

FAMILY CANDACIIDAE (COPEPODA, CALANOIDA) IN THE CENTRAL AND SOUTH ADRIATIC SEA

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Abstract

The family Candaciidae was investigated during nine cruises in the Central and South Adriatic. Six species of adults and their copepodites, all of which were present in low abundance, were found typically in subsurface layers of coastal stations. These are the first data on the abundance and distribution of the copepodites of this family in the Adriatic Sea.

Keywords: Zooplankton, Candacia, Paracandacia, Adriatic Sea

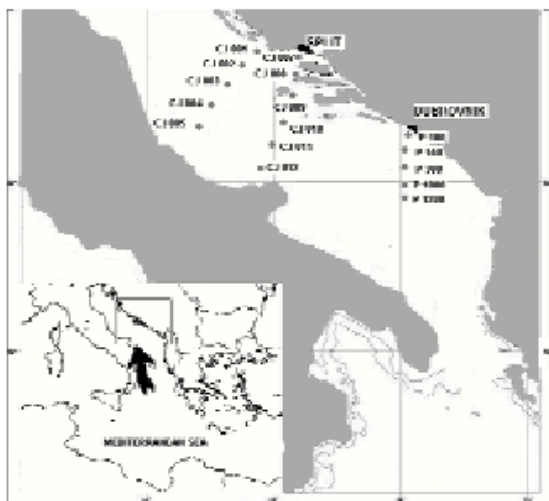
Introduction

Investigations of planktonic copepods in the Adriatic Sea began at the end of the 19th Century, but were restricted to the Northern Adriatic (1). Graeffe (2), among others, mentioned three species of Candaciidae: *Candacia longimana* (Claus, 1863), *C. melanopus* (Claus, 1863) [syn. *C. ethiopica* (Dana, 1849)], and *C. bispinosa* (Claus, 1863). Steuer (7) found *C. pectinata* (Boeck, 1873) near Silba Island and Dubrovnik, and *C. bispinosa* and *C. simplex* (Giesbrecht, 1889) in the vicinity of Dubrovnik. Nine species were collected from 1974-1976 during cruises of R/V Andrija Mohorovicic: *C. aethiopica*, *C. armata* (Boeck, 1873), *C. bipinnata* (Giesbrecht, 1889), *C. elongata* (Boeck, 1873), *C. longimana*, *C. tenuimana* (Giesbrecht, 1889), *C. varicans* (Giesbrecht, 1889), *Paracandacia bispinosa*, and *P. simplex* (6). *Candacia armata* and *C. pectinata* previously were regarded as synonyms. A consistently smaller form, previously considered to be *C. armata*, was described as a new species, *C. giesbrechti* (3). Later investigations have shown that the larger form, *C. armata*, is very rare. It thus has been assumed that most of the previous data refer to *C. giesbrechti*.

This paper adds new data on the abundance and distribution of Candaciidae, including life-history stages, in the Central and Southern Adriatic.

Materials and methods

Zooplankton was sampled at 17 stations during nine cruises in the Central and South Adriatic Sea (May 2002, June – July 2002, August 2002, September 2002, December 2002, April 2003, May 2003, June 2003, August 2003). Eleven stations were set along two transects in the Central Adriatic (CJ stations) and six, in the eastern South Adriatic Pit (JJ stations) (Fig.1). August 2002 was the only cruise when station P-1100 was visited. In December 2002 two new stations (P-150 and P-1200) were introduced.



A total of 196 samples were collected with a Nansen-type net (diameter 57 cm, length 255 cm, mesh 200 mm) equipped with a closing mechanism. Vertical hauls were taken in depth intervals of 50 or 100 m. Organisms were preserved in buffered formaldehyde. The entire samples were examined in the laboratory using a Wild microscope at a magnification of 400X. All copepodites and adults of

the family Candaciidae were counted. Adults were identified to the species level. Results are presented as individuals per cubic metre.

Results and discussion

Six species of Candaciidae were collected: *Candacia giesbrechti*, *C. varicans*, *C. tenuimana*, *C. longimana*, *Paracandacia simplex*, and *P. bispinosa*. All were present in small numbers; in some cases only a single specimen was found. The number of species decreased from the south to the central Adriatic.

C. giesbrechti, the most abundant species ($<3 \text{ ind/m}^3$), was collected mostly in subsurface layers of coastal stations. The same was true of *C. varicans*, which always was less abundant ($<2 \text{ ind/m}^3$). *P. bispinosa* was found at open-water stations along the Palagruža transect and in the South Adriatic ($<1 \text{ ind/m}^3$). *P. simplex*, was encountered only in the South Adriatic, and was most abundant at P-100 ($<0.5 \text{ ind/m}^3$). *C. longimana* and *C. tenuimana* were rare in the deep layers of the South Adriatic ($<0.1 \text{ ind/m}^3$). All copepodite stages were found at all stations throughout the entire water column. Highest values ($<6 \text{ ind/m}^3$) were collected at the coastal Central Adriatic stations.

Based on average density and species composition, stations JJ-1000, JJ-1100, and JJ-1200 were clustered in one group with great similarity. They were associated with CJ-003 and CJ-004, which are also open-sea stations. CJ-008, CJ-012, and especially CJ-007 were separated by higher values, as is typical of coastal stations (Fig. 2).

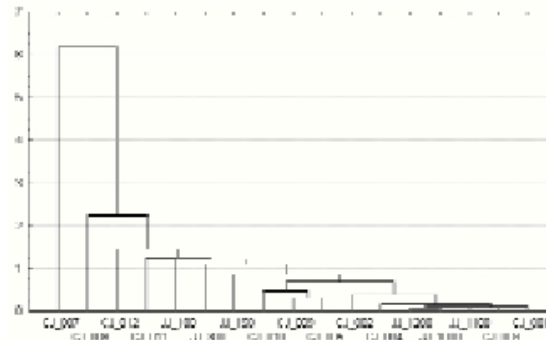


Fig. 2. Tree diagrams based on average density values of Candaciidae.

Available data on Candaciidae in the Adriatic Sea relate only to the frequency and distribution of species (4, 5). The present work adds information on the abundance of particular species, and the first data for their copepodites. This thus contributes baseline data essential to planning future investigations of this family's spatial and temporal distributions in this region.

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