

A new record for *Caulerpa mexicana* Sonder ex Kützing from Eastern Mediterranean Coast of Turkey

Doğu Akdeniz'in Türkiye kıyılarında *Caulerpa mexicana* Sonder ex Kützing için yeni bir kayıt

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Abstract

In this study, *Caulerpa mexicana* Sonder ex Kützing is recorded for the first time in the Hatay coasts of east Mediterranean of Turkey. The number of *Caulerpa* spp. are now reached to 10 taxa on the coasts of Turkey that were first observed in 1971. It was previously reported that the members of *Caulerpa* are widely threaten by the sea environment with their invader and migratory characteristics. The *C. mexicana* taxon was first reported by Rayss (1941) along the Palestine Coast in the east Mediterranean.

Key words: *Caulerpa mexicana*, Hatay, Mediterranean, Turkey

Introduction

Turkey has a rich biological diversity due particularly to the three seas that surround the country. However, this diversity is negatively affected, to some extent, by external factors like marine transportation, as well as interior agents including current dynamics and food etc. As a matter of fact, *Caulerpa lamouroux* is an example of an invader species that give rise to serious degradational changes in marine environments due to external factors.

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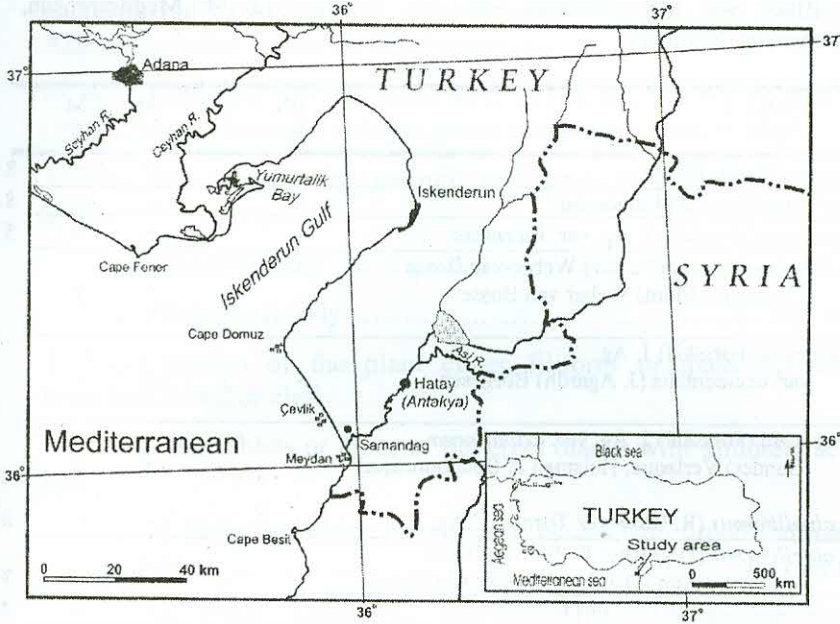
These factors are of significance not only they cause extensively distribution of invador species in the environment but also they threaten life condition of marine organisms and human life as well. In particular, *C. taxifolia* (M. Vahl) C. Agardh and *C. racemosa* (Forsskal) J. Agardh as a species of *Caulerpa* represented by 190 taxa appears to expand rapidly along the Mediterranean coast. A recent estimation by Aysel et al. (2002) suggested the possible involvement of this species from the eastern Mediterranean to the Turkish coasts has presently supported by Çevik et al. (2007) on the basis of the presence of *C. taxifolia* and *C. mexicana* species. *C. mexicana*, which naturally exists in the Antarctic and along coast of Mexico (Apartado et al. 2002) was first observed on the Mediterranean Coast of Turkey in 1941 (Olsen et al. 1998), which is likely associated with several factors such as sea currents, trade ships and tourism. *Caulerpa sp.* is characterized with 10 taxa on Turkey Coasts. *C. prolifera* (Forsskal) Lamouroux and *C. ollivieri* Dostal were cited by Güven and Öztığ (1971) and Zeybek et al. (1968), respectively. In the study of Aegean and Eastern Mediterranean region are *C. racemosa* (Forsskal) J. Agardh var. *racemosa* (Cirik and Öztürk 1991), *C. racemosa* (Forsskal) J. Agardh var. *lamourouxii* f. *requenii* (Montagne) Weber-van Bosse, *C. racemosa* var. *occidentalis* (J. Agardh) Borgesen (Tolay et al. 2001) and *C. racemosa* var. *cylindracea* (Sonder) Verlaque, Huisman and Boudouresque (Verlaque et al. 2003) was also reported from Turkey Coasts. In addition, *C. scalpelliformis* (Brown ex Turner) C. Agardh (Ertan et al. 1998) and *C. scalpelliformis* (Decaisne) Weber-van Bosse var. *denticulata* (Aysel et al. 2002) were shown formerly. The existence of *C. sertularioides* (S. G. Gmelin) Howe in the Sea of Marmara were first reported by Skolka and Vasiliu (Gallardo et al. 1993).

In this study, *Caulerpa mexicana* Solder ex Kützing that distributed on Hatay Coasts is investigated.

Material and Method

The samples collection was carried out on natural rocky refuges and the stones that surrounding these rocks near by Çevlik Site and Meydan Beach (Figure 1). The determination was made according to Taylor (1960).

Figure 1. Studying area



Results

C. mexicana Sonder ex Kützing is first observed on the Turkish coasts in this study. The majority of *Caulerpa* members, with a total of 190 taxa, develop in sandy and muddy environments with the exception of a few species that are known to live in deeper parts of the sea. It is represented by five taxa on variety and morphology scale. A total of the 11 *Caulerpa* taxa are observed with *C. mexicana* on the Turkish coasts (Table 1).

Table 1. Distribution of taxon of *Caulerpa* Lamouroux on the Turkey Coasts (BS: Black Sea, MS: Marmara Sea, AS: Aegean Sea, M: Mediterranean, RN:Reference Number).

TAXA	BS RN	MS	AS	M	
<i>Caulerpa ollivieri</i> Dostal	-	-	+	+	8
<i>C. prolifera</i> (Forsskål) Lamouroux	-	-	+	+	8
<i>C. racemosa</i> (Forsskål) J. Ag. var. <i>racemosa</i>	-	-	+	+	5
<i>C.---</i> var. <i>lamourouxii</i> (Turner) Weber-van Bosse f. <i>requenii</i> (Mont) Weber van Bosse	-	-	+	+	
13					
<i>C. racemosa</i> (Forsskål) J. Ag. var. <i>occidentalis</i> (J. Agardh) Borgesen	-	-	+	-	
13					
<i>C. racemosa</i> (Forsskål) J. Ag. var. <i>cylindracea</i> (Sonder) Verlaque, Huisman & Boudouresque	-	-	+	+	
14					
<i>C. scalpelliformis</i> (R. Brown ex Turner) C.Ag.	-	-	-	+	6
<i>C. scalpelliformis</i> (Decaisne) Weber van Bosse var. <i>denticulata</i> (Dacaisne) Weber van Bosse	-	-	-	+	3
<i>C. sertularioides</i> (S.G. Gmelin) Howe	-	+	-	-	7
<i>C. taxifolia</i>	-	-	-	+	4
<i>C. mexicana</i> Sonder ex Kützing	-	-	-	+	-
Total	-	1	6	9	

The samples were collected from two sites: The first site is a rocky area that is approximately 1 km from Çevlik Harbour approximately 1 km. This is a narrow refuge with an average depth of 1 meter characterized with good water circulation and preservation. Its deep sediments are composed of sand and rocky masses along its coastal zone. *Cystoseira* C. agardh and *Sargassum* C. Agardh populations are developed in this site that is protected from direct wave impacts.

The second site is at the starting point of the Meydan Beach. This small site also shows the same characteristics among rock masses where *Laurencia* sp. lamouroux were extensively observed. *C. mexicana*, however, was found to be plastered on rock surfaces near this area.

In addition, a vast coverage of species is observed to develop on the beach between September and October. Actually, the fishermen that fish in Domuz Burnu, revealed that fishing nets are largely filled with *Caulerpa* species.

On the contrary of the absence of *Caulerpa* on the Black Sea Coast, it is characterized with one taxon on the Coast of Marmara Sea, six taxons on Aegean and nine taxons on Mediterranean.

In this work, the identification key, developed by Aysel and Dural (1998), for the taxa of *Caulerpa* genus was improved as it below.

1. Erect blades flat, entire sparingly proliferous from stalk or face of the blades

2. Blades broadly*C. prolifera*

2. Blades narrowly.....*C. ollivieri*

1. Erect portion of the plant either filiform or massive, variously branched, lobed or cleft

3. Branchlets or lobes of the erect blades with minutely aculeate tips

4. Erect branchlets bearing flat blades with broad flat marginal pinnae.....*C. mexicana*

4. Erect branchlets bearing either dentate or flattened blades..... *C. sertularioides*

3. Branchlets or lobes of erect blades flat, cylindrical or separate flatted

4. Erect separated blades flat.....*C. scalpelliformis*

4. Erect separated blades cylindrical and tips obtuse

5. Erect spindle flat, branches pear shaped

.....*C. racemosa* var. *lamourouxii* f. *requenii*

5. Erect spindle orbicular

6. Branchlets cudgel shaped.....

.....*C. racemosa* var. *racemosa*

6. Branchlets cylindrical.....

.....*C. racemosa* var. *cylindracea*

Considering the morphological features of the algal involved, various characteristics were defined as follows:

