Turkish J. Marine Sciences 7:59-68 (2001)

Succession of Scyphozoa-Ctenophora in the Harbour of Çanakkale

Çanakkale Limanındaki Scyphozoa-Ctenophora Süksesyonu

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Abstract

This study was carried on the basic of physico-chemical parameters, Scyphozoa and Ctenophora succession in the Harbour of Çanakkale (40° 09′ 07″ N, 26° 24′ 09″ E) between January 2000 and December 2000 sampling intervals.

According to the results of chemical analysis; nitrate nitrogen ranged within 0.80-1.630 $mglt^{-1}$, total inorganic phosphate 0.016-0.044 $mglt^{-1}$, silica 0.180-0.300 $mglt^{-1}$, potassium 190-220 $mglt^{-1}$, zinc 0.030-0.14 $mglt^{-1}$, temperature 7.9-25.1, DO 8.30-9.60 $mglt^{-1}$, and lead 0.064 $mglt^{-1}$ (Table 1).

In spite of observing Rhizostoma pulmo rarely, Aurelia aurata could be seen intensively in winter and spring period along the Harbour. Pelagia noctiluca was found rarely in the Harbour during winter and generally during spring. Beroe ovata (Ctenophora) appeared generally during spring and intensively in summer period (Table 2).

Keywords: The Harbour of Çanakkale, Scyphozoa, Ctenophora, Jellyfish, Cnidaria.

Introduction

Generally , as a result of eutrophication while the species decrease, opportunist species which being carried, can find optimum environment for themselves. Scyphozoa like this point and produces fastly because

they can live in different physico-chemical conditions. Actually, these marine creatures are very interesting for their features. On the other hand, scyphozoa move easily from one place to another. Because they have a transparent structure, they are protected from hazardous rays of sun, and their body mainly consist of water (95 %).
Scyphozoa's species are carnivor creatures in the aquatic environment and they can eat zooplankton fish easily. The biomass of Aurelia aurata was 500.10^6 t in Black Sea (Zaitsev, 1997). Naturally, these organisms affect negatively to the regional fishery.

First record was on Rhizostoma pulmo in the Harbour of Urla by Colombo (1885). Demir (1952-1954) and Ergen (1969) mentioned these organisms in general in their studies. Ergen (1967) published 5 species of jellyfish from the Bay of Izmir which consists of Pelagia noctiluca, Aurelia aurata, Cotylorhiza tuberculata, and Chrysaora hysoscella.

Riedl (1963) and Bernard (1967) studied these scyphozoa in Mediterranean Sea. Tregouboff and Rose (1957) reported 12 species from Mediterranean Sea. Bingel et.al. (1987) showed relationships among cholorophyll a, phytoplankton and zooplankton in the Bay of Mersin. Kıdeyş and Gücü (1995) determined Chrysaora hysoscella, Rhizostoma pulmo, Aurelia aurita and Pelagia noctiluca in the same region. Balık (1973) studied ecology and taxonomy of A. Aurita, P. Noctiluca and C. Hysoscella in the Bay of Izmir.

This study aims to demonstrate the physico-chemical parameters, scyphozoa and ctenophora succession in the Harbour of Çanakkale.

Material and Methods

The samples of scyphozoa and ctenophora were collected from the Harbour of Çanakkale by using a scoop net. These organisms were fixed by 5 % of form-aldehide. The alcohol was not prefered (70%) since Rhizostoma pulmo had blue colour and would have lost its colour (Aktaç,1995).

Temperature, pH, and dissolved oxygen were determined by using Dr. Lange ECM Multi Mobil.Nitrate,Phosphate, Silica, Potassium, Zinc, and Lead were analyzed by using Dr.Lange LP 2W Photometer.

Result

Minimum temperature was established as 7.9 °C in February and maximum 25.1 °C in August in the sea water (Fig.1). Dissolved oxygen was minimum 8.30 $mglt^{-1}$ in August and max. 9.60 $mglt^{-1}$ in January (Fig 2). pH was min. 8.10 in October and max. 8.51 in July (Fig.3). Total phosphate was minimum 0.002 $mglt^{-1}$ in November, max. 0.048 $mglt^{-1}$ in August (Fig.4). Nitrate was minimum 0.78 $mglt^{-1}$ in October, max. 1.421 $mglt^{-1}$ in August (Fig.5). Potassium was min. 186 $mglt^{-1}$ in January, max. 217 $mglt^{-1}$ in October (Fig.6). Silica was min. 0.19 $mglt^{-1}$ in January, max. 0.28 $mglt^{-1}$ in November (Fig.7). Lead was min. 0.02 $mglt^{-1}$ in December, max. $mglt^{-1}$ in September (Fig.8). Zinc was min. 0.030 $mglt^{-1}$ in February, max. 0,140 $mglt^{-1}$ in October (Fig.9).

Table 1. Physico-chemical parameters.

Month	Temp. (°C)	DO ($mglt^{-1}$)	pH	PO_4 ($mglt^{-1}$)	NO_3 ($mglt^{-1}$)	K ($mglt^{-1}$)	Si ($mglt^{-1}$)	Pb ($mglt^{-1}$)	Zn ($mglt^{-1}$)
Jan	10,2	9,60	8,220	0,016	0,900	200	0,180	0,023	0,033
Feb	7,9	9,45	8,400	0,018	0,940	215	0,190	0,022	0,030
Mar	11,3	9,20	8,350	0,021	0,980	209	0,200	0,025	0,035
Apr	12,4	8,51	8,380	0,024	1,300	212	0,240	0,027	0,040
May	14,6	8,40	8,440	0,031	1,430	210	0,250	0,025	0,042
June	16,2	8,50	8,220	0,037	1,500	214	0,230	0,026	0,070
July	18,4	8,40	8,600	0,044	1,560	218	0,250	0,025	0,076
Aug	25,1	8,30	8,450	0,051	1,630	220	0,270	0,045	0,073
Sept	22,3	8,60	8,210	0,030	0,840	214	0,240	0,064	0,088
Oct	20,1	8,70	8,140	0,026	0,800	219	0,260	0,025	0,140
Nov	15,3	8,90	8,190	0,028	1,300	217	0,300	0,020	0,060
Dec	14,1	9,30	8,180	0,021	0,870	190	0,200	0,019	0,045

Figure 1. Temperature

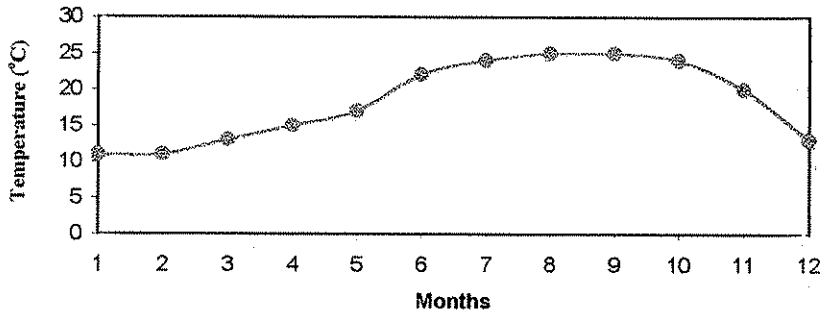


Figure 2. Level of Dissolved Oxygen

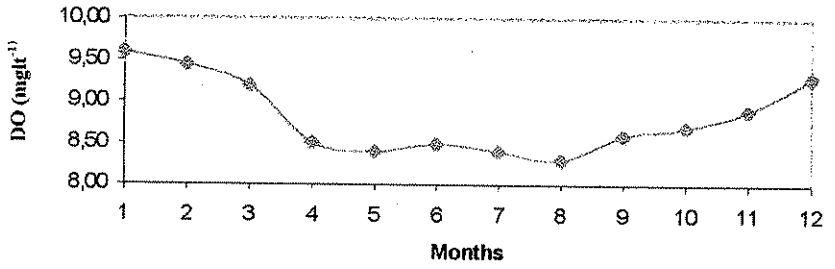


Figure 3. pH Value

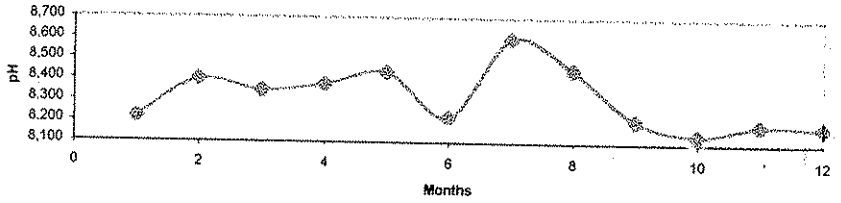


Figure 4. Concentration of Phosphate

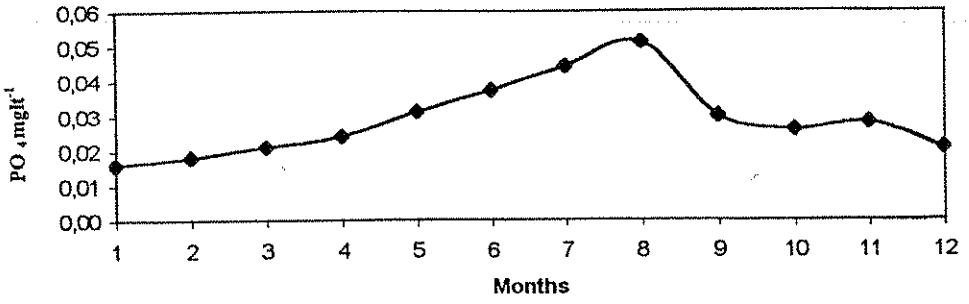


Figure 5. Concentration of Nitrate

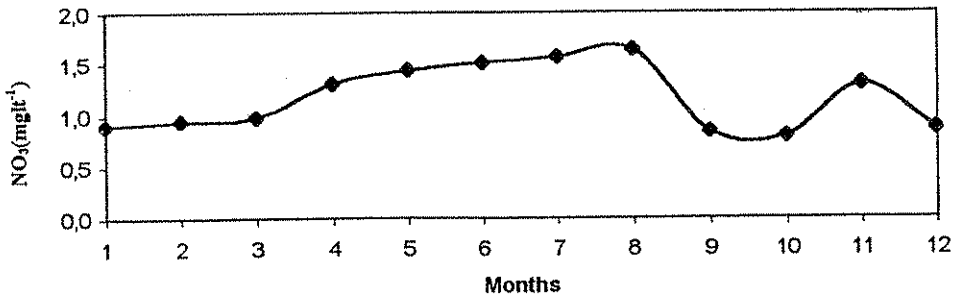


Figure 6. Concentration of Potassium

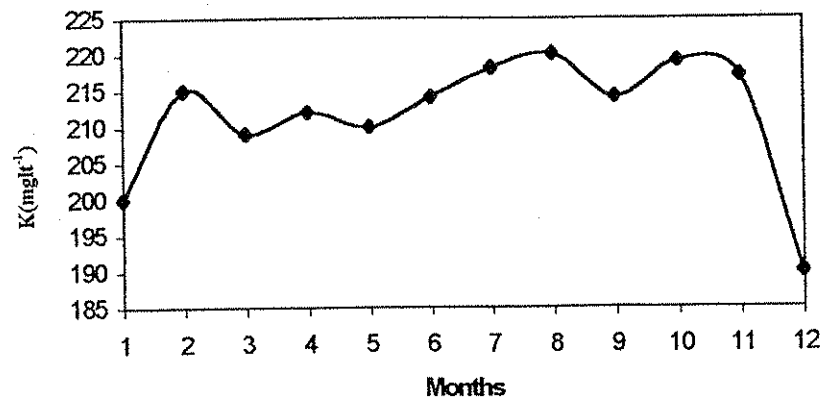


Figure 7. Concentration of Silica

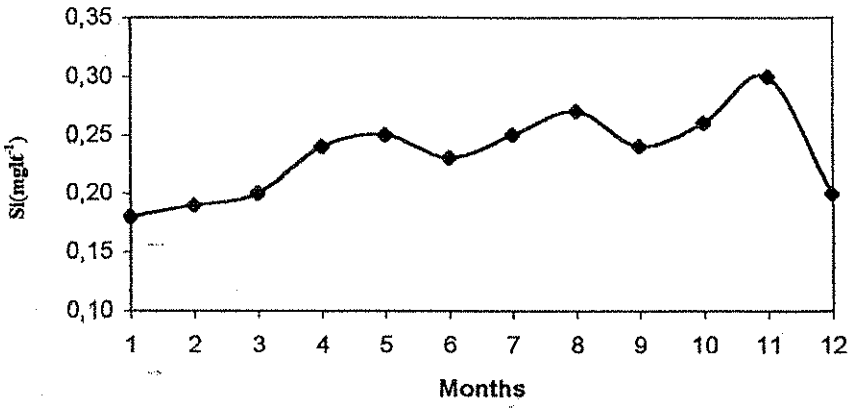


Figure 8. Concentration of Lead

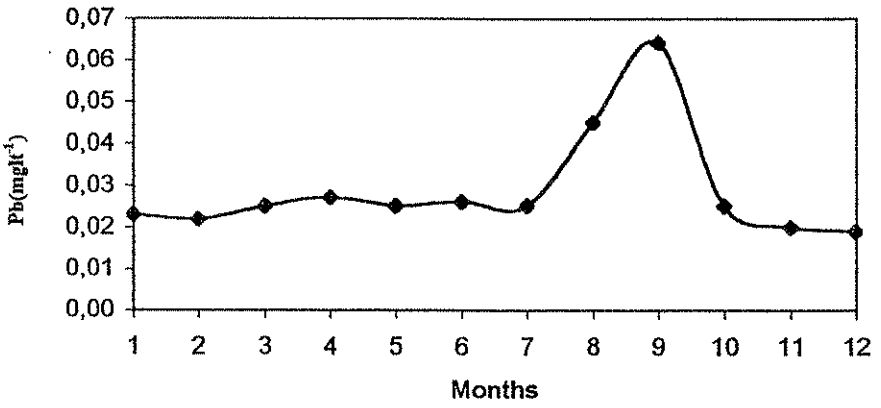
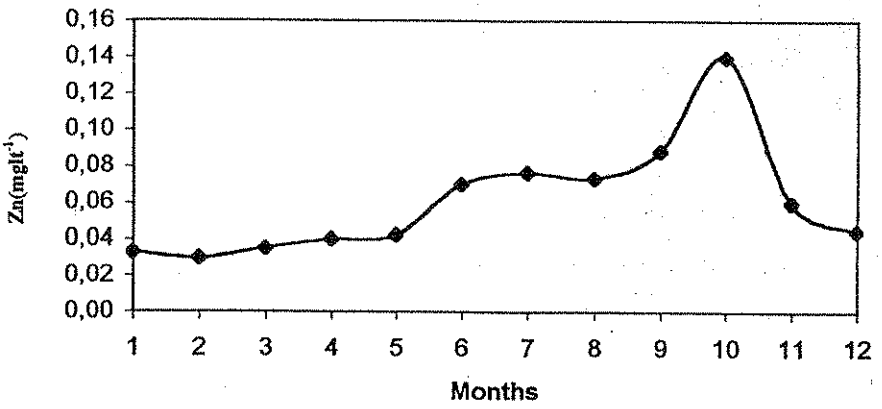


Figure 9. Concentration of Zinc



Scyphozoa

Rhizostoma pulmo was found rarely in January, March, April, July, September, November and December, absent in February and May, low is in June and November.
Aurelia aurita was found generally in January, March, April and November, always in February, May, June, July, August, September, October and December.

Pelagia noctiluca was found low in January, February and September, absent in March, April, June, July, October, and December, rarely in August and November.

Ctenophora

Beroe ovata was found generally in April, May, June, October and November, absent in January, February, and October, always in July, August, and September.

Table 2. Monthly succession of Scyphozoa and Ctenophora

SPECIES	MONTHS											
	1	2	3	4	5	6	7	8	9	10	11	12
SCYPHOZOA												
Rhizostoma pulmo	R	-	R	R	-	L	R	L	R	L	R	R
Aurelia aurita	G	A	G	G	A	A	A	A	A	A	G	A
Pelagia noctiluca	L	L	-	-	G	-	-	R	L	-	R	-
CTENOPHORA												
Beroe ovata	-	-	L	G	G	G	A	A	A	G	G	-

R : rarely (1-20 %) L : low (21-40 %) G : generally (40-60 %)
A : always (81-100 %) - : absent

Discussion

A high intensity of Aurelia aurita occurs in the Harbour of Çanakkale especially in winter period. The most important induced factor for this is the acceleration of sextual circle of this organisms at coast during winter season. A. Aurita is in high amounts, thus can be utilized in seafood industry.

The mean pH, temperature, total phosphate, and nitrate during the winter is negatively, but the dissolved oxygen is possitively related to A. Aurita intensity in the Harbour of Çanakkale. Werney (1966) pointed out that the productivity of Rhizostoma pulmo was affected mainly by temperature, salinity, and zooplankton biomass. However, dissolved oxygen, the speed of wind, surface currrent and phytoplankton biomass are not as affective as parameters mentioned before. Therefore, the determination of zooplankton and phytoplankton biomass, salinity and the speed of wind and correlation between these parameters and R. Pulmo, A. Aurita, and Pelagia noctiluca are necessary to provide significant information for the studied area. In a study by Bingel (1986), the decrease of jellyfish biomass was reported between November and March as observed in this study.

More studies are needed to understand any possible relationship between the high intensity of A. Aurita in Black Sea (500.10^6 tones) reported by Zaitsew (1997) and in the Harbour of Çanakkale, collectively.

Özet

Bu araştırma, Çanakkale Limanında (40° 09′ 07″ N, 26° 24′ 09″ E) Ocak 2000 ve Aralık 2000 dönemleri arasında aylık örnekleme aralıklarıyla temel fiziko-kimyasal parametreler ve Scyphomedüz ve Ctenophora süksesyonu üzerine sürdürüldü. Kimyasal analizlerin sonuçlarına göre nitrat azotunun 0.80-1.630 $mglt^{-1}$, toplam inorganik fosfatın 0.016-0.051 $mglt^{-1}$, silisin 0.18-0.30 $mglt^{-1}$, potasyumun 190-200 $mglt^{-1}$, çinkonun 0.030-0.140 $mglt^{-1}$ ve kurşunun 0.019-0.064 $mglt^{-1}$ aralığında değiştiği belirlenmiştir. Çanakkale limanında saptanan Scyphozoa türlerinden Aurelia aurita'ya en yoğun olarak kış ve ilkbahar mevsimlerinde rastlanmıştır. Rhizostoma pulmo'ya ise hiçbir mevsimde yoğun olarak rastlanmamakla beraber yaz ve sonbahar mevsimlerinde seyrek olarak saptanmışlardır. Pelagia noctiluca'ya ise araştırma yapılan bölgede ilkbaharda ve özellikle Mayıs ayında genellikle rastlanılmıştır. Ctenophora'dan Beroe ovata'ya yoğun olarak ilkbahar ve yaz aylarında saptanmış olup kış aylarında bulunamamıştır.

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Received :12/09/2000

Accepted : 15/11/2000