

# ANNUAL CYCLE OF ZOOPLANKTON OFF SINOP, THE SOUTHERN BLACK SEA, IN 2003-2004

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## Abstract

Monthly changes in zooplankton abundance, biomass and taxonomic composition off Sinop (southern Black Sea, Turkey) were studied during January 2003-December 2004. Cladocerans, the appendicularian, the chaetognath and copepod *Centropages ponticus* dominated the autumn and summer communities, whereas meroplankton and the other copepod species were more pronounced in winter and spring months. Copepods were the most abundant zooplankton group in 2003, whereas *Noctiluca scintillans* was the most dominant species in 2004.

*Keywords* : Black Sea, Zooplankton, Biomass.

Zooplankton is the principal trophic link between primary production and higher trophic levels, (i.e. in many cases the fish), and hence studying their abundance and distribution is important [1]. In the southern Black Sea, there are only a few published studies about distribution of zooplankton population, and regular annual studies only made after the year 1990. In comparison with the other basins in the Black Sea, even less work has been devoted to the plankton of Sinop region [3]. This study aims to evaluate seasonal mesozooplankton structure of the southern Black Sea.

The sampling station (35° 09' 32"E-42° 00' 21"N), a mile off-shore off Sinop (southern Black Sea, Turkey) having a 50 m bottom depth, was sampled monthly from January 2003 (except August 2003) to December 2004. The sampling of the zooplankton was carried out from 50 to 0 m (surface) for vertical tows using plankton net (50 cm diameter mouth opening and 210 mm mesh size) with the "Arast Irma" research vessel. The samples were preserved with borax buffered formalin solution (final concentration 4%). The analyses of samples were carried out using sub-samples with a Stempel pipette. The results were then averaged and extrapolated to the whole sample. Biomass transformations were based on wet individual weights [2].

In the present study, the annual total zooplankton ranging between was 4800 - 204 500 ind.m<sup>-2</sup> in 2003 and 13 300 - 198 900 ind.m<sup>-2</sup> in 2004. In terms of either in abundance and biomass the highest values were recorded in February, April, September and November 2003; May and August 2004. Zooplankton biomass showed a clear peak in May 2004, mostly due to the dinoflagellate *Noctiluca scintillans*.

Copepods (maximum: 172 200 ind. m<sup>-2</sup>) of annual abundance was the dominant group in 2003. *N. scintillans* was the most abundant of zooplankton group with a share of 49.6% (max: 172 000 ind. m<sup>-2</sup>) in 2004. All mentioned groups exhibited clear seasonality. This was especially apparent for cladocerans and appendicularian; which occurred in autumn, and for meroplankton, which were more abundant during spring months. *S. setosa* showed a summer-autumn distribution which closely coincided with the pattern of appendicularian and cladocerans. Amongst cladocerans, *Penilia avirostris* was dominant during summer and early autumn.

In this study, six copepods species were identified. Surprisingly, there were no *Acartia tonsa* in subsamples. *Acartia clausi* (65% in 2003 and 43% in 2004) was the most dominant copepod which was followed *Pseudocalanus elongatus* by in two years. *Acartia clausi* showed its remarkable existence in November 2003 and August 2004. *Calanus euxinus*, *P. elongatus*, *Oithona similis* and *Paracalanus parvus* was more pronounced cold months and *Centropages ponticus* was distinct summer and early autumn.

In this study, we observed that there was no significant alterations between the annual temperature mean changes within 2003-2004 (P>0.05). This situation reflected stable composition biomass and abundance of zooplankton between the years. Except Appendicularian, there were no statistically significant differences in abundance of different mesozooplankton groups between two consecutive years. It is especially interesting to note the dramatic decline in the abundance of all zooplankton groups in the period of peak *Noctiluca*. Same situation was observed by Unal (2002). We expect that these results will have importance in explaining oscillations in

plantivorous fish catches from the region.

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