NUTRIENT ENRICHMENT BIOASSAY IN THE HOMA LAGOON (IZMIR BAY, AEGEAN SEA)

Banu KUTLU [1]*, Murathan KAYIM [2], Erkan CAN [2] and Baha BÜYÜKISIK [3]
[1] Tunceli University/ Fisheries faculty, Turkey - kutlubanu@gmail.com
[2] Ege University/Fisheries Faculty, Turkey
[3] Faculty of Fisheries, Ege University, Bomova 35100, Izmir, TURQUIE

Abstract
The Homa lagoon is the enclosed bay of Izmir which has been subjected to a variety of human influences such as agriculture in the surrounding area. In this study, bio-chemical system was studied using some biological, chemical and physical parameters obtained from the Homa lagoon. Temperature, salinity, NH_4 + - N, NO_3 - N, PO_4 - P, Si, *in vivo* Chl-a were measured. To determine the variation of the parameters and to assess the dynamics between the nutrients and the microplankton of the Homa lagoon, nutrient enrichment bioassays were performed from the selected main sampling station. During the spring bloom of 2006, four main growths were observed. The first one appeared as bloom of *Chaetoceros* sp. In he second growth, an increase of *Licmophora abbreviata* algae was observed. In the third one, *Tintinopsis beroidea* appeared.
Keywords: Biokinetics, Chlorophyll-a

Introduction
Homa lagoon is a natural fish production area in the Izmir. The Homa lagoon is the enclosed bay of Izmir which is subjected to a variety of human influences such as agriculture in the surrounding area. Nutrient inputs from agriculture are the main antropogenic pollution source. In this study the bio-chemical structure was investigated using some biological, chemical and physical parameters obtained from the Homa lagoon. Temperature, salinity, NH_4 -NO_3, PO_4, Si, Chl-a were measured. To assess the dynamics between the nutrients and the microplankton of the Homa lagoon, nutrient enrichment bioassays were performed from the selected main sampling station. The region where the lagoon water and the sea water converge is determined as the station. Nutrients were added into the experimental bottles to find out growth curves and kinetic parameters. The obtained data were plotted as growth curves and chl-a based exponential growth rates were calculated. Growth rates as a function of nutrient concentrations were fitted to the monod equation.

Methods and Materials
Water for nutrient samples was collected in 100 ml polyethylene cans. (Nitrate+Nitrite)-nitrogen (NO_3+NO_2)-N, reactive phosphorus (RP), reactive silicate (RSi) were measured spectrophotometrically according to Strickland and Parsons [1]. During the sampling periods bioassay samples were collected from Homa lagoon. Water samples in pet carboys were filtered from 245 micrometer (µm) plankton net to remove mesozooplankton and distributed to the experimental bottles. *In situ* conditions were simulated in the laboratory by using constant temperature and light room (52 µmol/m light intensity). Experiments were carried out in March, April and May 2006 to find out about nutrient limitation and to assess phytoplankton community. Nutrients such as nitrogen, phosphorus, silica were added to the one litter bottles which contained seawater sample. This known nutrient concentration enrichments help find out growth rate. The obtained data were plotted as growth curves and chl-a based exponential growth rates were calculated. Growth rates as a functions of nutrient concentrations were fitted to monod equations.

Result and discussion
The surface waters of the main station are rich in chl-a for most of the year. In spring bloom, the values were as follows: 2006, (NO_3-N + NO_2-N (4.03 - 7.25), RP (0.62-0.97), RSi (13.15-19.15) µ gat/l. The values ranged in (mM) for the analyses in May 2006 (NO_3-N + NO_2-N (6.41 - 12.27), RP (0), RSi (1.19-9.83). The surface molar ratios of nitrogen to phosphate (N/P) were calculated as 2.98 in spring time. Temperature values ranged between 15 and 22°C in March, April, and May 2006. Salinity values ranged between 36 and 44.716 psu in March-April and May respectively. Spring bloom time fourth main growths were observed. The first one appears as bloom of *Chaetoceros sp*. In the second growth, there was an increase of *Licmophora abbreiata*. The third one was *Tintinopsis beroidea*. After all these observations, the specimens of copepod were seen in the bay. Bio assay experiments can be summarized as follows. Phytoplankton level of most of the experimental bottles reached the exponential phase immediately, while some of the bottles exhibited lag phase (for NO_3-N up to 4.11 µM). The greatest variation took place for Max chl-concentrations and phosphate concentrations. Growth rate and carrying capacity were calculated by formula 1 and 2 respectively. Results of the growh rate and chl a max for NH_4 are calculated as µ = 2,54 and Chl a max *in situ* = 12.12.

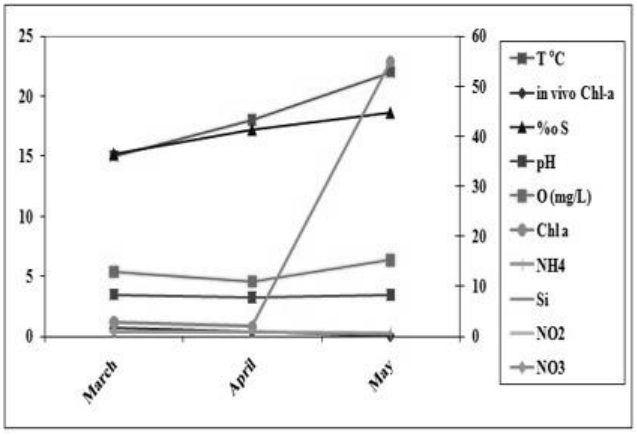

Fig. 1. Physico-chemical parameters

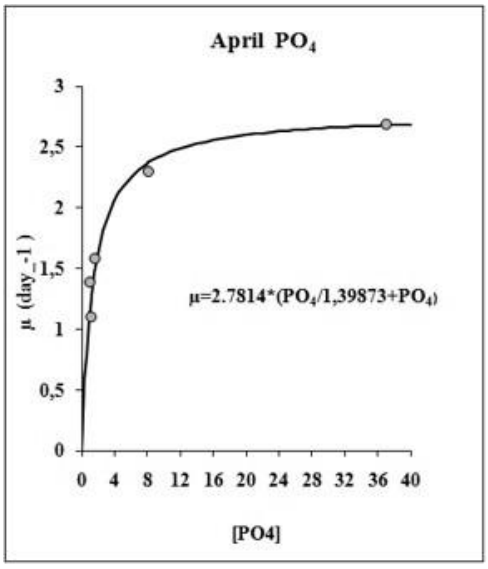

Fig. 2. Growth rate with PO4-P

References
1 - Strickland, J.D.H., Parsons, T.R., 1972, A practical handbook of seawater analysis, fisheries research boards of Canada. Bull, 167, Ottawa, pp:310.