

# THE DINOFLAGELLATE-DIATOM RATIO IN THE SOUTHERN BLACK SEA OFF SINOP IN 1999-2000

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## Abstract

In the present study, the seasonal composition and the qualitative and quantitative distributions of phytoplankton have been studied at two stations in the southern Black Sea during January-May 1999 and March 2000-October 2000. A total of 76 genera including 149 species and varieties were identified of which 46% were dinoflagellates and 34% were diatoms. Abundance of the genera *Emiliana* (in January-May 1999), *Pseudosolenia* and *Ceratium* (in March-October 2000) were higher than that of the other genera in almost every sampling period. Increased dinoflagellate to diatom ratio reflects more fertile conditions in the southern Black Sea.

**Keywords :** *Dinoflagellates, Diatoms, Phytoplankton, Black Sea.*

## Introduction

Phytoplankton abundance and biomass has increased in relation to a net increase in nutrient concentrations. The species composition has changed with a relative increase in species number, abundance and biomass of dinoflagellates compared to the diatoms and there has been a trend towards small-sized phytoplankton groups in the western Black Sea [1]. When the taxonomic structure (by biomass) of phytoplankton communities were compared for the years 1980's and 1990's, a decrease in the dominance of diatom species were observed [2]. However, the share of diatoms increased in winter and autumn. The taxonomic diversity was high in summer and autumn. The seasonal and the long term changes in phytoplankton community structure could be attributed to the shift of the nutrient ratios (N:P, Si:N and Si:P) [2]. Unfortunately, there is no data to compare our dinoflagellate to diatom ratios in the southern Black Sea since 1980's. Much more data is necessary to show long term changes in this ratio in the southern Black Sea.

## Material and Methods

The monthly samples were collected from the two stations (Fig.1) near the Sinop Peninsula in the Black Sea by the R.V. "Arastirma I" within the framework of TUBITAK (The Scientific and Technical Research Council of Turkey) project during January-May 1999 and March-October 2000. A total of 123 samples were collected in two stations from different layers of the water column (0, 10, 20, 30, 40, 50 and 75 m). A hand bucket and a Niskin Bottle were used for the sampling of surface and lower depths, respectively. Sedimentation method was used for counting and identification of the species. Samples were fixed with buffered formaldehyde to reach a final concentration of 2.5% and stored in 1 l of dark bottles for 2 or 3 weeks. Thin hoses were plunged into the bottles and the supernatant was evacuated down to a volume of 100 ml.

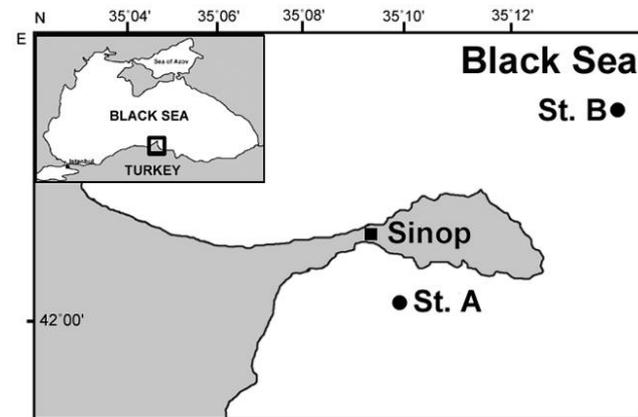


Fig. 1. Sampling stations.

## Results and Discussion

In January-May 1999 and March-October 2000, a total of 149 species were identified from both stations. Representatives of all phytoplankton

groups were obtained during the whole study period (Tab. 1.). In terms of the species composition, dinoflagellates were the dominant group with a proportion of 50%, diatoms ranked second while silicoflagellates were the third group. In terms of the species number, diatoms were more abundant in spring (March, April) than the other periods. However, dinoflagellates were more abundant in summer (May and June) and autumn.

Species	Station A		Station B		TOTAL		%	
	1999	2000	1999	2000	1999	2000	1999	2000
Dinoflagellates	58	32	46	22	64	35	50	50
Diatoms	37	24	28	19	45	27	35	39
Silicoflagellates	3	3	5	2	5	3	4	5
Euglenoids	1	2	1	2	1	2	1	3
Cyanophytes	1	1	1	1	2	1	2	1
Coccolithophores	7	1	5	1	6	1	5	1
Chlorophytes	1	1	1	1	1	1	1	1
Cryptomonads	5	-	1	-	5	-	4	-
Total					129	70	100	100

Tab. 1. Species composition of the total phytoplankton groups during January-May 1999 and March-October 2000.

Maximum and minimum species numbers were recorded in January 1999 (74 taxon) and October 2000 (29 taxon), respectively. The decline in diatoms was followed by an increase in dinoflagellates which began in late spring (May) and reached a maximum in June. It gradually decreased towards October. Dinoflagellate blooms were observed in summer. Diatoms were dominated in spring while their blooms were in mid spring. Dinoflagellate to diatom ratio in terms of species number differs with season and region as well. In summer season and in the eutrophic regions species number of dinoflagellates was relatively higher than the other seasons and regions. For example, while the percentage of dinoflagellates in the total species number was as low as 20.65% in April 1989 [3] it increased to 51% in April 1999. Even respective ratios from summer also appeared to increase to 50% in 2000, from 46.4% in August 1995- July 1996 [4]. Such finding indicated more fertile conditions in the Black Sea and is in accordance with the rise in fish landings.

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