ACOUSTIC IDENTIFICATION OF *NYCTIPHANES COUCHII* AND *NEMATOSCELIS MEGALOPS* IN THE SPANISH MEDITERRANEAN SEA

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Abstract

During the 2015 routine acoustic survey for stock assessment carried out in the Spanish Mediterranean continental shelf, krill swarms were localized in two different places using an EK60 scientific echosounder, operating at multiple frequencies. Biological identification was performed by mean of a plankton net (bongo 90) equipped with two different mesh sizes (500 to 2000 microns). Although krill frequency response was similar in both localizations, samples analysis revealed the presence of two different species: *Nyctiphanes couchii* (Bell, 1853) and *Nematoscelis megalops* (Sars, 1883).

Keywords: Acoustics, Crustacea, Continental shelf, North-Western Mediterranean

Introduction

Krill species are key organism in marine foods webs [1]. An understanding of the spatial and temporal variability in krill distribution is essential for implemented fisheries management based on ecosystem approach [2]. Acoustic surveys techniques developed rapidly during the 1980s, and since the early 1990s acoustic surveys have become the main method for study the krill distribution and abundance. Groundtruthing is an important component of acoustic surveys because the unbiased species identification is needed [3]. Krill frequency response has been properly studied, krill resonance occurs at high frequencies, around 120 or 200 kHz [4], but different krill species present different frequency response that can be used for species discrimination [5].

Material and methods

The study was carried out in summer 2015, during the annual acoustic survey for small pelagic stocks assessment (MEDIAS). The survey covers the Spanish Mediterranean continental shelf, from 30 to 200 meters depth (Figure 1). Acoustic data were acquired using an EK60 calibrated echosounder (Simrad®) operating at five frequencies, 18, 38, 70, 120 and 200 kHz. Biological samples were collected by means of a plankton net bongo 90 equipped with two different mesh size (500 and 2000 microns). In order to sample exactly the echotraces detected, the sample device was provided with a depth sensor (ITI, Simrad) which allowed monitoring the net track in real time. Krill swarms echotraces were delimited, geographically localized and their frequency response pattern determined using Echoview software (Miriax Lt.).
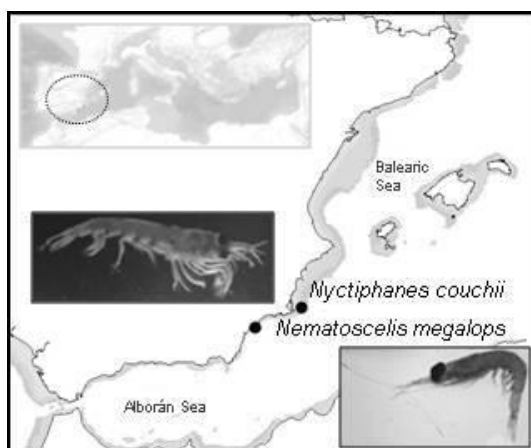

Fig. 1. Study area (continental shelf marked in grey). Identification hauls (black dots).

Results and discussion

Nyctiphanes couchii swarms were localized at 50 meters depth, on the continental shelf (144 m bottom depth). *Nematoscelis megalops* swarms were localized at 86 meters depth, on the continental shelf break (256 m bottom depth) (Figure 1). Differences in the mean volume backscattering strength (MVBS) were exhibited between species (Figure 2), although further research is needed to separate accurately this two species based on their frequency response in the study area.
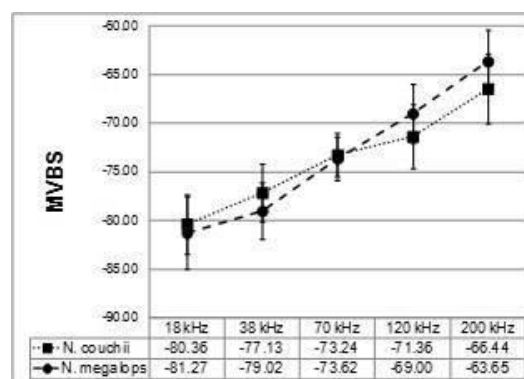

	18 kHz	38 kHz	70 kHz	120 kHz	200 kHz
N. couchii	-80.36	-77.13	-73.24	-71.36	-66.44
N. megalops	-81.27	-79.02	-73.62	-69.00	-63.65

Fig. 2. Mean volume backscattering strength (MVBS) at different frequencies for the two species analyzed.

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