

Notas / Notes

First report of *Nebalia truncosoi* Moreira, Cacabelos & Domínguez, 2003 (Crustacea: Phyllocarida) from the Mediterranean coasts of the Iberian Peninsula

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ABSTRACT

Leptostracans from western Iberian Peninsula are comparatively better known than in the Mediterranean coasts. The presence of *Nebalia truncosoi* Moreira, Cacabelos & Domínguez, 2003 is reported for the first time for the Iberian Mediterranean from specimens collected in 2014 off the Ebro Delta river mouth. Material examined fits well with original description including the following diagnostic features: long rostrum (four times as long as wide), a short carapace, one distal spine on the antennule peduncle fourth article, antennule flagellum shorter than the peduncle and provided with 6–7 articles, maxilla II exopod longer than endopod first article, posterodorsal borders of pleonites VI–VII provided with distally acute denticles and anal plates lacking defined 'shoulders'.

Keywords: Leptostraca; Nebaliidae; distribution; Ebro Delta offshore; Iberian Peninsula.

RESUMEN

Primer registro de *Nebalia truncosoi* Moreira, Cacabelos & Domínguez, 2003 (Crustacea: Phyllocarida) en el Mediterráneo ibérico

Los leptostráceos de las costas occidentales de la península Ibérica han sido comparativamente mejor estudiados que los de las mediterráneas en los últimos años. En este trabajo se reporta por primera vez la presencia de *Nebalia truncosoi* Moreira, Cacabelos & Domínguez, 2003 en las costas del Mediterráneo ibérico a partir de ejemplares recogidos en 2014 frente al Delta del Ebro. El material examinado coincide con la descripción original de la especie, que está caracterizada por presentar un rostro largo (cuatro veces más largo que ancho), un caparazón corto en relación a su altura, el cuarto artejo del pedúnculo de la anténula con una única espina distal, el flagelo antenular más corto que el pedúnculo y compuesto por 6–7 artejos, el exopodio de la maxilla II más largo que el primer artejo del endopodio, el borde dorsal y posterodorsal de los pleonitos VI–VII con denticulos agudos y las escamas anales sin una meseta definida en el borde medial.

Palabras clave: Leptostraca; Nebaliidae; distribución; costa del Delta del Ebro; península Ibérica.

Recibido/Received: 8/07/2020; **Aceptado/Accepted:** 30/11/2020; **Publicado en línea/Published online:** 26/05/2021

Cómo citar este artículo/Citation: Soler-Membrives, A. & Moreira, J. 2021. First report of *Nebalia truncosoi* Moreira, Cacabelos & Domínguez, 2003 (Crustacea: Phyllocarida) from the Mediterranean coasts of the Iberian Peninsula. *Graellsia*, 77(1): e132. <https://doi.org/10.3989/graellsia.2021.v77.290>

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Extant leptostracans (Crustacea: Phyllocarida: Leptostraca) have been extensively studied in the last years in the Iberian Peninsula, with nine species reported or described from the northern and western coasts: *Nebalia bipes* (Fabricius, 1780), *N. herbstii* Leach, 1814, *N. strausi* Risso, 1826, *N. troncosoi* Moreira, Cacabelos & Domínguez, 2003, *N. kocatasi* Moreira, Koçak & Katagan, 2007, *N. reboreada* Moreira & Urgorri, 2009 in Moreira *et al.*, 2009, *Sarsinebalia typhlops* (G.O. Sars, 1870), *S. cristoboi* Moreira, Gestoso & Troncoso, 2003 and *S. urgorii* Moreira, Gestoso & Troncoso, 2003 (Aguirrezabalaga *et al.*, 1988; Moreira *et al.*, 2003a, 2003b, 2004, 2009a, 2009b; Martínez *et al.*, 2007; Moreira, 2015; Sampaio *et al.*, 2016). Most of previous records corresponded to *N. bipes* but its presence in southern European latitudes and Iberian waters is doubtful (Dahl, 1985; Moreira, 2015). In comparison, records of leptostracans from the southern and the Mediterranean coasts are scarce and mostly correspond to *N. strausi* (e.g., Dahl, 1985); recently, Taboada *et al.* (2016) recorded *N. kocatasi* from Blanes and Moreira & Junoy (2017) also reported the genus *Paranebalia* Claus, 1880 for the Balearic Islands.

Examination of leptostracans collected in Ebro Delta offshore has revealed the presence of *N. troncosoi* that was originally described from Galicia, and later reported from the Bay of Biscay (Martínez *et al.*, 2007), Portugal (Sampaio *et al.*, 2016), Morocco (Bayed & Bazairi, 2017) and from both Atlantic and Mediterranean French coast (Latry & Droual, 2020). This record fills, therefore, the gap in the distribution of *N. troncosoi* in the eastern Iberian Peninsula.

The study area (40°38'53.8"–40°39'36.48" N / 0°51'59.1"–0°51'38.01" E) was located in the inner continental shelf at 4.71 miles offshore from the Ebro Delta river mouth, 2.04 miles offshore the coast and at depths between 11 and 14 m. Sampling was part of the DELTA campaigns, which aimed to monitor the community structure of macrofauna (among others) along a 3-year period and to relate it to their environment. Different types of samples were taken, e.g., macrofauna, benthic fish (*Solea solea* (Linnaeus, 1758), *S. senegalensis* Kaup, 1858 and *Mullus* spp.), and sediments. Macrofauna sampling was carried out using a Van Veen grab (KC DENMARK A/S) of 0.05 m² on soft bottoms. Grab samples were carefully sieved over a 0.5-mm mesh and stored in >90% ethanol. Samples were examined under a Leica EC3 stereomicroscope with camera, and digital images were captured by the LAS-EZ V2 software (Leica Microsystems). Drawings were done with the aid of a camera lucida connected to a compound microscope and measurements were made with an ocular micrometer. The following measurements were considered: total length (TL; distance from the articulation between the rostrum and carapace to the posterior end of the uropods not considering setation), rostrum length (RL; distance along

the midline), dorsal carapace length (DCL; distance between the articulation of the rostrum and the margin of the posterodorsal cleft), lateral carapace length (LCL; distance along lateral surface between the anterior-most and posterior-most margins) and carapace height (CH; distance between the dorsal and ventral margin). The abbreviated description corresponds to two mature females (Dahl, 1985; Martín *et al.*, 1996) and focuses in diagnostic characters. Specimens are deposited in the Museo Nacional de Ciencias Naturales (MNCN), Madrid.

Family **Nebaliidae** Samouelle, 1819

Genus *Nebalia* Leach, 1814

Nebalia troncosoi Moreira, Cacabelos & Domínguez, 2003

Figs. 1–4

Nebalia troncosoi Moreira *et al.*, 2003a: 341–350, figs. 1–8; 2009b: 271, fig. 1D. — Latry & Droual, 2020: 95–97, figs. 1–3, tab. 1.

MATERIAL EXAMINED. Ebro Delta continental shelf. 1 ovigerous ♀ (dissected; TL 3.45 mm, RL 0.69 mm, DCL 1.37 mm, LCL 1.82 mm, CH 1.47 mm), MNCN 20.04/13701, DELTA 1, St. 2, 40°38'53.8"N – 0°51'59.1"E, 8 April 2014, 11.8 m depth, muddy sediment. – 1 ovigerous ♀ (TL 3.85 mm, RL 0.80 mm, DCL 1.40 mm, LCL 2.02 mm, CH 1.57 mm; MNCN 20.04/13702), 1 preovigerous ♀ (TL 2.92 mm, RL 0.67 mm, DCL 1 mm, LCL 1.60 mm, CH 1.17 mm; MNCN 20.04/13703), 1 immature ♂ (TL 3.22 mm, RL 0.67 mm, DCL 1.25 mm, LCL 1.80 mm, CH 1.27 mm; MNCN 20.04/13704), 1 juvenile (TL 1.56 mm; MNCN 20.04/13705), DELTA 1, St. 3, 40°39'36.4"N – 0°51'38.0"E, 8 April 2014, 11 m depth, muddy sediment.

SHORT DESCRIPTION OF FEMALES

Carapace, rostrum and eye: Carapace covering at least lateral sides of pleonites 1–3; LCL 1.24–1.28 times CH. Rostrum long, with parallel margins, length about 4.1 times width, 0.5–0.55 times length of DCL (Figs. 1A, 2A, C). Eye 0.4 times length of rostrum; ommatidia numerous, distributed along eye distal half (Figs. 1A, 2B), with conspicuous dark pigment, more concentrated in central part with ommatidia; two small protuberances on distal inferior margin (Fig. 2B).

Antennae: Antennule peduncle fourth article with medial row of 7 simple setae and one distal thick spine (Figs. 1A, B, 2D); antennular scale length 2.2 times width; flagellum shorter than peduncle, with seven articles. Antenna peduncle third article lateral margin with eight similar spine-like setae (Figs. 1A, 2F); flagellum slightly shorter than peduncle, with 8–9 articles (Figs. 1C, 2E).

Mouthparts: Mandible with well-developed molar and incisor processes; incisor with sharp teeth along inner border, ending in acute process (Fig. 3A); mandibular palp second article with two setae, distal-most

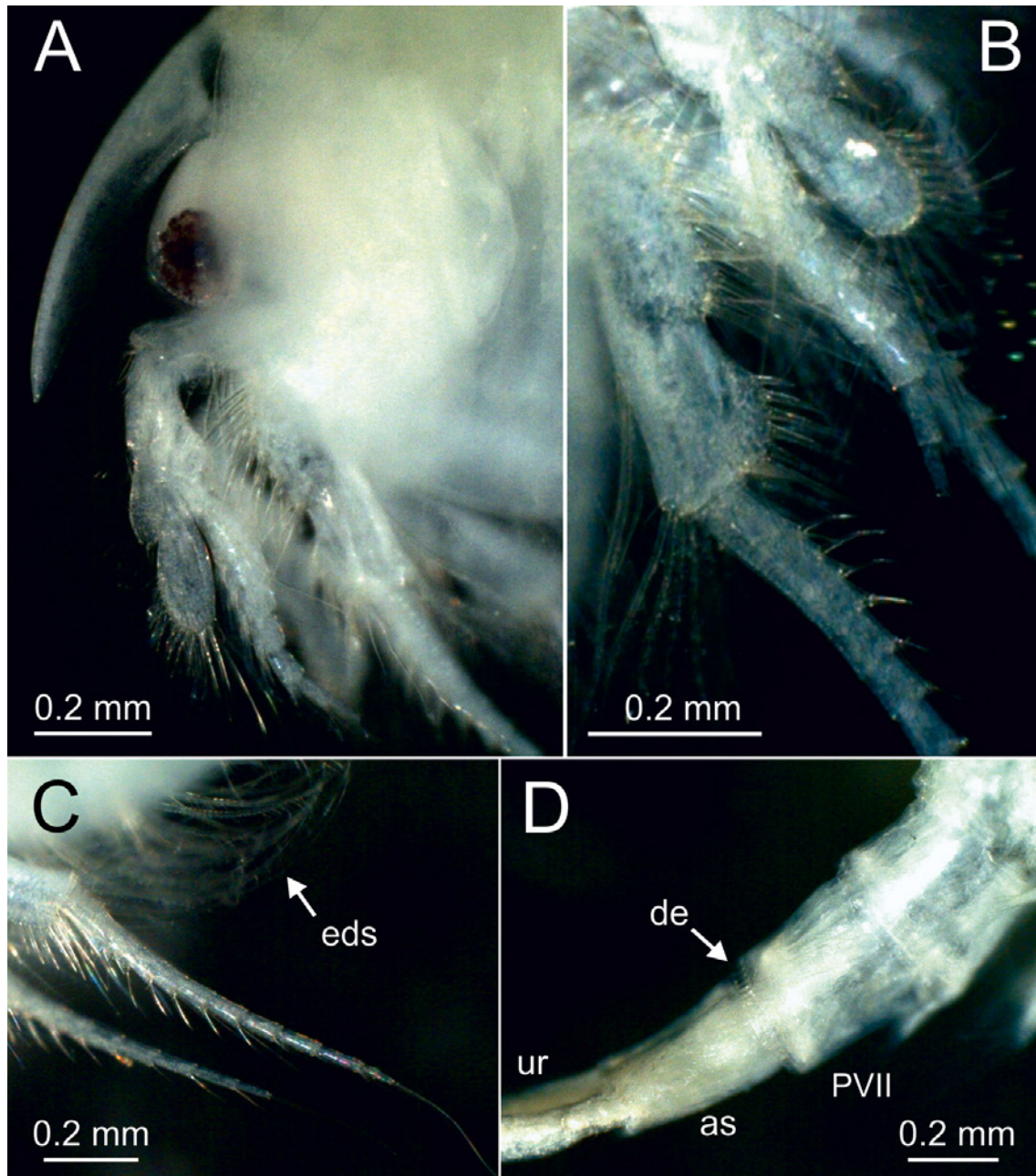


Fig. 1.— *Nebalia troncosoi* Moreira, Cacabelos & Domínguez, 2003. Ovigerous female (MNCN 20.04/13701). A. Rostrum, eye and antennae, lateral view. B. Antennule and antenna, lateral view. C. Antenna, flagellum and thoracopods, distal setae (eds), lateral view. D. Pleonites VI–VII and denticles (PVII, de), anal somite (as) and uropod (ur), lateral view.

Fig. 1.— *Nebalia troncosoi* Moreira, Cacabelos & Domínguez, 2003. Hembra ovigera (MNCN 20.04/13701). A. Rostro, ojo y antenas, vista lateral. B. Anténula y antena, vista lateral. C. Antena, flagelo y toracópodos, sedas distales (eds), vista lateral. D. Pleonitos VI–VII y denticulos (PVII, de), somito anal (as) y urópodo (ur), vista lateral.

the longest and about 0.5 times length of article; third article slightly longer than second. Maxilla I palp well-developed, about four times length of protopod (Fig. 3B). Maxilla II endopod proximal article about 1.45 times length of distal article; exopod clearly surpassing level of articulation of endopod articles (Fig. 3C); distal-most setae of endopod and exopod longer each than entire limb.

Thoracopods: Thoracopods I–VII with endopod longer than exopod (Fig. 4A, B); endopod distal article slightly enlarged, with several long plumose setae (Fig. 1C); endopod segmentation weak; exopod and epipod with several setae along posterior margin, less numerous on epipod (1–3). Thoracopod VIII epipod smaller than in other thoracopods and lacking setae (Fig. 4C).

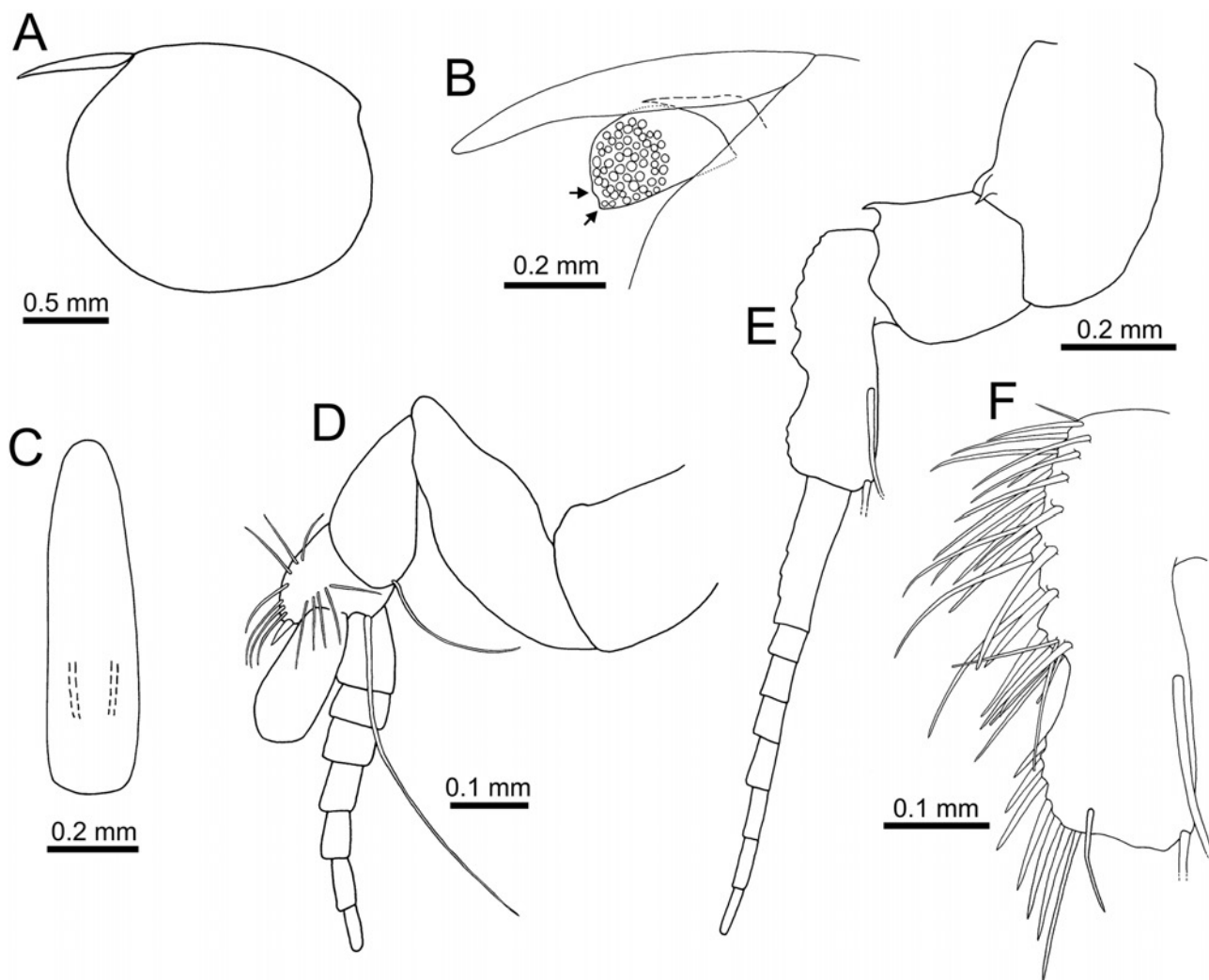


Fig. 2.— *Nebalia truncosoi* Moreira, Cacabelos & Domínguez, 2003. Ovigerous female (MNCN 20.04/13701). A. Rostrum and carapace, lateral view. B. Rostrum and eye, lateral view. C. Rostrum, dorsal view. D. Antennule, lateral view. E. Antenna, lateral view. F. Antenna, peduncle, third article, detail. B: arrows in eye pointing to distal protuberances; D–E: only selected setae illustrated.

Fig. 2.— *Nebalia truncosoi* Moreira, Cacabelos & Domínguez, 2003 (MNCN 20.04/13701). Hembra ovígera. A. Rostro y caparazón, vista lateral. B. Rostro y ojo, vista lateral. C. Rostro, vista dorsal. D. Anténula, vista lateral. E. Antena, vista lateral. F. Antena, pedúnculo, tercer artejo, detalle. B: las flechas apuntan a las protuberancias distales del ojo; D–E: sedas ilustradas parcialmente.

Pleonites and pleopods: Pleonite IV epimeron posterolateral corner forming triangular process acutely pointed (Fig. 4E). Pleonites VI–VII posterodorsal border bearing denticles acutely pointed (Figs. 1D, 3D, E). Pleopod I exopod 0.75 times length of endopod; lateral border with ‘comb-row’ of *ca.* 12 bi-pectinate setae (*sensu* Walker-Smith, 2000) (Fig. 4D); protopod with long seta near posterior base of exopod, surpassing middle of ‘comb-row’. Pleopod IV protopod posterior border with four serrations, posterodistal corner acute (Fig. 4E).

Anal somite, anal plates and uropods: Anal somite about as long as pleonite VII (Fig. 1D). Anal plates acutely tapering distally, lateral and medial margins sloping, ‘shoulder’ not developed (Fig. 4F). Uropods 0.85 times length of pleonite VII + anal somite; terminal seta at least two times length of ramus.

MALE

About 15 articles in antenna flagellum, showing incomplete divisions in proximal half; carapace slightly longer than in females: LCL 1.4 times CH; furca similar in length to pleonite VII + anal somite.

DISTRIBUTION AND ECOLOGY. SW European Atlantic, from Normandy (France) to Figueira da Foz (Portugal) (Latry & Droual, 2020), Morocco (Bayed & Bazairi, 2017); French Mediterranean coasts (Latry & Droual, 2020); Ebro Delta coast (present work). Mainly in fine sand to muddy sand with *Zostera marina* L.; also reported in maërl, gravel, coarse and medium sand; at depths of 4.5–54 m (Martínez *et al.*, 2007; Moreira *et al.*, 2009b; Latry & Droual, 2020). In this work, specimens were found within a typical macrofaunal community from marine muddy bottoms, numerical-

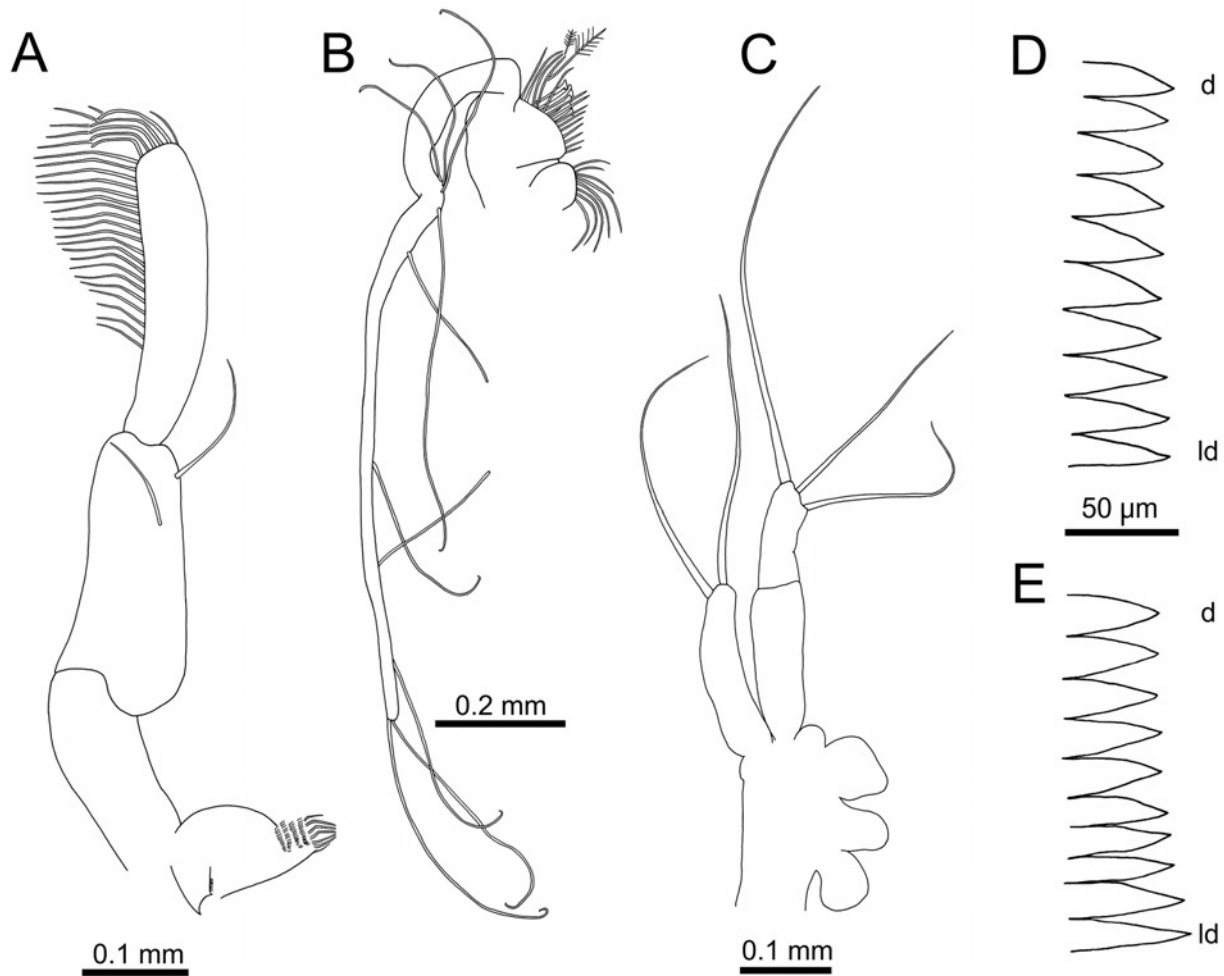


Fig. 3.— *Nebalia troncosoi* Moreira, Cacabelos & Domínguez, 2003. Ovigerous female (MNCN 20.04/13701). A. Mandible. B. Maxilla I. C. Maxilla II. D. Pleonite VI, dorsal (d) and laterodorsal (ld) denticles. E. Pleonite VII, dorsal (d) and laterodorsal (ld) denticles. A–C: setules not illustrated; C: only selected setae illustrated; D–E: same scale bar.

Fig. 3.— *Nebalia troncosoi* Moreira, Cacabelos & Domínguez, 2003 (MNCN 20.04/13701). Hembra ovigera. A. Mandíbula. B. Maxila I. C. Maxila II. D. Pleonito VI, denticulos dorsales (d) y laterodorsales (ld). E. Pleonito VII, denticulos dorsales (d) y laterodorsales (ld). A–C: sètulas no ilustradas; C: sedas ilustradas parcialmente; D–E: misma escala.

ly dominated by amphipods of the genus *Ampelisca* Kroyer, 1842.

REMARKS. The features of the specimens collected mostly agree with the original description. This species is mainly characterized by having a longer rostrum than other European *Nebalia* species (up to four times as long as wide), the antennule peduncle fourth article is only provided with one distal spine instead of two or more, the carapace in females is much shorter in comparison to height, the antennule flagellum is shorter than the peduncle and composed by up to seven articles, the maxilla II exopod is longer than the endopod proximal article and the anal plates lack defined ‘shoulders’ along lateral margin. The denticles of the posterodorsal borders of pleonites VI–VII are conspicuously acute distally; this character is only shared in European latitudes with

N. strausi, that is a much larger species, whereas other species bear rounded to truncated denticles. The present findings fill the gap in the known distribution of *N. troncosoi* in the Iberian Peninsula; it is likely that this species might be also present through the coasts of northern Africa (Bayed & Bazairi, 2017) and the European western Mediterranean. However, more data are needed to truly assess the diversity and distribution of leptostracans in the eastern and southern Iberian Peninsula.

Acknowledgements

The authors are grateful to the staff of the Universitat Autònoma de Barcelona (F. Padrós, S. Dallarés, M. Carrassón and M. Constenla) and students of the Department of Animal Biology, Vegetal Biology and Ecology that helped during the campaigns and the laboratory work. This work was funded by the Fish Pa-

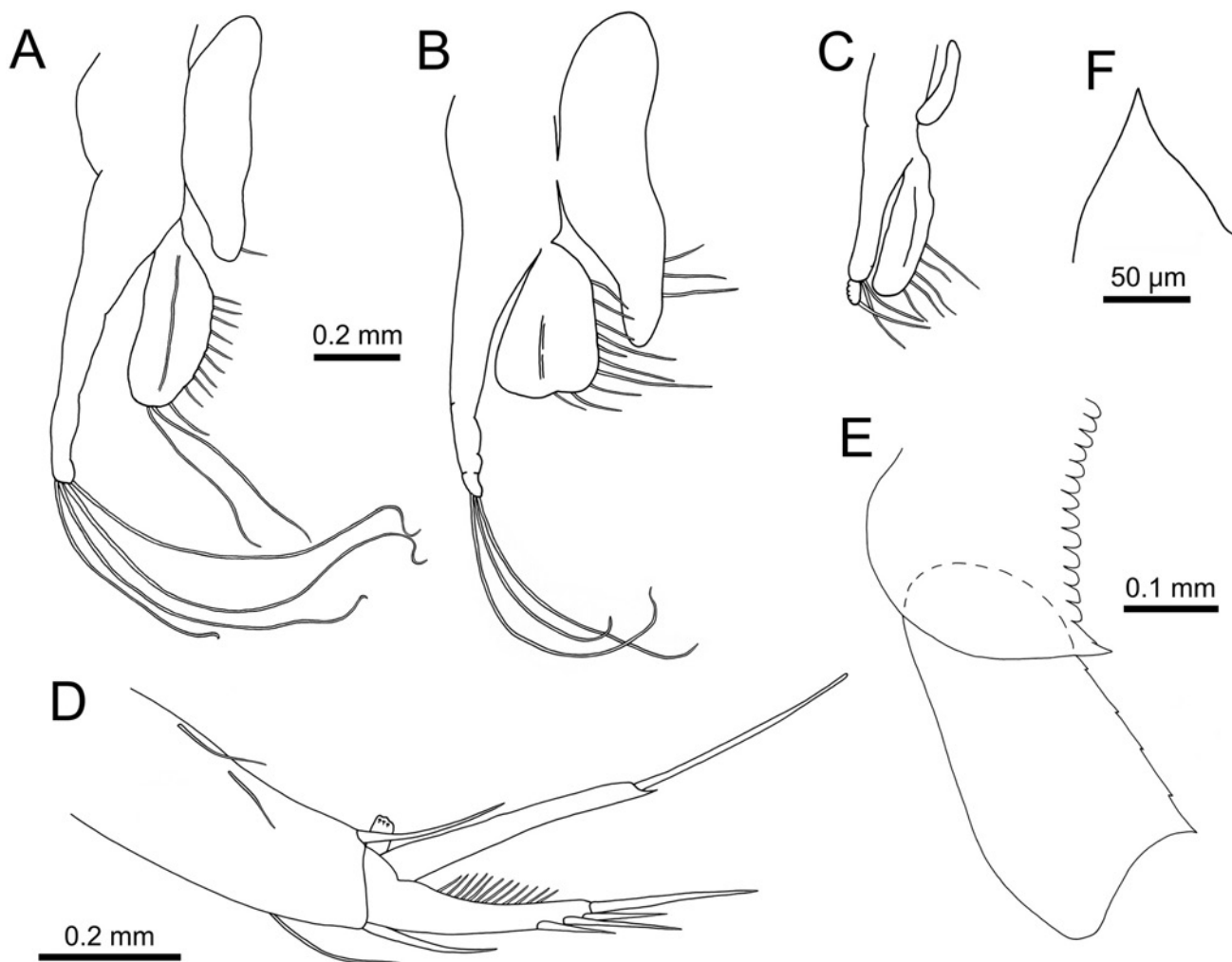


Fig. 4.— *Nebalia truncosoi* Moreira, Cacabelos & Domínguez, 2003. Ovigerous female (MNCN 20.04/13701). A. Thoracopod I. B. Thoracopod IV. C. Thoracopod VIII. D. Pleopod I. E. Pleonite IV (epimeron) and pleopod IV (protopod). F. Anal plate. A–D: only selected setae illustrated; A–C: same scale bar.

Fig. 4.— *Nebalia truncosoi* Moreira, Cacabelos & Domínguez, 2003. Hembra ovígera (MNCN 20.04/13701). A. Toracópodo I. B. Toracópodo IV. C. Toracópodo VIII. D. Pleópodo I. E. Pleonito IV (epímero) y pleópodo IV (protopodio). F. Escama anal. A–D: sedas ilustradas parcialmente; A–C: misma escala.

thology Service of the Universitat Autònoma de Barcelona, Spain. Constructive comments from Eva Cacabelos (MARE – Marine and Environmental Sciences Centre, Madeira, Portugal) and one anonymous reviewer contributed to improve the final version of the manuscript. We are also grateful to Begoña Sánchez (MNCN, Madrid) for her help with deposit of the specimens.

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