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New record of the heterotrophic Ebridian microflagellate *Hermesinium adriaticum* Zach. in the eutrophic Izmir Bay (Aegean Sea, Turkey).

Ötrofik İzmir Körfezi'nden yeni bir kayıt, Heterotrofik Ebridiyan mikroflagellat *Hermesinium adriaticum* Zach. (Ege Denizi, Türkiye).

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Abstract

Hermesinium adriaticum ZACH. 1906, as a rare non-photosynthetic flagellate was identified for the first time in the eutrophic Izmir Bay and along the coasts of Turkey, *i.e.*, southern Black Sea, eastern Mediterranean Sea and Aegean Sea. It has internal siliceous skeleton. For the first time in Izmir Bay, it was found in the surface water (up to max. 14.250 cells/l) during the sampling in September 1998 in the Middle and Outer Bay when the water temperature was maximum. Water quality parameters in September 1998 were also recorded and presented to elucidate in which the conditions presumably favored by *Hermesinium adriaticum*. In contrast to *H. adriaticum*, another ebridian species; *Ebria tripartita* was observed (up to max. 410.150 cells/l) throughout the bay not only in September but also in April and November 1998 without showing any correlation with temperature.

Key words: *Hermesinium adriaticum*, *Ebria tripartita*, eutrophication, Izmir Bay, new record, Aegean Sea.

Introduction

Hermesinium adriaticum ZACH.is a rare non-photosynthetic flagellate with an internal siliceous skeleton (Deflandre 1952; Preisig 1994; Throndsen 1997). Although its taxonomic position

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is uncertain (Corliss, 1994), Vilicic *et al.*, (1997) have emphasized that it was recently classified within the Order Ebriales of Dinoflagellata. However, Throndsen (1997) presented Ebriida in zooflagellates (Phylum Zoomastigophora) after Lee *et al.*, (1985) (cited in Throndsen, 1997). The problems in identification are mainly related to the great variation in the silica structures (Throndsen, 1997).

H. adriaticum was first described in the northern Adriatic Sea by Zacharias in 1906 (Vilicic *et al.*, 1997). It is known as a neritic species distributed in tropical and temperate seas (Sournia 1986). It has been found in summer season in the Black Sea (Bodeanu, 1969; cited in Vilicic *et al.*, 1997), southern Mediterranean Sea (Halim, 1960), in Narragansett Bay (Hargraves and Miller, 1974).

In this study, the distribution of *H. adriaticum* in the eutrophic Izmir Bay has been presented and the probable influences of environmental conditions have also been discussed on its appearance.

Study area

Since 1980, Izmir Bay became one of the most polluted areas in the Mediterranean Sea due to discharged untreated wastewaters (Kocatas *et al.*, 1987; Koray and Buyukısık, 1988; Koray, 1990; Cirik *et al.*, 1992; Aksu *et al.*, 1998; Bizsel and Uslu, 2000). The pollution in Izmir Bay and its biological effects were recorded as early as in the beginning of seventies (Geldiay and Kocatas, 1973; Geldiay and Kocatas, 1979; Geldiay *et al.*, 1979). In the beginning of nineties, considerable changes in both nutrient levels and phytoplankton biomass were recorded (Bizsel, 1996).

The average salinity of the surface layer in the bay varies seasonally between 37.02 psu (in January) and 39.16 psu (in October). The average temperature of the surface has its minimum 11.2 °C in January and maximum 26.6 °C in July (Bizsel, 1996).

Izmir Bay can be divided into three parts; hypereutrophic inner bay, eutrophic middle bay and relatively oligotrophic outer bay (Figure 1). The increase in toxic, noxious or harmful algal blooms (HABs) that is occuring worlwide has also been observed in Izmir Bay. The first records were given in the middle 1950's as a red tide event (Numann, 1955; Acara *et al.*, 1960). Phytoplankton blooms in every spring, including harmful red tides, are currently spreading and increasing their frequency of occurrence along the coasts of the bay. Today, different kinds of environmental disorders, such as anoxic outbreaks and fish kills, are not unusual. Red tide events are in increasing trend in terms of frequency particularly during the last two decades (Koray *et al.*, 1999). *Noctiluca scintillans* Macartney very often forms red tide, but *Prorocentrum micans* Ehrenberg, *P. triestinum* Schiller, *Alexandrium minutum* Halim, *Gymnodinium simplex* Lohmann, *Scrippsiella trochoidea* Stein, *Ceratium sp.*, *Nitzschia sp.*, *Pseudo-nitzschia sp.*, *Thalassiosira sp.*, and *Mesodinium rubrum* Lohmann are also potent causative organisms (Koray *et al.*, 1992; Koray *et al.*, 1999).

Materials and Methods

Samples were collected from 10 stations selected considering the hydrodynamic features of the bay (Figure 1) on April 2, 15, 21, 24 during the red tide period, September 2, November 25, 1998 and January 8, 1999. Phytoplankton samples taken from surface waters (0,3-0,5 m) were preserved with lugol. After sedimentation, they were concentrated to 10 ml and counted by the single drop technique (Semina, 1978). Each sample was counted at least five times. Different sources were used for the identification of phytoplankton (Nezan, 1996; Nezan and Piclet, 1996; Throndsen, 1997; Sournia, 1986).

The time plan of the survey and the dominant phytoplankton species were shown in Table 1. *In situ* measurements of temperature and salinity were done by using Sea-Bird CTD system. Discrete samples were analyzed for dissolved oxygen (DO) by using the Winkler method, and for macronutrients by using the methods described in Koroleff (1983), after filtering