

# PREDOMINANCE OF THE COPEPOD *CENTROPAGES KROYERI* (GIESBRECHT, 1892) IN THE BAY OF TUNIS DURING THE SPAWNING PERIOD OF THE ANCHOVY *ENGRAULIS ENCRASICOLIS*.

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## Abstract

A spatio-temporal survey of zooplankton and ichthyoplankton realised in the Bay of Tunis (south-western Mediterranean) between December 1993 and November 1995 resulted in the identification of a spawning area during the summer of the anchovy *Engraulis encrasicolus*. It is suggested that *E. encrasicolus* adults fed on the patches of the copepod *Centropages kroyeri* dominating the zooplankton community over this period. This species, very abundant in the Tunisian coasts, showed high preferences for warmer waters, whereas the species *Centropages typicus* is more abundant in the northern Mediterranean coasts.

**Keywords:** *Centropages*, anchovy, Bay of Tunis.

## Introduction

European anchovy (*Engraulis encrasicolus*) is a highly important fish resource of the western Mediterranean coasts. Several studies concerning the ecology of this species in the gulf of Lions [1] and the Catalan Sea [2] already exist. These works show that the diet of adult anchovies constituted primarily of copepods over the spawning period. The copepod *Centropages typicus* is one of the most abundant species of the northwestern Mediterranean coasts [3]. It also can dominate other copepods in the diet of anchovy [2]. Consequently, this copepod-anchovy interaction may play a determinant role in the Mediterranean pelagic ecosystem [4]. However, due to the lack of feeding ecology information in the present study area, the former conclusions are difficult to assume. Recently Daly Yahia [5] studied the dynamics of zooplankton communities in the bay of Tunis over two years. With this information the presence of anchovy eggs and larvae is used to identify the spawning period and the temporal evolution of the copepod *Centropages kroyeri*, the dominant species in summer, is described.

The main aim of this paper results in discussing the biogeographic importance of this copepod and its possible interaction with anchovy.

## Sampling area

The bay of Tunis is located between 10°17' to 11°37' longitude East and 36°42' to 36°53' latitude North; its surface area and average depth are about 361 km<sup>2</sup> and 15m respectively. A monitoring program of hydrology, phytoplankton, zooplankton and ichthyoplankton was developed between December 1993 and November 1995 [6]. Zooplankton groups including copepods were identified and counted down to species level.

## Results and discussion

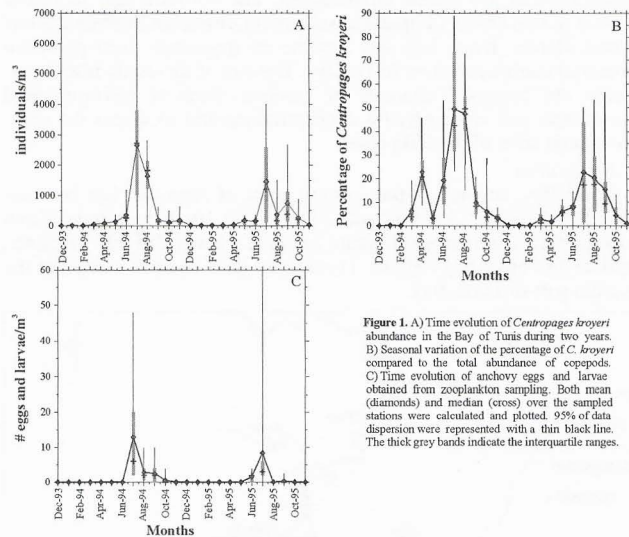
The species *Centropages kroyeri* considered rare for the northwestern Mediterranean coasts [7,8] can dominate the copepod communities in the Bay of Tunis, especially during summer (Figure 1B). Abundant also off the southern Tunisian coasts it can tolerate high salinity ranges [9]. Its reproductive activity has been correlated to increasing temperature during spring and summer [5]. So, this species can be considered as a biogeographic indicator for the warm waters in the Mediterranean coasts.

A peak in abundance of anchovy eggs and larvae was observed in July (Figure 1C). Both copepods and anchovy showed high spatial heterogeneity during July (Figure 1). Comparing the maps of *E. encrasicolus* eggs and *C. kroyeri* adults, Daly Yahia [5] concluded that anchovy adults fed and spawned in the patches of *C. kroyeri*. During the summer stratification period, *C. typicus* showed a daily patchy vertical distribution in the Catalan Sea [10]. In the same area, several schools of anchovy were observed in day time at the same depths of copepod patches [2].

On the basis of these first results, it is suggested that research programmes should be enlarged to be able to study and compare copepod-anchovy interactions for both sides of western Mediterranean coasts.

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**Figure 1.** A) Time evolution of *Centropages kroyeri* abundance in the Bay of Tunis during two years. B) Seasonal variation of the percentage of *C. kroyeri* compared to the total abundance of copepods. C) Time evolution of anchovy eggs and larvae obtained from zooplankton sampling. Both mean (diamonds) and median (cross) over the sampled stations were calculated and plotted. 95% of data dispersion were represented with a thin black line. The thick grey bands indicate the interquartile ranges.

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