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A new species of the genus *Pontocypria* (Crustacea, Ostracoda), commensal of a lamellariid gastropod *

by Karel WOUTERS

Abstract

Pontocypria coriocellae sp. n. is described from Papua New Guinea. The species was found inside the oral tube, near the radula, of *Coriocella nigra* BLAINVILLE, 1824 (Gastropoda, Prosobranchia, Lamellariidae). Because of its morphology and its mode of life, the new species may be considered as an occasional commensal of its gastropod host. It is the first *Pontocypria* species to be found inside its host. The distribution of the genus *Pontocypria* is discussed.
Keywords : Ostracoda, Pontocyprididae, Papua New Guinea, commensalism, Gastropoda, Lamellariidae.

Résumé

Pontocypria coriocellae sp. n., une nouvelle espèce provenant de Papouasie Nouvelle-Guinée, est décrite. Elle fut trouvée dans le tube buccal de *Coriocella nigra* BLAINVILLE, 1824 (Gastropoda, Prosobranchia, Lamellariidae). Par sa morphologie et son mode de vie, elle peut être considérée comme une espèce commensale occasionnelle du gastéropode. C'est la première fois qu'une espèce du genre *Pontocypria* est trouvée à l'intérieur de son hôte. La distribution du genre *Pontocypria* est discutée.
Mots-clefs : Ostracoda, Pontocyprididae, Papouasie Nouvelle-Guinée, commensalisme, Gastropoda, Lamellariidae.

Introduction

While dissecting some specimens of *Coriocella nigra* (Gastropoda), my colleague Dr W. SLEURS (Brussels) found 21 ostracods near the radula, inside the oral tube of a single gastropod, some specimens still being attached to the wall of the tube. After studying these ostracods it became clear that they belong to a new species of *Pontocypria*. This genus is known to comprise commensal species, mostly living externally on echinoderms and sponges. This is the first time, however, that a *Pontocypria* species has been found inside its host. The discovery of this species, with its remarkable mode of life, was considered a sufficient reason to describe the new species.

* Leopold III Biological Station, Laing Island, Contribution n° 189.

Systematic account

Order PODOCOPIDA SARS, 1866
Family Pontycyprididae MÜLLER, 1894
Genus *Pontocypria* MÜLLER, 1894

Pontocypria coriocellae sp. nov.
(Figs. 1-16)

TYPE-LOCALITY

Papua New Guinea, Madang Province, Laing Island, a small coral island in the Hansa Bay (4°10'20"S, 144°52'20"E).

HOLOTYPE

A dissected male, with valves mounted in euparal balsam (O.C. 1569a) and limbs mounted in lactophenol (O.C. 1569b).

ALLOTYPE

A dissected female, with valves kept in a micropalaeontological slide (O.C. 1570a) and limbs mounted in lactophenol (O.C. 1570b).

PARATYPES

3 dissected males, 1 dissected female and 1 dissected juvenile (valve length 0.55 mm) (O.C. 1571-1575), and 10 males, 2 females and 2 juveniles preserved in alcohol (O.C. 1576).
The specimens are deposited in the collections of the Koninklijk Belgisch Instituut voor Natuurwetenschappen, Brussels.

DERIVATION OF NAME

After the gastropod *Coriocella nigra*, the host of the new species.

Fig. 1-7. – Pontocypria coriocellae *sp. n., Laing Island, Papua New Guinea.*
Fig. 1. Antenna, female, allotype. Fig. 2. Antenna, male, holotype. Fig. 3. Antennula, male, holotype. Fig. 4. Mandibula, female, allotype. Fig. 5. Maxillula, male, holotype. Fig. 6, 7. Left and right male clasping organs, holotype.

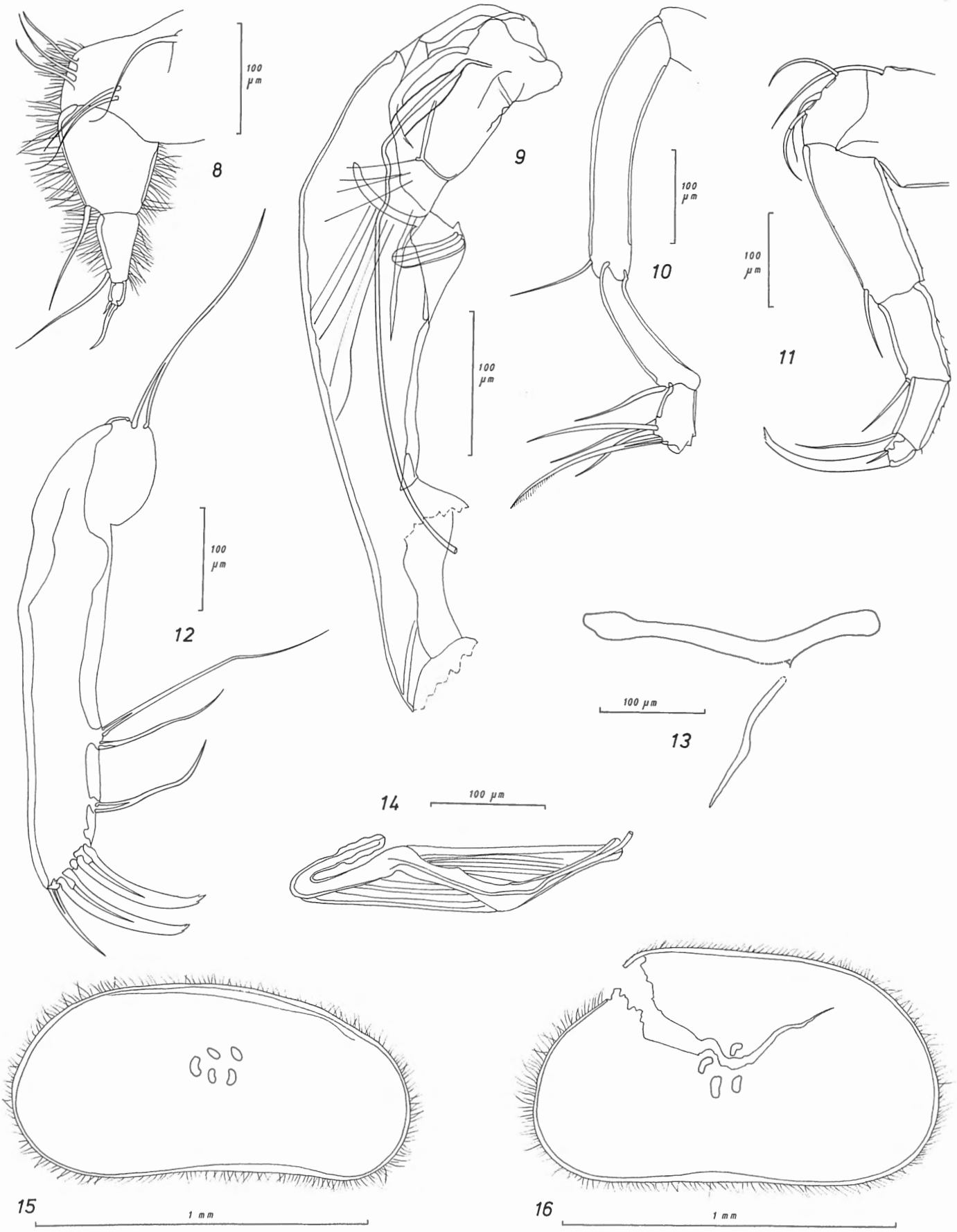

Fig. 8-16. – Pontocypria coriocellae *sp. N.*
Fig. 8. Maxilla (P1), female, paratype, O.C. 1573. Fig. 9. Male copulatory appendage, paratype, O.C. 1572. Fig. 10. Cleaning limb (P3), male, holotype. Fig. 11. Walking leg (P2), male paratype, O.C. 1568. Fig. 12. Furca, female, allotype. Fig. 13. Furcal attachment, male, paratype, O.C. 1571. Fig. 14. Zenkers' organ, male holotype. Fig. 15. Left valve, internal view, male, holotype. Fig. 16. Right valve, internal view, male, holotype.

DIAGNOSIS

Valves : large (up to 1.61 mm), with nearly straight dorsal margin; anterior and posterior margins broadly rounded.
Limbs : undivided distal antennal hook; absence of a dorsal mane of hairs on the mandibular palp; large trapezoidal distal lobe on the copulatory appendage.

DESCRIPTION

Male valves : thin, weakly calcified and markedly smaller than female ones (see dimensions); dorsal margin nearly straight, anterior and posterior margins broadly rounded; ventral margin straight to slightly concave; maximum width in the posterior third of the carapace.
Female valves : thin-shelled, but more strongly calcified than males; dorsal margin straight, anterior and posterior margins broadly and evenly rounded, ventral margin straight; female carapace in dorsal view with parallel lateral margins; width in anterior third the same as in posterior third; both male and female valves densely set with very short hairs; calcified inner lamella almost absent; marginal pore canals not percetible (if present at all); muscle scar pattern consisting of five widely spaced scars, two dorsal and three ventral ones.
Antennula : eight-segmented; length (in µm) of segments 2 to 8 of holotype (male) : 118:58:65:40:33:28:18 and of allotype (female) : 155:90:83:50:38:30:20; second segment broad; distal segments becoming rapidly shorter towards tip; second segment with three long setae; third and fourth segments each with one short dorso-distal seta and a long ventro-distal one; segments 5, 6, 7 and 8 with long swimming setae.
Antenna : four-segmented; segments short and broad; length (in µm) of segments 1 to 4 and claw, of holotype (male) : 138:95:88:23:55 and of allotype (female) : 178:140:103:43:68; exopodite consisting of a long seta with a very short bristle at its base, both inserted on a small plate between segment 1 and 2; Y-aesthetasc small, stalk as long as distal part which is only slightly inflated; natatory setae very long in females, about twice as long as the combined lengths of segments 2, 3 and 4; male natatory setae markedly shorter : only slightly longer than the combined lengths of the segments 2, 3 and 4; female swimming setae densely set with long setules; in male swimming setae the setules are very short and hardly visible; fourth segment in males with two short "male setae"; last segment with two relatively short, ventrally inserted claws with curved and bifid distal extremities; female fourth segment with three bifid and distally curved claws; one claw long and stout, the two others very long and slender; large terminal antennal hook with a single terminal point, and not bifid as in other *Pontocypria* species.
Mandibula : basal portion with long and slender curved teeth and a proximal weakly feathered seta; palp non-segmented; first segment with a large epipodite consisting of seven feathered rays, one short and six long ones; last podomere with three stout and short terminal claws, and one long and one short bristle; penultimate segment without dorsal mane of hairs.
Maxillula : small with large vibratory plate; palp with three bristles; endite 1, 2 and 3 with 4, 3 and 2 bristles respectively; vibratory plate with 22 feathered rays.
Maxilla (P1) : three-segmented and pediform in female; proximal segment very broad; setation : see fig. 8; first and second segment hirsute; terminal segment without hairs; in male transformed to large clasping apparatus with large curved distal hook-shaped grasping organ with one long, distally oriented seta and two small but stout spines; a third knob-like and strongly chitinized peg situated between the latter two.
Walking leg (P2) : five-segmented; length (in µm) of second to fifth segment and claw of holotype (male) : 168:103:75:35:138 and of allotype (female) : 230:138:85:36:228.
Cleaning limb (P3) : four-segmented; second and third segment very long, fourth segment short; length (in µm) of second to fourth segments of holotype (male) : 266:155:75 and of allotype (female) : 364:198:88; fourth segment with two claws and two stout bristles; longest claw weakly pectinate distally, second claw smooth.
Furca : large, length of shaft (in µm) : 424 in holotype (male) and 470 in allotype (female); two large distal claws and a smaller anterior claw-like seta; second terminal seta somewhat proximally displaced; two long posterior setae, the most proximal one being longer than half the length of the shaft.
Furcal attachment : with a somewhat curved central axis and a hardly visible dorsal branch; connection between both branches indistinct.
Abdominal seta : very long, as long as the proximal posterior furcal seta.
Copulatory appendage : large, oblong and translucent; approximate length in holotype : 520 µm; vas deferens almost straight, and distally ending in a simple ejaculatory tube showing a chitinous expansion; distal part of the tube free, and slightly curved.
Zenker's organ : relatively small, 145 µm long in the holotype, consisting of a W-shaped tube, the branches of the "W" being interconnected by bundles of muscles.
Sexual dimorphism : male valves thinner and much smaller than female ones; females with strongly hirsute and very long antennal swimming setae; male antennal swimming setae much shorter and only weakly hirsute; male antenna with two short bifid claws, female antenna with three very long bifid claws.
Colour of specimens fixed in formaline and preserved in alcohol : males translucent brownish; females brown and not translucent.

Dimensions :
Holotype (male)
Length : RV 1.24 mm, LV 1.21 mm
Height : RV 0.66 mm, LV 0.63 mm
Allotype (female)
Length : RV 1.61 mm, LV 1.59 mm
Height : RV 0.81 mm, LV 0.80 mm

AFFINITIES AND DIFFERENCES

Pontocypria coriocellae sp. nov. can be distinguished from other *Pontocypria* species by a number of characters of valves and limbs. *Pontocypria spinosa* G.W. MÜLLER, 1894 differs by having long furcal claws, a narrow first segment of the maxilla, a bifid terminal antennal hook and smaller valves. *Pontocypria helenae* MADDOCKS, 1968 has a dense dorsal mane of hairs on the mandibular palp, an indistinctly bifid antennal hook and a copulatory appendage with a small, beak-like distal segment. *Pontocypria humesi* MADDOCKS, 1968 can be distinguished by the presence of a dorsal mane of hairs on the mandibular palp, a bifid antennal hook and a copulatory appendage with a hinged flap, which is U-shaped. *Pontocypria meridionalis* (BRADY, 1880) differs by its very elongate valves with a somewhat pointed posterior extremity (H/L = 0.41; H/L in *P. Coriocellae* = 0.52). *Pontocypria hendleri* MADDOCKS, 1987 differs by its higher and more rounded valves, its bifid distal antennal hook, its long furcal claws and its copulatory appendage terminating in a distally tapering lobe with a profile like a bird's head. *Pontocypria calva* MADDOCKS, 1987 has a convex dorsal valve margin, a bifid antennal hook, a dense dorsal mane of hairs on the mandibular palp and a copulatory appendage terminating in a broad, flat, nearly circular lamellar flap. *Pontocypria* sp. of MADDOCKS, 1979 can be easily distinguished by its strongly bifid antennal hook. *Pontocypria* sp. B of MADDOCKS, 1987, finally, differs by its convex dorsal margin, its strongly bifid antennal hook, and most of all by the remarkable spatulate enlargement of the ventro-distal claw of the mandibular palp, a character which is not present in other *Pontocypria* species.

OCCURRENCE AND MODE OF LIFE

Pontocypria coriocellae sp. n. was found only at the type locality (Laing Island, N. Papua New Guinea), in the oral tube of the gastropod *Coriocella nigra* BLAINVILLE, 1824. The gastropod was collected by B. TURSCH & J. PIERRET on October 10th, 1975, at a depth of about 15 m.

Coriocella is a prosobranch gastropod genus of the family Lamellariidae. This family is characterized by an internal and reduced shell and a very long, spirally enrolled radula (MARCUS, 1987). *Coriocella nigra* is a carnivorous species, supposed to feed on Tunicata. During a taxonomic study of some species of the genus *Coriocella,* about 15 specimens were dissected, and in only one of them ostracods were found. They occurred inside the oral tube, near the radula, and during dissection of the gastropod some specimens of *Pontocypria coriocellae* sp. n. were still attached to the wall of the tube by means of their antennal hooks. The presence of so many ostracods in one oral tube (21 specimens : 14 males, 4 females and 3 juveniles) is surprising. *Coriocella* species are known to be predatory. With their large radula they reduce the prey to fine food particles, and it must be assumed that *Pontocypria coriocella* sp. n., living closely to the radula, is feeding on these particles, which are abundantly available. An important question arising is whether *Pontocypria coriocellae* sp. n. is actually living in the oral tube of the gastropod or whether it is a free living species searching for food, and finding it occasionally in the oral tube of *Coriocella nigra. Pontocypria coriocellae* sp. n. has strongly developed natatory setae on the second antennae, indicating that the species has good swimming abilities, and that it probably is free living, at least part of the time. Other questions then still remain : how do they get into the oral tube, are they actively searching for this very particular habitat, or are they swallowed by the gastropod ? No ostracods or ostracod remnants were found in the stomach of the dissected specimen of *Coriocella nigra.* Other *Pontocypria* species are free living or ectocommensals on echinoderms and sponges, but there is no *Pontocypria* species known to feed inside another animal. The absence of young juveniles and the presence of long swimming setae and normally developed limbs, however, indicate that the oral tube of *Coriocella nigra* is probably not the sole habitat of the new species. An hypothetical explanation would be that *Pontocypria coriocellae* sp. n. gets actively into the oral tube, feeds on the food particles which are abundantly available, and then leaves the gastropod host, to become a free swimming ostracod again. If this is the case, then *Pontocypria coriocellae* sp. n. must be considered as an occasional commensal of *Coriocella nigra.* Whether *Pontocypria coriocellae* sp. n. is exclusively a commensal on *Coriocella nigra* is also not known. This certainly needs further research, and other large carnivorous gastropods have to be dissected for this purpose.

This is not the first record of an ostracod found inside a mollusc. REID & CROSBY (1980) observed a transparent tube attached at one end by an array of hooks to the visceral mass in the suprabranchial chamber of *Cardiomya planetica* DALL (Mollusca, Bivalvia) from British Columbia, Canada. This tube was filled with small but distinctive ostracods. The authors gave no indications on the genus or family of ostracods involved, and efforts to locate the material in question have been unsuccessful.

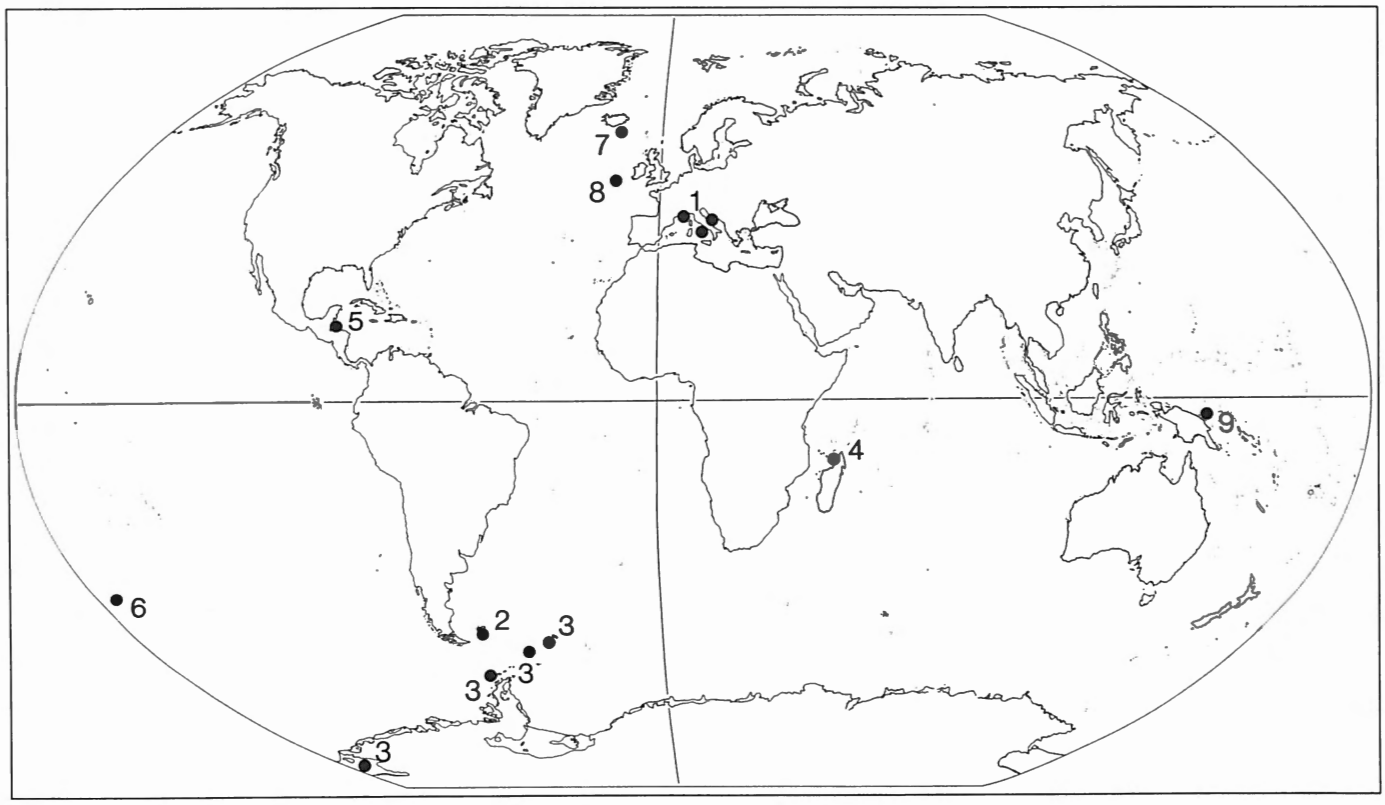

Fig. 17. – *Geographic distribution of known* Pontocypria *species. 1.* P. spinosa *G.W. Müller. 2.* P. meridionalis *(Brady, 1880). 3.* P. helenae *Maddocks, 1968. 4.* P. humesi *Maddocks, 1968. 5.* P. hendleri *Maddocks, 1987. 6.* P. calva *Maddocks, 1987. 7.* Pontocypria *sp. of Maddocks, 1979. 8.* Pontocypria *sp. B of Maddocks, 1987. 9.* Pontocypria coriocellae *sp. n.*

DISTRIBUTION OF *PONTOCYPRIA* SPECIES

Up to now, nine species of the genus *Pontocypria* have been described.

1. *Pontocypria spinosa* G.W. Müller, 1894 (type species of the genus *Pontocypria*) : a free living species, never found in association with a host; living in the Mediterranean, among calcareous algae and *Posidonia*-detritus (Müller, 1894). Gulf of Naples (Müller, 1894), French Riviera, depth 5-60 m (Rome, 1964), Adriatic Sea (Bonaduce, Ciampo & Masoli, 1975; Breman, 1976).

2. *Pontocypria meridionalis* (Brady, 1880) : originally described as *Aglaia (?) meridionalis* by Brady, 1880, but assigned to the genus *Pontocypria* by Maddocks (1968). A single whole carapace of this species is kept in the "Challenger collection", B.M.(N.H.). The specimen was collected at a depth of 11 m in Stanley Harbour, Falkland Islands. Morphology of limbs unknown.

3. *Pontocypria helenae* Maddocks, 1968 : a commensal on at least three species of Astropectinidae (Asteroidea, Echinodermata), but the absence of juveniles and the general morphology of the limbs indicate that this is probably not the sole habitat of the species (Maddocks, 1968). This point of view is confirmed by Hartmann (1987) who found free living specimens in two Antarctic localities. The species is reported from different stations around the Antarctic, at depths between 128 and 3,876 m (Maddocks, 1968; Hartmann, 1987).

4. *Pontocypria humesi* Maddocks, 1968 : 23 living specimens were collected in washings of a single sponge (*Agela,* Order Poecilosclerina), on a coral reef fringing the islet of Nosy Tanikely, Madagascar, at a depth of 20 m (Maddocks, 1968).

5. *Pontocypria hendleri* Maddocks, 1987 : commensal on a brittle-star, collected in Belize, on submerged reef, under rubble, at a depth of 3 to 15 m.

6. *Pontocypria calva* Maddocks, 1987 : collected in the Southwest Pacific Ocean (38°27'S-38°30'S, 168°07'W-168°04'W), depth 531-659 m. It is supposed to be free living, but specimens may have been attached to a host when collected and detached afterwards (Maddocks, 1987).

7. *Pontocypria* sp. of Maddocks, 1979 : two females found on *Echinocardium flavescens,* a spatangoid echinoid, collected at a depth of 170 m, S. of Iceland, N. Atlantic Ocean (Maddocks, 1979).

8. *Pontocypria* sp. B of Maddocks, 1987 : one female, not attached to a host, found S.W. of Ireland, Atlantic Ocean, at a depth of 4,426-4,435 m (Maddocks, 1987).

9. *Pontocypria coriocellae* sp. nov. : found in the oral tube of the gastropod *Coriocella nigra,* and supposed

to be an occasional commensal; Papua New Guinea, depth 15 m.

There certainly is a tenth species. I have one male specimen of a new species from Papua New Guinea, and it is very likely that still other *Pontocypria* species are to be found, when only looked for in the appropriate habitats.

The genus *Pontocypria* has a worldwide distribution (Fig. 17) and occurs in the North Atlantic Ocean, the Antarctic seas, the Indo-Pacific Ocean, the Caribbean and the Mediterranean, at depths ranging from 5 to 4,435 m. This wide distribution is possibly a reflection of the ancient origin and dispersal of the genus *Pontocypria*. Fossils of *Pontocypria*-species, which are necessary to corroborate this hypothesis, are unfortunately unknown, because of the fragility of the poorly calcified valves. As already pointed out by MADDOCKS (1987), *Pontocypria eocenica* MEHES, 1936, from the Middle Eocene of Hungary, the only fossil species reported this far, does not belong to the genus *Pontocypria*.

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