

# ANNALES

*Anali za istrske in mediteranske študije*  
*Annali di Studi istriani e mediterranee*  
*Annals for Istrian and Mediterranean Studies*  
*Series Historia Naturalis, 32, 2022, 1*





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**Series Historia Naturalis, 32, 2022, 1**

ISSN 1408-533X  
e-ISSN 2591-1783

UDK 5

Letnik 32, leto 2022, številka 1

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Založništvo PADRE d.o.o.

**Izdajatelj/Editori/Published by:**

Zgodovinsko društvo za južno Primorsko - Koper / Società storica del Litorale - Capodistria®

Inštitut IRRIS za raziskave, razvoj in strategije družbe, kulture in okolja / Institute IRRIS for Research, Development and Strategies of Society, Culture and Environment / Istituto IRRIS di ricerca, sviluppo e strategie della società, cultura e ambiente®

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**e-mail:** annales@mbss.org, **internet:** www.zdjp.si

Redakcija te številke je bila zaključena 30. 06. 2022.

**Sofinancirajo/Supporto finanziario/  
Financially supported by:**

Javna agencija za raziskovalno dejavnost Republike Slovenije (ARRS) in Mestna občina Koper

Annales - Series Historia Naturalis izhaja dvakrat letno.

**Naklada/Tiratura/Circulation:**

300 izvodov/copie/copies

Revija Annales, Series Historia Naturalis je vključena v naslednje podatkovne baze / La rivista Annales, series Historia Naturalis è inserita nei seguenti data base / Articles appearing in this journal are abstracted and indexed in: BIOSIS-Zoological Record (UK); Aquatic Sciences and Fisheries Abstracts (ASFA); Elsevier B.V.: SCOPUS (NL); Directory of Open Access Journals (DOAJ).

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received: 2022-02-10

DOI 10.19233/ASHN.2022.13

## A RARE OCCURRENCE OF *CARAPUS ACUS* (CARAPIDAE) IN THE EASTERN MEDITERRANEAN, TURKEY

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### ABSTRACT

*Two specimens of pearl fish Carapus acus (Brünnich, 1768) were caught at a depth of 108 m in Gazipaşa coast, Antalya Bay (Eastern Mediterranean, Turkey) in March 2019. The present paper provides information on the occurrence of C. acus in the eastern Mediterranean Sea, in Turkey. Since it was recorded only once before in the last twenty-eight years, this species could be considered exceptionally rare in the easternmost area of the Mediterranean Sea.*

**Key words:** Pearl fish, Carapidae, Rare record, Mersin Bay, Mediterranean Sea

## RARO RITROVAMENTO DI *CARAPUS ACUS* (CARAPIDAE) NEL MEDITERRANEO ORIENTALE, IN TURCHIA

### SINTESI

*Due esemplari di galiotto, Carapus acus (Brünnich, 1768), sono stati catturati ad una profondità di 108 m al largo della costa di Gazipaşa, baia di Antalya (Mediterraneo orientale, Turchia) nel marzo 2019. L'articolo fornisce informazioni sull'occorrenza di C. acus nel Mediterraneo orientale, in Turchia. Poiché precedentemente è stato ritrovato una volta sola negli ultimi ventotto anni, questa specie potrebbe essere considerata eccezionalmente rara nell'area più orientale del Mediterraneo.*

**Parole chiave:** Galiotto, Carapidae, ritrovamento raro, Baia di Mersin, Mediterraneo

## INTRODUCTION

The family Carapidae is represented in Mediterranean waters by a single genus and a single species (Froese & Pauly, 2022), *Carapus acus* (Brünnich, 1768).

Individuals of pearl fish swim close to the sea bottom searching for suitable (new) hosts. The species lives as a commensal in common association with sea cucumbers, spending the day inside the respiratory tree in the body cavity of sea cucumbers (Gonzales-Wangüemert *et al.*, 2014; Froese & Pauly, 2022).

In Turkish waters, the pearl fish has been observed only occasionally (Aksiray, 1954; Geldiay, 1969). It was reported by Gucu *et al.* (1994) from Mersin Bay (northeastern Mediterranean Sea) and later off the Bozcaada Island, in the northern Aegean Sea (Eryılmaz,

2003), as well as from Çeşme (İzmir) in the Turkish coast of the Aegean Sea (Aydın & Akyol, 2018).

Although *C. acus* has been reported in the north coasts of the Levantine Sea (Aksiray, 1954; Gucu & Bingel, 1994), the species is very rare in the Mediterranean (Fischer, 2007). In Turkish Mediterranean waters it had been recorded only once before in the last twenty-eight years. This study reports the first occurrence of *C. acus* from Antalya Bay and confirms the presence of the species in the western area of the southern coasts of Turkey.

## MATERIAL AND METHODS

On 28 March 2019, two specimens of *C. acus* were captured at a depth of 108 m with a commercial bottom trawl off the Gazipaşa coast (N 35°47'447''

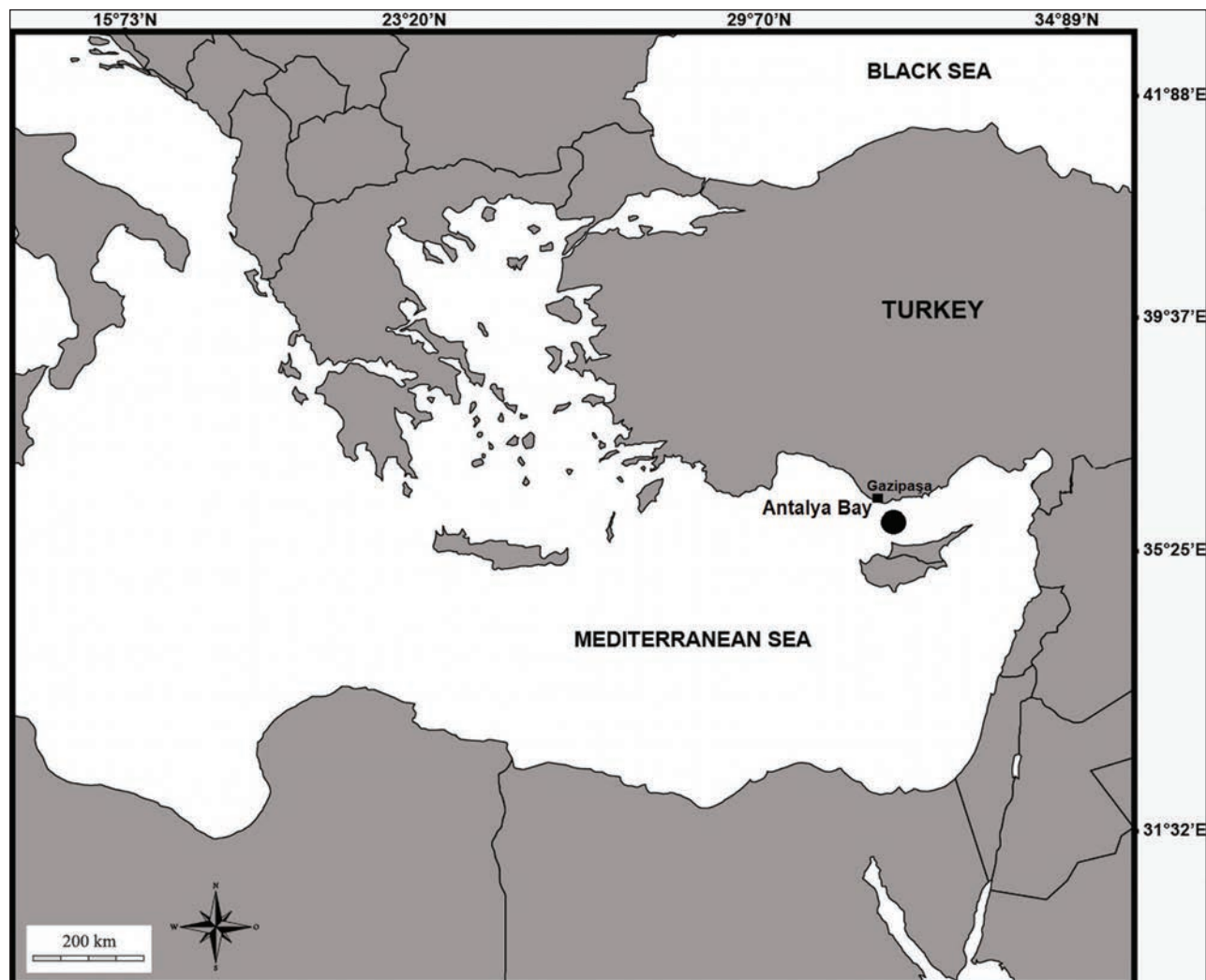


Fig. 1: Map showing the capture site (•) of *Carapus acus* specimens in Antalya Bay (Eastern Mediterranean Sea).

Sl. 1: Zemljevid obravnavanega območja z označeno lokaliteto ulova (•) primerkov strmorinca v Antalijskem zalivu (vzhodno Sredozemsko morje).

**Tab. 1: Morphometric measurements of *Carapus acus* specimens captured in Antalya Bay, Turkey and comparison with previous studies.**

**Tab. 1: Morfometrične meritve osebkov *Carapus acus*, ujetih v Antalijskem zalivu v Turčiji, in primerjava s prejšnjimi študijami.**

| Measurements (cm)    | This study |      | Enajjar & Bradai (2016) | Aydın & Akyol (2018) |
|----------------------|------------|------|-------------------------|----------------------|
| Numbers of Specimens | 1          | 2    | 1                       | 1                    |
| Total length         | 9.8        | 8.6  | 13.6                    | 18.1                 |
| Body depth           | 0.47       | 0.41 | 0.54                    | 0.94                 |
| Head length          | 1.34       | 1.18 | 1.16                    | 1.33                 |
| Head width           | 0.42       | 0.37 | -                       | -                    |
| Eye diameter         | 0.24       | 0.21 | 0.34                    | 1.67                 |
| Pre-orbital length   | 0.25       | 0.22 | 0.33                    | 1.25                 |
| Pre-pectoral length  | 0.70       | 0.61 | 1.77                    | 1.27                 |
| Pre-dorsal length    | 1.48       | 1.30 | 2.16                    | 4.36                 |
| Pre-anal length      | 1.32       | 1.16 | 1.91                    | 1.38                 |

and E 32°45'488"), in Antalya Bay (western Mediterranean, Turkey) (Fig. 1). After being brought to the laboratory, the specimens were identified and photographed. The morphometric characters of the two specimens were measured to the nearest 0.1 mm using a digital caliper. All measurements and colour agree with the description of Trott & Olney (1986). The specimens were preserved in 4% formaldehyde and deposited in the Museum of the Faculty of Marine Sciences and Technology, Iskenderun Technical University, under catalogue numbers MSM-PIS/2019-4 and MSM-PIS/2019-5 (Fig. 2).

## RESULTS AND DISCUSSION

The body is laterally compressed, elongated. The continuous dorsal fin and the anal fin run the whole length of the body. Teeth in jaws small and uniform. There is no caudal fin and the tail ends with a point. Colour: the body is translucent, with a number of silvery or reddish-gold iridescent spots on the operculum and the thoracic region. The peritoneum lining the body cavity is an opaque silvery colour.

The pearl fish *C. acus* is a nocturnal species. Adult specimens occurring in shallow waters are typically commensal with holothurian species (Eeckhaut *et al.*, 2004) and generally use them as shelter (Schwartz *et al.*, 2012). The most common sea cucumber hosts are *Parastichopus regalis*, *H. hammata*, *H. sanctori*, and *H. tubulosa* (González-Wangüemert *et al.*, 2014). According to Trott & Olney (1986) *C. acus* may partly protrude from or entirely leave the host at night to feed.



**Fig. 2: The specimens of *Carapus acus* captured from Gazipaşa coast (Antalya Bay).**  
**Sl. 2: Primerki strmorcev (*Carapus acus*), ujeti na obali Gazipaşa (Antalijski zaliv).**

**Tab. 2: Records of *C. acus* in the Mediterranean Sea.****Tab. 2: Najdbe strmorincev (*C. acus*) v Sredozemskem morju.**

| Author(s)                                | Year(s)                 | Location                                       | Depth (m) | Gear      | TL (cm)   |
|------------------------------------------|-------------------------|------------------------------------------------|-----------|-----------|-----------|
| Gucu <i>et al.</i> (1994)                | May 1980 - October 1984 | Northeastern Mediterranean Sea, Turkey         | 55-78     | Trawl net | -         |
| Eryılmaz (2003)                          | May 2001                | Bozcaada Island (northern Aegean Sea), Turkey  | 68        | Trawl net | 14.9-16.1 |
| González-Wangüemert <i>et al.</i> (2004) | May-July 2013           | Off the Southeastern Spanish coast, Spain      | -         | Trawl net | 7.0-21.5  |
| Enajjar & Bradai (2016)                  | 09 May 2014             | Gulf of Gabes (central Mediterranean), Tunisia | 100       | Trawl net | 13.6      |
| Aydın & Akyol (2018)                     | 30 March 2018           | Çeşme (İzmir) coast (Aegean Sea), Turkey       | 60-80     | Trawl net | 18.1      |
| This study                               | 28 March 2019           | Gazipaşa coast, Antalya Bay, Turkey            | 108       | Trawl net | 8.6-9.8   |

*C. acus* is known throughout the Mediterranean, commonly in its western part, and rarely occurs in the Adriatic and the Aegean Seas (Uiblein *et al.*, 2015). It is a non-migratory benthic species found in demersal areas usually at depths between 1 m and 150 m (Nielsen *et al.*, 1999). *C. acus* can reach a maximum size of 20.8 cm in total length, TL (Markle & Olney, 1990). It commonly feeds on small bottom invertebrates and small fishes (Trott & Olney, 1986).

The specimens of pearl fish *C. acus* from Antalya Bay were captured during commercial trawling hauls in the evening, and no sea cucumbers were caught in the process. Gonzales-Wangüemert *et al.* (2014) and Aydın & Akyol (2018) reported *C. acus* specimens found among *P. regalis*. Parmentier and Das (2004) mentioned that these species leave their host holothurians essentially at night. Thus, the two specimens from the present study might have been captured after leaving their hosts.

The two specimens were measured at 8.6 cm and 9.8 cm in TL. The measurements of *C. acus* are summarised in Table 1 and compared with previous Mediterranean samples (Enajjar & Bradai, 2016; Aydın & Akyol, 2018). Our specimens were found

to be smaller than those of the previous records reported for the Gulf of Gabes (southern Tunisia, central Mediterranean) (Enajjar & Bradai, 2016), for Bozcaada Island (Aegean Sea, Turkey) (Eryılmaz, 2003), and the Aegean Sea (Çeşme, Turkey) (Aydın & Akyol, 2018). However, González-Wangüemert *et al.* (2004) reported samples for the Mediterranean (southern Spain) that are in total agreement with our measurements. The previous captures of the species in the Mediterranean waters are documented in Table 2.

Although *C. acus* has been categorised as a Least Concern (LC) species in the Mediterranean according to the Red List of the International Union for Conservation of Nature (IUCN), the situation concerning *C. acus* in the Eastern Mediterranean should be re-evaluated. We propose that continuous studies are conducted to further investigate and monitor this rare species in the eastern region of the Mediterranean.

#### ACKNOWLEDGMENTS

The authors thank the boat captain and staff who helped the samples.

## REDKO POJAVLJANJE STRMORINCA *CARAPUS ACUS* (CARAPIDAE) V VZHODNEM SREDOZEMSKEM MORJU (TURČIJA)

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### POVZETEK

Dva primerka strmorinca *Carapus acus* (Brünnich, 1768) sta bila ujeta na globini 108 m na obali Gazi-paşa, v Antalijskem zalivu (vzhodno Sredozemsko morje, Turčija) v marcu 2019. V pričujočem prispevku avtorja podajata podatke o pojavljanju vrste *C. acus* v vzhodnem Sredozemskem morju (Turčija). Ker je bil v zadnjih 28 letih ujet doslej le v enem primeru, to vrsto opredeljujeta kot izjemno redko vrsto v skrajnem vzhodnem delu Sredozemskega morja.

**Ključne besede:** strmorinec, Carapidae, redka najdba, zaliv Mersin, Sredozemsko morje

## REFERENCES

- Aksiray, F. (1954):** A key to marine fishes of Turkey. I.U. Fen Fakültesi Hidrobiologi Arastirma Enst. Yayinlari, Istanbul, 277 pp.
- Aydın, İ. & O. Akyol (2018):** Occurrence of pearl fish, *Carapus acus* (Osteichthyes: Carapidae) in Çeşme, Izmir (Aegean Sea, Turkey). *Annales, Ser. Hist. Nat.*, 28(2), 119-122. <http://dx.doi.org/10.19233/ASHN.2018.14>.
- Eeckhaut, I., E. Parmentier, P. Becker, S.G. Da Silva & M. Jangoux (2004):** Parasites and biotic diseases in field and cultivated sea cucumbers. In: Lovatelli, A, C. Conand, S. Purcell, S. Uthicke, J.F. Hamel, & A. Mercier (eds.): *Sea cucumber aquaculture and management*. FAO Fisheries Technical Paper 463, Rome, pp. 311-326.
- Enajjar, S. & M.N. Bradai (2016):** First Record of *Carapus acus* (Osteichthyes: Carapidae) in the Gulf of Gabès (southern Tunisia, central Mediterranean Sea). *Mar. Biodiv. Rec.*, 9, 1-7. <https://doi.org/10.1186/s41200-016-0015-8>.
- Eryilmaz, L. (2003):** A study on the fishes of Bozcaada Island (North Aegean Sea). *Tr. J. Mar. Sci.*, 9(2), 121-137.
- Fischer, S., R.A. Patzner, C.H.G. Muller & H.M. Winkler (2007):** Studies on the ichthyofaunal of the coastal waters of Ibiza (Balearic Islands, Spain). *Rostocker Meeresbiologische Beitr.*, 18, 30-62.
- Froese, R. & D. Pauly (2022):** FishBase. World Wide Web electronic publication. [www.fishbase.org](http://www.fishbase.org). Version (01/2022) (accessed date: 02 February 2022).
- Geldiay, R. (1969):** Important fishes found in the Bay of Izmir and their possible invasions. *E.U. Monogr. Fac. Sci.*, 11, 135 pp.
- González-Wangüemert, M., C. Maggi, S. Valente, J. Martínez-Garrido & V. Rodrigues Nuno (2014):** *Parastichopus regalis*: The main host of *Carapus acus* in temperate waters of the Mediterranean Sea and northeastern Atlantic. *Beche-de-mer Inf. Bull.*, 34, 38-42.
- Gucu, A.C. & F. Bingel (1994):** Trawlable species assemblages on the continental shelf of the Northeastern Levant Sea (Mediterranean) with an emphasis on Lessepsian migration. *Acta Adriatica*, 35, 83-100.
- Markle, D.F. & J.E. Olney (1990):** Systematics of the pearlfishes (Pisces: Carapidae). *Bull. Mar. Sci.*, 47(2), 269-410.
- Nielsen, J.G., D.M. Cohen, D.F. Markle & C.R. Robins (1999):** Ophidiiform fishes of the world (Order Ophidiiformes). An annotated and illustrated catalogue of pearlfishes, cusk-eels, brotulas and other ophidiiform fishes known to date. FAO Fisheries Synopsis No.125, Vol.18, Rome, 178 pp.
- Parmentier, E. & K. Das (2004):** Commensal vs. parasitic relationship between Carapini fish and their hosts: some further insight through  $\delta^{13}\text{C}$  and  $\delta^{15}\text{N}$  measurements. *J. Exp. Mar. Biol. Ecol.*, 3, 47-58.
- Schwartz, C., E. Parmentier, S. Wiehrr, & S. Gemballa (2012):** The locomotory system of pearlfish *Carapus acus*: what morphological features are characteristic for highly flexible fishes? *J. Morph.*, 273(5), 519-529.
- Trott, L.B. & J.E. Olney (1986):** Carapidae. In: Whitehead, P.J.P., M.-L. Bauchot, J.-C. Hureau, J. Nielsen & E. Tortonese (eds.): *Fishes of the North-eastern Atlantic and the Mediterranean*. Vol. 3. Unesco, Paris, pp. 1172-1176.
- Uiblein, F., S. Knudsen & J. Nielsen (2015):** *Carapus acus*. IUCN Red List of Threatened Species. 2015:e.T198624A60784465.<http://dx.doi.org/10.2305/IUCN.UK.2015-4.RLTS.T198624A60784465.en>. (Last accession: 01 February 2022).