COMPARATIVE SAMPLING OF THE MESOZOOPLANKTON WITH 333 AND 125 MICROMETER MESH SIZE NETS IN THE KASTELA BAY

Olja Vidjak

Institute of oceanography and fisheries, Setaliste I. Mestrovica 63, 21000 Split, Croatia

Abstract

In order to test the adequacy of the 333 micrometer mesh size net used until now in mesozooplankton sampling in Kastela Bay, parallel sampling with the 125 micrometer mesh size net was performed in this area. The 125 micrometer net was equally efficient in sampling cladocerans, adult stages of larger copepods, chaetognaths, thaliaceans, ostracods and decapod larvae, but more efficient in sampling calanoid copepodites, small copepods (cyclopoids and *Oncaea* spp.), appendicularians, pteropods and larval stages of bivalves, polychaets, gastropods and echinoderms which constitute the major part of mesozooplankton in this shallow neritic area. Therefore, it should entirely substitute the 333 micrometer mesh size net in mesozooplankton sampling in Kastela Bay.

Key-words: zooplankton, sampling methods, Adriatic sea

Introduction

When sampling zooplankton with any type of plankton net, the loss of organisms whose dimensions lie close to the mesh size is inevitable. Even organisms larger than the mesh size can sometimes pass through it due to their morphology, elasticity of the net itself and the fact that the pores are seldom of exactly the same size (1).

This problem is especially evident in neritic and eutrophicated areas, where inadequate sampling gear can lead to great loss of organisms through the meshes, even complete omission of zooplankton groups or species from the catch regardless of their abundance, and underestimation of the total biomass.

Although there are long term and regular data on zooplankton of the Kastela Bay (2-9), so far sampling has been performed with the 333 micrometer mesh size Hensen net exclusively. In this investigation, the adequacy of this mesh size in sampling the neritic zooplankton has been tested by parallel sampling with the 125 micrometer mesh size net.

Material and methods

Sampling was performed by the R/V Bios of the Institute of oceanography and fisheries of Split, from January to November 1995 (except in August) at one station (43°31'N: 16°19'E) located in the middle part of the Kastela Bay, a shallow and enclosed neritic area (Fig. 1). Zooplankton was sampled both with a Hensen net (mesh size 333 micrometers and 0.418 m^2 mouth area), and a Nansen net, (125 micrometers mesh size and 0.255 m^2 mouth area), by successive vertical hauls from bottom (35 m) to the surface. The samples were preserved in 2.5 % formaldehyde-seawater solution buffered with $CaCO_3$. Analysis of the subsamples (1/32 or 1/64 of the total sample) was performed under a WILD stereomicroscope at a magnification of 80x. Abundance was expressed as No. ind. m^{-3}. The significance of the differences in abundance of the recorded mesozooplankton groups between 333 and 125 micrometer net catches were tested with the Student's t-test.

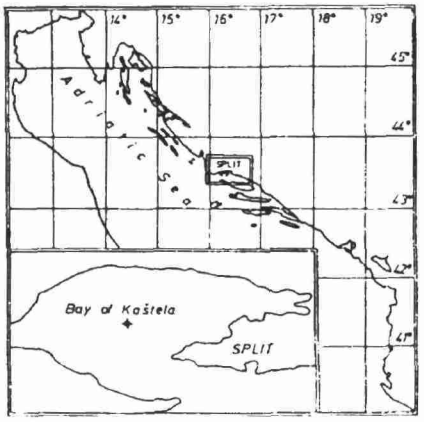

Figure 1. The study area.

Results and discussion

In 1995 at the investigated station the following zooplankton groups were recorded: Copepoda, Cladocera, Ostracoda, Appendicularia, Thaliacea, Pteropoda, Chaetognatha, Siphonophora, Medusae and larval stages of benthic organisms. In the 125 micrometer net samples ("Nansen" samples) mesozooplankton maxima were recorded in March, June and November with highest abundance in November (13966 ind. m^{-3}). In the 333 micrometer net ("Hensen" samples), mesozooplankton maximum was recorded in September with 3742 ind. m^{-3} (Fig. 2).

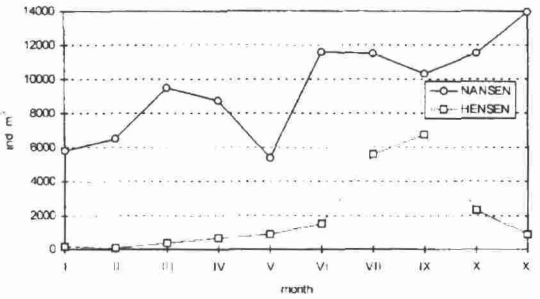

Figure 2. Annual variability of total mesozooplankton in "Nansen" and "Hensen" net catches in 1995.

Copepods Calanoids

According to Regner (5, 6, 7, 8) dominant species in this area which determine the copepod annual abundance are: *Acartia clausi, Centropages typicus, Centropages kroyeri* and *Temora stylifera.* Although no significant differences in abundance of those adult larger copepods were found between "Nansen" and "Hensen" net catches (Tab. 1), because of the incomplete data on the abundance of the smaller calanoids *(Paracalanus, Clausocalanus* and *Ctenocalanus)* we cannot state the adequacy of the 333 micrometer net in sampling all calanoids. Nichols and Thompson (10) found that the smallest copepod *Paracalanus parvus* is poorly sampled by the 270 micrometer mesh size, since even adult forms appear to pass through the meshes.

Calanoid copepodites

In "Nansen" samples, calanoid copepodites constituted 28.6 - 66.9% of the total copepod numbers, while in "Hensen" samples their contribution was 27.6 - 54.1 %. Statistically significant difference in calanoid copepodites abundance between "Nansen" and "Hensen" net catches was found (Tab. 1).

Table 1. Summarized data of Student's t-test for mesozooplankton groups.

	Significance between 125 and 330 micrometer samples
adult Calanoida	Ns
calanoid copepodites	P< 0.001
Cyclopoida	P< 0.001
Oncaea spp.	P< 0.001
Cladocera	Ns
Bivalvia larvae	P<0.05
Gastropoda larvae	P<0.001
Polychaeta larvae	P<0.05
Echinodermata larvae	P<0.001
Decapoda larvae	Ns
Appendicularia	P<0.001
Pteropoda	P< 0.05
Ostracoda	Ns
Thaliacea	Ns
Chaetognatha	Ns

Ns, Not significant