



First finding of rare Pearlfish, *Carapus acus* (Brünnich, 1768) (Ophidiiformes: Carapidae) from Mediterranean coasts of Morocco

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Received 04 Jan 2019,
Revised 10 March 2019,
Accepted 11 March 2019

Keywords

- ✓ *Carapus acus*,
- ✓ Carapidae,
- ✓ first finding,
- ✓ Alboran Sea,
- ✓ Morocco.

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Abstract

The present work is to document the first finding of the rare Pearlfish, *Carapus acus* (Brünnich, 1768) from Mediterranean coasts of Morocco, based on ten specimens collected during a bottom trawl survey in the frame of the monitoring of benthic fish stocks in Mediterranean coasts of Morocco. Total length of *C. acus* captured specimens is comprised between 145 and 210 mm. Morphometric characteristics of the species are given. This species is rarely observed in sea waters and is unknown from the Mediterranean coast of Morocco.

1. Introduction

Symbiosis is an intimate interaction between different organisms of different species [1]. It is common in marine environments [2] among the different species, and it takes place in various forms like commensalism, mutualism and parasitism [3]. Indeed, numerous species live in association with larger invertebrates, such as echinoderms [4 -5]. A variety of fish, most commonly pearlfish, is able to live in association with different invertebrates, including holothurians [6]. There are specialised fishes that are mainly found in the respiratory trees or in the coelomic cavity of holothuroids or in the coelomic cavity of asteroids [7].

The pearlfish, *Carapus acus* (Brünnich, 1768) is a benthic species which usually has less than 25 cm in total length and lives in warm waters [8]. It is characterised by a slender elongated body with long dorsal fin and anal fin meeting at the point of the tail edge. *Carapus acus* is found throughout eastern Atlantic including archipelagos, and Mediterranean Sea [9-10]. It presents no interest for commercial fisheries [11] and it is classified as bycatch. This pearlfish, is known to live inside the body cavity of various species of sea cucumbers, mainly *Holothuria tubulosa*, *Holothuria poli*; *Holothuria helleri*; *Holothuria sanctori* and *Parastichopus regalis* [7,12-13]. In most cases, there is only one fish per host [7].

In this present study, the presence of pearl fish *Carapus acus* was recorded for the first time from Mediterranean coasts of Morocco (Fig. 1).

2. Material and Methods

During a bottom trawl survey in the frame of the monitoring of benthic fish stocks carried out during June and July 2018 in Mediterranean coasts of Morocco, ten specimens of *Carapus acus* were caught from six stations from depths ranged between 83 and 195 m (Figure 2). All specimens were measured, weighed and photographed. Morphometric measurements are presented in table 1. Total length (TL) of specimens varies between 145 and 210 mm and net weight varying from 3.07 to 12.5 g (Figure 1).

All specimens are preserved in ethanol absolute and are deposited at the Laboratory of Fisheries of the National Institute of Fisheries Research- Tangier (Morocco) with voucher number LP-18/02.

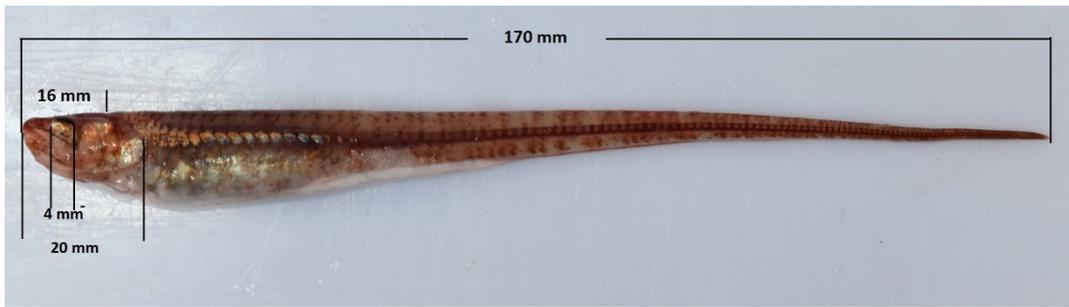


Figure 1: *Carapus acus* from south of Alboran Sea, Morocco; 170 mm TL.

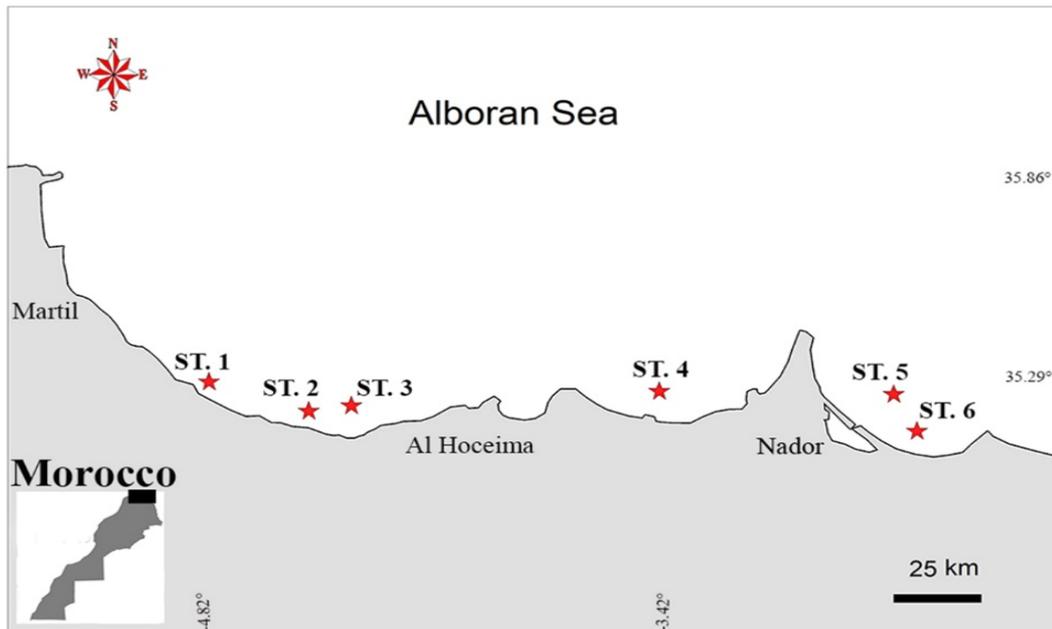


Figure 2. The capture stations of *Carapus acus* specimens from the Mediterranean coast of Morocco, (stars: St1-St6).

Table 1. Morphometric measurements *Carapus acus*, captured from Mediterranean coasts of Morocco and comparison with those captured in other area.

	Enajjar&Bradai. 2016 (Tunisia)	% Total length	Present study (Morocco)	% Total length
Number of specimens	1	-	10	-
Measurements (mm)				
Total length	136.1	-	145-210	-
Body depth	5.4	3.96	12-19	8.27-9.04
Predorsal fin length	21.6	15.87	29-42	20
Prepectoral fin length	17.7	13	17-24	11
Pre-anal fin length	19.1	14.03	15-26	10.34- 12.38
Head length	16.1	11.83	13-16	8.96-7.61
Eye diameter	3.4	2.49	3-5	2
Preorbital length	3.3	2.42	3-5	2

3. Results and discussion

According to “Fish Base/occurrence records” [8], there are no records of *Carapus acus* from Mediterranean coasts of Morocco. Yet, and close to the Moroccan coasts, *C. acus* was recorded from Spain including Balearic Island, France, Italy and Tunisia [8-11].

Most recorded *Carapus acus* hosts are typically sea cucumbers (see [7-8-14]) and the association between *C. acus* and *P. regalis* is widely cited [7-8-12-13]. Indeed, *C. acus* was found, in some area, only with *P. regalis*. For example, although more than 1,800 samples belonging to 6 different sea cucumbers species were examined, *C. acus* was found only in *P. regalis* individuals [6].

Our observations accord with these results. Indeed, all specimens we have found with sea cucumbers *P. regalis* and this pearlfish often show preference for a specific one [15-16].

These observations suggest that probably in west Mediterranean Sea, *C. acus* could have preference more to *P. regalis* than others sea cucumbers. Nevertheless, this remains a probability that requires more investigations. Thorough reviews of previous studies [8] have revealed no indication of the presence of *C. acus* in Mediterranean coasts of Morocco.

Carapus acus has no specific conservation measures [17] and this is due to the scarcity of data on this species. Further researches on feeding, maturity stages, occurrence percentage of *Carapus acus* with sea cucumbers, are needed. The present record confirms the occurrence of this pearlfish in Mediterranean coasts of Morocco.

Acknowledgments

We are grateful to the reviewers for critical and constructive comments on the manuscript.

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(2018) ; <http://www.jmaterenvirosci.com>