
Occurrence of *Lophogaster spinosus* Ortmann, 1906 (Crustacea, Lophogastrida) in the Gulf of Cadiz (NE Atlantic)

P. Abelló, J. Canoura & J. Gil

Abelló, P., Canoura, J. & Gil, J., 2011. Occurrence of *Lophogaster spinosus* Ortmann, 1906 (Crustacea, Lophogastrida) in the Gulf of Cadiz (NE Atlantic). *Arxius de Miscel·lània Zoològica*, 9: 6–12, Doi: <https://doi.org/10.32800/amz.2011.09.0006>

Abstract

Occurrence of Lophogaster spinosus Ortmann, 1906 (Crustacea, Lophogastrida) in the Gulf of Cadiz (NE Atlantic).— The occurrence of the lophogastrid crustacean *Lophogaster spinosus* is reported for the Gulf of Cadiz waters, in the North–East Atlantic. This is the first report of the species for the Iberian Atlantic region. Samples were collected by demersal trawling during a fisheries research survey performed in March 2008. A total of four specimens were collected at three sampling sites. Depths of occurrence ranged between 363 and 548 m.

Key words: *Lophogaster spinosus*, Lophogastrida, North–eastern Atlantic, Gulf of Cadiz.

Resumen

Presència de Lophogaster spinosus Ortmann, 1906 (Crustacea, Lophogastrida) en el Golfo de Cádiz (Atlàntic nororiental).— Se registra la presencia del crustáceo lofogàstrido *Lophogaster spinosus* en aguas del golfo de Cádiz, en el Atlàntic nororiental. Esta es la primera cita de la especie en las costas atlánticas de la península Ibérica. Las muestras se obtuvieron mediante arrastre demersal durante una campaña de investigación pesquera en marzo de 2008. Se capturaron un total de cuatro individuos. Las profundidades de captura están comprendidas entre 363 y 548 m.

Palabras clave: *Lophogaster spinosus*, Lophogastrida, Atlàntic nororiental, Golfo de Cádiz.

Resum

Presència de Lophogaster spinosus Ortmann, 1906 (Crustacea, Lophogastrida) al golf de Cadis (Atlàntic nord–oriental).— Es registra la presència del crustaci lofogàstrid *Lophogaster spinosus* en aigües del golf de Cadis, a l'Atlàntic nord–oriental. Aquesta és es la primera referència de l'espècie a les costes atlàntiques de la península Ibèrica. Les mostres es van obtenir mitjançant ròssec demersal durant una campanya de recerca pesquera al mes de març de 2008. Es van capturar un total de quatre individus. Les profunditats de captura estan compreses entre 363 i 548 m.

Paraules clau: *Lophogaster spinosus*, Lophogastrida, Atlàntic nord–oriental, Golf de Cadis.

(Rebut: 13/09/2011; Acceptació condicional: 13/10/2011; Acceptació definitiva: 25/10/2011)

Pere Abelló⁽¹⁾, Institut de Ciències del Mar (CSIC), Passeig Marítim 37–49, 08003 Barcelona, Catalunya, Spain.– Jesús Canoura⁽²⁾ & Juan Gil⁽³⁾, Centro Oceanográfico de Cádiz, Instituto Español de Oceanografía (IEO), Muelle de Levante (Puerto Pesquero), Apdo. 2609, 11006 Cádiz, España (Spain).

⁽¹⁾E–mail: pabello@icm.csic.es

⁽²⁾E–mail: jesus.canoura@cd.ieo.es

⁽³⁾E–mail: juan.gil@cd.ieo.es

Introduction

Knowledge of lophogastrid crustaceans is relatively scarce, especially when compared to other more diverse and abundant crustacean groups, such as Decapoda, Copepoda or even the phylogenetically close group, Mysida. The previous Mysidacea are nowadays split in two orders, the Lophogastrida and the Mysida (Martin & Davis, 2001; Meland & Willassen, 2007; Wittmann & Ariani, 2010). A total of 51 living species, belonging to eight genera, are currently known within Lophogastrida (Anderson, 2010). The most diverse genus is *Lophogaster*, that has a total of 20 species. Most *Lophogaster* species are pelagic or bathypelagic, while some can be considered epibenthic, showing daily vertical migrations, such as *L. typicus* M. Sars, 1856 or *L. eurylepis* Bamber & Clark, 2004 (Kaartvedt, 1989; Bamber & Clark, 2004; Cartes et al., 2011).

We report the occurrence of the lophogastrid crustacean *Lophogaster spinosus* Ortmann, 1906 in the Gulf of Cadiz, the first report of the species for the Iberian Atlantic region.

Material examined

Samples were obtained during a demersal fisheries research survey (ARSA_0308) run by the Instituto Español de Oceanografía (IEO) in March 2008 on board the R/V 'Cornide de Saavedra', in the Gulf of Cadiz (SW Iberian Peninsula, NE Atlantic Ocean) (fig. 1). The aim of the survey was to obtain estimates of density, biomass, size, and age structure of the main demersal species of interest to fisheries, and to gather information on the ecosystem structure and dynamics, and environmental data. A demersal trawl gear was used (Silva et al., 2011). All hauls were performed during daytime hours. All morphometric measurements on the specimens were taken with a precision of 0.01 mm. Carapace length (CL) was taken as the reference size (as in shrimp-like decapod crustaceans) given the higher precision that a measurement can be taken on this hard structure versus other measures used previously, such as total length (that includes pleon and telson). CL was measured from the anterior orbital edge to the laterodorsal posterior carapace edge.

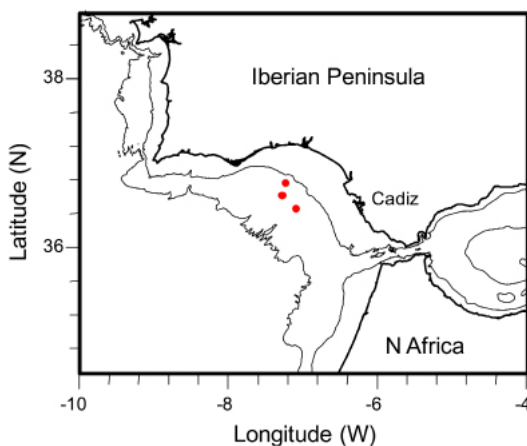


Fig. 1. Map of the study area showing the recorded occurrences (circles) of *Lophogaster spinosus* Ortmann, 1906 (200 m and 1,000 m isobaths are shown).

Fig. 1. Mapa del área de estudio que muestra las presencias registradas (círculos) de *Lophogaster spinosus* Ortmann, 1906 (se indican las curvas de isopropundidad de 200 y 1.000 m).



Fig. 2. Freshly collected *Lophogaster spinosus* Ortmann, 1906 from the Gulf of Cadiz; male (CL, 8.98 mm): lateral and dorsal view.

Fig. 2. *Lophogaster spinosus* Ortmann, 1906 recién recolectado en el golfo de Cádiz; macho de 8,98 mm de longitud: vista lateral y dorsal.

Results

The specimens were identified as *Lophogaster spinosus* Ortmann, 1906 (fig. 2) based on the original description of the species (Ortmann, 1906) and on information provided by Fage (1942) and Tattersall (1951, 1955). The species occurred in three samples (table 1), with a total of four individuals. The four specimens have been deposited in the Biological Collections of Reference (CBR) of the Institut de Ciències del Mar–CSIC (accession numbers: ICMM_20110705–01 to –04).

Morphological and meristic characteristics of the sampled specimens are provided in table 2. The carapace length of these specimens ranged between 8.08 and 9.77 mm in males, while the only female caught measured 10.95 mm CL.

The diagnostic characters identified are as follows: long rostral spine, extending beyond antennal scale; posterolateral angles of the carapace produced into a long spine reaching the end of abdominal segments 2 (males) or 3 (female); carapace smooth; elongate antennal scale, more so in the female (length/width ratio: 3.8) than in the males (ratio: 2.6–3.3);

Table 1. Main characteristics (date, initial position in decimal degrees, and depth range) of the demersal hauls taken in March 2008 in the Gulf of Cadiz where *Lophogaster spinosus* occurred.

Tabla 1. Principales características (fecha, posición inicial en grados decimales y rango de profundidades) de los arrastres demersales efectuados en marzo de 2008 en el golfo de Cádiz en los que se recolectó *Lophogaster spinosus*.

| Haul ID | Date | Latitude (N) | Longitude (W) | Depth (m) |
|---------------|-------------|--------------|---------------|-----------|
| ARSA_0308_L14 | 14 III 2008 | 36.491 | –7.108 | 530–532 |
| ARSA_0308_L17 | 14 III 2008 | 36.661 | –7.235 | 530–548 |
| ARSA_0308_L30 | 18 III 2008 | 36.813 | –7.203 | 363–390 |

Table 2. Main morphological characteristics of the specimens of *Lophogaster spinosus* collected in March 2008 in the Gulf of Cadiz. All measurements are in mm: m. Missing; n.a. Not available. Haul ID of specimens: #1 ARSA_0308_L14; #2 ARSA_0308_L17; #3 ARSA_0308_L17; #4 ARSA_0308_L30.

Tabla 2. Principales características morfológicas de los especímenes de *Lophogaster spinosus* recolectados en marzo de 2008 en el golfo de Cádiz. Todas las mediciones son en mm: m. Ausente; n.a. No disponible. Lances correspondientes a cada espécimen: #1 ARSA_0308_L14; #2 ARSA_0308_L17; #3 ARSA_0308_L17; #4 ARSA_0308_L30.

| Morphological characteristics | Specimen | | | |
|---|----------|----------|----------|-------|
| | #1 | #2 | #3 | #4 |
| Sex | Male | Male | Female | Male |
| Carapace length | 8.98 | 8.08 | 10.95 | 9.77 |
| Total length (TL1): eye to telson end | 31.37 | 25.41 | 31.85 | 32.65 |
| Total length (TL2): tip of the rostrum to telson end | 39.84 | 31.56 | 38.06 | 41.42 |
| Rostral spine length | 8.15 | 6.36 | 8.06 | 8.65 |
| Ratio rostral spine vs. TL2 | 0.20 | 0.20 | 0.21 | 0.21 |
| Ratio rostral spine vs. CL | 0.91 | 0.79 | 0.74 | 0.89 |
| Posterolateral spines reach end of abdominal somite | 2nd | 2nd | 3rd | 2nd |
| Right antennal scale length | 8.75 | m | m | 8.12 |
| Right antennal scale maximum width | 3.33 | m | m | 2.47 |
| Left antennal scale length | m | 6.94 | 8.25 | 9.36 |
| Left antennal scale maximum width | m | 2.47 | 2.16 | 2.84 |
| Ratio right antennal scale length vs. width | 2.63 | – | – | 3.29 |
| Ratio left antennal scale length vs. width | – | 2.81 | 3.82 | 3.30 |
| Number of teeth on outer margin of right antennal scale (in addition to the terminal spine) | 9 | m | m | 9 |
| Number of teeth on outer margin of left antennal scale (in addition to the terminal spine) | m | 9 | 10 | 8 |
| Number of spines on the right lateral margins of the telson, including apical spines | 7 | 7 | 6 | 8 |
| Number of spines on the left lateral margins of the telson, including apical spines | 6 | 6 | 7 | 8 |
| Number of spinules between telson apical spines | n.a. | n.a. | n.a. | 7 |
| | (broken) | (broken) | (broken) | |

8–10 teeth on the outer margin of the antennal scales, in addition to the terminal spine; one strong spine on each posterolateral angle of the tergum of the last abdominal somite; lateral margins of the telson with 6–8 spines including the apical spines; 7 spinules between the telson apical spines.

Concerning colouration, all freshly collected specimens had a uniform dark, brownish–slatish, colouration with no evident dorso–ventral differentiation signs (fig. 2).

Discussion

The known distribution of *L. spinosus* comprises the eastern and western North Atlantic between latitudes 40°N and 30°S with an apparent gap in equatorial waters (Tattersall, 1955; Wittmann et al., 2004; Southampton Oceanography Center Discovery Collections Midwater Database, on line). The closest known reports of the species are from deep waters off Portugal at approximately latitude 40°N, longitude 15°W (Southampton Oceanography Center Discovery Collections Midwater Database, on line). The species has been recently reported from the Canary Islands (Dürr & González, 2002; Wittmann et al., 2004).

In the Gulf of Cadiz, the species has been found to live on muddy bottoms of the upper continental slope (fig. 1), in areas characterised by the occurrence of submarine mud volcanoes which condition the structure and deposition dynamics of the sediments (Díaz del Río et al., 2003). Depths of collection ranged between 363 and 548 m (table 1). Interestingly, this epibenthic report demonstrates the occurrence of *L. spinosus* on continental slope bottoms in day–time hours. Tattersall (1951) included this species in the 'deep–water bottom–living species of the continental shelf' as differing from the 'pelagic species', while Tattersall (1955) suggested that this species performs daily vertical migrations in the water column. However, the absence of night–time samples on the bottom and in the water column during the survey does not allow verification of this hypothesis. Most reports of *L. spinosus* have however been obtained from epipelagic or bathypelagic macroplankton/nekton samples at depths between 260 and 700 m in much deeper waters (Wittmann et al., 2004). Tattersall (1955), taking into account the comments of Fage (1942), previously reported that '*L. spinosus*, in contrast to all the other species of the genus, inhabits the open ocean far from land...'. However, some specimens have also been reported from examination of stomach contents of bathyal epibenthic/demersal fish, such as deep–sea *Beryx* spp. (Dürr & González, 2002).

Concerning the morphology and meristic characters of the specimens studied, we emphasize that males showed a proportionally longer rostral spine with respect to the only female analyzed (table 2), although Fage (1942) stated that was more developed in females. The posterolateral spines of the female, however, were proportionally longer than those of the males, since they reached the end of the second pleonal segment in males, but clearly overreached the third segment in the female. The shape of the antennal scale was more elongate in the female (length/width ratio: 3.8) than in males (length/width ratio: 2.6–3.3). All these morphologic, morphometric, and meristic characters are worthy of study when more specimens become available to assess whether they are real sexual dimorphism characteristics, whether they are size dependent, or whether they are just the product of the low sample size obtained.

Acknowledgements

We are very grateful for all the help and support from crew and participants in the fisheries research survey ARSA_0308 on board R/V 'Cornide de Saavedra'. Thanks are also due to Drs. Carlos San Vicente and Jean Claude Sorbe for helpful comments on the manuscript. Partial support was obtained from research project CGL2009–12912–C03–03.

References

- Anderson, G., 2010, January 20. *Lophogastrida Taxa and Literature*. <<http://peracarida.usm.edu/>>. [accessed on 12 September 2011].
- Bamber, R. N. & Clark, P. F., 2004. A new species of *Lophogaster* (Crustacea, Mysidacea, Lophogastrida) from the equatorial eastern Atlantic. *Zoosystema*, 26: 419–423.
- Cartes, J. E., Mamouridis, V. & Fanelli, E., 2011. Deep-sea suprabenthos assemblages (Crustacea) off the Balearic Islands (western Mediterranean): Mesoscale variability in diversity and production. *Journal of Sea Research*, 65: 340–354.
- Díaz del Río, V., Somoza, L., Martínez-Frias, J., Mata, M. P., Delgado, A., Hernández-Molina, F. J., Lunar, R., Martín-Rubí, J. A., Maestro, A., Fernández-Puga, M. C., León, R., Llave, E., Medialdea, T. & Vázquez, J. T., 2003. Vast fields of hydrocarbon-derived carbonate chimneys related to the accretionary wedge/olistostrome of the Gulf of Cadiz. *Marine Geology*, 195: 177–200.
- Dürr, J. & González, J. A., 2002. Feeding habits of *Beryx splendens* and *Beryx decadactylus* (Berycidae) off the Canary Islands. *Fisheries Research*, 54: 363–374.
- Fage, L., 1942. Mysidacea : Lophogastrida, II. *Dana Report*, 23: 1–67.
- Kaartvedt, S., 1989. Retention of vertically migrating suprabenthic mysids in fjords. *Marine Ecology Progress Series*, 57: 119–128.
- Martin, J. W. & Davis, G. E., 2001. An updated classification of the recent Crustacea. *Natural History Museum of Los Angeles County, Science Series*, 39: 1–124.
- Meland, K. & Willassen, E., 2007. The disunity of 'Mysidacea' (Crustacea). *Molecular Phylogenetics and Evolution*, 44: 1083–1104.
- Ortmann, A. E., 1906. Schizopod crustaceans of the United States National Museum. The families Lophogastridae and Eucopiidae. *Proceedings of the United States National Museum*, 31: 23–54.
- Silva, L., Vila, Y., Torres, M. A., Sobrino, I. & Acosta, J. J., 2011. Cephalopod assemblages, abundance and species distribution in the Gulf of Cadiz (SW Spain). *Aquatic Living Resources*, 24: 13–26.
- Southampton Oceanography Center Discovery Collections Midwater Database [on line]: Global Biodiversity Information Facility. <http://data.gbif.org/datasets/resource/321> [accessed on 1 July 2011].
- Tattersall, W. M. 1951. A review of the Mysidacea of the United States National Museum. *Bulletin of the United States National Museum*, 201: 1–292.
- Tattersall, O. S., 1955. Mysidacea. *Discovery Reports*, 28: 1–190.
- Wittmann, K. J. & Ariani, A. P., 2010. Lophogastrida & Mysida. *Biologia Marina Mediterranea*, 17: 474–483.
- Wittmann, K. J., Hernández, F., Dürr, J., Tejera, E., González, J. A. & Jiménez, S., 2004. The epi- to bathypelagic Mysidacea (Peracarida) off the Selvagens, Canary, and Cape Verde islands (NE Atlantic), with first description of the male of *Longithorax alicei* H. Nouvel, 1942. *Crustaceana*, 76: 1257–1280.