

# OCCURRENCE OF *PROROCENTRUM* SPP. IN IZMIT BAY AND RELATED ENVIRONMENTAL FACTORS

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## Abstract

*Prorocentrum* has been characterized as a genus that thrives in temperate waters and in the case of eutrophication and can occur in very high concentrations in coastal waters. The aim of this study was to examine the temporal occurrence of *Prorocentrum* spp. together with factors affecting its regional distribution in Izmit Bay. In total, five species were identified as *Prorocentrum micans*, *P. scutellum*, *P. triestinum*, *P. minimum* and *P. compressum*. A trend toward decreasing density and biomass with distance from the bay to Marmara Sea was found.

**Keywords :** *Sea Of Marmara, Phytoplankton, Eutrophication, Dinoflagellates.*

## Introduction

*Prorocentrum* spp. are widespread in many marine areas and grow in extensive blooms and cause negative effects on environment [1]. Pollution problems have gradually become more serious in Izmit Bay since 1960 [2, 3]. Red tides and fish mortalities have been showed result from *Prorocentrum* spp blooms.

## Methods

Izmit Bay, located in the northeastern part of the Marmara Sea, is one of the most polluted areas in the Marmara Sea and an important, rapidly developing industry centre in Turkey. Besides the impact of streams, Izmit Bay, particularly the inner part of the bay, receives mainly continuous domestic and industrial input. Samples were taken bimonthly from February 1999 to September 2000 at 10 sampling sites in the euphotic zone, representing to the bay and at four depths. Phytoplankton abundance was studied by the Uthermohl's technique. Biomass was estimated by biovolumes and chlorophyll *a*. Also, main physical and chemical parameters were determined using standard methods.

## Results and Discussion

During the research period, five species were identified as *Prorocentrum micans*, *P. scutellum*, *P. triestinum*, *P. minimum* and *P. compressum*. The higher values in density and biomass were recorded in December 1999 (285337 cells l<sup>-1</sup> and 3.94 mg m<sup>-3</sup>) and in April 1999 (237675 cells l<sup>-1</sup> and 2.48 mg m<sup>-3</sup>), respectively (Figure 1).

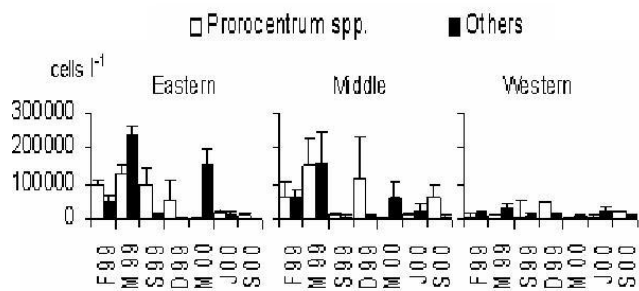


Fig. 1. Seasonal variations of *Prorocentrum* spp. and other phytoplankton density in the three parts of Izmit Bay.

A trend towards decreasing density and biomass with distance from the bay to Marmara Sea was found. Nutrient concentrations (especially NO<sub>3</sub>+NO<sub>2</sub>-N, PO<sub>4</sub>-P) in the upper layer of the bay were determined to be high, especially in the parts of eastern and middle, however, the highest values were recorded at the depth of 20 m (Table 1).

Tab. 1. Main average physico-chemical parameters (with standard deviation) in Izmit Bay.

Parameters	Eastern	Middle	Western
Temperature (°C)	13.7±3.3	14.5±4.4	12.8±4.4
Dissolved oxygen (mg l <sup>-1</sup> )	9.4±3.8	9.7±2.9	9.2±2.4
SPM (mg l <sup>-1</sup> )	22.7±1.9	22.9±1.1	23.8±4.4
NO <sub>2</sub> +NO <sub>3</sub> -N (µg N l <sup>-1</sup> )	14.5±7.2	9.4±4.7	8.9±6.2
PO <sub>4</sub> -P (µg P l <sup>-1</sup> )	12.7±8	6.8±5	4.9±4.5
Total Nitrogen (µg N l <sup>-1</sup> )	306.8±122.7	297.9±97.5	284.5±82.5
Total Phosphorus (µg P l <sup>-1</sup> )	38.9±40.6	29.8±34.8	17.2±13.5
SiO <sub>2</sub> (µg Si l <sup>-1</sup> )	299±317.4	220±232.5	201.7±187.8
Total Organic Carbon (mg l <sup>-1</sup> )	2.96±0.31	2.63±0.29	2.37±0.1
Total Chlorophyll <i>a</i> (mg m <sup>-3</sup> )	5.2±4.5	3.5±3.6	1.9±1.8
Total Density (x10 <sup>3</sup> cell l <sup>-1</sup> )	123±112	106±98	31±17
Total Biomass (mg l <sup>-1</sup> )	1.63±1.64	1.48±1.5	0.68±0.6
Diversity (H') (bits ind <sup>-1</sup> )	1.4±0.3	1.7±0.2	2.1±0.4
Secchi disc depth (m)	2.3±0.61	3.7±0.95	4.7±0.85

During the increase of phytoplankton biomass, nutrient concentrations in the surface water of the bay were low. The transparency of the water column decreased towards the eastern part of the bay related to lower productivity and amount of terrestrial solid material in the water.

## References

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