

Copidognathus lamelloides sp. n.
(Copidognathinae, Halacaridae, Acari),
a new species from European waters

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(With 16 figures)

Abstract

Copidognathus lamelloides sp. n. is described. The most marked characters, porose areolae with rosette pores, anterior dorsal plate with a pair of round, adjacent porose areolae, posterior dorsal plate with single pair of costae, epimeral processes I and II large, gnathosoma slender; telofemora III and IV with 2/0 and 2/1 dorsal/ventral setae, are shared with *C. lamellosus* (Lohmann, 1893), *C. tabellio* (Trouessart, 1894), *C. brevipes* Viets, 1940, *C. falcifer* Viets, 1940, *C. hartwigi* Bartsch, 1978, and *C. novus* Bartsch, 1980. *C. lamelloides* sp. n. inhabits predominantly sublittoral deposits; records are from the northeastern Atlantic and Mediterranean.

Introduction

At the end of the 19th century two at a first glance similar species were described, *Copidognathus lamellosus* (Lohmann, 1893), taken off Brazil and Bermudas, north-western Atlantic (Lohmann 1893), and *C. tabellio* (Trouessart, 1894), from the French coast of the English Channel, northeastern Atlantic (Trouessart 1894). Later, *C. lamellosus* was recorded from the northeastern Atlantic (Trouessart 1901) and Mediterranean (André 1928; Viets 1940).

Based on specimens from the Adriatic Sea, Mediterranean, Viets (1940) presented a re-description of a species which he believed to belong to *C. lamellosus*. This description was used when identifying halacarids collected in the northeastern Atlantic (Bartsch 1979a; Green & MacQuitty 1987).

Because of the similarity in the characters and collecting data of specimens identified as *C. lamellosus* and *C. tabellio*, Bartsch (1979a) synonymized *C. tabellio* with *C. lamellosus*. Recently, doubts arose as to the conspecificity of these species and slides of halacarids housed in the Zoologisches Museum, Hamburg (Collection Viets), the Muséum National d'Histoire Naturelle, Paris (Collection Trouessart) and the author's collection were restudied, as well as the descriptions by Lohmann (1893) and

Trouessart (1894). The result is: 1) *C. tabellio* is a distinct species and 2) the majority of the species from European coasts identified as *C. lamellosus* belongs to an undescribed species, *C. lamelloides* sp. n. That latter species is described and *C. lamellosus* diagnosed. A detailed diagnosis and illustrations of *C. tabellio* are in press (Bartsch 2000).

Material and Methods

The description of *Copidognathus lamelloides* is prepared on the basis of specimens taken by the author in the Roscoff area, France, English Channel. Additional material was available from the Irish Sea (author's collection), the Mediterranean, Adriatic Sea (Collection Viets) and the Golfe du Lion (Collection Trouessart and author's collection).

Abbreviations used in the descriptions: *AD*, anterior dorsal plate; *AE*, anterior epimeral plate; *ds-1* to *ds-5*, first to fifth pair of dorsal setae; *GA*, genitoanal plate; *GO*, genital opening; *OC*, ocular plate(s); *P-1* to *P-4*, first to fourth palpal segment; *pas*, parambulacral seta(e); *PD*, posterior dorsal plate; *PE*, posterior epimeral plate(s); *pgs*, perigenital setae, *pgs-1* to *pgs-3*, setae from anterior to posterior. Legs numbered I to IV.

Systematics

Copidognathus lamelloides sp. n.

Figs 1-16

Copidognathus lamellosus Viets 1940: 45-48 (in part.).

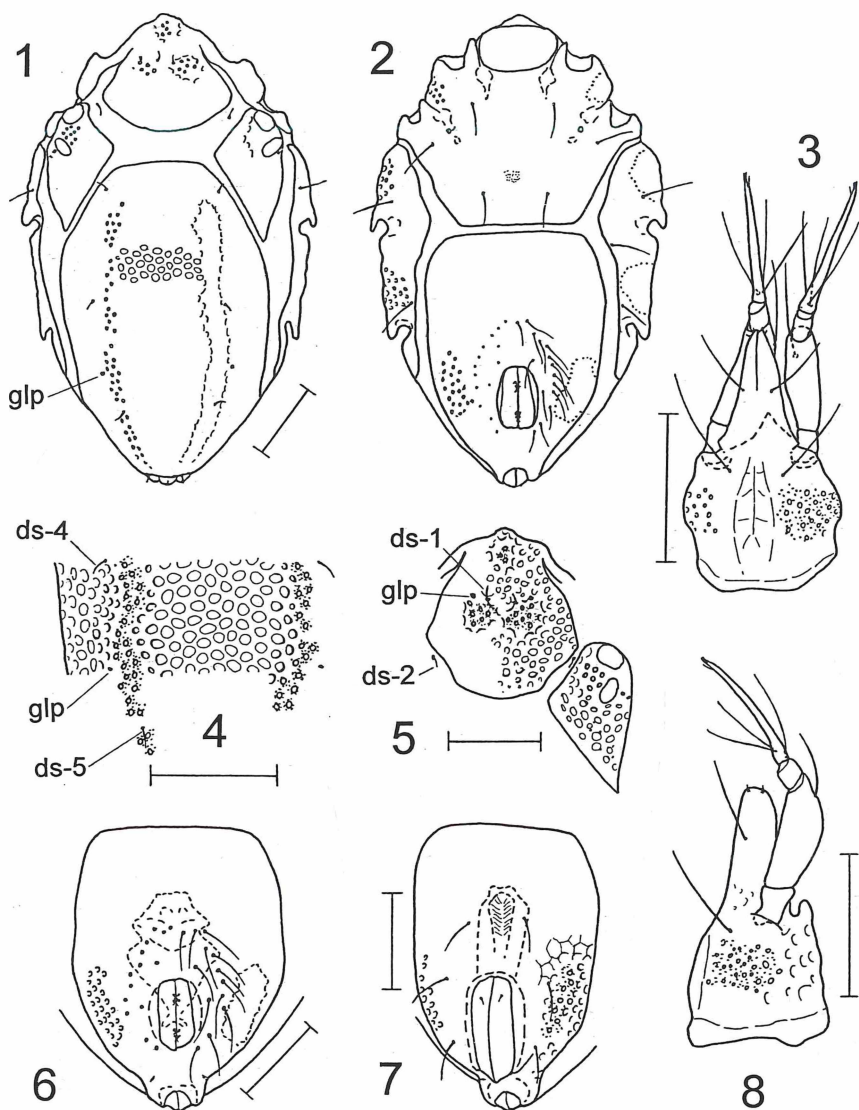
Copidognathus lamellosus, Bartsch 1979a: 226-228, Figs 49-61; Green & MacQuitty 1987: 90, 91, Fig. 34.

HOLOTYPE: Male, Zoologisches Museum Hamburg (ZMH A56/00), 303 µm, Northeast Atlantic, Bai de Morlaix, off Taureau, 20-25 m, 27 May 1974; coll. I. Bartsch. Mounted in glycerine-jelly.

PARATYPES: One female, Zoologisches Museum Hamburg (ZMH A57/00), female, male, Senckenberg Museum, Frankfurt; male, Muséum Nationale d'Histoire Naturelle, Paris; 5 females, 3 males, 2 protonymphs, author's collection, collecting data as above.

ADDITIONAL MATERIAL: Two females, 3 males, author's collection, Irish Sea, 40-42 m depth, coll. C. Poizat. One female, ZMH, Collection Viets Nr. 5526 (labelled *Copidognathus lamellosus*), Mediterranean, Adriatic Sea, 0.5 m depth. One female, male, ZMH, Collection Viets Nr. 5383 (labelled *Copidognathus brevipes*), Mediterranean, Adriatic Sea, 1-2 m. One female, Muséum Nationale d'Histoire Naturelle, Paris, Collection Trouessart, 16H14 (labelled *Halacarus tabellio*), Mediterranean, La Ciotat, 40-45 m depth. Five females, 5 males, author's collection, Mediterranean, Golfe du Lion, 11-45 m depth, coll. C. Poizat.

DESCRIPTION: *Male*. Idiosoma 267-341 µm long, holotype 303 µm long, 192 µm wide. Raised porose areolae of dorsal plates with typical rosette pores, i.e. central ostium surrounded by almost 10 canaliculi; remainder of plates foveate (Figs 1 and 4). Membraneous integument with parallel rather than anastomosing striae. *AD* longer than wide (Fig. 5) (*AD* in holotype not within same optical plane); plate with 3



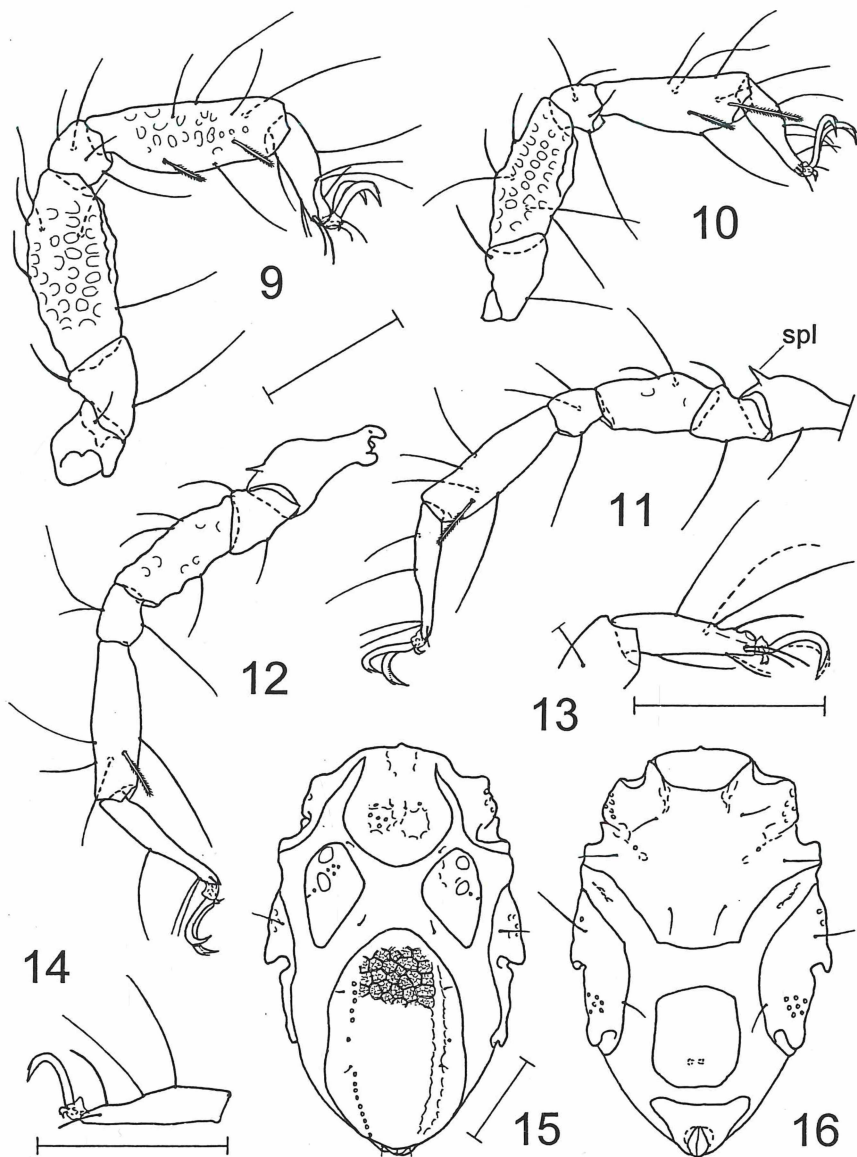
Figs 1-8. *Copidognathus lamelloides* sp. n. 1 - Idiosoma, dorsal, male (right half showing outline of raised areolae, left half showing ostia). 2 - Idiosoma, ventral, male (right half showing ostia, left half outline of porose areolae). 3 - Gnathosoma, ventral, male. 4 - Detail of PD, male. 5 - AD and OC, male. 6 - Genitoanal plate, male. 7 - Genitoanal plate, female. 8 - Gnathosoma, lateral, female. (ds-1, ds-2, ds-4, ds-5, first, second, fourth, and fifth dorsal setae; glp, gland pore). Scale line = 50 µm.

round porose areolae; anterior areola within small frontal projection with 3-5 rosette pores, posterior areolae adjacent, with approximately 10 rosette pores each. Posterior margin of plate convex, without rosette pores. Pores *glp-1* in anterolateral margin of pair of porose areolae (Fig. 5). *OC* 85 μm long, 48 μm wide; acutely pointed posterior angle extending posteriad just beyond the level of insertion of leg III; length:width ratio 1.6-1.8. Anterior part of *OC* with 2 corneae; porose areola medial to corneae; gland pore and pore canaliculus adjacent and immediately lateral to posterior cornea. *PD* 200 μm long, 140 μm wide, 1.4 times longer than wide. Pair of costae not reaching anterior margin of plate; costae 2, posteriorly 3 rosette pores wide. Pair of gland pores immediately lateral to costae level with posterior angle of *PE*. Setae *ds-1* on *AD* within anteromedial margin of pair of porose areolae; *ds-2* within striated integument between *AD* and *OC*; *ds-3* to *ds-5* on *PD*, *ds-3* near margin of plate and near anterior end of costae; *ds-4* immediately lateral to costae and *ds-5* within costae (Fig. 4).

Porose areolae of ventral plates distinctly demarcated, rosette pores with fovea-like ostia. *AE* with pair of ventromarginal areolae between insertions of legs I and II, *PE* with marginal areola anterior to leg III and ventromarginal areola anterior to leg IV; *GA* with porose areolae lateral to *GO* (Fig. 2). Ventral parts of *AE* and *GA* delicately punctate; when focused on deeper integumental layers, a faint reticulation visible. Ventral part of *PE*, outside porose areolae, with scattered foveae. Opposing margins of *AE* and *GA* truncate. Epimeral processes I and II large. *AE* 100 μm long, 160 μm wide, with 3 pairs of setae and pair of epimeral pores. *PE* extending beyond insertion of legs IV; plate with 1 dorsal and, normally, 3 ventral setae (in holotype one of the setae lacking). *GA* 162 μm long, 115 μm wide. *GO* 40 μm long; its distance to anterior margin of *GA* equalling more than twice the length of *GO*. Ring of 21-29 *pgs* (in holotype 29 *pgs*) surpassing *GO*. Genital sclerites with 4 pairs of subgenital setae. Spermatopositor extending beyond ring of *pgs* (Fig. 6).

Gnathosoma 90 μm long, 55 μm wide, length:width ratio 1.5-1.6, in holotype 1.6 (Fig. 5). Rostrum slender, 42 μm long, about as long as gnathosomal base and almost reaching end of *P-2*. Gnathosomal base dorsally foveate; marginally with rosette pores with small ostia. Tectum triangular, extending to or slightly beyond end of *P-1*. Pair of maxillary setae on rostrum at about 0.5 (relative to length of rostrum). Rostral sulcus extending to this pair of setae. Palps as in female.

Legs slender. Telfemora, genua and tibiae I-IV with short articular lamellae (Figs 9-12). Trochanters III and IV with spiniform lamella (Figs 11 and 12); fossa membranes of these legs very small (seen only in adequately mounted legs). Lateral and medial flanks of telfemora coarsely foveate; canaliculi lacking. Telfemur I with ventrolateral membrane; length:height ratio 1.7-2.1 (in holotype 2.1). Number of setae, from trochanter to tarsus (*pas* excluded, solenidia included): leg I, 1, 2, 5, 4, 7, 7; leg II, 1, 2, 5, 4, 7, 4; leg III, 1, 2, 2, 3, 5, 4; leg IV, 0, 2, 3, 3, 5, 3. Tibiae I-IV with 2, 2, 1, 1 bluntly ending bipectinate setae and 1, 1, 1, 1 smooth and slender setae. Tarsus I with 19 μm long solenidion and lamellar famulus on lateral membrane (Fig. 13). Solenidion on tarsus II 19 μm long (Fig. 14); dorsal setae shorter and more slender than these setae on tarsus I. Two basal setae on tarsus III separated by at least height of that segment; pair of fossary setae inserted apically.



Figs 9-16. *Copidognathus lamelloides* sp. n. **9** - Leg I, medial, male. **10** - Basifemur-tarsus II, medial, male. **11** - Leg III, medial, male. **12** - Leg IV, medial, male. **13** - Tarsus I, lateral, male (medial *pas* omitted, the other medial setae and claw in broken line). **14** - Tarsus II, lateral, male (medial setae and claw omitted). **15** - Idiosoma, dorsal, protonymph. **16** - Idiosoma, ventral, protonymph. (*spl*, spiniform lamella). Scale line = 50 μ m.

Claws slender; with accessory processes and pectines, the latter with very delicate tines. Median claw small; that of tarsus I distinctly bidentate; on following legs dorsal tooth minute.

Female. Idiosoma 267-377 μm long. GA with marginal porose areolae. Distance between anterior margin of GA and GO 1.4-1.5 times length of GO (Fig. 7). Ovipositor generally extending distinctly beyond *pgs-1*, though in some females shorter, not reaching the level of *pgs-1*. Setae *pgs-2* level with anterior margin of GO. Gnathosoma as in male. *P-2* with dorsal seta. *P-4* slender, longer than *P-2* (Fig. 8); with 3 basal setae, apical setula and 2 spurs. Legs as in male.

Protonymph. Idiosoma 223-281 μm long. Dorsal and ventral plates shorter than in adults (Fig. 15). Anterior areola of AD with 0-3 rosette pores; pair of areolae with about 5 rosette pores each. Pair of *glp-1* and *ds-1* in anterior edge of areolae. Anterior margin of PD rounded. Costae 0-1 rosette pores wide; integument between costae reticulate, each polygon delicately subdivided. Ventral plates with porose areolae as illustrated (Fig. 16). PE with 1 dorsal and 2 ventral setae. Length:width ratio of gnathosoma 1.45. Rostrum about as long as gnathosomal base and extending to the level of seta of *P-2*. Rostral sulcus short, hardly reaching rostral pair of maxillary setae. Telfemora coarsely foveate. Leg chaetotaxy, from trochanter to tibia: leg I, 1, 2, 3, 4, 5; leg II, 1, 2, 3, 4, 5; leg III, 1, 2, 2, 3, 5; leg IV, 0, 3, 3, 5. Tibiae I-IV each with 1 bipectinate and 1 smooth seta.

REMARKS: *Copidognathus lamelloides* sp. n. resembles *C. lamellosus* in general facies. Distinguishing features are mentioned after the diagnosis of that species.

The most obvious characters of *Copidognathus lamelloides* sp. n. are: porose areolae or costae with typical rosette pores; pair of areolae on AD round, adjacent; PD with single pair of costae; porose areolae of ventral plates delimited; epimeral processes I and II large; *pgs* in males arranged in a ring that surpasses the GO; gnathosoma slender; telfemora foveate or reticulate, telfemora III and IV with 2/0 and 2/1 dorsal/ventral setae, and tarsi III and IV with 4 and 3 dorsal setae, respectively, with the 2 basal setae on tarsus III being distinctly separated. In European waters, five species are known with a similar combination of characters, *C. brevipes* Viets, 1940, *C. falcifer* Viets, 1940, *C. hartwigi* Bartsch, 1978, *C. lamelloides* sp. n., and *C. tabellio*. *C. falcifer*, *C. hartwigi* and *C. lamelloides* sp. n. bear the *ds-2* within the striated integument, the *glp-1* within the anterior margin of the porose areolae and the ventromedial seta of tibia IV is bipectinate; in contrast, in *C. brevipes* and *C. tabellio* the *glp-1* are near the lateral margin of the AD, the *ds-2* insert on the OC and the ventromedial seta of tibia IV is smooth and slender. Distinctive features of *C. hartwigi* are: idiosoma and gnathosoma very slender, rostrum extending beyond *P-3*, OC slender, posteriorly tapering, dorsal plates outside porose areolae foveate, and trochanters III and IV with spiniform lamellae. In *C. falcifer* the OC are wide (length:width ratio almost 1.5), posteriorly rounded; the foveae of the integument outside the porose areolae are coarsely subdivided; the rostrum extends to the end of *P-2* but not beyond; no distinct lamellae are seen on trochanters III and IV. In contrast to *C. falcifer*, the OC of *C. lamelloides* sp. n. are less wide (length:width ratio almost 1.6-1.8), the foveae of the dorsal plates are not divided; the telfemora are less slender (length:height ratio 1.7-2.1 in *C. lamelloides* sp. n. vs 2.4-2.6 in *C. falcifer*) and there are spiniform lamellae

on the trochanters III and IV. *C. tabellio* can be separated from *C. brevipes* on the basis of its longer telofemora I (length:height ratio 1.8-2.0 in *C. tabellio* vs 1.5-1.6 in *C. brevipes*) and the brown pigmentation of the *PD*.

Copidognathus lamellosus (Lohmann, 1893)

Halacarus lamellosus Lohmann, 1893: 79, 80, Pl. 6: 1-9, Pl. 7: 1, 4.

non *Copidognathus lamellosus* Viets 1940: 45-48, Figs 75-79; Bartsch 1979a: 226-228, Figs 49-61; Green & MacQuitty 1987: 90, 91, Fig. 34.

DIAGNOSIS (according to description in Lohmann 1893): Length 245-290 μm . Raised areolae of dorsal plates with rosette pores consisting of central ostium surrounded by 8-10 canaliculi; remainder of plates foveate. *AD* with 3 porose areolae, one within small frontal process, the other paired in middle of plate. No porose areolae near posterior margin of plate. *OC* slightly shorter than *AD*; with porose areolae medial to 2 corneae. Anterior margin of *PD* rounded; its pair of medial costae 2 rosette pores wide.

Ventral plates with rosette pores within clearly demarcated areolae; marginal porose areolae on *AE* between insertion of legs I and II, areolae on *PE* anterior to insertion of legs III and IV and posterior to leg IV. *GA* with pair of porose areolae lateral to *GO*. Areas outside these porose areolae with delicate canaliculi arranged within polygons. Epimeral processes I and II large. Female *GO* large; distance between *GO* and anterior margin of *GA* equalling length of *GO*. Setae *pgs-2* slightly anterior to *GO*; ovipositor extending to the level of *pgs-1*. Male *GO* smaller, approximately 24 *pgs* arranged in a ring around *GO*; spermatopositor extending beyond *pgs* but far from reaching anterior margin of *GA*.

Gnathosoma slender, 1.7 times longer than wide. Gnathosomal base dorsally foveate; marginally with rosette pores, each pore with large fovea and numerous canaliculi. Rostrum longer than gnathosomal base and reaching to end of *P-2*. Tectum extending slightly beyond *P-1*. *P-4* longer than *P-2*.

Telofemora roughly foveate. Telofemur I with ventral lamella. Telofemora, genua and tibiae of all legs with articular lamellae, tarsi with fossa membranes. Telofemora III and IV with 2/0 and 2/1 dorsal/ventral setae, respectively. Tarsi III and IV with 4 dorsal setae each. Claws with accessory process.

REMARKS: The original description is based on material from off Brazil and Bermuda, the most relevant illustrations (Lohmann 1893: Pl. 6: 1, 2, 3, 9; Pl. 7: 4) are prepared on the basis of two specimens (one female, one male) from off the mouth of the Amazon, Brazil. Obviously, these two specimens represent the holo- and paratype from the waters off the Amazon type locality. The specimen taken off Sydney, Australia (Lohmann 1893: 80) certainly belongs to another species.

The eastern Atlantic *Copidognathus lamellosus* is easily separated from the western Atlantic *C. lamelloides* sp. n. with help of the number of setae on tarsus IV, 4 in *C. lamellosus* and 3 in *C. lamelloides* sp. n.

From the boreal coast of Eastern North America *Copidognathus novus* Bartsch, 1980 is known (Newell 1947; Bartsch 1979b, 1980b), it is a species in general facies similar to *C. lamellosus* and with 4 setae on both tarsus III and IV. *C. novus* differs from *C. lamellosus* in having rosette pores in the posterior angles of the AD.

Distribution

Seven at a first glance very similar species are mentioned above. According to present knowledge *Copidognathus lamellosus* and *C. novus* exclusively inhabit the western North Atlantic, *C. lamellosus* warm water areas and *C. novus* the boreal waters of the coast of the United States (Lohmann 1893; Newell 1947; Bartsch 1979b, 1980b, 1982). *C. novus* is most abundant amongst a crevice system within small bushy algae near the low water edge (Bartsch 1979b). Records of *C. novus* from Great Britain (Pugh & King 1985; Pugh 1988) assumedly are erroneous, the mites may be conspecific with either *C. lamelloides* sp. n. or *C. tabellio*. Most of the European records of *C. lamellosus* have turned out to base on misidentifications; the majority of the specimens extracted from sublittoral sediments in the English Channel, the Irish Sea and the North Sea (Bartsch 1979a, 1980a, 1985a, b; Green & MacQuitty 1987) is conspecific with *C. lamelloides* sp. n., similarly, the individuals recorded from sublittoral sediments from off Ireland (Somerfield 1991; Somerfield & Jeal 1995) supposedly also belong to *C. lamelloides* sp. n. Shallow water records from Great Britain (e.g. in Pugh & King 1985; Pugh 1988) are in need of re-identification. Specimens from the Mediterranean, Adriatic Sea (Viets 1940), are *C. tabellio* and *C. lamelloides* sp. n., and the sublittoral records mentioned by Morselli & Mari (1982) may belong to *C. lamelloides* sp. n.

Species of the eastern Atlantic and/or adjacent seas are *Copidognathus brevipes*, *C. falcifer*, *C. lamelloides* sp. n., and *C. tabellio*. The only record of *C. falcifer* is from the Adriatic Sea, from 25-28 m depth (Viets 1940). *C. brevipes* is widely spread in the Mediterranean (Viets 1940; Bartsch 1975; Morselli & Mari 1985), most specimens are from 0-3 m depth, though records exist from depth of almost 30 m (Viets 1940). *C. lamelloides* sp. n. and *C. tabellio* inhabit a wide area, they are spread along the European Atlantic coast and the Mediterranean.

C. hartwigi is the only species with records from either side of the Atlantic Ocean. The species was described on the basis of a single female from the coast of Bermuda (Bartsch 1978), later it was extracted from samples from the Irish Sea (Bartsch 1985a).

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Zusammenfassung

Copidognathus lamelloides sp. n. wird beschrieben. Auffällige Merkmale dieser Art, so Porenbezirke mit Rosettenporen, paarige Porenbezirke auf der vorderen Dorsalplatte rund und eng nebeneinander liegend, Postdorsalplatte mit nur einem einzigen Paar von Porenrippen, Epimeralfortsätze I und II groß, Gnathosoma schmal, Telofemur III mit 2/0, Telofemur IV mit 2/1 dorsalen/ventralen Haaren, sind auch bei den Arten *C. lamellosus* (Lohmann, 1893), *C. tabellio* (Trouessart, 1894), *C. brevipes* Viets, 1940, *C. falcifer* Viets, 1940, *C. hartwigi* Bartsch, 1978 und *C. novus* Bartsch, 1980 zu finden. *C. lamelloides* ist in erster Linie ein Bewohner sublitoraler Sedimente; Funde liegen vor vom Nordostatlantik und dem Mittelmeer.

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