



A new species of Ancorabolidae (Copepoda, Harpacticoida) from the northern coast of Spain: *Laophontodes mourois* sp. n.

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Abstract

Both sexes of a new species of the family Ancorabolidae Sars, 1909 (Copepoda, Harpacticoida), *Laophontodes mourois* sp.n. were collected from *Laminaria ochroleuca* holdfasts and are described in this paper. Its inclusion in the genus *Laophontodes* Scott, 1894 is justified by the diagnostic characters of the genus: three outer setae on the terminal exopod segment of P2–P4; presence of two endopod segments in each swimming leg; prehensile P1 endopod and, transversely elongated basis of P2–P4. *L. mourois* sp. n. is the only hitherto described species of the genus *Laophontodes* bearing 2-segmented enps on P2–P4 and only 1 inner seta on exopod 3, while the two other segments of every swimming appendage remain unarmed.

Abbreviations: cphth – cephalotorax; A1 – antennule; mx1 – maxillule; mx – maxilla; mxp – maxilliped; enp – endopod; exp – exopod; exp1 – first segment of exopod; CR – caudal ramus; P1–P6 – swimming legs 1–6; benp – basoendopod

Introduction

Marine harpacticoid copepods remain a neglected component of the fauna of the Iberian Peninsula. Taxonomic studies are restricted to the works of Galhano (1968, 1970) and to the description of three superornatiremid species from anchialine caves in the Balearic Islands (Jaume, 1997). Some other studies have dealt with the ecology of these animals, but they are only general surveys on meiobenthic communities from sedimentary habitats (Giere, 1979; Anadón, 1982; Tenore et al., 1984; Austen et al., 1989; Villora-Moreno et al., 1991, Palacín et al., 1992; Villora-Moreno, 1993), none providing exhaustive species listings or detailed focus on harpacticoids.

During a study of the meiobenthic community associated to the macroalga *Laminaria ochroleuca* de la Pylaie, in the northern coast of Spain, several harpacticoids belonging to the family Ancorabolidae were recovered from the holdfast fraction. This family is not within those considered typically phytal (Hicks, 1977a; Hicks & Coull, 1983), but has been repeatedly reported from phytal habitats, usually from holdfasts, lower parts of the thallus and those fractions of the plants retaining sediment or being colonized by macroepifauna (Pallares & Hall, 1974 a,b; Hicks, 1977b). Members of the genus *Laophontodes* T. Scott are no exception and species have been described or reported from algae. *Laophontodes bicornis* Scott has been found among seaweeds (Brian, 1923, 1927, 1928; Monard, 1928) and on *Laminaria digitata* (L.) Lam-

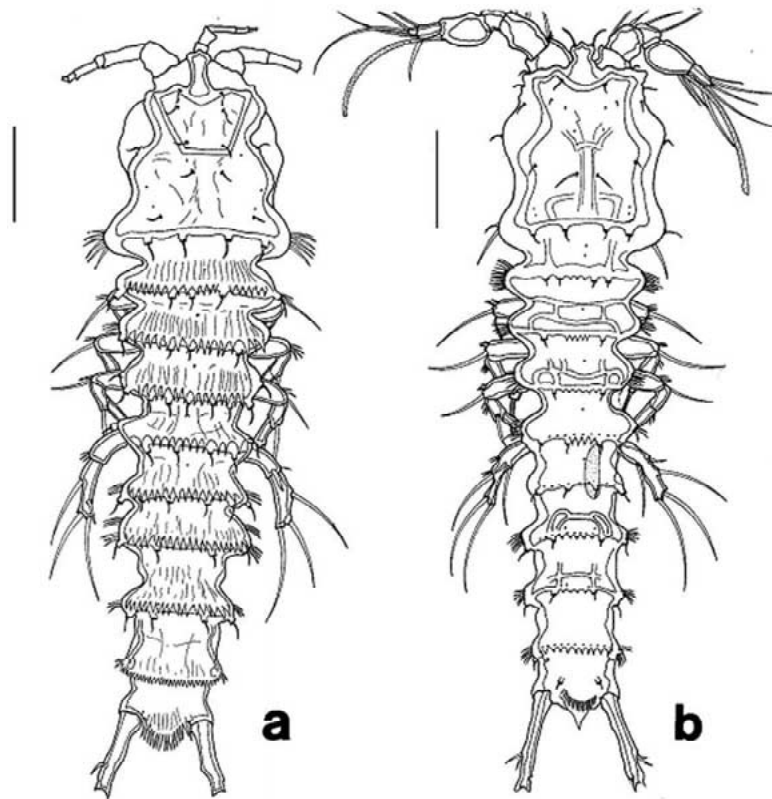


Figure 1. *Laophontodes mourois* sp.n. Habitus, dorsal view. (a) Female, (b) Male. Scale bars: 35 μ m.

oroux holdfasts together with a species “similar to *Laophontodes expansus* Sars” and *Laophontodes typicus* Scott (Roe, 1958). The latter species was also found by Jakubisiak (1933) among algae attached to *Maia squinado* Bose, while *Laophontodes hedgpethi* Lang was rinsed from holdfasts at Dillon beach (Lang, 1965) and *Laophontodes whitsoni* Scott was found associated to *Macrocystis* forests in Argentina (Pallares & Hall, 1974 a,b). In this study we describe male and female of a new species of *Laophontodes* from *Laminaria ochroleuca* holdfasts.

Materials and methods

We obtained 20 specimens from the same sample at the Island of Mouro, Cantabric Sea (43° 28' 24" N, 3° 45' 22" W) at a depth of 12.1 m. The specimens were found in the holdfast fraction of a *L. ochroleuca* sample containing 8 thalli. Ten males and 10 females were recovered. No ovigerous females were found among them. The animals, along with the

algae were initially frozen and then fixed in 4% formalin. After sorting, our specimens were kept in 70% ethanol. Two males and one female were dissected and mounted on 25 slides and labelled LMOUROIS 2001/1–LMOUROIS 2000/25, using glycerol as embedding medium. The type material (female holotype and male allotype, labeled MNCN 20.04/5341a and MNCN 20.02/5341b, respectively) is stored in the Museo Nacional de Ciencias Naturales, José Abascal 40, Madrid, Spain. Drawings were made with the aid of a camera lucida on a LEICA DMLB interference contrast microscope. The morphological terminology has been adopted from Huys & Boxshall (1991).

Description

Laophontodes mourois n.sp., male

Body (Figs 1b and 2b) slender, slightly tapering posteriorly. Length ranging from 250 to 272 μ m (average: 258 μ m). No clear distinction of prosome-urosome

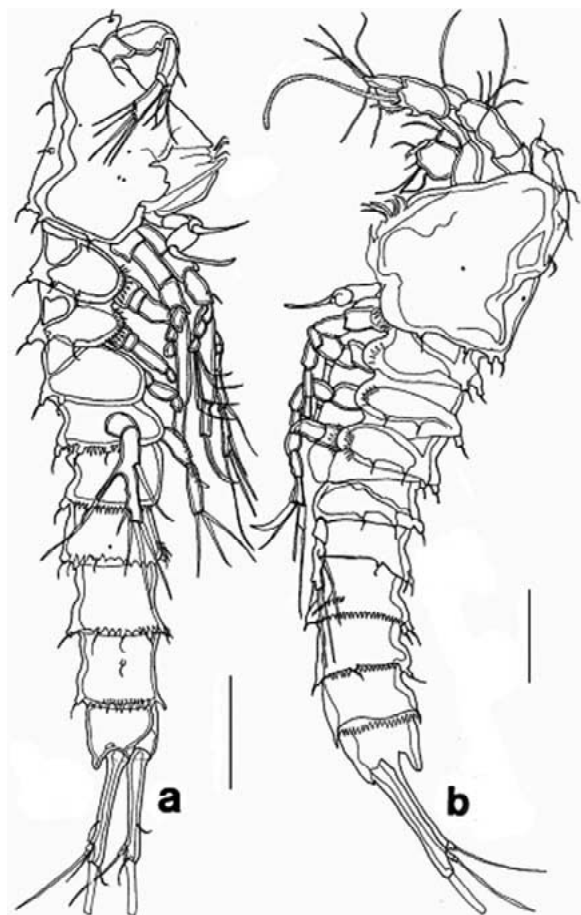


Figure 2. *Laophontodes mourois* sp. n. Habitus, lateral view. (a) Female, (b) Male. Scale bars: (a) 35 μm , (b) 30 μm .

articulation. Somites quite rounded when compared to those of other members of the genus. Cphth as long as 3 succeeding somites combined, sub-quadrangular in outline, posterolateral corners only slightly produced. Cphth with sensilla and pores in lateral and dorsal surface; lateral edges with slender spinules. Rostral projection not very prominent, tripartite in dorsal view and obtuse at the point, with one sensillum on each side. Cphth expanded dorsally with 2 lateral, more or less rounded processes. Bordering ridge near border. First 5 free thoracal somites with large medial pore, second and third abdominal somite with 2 symmetrical mid-lateral pores.

Urosome of more or less the same width as the preceding division. Lateral expansions of the somites well defined and more conspicuously spinulose at the edges. All somites with sensilla at posterior border and

with serrate edges, except the pre-anal somite. Anal operculum flanked by 2 sensilla.

Urosomites with rows of spinules at ventral posterior edge. Body ornamentation conspicuous, with cuticular ridges making patterns on the dorsal region (Fig. 1b).

CR (Fig. 3c) cylindrical, approximately 5 times longer than wide, with 7 setae. Seta I small; II slender; seta III displaced subterminally, spinulose; setae IV and VI terminally, neighbouring seta V. VII dorsally, triarticulate.

A1 (Fig. 4e) 5-segmented, chirocer. First segment with several spinules and with 1 seta distally. Second segment longer than wide, with several rows of spinules, 4 setae on anterior and posterior margin. Third segment smallest, with 3 setae on anterior margin. Fourth segment swollen, with 2 long and slender setae, 1 short seta, and 1 strong claw-like spine near proximal edge. Additionally with 2 setae (one seta bare and slender, the other seta spiniform) on anterior margin; also with 3 long setae, and with an aesthetasc arising from process near distal margin. Fifth segment with 3 short setae on anterior margin, 8 setae and aesthetasc, which is fused basally with 2 setae on distal margin; many setae articulated basally.

A2 (Fig. 4a). Allobasis with row of spinules. Exp absent. Enp with several spinules on anterior edge and on distal margin, and with 2 spines at medial margin. Terminally with 1 pinnate and 1 spiniform seta, and with 2 slender, and 3 geniculate setae, one of which being unipinnate. Also with small cuticular spiniform outgrowth on distolateral corner of segment.

Md (Fig. 4d). Coxa well developed. Gnathobase with only two big teeth. Palp longer than wide, with several spinules and 1 subapical, 2 simple subterminal, and 4 terminal setae, 3 of which bipinnate.

Mxl not described.

Mx (Fig. 4c, described from female). Syncoxa with rows of spinules, and with 2 endites, bearing 3 and 2 setae, respectively. Basis transformed into strong claw, with 2 setae representing the endopod. Exopod completely reduced.

Mxp (Fig. 4b) subchelate. Syncoxa well-developed, with 1 seta at inner distal margin. Basis elongated, with row of spinules. Enp 1-segmented, with 1 seta which is transformed into ornamented claw. Additionally with 1 small bare seta.

P1 (Fig. 3a) prehensile. Exp 3-segmented, all segments with spinules on outer margins. Exp1 with 1 spine, exp2 with 1 geniculate seta, exp3 with 4 geniculate setae. Enp 2-segmented. Enp1 about twice as

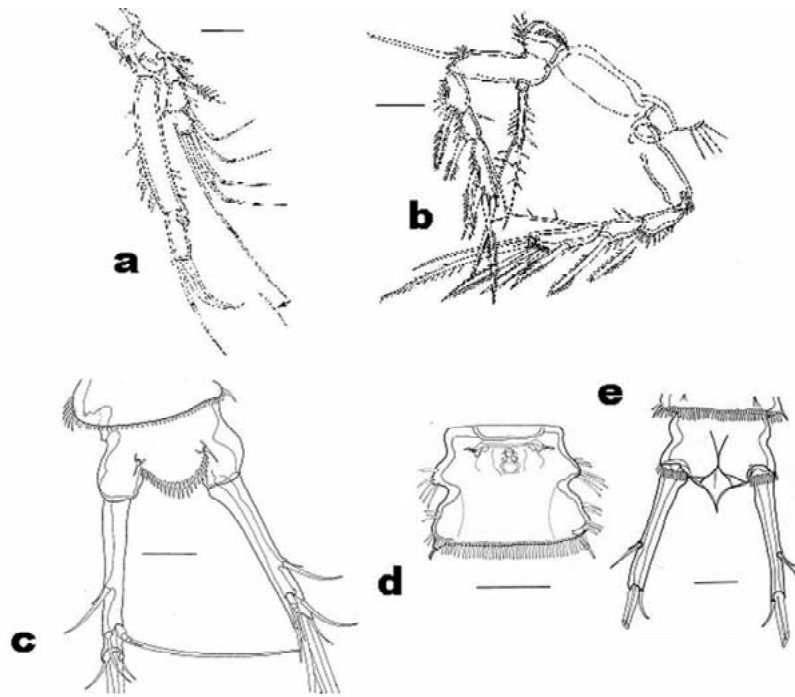


Figure 3. *Laophontodes mourois* sp. n. (a) Male, P1. (b) Male, P4. (c) Male. Telson and CR, dorsal view. (d) Female. Genital field. (e) Female. Telson and CR, ventral view. Scale bars: (a, b, c & e) 10 μm ; (d) 25 μm .

long as exp, with row of spinules on inner and outer margin, enp2 with strong claw, 1 long seta and 1 small subterminal seta.

P2–P4 (Figs 3b and 5a, b) with prominent, semi-ellipsoid intercoxal sclerite. Praecoxa (Fig. 3b) small, with spinules on outer and distal margins. Coxa (Fig. 3b) well developed, wider than long and with row of spinules on outer margin. Basis transversely elongated, P4 with row of spinules near insertion of outer simple seta. P2 and P3 basis with few spinules on outer margin (the outer setae on the basis of legs P2 and P3 was broken during dissection. Its position is indicated by an arrow in Fig. 5). Exps 3-segmented. Exopodal spines stout and spinulose. Exp1–exp3 with small spinules on both inner and outer margins. Exp3 with slender inner pinnate setae. Enps of P2 and P4 2-segmented, enp of P3 3-segmented, second segment with apophysis at inner distal corner, and with slightly swollen distal outer margin. Enps2 of P2 and P4, and enp3 of P3 with 2 long, slender and bipinnate setae.

Setal formula as follows:

	Exp1	Exp2	Exp3	Enp1	Enp2	Enp3
P2	0	0	1;2;3	0	0;2;0	–
P3	0	0	1;2;3	0	0	0;2;0
P4	0	0	1;2;3	0	0;2;0	–

P5 (Fig. 6b). Two-segmented, first segment unarmed, second segment with 1 pinnate seta on outer margin, 2 pinnate setae plus short spine on distal margin and 1 pinnate seta along inner margin. Length of setophore approx. 10 μm .

Description of female

Resembling the male except for body size, A1, P3 enp, P5 and genital somites. Body slightly larger than in male. Length of holotype, measured from tip of rostrum to posterior edge of caudal rami, approx. 282 μm . Body ornamentation less conspicuous than in male, lacking the cuticular ridges of the dorsal region (Figs 1a and 2a), but with striated, dorsal ornamentation.

A1 (Fig. 4f) 5-segmented. First segment longer than wide, covered with spinules and with 1 bipinnate seta at distal corner. Second segment with row of spinules on anterior edge and cluster of thicker spinules

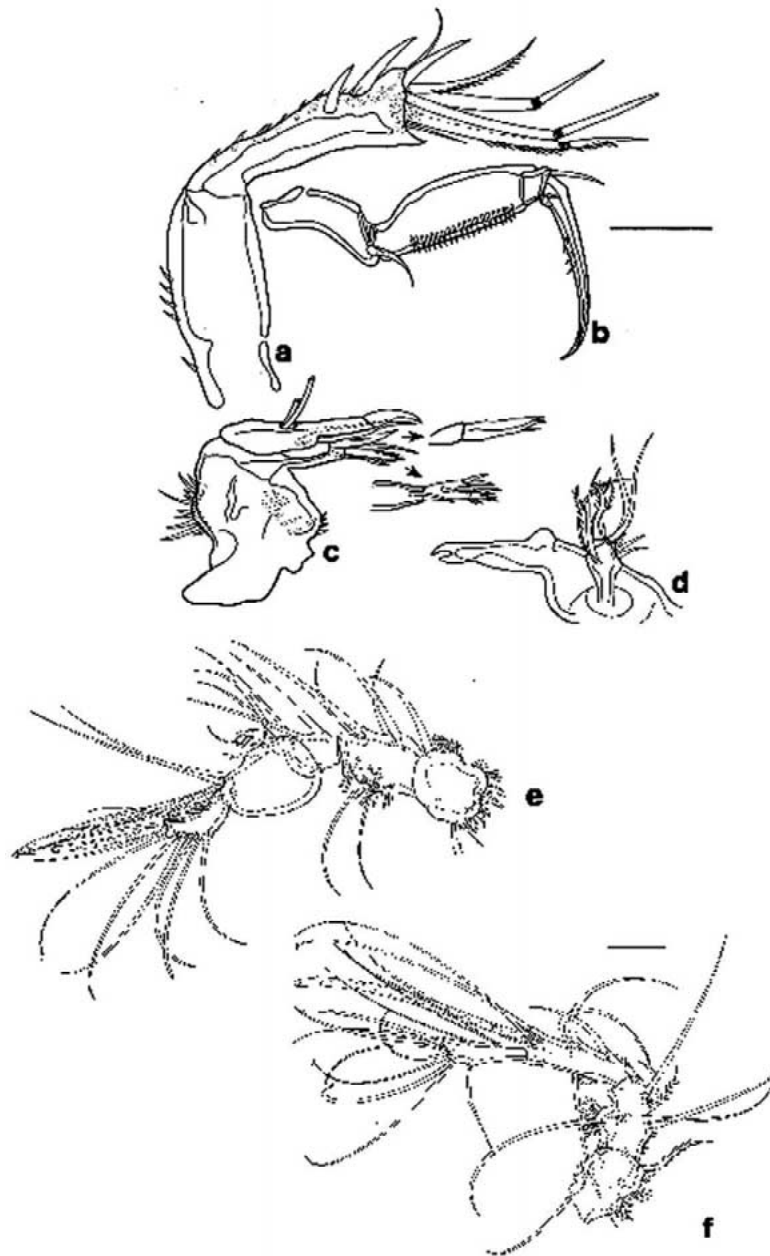


Figure 4. *Laophontodes mourois* sp. n. (a) Male, antenna. (b) Male, maxilliped. (c) Female, mx. (d) Male, mandible. (e) Male, A1. (f) Female, A1. Scale bars: 10 μ m.

on 'hump' of posterior edge, with 4 simple setae and 1 bipinnate seta on anterior edge; 3 additional setae midway of the segment. Third segment with short row of spinules on both anterior and posterior edges, 4 setae on mid-anterior edge and 2 setae plus aesthetasc on distal edge. Fourth segment smallest, with 1 seta. Fifth

segment with 11 simple setae (most setae articulated basally) and aesthetasc.

P3 (Fig. 5c). Endopod 2-segmented. Enp 2 without trace of apophysis displayed by male in homologous position, nor swollen, distal outer margin on enp 3. Otherwise, same as male.

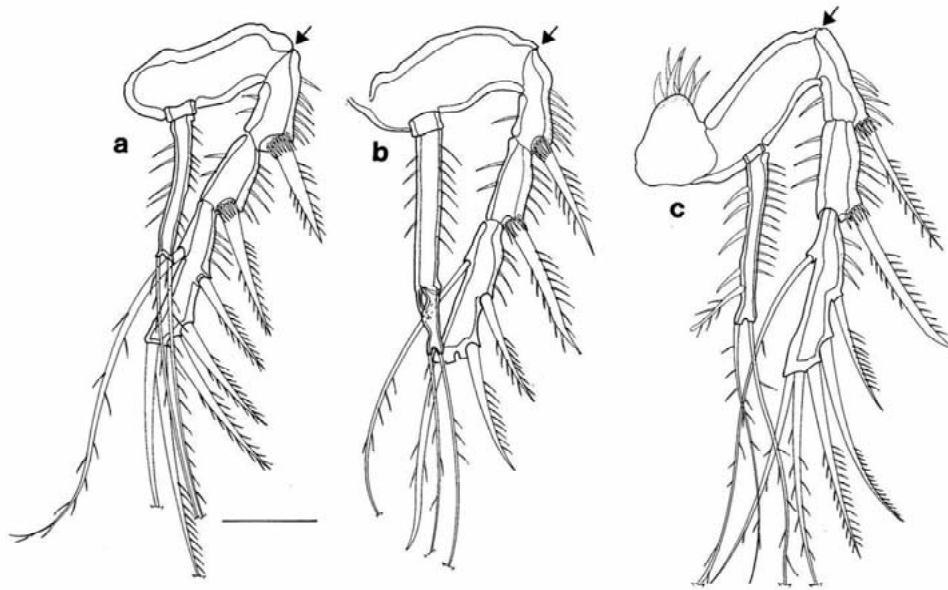


Figure 5. *Laophontodes mourois* sp. n. (a) Male, P2. (b) Male, P3. (c) Female, P3. Arrows indicate the insertion point of the basis outer seta. Scale bar: 10 μ m.

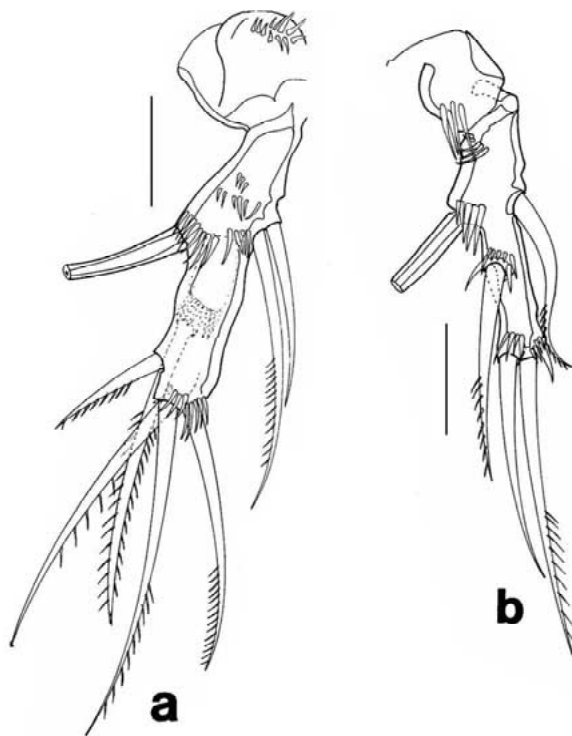


Figure 6. *Laophontodes mourois* sp. n. (a) Female, P5. (b) Male, P5. Scale bars: 10 μ m.

P5 (Fig. 6a). Two-segmented, first segment un-armed, second with 7 setae as Figured.

Last thoracic somite and genital somite fused ventrally. Genital area with 2 setae on both sides representing the vestigial P6 (cf. Fig. 3d). Remaining abdominal somites furnished with serrate edges (Fig. 3e). Ventrally, posterior edge of genital double-somite and 2 subsequent abdominal somites with spinules and with tubes bearing sensilla.

Discussion

Laophontodes mourois sp. n. presents all the diagnostic characters of the genus *Laophontodes* (namely, 3 outer setae on the terminal exp segment of P2–P4; presence of 2-segmented enps in female; P1 enp prehensile; bases of P2–P4 transversely elongated). Together with *Laophontodes ornatus* Krishnaswamy, 1957, *L. mourois* sp. n. shows only 1 inner seta on P2–P4 exp3, while exp1 and exp2 lack inner setae. The taxon *L. spongiosus* Schizas & Shirley, 1994, displays this state only in P4, while *L. psammophilus* Soyer, 1974, (found in sandy sediments of Norway) lacks this configuration in P2. However, *L. ornatus* is characterized by the presence of a 1-segmented enp in P2–P4 and one apical and two inner setae in P4 enp, differing therefore considerably from *L. mourois* sp. n.

Furthermore, the slightly swollen enp2 of male P3 is not found in any other species, whereas the strong apophysis of the second segment appears also in *Laophontodes armatus* Lang, 1936, *L. hedgpethi* Lang, 1965 (Pacific coast of the U.S.), *Laophontodes macropodia* Gee & Fleeger, 1986, and *L. typicus* Scott, 1894.

L. mourois sp. n. resembles *L. spongiosus* in general appearance and body ornamentation. However, besides having a different setal formula, the latter species lacks the strong apophysis on P3.

Despite *L. mourois* sp. n. sharing some characters with *L. hedgpethi* and *L. armatus*. (e.g. the possession of ridges and sensilla on the cphth), the absence of setules on cphth of the new species and the prominent abdominal processes presented by *L. hedgpethi* and *L. armatus*, together with their body shape, clearly separate the new species from these two. Moreover, *L. mourois* sp. n. lacks the 2 processes of the cphth displayed by *L. hedgpethi*. Also the setal formula of the pereopods is different, and the P3 of both species, although presenting an apophysis in the male, lacks the particular swelling presented by *L. mourois* sp. n.

L. mourois sp. n. resembles *L. typicus* in general appearance, but the latter species lacks the small accessory seta on P1 enp2, the swelling on P3 enp2, the inner seta on exp3, and *L. typicus* has a 1-segmented endopod on P4, while the enp of *L. mourois* sp. n. is 2-segmented. Additionally, the P4 enp of *L. typicus* is, contrary to *L. mourois* sp. n., very plumose.

The holdfasts of *Laminaria* species have been repeatedly identified as a particular habitat in which many different biocenoses are encountered (Colman, 1940; Wieser, 1952; Moore, 1971, 1973). In the holdfasts of *L. ochroleuca*, ancorabolids accounted for 1% of the total copepod abundance and they were restricted to this fraction (Arroyo et al., unpublished data). In this fraction of the macrophytes, several habitats appear combined. Besides the phytal provided by the host algae and the epiphytes which are associated to it, there are considerable amounts of sediment, sponges and other sessile macrofauna such as barnacles, bryozoans or ascidians which provide possible habitats for copepod fauna. Most species within the genus *Laophontodes* have been reported from sedimentary habitats and some were found associated to sponges in Antarctic waters (*Laophontodes macklintocki* and *L. spongiosus*) (Schizas & Shirley, 1994), so it is unclear whether *L. mourois* sp. n., as those other members of the genus encountered previously on similar habitats, belongs to the psammal or was detached from some

other substrate during processing and sorting of the samples.

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