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# INVENTORY OF AMPHIPODA (PERACARIDA: SENTICAUDATA AND AMPHILOCHIDEA) FROM THE INTERNATIONAL MINHO RIVER, IBERIAN PENINSULA

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## ABSTRACT

Crustacea are a diverse and abundant group of the littoral and estuarine community invertebrate fauna. This study presents the first survey on the Amphipod fauna found at the Minho River estuary, Iberian Peninsula, collected through glass eel fishing bycatch, grab sampler and beam trawl sampling methods. A total of 100 specimens were examined belonging to 18 families, 23 genera and 34 species (23 new records for the Minho River, including one new record for Portugal, *Parametopa kervillei* Chevreux, 1901). The most represented families were Ampeliscidae, with 7 species from the genus *Ampelisca*, and Gammaridae, with 3 species from 3 distinct genera. Brief diagnosis, ecological notes, species distributions and figures are provided aiming to provide taxonomic support on future environmental projects on this area.

**Keywords:** Atlantic Ocean; distribution; estuary; invertebrates; taxonomy; crustaceans.

## RESUMEN

### Inventario de Amphipoda (Peracarida: Senticaudata y Amphilochidea) del Río Miño Internacional, Península Ibérica

Los crustáceos son un grupo diverso y abundante de la fauna invertebrada de la comunidad litoral y estuarina. Este estudio presenta el primer compendio sobre la fauna de anfípodos en el estuario del río Miño, Península Ibérica, recolectada a través de captura accidental de pesca de angula, y muestreos con draga y arrastre de vara. Se examinaron un total de 100 especímenes pertenecientes a 18 familias, 23 géneros y 34 especies (23 nuevos registros para el río Miño, incluyendo un nuevo registro para Portugal, *Parametopa kervillei* Chevreux, 1901). Las famílias más representadas fueron Ampeliscidae, con 7 especies del género *Ampelisca*, y Gammaridae, con 3 especies de géneros distintos. Además se proporciona para todas las espécies un breve diagnóstico, notas ecológicas, distribución y figuras con el objetivo de proporcionar apoyo taxonómico en futuros proyectos medioambientales en esta zona.

**Palabras clave:** océano Atlántico; distribución; estuario; invertebrados; taxonomía; crustáceos.

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## Introduction

Amphipods are an order of crustaceans of the superorder Peracarida Calman, 1904 characterized by direct development and absence of independent larval stages, with females carrying their embryos on brood pouches between the pereopods. Amphipods are one of the most abundant and diverse groups within Peracarida with over 10.000 described species (Horton *et al.*, 2021). Mostly marine, although some taxa inhabit terrestrial habitats (talitrids) and wide range of freshwater habitats, being especially diverse on subterranean water (Skett, 1999). Amphipods play a vital role on aquatic trophic webs serving as a major component in fish diet, having themselves a wide variety of feeding habits, being herbivores, carnivores, omnivores and detritivores, as well as parasites (Väinölä *et al.*, 2008). Apart from pioneer European Amphipoda systematic works covering some specific areas like Bate & Westwood (1863) and Lincoln (1979) for British Isles, Sars (1895) and Stephensen (1923a, 1923b, 1931) for Norway, Stebbing (1906) compilation or Chevreux & Fage (1925) work on French amphipods, modern and comprehensive monographs based on local fauna are still far from completion and an enormous amount of work is still needed to meet the requirements of modern taxonomy. Portuguese amphipod fauna remains poorly studied with few dedicated surveys (van Maren, 1975; Marques and Bellan-Santini, 1987, 1990, 1991, 1993; Ortiz & Jimeno, 2001; d'Udekem d'Acoz, 2010; Carvalho *et al.*, 2012; Plicanti *et al.*, 2017; Cabezas *et al.*, 2022), despite recent ecological studies (Cunha *et al.*, 1999, 2011; Pereira *et al.*, 2006; Guerra-García & Izquierdo, 2010; Izquierdo & Guerra-García, 2011; Guerra-García *et al.*, 2012; Martins *et al.*, 2013; Sampaio *et al.*, 2016; Dauvin *et al.*, 2021). In this study we provide an overview on Amphipoda fauna collected on the Minho River estuary (with brief diagnosis, ecological notes, global and Portuguese distributions), belonging to 34 species, in which 23 are new records for the Minho River (including one new record for Portugal).

## Material and methods

### Study Area

The Minho River located at the northwest of the Iberian Peninsula, originates at the Meira mountains (Spain) and has a total extension of around 300 km (APA, 2016). The international section located on the last 70 km represents the Northwest Spanish/Portuguese border, culminating on an estuary flowing into the Northeast Atlantic Ocean. The estuarine area has a length of approximately 40km, with a total area of 23 km$^2$ (Sousa *et al.*, 2008), with a mesotidal partially mixed system tending towards a salt wedge estuary during the high floods (Sousa *et al.*, 2005) and is part of the protected areas of the Natura 2000 network as site of ecological importance and a special area of conservation, marked as an Important Bird Area (Dias *et al.*, 2014; BirdLife International, 2021).

### Sampling, identification and preservation of specimens

Specimens examined were collected during previous sampling campaigns at the International Minho River, on the estuarine zone (Fig. 1), with following methods: 1) glass eel fishing bycatch, in Caminha, Portugal (41º52'59.00"N / 8º50'14.00"W), during a new moon night on flood tides, using stow net (length of float lines 10 m, bottom anchored lead line of 15 m, height 8 m, mesh size 1-2 mm, covering an area of 50 m$^2$) (Weber, 1986), on April, 2020 and May 2020; 2) glass eel fishing bycatch, in Caminha, Portugal (41º52'44.80"N / 8º50'26.25"W), on March 2021; 3) beam trawl in front of Morraceira das Varandas Island (41°52'04.8"N / 8°51'18.8"W) on June 2021; 4) on sediment sampling with a Van Veen grab sampler in Caminha, Portugal (41º54'36.7"N / 8º49'4.49"W), on September, 2020; 5) on *Fucus* cf. *spiralis* Linnaeus 1793 collected by hand in Caminha, Portugal (41°51'58.3''N / 8°50'55.8''W), on September 2021.

Species identification was based on specialized literature (i.e., Bate & Westwood 1863; Sars 1895; Stebbing 1906; Chevreux & Fage 1925; Reid 1951; Lincoln 1979; Dauvin & Bellan-Santini 1988; Conlan 1990; Pinkster 1993; Guerra-García & Takeuchi 2002; Guerra-García *et al.* 2013, 2018) using the family taxonomic classification suggested by (Lowry & Myers, 2013, 2017), and following Hou & Sket (2016) and Sket & Hou (2018) for Gammaridae classification. Synonym's compilation was performed, mainly according to WoRMS database (WoRMS Editorial Board, 2021) and on species description manuscripts. Type material and locality data were obtained from Global Biodiversity Information Facility (GBIF.org, 2021) or from original descriptions, whenever available. All specimens were photographed with a Nikon Digital Sight D5-L1 camera using a Nikon SMZ800 stereomicroscope and a Nikon ECLIPSE 50i microscope. Specimens were deposited at Arthropod Collection (Crustacean section) from Natural History Museum of the Iberian Peninsula (NatMIP – "Museu de História Natural da Península Ibérica"), sited at Aquamuseu do Rio Minho, Vila Nova de Cerveira, North Portugal.

## Results

A total of 100 specimens were examined belonging to 34 species distributed by 18 families and 23 genera (Table 1).

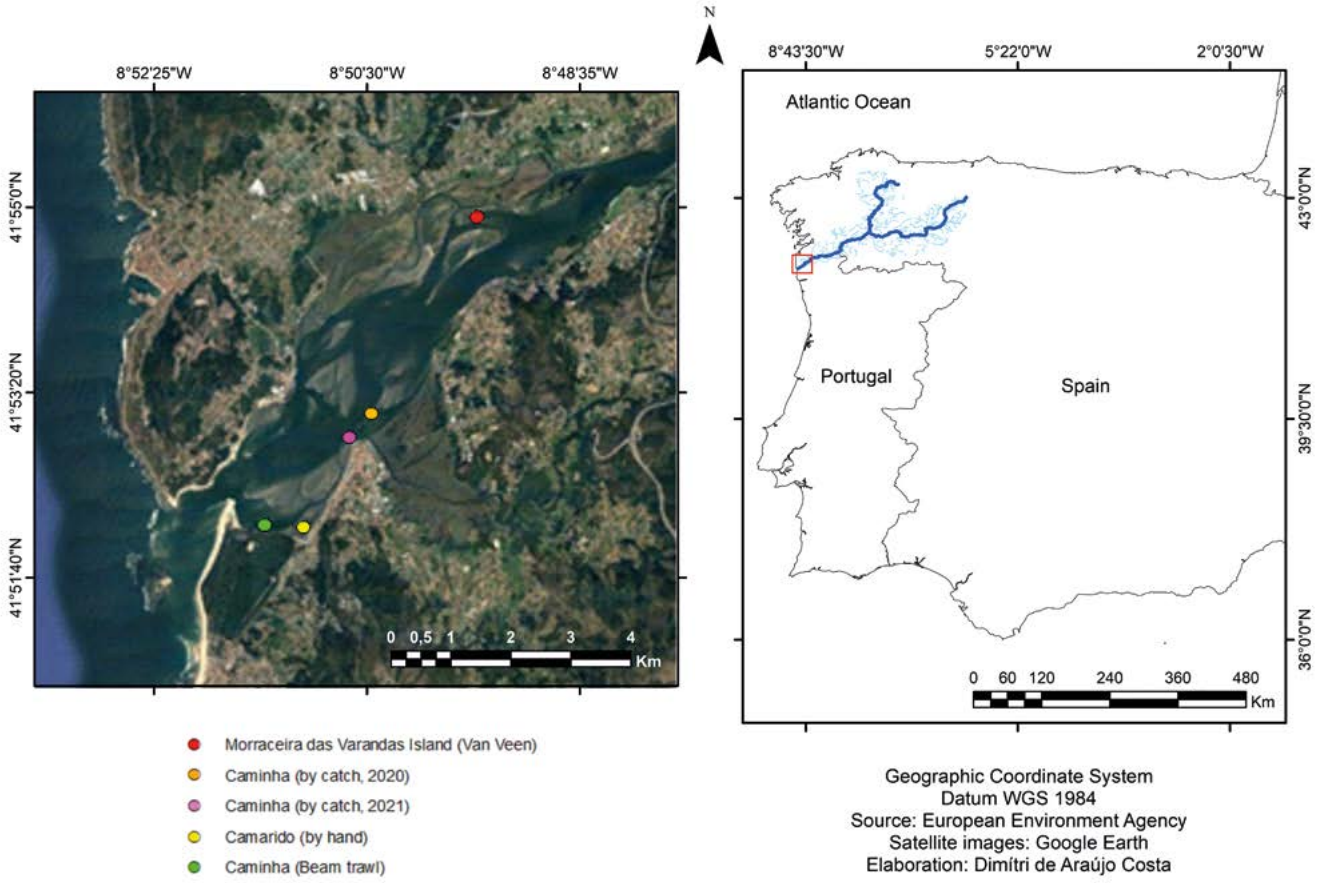


Fig. 1.– Study Area. Minho River (Iberian Peninsula), with highlight on the sampling points and methods in the international zone, satellite images: Google Earth.

Fig. 1.– Área de estudio. Río Miño (Península Ibérica), con destaque para los puntos y métodos de muestreo en la zona internacional, imágenes de satélite: Google Earth.

Table 1 / Tabla 1

| Family | Species | Sampling information |
|---|---|---|
| **Ampeliscidae** | *Ampelisca aequicornis* Bruzelius, 1858 | Glass eel fishing bycatch |
| | *Ampelisca armoricana* Bellan-Santini & Dauvin, 1981 | Glass eel fishing bycatch |
| | *Ampelisca lusitanica* Bellan-Santini & Marques, 1986 | Glass eel fishing bycatch |
| | *Ampelisca pectenata* Reid, 1951 | Glass eel fishing bycatch |
| | *Ampelisca rubella* Costa, 1864 | Glass eel fishing bycatch |
| | *Ampelisca serraticaudata* Chevreux, 1888 | Glass eel fishing bycatch |
| | *Ampelisca spinimana* Chevreux, 1887 | Glass eel fishing bycatch |
| **Aoridae** | *Aora gracilis* (Bate, 1857) | Glass eel fishing bycatch |
| **Atylidae** | *Nototropis guttatus* (Costa, 1851) | Glass eel fishing bycatch |
| | *Nototropis vedlomensis* (Bate & Westwood, 1863) | Glass eel fishing bycatch |
| **Bathyporeiidae** | *Bathyporeia roberstoni* Sars, 1895 | Glass eel fishing bycatch |
| **Calliopiidae** | *Apherusa jurinei* (Milne-Edwards, 1830) | Glass eel fishing bycatch |
| | Calliopiidae sp. | Glass eel fishing bycatch |
| **Caprellidae** | *Caprella danilevskii* Czerniavski, 1868 | Beam trawl |
| | *Caprella* sp. | Beam trawl |
| **Corophiidae** | *Corophium multisetosum* Stock, 1952 | Glass eel fishing bycatch; |
| | *Leptocheirus pilosus* Zaddach, 1844 | Van Veen dredge, on medium sand |
| | *Leptocheirus* sp. | Glass eel fishing bycatch |
| **Dexaminidae** | *Dexamine spinosa* (Montagu, 1813) | Glass eel fishing bycatch |
| **Gammaridae** | *Marinogammarus marinus* (Leach, 1815) | On intertidal among *Fucus* spp. |
| | *Relictogammarus stoerensis* (Reid, 1938) | Beam trawl |
| | *Gammarus chevreuxi* Sexton, 1913 | Glass eel fishing bycatch |

| Family | Species | Sampling information |
|---|---|---|
| **Haustoriidae** | *Haustorius arenarius* (Slabber, 1778) | Glass eel fishing bycatch |
| **Hyalidae** | *Protohyale* (*Protohyale*) sp. | Glass eel fishing bycatch |
| **Ischyroceridae** | *Jassa falcata* (Montagu, 1808) | Glass eel fishing bycatch |
| | *Parajassa pelagica* (Leach, 1814) | Glass eel fishing bycatch |
| **Maeridae** | *Maera grossimana* (Montagu, 1808) | Glass eel fishing bycatch |
| **Melitidae** | *Melita palmata* (Montagu, 1804) | Glass eel fishing bycatch |
| | *Abludomelita gladiosa* (Bate, 1862) | Glass eel fishing bycatch |
| **Stenothoidae** | *Parametopa kervillei* Chevreux, 1901 | Glass eel fishing bycatch |
| **Tryphosidae** | *Lepidepecreum longicorne* (Bate, 1862) | Glass eel fishing bycatch |
| | *Tryphosites longipes* (Bate, 1862) | Glass eel fishing bycatch |
| **Uristidae** | *Centromedon* sp. | Glass eel fishing bycatch |
| **Urothoidae** | *Urothoe brevicornis* Bate, 1862 | Glass eel fishing bycatch |

Phylum Arthropoda Siebold, 1848
Subphylum Crustacea Brünnich, 1772
Superclass Multicrustacea Regier, Shultz, Zwick, Hussey, Ball, Wetzer, Martin & Cunningham, 2010
Class Malacostraca Latreille, 1802
Subclass Eumalacostraca Grobben, 1892
Superorder Peracarida Calman, 1904
Order Amphipoda Latreille, 1816
Suborder Amphilochidea Boeck, 1871
Superfamily Amphilochoidea Boeck, 1871
Family Stenothoidae Boeck, 1871
Genus ***Parametopa*** Chevreux, 1901

***Parametopa kervillei*** Chevreux, 1901 (Fig. 2)
*Parametopa kervillei* Chevreux 1901: 233-237, Pl. III. — Chevreux & Fage, 1925: 139-140, figs. 139-140. — Lincoln 1979: 206, figs. 80D-E, 94A-H.
*Metopa sarniensis* Norman 1907: 365, Pl. XVII figs. 1-5.
Type material: Unknown.
Type locality: Omonville-la-Rogue, France (Chevreux, 1901).
Material examined: 10 adult specimens, size range 3 to 5 mm, collected at Caminha, International Minho River (41°52'59"N/8°50'14"W), 6 April 2020 on glass eel fishing bycatch, deposited as NatMIP-CMAm-0070.
Diagnosis: Male gnathopod 1 simple with merus rounded distally, merus and carpus setose, propodus long and narrow with 3 robust setae at posterodistal angle (Fig. 2C); male gnathopod 2 merus acute and prolonged distally, propodus broad distally, palm convex, delimited by group of small spines; palmar margin minutely toothed (Fig. 2D); pereopod 7 expanded, merus also expanded with distal angle reaching end of carpus (Fig. 2E); uropod 3 uniramous, peduncle with 4 marginal spines, ramus article 2 shorter than 1; telson entire, elongated, with 2 pairs of dorsolateral spines (Fig. 2F) (Lincoln, 1979).
Geographical distribution: North coast of France and British Isles (Lincoln, 1979), and North Portugal (this study).
Distribution in Portugal: New record.
Ecological notes: Depth range 0 to 50 m, often on holdfasts of *Sacchoriza* (Lincoln, 1979).

Superfamily Dexaminoidea Leach, 1814
Family Atylidae Lilljeborg, 1865
Genus ***Nototropis*** Costa, 1853

***Nototropis guttatus*** **(**Costa, 1851) (Fig. 3A-B)
*Acanthonotus guttatus* Costa, 1851: 46. (**original description**).
*Nototropis guttatus* Costa, 1853: 194, Tab. 1 fig. 7.— Stebbing, 1906: 331-332. — Chevreux & Fage, 1925: 194-195, figs. 201-203.
*Nototropis spinulicauda* Costa, 1853: 173.
*Atylus spinulicauda* – Bate, 1862: 139-140
*Paratylus guttatus* – Walker, 1901: 304, Pl. 27 figs. 27-28.
*Atylus guttatus* – Lincoln, 1979: 446, figs. 213A-H.
Type material: Unknown.
Type locality: Naples, Italy (Costa, 1853).
Material examined: 1 adult specimen, size 6 mm, collected at Caminha, International Minho River (41°52'59"N/8°50'14"W), 6 April 2020 on glass eel fishing bycatch, deposited as NatMIP-CMAm-0073.
Diagnosis: Female antenna 1 peduncle article 1 distoventral angle without tooth; pleonites 1-3 with distinct backwardly directed dorsal teeth; pereopod 5 basis with produced triangular posterodistal margin (Fig. 3B); pereopod 6 basis not produced at distal angle (Lincoln, 1979).
Geographical distribution: Mediterranean and Northeast Atlantic from southern North Sea to Senegal (Lincoln, 1979).
Distribution in Portugal: Species recorded at Mira estuary (Marques & Bellan-Santini, 1987) and along the southwestern coast (Marques & Bellan-Santini, 1991; Carvalho *et al.*, 2012), and International Minho River (this study).
Ecological notes: Depth range intertidal to 75 m (Lincoln, 1979).

***Nototropis vedlomensis*** (Bate & Westwood, 1863) (Fig. 3C-D)
*Dexamine vedlomensis* Bate & Westwood, 1863: 242-243 (**original description**).
*Atylus vedlomensis* – Boeck, 1870: 112-113. — Lincoln, 1979: 444, figs. 212A-H.
*Paratylus vedlomensis* – Sars, 1895: 466-467, Pl. 164 fig. 2.
*Nototropis vedlomensis* – Stebbing, 1906: 331.
Type material: Holotype collected at Shetland Islands, Scotland in 1861; deposited at Natural History Museum (London), catalogue number 1911.11.8.18078-18081 (GBIF.org, 2021)
Type locality: Shetland Islands, Scotland (Bate & Westwood, 1863).
Material examined: 7 specimens, size range 3 to 6 mm, collected at Caminha, International Minho River (41°52'59"N/8°50'14"W), 6 April 2020 on glass eel fishing bycatch, deposited as NatMIP-CMAm-0072.
Diagnosis: Male with slender tooth on peduncle article 1 of antenna 1; pleonites 1-3 with distinct dorsal teeth; pereopod 5 basis with hook-like process (Fig. 3D); pereopod 6 basis with distal angle produced (Lincoln, 1979).
Geographical distribution: Northeast Atlantic from Norway to Ireland (Lincoln, 1979).
Distribution in Portugal: Species recorded at the International Minho River (this study), at depths <150 m on coastal lines adjacent to the Minho and Douro rivers and Tagus canyon (Marques & Bellan-Santini, 1993), on Ria de Aveiro (Cunha

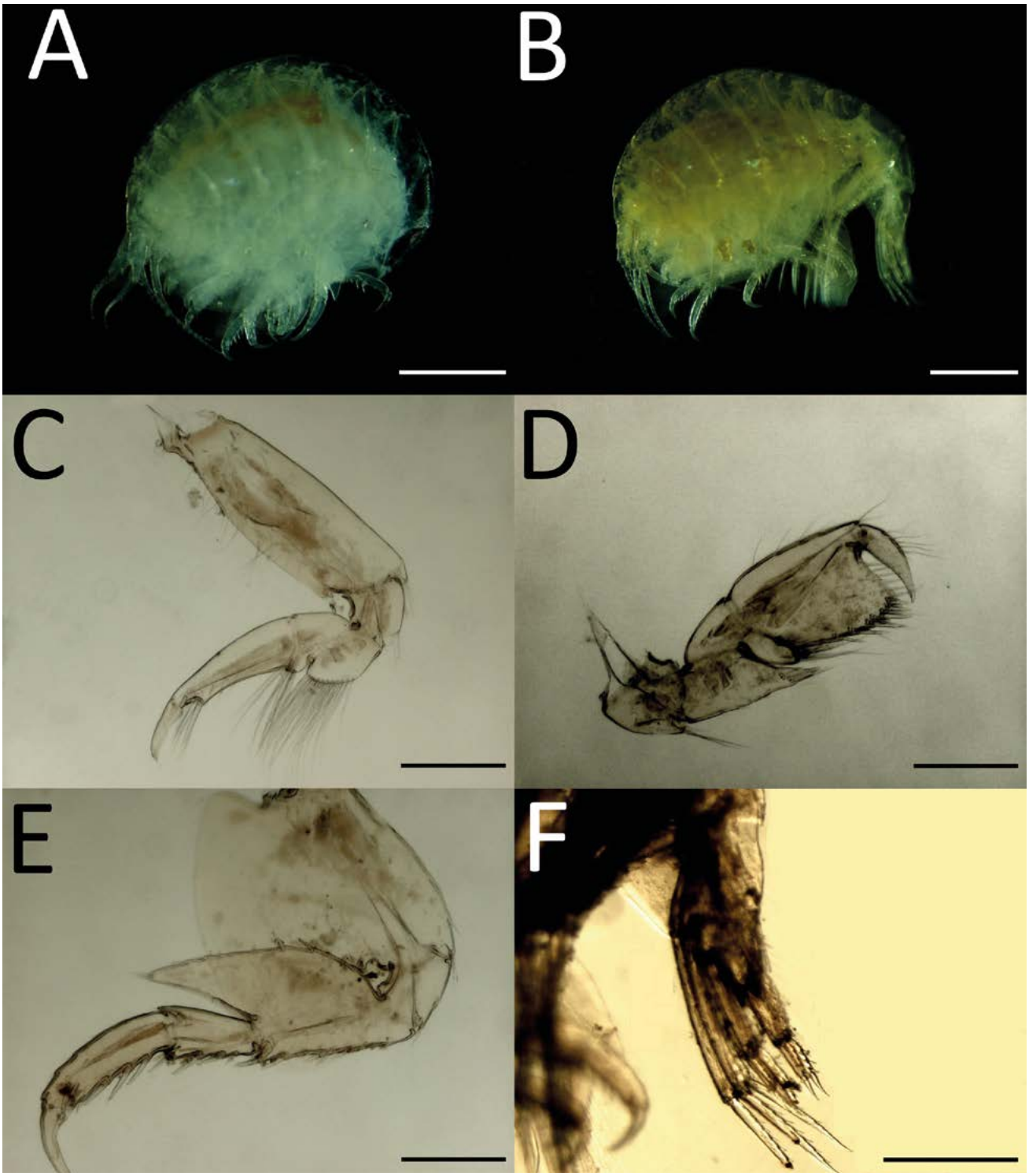


Fig. 2.– *Parametopa kervillei* Chevreux, 1901: adult lateral view (**A**), adult lateral view (**B**); gnathopod 1 (**C**), gnathopod 2 (**D**), pereopod 7 (**E**); uropods (**F**). Scale bars: A–B = 1 mm; C–E = 0.25 mm; F = 0.5 mm.

Fig. 2.– *Parametopa kervillei* Chevreux, 1901: vista lateral del adulto (**A**), vista lateral del adulto (**B**); gnatopodio 1 (**C**), gnatopodio 2 (**D**), pereópodo 7 (**E**); urópodos (**F**). Escala: A–B = 1 mm; C–E = 0.25 mm; F = 0.5 mm.

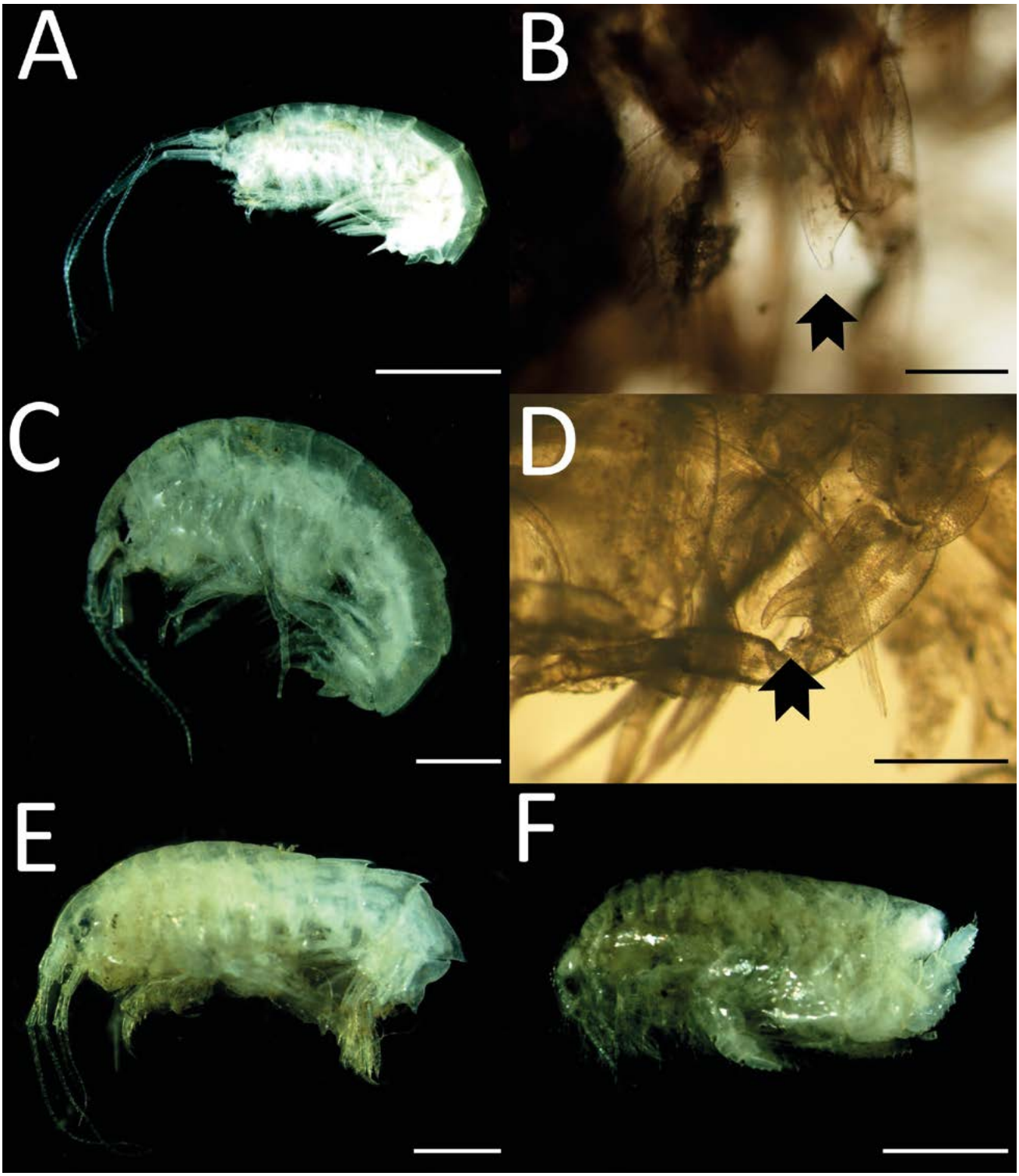


Fig. 3.– *Nototropis guttatus* (Costa, 1851): adult lateral view (**A**), pereopod 5 basis (arrow highlighting produced triangular posterodistal margin) (**B**); *Nototropis vedlomensis* (Bate & Westwood, 1863): adult lateral view (**C**), pereopod 5 basis (arrow highlighting produced hook-like posterodistal margin) (**D**); *Dexamine spinosa* (Montagu, 1813): adult lateral view (**E**); *Haustorius arenarius* (Slabber, 1778): adult lateral view (**F**). Scale bars: A, F = 2 mm; B = 0.25 mm; C, E = 1 mm; D = 0.5 mm.

Fig. 3.– *Nototropis guttatus* (Costa, 1851): vista lateral del adulto (**A**), pereópodo 5 base (flecha resaltando el margen posterodistal triangular) (**B**); *Nototropis vedlomensis* (Bate & Westwood, 1863): vista lateral del adulto (**C**), base del pereópodo 5 (flecha destacando el margen posterodistal en forma de gancho) (**D**); *Dexamine spinosa* (Montagu, 1813): vista lateral del adulto (**E**); *Haustorius arenarius* (Slabber, 1778): vista lateral del adulto (**F**). Escala: A, F = 2 mm; B = 0.25 mm; C, E = 1 mm; D = 0.5 mm.

*et al.*, 1997), Mira River estuary (Marques & Bellan-Santini, 1987) and along the southern coast (Carvalho *et al.*, 2012).
Ecological notes: Depth range 10-200 m (Lincoln, 1979).

Family Dexaminidae Leach, 1814
Genus ***Dexamine*** Leach, 1814

***Dexamine spinosa*** (Montagu, 1813) (Fig. 3E)
*Cancer (Gammarus) spinosus* Montagu, 1813: 3-4, Tab. II fig.1 (**original description**).
*Dexamine spinosa* – Leach, 1814: 432. — Desmarest, 1825: 263, Pl. 45 fig. 6. — Bate, 1857: 141; 1862: 130-131, Pl. XXIV fig. 1. — Bate & Westwood, 1863: 237-239. — Sars 1895: 475-477, Pl. 166 fig. 2, Pl. 167. — Stebbing, 1906: 515-516. — Chevreux & Fage, 1925: 263, fig. 274. — Lincoln 1979: 450, figs. 214A-H.
*Atylus coralinus* Risso, 1826: 99.
*Amphitoe marionis* Milne-Edwards, 1830: 375.
*Amphitoe tenuicornis* Rathke, 1843: 77-79, Tab. IV fig. 3.
*Amphithonotus acanthophthalmus* Costa, 1851: 45-46.
*Amphithonotus marionis* – Costa, 1853: 195.
*Amphitoe spinosa* – Gosse, 1855: 141.
*Dexamine tenuicornis* – Bruzelius, 1858: 79-80.
Type material: Deposited at Natural History Museum (London) (Bate & Westwood, 1863).
Type locality: Devonshire, England (Montagu, 1813).
Material examined: 4 specimens, size range 3 to 6 mm, collected at Caminha, International Minho River (41°52'59"N/8°50'14"W), 6 April 2020 on glass eel fishing bycatch, deposited as NatMIP-CMAm-0071.
Diagnosis: Peduncle of antenna 1 article 1 with distoventral tooth; pleon segments 1-4 with a dorsal tooth; pereopods 3-7 merus shorter than carpus and propodus combined; pereopod 7 basis with posterior margin expanded; telson with dorsolateral spines (Lincoln, 1979).
Geographical distribution: Northeast Atlantic from Norway to Senegal, Azores and Canary archipelagos, Mediterranean and Black Seas (Lincoln, 1979).
Distribution in Portugal: International Minho River (this study), species also recorded at Mira estuary (Marques & Bellan-Santini, 1987), on Ria Formosa (Cruz *et al.*, 2003; Carvalho *et al.*, 2007), along the southwest coast (Izquierdo & Guerra-García, 2011; Carvalho *et al.*, 2012; Guerra-García *et al.*, 2012) and on Azores archipelago (Borges *et al.*, 2010).
Ecological notes: Depth range intertidal to 60 m (Lincoln, 1979), collected on *Corallina elongata* J.Ellis & Solander, 1786 (Izquierdo & Guerra-García, 2011; Guerra-García *et al.*, 2012).

Superfamily Haustorioidea Stebbing, 1906
Family Haustoriidae Stebbing, 1906
Genus ***Haustorius*** Müller, 1775

***Haustorius arenarius*** (Slabber, 1778) (Fig. 3F)
*Oniscus arenarius* Slabber, 1778: 92-96, Pl. IX fig. 4 (**original description**).
*Bellia arenaria* – Bate, 1851: 318-320, Pl. XI figs. 1-7.
*Sulcator arenarius* – Bate & Westwood, 1863: 189-191.
*Haustorius arenarius* Stebbing, 1906: 125. — Sars, 1895: 135-137, Pl.46. — Chevreux & Fage, 1925: 95-97, figs. 88-89. — Lincoln, 1979: 324, figs. 146A, 152A-E.
Type material: Unknown.
Type locality: Unknown.
Material examined: 9 specimens, size range 2 to 10 mm, collected at Caminha, International Minho River (41°52'59"N/8°50'14"W), 6 April 2020 on glass eel fishing bycatch, deposited as NatMIP-CMAm-0088.
Diagnosis: Body arched and weakly compressed; head with acute lateral lobes; eyes small and poorly defined, often indistinct in large specimens; antenna 1 densely setose, shorter than 2 with well-developed accessory flagellum; pereopods 3-7 without dactylus; pereopods 6-7 merus and carpus strongly expanded (Lincoln, 1979).
Geographical distribution: North Atlantic Ocean on American and European coasts (Lincoln, 1979).
Distribution in Portugal: Common species along the Portuguese coast (Dexter, 1992), also recorded at the Minho River (Mazé *et al.*, 1993; Sousa *et al.*, 2008), Mondego (Marques *et al.*, 1993) and Mira estuaries (Marques & Bellan-Santini, 1987), Ria de Aveiro (Cunha *et al.*, 1999) and Ria de Alvor (Rodrigues & Dauvin, 1987).
Ecological notes: Intertidal sand burrower usually up to high water mark, numerous in the wet sand at lower levels of the shore (Lincoln, 1979).

Family Urothoidae Bousfield, 1978
Genus ***Urothoe*** Dana, 1852

***Urothoe brevicornis*** Bate, 1862 (Fig. 4A-C)
*Urothoe brevicornis* Bate, 1862: 116-117, Pl. XX fig. 2. — Bate & Westwood, 1863: 198-199. — Stebbing, 1906: 131. — Chevreux & Fage, 1925: 100-101, fig. 94. — Lincoln, 1979: 330, figs. 153F, 155D-F.
Type material: Holotype deposited at Natural History Museum, London catalogue number 1952.5.7.35-37 (GBIF.org, 2021).
Type locality: Tenby, Wales (Bate, 1862).
Material examined: 2 adult specimens, size 7 mm, collected at Caminha, International Minho River (41°52'59"N/8°50'14"W), 6 April 2020 on glass eel fishing bycatch, deposited as NatMIP-CMAm-0080.
Diagnosis: Antenna 1 flagellum with 7 or 8 segments, accessory flagellum well-developed with 7 segments; antenna 2 peduncle robust and spinose (Fig. 4B); pereopod 5 basis expanded, carpus slightly broader than merus; uropod 1 outer ramus with 3 spines; uropod 2 peduncle short, rami subequal, about equal to length of peduncle, outer ramus with 1-3 spines; uropod 3 rami with subequal length and densely setose (Fig. 4C) (Lincoln, 1979).
Geographical distribution: Northeast Atlantic from the North Sea to France and British Isles (Lincoln, 1979).
Distribution in Portugal: International Minho River (this study), species also recorded at depths <150 m on coastal lines adjacent to the Minho and Douro rivers and Tejo canyon (Marques & Bellan-Santini, 1993) and along the southwestern coast (Marques & Bellan-Santini, 1991).
Ecological notes: Depth range from intertidal to 40 m (Lincoln, 1979).

Superfamily Lysianassoidea Dana, 1849
Family Tryphosidae Lowry & Stoddart, 1997
Genus ***Lepidepecreum*** Bate & Westwood, 1868

***Lepidepecreum longicorne*** (Bate, 1862) (Fig. 4D)
*Anonyx longicornis* Bate, 1862: 72-73, Pl. XI fig. 4 (**original description**). — Bate & Westwood, 1863: 91-93.
*Lepidepecreum carinatum* Bate & Westwood, 1866: 509-510. — Sars, 1895: 113-115, Pl. 38 fig. 2, Pl. 39 fig. 1.
*Lepidepecreum longicorne* – Stebbing, 1906: 80. — Chevreux & Fage, 1925: 63-64, fig. 52. — Ruffo & Schiecke, 1977: 429-435, fig. 1. — Lincoln, 1979: 72, figs. 27A-I.
Type material: Unknown.
Type locality: Shetland, Scotland (Bate & Westwood, 1863).

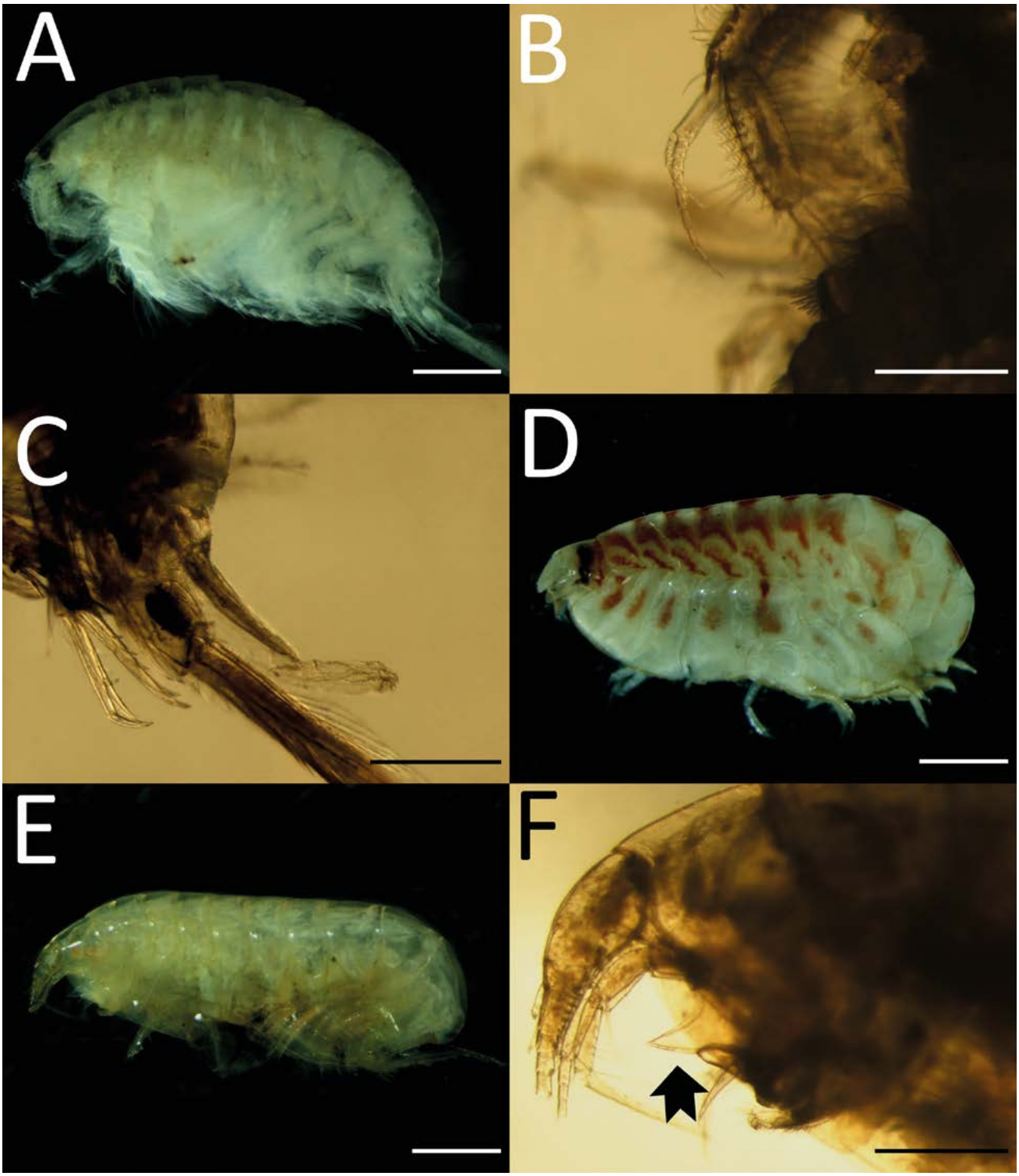


Fig. 4.– *Urothoe brevicornis* Bate, 1862: adult lateral view (**A**), antennae (**B**), uropods (**C**); *Lepidepecreum longicorne* (Bate, 1862): adult lateral view (**D**); *Tryphosites longipes* (Bate, 1862): adult lateral view (**E**), epistome highlighted by arrow (**F**). Scale bars: A, D–E = 1 mm; B–C, F = 0.5 mm.

Fig. 4.– *Urothoe brevicornis* Bate, 1862: vista lateral del adulto (**A**), antenas (**B**), urópodos (**C**); *Lepidepecreum longicorne* (Bate, 1862): vista lateral del adulto (**D**); *Tryphosites longipes* (Bate, 1862): vista lateral del adulto (**E**), epistoma resaltado con una flecha (**F**). Escala: A, D–E = 1 mm; B–C, F = 0,5 mm.

Material examined: 2 adult females, size range 4.9 to 5.1 mm, collected at Caminha, International Minho River (41°52'59"N/8°50'14"W), 6 April 2020 on glass eel fishing bycatch, deposited as NatMIP-CMAm-0078 and Caminha, International Minho River (41°52'76.62"N/8°50'41.7"W), 14 March 2021 on glass eel fishing bycatch, deposited as NatMIP-CMAm-0079.

Diagnosis: Body robust and compressed; antenna 1 peduncle article 1 large with compressed anterior margin and prolonged distal angle forming a large lobe, article 2 with small anterodistal lobe, antenna 1 in male little longer than in female, accessory flagellum absent; antenna 2 short and slender on females, flagellum with 4 segments, in male flagellum filiform, as long as body.

Geographical distribution: Northeast Atlantic from Norway to Iberian Peninsula and Mediterranean (Lincoln, 1979).

Distribution in Portugal: International Minho River (this study), species also recorded at depths <150 m on coastal lines adjacent to the Minho and Douro rivers (Marques & Bellan-Santini, 1993) and along the southwestern coast (Marques & Bellan-Santini, 1991; Pereira *et al.*, 2006).

Ecological notes: Depth range 5-60 m (Lincoln, 1979)**.**

Genus ***Tryphosites*** Sars, 1891

***Tryphosites longipes*** (Bate, 1862) (Fig. 4E-F)

*Anonyx longipes* Bate, 1862: 79, Pl. XIII fig. 4 (**original description**). — Bate & Westwood, 1863: 113-115.

*Anonyx ampulla* Bate, 1862: 79-80, Pl. XIII fig. 5. — Bate & Westwood, 1863: 116-118.

*Tryphosa longipes* – Boeck, 1871: 118-119.

*Tryphosites longipes* – Sars, 1895: 81-82, Pl. 28 fig. 3, Pl. 29 fig. 1. — Stebbing, 1906: 77. — Chevreux & Fage, 1925: 61-62, fig. 49. — Lincoln, 1979: 80, figs. 31A-H.

Type material: Unknown.

Type locality: Shetland, Scotland (Bate & Westwood, 1863).

Material examined: 2 adult females, size 6 mm, collected at Caminha, International Minho River (41°52'59"N/8°50'14"W), 6 April 2020 on glass eel fishing bycatch, deposited as NatMIP-CMAm-0082.

Diagnosis: Antenna 1 peduncle with articles 2-3 compressed segments, flagellum slender with 18 segments in females and up to 30-articulated in males, accessory flagellum with 5 segments; antenna 2 in female equal to length of antenna 1, flagellum with 15 segments and in male exceeding body length; epistome acute produced forward (Fig. 4F); epimeral plate 3 posterodistal angle forming very large tooth (Lincoln, 1979).

Geographical distribution: Northeast Atlantic from Norway to Iberian Peninsula and Canary islands, Mediterranean (Sars, 1895; Lincoln, 1979).

Distribution in Portugal: International Minho River (this study), species also recorded at depths <150 m on coastal lines adjacent to the Minho and Douro rivers (Marques & Bellan-Santini, 1993) and along the southwestern coast (Marques & Bellan-Santini, 1991).

Ecological notes: Depth range 5 to 200 m (Lincoln, 1979).

Family Uristidae Hurley, 1963

Genus ***Centromedon*** Sars, 1891

***Centromedon* sp.** (Fig. 5)

Material examined: 1 adult specimen, size 7 mm, collected at Caminha, International Minho River (41°52'59"N/8°50'14"W), 6 April 2020 on glass eel fishing bycatch, deposited as NatMIP-CMAm-0101.

Description: Lateral view (left): Body compressed; lateral cephalic lobes subtriangular; eyes absent (Fig. 5 B); epimeral plate 3 with large acute tooth produced posteroventrally (Fig. 5E). Antenna 1 reaching beyond peduncle of antenna 2, with stout peduncle, article 1 larger than 2 and 3 combined, article 4 with a group of parallel structures organized perpendicularly to article 4, accessory flagellum 5 articulated, antenna 1 flagellum with 26 articles (Fig. 5B); antenna 2 almost as long as body length (Fig. 5A). Pereopod 5 basis dented on the inferoposterior margin (Fig. 5C); pereopod 7 basis expanded, oval, serrulate on posterior margin (Fig. 5D). Uropods 1 and 2 subequal, uropod 3 reaching beyond uropod 1 and 2; uropod 1 outter ramus armed with 6 spines on dorsal margin, uropod 2 with 5 spines; uropod 3 with 6 spines (Fig. 5F). Telson armed with two pairs of spines on dorsolateral margin and one pair of spines apically.

Remarks: This specimen differs from other *Centromedon* species described for Europe on antenna 1 and 2 length and on the structures present on article 4 of antenna 1. More specimens (males and females) are required for a complete evaluation, and confirmation of a possible new species.

Superfamily Synopioidea Dana, 1852

Family Ampeliscidae Krøyer, 1842

Genus ***Ampelisca*** Krøyer, 1842

***Ampelisca aequicornis*** Bruzelius, 1858 (Fig. 6A)

*Ampelisca aequicornis* Bruzelius, 1858: 82-84, fig. 15. — Sars, 1895: 177-178, Pl.62 fig. 1. — Stebbing, 1906: 106-107. — Reid, 1951: 216-218, figs. 17A-D, 18A-F. — Lincoln, 1979: 114, figs. 48E-G. — King *et al.*, 2004: 156-158, figs. 1-2.

Type material: Unknown.

Type locality: Gullmarsfjorden, Sweeden (Bruzelius, 1858).

Material examined: 1 specimen, size 4 mm, collected at Caminha, International Minho River (41°52'59"N/8°50'14"W), 6 April 2020 on glass eel fishing bycatch, deposited as NatMIP-CMAm-0087.

Diagnosis: Head with convex ventral margin; antennae 1 and 2 nearly equal; antenna 1 article 2 with 1.5 times the length of article 1; flagellum longer than peduncle; antenna 2 peduncular articles 4 and 5 subequal in length; flagellum longer than peduncle; urosome 1 with flattened dorsal keel; pereopod 7 merus without posterodistal lobe; uropods 1 and 2 with small marginal spines (Lincoln, 1979; Dauvin & Bellan-Santini, 1988; King *et al.*, 2004).

Geographical distribution: Northwest Atlantic, Northeast Atlantic from Norway to Gulf of Guinea and Canary Islands (Lincoln, 1979; Dauvin & Bellan-Santini, 1988).

Distribution in Portugal: Uncommon species records for the Portuguese coast (Marques & Bellan-Santini, 1990), including International Minho River (this study).

Ecological notes: Depth range 30-835 m (Lincoln, 1979; Dauvin & Bellan-Santini, 1988).

***Ampelisca armoricana*** Bellan-Santini & Dauvin, 1981 (Fig. 6B)

*Ampelisca armoricana* Bellan-Santini & Dauvin, 1981: 242-247, figs. 1-4.

Type material: Unknown.

Type locality: Pierre Noire, Baie de Morlaix, France (Bellan-Santini & Dauvin, 1981).

Material examined: 1 specimen, size 4.7 mm, collected at Caminha, International Minho River (41°52'59"N/8°50'14"W), 6 April 2020 on glass eel fishing bycatch, deposited as NatMIP-CMAm-0077.

Diagnosis: Antenna 1 reaching slightly beyond the peduncle of antenna 2; antenna 2 length between one third and half

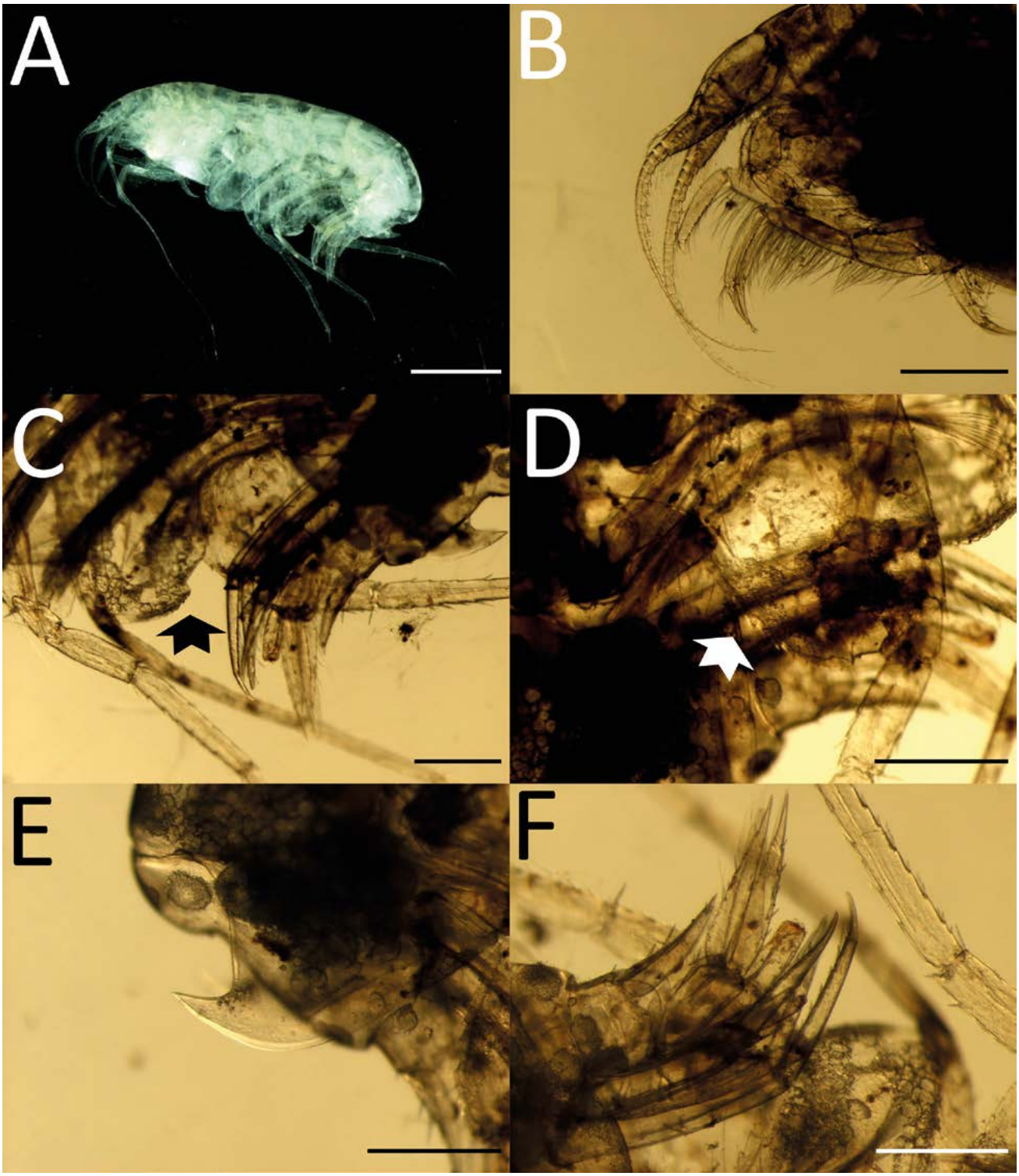


Fig. 5.– *Centromedon* sp.: adult lateral view (**A**), antennae (**B**), pereopod 5 (arrow highlighting basis dented on the inferoposterior margin) (**C**), peropod 7 (arrow highlighting serrulation on posterior margin) (**D**), epimeral plate 3 (**E**); uropods (**F**). Scale bars: A = 2 mm; B-F = 0.5 mm.

Fig. 5.– *Centromedon* sp.: vista lateral del adulto (**A**), antenas (**B**), pereópodo 5 (flecha destacando la base dentada en el margen inferoposterior) (**C**), peropodio 7 (flecha destacando la serrulación en el margen posterior) (**D**), placa epimeral 3 (**E**); urópodos (**F**). Escala: A = 2 mm; B-F = 0.5 mm.

the body size; dactylus of pereopods 3-4 longer than carpus and merus combined; pereopod 7 merus shorter than carpus; epimeral plate 2 with small tooth on inferior-posterior margin; epimeral plate 3 inferior-posterior margin with quadrate angle (Bellan-Santini & Dauvin, 1981).

Geographical distribution: Northeast Atlantic from the English Channel to Senegal (Dauvin & Bellan-Santini, 1988).

Distribution in Portugal: International Minho River (this study), species also recorded at depths <150 m on coastal lines adjacent to the Minho and Douro rivers and Tejo canyon (Marques & Bellan-Santini, 1993).

Ecological notes: Present in intertidal zone on fine sand (Dauvin & Bellan-Santini, 1988).

***Ampelisca lusitanica*** Bellan-Santini & Marques, 1986 (Fig. 6C-D)

*Ampelisca lusitanica* Bellan-Santini & Marques, 1986: 155-159, figs. 1-4. — Belattmania *et al.* 2017: 2-3, fig. 2.

Type material: Holotype, 1 female size 4.2 mm deposited at Station Marine d'Endoume, Marseille, France (Bellan-Santini & Marques, 1986).

Type locality: Estoril, Portugal (Bellan-Santini & Marques, 1986).

Material examined: 1 specimen, size 4.7 mm, collected at Caminha, International Minho River (41°52'59"N/8°50'14"W), 6 April 2020 on glass eel fishing bycatch, deposited as NatMIP-CMAm-0089.

Diagnosis: Antenna 1 shorter than antenna 2, slightly longer than the head and the first 4 pereonites; antenna 2 approximately half the length of the body, article 4 of peduncle slightly shorter than article 5; dactyl long but not exceeding the propodus and carpus length; pereopod 7 with distally rounded basis, the merus without a large posterior lobe, shorter than the carpus and with an anterior peg-like process projecting beyond the proximal end of the carpus but not reaching its distal end (Fig. 6D) (Bellan-Santini & Marques, 1986; Belattmania *et al.*, 2017).

Geographical distribution: Northeast Atlantic from Bay of Biscay to Morocco (Belattmania *et al.*, 2017).

Distribution in Portugal: Species recorded at International Minho River (this study), Viana do Castelo, Peniche, Estoril and Sines (Bellan-Santini & Marques, 1986).

Ecological notes: Depth range intertidal to 37 m (Bellan-Santini & Marques, 1986).

***Ampelisca pectenata*** Reid, 1951 (Fig. 6E-F)

*Ampelisca pectenata* Reid, 1951: 210, fig. 15.

*Ampelisca spooneri* Dauvin & Bellan-Santini, 1982: 260-266, figs. 3-4.

Type material: Deposited at Zoological Museum of the University of Copenhagen (Reid, 1951).

Type locality: Gambia (Reid, 1951).

Material examined: 6 specimens, size range 3.9 to 10 mm, collected at Caminha, International Minho River (41°52'59"N/8°50'14"W), May 2020 on glass eel fishing bycatch, deposited as NatMIP-CMAm-0076 and NatMIP-CMAm-0091.

Diagnosis: Antenna 1 reaching up to the fourth segment of peduncle of antenna 2; antenna 2 long with almost the body length; pereopod 7 merus with large setose distal lobe overlapping carpus (Fig. 6F), anterodistal margin of carpus produced and spinose; urosome segment 1 with a cockscomb dorsal keel; postero-inferior corner of epimeral plate 3 sinuous with a little tooth (Reid, 1951; Dauvin & Bellan-Santini, 1982, 1988).

Geographical distribution: Northeast Atlantic from the Irish Sea to Sierra Leone (Reid, 1951; Dauvin & Bellan-Santini, 1982).

Distribution in Portugal: International Minho River (this study), species also recorded at depths <150 m on coastal lines adjacent to the Minho and Douro rivers and Tejo canyon (Marques & Bellan-Santini, 1993).

Ecological notes: Depth range 35 to 105 m, among shells (Reid, 1951; Dauvin & Bellan-Santini, 1982).

***Ampelisca rubella*** Costa, 1864 (Fig. 7)

*Ampelisca rubella* Costa, 1864: 153-155, Pl. II, fig.7. — Valle, 1893: 482-483, Pl. 2 fig. 4, Pl. 37 fig. 21, Pl. 38 figs. 1, 10, 16. — Chevreux, 1900: 44-45. — Stebbing, 1906: 104-105. — Chevreux & Fage, 1925: 79-80, figs 66,70.

*Ampelisca serrata* Schellenberg, 1925: 123.

Type material: Unknown.

Type locality: Naples, Italy (Costa, 1864).

Material examined: 10 male specimens, size range 4 to 5 mm, collected at Caminha, International Minho River (41°52'59"N/8°50'14"W), 6 specimens collected on April 2020 on glass eel fishing bycatch, deposited as NatMIP-CMAm-0098; 1 specimen, same data as preceding with pereopods 6 and 7 on mounted blade, deposited as NatMIP-CMAm-0100 and 3 specimens collected on 14 March 2021 on glass eel fishing (41°52'76.62"N/8°50'41.7"W), deposited as NatMIP-CMAm-0099,

Diagnosis: Antenna 1 on female almost as long as antenna 2 with about half the body length; corneal lenses with blots of black pigment behind them (Fig. 7B); epimeral plate 3 posterodistal angle with a tooth (Fig. 7C); pereopod 3-4 with datcylus smaller than propodus and carpus combined (Fig. 7D) pereopod 7 merus without posterodistal lobe (Fig. 7E), basis outer surface without spines; uropod 3 with broad rami; urosome with a small angular carina (Fig. 7F) (Stebbing, 1906; Dauvin & Bellan-Santini, 1988).

Male description: Males similar to female description with the only difference being the length of antenna 2 which is larger than the body length; antenna 1 reaching well beyond the peduncle of antenna 2 (Fig. 7A).

Geographical distribution: Northeast Atlantic on Iberian Peninsula and occidental basin of the Mediterranean sea (Dauvin & Bellan-Santini, 1988).

Distribution in Portugal: International Minho River (this study), species also recorded at depths <150 m on coastal lines adjacent to the Tejo canyon (Marques & Bellan-Santini, 1993).

Ecological notes: Usually among algae (Stebbing, 1906).

Remarks: First description for adult male.

***Ampelisca serraticaudata*** Chevreux, 1888 (Fig. 8A-C)

*Ampelisca serraticaudata* Chevreux, 1888: 349-350, Pl. VI figs. 3-9. — Stebbing, 1906: 107. — Chevreux & Fage, 1925: 80, fig. 71.

Type material: Holotype deposited at Muséum National d'Histoire Naturelle de Paris, catalogue number AM452 (Bulletin du Museum d'Histoire Naturelle de Paris, 1986).

Type locality: Cherchell, Algeria (Chevreux, 1888).

Material examined: 1 adult specimen, size 8 mm, collected at Caminha, International Minho River (41°52'76.62"N/8°50'41.7"W), 14 March 2021 on glass eel fishing bycatch, deposited as NatMIP-CMAm-0092.

Diagnosis: With 4 corneal lenses; pereopod 7 merus without posterodistal lobe (Fig. 8B), basis outer surface without spines; uropod 3 inner ramus serrulate (Fig. 8C) (Dauvin & Bellan-Santini, 1988).

Geographical distribution: Northeast Atlantic from Iberian Peninsula to Senegal and Mediterranean (Dauvin & Bellan-Santini, 1988).

Distribution in Portugal: Species recorded at International Minho River (this study), and on the southwestern coast (Marques & Bellan-Santini, 1991, 1993; Pereira *et al.*, 2006).

Ecological notes: Depth range 4-52 m (Dauvin & Bellan-Santini, 1988).

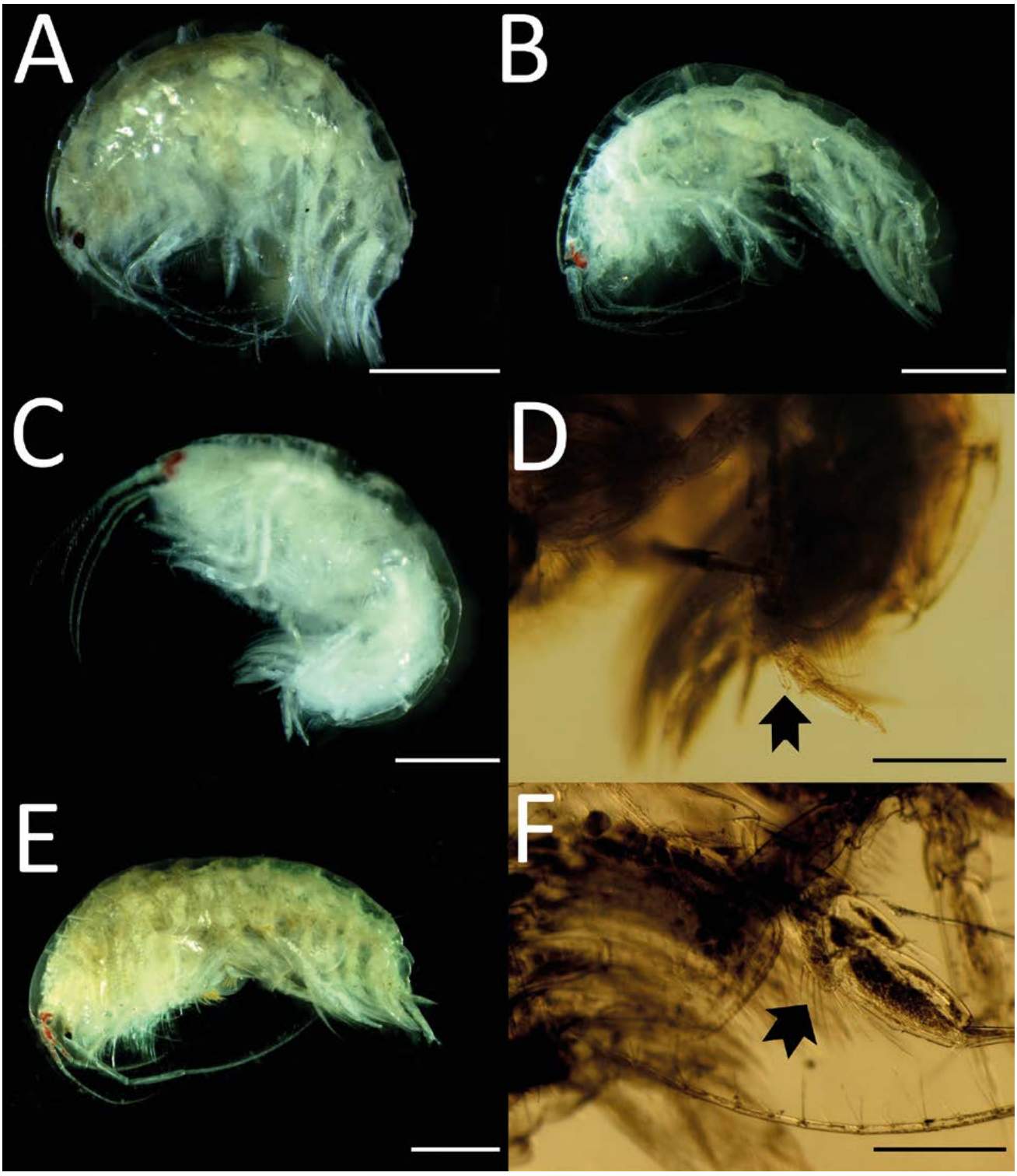


Fig. 6.– *Ampelisca aequicornis* Bruzelius, 1858: adult lateral view (**A**); *Ampelisca armoricana* Bellan-Santini & Dauvin, 1981: adult lateral view (**B**); *Ampelisca lusitanica* Bellan-Santini & Marques, 1986: adult lateral view (**C**), pereopod 7 (arrow highlighting merus peg-like process projecting beyond the proximal end of the carpus) (**D**); *Ampelisca pectenata* Reid, 1951: adult lateral view (**E**), pereopod 7 (arrow highlighting merus distal lobe overlapping carpus) (**F**). Scale bars: A-C = 1 mm; D,F = 0.5 mm; E = 2 mm.

Fig. 6.– *Ampelisca aequicornis* Bruzelius, 1858: vista lateral del adulto (**A**); *Ampelisca armoricana* Bellan-Santini & Dauvin, 1981: vista lateral del adulto (**B**); *Ampelisca lusitanica* Bellan-Santini & Marques, 1986: vista lateral del adulto (**C**), pereópodo 7 (flecha destacando proceso en forma de clavija que se proyecta más allá del extremo proximal del carpo) (**D**); *Ampelisca pectenata* Reid, 1951: vista lateral del adulto (**E**), pereópodo 7 (flecha resaltando el lóbulo distal del merus superpuesto al extremo proximal del carpo) (**F**). Escala: A-C = 1 mm; D,F = 0.5 mm; E = 2 mm.

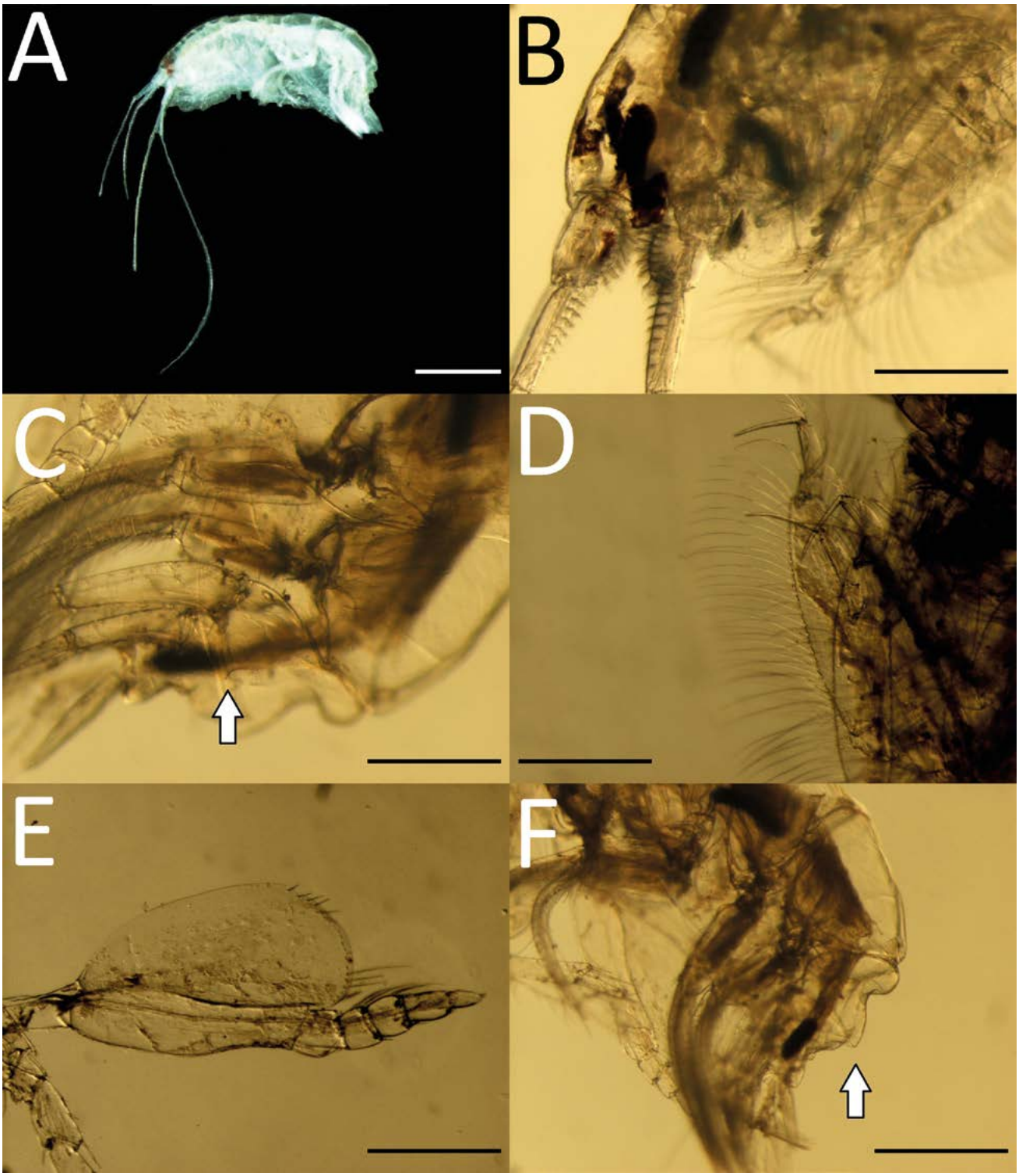


Fig. 7.– *Ampelisca rubella* Costa, 1864: adult male lateral view (**A**), head (**B**), epimeral plate 3 (arrow highlighting tooth on inferior margin) (**C**), pereopods 3 and 4 (**D**), pereopod 7 (**E**), urosome (arrow highlighting carina). Scale bars: A = 2 mm; B-F = 0.5 mm.

Fig. 7.– *Ampelisca rubella* Costa, 1864: vista lateral del macho adulto (**A**), cabeza (**B**), placa epimeral 3 (flecha resaltando el diente en el margen inferior) (**C**), pereópodos 3 y 4 (**D**), pereópodo 7 (**E**), urosoma (flecha resaltando la carina). Escala: A = 2 mm; B-F = 0.5 mm.

***Ampelisca spinimana*** Chevreux, 1887 (Fig. 8D-E)
*Ampelisca spinimana* Chevreux, 1887: 574-575. — Stebbing, 1906: 109. — Chevreux & Fage, 1925: 81-82, fig. 73.
Type material: Holotype deposited at Museé Oceánographique de Monaco (Bulletin du Museum d'Histoire Naturelle de Paris, 1986).
Type locality: Croisic, France (Chevreux, 1887).
Material examined: 1 female adult, size 8 mm, collected at Caminha, International Minho River (41°52'59"N/8°50'14"W), 6 April 2020 on glass eel fishing bycatch, deposited as NatMIP-CMAm-0090.
Diagnosis: Antenna 1 on female shorter than antenna 2 slightly longer than antenna 2 peduncle; antenna 2 on female shorter than one third of the body length; gnathopod 1 with large spines on palm (Fig. 8E); pereopod 7 merus not produced (Chevreux, 1887; Stebbing, 1906; Dauvin & Bellan-Santini, 1988).
Geographical distribution: Northeast Atlantic from Brittany to Gulf of Guinea (Dauvin & Bellan-Santini, 1988).
Distribution in Portugal: Species recorded at International Minho River (this study), and on the southwestern coast (Marques & Bellan-Santini, 1991).
Ecological notes: Depth range 15 to 510 m (Stebbing, 1906; Dauvin & Bellan-Santini, 1988).

Suborder Senticaudata Lowry & Myers, 2013
Superfamily Aoroidea Stebbing, 1899
Family Aoridae Stebbing, 1899
Genus ***Aora*** Krøyer, 1845

***Aora gracilis*** (Bate, 1857) (Fig. 8F)
*Lonchomerus gracilis* Bate, 1857: 143 (**original description**).
*Aora gracilis* – Bate, 1862: 160-161, Pl. XXIX fig. 7. — Bate & Westwood, 1863: 281-283. — Sars 1895: 545-546, Pl. 191. — Myers & Costello 1984: 281, fig. 1.
Type material: Holotype deposited at Natural History Museum, London, catalogue number 1952.5.7.133 (GBIF.org, 2021).
Type locality: Plymouth, England (Bate, 1857).
Material examined: 3 adult specimens, size 6 mm; 1 male specimen with antenna 1 and 2 missing, collected at Caminha, International Minho River (41°52'59"N/8°50'14"W), 6 April 2020 on glass eel fishing bycatch, deposited as NatMIP-CMAm-0085; 1 male specimen with pereopods 6 and 7 on mounted blade, same data as preceding, deposited as NatMIP-CMAm-0093; 1 female specimen, antenna 1 missing, same data as preceding, deposited as NatMIP-CMAm-0105.
Diagnosis: Antenna 1 more than half the length, flagellum longer than peduncle; antenna 2 shorter than 1 and more robust, moderately setose, flagellum shorter than peduncle; gnathopod 1 on male extremely large with long and robust basis, merus with enormous pointed process reaching to end of elongate carpus (Fig. 8F) (Bate & Westwood, 1863; Sars, 1895)
Geographical distribution: Northeast Atlantic from Norway to Azores (Sars, 1895).
Distribution in Portugal: Species recorded at International Minho River (this study), Ria de Aveiro (Cunha *et al.*, 1999), Ria Formosa (Cruz *et al.*, 2003) and on Azores archipelago (Borges *et al.*, 2010)
Ecological notes: Present at shallow depths (Sars, 1895).

Superfamily Calliopioidea Sars, 1895
Family Calliopiidae Sars, 1895
Genus ***Apherusa*** Walker, 1891

***Apherusa jurinei*** (Milne-Edwards, 1830) (Fig. 9A-B)
*Ampithoe jurinei* Milne-Edwards, 1830: 376 (**original description**).
*Amphitoe norvegica* Rathke, 1843: 83-84, Tab. IV fig. 6.
*Paramphithoe norvegica* – Bruzelius, 1858: 77.
*Calliopius norvegicus* – Boeck, 1870: 118.
*Apherusa jurinei* – Sars, 1895: 445-446, Pl. 157 fig. 1. — Stebbing, 1906: 307-308. — Chevreux & Fage, 1925: 182-183, figs. 187-188. — Lincoln, 1979: 414, figs. 192D, 194A-C, 197A-E.
Type material: Unknown.
Type locality: France (Milne-Edwards, 1830).
Material examined: 1 adult specimen, size 6.8 mm, collected at Caminha, International Minho River (41°52'59"N/8°50'14"W), 6 April 2020 on glass eel fishing bycatch, deposited as NatMIP-CMAm-0075.
Diagnosis: Antenna 1 approximately half body length, flagellum slender up to 35 segments; antenna 2 longer than 1, peduncle articles 4 and 5 subequal, flagellum long and slender with over 50 segments (Fig. 9A); gnathopods 1 and 2 similar, palm oblique delimited by 3-4 spines (Fig. 9B); telson triangular with rounded apex (Lincoln, 1979).
Geographical distribution: Northeast Atlantic from Norway to Iberian Peninsula (Lincoln, 1979).
Distribution in Portugal: Species recorded at International Minho River (this study), along the western coast (Izquierdo & Guerra-García, 2011), at Peniche (Patrício *et al.*, 2006) and on Azores archipelago (Borges *et al.*, 2010).
Ecological notes: Depth range from intertidal to shallow subtidal, on algae (Lincoln, 1979), collected on *Corallina elongata* (Izquierdo & Guerra-García, 2011).

**Calliopiidae sp.** (Fig. 9C-F)
Material examined: 1 adult specimen, size 6 mm, antenna 2 broken, collected at Caminha, International Minho River (41°52'59"N/8°50'14"W), 6 April 2020 on glass eel fishing bycatch, deposited as NatMIP-CMAm-0102.
Description: Lateral view (left): Pleosome with sinuous dorsal margin (Fig. 9C); epimeral plate 3 with a tooth on inferoposterior margin, followed by a large acute projection on the posterior midline (Fig. 9D). Antenna 1 longer than antenna 2 peduncle, antenna1 peduncle article 1 longer than 2, and longer than 1, flagellum 32 articulated, accessory flagellum absent; antenna 2 longer than 1 with about half the body length, peduncle article 1 and 2 subequal and shorter than article 3 and 4, also subequal, flagellum more than 38 articulated (Fig. 9C). Gnathopod 1 slightly larger than 2, subchelate, propodus oval with stout spine near dactylus (Fig. 9E). Pereopods 3-7 with stout spine on propodus near to hook-like dactylus; pereopod 7 merus and carpus expanded fringed with 4 spines (Fig. 9F). Uropods biramous subequal in length; ramus fringed with spines.
Remarks: The set of morphological features of this specimen don't fully match with European genera. In this study we prefer to keep family level taxonomic identification. The genus *Haliragoides* seems to resemble this specimen the most having antenna 2 longer than 1, peduncle articles of antenna 1 progressively shorter, antenna 1 peduncle article 3 not produced, absence of accessory flagellum and epimeral plate 3 toothed shaped, however the fact that gnathopods 1 and 2 carpus is smaller than propodus and lack posterior lobe indicates that we are in the presence of a genus different from *Haliragoides*. More specimens (males and females) are required for a complete evaluation, and confirmation of a possible new genus/species.

Superfamily Caprelloidea Leach, 1814
Family Caprellidae Leach, 1814
Genus ***Caprella*** Lamarck, 1801

***Caprella danilevskii*** Czerniavski, 1868 (Fig. 10A-B)
*Caprella danilevskii* Czerniavski, 1868: 76-77, Pl. VI figs. 21-34. — Mayer, 1890: 58-60, Pl. 5 fig. 44, Pl. 7 figs. 12-13. —

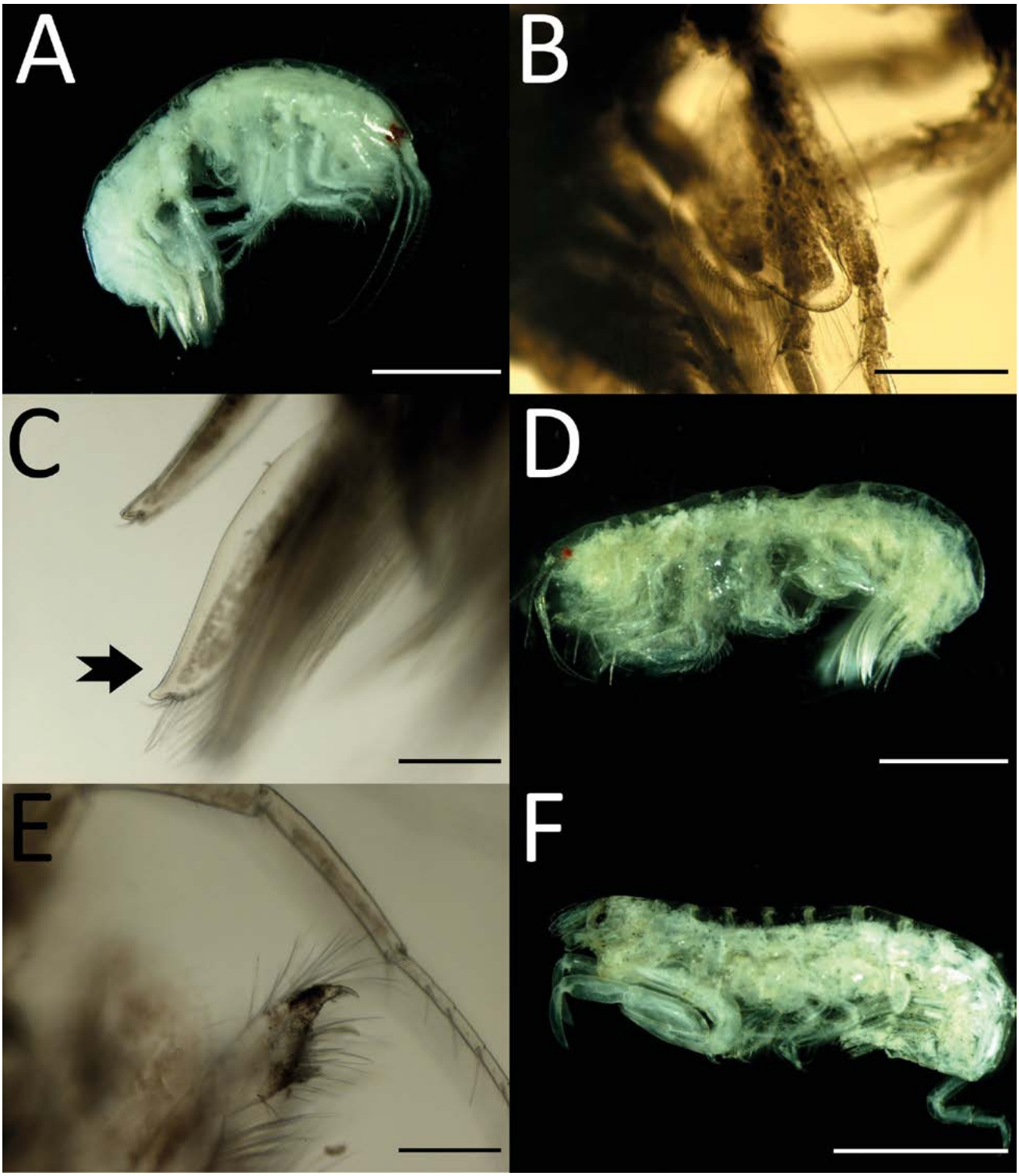


Fig. 8.– *Ampelisca serraticaudata* Chevreux, 1888: adult lateral view (**A**), pereopod 7 (**B**), uropod 3 (arrow highlighting serrulation on inner ramus) (**C**); *Ampelisca spinimana* Chevreux, 1887: adult lateral view (**D**), gnathopod 1 (**E**); *Aora gracilis* (Bate, 1857): adult male lateral view (**F**). Scale bars: A, D, F = 2 mm; B = 0.5 mm; C, E = 0.25 mm.

Fig. 8.– *Ampelisca serraticaudata* Chevreux, 1888: vista lateral del adulto (**A**), pereópodo 7 (**B**), urópodo 3 (flecha resaltando la serrulación en la rama interna) (**C**); *Ampelisca spinimana* Chevreux, 1887: vista lateral del adulto (**D**), gnatopodio 1 (**E**); *Aora gracilis* (Bate, 1857): vista lateral del macho adulto (**F**). Escala: A, D, F = 2 mm; B = 0.5 mm; C, E = 0.25 mm.

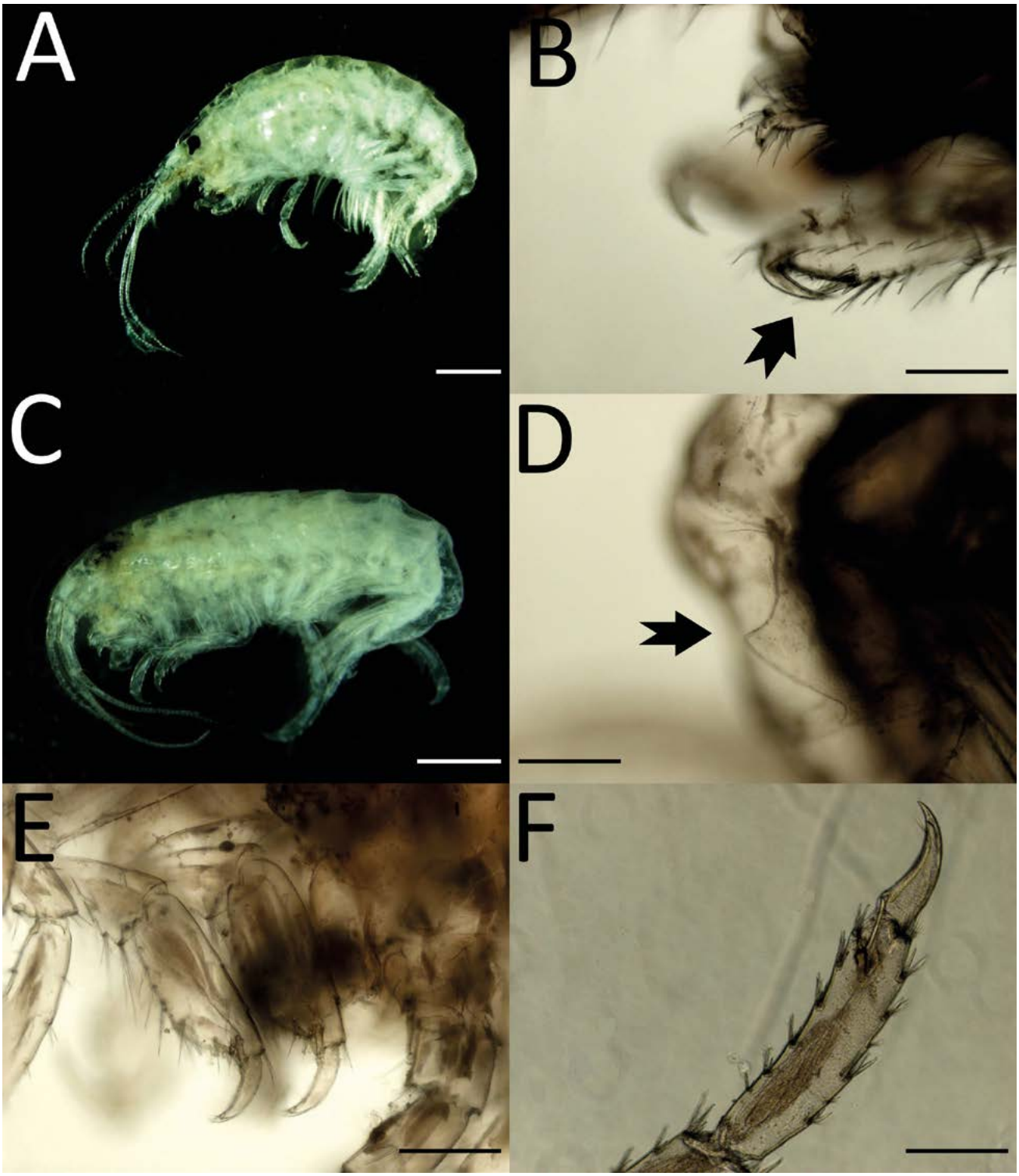


Fig. 9.– *Apherusa jurinei* (Milne Edwards, 1830): adult lateral view (**A**), gnathopod 1 (arrow highlighting spines on propodus palm) (**B**); Calliopiidae sp.: adult lateral view (**C**), epimeral plate 3 (arrow highlighting triangular projection on posterior margin) (**D**), gnathopods 1 and 2 (**E**), pereopod 7 (**F**). Scale bars: A = 1 mm; B, D–F = 0.25 mm; C= 2 mm.

Fig. 9.– *Apherusa jurinei* (Milne Edwards, 1830): vista lateral del adulto (**A**), gnatopodio 1 (flecha resaltando las espinas de la palma del propodeo) (**B**); Calliopiidae sp.: vista lateral del adulto (**C**), placa epimeral 3 (flecha que resalta la proyección triangular en el margen posterior) (**D**), gnatópodos 1 y 2 (**E**), pereópodo 7 (**F**). Escala: A = 1 mm; B, D–F = 0.25 mm; C= 2 mm.

Chevreux & Fage, 1925: 454-455, fig. 432. — Hiro, 1937: 312-313, Pl. 22 fig. 7. — Mccain, 1968: 22-25, figs. 10, 11, 55. — Griffiths, 1974: 205. — Arimoto, 1976: 183-189, figs. 99-101. — Guerra-García & Takeuchi, 2002: 683, fig. 6. — Díaz *et al.*, 2005: 3-4, fig. 3. — Guerra García *et al.*, 2010: 114-115.

*Caprella inermis* Haswell, 1879: 348, Pl. XXIII fig. 3.

Type material: Unknown.

Type locality: Black Sea (Mccain, 1968).

Material examined: 4 pre-adult males, size range 6 to 8 mm, collected at Caminha, International Minho River (41°52'04.8"N 8°51'18.8"W), June 2021 on beam trawl, deposited as NatMIP-CMAm-0096.

Diagnosis: Gills elliptical parallel to body (Fig. 10A); pereopods 3-5 lacking grasping spines (Fig. 10B); male abdomen with hooked appendages (Mccain, 1968).

Geographical distribution: Widespread, pantropical (Mccain, 1968).

Distribution in Portugal: Species collected at International Minho River (this study), along the western coast (Pereira *et al.*, 2006) and on the southeastern coast (Guerra García *et al.*, 2010, 2012; Guerra-García & Izquierdo, 2010).

Ecological notes: Usually on sea grass, bryozoans, sponges and tunicates (Mccain, 1968; Guerra García *et al.*, 2010), collected on *Asparagopsis armata* Harvey, 1855 (Guerra-García *et al.*, 2012) and on *Corallina elongata* (Guerra-García & Izquierdo, 2010).

Remarks: Due to the disparity on the geographical records for this species, the use of DNA barcoding methodologies may provide some insight on the population dynamics and gene flow using a biogeographic approach, although the possibility of the presence of a species complex cannot be ruled out.

***Caprella* sp.** (Fig. 10C-E)

Material examined: 1 adult female, size 6 mm, collected at Caminha, International Minho River (41°52'04.8"N 8°51'18.8"W), June 2021 on beam trawl, deposited as NatMIP-CMAm-0094.

Description: Lateral view (left): Body slender; head without rostrum with well-developed spine on dorsal-posterior zone; pereonite 1 reduced with a single tubercle, pereonites 2-5 sub-equal with 3 well-developed tubercles, pereonites 6-7 sub-equal with 2 tubercles each. Antenna 1 about one third the body length, peduncle with very few setae on inferior surface, flagellum with 8 articles; Antenna 2 about half length of antenna 1, peduncle article 3 with 4 pairs of long setae, article 4 with 7 pairs of long setae, flagellum two-articulated, setose. Gnathopod 1 ischium small, merus and carpus each with marginal row of setae on inferior margin, carpus triangular, propodus inferior margin with small setae; Gnathopod 2 on the proximal end of peronite 2, basis about half the length of pereonite 2, ischium and merus round sub-equal; carpus very short, propodus palm slightly convex with one spine on distal end and two tubercles on mid to proximal end. Oval, length about twice the width. Pereopods 5, 6 and 7 increasing in length; pereopod 7 ischium small, carpus and merus length subequal with a triangular projection on dorsal margin; palm of propodus concave with a hook-like process on inferior proximal margin.

Remarks: This species resembles *Caprella erethizon* Mayer, 1901 the most except for the absence of spines on pereonite 1 in *Caprella* sp. as well as pereopod 7 carpus and merus having different shapes comparing these two species. More specimens (mainly males) are needed for a complete evaluation.

Superfamily Corophioidea Leach, 1814

Family Corophiidae Leach, 1814

Genus ***Corophium*** Latreille, 1806

***Corophium multisetosum*** Stock, 1952 (Fig. 10F)

*Corophium multisetosum* Stock, 1952: 3-8, figs. 6-15. — Lincoln, 1979: 526, figs. 252F-I.

Type material: Holotype, adult male, collected at the North Sea Canal, Netherlands, deposited at Naturalis Biodiversity Center, catalogue number ZMA Amph. 100328 (Stock, 1952).

Type locality: North Sea Canal, Netherlands (Stock, 1952).

Material examined: 4 adult specimens, size range 6 to 12.8 mm, collected at Caminha, International Minho River (41°52'59"N/8°50'14"W), 6 April 2020 on glass eel fishing bycatch, deposited as NatMIP-CMAm-0068.

Diagnosis: Head with triangular rostrum; antenna 1 peduncle article 1 with 3 spines on ventral margin; uropod 1 peduncle with 7-8 spines on outer margin and 2-3 spines on inner margin; uropod 2 peduncle with 3-4 dorsal spines; uropod 3 peduncle with produced distolateral angle (Stock, 1952; Lincoln, 1979).

Geographical distribution: Southern North and Baltic Seas, Northeast Atlantic from Netherlands to France (Lincoln, 1979).

Distribution in Portugal: Species recorded at the Minho River (Mazé *et al.*, 1993; Sousa *et al.*, 2008), Ria de Aveiro (Cunha *et al.*, 1999), Mondego River (Chainho *et al.*, 2006) and Mira River estuary (Marques & Bellan-Santini, 1987).

Ecological notes: Builds mud burrows in clay or sand in fresh brackish waters and occasionally on fixed substrata (Lincoln, 1979).

Genus ***Leptocheirus*** Zaddach, 1844

***Leptocheirus pilosus*** Zaddach, 1844 (Fig. 11A)

*Leptocheirus pilosus* Zaddach, 1844: 8-9. — Stebbing, 1906: 630. — Sexton, 1911: 562. — Chevreux & Fage, 1925: 322-323, fig. 331. — Lincoln, 1979: 484, figs. 231A-F.

*Protomedeia pilosa* Bate, 1862: 168.

*Leptocheirus cornuaurei* Sowinsky, 1898: 470.

*Leptocheirus subsalsus* Norman, 1908: 307-308, Pl. XII figs. 1-6.

Type material: Unknown.

Type locality: Baltic Sea (Zaddach, 1844).

Material examined: 4 specimens, size range 4 to 4.52 mm, collected on sediment at Morraceira das Varandas Island, International Minho River (41°54'36.7"N/8°49'4.49"W) on September 25 2020 with Van Veen grab sampler; on medium sand, deposited as NatMIP-CMAm-0067.

Diagnosis: Antenna 2 flagellum with up to about 10 segments; gnathopod 2 basis anterior margin with dense double row of elongate plumose setae; coxal plate 1 elongated and rounded; urosome segments with a pair of dorsal setae each (Lincoln, 1979).

Geographical distribution: Northeast Atlantic from North Sea to Iberian Peninsula and Mediterranean (Lincoln, 1979).

Distribution in Portugal: Species recorded at Minho River (Picanço *et al.*, 2014), Ria de Aveiro (Cunha *et al.*, 1997), Tejo River (Rodrigues *et al.*, 2006), Mira River (Marques & Bellan-Santini, 1987) and Ria Formosa (Cruz *et al.*, 2003).

Ecological notes: Tube builder, often found in brackish waters (Lincoln, 1979).

***Leptocheirus* sp.** (Fig. 11B-F)

Material examined: 1 specimen, size 6 mm, collected at Caminha, International Minho River (41°52'59"N/8°50'14"W), 6 April 2020 on glass eel fishing bycatch, deposited as NatMIP-CMAm-0104.

Description: Lateral view (left): Coxal plates elongated and overlapping, plate 2 larger than the rest, partially concealing plate 1 (Fig. 11C). Antenna 1 slightly longer than antenna 2, peduncle article 1 smaller than 2, but longer than 3, accessory flagellum absent, flagellum 17 articulated; antenna 2 peduncle

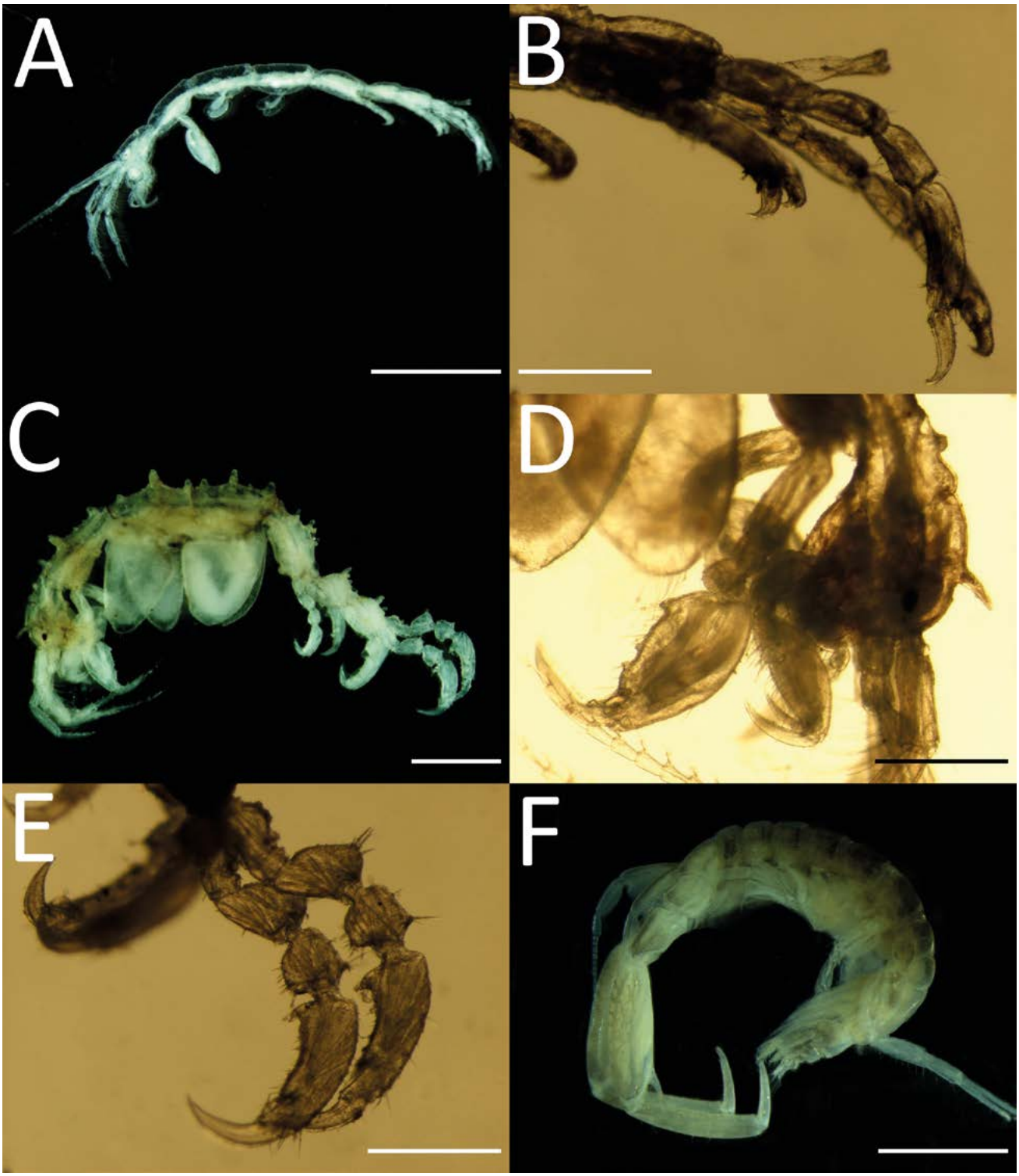


Fig. 10.– *Caprella danilevskii* Czerniavski, 1868: male lateral view (**A**), pereopod 7 (**B**); *Caprella* sp.: female lateral view (**C**), gnathopods 1 and 2 (**D**), pereopod 7 (**E**); *Corophium multisetosum* Stock, 1952: adult lateral view (**F**). Scale bars: A, F = 2 mm; B, D–E = 0.5 mm; C = 1 mm.

Fig. 10.– *Caprella danilevskii* Czerniavski, 1868: vista lateral del macho (**A**), pereópodo 7 (**B**); Caprella sp.: vista lateral de la hembra (**C**), gnatópodos 1 y 2 (**D**), pereópodo 7 (**E**); *Corophium multisetosum* Stock, 1952: vista lateral del adulto (**F**). Escala: A, F = 2 mm; B, D–E = 0.5 mm; C = 1 mm.

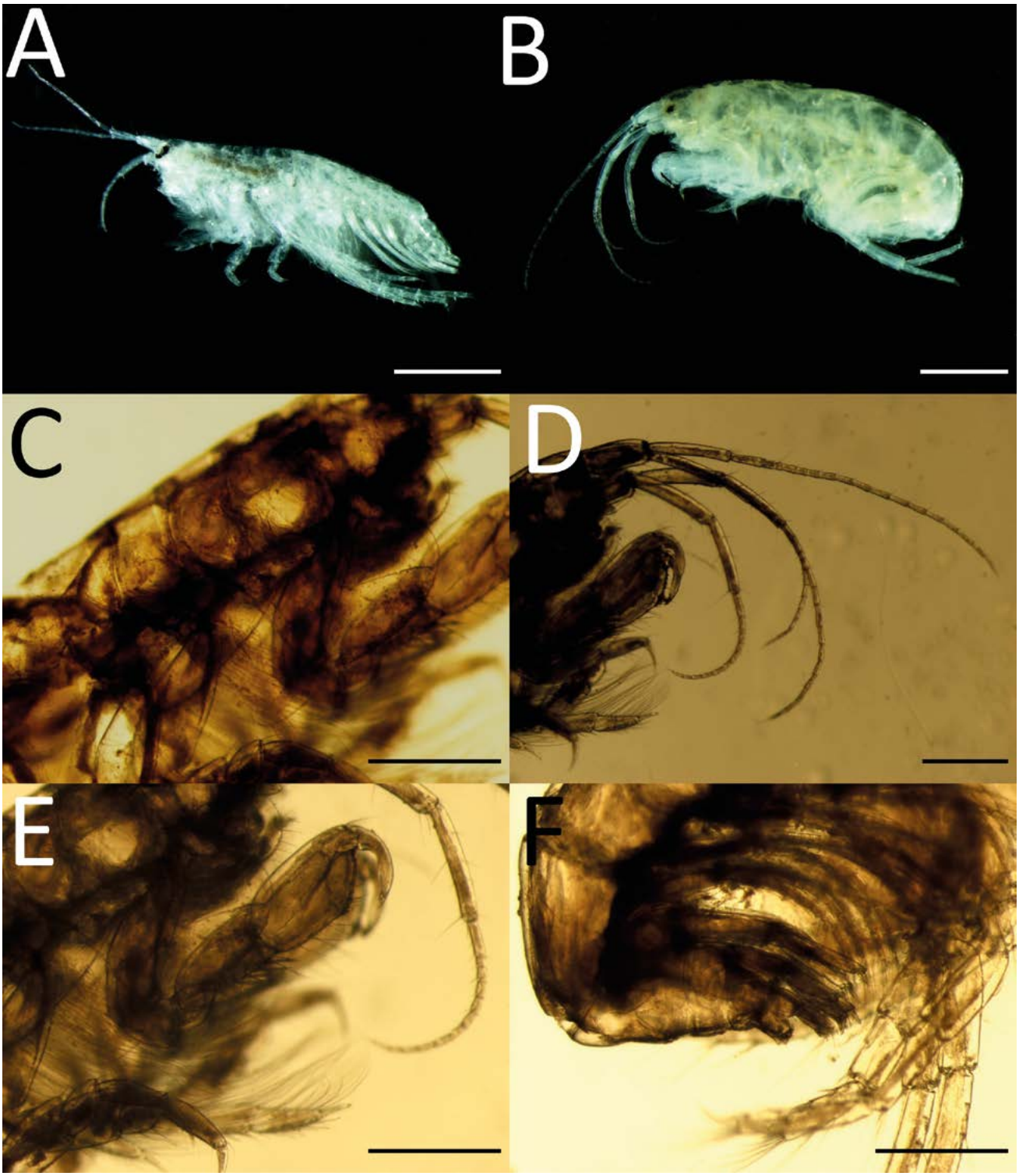


Fig. 11.– *Leptocheirus pilosus* Zaddach, 1844: lateral view (**A**); *Leptocheirus* sp.: adult lateral view (**B**), coxal plates (**C**), antennae (**D**), gnathopod 1 (**E**), uropods (**F**). Scale bars: A–B = 1 mm; C-F = 0.5 mm.

Fig. 11.– *Leptocheirus pilosus* Zaddach, 1844: vista lateral (**A**); *Leptocheirus* sp: vista lateral del adulto (**B**), placas coxales (**C**), antenas (**D**), gnatopodio 1 (**E**), urópodos (**F**). Escala: A–B = 1 mm; C-F = 0.5 mm.

article 1 about one third the length of article 2, article 2 and 3 subequal, flagellum 12 articulated (Fig. 11D). Gnathopod 1 subchelate, propodus and carpus subequal in length; gnathopod 2 slender and simple, basis, merus, carpus and propodus with long plumose setae (Fig. 11E). Pereopods 5-7 basis expanded. Uropods 1 to 3 subequal in length; uropod 3 shorter than 1 and 2, peduncle and rami subequal in length (Fig. 11F). Telson broad with one pair of apical setae.

Remarks: More specimens (males and females) are required for a complete evaluation.

Superfamily Gammaroidea Latreille, 1802
Family Bathyporeiidae d'Udekem d'Acoz, 2011
Genus ***Bathyporeia*** Lindström, 1855

***Bathyporeia robertsoni*** Sars, 1895 (Fig. 12A-C)

*Bathyporeia robertsoni* Sars, 1895: 131-132, Pl. 44 fig. 2 (**original description**). — Stebbing 1906: 121.

*Bathyporeia sarsi* Watkin, 1938: 231-233, fig. 6. — Lincoln 1979: 320, figs. 150F-J. — d'Udekem d'Acoz, 2004: 68-75, figs. 60-69.

Type material: Holotype, adult male collected in Sorvaer, Finnmark, Norway, deposited at Zoological Museum, Oslo (Watkin, 1938).

Type locality: Sorvaer, Finmark, Norway (Sars, 1895).

Material examined: 4 adult specimens, 2 females and 2 males, size range 5 to 6 mm, collected at Caminha, International Minho River (41°52'59"N/8°50'14"W), 6 April 2020 on glass eel fishing bycatch, deposited as NatMIP-CMAm-0083.

Diagnosis: Antenna 1 apex of peduncle article 1 broadly rounded (Fig. 12B); pleonite 4 dorsally depressed with pair of anteriorly directed setae and without posteriorly directed spines; epimeral plate 3 distal margin with 4-6 spine groups (Fig. 12C) (Lincoln, 1979).

Geographical distribution: Northeast Atlantic from Norway to English Channel (Lincoln, 1979).

Distribution in Portugal: Species recorded at International Minho River (this study), Mondego River estuary (Marques *et al.*, 1993) and at the southwestern Portuguese coast (Marques & Bellan-Santini, 1991).

Ecological notes: Burrower, depth range from intertidal to about 20 m (Lincoln, 1979).

Remarks: After a re-examination of Sars (1895) specimens, Watkin (1938) confirmed that Sars misidentified his specimens as *Bathyporeia robertsoni* Bate, 1862, and erected *Bathyporeia sarsi*, based on Sars' material. Furthermore Barclay (1982) re-examination of Bate's *B. robertsoni*, confirmed that it was a junior synonym of *Bathyporeia pilosa* Lindström, 1855. As Bate's *B. robertsoni* was confirmed as a synonym of *B. pilosa*, Sars's *B. robertsoni* has priority over Watkin's *B. sarsi*, since Sars provided its original description, so we propose that *B. sarsi* should be accepted as *Bathyporeia robertsoni* Sars, 1895.

Family Gammaridae Leach, 1814
Genus ***Gammarus*** Fabricius, 1775

***Gammarus chevreuxi*** Sexton, 1913 (Fig. 12D-E)

*Gammarus chevreuxi* Sexton, 1913: 542-545, figs. 1-5. — Chevreux & Fage 1925: 255-256, fig. 266. — Lincoln, 1979: 256, figs. l18A-I.

Type material: Unknown.

Type locality: Plym River, Devon Meadow, England (Sexton, 1913).

Material examined: 4 adult specimens, size range 5 to 8 mm, collected at Caminha, International Minho River (41°52'59"N/8°50'14"W), 6 April 2020 on glass eel fishing bycatch, deposited as NatMIP-CMAm-0086.

Diagnosis: Antenna 2 and gnathopods in mature male with long curled setae; mandible palp article 3 ventral setae comb-like (Fig. 12E); pereopods 6-7 basis posterodistal angle not produced; uropod 3 inner ramus between one-half and two-thirds the length of outer ramus (Lincoln, 1979).

Geographical distribution: Northeast Atlantic from north Wales to south Morocco (Lincoln, 1979).

Distribution in Portugal: Species recorded at the Minho (van Maren, 1975; Mazé *et al.*, 1993; Sousa *et al.*, 2008) and Douro estuaries and Esposende (van Maren, 1975), also recorded at Ria de Aveiro (Cunha *et al.*, 1999; Costa *et al.*, 2004) and Figueira da Foz (Stock, 1967) and Mira River (Marques & Bellan-Santini, 1987).

Ecological notes: Brackish water species found in marshy areas and on mud, sand and stones within estuaries (Lincoln, 1979).

Genus ***Marinogammarus*** Schellenberg, 1937

***Marinogammarus marinus*** (Leach, 1815) (Figs. 12F, 13A-B)

*Gammarus marinus* Leach, 1815: 359 (**original description**). — Bate & Westwood, 1863: 370-375. — Sars, 1895: 497-498, Pl. 175. — Stebbing, 1906: 472-473. — Chevreux & Fage, 1925: 250-251, fig. 261

*Marinogammarus marinus* – Sexton & Spooner, 1940: 638-644, figs. 1A-I, 2A-J.

*Chaetogammarus marinus* – Lincoln, 1979: 266, figs. 122A, 123A-J.

*Echinogammarus marinus* – Pinkster, 1993: 148-150, fig. 63

Type material: Holotype, deposited at Natural History Museum, London, catalogue number White 1 289.a-e (GBIF.org, 2021)

Type locality: Devonshire, Great Britain (Leach, 1815).

Material examined: 2 adult specimens, size range 15 to 17 mm, collected at Caminha, International Minho River (41°51'58.3"N/8°50'55.8"W), September 2021 on *Fucus* cf. *spiralis* Linnaeus 1753, deposited as NatMIP-CMAm-0106.

Diagnosis: Antenna 1 peduncle article 1 longer than 2, article 3 about half length of 2, flagellum up to 50 articulated; accessory flagellum 7 to 9 articulated; antenna 2 densely setose; urosome segments 1-3 each with numerous dorsal spines in transverse rows (Fig. 13A); uropod 3 outer ramus densely setose along both margins inner ramus spinose and setose (Fig. 13B); telson with small group of lateral and apical spines and few short setae on each lobe (Lincoln, 1979).

Geographical distribution: Northeast Atlantic from Norway to Portugal (Lincoln, 1979).

Distribution in Portugal: Species recorded at International Minho River (this study), and Mondego estuary (Maranhão *et al.*, 2001).

Ecological notes: Intertidal, upper shore, usually beneath algae on stones, tolerates reduced salinities (Lincoln, 1979).

Genus ***Relictogammarus*** Hou & Sket, 2016

***Relictogammarus stoerensis*** (Reid, 1938) (Fig. 13C-D)

*Gammarus marinus* var. *stoerensis* Reid, 1938: 287-289, figs. A-E (**original description**).

*Gammarus* (*Marinogammarus*) *stoerensis* – Stephensen, 1938: 143-146.

*Marinogammarus stoerensis* – Sexton & Spooner, 1940: 662-667, figs. 8A-O, 11A.

*Chaetogammarus stoerensis* – Lincoln, 1979: 270, figs. 125A-J.

*Echinogammarus stoerensis* – Pinkster, 1993: 155-158, fig. 66.

*Relictogammarus stoerensis* – Hou & Sket, 2016: 330, 336.

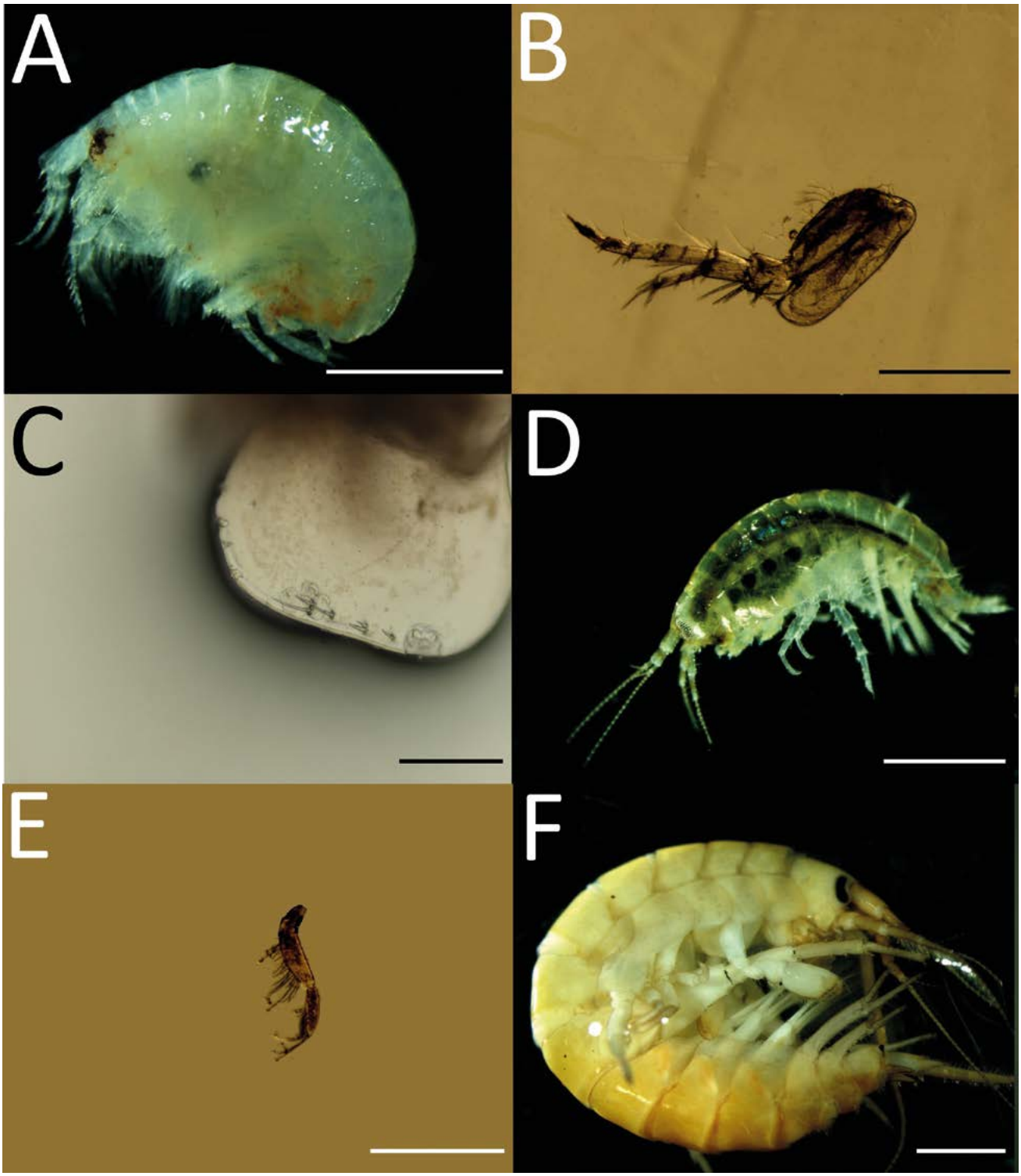


Fig. 12.– *Bathyporeia robertsoni* Sars, 1895: adult female lateral view (**A**), antenna 1 (**B**), epimeral plate 3 (**C**); *Gammarus chevreuxi* Sexton, 1913: adult lateral view (**D**), mandible palp (**E**), *Marinogammarus marinus* (Leach, 1815): adult lateral view (**F**). Scale bars: A, C, F = 2 mm; B, D–E = 0.5 mm.

Fig. 12.– *Bathyporeia robertsoni* Sars, 1895: vista lateral de la hembra adulta (**A**), antena 1 (**B**), placa epimeral 3 (**C**); *Gammarus chevreuxi* Sexton, 1913: vista lateral del adulto (**D**), palpo de la mandíbula (**E**), *Marinogammarus marinus* (Leach, 1815): vista lateral del adulto (**F**). Escala: A, C, F = 2 mm; B, D–E = 0.5 mm.

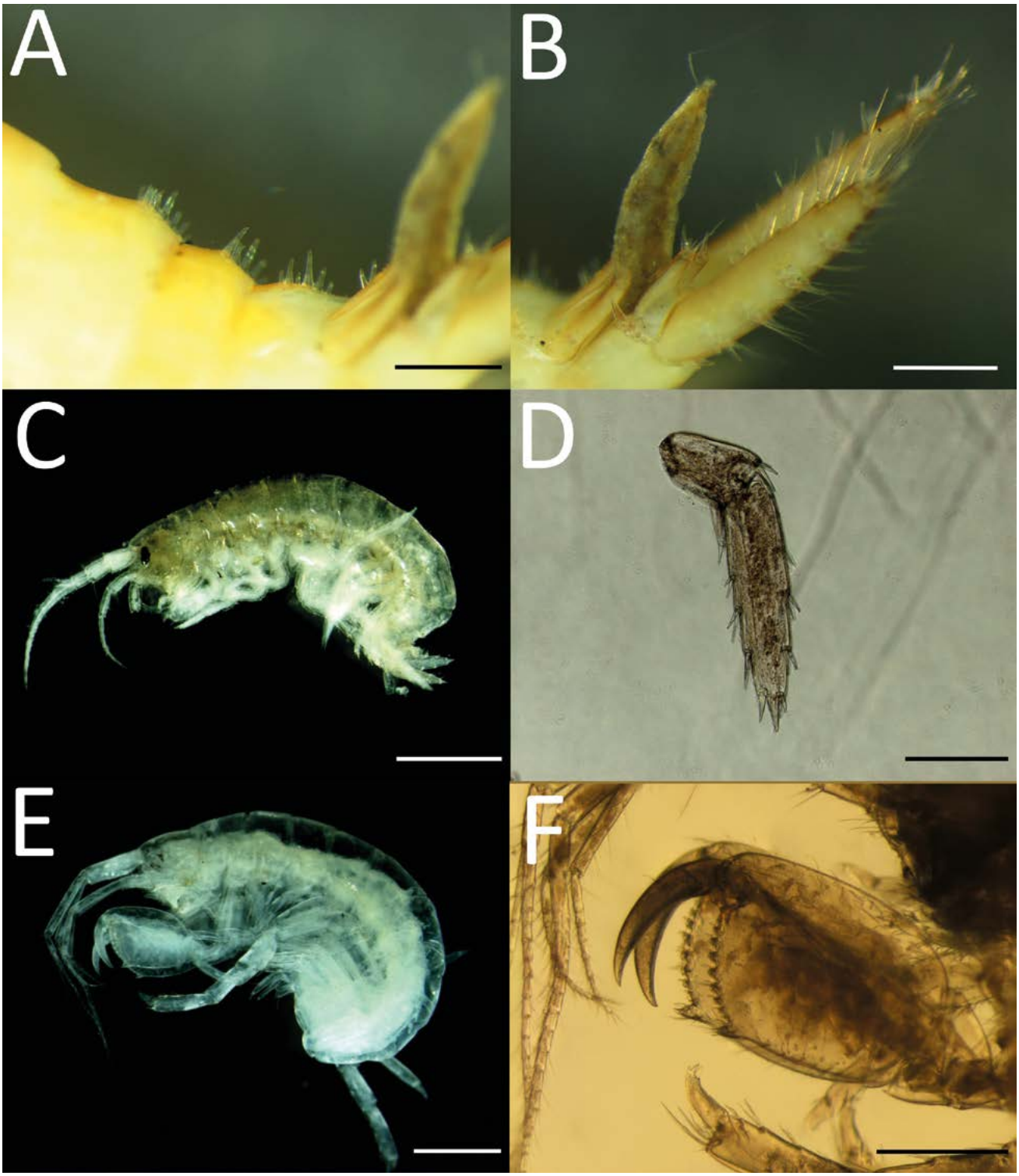


Fig. 13.– *Marinogammarus marinus* (Leach, 1815): urosome (**A**), uropod 3 (**B**); *Relictogammarus stoerensis* (Reid, 1938): adult lateral view (**C**), uropod 3 (**D**); *Maera grossimana* (Montagu, 1808): adult lateral view (**E**), gnathopod 1 (**F**). Scale bars: A–B, F = 0.5 mm; C, E = 1 mm; D = 0.25 mm.

Fig. 13.– *Marinogammarus marinus* (Leach, 1815): urosoma (**A**), urópodo 3 (**B**); *Relictogammarus stoerensis* (Reid, 1938): vista lateral del adulto (**C**), urópodo 3 (**D**); *Maera grossimana* (Montagu, 1808): vista lateral del adulto (**E**), gnatopodio 1 (**F**). Escala: A–B, F = 0.5 mm; C, E = 1 mm; D = 0.25 mm.

Type material: Unknown.
Type locality: Stoer Bay, Scotland (Reid, 1938).
Material examined: 1 specimen, size 4 mm, collected at Caminha, International Minho River (41°52'04.8"N/8°51'18.8"W), June 2021 on beam trawl, deposited as NatMIP-CMAm-0095, uropod 3 on mounted blade.
Diagnosis: Antenna 1 slightly less than half the body length and longer than antenna 2, flagellum 14 to 17 articulated, accessory flagellum 3 to 4 articulated; antenna 2 flagellum 11 to 13 articulated; uropod 3 outer ramus with spinose inner and outer margins and without setae, inner ramus small and scale-like (Fig. 13D) (Lincoln, 1979; Pinkster, 1993).
Geographical distribution: Northeast Atlantic from Norway to Iberian Peninsula (Pinkster, 1993).
Distribution in Portugal: Species recorded at International Minho River (this study), and Mondego River (Pinkster, 1993).
Ecological notes: Intertidal species, vertically distributed from high to low water neaps, usually in areas with freshwater flow, on course gravel beaches (Pinkster, 1993).

Superfamily Hadzioidea Karaman, 1943
Family Maeridae Krapp-Schickel, 2008
Genus ***Maera*** Leach, 1814

***Maera grossimana*** (Montagu, 1808) (Fig. 13E-F)
*Cancer* (*Gammarus*) *grossimanus* Montagu, 1808: 97-98, Tab. IV fig. 5 (**original description**).
*Maera grossimana* – Leach, 1814: 403. — Bate & Westwood, 1863: 350-352. — Stebbing, 1906: 435. — Chevreux & Fage, 1925: 239-240, figs. 248, 250. — Lincoln, 1979: 282, figs. 131A-F.
*Maera grossimanus* – Bate, 1862: 188-189, Pl. XXXIV fig. 3.
Type material: Holotype deposited at Natural History Museum, London, catalogue number White 1 287.a-f (GBIF.org, 2021).
Type locality: Devonshire, Scotland (Montagu, 1808).
Material examined: 1 adult specimen, size 6 mm, collected at Caminha, International Minho River (41°52'59"N/8°50'14"W), 6 April 2020 on glass eel fishing bycatch, deposited as NatMIP-CMAm-0103.
Diagnosis: Antenna 1 about half body length, peduncle long and slender, flagellum shorter than peduncle; accessory flagellum elongated 8-articulated; antenna 2 shorter than antenna 1, flagellum short 8 articulated; gnathopod 2 much larger than gnathopod 1, especially in males, propodus broad, palm with double row of small spines and small tooth and 2 long spines on inferior margin (Fig. 13F); epimeral plate 3 with tooth on inferior margin; uropod 3 rami subequal (Lincoln, 1979).
Geographical distribution: Atlantic Ocean from English Channel to southwest Africa, Azores and Canary islands and Mediterranean sea (Lincoln, 1979).
Distribution in Portugal: Species recorded at International Minho River (this study), along the southwestern coast (Marques & Bellan-Santini, 1991, 1993; Carvalho *et al.*, 2012) and on Azores archipelago (Borges *et al.*, 2010).
Ecological notes: Depth range about 0 to 150 m (Lincoln, 1979).

Family Melitidae Bousfield, 1973
Genus ***Abludomelita*** Karaman, 1981

***Abludomelita gladiosa*** (Bate, 1862) (Fig. 14A-B)
*Melita gladiosa* Bate, 1862: 185, Pl. XXXIII fig. 6 (**original description**). — Bate & Westwood, 1863: 346-347. — Stebbing, 1906: 428. — Chevreux & Fage, 1925: 233-234, fig. 244. — Lincoln, 1979: 302, figs. 137C, 141A-I.
*Abludomelita gladiosa* – Jarrett & Bousfield, 1995: fig. 2.
Type material: Holotype, specimen deposited at Museum of the Jardin des Plantes (Bate, 1862).
Type locality: Boulogne, France (Bate, 1862).
Material examined: 1 adult female, with antenna 1 missing, size 9.7 mm, collected at Caminha, International Minho River (41°52'59"N/8°50'14"W), 6 April 2020 on glass eel fishing bycatch, deposited as NatMIP-CMAm-0074.
Diagnosis: Female gnathopod 2 larger than gnathopod 1, propodus subrectangular, palm oblique, weakly sinuous and delimited by small spine; male gnathopod 2 robust, merus distally acute, propodus large and broad distally, palm irregularly toothed, inner surface of propodus with small tooth, dactylus broad and flattened with subacute apex; pleonites 1-5 each with 3 dorsal teeth, pleonite 6 also with small teeth; epimeral plate 3 serrated with distal angle with large upturned tooth (Fig. 14B), distinctly serrate (Lincoln, 1979).
Geographical distribution: Northeast Atlantic from English Channel to Mediterranean and Azores (Lincoln, 1979).
Distribution in Portugal: Species recorded at International Minho River (this study), Sado estuary (Carvalho *et al.*, 2001) and on Azores archipelago (Borges *et al.*, 2010).
Ecological notes: Depth range 10-250 m (Lincoln, 1979).

Genus ***Melita*** Leach, 1814

***Melita palmata*** (Montagu, 1804) (Fig. 14C-D)
*Cancer palmatus* Montagu, 1804: 69, Tab. VI fig. 4 (**original description**).
*Astacus palmatus* – Pennant, 1812: 35.
*Melita palmata* – Leach, 1814. — 403. — Bate, 1857: 144; 1862: 182-183, Pl. XXXIII fig. 2. — Bate & Westwood, 1863: 337-340. — Sars, 1895: 508-509, Pl. 179. — Stebbing, 1906: 425. — Chevreux & Fage, 1925: 230-231, fig. 241. — Lincoln, 1979: 298, figs. 137A, 139A-J.
*Gammarus dugesii* Milne-Edwards, 1830: 368.
*Gammarus inaequimanus* Bate, 1857: 145.
Type material: Unknown.
Type locality: Devonshire, England (Montagu, 1808).
Material examined: 3 adult specimens, 1 adult male size 9.7 mm, collected at Caminha, International Minho River (41°52'59"N/8°50'14"W), 6 April 2020 on glass eel fishing bycatch, deposited as NatMIP-CMAm-0069; 2 adult females, one ovigerous size range 6 to 7 mm, same data as preceding, deposited as NatMIP-CMAm-0081.
Diagnosis: Pleonites without teeth on dorsal margin; first urosome segment with a single dorsal tooth; uropod 3 inner ramus less than half the length of outer ramus, outer ramus longer than peduncle; telson with apical spines (Lincoln, 1979).
Geographical distribution: Northeast Atlantic from Norway to Iberian Peninsula and Macaronesian archipelagos and on the Mediterranean and Black seas (Lincoln, 1979).
Distribution in Portugal: Species recorded at the Minho (Mazé *et al.*, 1993), Mondego (Marques *et al.*, 1993), Tejo (Rodrigues *et al.*, 2006) and Mira (Marques & Bellan-Santini, 1987) estuaries, at Ria de Aveiro (Cunha *et al.*, 1999) and Ria Formosa (Cruz *et al.*, 2003), along the Portuguese coast (van Maren, 1975) and on Azores archipelago (Borges *et al.*, 2010).
Ecological notes: Usually found on sheltered beaches in sediments of sand or mud with stones, depth range from intertidal to 50 m tolerant to a wide range of salinity (Lincoln, 1979).

Superfamily Hyaloidea Bulyčeva, 1957
Family Hyalidae Bulyčeva, 1957
Genus ***Protohyale*** Bousfield & Hendrycks, 2002

***Protohyale* (*Protohyale*) sp.** (Fig. 15A-D)
Material examined: 1 male adult, size 6 mm, collected at Caminha, International Minho River (41°52'59"N/8°50'14"W), 6 April

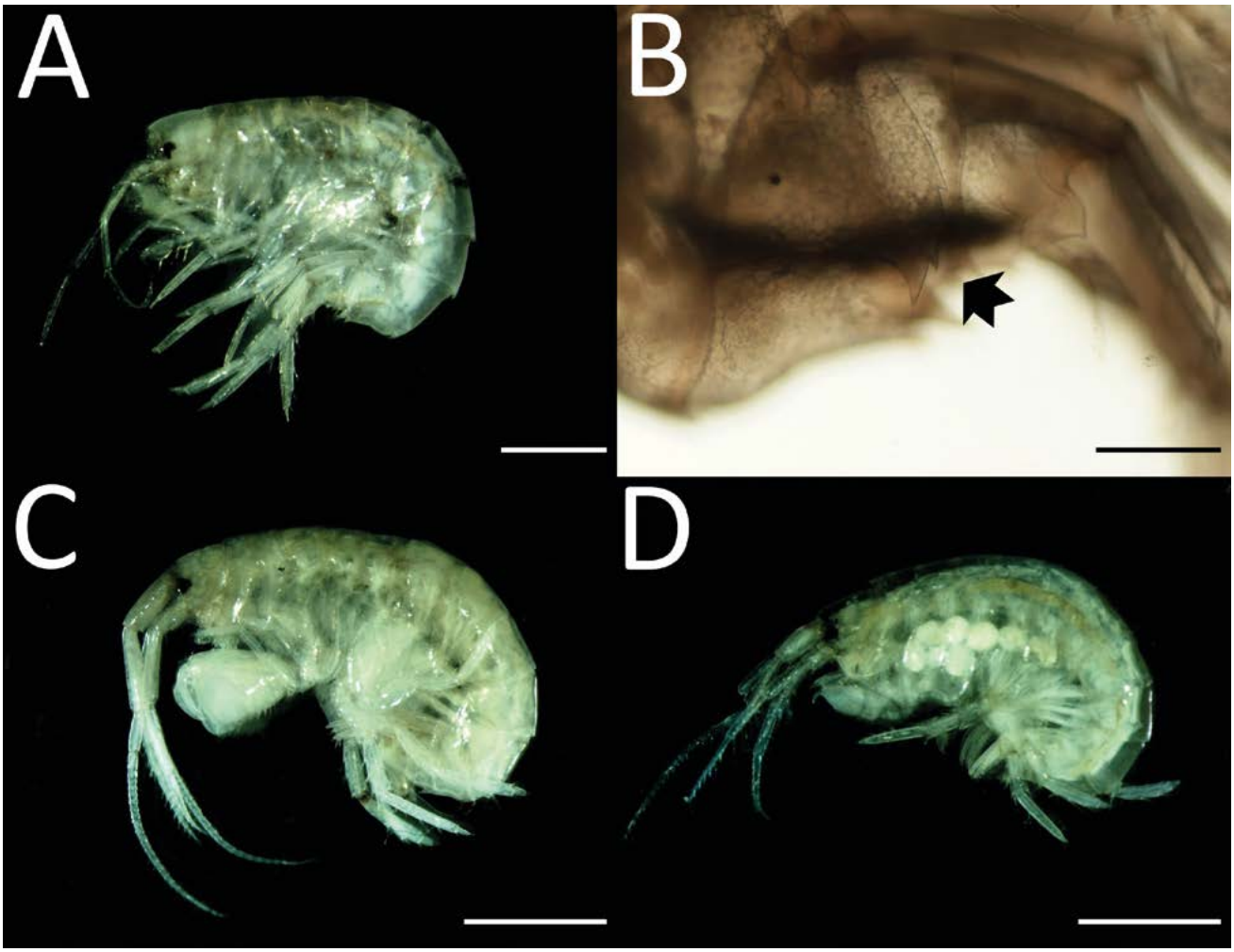


Fig. 14.– *Abludomelita gladiosa* (Bate, 1862): adult lateral view (**A**), epimeral plate 3 (arrow highlighting serration on inferior margin) (**B**); *Melita palmata* (Montagu, 1804): adult male lateral view (**C**), adult female lateral view (**D**). Scale bars: A = 1 mm; B = 0.25 mm; C–D = 2 mm.

Fig. 14.– *Abludomelita gladiosa* (Bate, 1862): vista lateral del adulto (**A**), placa epimeral 3 (flecha resaltando la serración en el margen inferior) (**B**); *Melita palmata* (Montagu, 1804): vista lateral del macho adulto (**C**), vista lateral de la hembra adulta (**D**). Escala: A = 1 mm; B = 0.25 mm; C–D = 2 mm.

2020 on glass eel fishing bycatch, deposited as NatMIP-CMAm-0097.

Description: Antenna 1 longer than antenna 2 pedunculum, flagellum with 14 segments; antenna 2 one third the body length, flagellum with 29 segments. Gnathopod 1 propodus oval with group of setae on palm; gnathopod 2 propodus about 3 times the size of gnathopod 1, gnathopod 2 propodus formed by two balloon-like structures with similar size, with a lobed structure rising from propodus midline forming a hook-like structure on the anterior apical margin (Fig. 15B–C). Merus and carpus with small lobes carrying 3 and 4 spines respectively; propodus with 5 spines across the inferior margin; dactylus hook-like, about one third the propodus length. Uropods with 4 apical spines on each ramus; uropod 1 and 2 biramous; uropod 2 reaching uropod 1; uropod 3 uniramous, not reaching uropod 2 (Fig. 15D). Telson not armed with spines or setae.

Remarks: According to Costello *et al.* (2021) three species of *Protohyale* (*Protohyale*) occur on Europe *Protohyale* (*Protohyale*) *dollfusi* (Chevreux, 1911), *Protohyale* (*Protohyale*) *grimaldii* (Chevreux, 1891) and *Protohyale* (*Protohyale*) *schmidtii* (Heller, 1866), nonetheless this species recorded at the Minho river differs from all of them on the shape of gnathopod 2 propodus and number of segments of antenna 2. More specimens (mainly females) are required for a complete evaluation, and confirmation of a possible new species.

Superfamily Photoidea Boeck, 1871
Family Ischyroceridae Stebbing, 1899
Genus ***Jassa*** Leach, 1814

***Jassa falcata*** (Montagu, 1808) (Fig. 15E)

*Cancer* (*Gammarus*) *falcatus* Montagu, 1808: 100, Tab. V fig. 2 (**original description**).

*Jassa pulchella* Leach, 1814: 433. — Stebbing, 1906: 654-655.

*Podocerus calcaratus* Rathke, 1843: 91-93, Tab. IV fig. 9.

*Podocerus falcatus* Bate, 1857: 148. — Bate & Westwood, 1863: 445-446. — Sars, 1895: 594-595, Pl. 212.

*Podocerus odontonyx* Sars, 1895: 597-598, Pl. 213.

*Jassa falcata* – Chevreux & Fage, 1925: 344-346, figs. 352-353. — Reid, 1951: 266, fig. 56. — Sexton & Reid, 1951: 30-33. — Lincoln, 1979: 650, figs. 263A-B, 264A-J. — Conlan, 1990: 2069-2071, figs. 1-6, 8-10, 23. — Conlan *et al.*, 2021: 81-87, figs. 42-47.

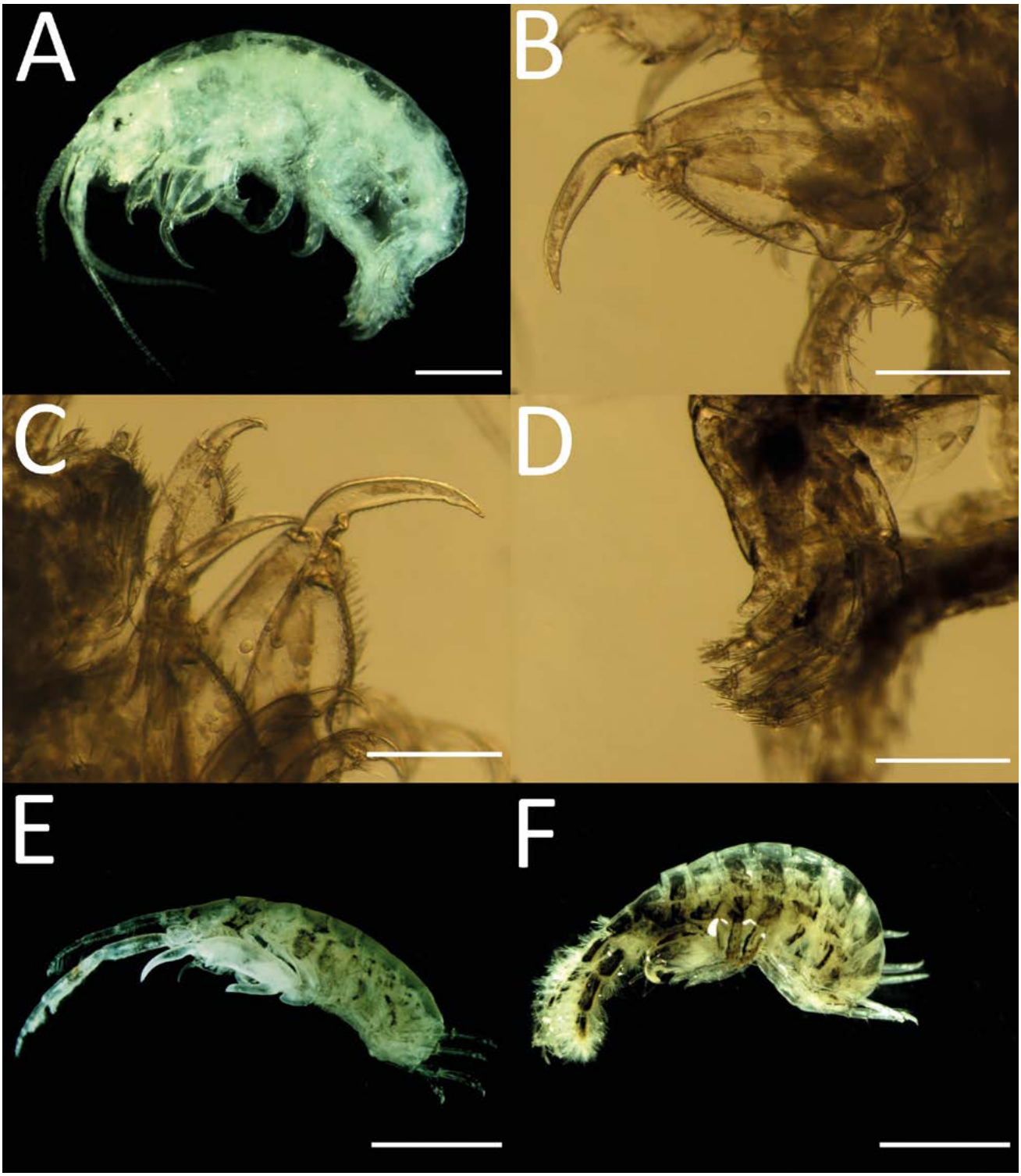


Fig. 15.– *Protohyale (Protohyale)* sp.: adult lateral view (**A**), gnathopod 2 (**B**), gnathopods 1 and 2 (**C**), uropods (**D**); *Jassa falcata* (Montagu, 1808): adult male lateral view (**E**); *Parajassa pelagica* (Leach, 1814): adult lateral view (**F**). Scale bars: A = 1 mm; B–D = 0.5 mm; E–F = 2 mm.

Fig. 15.– *Protohyale (Protohyale)* sp.: vista lateral del adulto (**A**), gnatopodio 2 (**B**), gnatópodos 1 y 2 (**C**), urópodos (**D**); *Jassa falcata* (Montagu, 1808): vista lateral del macho adulto (**E**); *Parajassa pelagica* (Leach, 1814): vista lateral del adulto (**F**). Escalas: A = 1 mm; B–D = 0.5 mm; E–F = 2 mm.

Type material: Holotype, adult male, length 6.3 mm; collected at Torcross, South Devon, England; deposited at Natural History Museum (London) catalogue number NHM 603a (Conlan *et al.*, 2021).

Type locality: Devonshire, England (Montagu, 1808).

Material examined: 4 adult specimens, size range 6.8 to 7.6 mm, collected at Caminha, International Minho River (41°52'59"N/8°50'14"W), 6 April 2020 on glass eel fishing bycatch, deposited as NatMIP-CMAm-0084.

Diagnosis: Gnathopod 1 basis anterolateral margin with few very short setae; carpus without setae at the anterodistal junction of the propodus; gnathopod 2 basis with few small setae on the anterolateral; propodus of pereopods 5-7 not expanded anteriorly; uropod 1 ventral spinous process with about half of the longest ramus; uropod 3 inner ramus with 1–2 dorsal spines and a single apical spine (Conlan *et al.*, 2021).

Geographical distribution: Cosmopolitan (Lincoln, 1979).

Distribution in Portugal: Species recorded at International Minho River (this study), Ria de Aveiro (Cunha *et al.*, 1999), Mondego River, Figueira da Foz (Dexter, 1992), along the west coast (Izquierdo & Guerra-García, 2011; Guerra-García *et al.*, 2012) and Azores archipelago (Borges *et al.*, 2010).

Ecological notes: Constructs tubes on algae or hydroids, or on solid artificial surfaces such as buoys, rafts or ship hulls (Lincoln, 1979), collected on *Corallina elongata* (Izquierdo & Guerra-García, 2011; Guerra-García *et al.*, 2012).

Genus ***Parajassa*** Stebbing, 1899

***Parajassa pelagica*** (Leach, 1814) (Fig. 15F)

*Jassa pelagica* Leach, 1814: 433 (**original description**); 1815: 361

*Podocerus capillatus* Rathke, 1843: 89-91, Tab. IV fig. 8. — Bate & Westwood, 1863: 442-444.

*Jassa capillata* – Bruzelius, 1858: 19-20.

*Janassa variegata* Boeck & Boeck, 1872: 608-611, Pl. XXVIII fig. 1, Pl. XXIX fig. 2.

*Janassa capillata* – Sars, 1895: 599-600, Pl. 214.

*Parajassa pelagica* – Stebbing, 1899: 237-240. — Chevreux & Fage, 1925: 349-350, fig. 357. — Lincoln. 1979: 562, figs. 270A-F.

Type material: Unknown.

Type locality: Bell Rock, Scotland (Leach, 1815).

Material examined: 1 adult specimen, size 6 mm, collected at Caminha, International Minho River (41°52'59"N/8°50'14"W), 6 April 2020 on glass eel fishing bycatch, deposited as NatMIP-CMAm-0033.

Diagnosis: Antennae very characteristic, short and robust with dense tuffs of long setae, especially in large male; accessory flagellum rudimentary; pereopod 7 basis with posterodistal angle prolonged and narrowly rounded (Lincoln, 1979).

Geographical distribution: Arctic Ocean and Northeast Atlantic from Norway to Portugal (Lincoln, 1979).

Distribution in Portugal: Species recorded at International Minho River (this study), on the gut content of *Lipophrys pholis* (Linnaeus, 1758) collected in Aguda (Monteiro *et al.*, 2005) and along the western coast (Izquierdo & Guerra-García, 2011; Guerra-García *et al.*, 2012).

Ecological notes: Among algae and hydroids (Lincoln, 1979), collected on *Corallina elongata* (Izquierdo & Guerra-García, 2011; Guerra-García *et al.*, 2012).

## Discussion

From the 34 species collected, five were previously recorded on the Minho river estuary, i.e. *Haustorius arenarius* (Slabber, 1778), *Corophium multisetosum* Stock, 1952, *Leptocheirus pilosus* Zaddach, 1844, *Melita palmata* (Montagu, 1804) and *Gammarus chevreuxi* Sexton, 1913 (van Maren, 1975; Mazé *et al.*, 1993; Sousa *et al.*, 2008; Picanço *et al.*, 2014). Six species were recorded along the coastal line adjacent (i.e. subtidal zone) to the Minho and Lima rivers mouth: *Nototropis vedlomensis* (Bate & Westwood, 1863), *Lepidepecreum longicorne* (Bate, 1862), *Urothoe brevicornis* Bate, 1862, *Tryphosites longipes* (Bate, 1862), *Ampelisca armoricana* Bellan-Santini & Dauvin, 1981 and *Ampelisca pectenata* Reid, 1951 (Marques & Bellan-Santini, 1993), which could explain their presence on brackish waters (such as in this study) during the high flood tides. Of those 34 species recorded, 23 were new records for the Minho River (*Nototropis guttatus* (Costa, 1851), *Abludomelita gladiosa* (Bate, 1862), *Ampelisca aequicornis* Bruzelius, 1858, *Ampelisca lusitanica* Bellan-Santini & Marques, 1986, *Ampelisca rubella* Costa, 1864, *Ampelisca serraticaudata* Chevreux, 1888, *Ampelisca spinimana* Chevreux, 1887, *Apherusa jurinei* (Milne-Edwards, 1830), *Aora gracilis* (Bate, 1857), *Bathyporeia robertsoni Sars*, 1895, *Caprella danilevskii* Czerniavski, 1868, *Dexamine spinosa* (Montagu, 1813), *Marinogammarus marinus* (Leach, 1815), *Relictogammarus stoerensis* (Reid, 1938), *Jassa falcata* (Montagu, 1808), *Maera grossimana* (Montagu, 1808), *Parajassa pelagica* (Leach, 1814) plus the 5 not fully identified species which do not match any of the amphipod species recorded for the Minho River) with the presence of a new record for Portuguese waters, *Parametopa kervillei* Chevreux, 1901 which was only recorded to date on the north French coast and on the British Isles, extending its southern distribution range to the north of the Iberian Peninsula. The genus *Ampelisca* was the most represented group with 7 species recorded. For the first time a male specimen of *Ampelisca rubella* Costa, 1864 was described, complementing the descriptions based on female specimens. Most species are fully marine, with the exception of *Haustorius arenarius*, *Corophium multisetosum*, *Leptocheirus pilosus*, and *Gammarus chevreuxi* common on the brackish waters of the estuary. High flood tide dynamics seem to bring an unexpected amount of marine adventitious fauna well inside estuary boundaries, since most specimens were collected on the water column with a stationary net capturing organisms transported upstream (e.g. Weber, 1986) (with mostly brackish species during the first hour of continuous sampling, and only marine species on the subsequent hours), providing opportunities on data collection about the populations present on the coastal lines adjacent to the estuary. However, ecological data cannot be collected as those organisms are carried by the water strength. Nonetheless, an in-depth analysis on the lower estuary macroinvertebrate communities may provide insight

on shifting population dynamics or on the periods in which those species remain at more brackish areas.

On five of those species a full identification was not possible due to the scarcity or fragmentation of the information on certain amphipod groups however the possibility of being new or exotic species cannot be ruled out.

## Conclusions

This represents the first taxonomic study on Amphipoda from the International Minho River, contributing to the knowledge of the Portuguese and Iberian fauna. Apart from a few brackish species which reside permanently on the river estuary, most of the amphipod fauna examined was marine adventitious fauna transported upstream trough high flood tide dynamics.

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