TEMPORAL DISTRIBUTION OF PHYTOPLANKTON IN CARDAK ESTUARY (DARDANELLES, TURKEY)

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Abstract
The study contains evaluation of the data collected (15 days intervals) during the samplings between 18 January and 22 December 2006, in the framework of a National project of TUBITAK-105Y103. Average cell concentrations of dinoflagellates, diatoms and other phytoplankton groups were $6.17x10^6 \pm 4.06x10^7$ cell L^{-1}, $7.13x10^6 \pm 1.23x10^7$ cell L^{-1} and $1.59 \times 10^7 \pm 7.32x10^7$ cell L^{-1}, respectively. Average phytoplankton density was $1.81x10^7 \pm 5.39x10^7$ cell L^{-1} in the study period. Chlorophyll a and nutrient concentrations in the lagoon were higher than previous average concentrations in the Dardanelles.

Keywords: Toxic blooms, Dardanelles, Estuaries, Phytoplankton, Aquaculture

Çardak Lagoon is localized in Lapseki, Dardanelles (Fig.1). This lagoon is connected with a channel having average 4 m depth and 6.00 cm/sn water flow speed, but current speeds in lagoon inside are under 6.00 cm/sn except for near stations to the channel. The Dardanelles is located between the Aegean Sea and the Sea of Marmara.

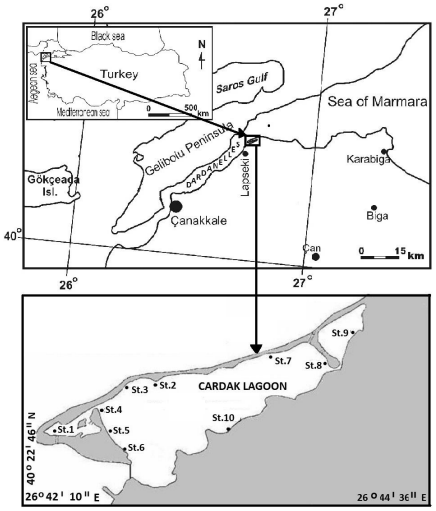

Fig. 1. Sampling stations in Cardak Lagoon (Dardanelles, Turkey)

This data were collected during the samplings between Jan. 18 and Dec. 22, 2006 (15 days intervals), in the framework of a national project of TUBITAK-105Y103. CTD parameters, nutrient and chlorophyll a were also measured by using YSI 556 MPS, autoanalizor and spectrophotometer, respectively [1]. Phytoplankton census were realized to Hasle [2].

While temperature, salinity, DO and pH varied from 2.92 °C to 30.2 °C, from 8.56 to 31.1 ppt, from 3.45 mg L^{-1} to 12. 8 mg L^{-1}, from 7.65 to 9.30, respectively. DIN, TP, IP, silicate, chla varied between 0.01 and 60.3 µM, 0.02 and 12.5 µM, 0.01 and 0.67 µM, 0.14 and 33.8 µM, 0.32 and 24.9 µg L^{-1}, respectively [3].

Dinoflagellates, diatoms and other phytoplankton groups varied between 0 and $4.70x10^8$ cell L^{-1} (average: $6.17x10^6 \pm 4.06x10^7$ cell L^{-1}), between 0 and $8.50x10^7$ cell L^{-1} (average: $7.13x10^6 \pm 1.23x10^7$ cell L^{-1}) and, between 0 and $9.43x10^8$ cell L^{-1} (average: $1.59x10^7 \pm 7.32x10^7$ cell L^{-1}), respectively in the lagoon. Total phytoplankton varied from 0 to $4.84x10^8$ cell L^{-1} (average: $1.81x10^7 \pm 5.39x10^7$ cell L^{-1}) during the study. It is clear that diatoms were more dominant than others in January-March and July-September periods. In the spring period, picoplankton such as coccoid cyanobacteria and coccolithophores were denser than others especially in April and May. It is important rise in the picoplankton abundant particularly at Sts. 7, 8 and 9 in autumn period. While dinoflagellates were abundant in May and June, diatoms were denser in winter-spring and August periods (Fig.2). Regarding cell density, while regional similarity varied from 23.8 to 76.2, temporal similarity varied from 31.5 to 73.0 according to Bray-Curtis analyses.

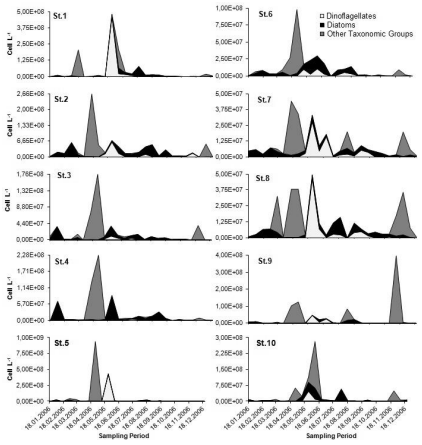

Fig. 2. Phytoplankton distributions in the Cardak Lagoon (Dardanelles)

In the lagoon, 1-2 unknown taxa from cyanophytes, 8 taxa from dinoflagellates (*Ceratium furca, C.fusus, Cylindrotheca closterium, Gymnodinium* sp., *G.spinifera, Oxytoxum rampii, Prorocentrum micans, P.minimum and Scripsiella trochoidea*), one taxon (*E.huxleyi)* from coccolithophores, 12 taxa from diatoms (*Dactilosolen fragilissimus, Grammatophora marina, Leptocylindrus* spp., *Navicula* spp., *Proboscia alata, Pseudo-nitzschia pungens, Rhizosolenia delicatula, R.setigera, Sceletonema costatum, Thalassionema nitzschioides and Thalassiosira* spp.) control community structure. Particularly, some dinoflagellates create excessive HABs in different periods and also create a high risk with regard to aquaculture. Except April-June, the dominancy of diatoms to other phytoplankton was important for feeding and aquaculture of carpet clam (Tapes decustatus). Although diatoms were dominant (66.8%) to dinoflagellates (23.3%) and others (26.1%), cyanophytes were denser than others especially in the second period of March and April. Extreme dinoflagelate density in May and June and substantially to be supported by the toxic ones showed that the lagoon was under very high risk especially in late spring and early summer in view of aquaculture. But, results showed that the lagoon is suitable in view of aquaculture fisheries, except for high risk periods, due to the high algal biomass, especially high diatom density.

References
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