

First record of *Ceratoperidinium yeye* in the eastern Adriatic Sea

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Ceratoperidinium is a very rare dinoflagellate genus reported from both the western and the eastern Mediterranean Sea. While *Ceratoperidinium yeye* had been collected from the Bay of Palma de Mallorca, *C. cf. yeye* from the Alborán Sea, *C. yeye* and *C. mediterraneum* from Lebanese coastal waters, and *Ceratoperidinium* sp. from the Bay of Palma de Mallorca, this paper reports on the first occurrence of the dinoflagellate *C. yeye* in the Adriatic Sea. There are very scarce data about this species in literature.

Key words: *Ceratoperidinium yeye*, Adriatic Sea

INTRODUCTION

Ceratoperidinium is a very rare dinoflagellate genus reported from both the western and the eastern Mediterranean Sea (GÓMEZ *et al.*, 2003; MARGALEF, 1969).

Genus *Ceratoperidinium* is a very rare and information of its ecology and distribution is scarce.

The aim of this paper is record of the first finding of *C. yeye* in the eastern part of the Adriatic Sea and describe the ecological factors obtained during the *C. yeye* occurrence.

MATERIAL AND METHODS

Phytoplankton samples were taken by net (upper diameter 29 cm, 20 µm mesh size)

throughout the water column. Samples were fixed with a glutaraldehyde solution with final concentration of 0.5%. and phytoplankton species were identified and counted under the inverted microscope (Olympus IX50) according to UTERMÖHL method (1958). Temperature and salinity were recorded by CTD YSI63 probe.

RESULTS AND DISCUSSION

The species *Ceratoperidinium yeye* was found in net samples from the coastal waters of the eastern Adriatic Sea in summer 2003. The species was found in both the northern and the middle parts of the sea. In the northern Adriatic, it was found at stations A (45°15'54"N, 13°34'58"E) and B (45°17'45"N, 13°32'25"E;



Fig. 1. Locations of stations A, B, and C, where *Ceratoperidinium yeye* were found

Table 1. Date, depth, temperature, and salinity of stations at which *Ceratoperidinium yeye* were found

| Station | Date | Depth (m) | Temperature (°C) | | Salinity (psu) | |
|---------|---------|-----------|------------------|--------|----------------|--------|
| | | | Surface | Bottom | Surface | Bottom |
| A | 25.7.03 | 10 | 25.7 | 25.6 | 38.7 | 38.7 |
| B | 27.8.03 | 20 | 27.4 | 21.1 | 38.4 | 38.6 |
| C | 8.7.03 | 10 | 24.3 | 17.8 | 6.0 | 22.1 |

Fig. 1) and, in the middle Adriatic, at station C (43°45'38"N, 15°51'14"E).

The dinoflagellate was found at all three stations during summer when the sea water temperature was above 20°C (Table 1). The species was found in both the high salinity stations A and B as well as in the low salinity station C, indicating that *C. yeye* is euryhaline. (Station C is strongly influenced by the Krka River which causes very low salinity in the surface layer.) *Ceratoperidinium yeye* were found in phytoplankton communities containing diatoms and other dinoflagellate species. Abundance was less than 1 cell/l. Because this species was found in net samples, we cannot know whether *C. yeye* occupies the surface layer, the bottom layer, or the whole water column.

The phytoplankton community collected at station A was dominated by the dinoflagellate

Noctiluca scintilans. The community included other dinoflagellate species such as *Peridinium* spp., *Dinophysis caudata*, and *Pselodinium vaubanii*. Diatom species included *Guinardia flacida*, *Hemiaulus hauckii*, *Leptocylindrus danicus*, *Pseudonitzschia seriata* complex, *Rhizosolenia alata*, *Rh. calcar avis*, *Rh. stolterfothii*, and *Thalassiothrix frauenfeldii*.

The phytoplankton community at station B contained dinoflagellates of *Ceratium* spp., *Dinophysis caudata*, and *Peridinium* spp., and the diatoms *Chaetoceros* spp., *Guinardia flacida*, *Hemiaulus hauckii*, *Leptocylindrus danicus*, *Rhizosolenia alata*, *Rh. stolterfothii*, and *Thalassionema nitzschioides*.

The phytoplankton community at station C consisted of dinoflagellate species of *Ceratium* spp., *Peridinium* spp., and *Pselodinium vaubanii* and the diatom species *Cerataulina bergoni*,



Fig. 2. The dinoflagellate, *Ceratoperidinium yeye*, found in the Adriatic Sea

Chaetoceros spp., *Grammatophora* sp., *Guinardia flaccida*, *Hemiaulus hauckii*, *Melosira sulcata*, *Rhizosolenia alata*, *Rh. stolterfothii*, *Striatella unipunctata*, *Thalassionema nitzschioides*, and *Thalassiothrix frauenfeldii*.

In both the northern and middle Adriatic, *C. yeye* was associated with dinoflagellate *Gonyaulax polygramma* post-bloom conditions. The *G. polygramma* bloom was recorded at the end of June.

Ceratoperidinium yeye has a pentagonal body with two long posterior appendices (SOURNIA, 1986; Fig. 2). The length of the body without the appendices is 63 μm. The subconical epitheca has apical pores. A cingulum is located in front of the equatorial plane. No sulcus was observed. The hypotheca has two posterior tubular appendices. The thecal surface is rigid and without ornamentation. Chloroplasts are present. The genus *Ceratoperidinium* is exclusively marine.

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Prvi nalaz dinoflagelata *Ceratoperidinium yeye* u istočnom dijelu Jadrana

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SAŽETAK

Dinoflagelat *Ceratoperidinium* veoma se rijetko javlja. Zabilježen je u Sredozemnom moru i to *Ceratoperidinium yeye* u zaljevu Palma de Mallorca, *C. cf. yeye* u Alboránskom moru, *C. yeye* i *C. mediterraneum* u Libanonskim obalnim vodama i *Ceratoperidinium* sp. u zaljevu Palma de Mallorca. U radu su iznesene lokacije i opisani ekološki uvjeti pri kojima su zabilježeni prvi nalazi vrste *C. yeye* u istočnom dijelu Jadrana.

Ključne riječi: *Ceratoperidinium yeye*, Jadransko more
