which water temperature declined and reported disappearance of the species. Reduction of water temperature has been shown as a possible reason of this situation and it was considered that the species was temporarily detected [1]. Similar results have been reported by Aysel et

al. (2002). Disappearance of *C. scalpelliformis* has been associated with water pollution by these researchers [2]. Notification for record of this species from entrance of a harbour for the coasts of Turkey supports the possibility of transportation by bottom and anchors of vessels. In the present study this species was detected on rockless substrate at 15 m. It demonstrates that the species is still available in this area. The species was found not only in entrance of the marina but also distributed around the Great Harbour. Therefore it can be marked that it is a spreading species. In the present study it was determined that the species died in July at 26.5-27°C. It is estimated that the reason of detection of this species in February and March in Konyaalti Beaches is due to increasing of water temperature. *Caulerpa scalpelliformis* was not detected in more than 15 m depth along the coast of 7 km between Marina and Great Harbour. Presence of this species in shallow waters may be arisen from increase of water temperature (30-31°C) in the coast and movement of coast sediment by waves. The reasons of aggregation and poor growing in the region until Great Harbour are sandy bottom structure of the Gulf, movements in benthic by wave and difficulty in cling of organism onto the sediment. It is occurred that the species spreads towards the west from first recorded area because of the currents. It indicates that the species may spread from Antalya to Kemer after this time. Although *C. scalpelliformis* has unfairable properties like coverable and cytotoxicity, it possesses the good developed rhizomes to avoid the underwater erosion. Monitoring of this species will provide the elaborate data about *C. scalpelliformis*.

References

- 1 - Ertan, Ö. O., Turna, I. I. and Cormaci, M., 1998. First record of *Caulerpa scalpelliformis* (Brown ex Turner) C.Ag. (Caulerpaceae, Chlorophyceae) from the Mediterranean coast of Turkey. *Tr. Jour. of Botany*, 22 (4): 285-287.
- 2 - Aysel, V.; Senkardesler, A.; Aysel, F.; 2002; Türkiye Denizlerine Gelen Yeni Bir Tehlikeli Alg *Caulerpa scalpelliformis* (R. Brown ex Turner) C. Ag. var. *denticulata* (Dacaisne) Weber van Bosse (Caulerpaceae, Caulerpales), *E.Ü. Su Ürünleri Dergisi*, 19 (1-2): 105 -108.
- 3 - Verlaque, M., Ruitton, S., Mineur, F. and Boudouresque, C.F. 2009. *CIESM Atlas of Exotic Macrophytes in the Mediterranean*.
- 4 - Womersley, H.B.S., 1984. The marine benthic flora of southern Australia. Part I, Government Printer, South Australia.
- 5 - Silva, P.C., Basson, P.W. and Moe, R.L., 1996. Catalogue of the benthic marine algae of Indian Ocean. University of California press.