

Leucothoe cathalaa sp. nov. (Crustacea: Amphipoda: Leucothoidae), a new bathyal benthic species from the Le Danois Bank ('El Cachucho' Spanish MPA), southern Bay of Biscay

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A new bathyal leucothoid amphipod, Leucothoe cathalaa sp. nov., is described and illustrated based on specimens collected at the Le Danois Bank ('El Cachucho' Marine Protected Area), southern Bay of Biscay. This species can be distinguished from the other species of the genus *Leucothoe* by the hardly visible eyes (translucent ocelli, in preserved specimens); antenna 1 with minute accessory flagellum; coxae 1–3 with 2 serrations on posterodistal margin; epimeron 3 posterodistal corner produced, bifid, with one seta between blunt lobes and telson apex pointed without accessory teeth. In live specimens, the eyes are easily visible, each represented as a rounded whitish-pigmented spot. The new species has been found living on fine sandy soft-bottoms between 486 and 574 m depth at the top of the bank. An identification key to the deep Atlantic European species of *Leucothoe* is provided, as well as ecological and biological comments.

Keywords: Amphipoda, Leucothoidae, *Leucothoe*, new species, Le Danois Bank, 'El Cachucho' MPA, Bay of Biscay, deep-sea

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INTRODUCTION

The family Leucothoidae has been reported from all the world's oceans and currently comprises 5 genera (White, 2011), where the genus *Leucothoe* is the only one reported in European Atlantic waters. The *Leucothoe* genus contains 115 valid species (White, 2011; White & Reimer, 2012a, b, c), 42 known from the Atlantic Ocean, where only 8 of them have been recorded on bottoms >200 m depth (White, 2011): *L. spinicarpa* (Abildgaard, 1789; *sensu* Crowe, 2006) (north-east Atlantic, 50–300 m); *L. lilljeborgii* Boeck, 1861 (north-east Atlantic and Mediterranean, 10–2700 m); *L. miersi* Stebbing, 1888 (South Africa, 274 m); *L. rostrata* Chevreux, 1908 (Azores, 1360–1919 m); *L. spinulosa* Chevreux, 1919–1920 (off Mauritania, 235 m); *L. uschakovi* Gurjanova, 1951 (North Atlantic, 2750–3550 m); *L. ayrtonia* Bellan-Santini, 1997 (Barbados Trench, 1947 m) and *L. atosi* Bellan-Santini, 2007 (Mid-Atlantic Ridge, 850 m). In the deep Bay of Biscay, *Leucothoe* species were mentioned neither by Bonnier (1896) ('Caudan' survey) nor by Lagardère (1977) (pioneering study on the bathymetric distribution of species). However, recent studies in the same area reported *Leucothoe lilljeborgii* from Éperon Berthois

(Dewicke, 2002: 253–312 m) and Meriadzek Terrace (Vanquickenberge, 2005: 227–352 m).

During a multidisciplinary survey of the deep seamount-like Le Danois Bank (southern Bay of Biscay), nowadays classified as the first off-shore Spanish Marine Protected Area (MPA) ('El Cachucho': see Heredia *et al.*, 2008), 41 amphipod families and 121 species were identified (unpublished data). Lysianassidae and Oedicerotidae were the most speciose families whereas Leucothoidae were represented by only one *Leucothoe* species, new to science. This paper deals with the morphological description of this new species. An identification key is provided for all the deep *Leucothoe* species known from European Atlantic waters. Furthermore, some ecological data on the new species are also given.

MATERIALS AND METHODS

Within the ECOMARG project framework (see www.ecomarg.net), two multidisciplinary surveys, ECOMARG 03 (October 2003) and ECOMARG 04 (April 2004), were carried out at the Le Danois Bank (Figure 1). Different devices were used to study benthic and demersal communities of the bank area. The suprabenthic fauna was sampled during daytime with a suprabenthic sled equipped with superimposed nets (0.5 mm mesh size), an opening–closing system of the nets activated by contact with the sea floor, and a

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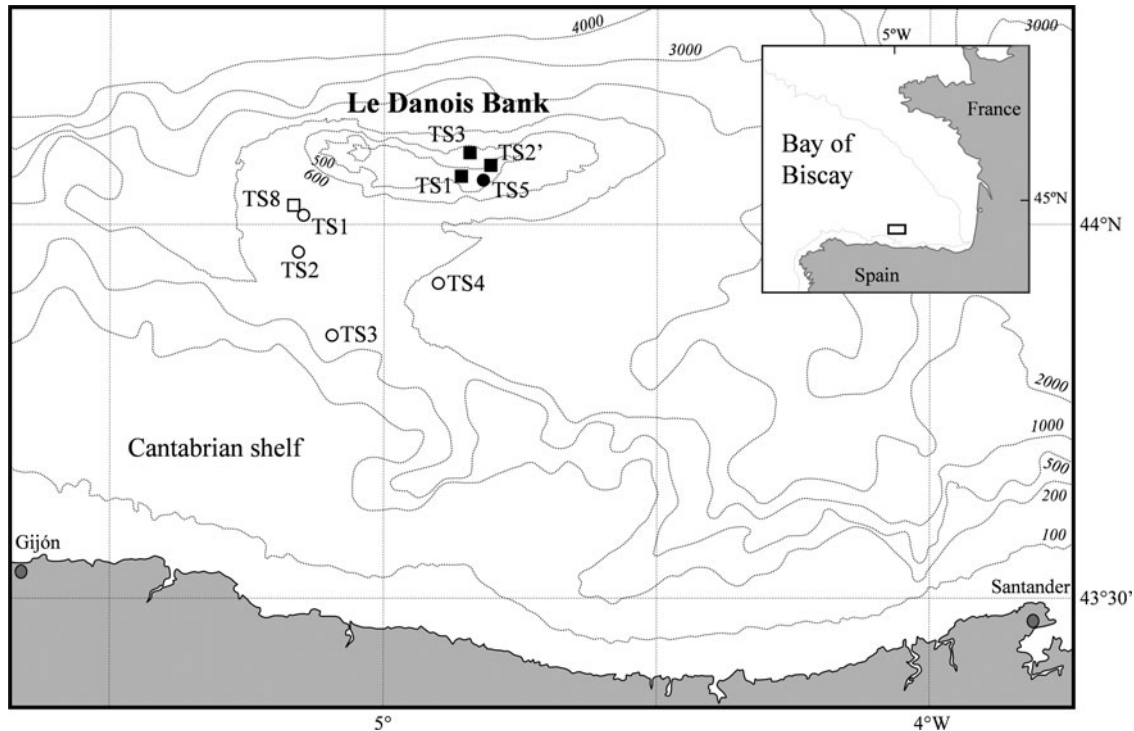


Fig. 1. Location of stations sampled with a suprabenthic sled at the Le Danois Bank ('El Cachucho' MPA) during ECOMARG 03 (squares) and ECOMARG 04 cruises (circles). Solid symbols, samples including *Leucothoe cathalaa* sp. nov. Isobaths in metres.

TSK Flowmeter for haul length estimations (see Sorbe, 1983). The nets quantitatively sample the motile fauna in two near-bottom water layers (0–50 and 50–100 cm above the sea floor). Abundance data are expressed as ind./100 m² according to the area swept by the sled during each haul (0–100 cm water layer). On-board, samples were fixed with a solution of 4% formalin in seawater. At the laboratory, the *Leucothoe* specimens were sorted and stored separately in 70% ethanol for later examination.

The *Leucothoe* specimens examined in the present study were recorded at four stations located between 486 and 574 m depth (Table 1; Figure 1). Males and females specimens were examined. The total body length (BL) was measured on manually extended individuals from the anterior margin of the cephalon to the telson apex. Specimens were examined under a Nikon SMZ 1500 stereomicroscope and drawn with a camera lucida. Dissected appendages were mounted in dimethyl hydantoin formaldehyde and illustrated using an optical microscope, ZEISS 474620-9900, equipped with a camera lucida. Another specimen collected during a more

recent survey (ECOMARG 08 cruise, 15/07/2008, haul Eo8-TSo7a, 44°03.59'N 4°51.06'W, 487 m depth) was photographed alive on-board in order to show the eye structure before preservative-induced modifications.

The morphological nomenclature herein used follows that used by Barnard & Karaman (1991). Setal nomenclature follows the classification system proposed by Garm (2004). The type specimens are deposited in the Museo Nacional de Ciencias Naturales (MNCN), Madrid.

RESULTS

SYSTEMATICS

- Order AMPHIPODA Latreille, 1816
 Suborder GAMMARIDEA Latreille, 1802
 Infraorder GAMMARIDA Latreille, 1802
 Family Leucothoidae Dana, 1852
Leucothoe Leach, 1814
Leucothoe cathalaa sp. nov.
 (Figures 2–6)

Table 1. Haul characteristics and abundance of the amphipod *Leucothoe cathalaa* sp. nov. in the 0–50, 50–100 cm (no. of ind.) and 0–100 cm (ind./100 m²) near-bottom water layers at four stations of the Le Danois Bank ('El Cachucho' MPA) sampled with a suprabenthic sled during ECOMARG 03/04 cruises.

Haul code	Date d/m/y	Time ^a h:m	Position ^a		Depth ^b m	Abundance		
			N	W		0–50	50–100	0–100
Eo3-TS1	15/10/2003	9:58	44°03.93'	4°51.68'	486/486	36	0	28.6
Eo3-TS2'	16/10/2003	11:51	44°04.77'	4°48.49'	499/498	15	0	2.4
Eo3-TS3	17/10/2003	10:28	44°05.85'	4°51.08'	574/574	31	–	8.6
Eo4-TS5	17/04/2004	10:54	44°03.22'	4°49.14'	496/496	4	0	3.0

^aAt beginning of haul; ^bat beginning/end of haul; –, not sampled.

TYPE MATERIAL

Holotype: 1 male, BL 4.0 mm, MNCN 20.04/8680, north-east Atlantic Ocean, Le Danois Bank, RV 'Vizconde de Eza', ECOMARG 03 cruise, 15 October 2003, suprabenthic sled, station E03-TS1a, 44°03.94'N 4°51.68'W, 486 m depth, fine sand, 0–50 cm near-bottom water layer; one vial.

Paratypes: 1 male, BL 3.8 mm, MNCN 20.04/8681, data as for holotype; dissected, two slides and one vial. 1 male, BL 4.3 mm, MNCN 20.04/8682, data as for holotype; dissected, one slide and one vial. 1 male, BL 4.0 mm, MNCN 20.04/8683, data as for holotype; dissected, one slide and one vial. 1 male, BL 4.3 mm, MNCN 20.04/8684, data as for holotype; dissected, one slide and one vial. 1 male, BL 4.3 mm, MNCN 20.04/8685, north-east Atlantic Ocean, Le Danois Bank, RV 'Vizconde de Eza', ECOMARG 03 cruise, 17 October 2003, suprabenthic sled, station E03-TS3b, 44°05.85'N 4°51.08'W, 574 m depth, 0–50 cm near-bottom water layer; dissected, one slide and one vial. 1 brooding female, BL 3.9 mm, MNCN 20.04/8686, north-east Atlantic Ocean, Le Danois Bank, RV 'Vizconde de Eza', ECOMARG 04 cruise, 17 April 2004, suprabenthic sled, station E04-TS5a, 44°03.22'N 4°49.14'W, 496 m depth, 0–50 cm near-bottom water layer; dissected, one slide and one vial.

Type locality: Le Danois Bank ('El Cachucho' MPA), southern Bay of Biscay, north-east Atlantic.

DIAGNOSIS

Antenna 1 with minute accessory flagellum. Eyes rounded and whitish in live specimens, but hardly visible in preserved specimens, composed of more than 10 translucent ocelli as a

result of preservative impact. Coxae 1–3 with 2 serrations on posterodistal margin. Epimeron 3 posterodistal corner produced, bifid, with one seta between blunt lobes. Telson apex pointed without accessory teeth.

DESCRIPTION OF MALE

Head length less than pereonite 1 + 2; rostrum small, lateral anterior margin rounded, anterior cephalic keel not projecting. Eyes hardly visible but present (preserved holotype), with more than 10 scattered translucent spots (ocelli) arranged in a circular structure (Figure 2A, D).

Antenna 1 (Figure 2B) length $0.4 \times$ body length, accessory flagellum minute and 1-articulate, flagellum 8-articulate, peduncle maximum width $1.7 \times$ article 2 width.

Antenna 2 (Figure 2C) length $0.3 \times$ body length, flagellum 6-articulate. Relative length of antenna 1 and 2, 1:0.8.

Upper lip (Figure 3A) asymmetrically lobate, anterior margin setose.

Mandibles (Figure 3E, F) lacking molar; palp 3-articulate; ratio of articles 1–3, 1: 3.2: 1.7; article 2 with 3 lateral setae and 5 subdistal setae; article 3 with 2 apical setae; incisors strongly dentate. Left mandible (Figure 3E) lacinia mobilis large, strongly toothed, raker row with 14 setae, distal ones serrate. Right mandible (Figure 3F) lacinia mobilis small, weakly dentate, raker row with 15 setae, distal ones serrate.

Lower lip inner lobes partially fused, bare; outer lobes widely separated, anterodistal margins setose; mandibular lobes well developed and apically pointed.

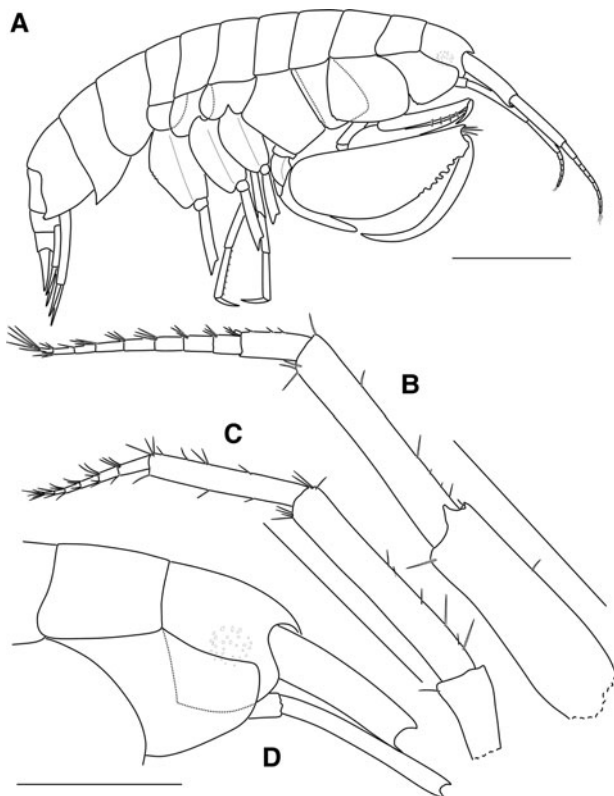


Fig. 2. *Leucothoe cathalaa* sp. nov.: (A, D) holotype male MNCN 20.04/8680; (B, C) paratype male MNCN 20.04/8682. (A) Habitus in lateral view; (B) left antenna 1; (C) left antenna 2; (D) anterior part of body in lateral view. Scale bars: A, 1 mm; B–D, 0.5 mm.

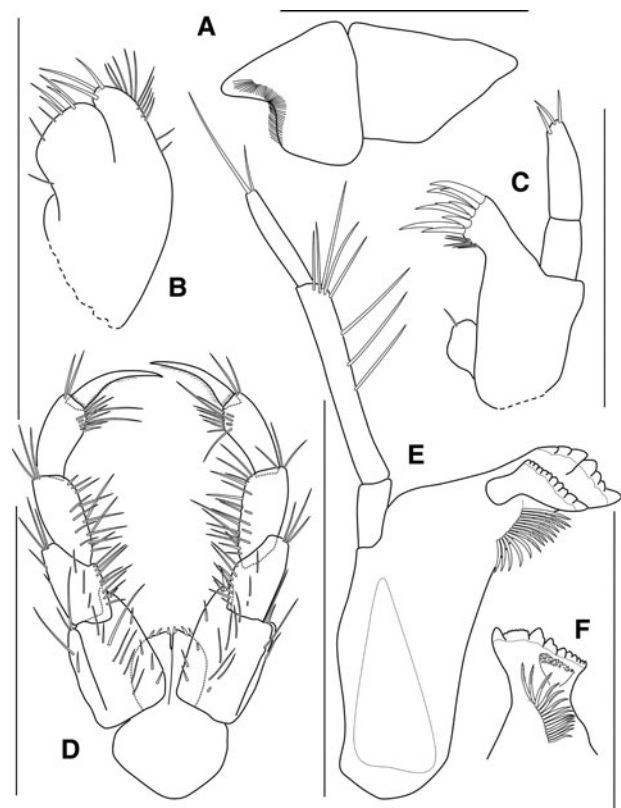


Fig. 3. *Leucothoe cathalaa* sp. nov.: (A, F) paratype male MNCN 20.04/8685; (B, D, E) paratype male MNCN 20.04/8682; (C) paratype male MNCN 20.04/8684. (A) Upper lip; (B) left maxilla 2; (C) left maxilla 1; (D) posterior face of maxilliped; (E) inner face of left mandible; (F) distal end of right mandible. Scale bars: A–C, E, F, 0.3 mm; D, 0.5 mm.

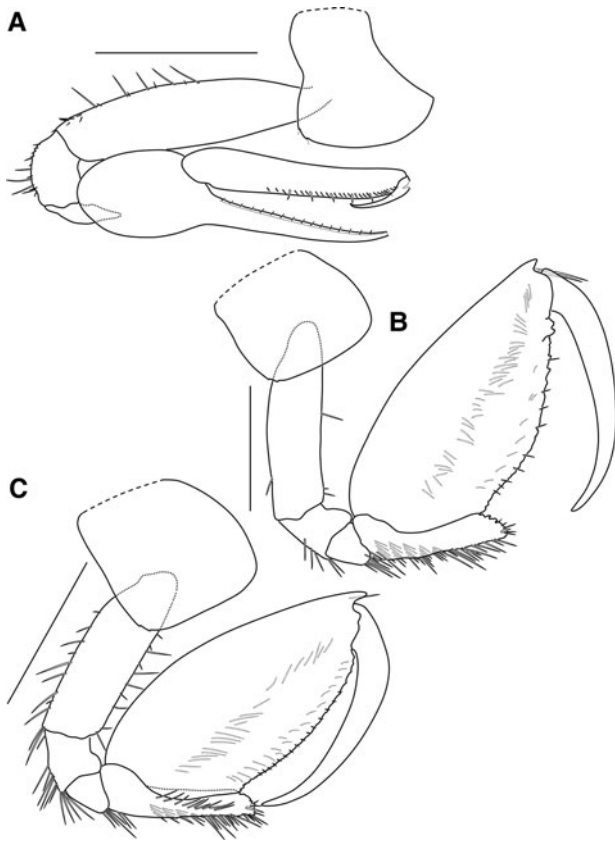


Fig. 4. *Leucothoe cathalaa* sp. nov.: (A, B) paratype male MNCN 20.04/8681, (C) paratype female MNCN 20.04/8686. Outer face of right gnathopods: (A) male gnathopod 1; (B) male gnathopod 2; (C) female gnathopod 2. Scale bar: 0.5 mm.

Maxilla 1 (Figure 3C) palp 2-articulate with 3 apical setae; outer plate with 9 cuspidate distal setae and 5 subapical setae on medial margin; inner plate with one apical seta.

Maxilla 2 (Figure 3B) inner plate with 4 stout apical setae and 3 medial setae; outer plate with 3 stout apical setae and 12 lateral marginal setae.

Maxilliped (Figure 3D), distal margin of inner plates with v-shaped indentation, each one with 3 cuspidate apical setae; outer plates reduced, reaching much less than half of palp article 1, with one stout subdistal seta and one medial seta; palp 4-articulate, articles 1 and 2 with 2 rows of numerous setae on medial margin, article 3 with 2 subdistal rows of setae on medial margin and 2 distal long setae on outer margin, article 4 slightly recurved with dense covering of short pubescent setae along medial margin.

Gnathopod 1 (Figure 4A) coxa anterodistal corner produced, distal margin convex, posterodistal corner with 2 serrations, each with one small simple seta; basis slightly inflated, anterior margin bare, posterior margin with mix of 5 long and a few short setae; ischium anterior margin bare, posterior margin with mix of 4 long and a few short setae; merus bare, carpal lobe thin and acutely pointed distally (distal end broken in Figure 4A), posterior margin bare, anterior margin smooth with 16 regularly spaced short setae; propodus, posterior margin smooth with 23 short and 6 longer setae; dactylus smooth, reaching $0.3 \times$ propodus length.

Gnathopod 2 (Figure 4B) coxa subquadrate, anterior margin convex, distal and posterior margins slightly convex, posterodistal corner with 2 serrations; basis linear, anterior

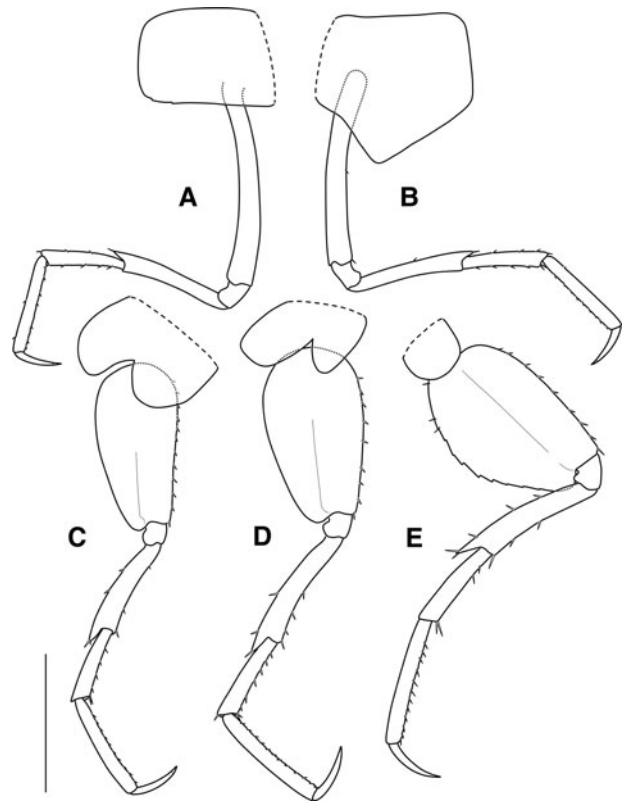


Fig. 5. *Leucothoe cathalaa* sp. nov.: (A–D) paratype male MNCN 20.04/8681, (E) paratype male MNCN 20.04/8683. Outer face of pereopods: (A) left pereopod 3; (B) right pereopod 4; (C) right pereopod 5; (D) right pereopod 6; (E) right pereopod 7. Scale bar: 0.5 mm.

margin with 3 setae, posterior margin with 1 seta; carpus reaching $0.5 \times$ propodus length, posterior margin with transverse tufts of long setae, anterior margin bare, carpal lobe distally truncate and dentate, with one short stout subdistal seta; propodus anterodistal margin with small blade-like seta and two long setae, palm convex with two blunt projections near insertion of dactylus, remainder of palm with irregular

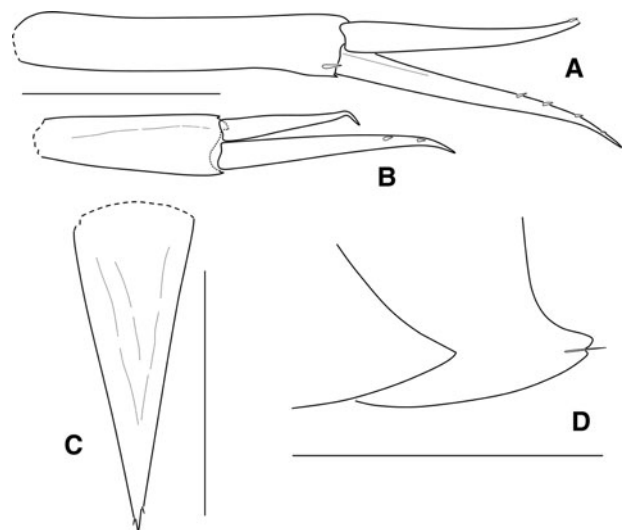


Fig. 6. *Leucothoe cathalaa* sp. nov.: (A–C) paratype male MNCN 20.04/8681, (D) paratype male MNCN 20.04/8682. (A) Right uropod 1 in dorsal view; (B) right uropod 2 in dorsal view; (C) telson in dorsal view; (D) epimera 2–3. Scale bar: 0.3 mm.

marginal denticles and submarginal setae, posterior margin with 9 short marginal setae, primary mediofacial setal row displaced to propodus midline and reaching $0.7 \times$ propodus length, secondary mediofacial row with 9 short submarginal setae, parallel to posterior margin; dactylus strong, recurved, reaching $0.8 \times$ propodus length.

Pereopod 3 (Figure 5A) coxa subrectangular, narrower than coxae 1–2, anterior and distal margins slightly convex, posterior margin straight, posterodistal corner with 2 serrations; basis not expanded posteriorly and recurved; dactylus recurved, reaching $0.5 \times$ propodus length.

Pereopod 4 (Figure 5B) coxa smooth, bare, anterior and distal margins straight, posterior margin proximally excavate; basis not expanded posteriorly and recurved; dactylus recurved, reaching $0.5 \times$ propodus length.

Pereopods 5–6 (Figure 5C, D) coxae bilobed, smooth and bare; bases slightly expanded, width/length ratios 1: 2 and 1: 1.8 respectively, anterior margins with short setae, posterior margins smooth; dactylus recurved, reaching $0.5 \times$ propodus length.

Pereopod 7 (Figure 5E) coxa smaller than coxae 5–6, not bilobed and distally convex; basis slightly expanded, width/length ratio 1: 1.5, anterior margin with short setae, posterior margin serrate; dactylus recurved, reaching $0.5 \times$ propodus length.

Epimera 1–3 (Figure 2A) without ventral setae; epimeron 2 posterodistal corner acutely produced; epimeron 3 posterodistal corner produced, bifid with one seta between blunt lobes (Figure 6D).

Uropod 1 (Figure 6A) peduncle $1.1 \times$ inner ramus length, with one dorsal subdistal seta; outer ramus $1.1 \times$ inner ramus length; outer ramus with zero medial and one subdistal lateral seta; inner ramus with zero medial and four lateral setae along the half distal part.

Uropod 2 (Figure 6B) peduncle $0.8 \times$ inner ramus length, without setae; outer ramus $1.7 \times$ inner ramus length; outer ramus without setae; inner ramus with zero medial and two lateral setae along the third distal part.

Uropod 3 missing in all specimens recorded.

Telson (Figure 6C) length/maximum width ratio 2.5, apex acutely pointed with 2 short subdistal setae.

DESCRIPTION OF FEMALE

Similar to male in most aspects except gnathopod 2 (Figure 4C): basis more setose on both anterior and posterior margins; propodus palm without blunt projections near insertion of dactylus and more regular denticulations along remainder of margin, blade-like process more developed.

Mature females can be recognized by the presence of oostegites fixed on coxae 2–5 (elongate and narrow lamella bearing sparse, long and simple setae all around margin). In one non-brooding female (3.4 mm BL), the length/width ratio of succeeding oostegites was: 12.7, 13.2, 12.0 and 8.0 for coxae 2–5, respectively.

ETYMOLOGY

The new species is dedicated to Jacqueline and Pierre Cathalaa for the friendship and warm hospitality shown to I. Frutos during her numerous stays in Arcachon (noun in apposition).

DISTRIBUTION

The known distributional area of *Leucothoe cathalaa* sp. nov. is limited to the Le Danois Bank (southern Bay of Biscay), between 486 and 574 m depth.

REMARKS

Within the 115 valid *Leucothoe* reported by White (2011) and White & Reimer (2012a, b, c), only five species are blind (observed on preserved specimens) and all from deep bottoms: *L. atosi* (Azores), *L. ayrtonia* (Barbados Trench), *L. pacifica* Nagata, 1963 (Japan), *L. rostrata* (Azores) and *L. uschakovi* (Greenland and Norwegian Seas). Three of them were recorded in European Atlantic waters. The bathyal species *L. cathalaa* sp. nov. cannot be considered a blind species although its eyes are hardly visible in preserved specimens (translucent ocelli), even under an optical microscope. Furthermore, these ocelli disappear when specimens are treated with hypochlorite sodium, demonstrating that they are labile structures. However, in a freshly sampled specimen the eyes are clearly visible, each represented as a rounded whitish-pigmented spot (Figure 7). According to Barnard (1961) and White (2011), only the abyssal *L. panpulco* Barnard, 1961 (off Acapulco) shows poorly developed eyes, composed of a small mass of dense tissue (unclearly described and figured). However, it can be easily distinguished from *L. cathalaa* sp. nov. by the shape of epimeron 3 (posterodistal corner not produced) and telson (apex rounded and not ornamented). Finally, this new species differs from all other 105 valid darkly pigmented eyed *Leucothoe* by its original ocular structure.

Leucothoe cathalaa sp. nov. bears a minute accessory flagellum on article 3 of antennae 1 peduncle. Such a morphological feature is shared with 17 *Leucothoe* species from the Indian and Pacific Oceans and only 1 species from the Atlantic Ocean (*L. spinulosa* Chevreux, 1919–1920: Mauritania). In *L. safaie* Lyons & Myers, 1991 (Red Sea) this accessory flagellum is mentioned as vestigial (i.e. fused to peduncle article 3), whereas in *L. elegans* White & Reimer, 2012 (East China Sea) it is exceptionally 2-articulate (White & Reimer, 2012a).

As in the case of *L. alcyone* Imbach, 1969 (South China Sea), *L. bidens* Hirayama, 1985 (East China Sea), *L. dentata* Ledoyer, 1973 (Indo-Pacific Ocean), *L. germanalcyone* Hirayama, 1992 (South China Sea) and *L. pollexa* White & Thomas, 2009 (Pacific Ocean), *L. cathalaa* sp. nov. show a bifid projection at epimeron 3 posterodistal corner. However, the two lobes are blunt (versus acutely pointed in the other species) with a single seta between them, as also observed in *L. alcyone*.



Fig. 7. Live specimen of *Leucothoe cathalaa* sp. nov. (male, body length = 3.6 mm) photographed on-board during ECOMARG 08 cruise at the Le Danois Bank (suprabenthic haul E08-TS7a, $44^{\circ}03.59'N$ $4^{\circ}51.06'W$, 487 m depth), showing the whitish pigmentation of the rounded eye before storage in preservative medium.

When compared to other species from European Atlantic waters (see key below), *L. cathalaa* sp. nov. shows a general morphology (rostrum, maxilliped, coxa 1, gnathopods 1 and 2, epimeron 3) close to the blind bathyal *L. atosi* recorded at the Mid-Atlantic Ridge. However, the new species can be distinguished by the following characters: presence of eyes and a minute accessory flagellum; coxae 1–3 with 2 serrations; pereopods 5–7 bases more expanded; epimeron 3 with bifid projection and telson acutely pointed.

KEY TO DEEP *LEUCOTHOE* SPECIES FROM THE EUROPEAN ATLANTIC WATERS (EUROPEAN REGISTER OF MARINE SPECIES AREA, FROM NORTH GREENLAND/NORTH NORWAY TO PARALLEL 26°N)

Key based on original descriptions of species except for *L. spinicarpa* (recent redescription by Crowe, 2006). Ecological data are according to Chevreux (1908, 1919–1920), Gurjanova (1951), Oldevig (1959), Kamenskaya (1979), Marques & Bellan-Santini (1993), Bellan-Santini (1998, 2007), Crowe (2006) and White (2011).

1. Eyes absent 2
 - Eyes present 4
2. Rostrum long (0.4 head length) and acutely pointed; telson short (length 1.2 maximum width) and heart-shaped. *L. rostrata* Chevreux, 1908
Atlantic Ocean: Azores
1360–1919 m
 - Rostrum short (~0.18 head length) and rounded; telson elongate (length ~2.2 maximum width) and more or less triangular. 3
3. Antenna 1 flagellum 4-articulate, article 2 equal to article 1; mandibular palp article 3 with one distal seta; maxilliped inner plates with apical margin rounded, outer plates with facial setae; epimeron 2 with posterodistal corner rounded. *L. atosi* Bellan-Santini, 2007
Atlantic Ocean: Mid-Atlantic Ridge
850 m
 - Antenna 1 flagellum 15-articulate, article 2 1.6× article 1 length; mandibular palp article 3 with two distal setae; maxilliped inner plates with apical margin flat, outer plates without facial setae; epimeron 2 with posterodistal corner acutely pointed
..... *L. uschakovi* Gurjanova, 1951
Greenland and Norwegian Seas
2750–3550 m, coral reef
4. Eyes hardly visible in preserved specimens (ocelli translucent), but clearly visible in live specimens, each as a rounded and whitish-pigmented spot
..... *L. cathalaa* sp. nov.
North-east Atlantic Ocean: Le Danois Bank
486–574 m, on fine sand bottoms

- Eyes clearly visible (darkly pigmented) 5
- 5. Coxa 4 acutely pointed anterodistally. Telson short, length <2.0 maximum width.
..... *L. lilljeborgii* Boeck, 1861
North-east Atlantic Ocean, from Norway to south-west Portugal; western and eastern Mediterranean Sea
10–2700 m, on sandy and muddy bottoms
 - Coxa 4 anterodistally rounded. Telson elongate, length >2.5 maximum width. 6
- 6. Epimeron 3 with posterodistal corner subquadrate, without sinus; antenna 1 without accessory flagellum.
..... *L. spinicarpa* Abildgaard, 1789
North-east Atlantic, from Norway to Denmark
Shelf and slope down to ~300 m, in ascidians and sponges
 - Epimeron 3 with posterodistal corner toothed, surmounted by a sinus; antenna 1 with minute accessory flagellum. *L. spinulosa* Chevreux, 1919–1920
North-east Atlantic Ocean: off Arguin Bank*
235 m, muddy sand bottoms

*probably present north of parallel 26°N, in the European Register of Marine Species area (see Barnard & Karaman, 1991).

ECOLOGICAL NOTES

According to Barnard & Karaman (1991), *Leucothoe* species are known from 0 to 3570 m depth. Only 15 species were reported on deep bottoms (>200 m), most of them in the upper bathyal, two at depths ≥3000 m (Bellan-Santini, 1998; White, 2011). For most of these species, the habitat was not reported in original descriptions, except for *L. ayrtonia* (cold seeps; 1947 m), *L. lilljeborgii* (sandy and muddy bottoms; 10–2700 m), *L. miersi* (green sands; 274 m), *L. panpulco* (dark muddish clay; 3570 m), *L. tridens* Stebbing, 1888 (blue mud; 2011 m) and *L. uschakovi* (coral reef; 2750–3550 m). *Leucothoe cathalaa* sp. nov. belongs to the group of bathyal/abyssal species and represents an intermediate morphotype between the numerous neritic eyed species and the few blind ones only recorded on deep bottoms from the Atlantic (4 species) and Pacific (1 species) Oceans.

During the ECOMARG survey, 86 specimens of *Leucothoe cathalaa* sp. nov. were sampled in two demersal/epibenthic habitats of the Le Danois Bank (as defined by Sánchez *et al.*, 2008): the *Grypus vitreus*–*Galeus melastomus* community from the top of the bank (stations TS₁, TS₂' and TS₅) and the *Phormosoma placenta*–*Trachyrincus scabrus* community from the north-eastern bank break (station TS₃). According to available sedimentological data (Parra, personal communication), the new species was collected on fine sands from the top of the bank (median grain size: 135.8–166.1 μm; particles <62 μm: 13.92–35.02%; particles 62–500 μm: 61.06–84.31%; particles >500 μm: 1.70–5.09; organic content: 2.55–3.50%). Within its known distributional area (probably an endemic species to the Le Danois Bank), this species is a strict inhabitant of upper bathyal bottoms, between 486 and 574 m depth, where near-bottom temperatures and salinities

Table 2. Reported abundances (ind./100 m²) for *Leucothoe* species from European Atlantic waters. Data according to Vallet & Dauvin (1995; English Channel); Cunha *et al.* (1997; off Aveiro); Dewicke (2002; Dogger Bank, Éperon Berthois); Vanquickenberge (2005; Meriadzek Terrace) and present study (Le Danois Bank).

Geographical area Depth range (m)	Shelf populations			Bathyal populations		
	Dogger Bank 15–70	English Channel ^{a,b} 29–75	Off Aveiro 125–185	Éperon Berthois ^b 253–312	Meriadzek Terrace 227–352	Le Danois Bank 486–574
<i>L. incisa</i>	0.3–0.8	2.0	–	–	–	–
<i>L. lilljeborgii</i>	–	0.1	0.7	1.6	0.5–0.7	–
<i>L. procera</i> ^c	–	0.1–0.6	–	–	–	–
<i>L. spinicarpa</i> ^d	–	0.8	2.3	–	–	–
<i>L. cathalaa</i> Sp. nov.	–	–	–	–	–	2.4–28.6

^aconverted from original data expressed as ind./100 m³; ^bmeans values; ^coriginally mentioned as *L. richardii*; ^dneed revision at species level (see Crowe, 2006)

range between 10.9–11.0°C and 35.6, respectively (CTD data: Sánchez, personal communication). All specimens were collected in the 0–50 cm near-bottom water layer (lower net of the sled), indicative of their poor swimming abilities and epibenthic behaviour, as also mentioned for *Leucothoe lilljeborgii* in the Mediterranean bathyal (Cartes & Sorbe, 1999).

In the study area, the observed abundances of *L. cathalaa* sp. nov. ranged between 2.4 and 28.6 ind./100 m² (Table 1). This maximum value of abundance is one order of magnitude higher than the values reported for *L. lilljeborgii* in the upper bathyal of the northern Bay of Biscay (0.5–7.0 ind./100 m²), as well as for several *Leucothoe* species from European shelves (0.1–2.3 ind./100 m²) (see Table 2).

Leucothoids are most often reported as commensal inhabitants of sessile invertebrates such as sponges, ascidians and bivalves, where they find a stable microhabitat that provides access to food resources and possible protection from predators (Crowe, 2006; Thomas & Klebba, 2006, 2007; Thomas & Krapp-Schickel, 2011). All the specimens of *L. cathalaa* sp. nov. sampled during the present study showed a free living behaviour at the moment of their capture on bathyal sandy bottoms (no sign of commensalism). This is also the case for the 15 known bathyal/abyssal *Leucothoe* species reported without known host, some of them sampled as free individuals on soft bottoms or coral reefs (White, 2011).

Additional ECOMARG trawlings and photogrammetric observations on epibenthic communities (Sánchez *et al.*, 2008, 2009), carried out in the same area than suprabenthic hauls, showed the presence of several sponge species, including the cup-shaped *Asconema setubalense* Kent, 1870 (up to 1 m in height above bottom). This sponge could be the best host candidate for commensalism with the whitish *Leucothoe cathalaa* sp. nov., offering to this amphipod a cryptic lifestyle inside its whitish cup.

BIOLOGICAL NOTES

From the 86 specimens of *L. cathalaa* sp. nov. collected at the top of the Le Danois Bank, 51.2% were classified as males (presence of penile processes on ventral face of pereonite 7), 17.4% as females (presence of oostegites on coxae 2–5) and 31.4% as juveniles (without visible sexual characters). Therefore, the sex-ratio is clearly in favour of males in this population. The body length of specimens examined ranges between 1.7 and 4.3 mm for males, between 2.5 and 3.9 mm for females with oostegites. Only one brooding female was

registered in the material examined (haul Eo4-TS5; paratype MNCN 20.04/8686, BL 3.9 mm). Its marsupium contained 3 rounded embryos (mean length/width: 0.49/0.37 mm).

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