

VERTICAL DISTRIBUTION OF COPEPOD ASSEMBLAGES IN THE UPPER LAYER OF THE EASTERN IONIAN SEA (GREECE) DURING MIXED AND STRATIFIED CONDITIONS

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Abstract

The copepod community structure and vertical distribution in the eastern Ionian Sea were examined during two seasons with different hydrological conditions. Community structure seemed to follow the well-mixed structure of the water column in March and the strong stratification in September. Deep layer samples showed less seasonal differentiation than the surface and intermediate layers. The differences in density with depth in most abundant species were more profound in September than in March.

Keywords: zooplankton, copepods, eastern Mediterranean

Introduction

The Ionian Sea pelagial is oligotrophic (1), characterized by the low abundance and high diversity of its zooplankton (2). The NE part of this region has been studied in a fragmentary fashion in space and time (1,3,4). The main goal of this study is the description of the copepod community structure during two periods with different hydrological characteristics.

Materials and Methods

A total of 87 mesozooplankton samples were collected during March and September 2000 in the eastern Ionian Sea, from three depth layers (0-50m, 50-100m and 100-200m), using a vertically towed opening-closing WP2 net (200µm). The sampling grid was comprised of 18 stations (Fig. 1). The copepods were identified to species. Hydrographic conditions were measured by vertical CTD casts.

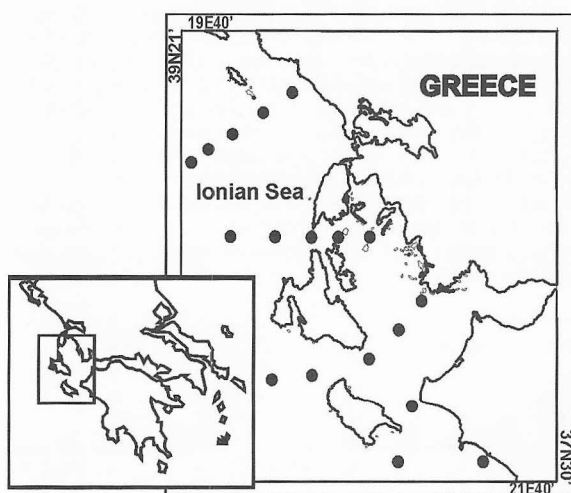


Fig. 1. Sampling stations in March and September 2000.

Results

The physical structure of the water column differed markedly between the two sampling periods. In March the water column appeared homogenized. Temperature from surface to 200m depth ranged between 14.4 and 15.1°C. In September strong thermal stratification was noted, with surface temperature values ranging from 22 to 25°C and a sharp thermocline in an average depth of 45m. Below the thermocline, temperature appeared quite constant between 14 and 14.5°C. Salinity ranged between 38.4 and 38.9 during both sampling periods.

Maximum mesozooplankton density values were recorded in the upper layer (0-50m) decreasing with increasing depth, in both March and September. Mean density values were 288 ind/m³, 208 ind/m³ and 93 ind/m³ for the three depth layers respectively in March and 389 ind/m³, 201 ind/m³ and 77 ind/m³ in September.

Copepods, appendicularians, chaetognaths and ostracods comprised the 90-95% of the total zooplankton during both sampling periods in all layers. Copepods were by far the dominant taxon in all samples, its percentage varying between 62% and 91%. Only 12 copepod species in March (out of 88) and 14 in September (out of 81) were considered as abundant, 11 were common to both sampling periods.

Group average cluster analysis of samples on copepod species only, produced 4 major groups at the 52% similarity level and 2 additional subgroups at the 55% level. NMDS ordination showed that the four major groups were quite distinct (stress value 0.14) while the distinction between the subgroups was unclear. Group A consisted of March samples from all layers (Subgroup A1: all surface and 5 intermediate samples, Subgroup A2: 8 intermediate and 5 deep layer samples). Group B consisted of all surface September samples and Group C of all intermediate layer September samples. Group D included 13 deep layer and one intermediate sample (Subgroup D1: 4 March and 2 September samples, Subgroup D2: 8 September samples) (Fig. 2).

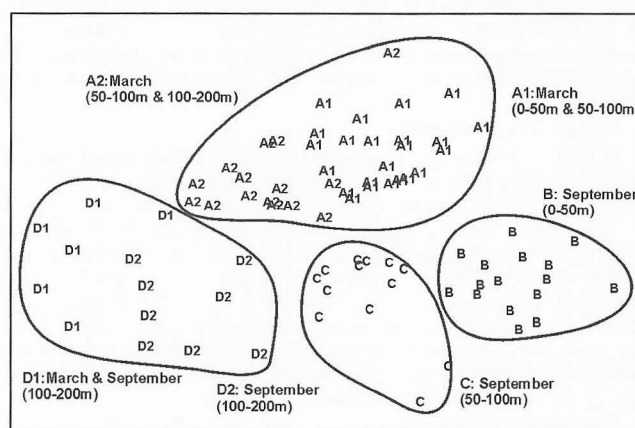


Fig. 2. NMDS ordination plot of the comparison of all samples using Bray-Curtis similarity index. Respective cluster groups are superimposed.

Copepodites of the genera *Clausocalanus* and *Oithona* were dominant in all surface samples. The surface layer was also characterised by *Clausocalanus paululus* (March), *Clausocalanus furcatus* and *Temora stylifera* (September), *Farranula rostrata* and *Calocalanus spp.* copepodites (both periods).

The intermediate layer in September, was characterised by the species *Oithona* copepodites, *Farranula rostrata*, *Mecynocera clausi*, *Clausocalanus paululus* and copepodites, *Ctenocalanus vanus* and *Ischnocalanus plumulosus*; while in March *Haloptilus longicornis* and *Paracalanus denudatus* were present as well.

Haloptilus longicornis showed maximum abundance in the deep layer along with *Pleuromamma gracilis*, *Lucicutia flavicornis* and *Mormonilla minor* (March).

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