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 mg/l, total inorganic phosphate 0.016-0.044 mg/l, silica 0.180-0.300 mg/l, potassium 190-220 mg/l, zinc 0.030-0.14 mg/l, temperature 7.9-25.1, DO 8.30-9.60 mg/l, and lead 0.064 mg/l (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, Chidaria.

Introduction

Generally, as a result of eutrophication while the species decrease, opportunistic 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, scyphozoaa 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 %).

Scyphozoaa'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.


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

**Material and Methods**

The samples of scyphozoaa and ctenophora were collected from the Harbour of Çanakkale by using a scoop net. These organisms were fixed by 5 % of form-aldehyde. The alcohol was not preferred (70%) since Rhizostoma pulmo had blue colour and would have lost its colour (Aktça, 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 mg/l in August and max. 9.60 mg/l 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 mg/l in November, max. 0.048 mg/l in August (Fig.4). Nitrate was minimum 0.78 mg/l in October, max. 1.421 mg/l in August (Fig.5). Potassium was min. 186 mg/l in January, max. 217 mg/l in October (Fig.6). Silica was min. 0.19 mg/l in January, max. 0.28 mg/l in November (Fig.7). Lead was min. 0.02 mg/l in December, max. mg/l in September (Fig.8). Zinc was min. 0.030 mg/l in February, max. 0.140 mg/l in October (Fig.9).

<table>
<thead>
<tr>
<th>Month</th>
<th>Temp. (°C)</th>
<th>DO (mg/l)</th>
<th>pH</th>
<th>PO₄ (mg/l)</th>
<th>NO₃ (mg/l)</th>
<th>K  (mg/l)</th>
<th>Si  (mg/l)</th>
<th>Pb  (mg/l)</th>
<th>Zn  (mg/l)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan</td>
<td>10.2</td>
<td>9.60</td>
<td>8.220</td>
<td>0.016</td>
<td>0.900</td>
<td>200</td>
<td>0.180</td>
<td>0.023</td>
<td>0.033</td>
</tr>
<tr>
<td>Feb</td>
<td>7.9</td>
<td>9.45</td>
<td>8.400</td>
<td>0.018</td>
<td>0.940</td>
<td>215</td>
<td>0.190</td>
<td>0.022</td>
<td>0.030</td>
</tr>
<tr>
<td>Mar</td>
<td>11.3</td>
<td>9.20</td>
<td>8.350</td>
<td>0.021</td>
<td>0.980</td>
<td>209</td>
<td>0.200</td>
<td>0.025</td>
<td>0.035</td>
</tr>
<tr>
<td>Apr</td>
<td>12.4</td>
<td>8.51</td>
<td>8.380</td>
<td>0.024</td>
<td>1.300</td>
<td>212</td>
<td>0.240</td>
<td>0.027</td>
<td>0.040</td>
</tr>
<tr>
<td>May</td>
<td>14.6</td>
<td>8.40</td>
<td>8.440</td>
<td>0.031</td>
<td>1.430</td>
<td>210</td>
<td>0.250</td>
<td>0.025</td>
<td>0.042</td>
</tr>
<tr>
<td>June</td>
<td>16.2</td>
<td>8.50</td>
<td>8.220</td>
<td>0.037</td>
<td>1.500</td>
<td>214</td>
<td>0.230</td>
<td>0.026</td>
<td>0.070</td>
</tr>
<tr>
<td>July</td>
<td>18.4</td>
<td>8.40</td>
<td>8.600</td>
<td>0.044</td>
<td>1.560</td>
<td>218</td>
<td>0.250</td>
<td>0.025</td>
<td>0.076</td>
</tr>
<tr>
<td>Aug</td>
<td>25.1</td>
<td>8.30</td>
<td>8.450</td>
<td>0.051</td>
<td>1.630</td>
<td>220</td>
<td>0.270</td>
<td>0.045</td>
<td>0.073</td>
</tr>
<tr>
<td>Sept</td>
<td>22.3</td>
<td>8.60</td>
<td>8.210</td>
<td>0.030</td>
<td>0.840</td>
<td>214</td>
<td>0.240</td>
<td>0.064</td>
<td>0.088</td>
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<tr>
<td>Oct</td>
<td>20.1</td>
<td>8.70</td>
<td>8.140</td>
<td>0.026</td>
<td>0.800</td>
<td>219</td>
<td>0.260</td>
<td>0.025</td>
<td>0.140</td>
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<tr>
<td>Nov</td>
<td>15.3</td>
<td>8.90</td>
<td>8.190</td>
<td>0.028</td>
<td>1.300</td>
<td>217</td>
<td>0.300</td>
<td>0.020</td>
<td>0.060</td>
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<tr>
<td>Dec</td>
<td>14.1</td>
<td>9.30</td>
<td>8.180</td>
<td>0.021</td>
<td>0.870</td>
<td>190</td>
<td>0.200</td>
<td>0.019</td>
<td>0.045</td>
</tr>
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</table>

Table 1. Physico-chemical parameters.
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
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

<table>
<thead>
<tr>
<th>SPECIES</th>
<th>MONTHS</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
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<tbody>
<tr>
<td>Rhizostoma pulmo</td>
<td></td>
<td>R</td>
<td>R</td>
<td>-</td>
<td>R</td>
<td>L</td>
<td>R</td>
<td>L</td>
<td>R</td>
<td>L</td>
<td>R</td>
<td>R</td>
<td></td>
</tr>
<tr>
<td>Aurelia aurita</td>
<td></td>
<td>G</td>
<td>A</td>
<td>G</td>
<td>G</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>G</td>
<td>A</td>
</tr>
<tr>
<td>Pelagia noctiluca</td>
<td></td>
<td>L</td>
<td>L</td>
<td>-</td>
<td>-</td>
<td>G</td>
<td>-</td>
<td>-</td>
<td>R</td>
<td>L</td>
<td>-</td>
<td>R</td>
<td>-</td>
</tr>
<tr>
<td>Beroe ovata</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>L</td>
<td>G</td>
<td>G</td>
<td>G</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>G</td>
</tr>
</tbody>
</table>

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 sexual 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 positively 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 current and phytoplankton biomass are not as effective 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 örneklemeye aralıklarıyla temel fiziko-kimyasal parametreler ve Scyphomediz ve Ctenophora süksiyonu 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 aralığından değiştiği belirlenmiştir. Çanakkale limanında saptanan Scyphozaa türlerinden, Aurelia aurita’ya en yoğun olarak kiş ve İlkbahar mevsimlerinde rastlanmıştır. Rhizostoma pulmo’ya ise hiçbir mevsimde yoğun olarak rastlanmamakla beraber yaz ve sonbahar mevsimlerinde seyrek olarak saptanmıştır. Pelagia noctiluca’ya ise araştırma yapılan bölgede İlkbaharda ve özellikle Mayıs ayında genellikle rastlanmıştır. Ctenophora’dan Beroe ovata’ya yoğun olarak İlkbahar ve yaz aylarında saptanmış olup kiş aylarında bulunmamamıştır.

References


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