



## Some Deep-Sea Cephalopods from the Northeastern Mediterranean Sea (Mersin Bay, Turkey)

Nuray Çiftçi<sup>1</sup> • Moez Shaiek<sup>2,3</sup> • Deniz Ayas<sup>1</sup>

<sup>1</sup> Mersin University, Faculty of Fisheries, Mersin, Turkey. nciftci@mersin.edu.tr; ayasdeniz@mersin.edu.tr

<sup>2</sup> Unité de recherche "Exploitation des milieux aquatiques" (UR14AGRO1), Institut Supérieur de Pêche et d'Aquaculture de Bizerte, BP15Rimel 7080 Menzel Jemil Bizerte, Tunisia. shaiekmoez@yahoo.fr

<sup>3</sup> Association Méditerranée Action-Nature (MAN, NGO), 1 rue d'Istanbul, 7000 Bizerte-Tunisia

✉ Corresponding Author: nciftci@mersin.edu.tr

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### ABSTRACT

Deep-sea sampling was conducted by a commercial trawl in the International Waters of Mersin Bay between 14 and 17 May 2018. The sampling depth ranged between 274 and 641 meters. A total of 13 trawling operations were performed, and each trawling operation lasted approximately 4 hours. During the sampling, six of the deep-sea cephalopods species were caught. All specimens were preserved in ethyl alcohol and were deposited in the Museum of the Systematic, Faculty of Fisheries, Mersin University (Catalog no: MEUCC-18-11-2- MEUCC-18-11-7). A total of two cuttlefish species belonging to the families of Sepiidae were identified. The others were represented by the families of Sepiolidae, Octopodidae, Bathypolypodidae, and Ommastrephidae.

### INTRODUCTION

Although deep seas cover over 65% of the earth's surface and more than 95% of the biosphere, there remains a region where scientific research carried out is minimal (Danovaro et al., 2010). Cephalopods live in

deep waters of the oceans (Voss, 1967) and inhabit abundantly in the seamounts and continental slopes. They are also reported to live in hydrothermal vents with extreme environmental conditions where oxygen is minimal, and light is limited (Roper & Young, 1975; Roeleveld et al., 1992; Voight, 2000;

Clarke, 2008; Ramirez-Llodra et al., 2010; Gilly et al., 2013; Hoving et al., 2014). There is limited information about cephalopod species living in bathyal and abyssal ecosystems due to sampling difficulty.

Since Levant Basin is an enclosed system and has oligotrophic water, specific diversity is 30% less (Por & Dimentman, 1987). However, the biodiversity of the Levant basin is continuously changing with Lessepsian migration. The Mediterranean cephalopods are represented by 66 species, which have been inventoried on the Mediterranean Sea since 1893 (Sanchez, 2009), 50 of them were reported in the Catalan Sea (Bello, 2004). The studies on cephalopods were mostly performed in the Western Mediterranean region. The first studies in Levant Basin were reported by Degner (1925), Adam (1967), Ruby & Knudsen (1972), Roper (1974), Knudsen (1981, 1992), and Popper et al. (1990). Studies on the cephalopods were carried out in detail in the Aegean Sea by D'Onghia et al. (1991) and Salman et al. (1997). As the main result of these studies, D'Onghia et al. (1991) have recorded 26 species, Salman et al. (1997) 30 species (belonging to 3 orders), Lefkaditou et al. (2003a) 34 species (belonging to 12 families). The other study reported 11 species from the Marmara Sea, 34 species from the Aegean Sea, and 24 species from the Mediterranean Sea. It was also reported that the Eastern Mediterranean cephalopod fauna consisted of 51 species in the same study (Salman et al., 2002).

More specifically, *Scaevurgus unicirrhus* is a species with records from different parts of the Mediterranean Sea (Degner, 1925; Berry, 1920, 1934; Bello, 2004; Salman, 2012; Haimovici & Perez, 1991; Mangold, 1998; Norman et al., 2005). *Sepia orbignyana* was recorded from Northwestern Mediterranean (Sanchez et al., 1998), Balearic Island (Sanchez, 2009), Marmara Sea (Katagan et al., 1993), and Aegean Sea (Salman et al., 1997). This species is vital in terms of fishing and represents a wide distribution in the Aegean Sea at a ranged depth between 0 to 500 m (Salman et al., 1997). *Sepia elegans* was firstly studied by Girard (1893) in the Mediterranean Sea (Sanchez, 2009). It was reported that the species has a sizeable bathymetric distribution up to 500 m depth in the Aegean Sea (Salman et al., 1997). Additionally, *S. elegans* were more abundant in the Catalan Sea in the spring and the Tyrrhenian Sea during autumn (Sanchez et al., 1998). According to Sanchez (2009), *Rossia macrosoma* and *Todarodes sagittatus* have been reported from Balearic Island by Lozano-Rey (1905) as new records. These species have also been recorded in the Aegean Sea. *Bathypolypus sponsalis* was found for the first time by Wirz (1955) in Menorca Island. The species was recorded in the Catalan Sea, Northwestern Mediterranean, while it has not been reported in the Tyrrhenian Sea (Sanchez, 2009). *B. sponsalis* has a distribution ranged between depths 200-500 m of depth in the North Aegean Sea (Salman et al., 1997). Among these species, *S. orbignyana* (Salman et al.,

1997) and *T. sagittatus* (Lefkaditou et al., 2003b) represents economic importance for fishing.

In this study, it has been presented the records of six deep-sea cephalopods from Mersin Bay. It has also been aimed to understand those species according to the scale of the Mediterranean Sea.

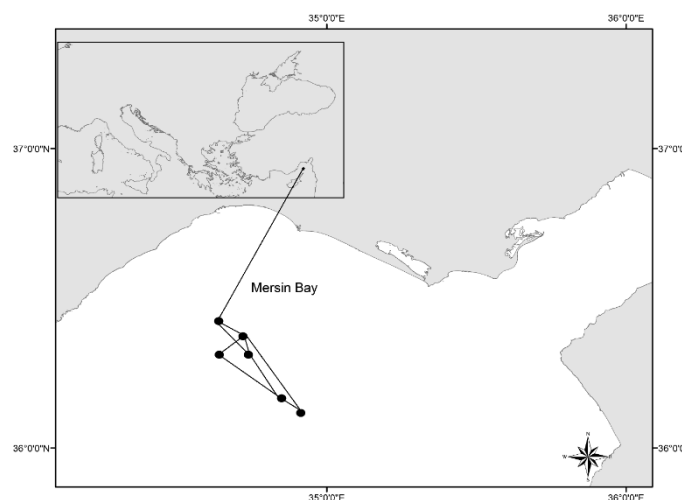
## MATERIAL AND METHODS

Deep-sea sampling was carried out by a commercial trawl in the international waters of Mersin Bay between 14 and 17 May 2018. The sampling depth was ranged between 274 and 641 m. The coordinates of the sampling area were: 36.24853N-34.36491E, 36.18839N-43.38847E, 36.17065N-34.40686E and 36.07227N-34.53326E (Figure 1). A total of 13 trawling operations were performed, and each trawl has lasted approximately 4 hours. The caught was represented by six cephalopods species, *S. unicirrus*, *S. orbignyana*, *S. elegans*, *R. macrosoma*, *T. sagittatus*, and *B. sponsalis*. All collected specimens 8 were preserved in ethyl alcohol and were deposited in the Museum of the Systematic, Faculty of Fisheries, Mersin University (Catalog no: MEUCC-18-11-2-MEUCC-18-11-7) (Figure 2).

## RESULTS AND DISCUSSION

A total of six cephalopod species were caught in the deep-sea waters of Mersin Bay among the more Octopodidae (*S. unicirrus*), one Bathypolypodidae (*B. sponsalis*), two Sepiidae (*S. orbignyana* and *S. elegans*), one

Sepiolidae (*R. macrosoma*), and finally one Ommastrephidae (*T. sagittatus*) (Figure 2).



**Figure 1.** The sampling area where the cephalopod species were caught



**Figure 2.** Species of deep-sea cephalopods from NE Mediterranean Sea (*R. macrosoma*<sup>1</sup>, *B. sponsalis*<sup>2</sup>, *S. unicirrus*<sup>3</sup>, *T. sagittatus*<sup>4</sup>, *S. orbignyana*<sup>5</sup>, *S. elegans*<sup>6</sup>)

## CONCLUSION

Cephalopods constitute an essential link in the food chain, especially in deep habitats. Thus, monitoring of distribution and diversity of these organisms in the marine ecosystem is essential in preserving the ecological balance and providing insight into the status of the species, in particular for those with economic importance.

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## COMPLIANCE WITH ETHICAL STANDARDS

### Authors' Contributions

Authors contributed equally to this paper.

### Conflict of Interest

The authors declare that there is no conflict of interest.

### Ethical Approval

For this type of study, formal consent is not required.

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