ANNUAL DISTRIBUTION OF CLADOCERANS IN THE OPEN SEA NEAR DUBROVNIK (SOUTH ADRIATIC)

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Abstract

The quantitative and qualitative composition and annual changes of abundance of cladocerans have been investigated. A weekly samplings were taken at the station one mile southwest from the island of Lokrum (sea depth 100 m) from 16 May 1995 till 9 December 1996. Five cladoceran species were found. A maximum density of 845 ind/m^3 was recorded on 26 September 1996 with *Penilia avirostris* accounting for 97.6% of the total number. *P. avirostris* and *Evadne tergestina* display similar seasonal fluctuations in abundance.

Keywords : Adriatic Sea, plankton, open sea, population dynamics

Introduction

Researches about Adriatic cladocerans (the Gulf of Trieste) date back to 1876 (1) and many studies have been carried out in this area (2, 3) and in the open Adriatic Sea (4). On the contrary, seasonal variations of cladoceran populations densities in the eastern part of Adriatic are mostly unknown (2). Particular investigations were performed in Rijeka Bay (5), in Mali Ston Bay (6, 7) and in the coastal region of the south Adriatic (8).

Study area

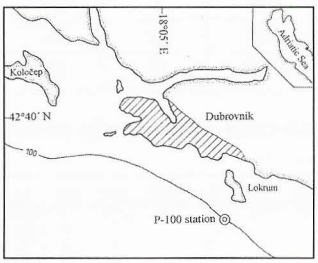

Fig. 1. Location de P-100 station

Station P-100 (fig.1.) is positioned extend from the coast, above isobaths of 100 m, directly exposed to the incoming open sea current. This is the zone of the lowest production in the Adriatic Sea on the base of concentrations of nutrition (<0.2 µmol l^{-1} PO_4 and <3μmol l^{-1} NO_3), primary production, abundance of populations and phytoplankton volumes, and bacterioplankton population densities (9, 10).

Material and methods

Material was collected at P-100 station during 44 cruises from 16 May 1995 till 9 December 1996. Samples were taken with 200 μm Nansen net, 255 cm in length, 54 cm in diameter, by hauling speed of 0.5 ms^{-1}, in the depth layer 0-75m. All samples were preserved in 2.5% formaldehyde, neutralized with a calcium carbonate buffer.

Results and discussion

At P-100 station a regular seasons successions of cladoceran species was noted. *Penilia avirostris* Dana 1849 was dominant species (fig. 2.) with portion of 97% in whole number of cladocerans with the maximum number of 827 ind.m^{-3}, found on 26 September 1996. *P. avirostris* always dominated during the summer (2, 4, 6). *Evadne spinifera* P. E. Müller 1868 was the second quantity important cladocera at this station. It is the most common open water species with optimal salinity values of 38.1 psu that clearly indicates the influence of open sea waters and stability of environment (11, 4). Maximum 31 ind./m^3 was found on 4 July 1996. (fig. 4.). *Evadne tergestina* Claus 1862 was noted from the beginning of July till the end of October with maximum 7.6 ind./m^3 on 26 September. It was not found during the winter (fig. 3.). *E. tergestina* shows similar seasonal fluctuations in abundance as *P. avirostris*. *Evadne nordmanni* Loven 1836 is rare species at the investigated station. It is found in only 16% samples (fig. 3.), particularly represented in the winter period from 26 February till 17 May 1996. Maximum number of *Podon intermedius* Lilljeborg 1901 (fig. 4.) 37 ind./m^3 was found on 23 May 1995. On the contrary, one year later, on 24 May 1996 only one specimen was found. Adriatic cladoceran species *P. polyphemoides* was not found because it preferes low salinity coastal waters. It is numerous in pollution harbor areas (12) as it is in Marseilles Bay (13, 14). The observed changes show progressive influence of open sea waters at P-100 station, despite of small vicinity of the investigated station from the coast.

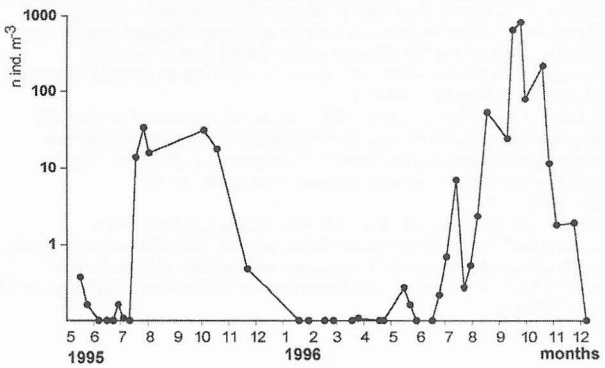

Fig. 2. Number of individuals of species *Penilia avirostris*

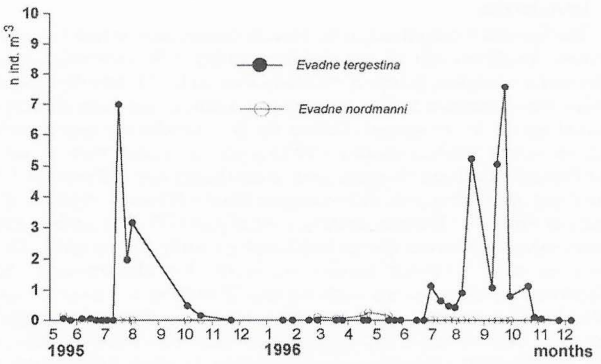

Fig. 3. Number of individuals of species *Evadne tergestina* and *Evadne nordmanni*

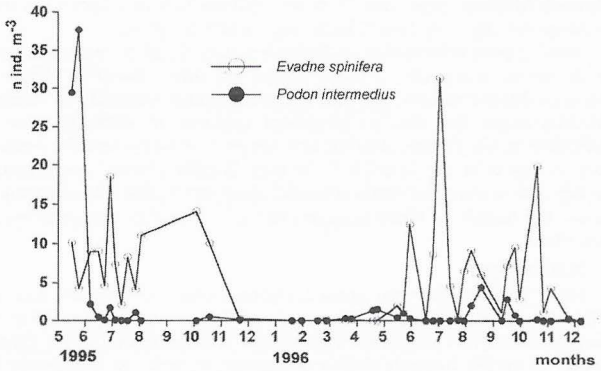

Fig. 4. Number of individuals of species *Podon intermedius* and *Evadne spinifera*

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