



# A redescription and new host record for the parasitic isopod *Pseudione tuberculata* (Epicaridea: Bopyridae) from the Beagle Channel, Argentina

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**Abstract:** The branchial bopyrid *Pseudione tuberculata* infests species of the family Lithodidae (Anomura). Previously known as a parasite of *Neolithodes diomedae* off Archipelago de los Chonos, Chile, and *Paralomis granulosa* from shallow waters in the Beagle Channel, Argentina, it is herein reported from a new host, *Lithodes santolla*, also from shallow waters in the Beagle Channel, Argentina. The female and male of *Pseudione tuberculata* are redescribed in detail and fully illustrated. A comparison of the specimens from the Beagle Channel with those of the type series, and comments on the distribution of *P. tuberculata* are included.

**Résumé :** Redescription et signalement d'un nouvel hôte de l'isopode parasite *Pseudione tuberculata* (Epicaridea : Bopyridae) du Canal Beagle, Argentine. Le Bopyridae branchial *Pseudione tuberculata* a été trouvé jusqu'à ce jour seulement chez des espèces de la famille des Lithodidae (Anomura). D'abord connu comme un parasite de *Neolithodes diomedae* des eaux profondes au large de l'Archipel de los Chonos, Chili, et de *Paralomis granulosa* des eaux peu profondes du Canal Beagle, *Pseudione tuberculata* est ici signalé sur un nouvel hôte, *Lithodes santolla*, également des eaux peu profondes du Canal Beagle. La femelle et le mâle de *P. tuberculata* sont décrits et illustrés en détail. Une comparaison des spécimens du Canal Beagle avec ceux de la série-type, et quelques commentaires concernant la distribution de *P. tuberculata* sont présentés.

**Keywords:** Bopyridae, *Pseudione tuberculata*, Lithodidae, Beagle Channel.

## Introduction

Out of more than 50 species included in the genus *Pseudione*, five have been recorded from southern Argentina and Chile. Richardson (1904) described

*Pseudione tuberculata* parasitic on the king crab *Neolithodes diomedae* (Benedict, 1894) from Archipelago de los Chonos, Chile, and briefly redescribed *Pseudione galacanthae* Hansen, 1897, based on two specimens parasitic on the squat lobster *Munida subrugosa* (White, 1847) from the east coast of Patagonia, Argentina. More recently, three other species, all from Chile, have been described: *Pseudione brattstroemi* Stuardo et al., 1986

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parasitic on the ghost shrimp *Neotrypaea uncinata* (H. Milne-Edwards, 1837), *Pseudione humboldtensis* Pardo et al., 1998 parasitic on the squat lobsters *Cervimunida johni* Porter, 1903 and *Pleuroncodes monodon* (H. Milne-Edwards, 1837), and *Pseudione chiloensis* Román-Contreras & Wehrtmann, 1997 parasitic on the hippolytid shrimp *Nauticaris magellanica* (A. Milne-Edwards, 1891) (Stuardo et al., 1986; Román-Contreras & Wehrtmann, 1997; Pardo et al., 1998).

In studies on lithodids from the Beagle Channel, Vinuesa (1989) reported an unidentified bopyrid infesting *Paralomis granulosa* (Jacquinot, 1847) and *Lithodes santolla* (Molina, 1782), and Lovrich (1991) found additional specimens of *P. granulosa* bearing bopyrids. More recently, Roccatagliata & Lovrich (1999) studied the association between *P. granulosa* and its bopyrid, based on an intense sampling program carried out between July 1996 and July 1997. This parasite was identified by these authors as *Pseudione tuberculata* Richardson, 1904.

In the present paper, the female and male of *Pseudione tuberculata* are fully redescribed based on a large number of specimens collected in the Beagle Channel. In addition, these specimens are compared with the syntypes from Chile and a new host, *Lithodes santolla*, is recorded from the Magellan area.

## Materials and methods

### Material examined

Infesting *Paralomis granulosa*: Beagle Channel (about 54°54'S, 67°12'W), Tierra del Fuego, Argentina, at 10-50 m depth, collected between 1996-1998: 292 marsupial ♀♀, 290 adult ♂♂ (many ♀♀ and ♂♂ deposited in the collection of the Museo Argentino de Ciencias Naturales "Bernardino Rivadavia", Buenos Aires; MACN-In: 35968). Infesting *Lithodes santolla*: Beagle Channel (about 54°54'S, 67°12'W), Tierra del Fuego, Argentina, at 10-50 m depth, collected between 1996-1998: 17 marsupial ♀♀, 16 adult ♂♂ (all of them deposited in the MACN-In: 35969). Infesting *Neolithodes diomedea*: U.S. Fish Commission steamer 1904, Albatross, 1921 m, Chile; type-series: 13 marsupial ♀♀ (one broken in two), 8 adult ♂♂ (only 3 unbroken) (USNM 29092).

The specimens described were preserved in 70% ethanol, after fixation in 5% sea-water formalin. Drawings were made with the aid of a camera lucida attached to dissecting and compound microscopes. Two parasites infesting *Paralomis granulosa* were examined with a scanning electron microscope (SEM) model EDAX 9100.

The total length of each specimen was measured with a calibrated ocular micrometer: for females this was taken from the anterior margin of the cephalon to the anterior margin of pleotelson, and for males from the anterior margin of cephalon to the posterior margin of pleotelson.

## Results

### *Pseudione tuberculata* Richardson, 1904 (Figs 1-6)

*Pseudione tuberculata* Richardson, 1904: 27, 84-85; figs 83-87 [Type-locality\*: off Port Otway, Patagonia, 1921 m, infesting *Neolithodes diomedea*]. Nierstrasz & Brender à Brandis, 1923: 72. Nierstrasz & Brender à Brandis, 1931: 167. Shiino, 1952: 41. Gruner, 1966: 331. Bourdon, 1968: 218. Markham, 1978: 116. Stuardo et al., 1986: 3, 7. Román-Contreras & Wehrtmann, 1997: 243. Pardo, 1998: 6. Pardo et al., 1998: 272, 276. Roccatagliata & Lovrich, 1999: 720-727, figs 1-4, tables 1-4 [Beagle Channel, Argentina, 54°54'S, 67°12'W, infesting *Paralomis granulosa*]. Markham, 2003: 73.

Non *Pseudione tuberculata* Caspers, 1939: 240-243, figs 7-13 [Helgoland, Germany, infesting *Callinassa subterranea* (Montagu, 1808)] [= *Pseudione caspersi* Gruner, 1966: 331-333].

"Bopyridae... no identificado": Vinuesa, 1989: 48, 49 [Beagle Channel, Argentina, infesting *Lithodes santolla* and *Paralomis granulosa*].

*Description of marsupial female* (based on specimens parasitic on *Paralomis granulosa*)

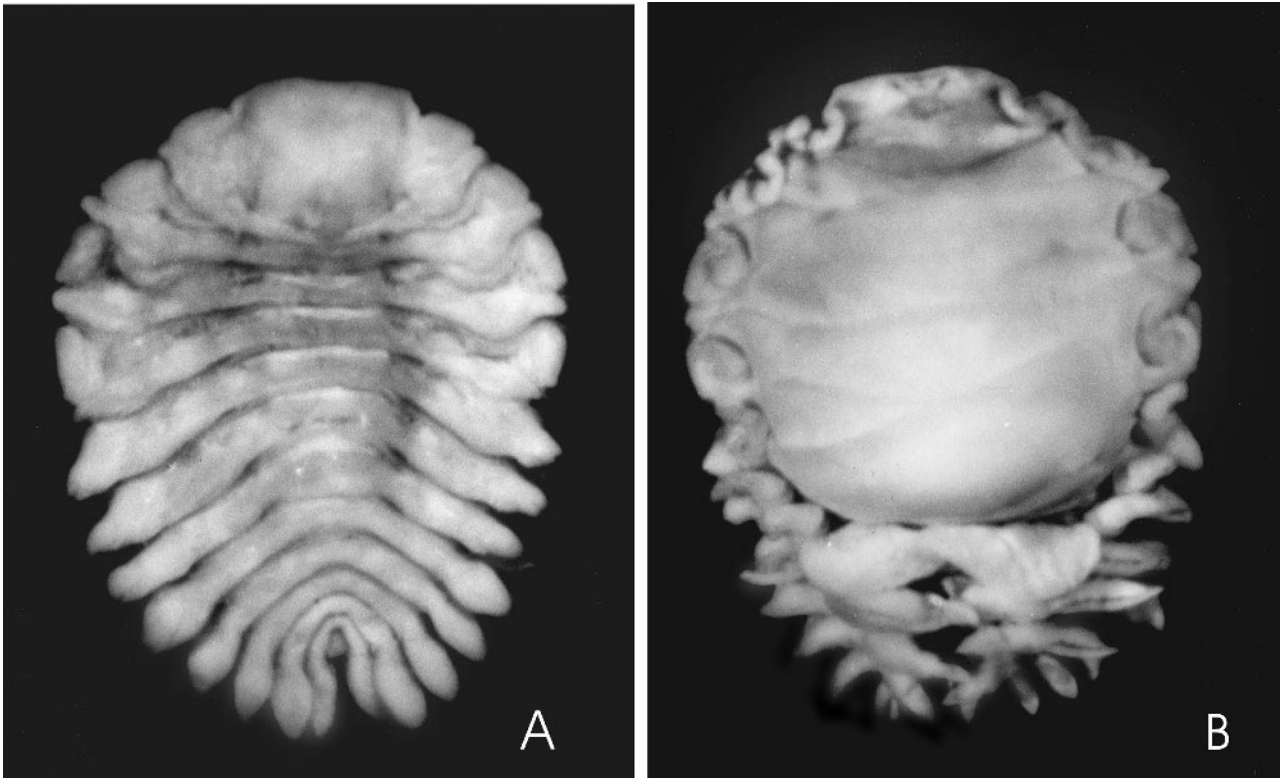
Length: 2.5-29.5 mm.

Colour (material preserved in ethanol): uniformly light yellow.

Body symmetrical, occasionally slightly asymmetrical; all segments distinct (Figs 1A, 1B, 2A). Head small, deeply embedded into pereion. Frontal lamina arched upwards, anterior margin straight, moderately long and slightly broader than head, large specimens sometimes with small swelling on each side. Eyes absent. First antenna (Fig. 2B) of 3 articles, left and right basal articles contiguous (as in Fig. 2B), exceptionally slightly apart from each other; second antenna (Fig. 2C) of 4 articles (rarely of 5 articles); both antennae with large basal article and sparsely setose distally, neither first nor second antennae extending beyond margin of head. Posteroventral border of head (barbula) with 2 large lateral projections and numerous small digitations in between; both very variable in aspect (Figs 2D, 2E).

Maxilliped (Fig. 2F) of two articles. Palp and contiguous areas of anterior article setose, as in Fig. 2F or less so; setae outside palp on anterior article, sometimes absent. Palp variably set into distal margin of anterior article, as shown as in Fig. 2F or sometimes more protruded; articulation with anterior article poorly defined, although a pair of antagonistic muscles attached to base of palp suggesting

\*See also remarks about the type locality in the discussion.



**Figure 1.** *Pseudione tuberculata* Richardson, 1904. Adult female. **A.** dorsal view. **B.** ventral view (the male was removed). Length: 24.5 mm.

**Figure 1.** *Pseudione tuberculata* Richardson, 1904. Femelle adulte. **A.** face dorsale. **B.** face ventrale (le mâle a été détaché). Longueur : 24,5 mm.

some capability of movement. Anteromedial projection (plectron) of posterior article well developed.

Pereomers I-IV (Figs 1A, 2A) with dorsolateral bosses on both sides, clearly larger than tergal projections. Coxal plates not visible in dorsal view. Lateral edges of pereomers V-VII expanded into large plates. Oostegites II-V tuberculated basally, completely enclosing brood pouch. Oostegite I (Figs 3A, 3B), internal ridge digitate, posterolateral margin with blunt, falcate projection bearing minute marginal setae. Pereopods I-VII (Figs 3E-G) not visible dorsally, gradually larger posteriorly. Bases with sharp outer margins. Meri and carpi distinct, together slightly longer than propodi (in most specimens examined, merus-carpus / propodus ratio slightly increasing in posterior pereopods). Carpi with minute setae distally. Propodi with sparse scattered minute setae. Dactyli short and thick, approximately equal in size in all pereopods.

Pleon (Figs 1A, 2A) distinctly segmented, pleomers I-V produced into large lateral plates, forming continuous series with those of pereomers V-VII (in small specimens, left lateral plates usually slightly more developed than right ones). Five pairs of biramous pleopods, some with tubercles, usually on first pairs only (Fig. 3H); distal ends of

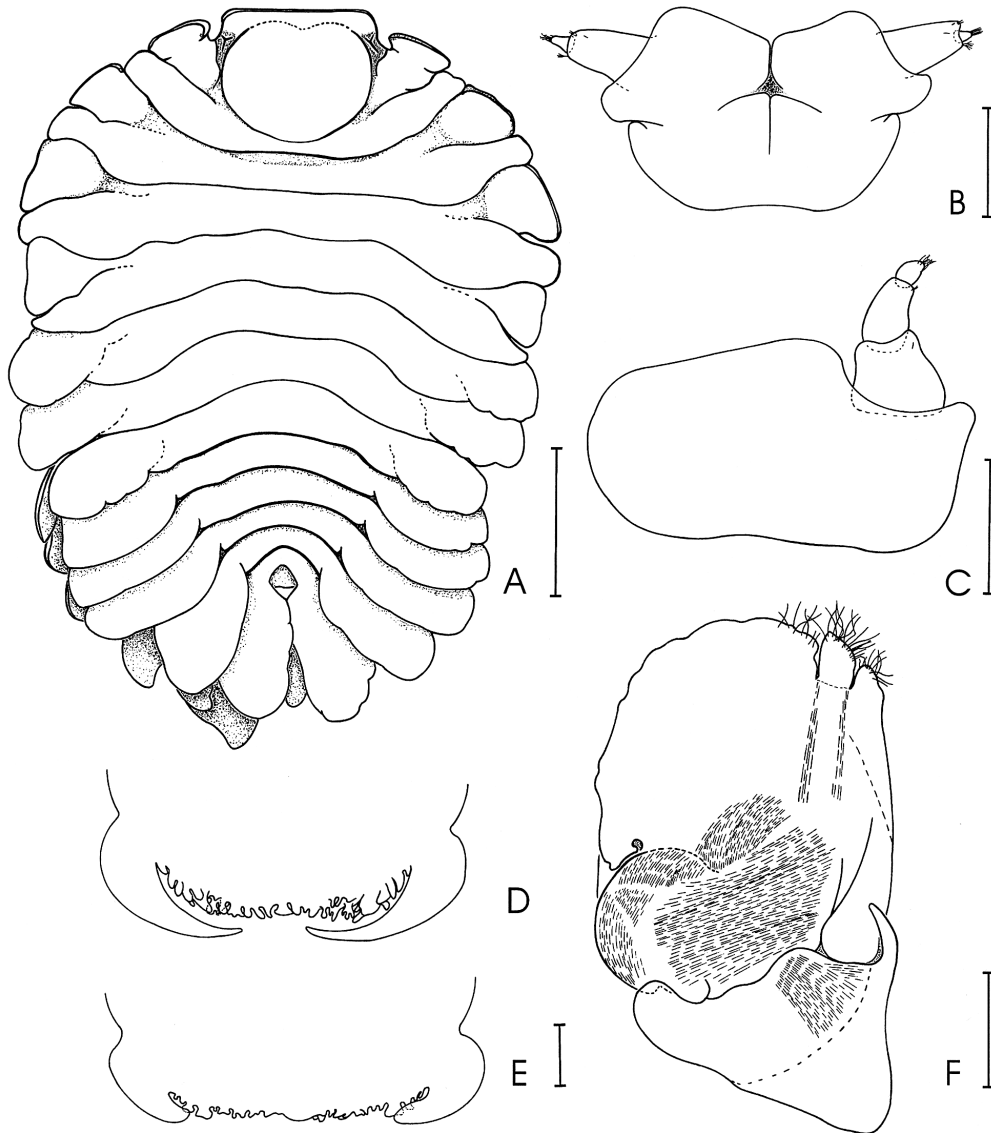
pleopods either slightly exceeding lateral plates on both sides, or on one side only (Fig. 2A), or not visible at all in dorsal view; ventral surface of pleon completely covered by pleopods (Fig. 1B), or partially exposed. Uropods uniramous (Fig. 3H), approximately as long as fifth pleopods, almost completely covered by fifth lateral plates (Figs 1A, 2A) but exposed in some small specimens.

*Description of adult male* (based on specimens parasitic on *Paralomis granulosa*)

Length: 2.1-12.2 mm.

Colour (material preserved in ethanol): uniformly light yellow.

Head (Figs 4D, 6B, 6C) anteriorly rounded, slightly wider than long; partially set into pereon, border between head and pereon rather faint. Eyes, when evident, distinct as small dark spots (when absent, perhaps because of fading in preservation). Dorsal surface with 2 slits on anterior third of head, obliquely oriented towards midline. First antenna (Figs 4E, 6C) of 3 articles, not visible in dorsal view, first article large and rounded, second article cylindrical and approximately as long as first, third small, all three articles setose distally, the last two more densely setose. Second



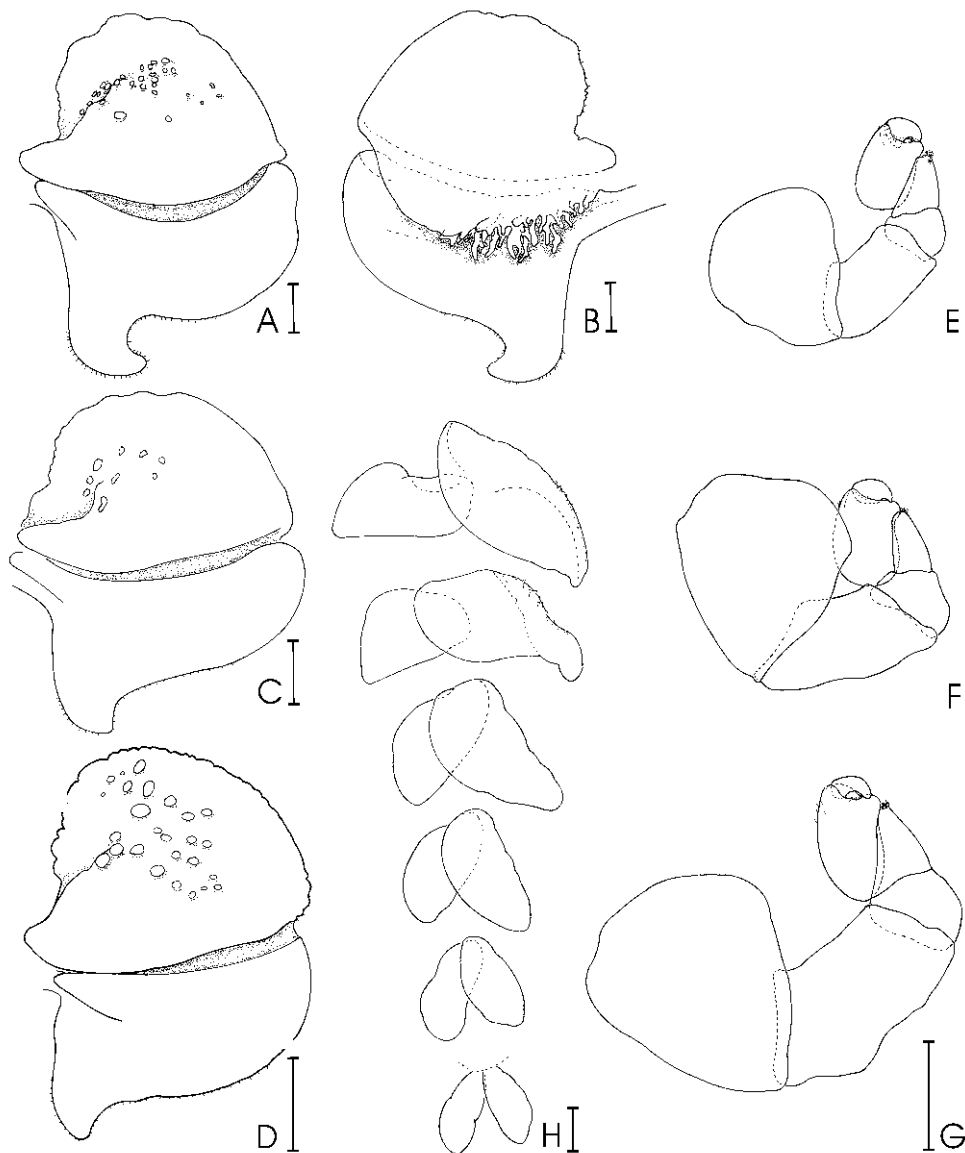
**Figure 2.** *Pseudione tuberculata* Richardson, 1904. Adult female. **A.** right first oostegite in external view. **B.** same oostegite in internal view. **C.** right first oostegite in external view of one specimen from the type series. **D.** right first oostegite in external view of one specimen found on *Lithodes santolla*. **E-G.** left second, fourth and seventh pereopods. **H.** from the top downwards, right pleopods 1-5 and uropods. Scales: A-G, 1 mm; H, 2 mm.

**Figure 2.** *Pseudione tuberculata* Richardson, 1904. Femelle adulte. **A.** premier oostégite droit en vue externe. **B.** le même oostégite en vue interne. **C.** premier oostégite droit en vue externe d'un spécimen de la série-type. **D.** premier oostégite droit en vue externe d'un spécimen trouvé sur *Lithodes santolla*. **E-G.** deuxième, quatrième et septième périopodes gauches. **H.** de haut en bas, pléopodes droits 1 à 5 et uropodes. Échelles : A-G, 1 mm ; H, 2 mm.

antenna (Figs 4E, 6C) of 5 articles, overreaching margins of head, first three articles roughly equal in length, fourth distinctly shorter than third, and fifth smallest; last three articles setose distally. Maxilliped as small elongated article with a few minute setae distally.

Pereon variable, pereonites slightly to deeply separated

(Figs 4A-C, 6A). No midventral tubercles. Pereopods (Figs 4F-H, 6A, 6D) gradually larger posteriorly; bases with sharp outer margins; meri and carpi distinct, these two articles combined increasing gradually from approximately 1/2 length of propodus on first pereopod to as long as propodus on seventh pereopod. Carpi with short setae distally.



**Figure 3.** *Pseudione tuberculata* Richardson, 1904. Adult female. **A.** dorsal view. **B.** first antenna. **C.** left second antenna. **D, E.** two forms of barbulae. **F.** right maxilliped. Scales: A, 5 mm; B, C, 0.5 mm; D-F, 1 mm.

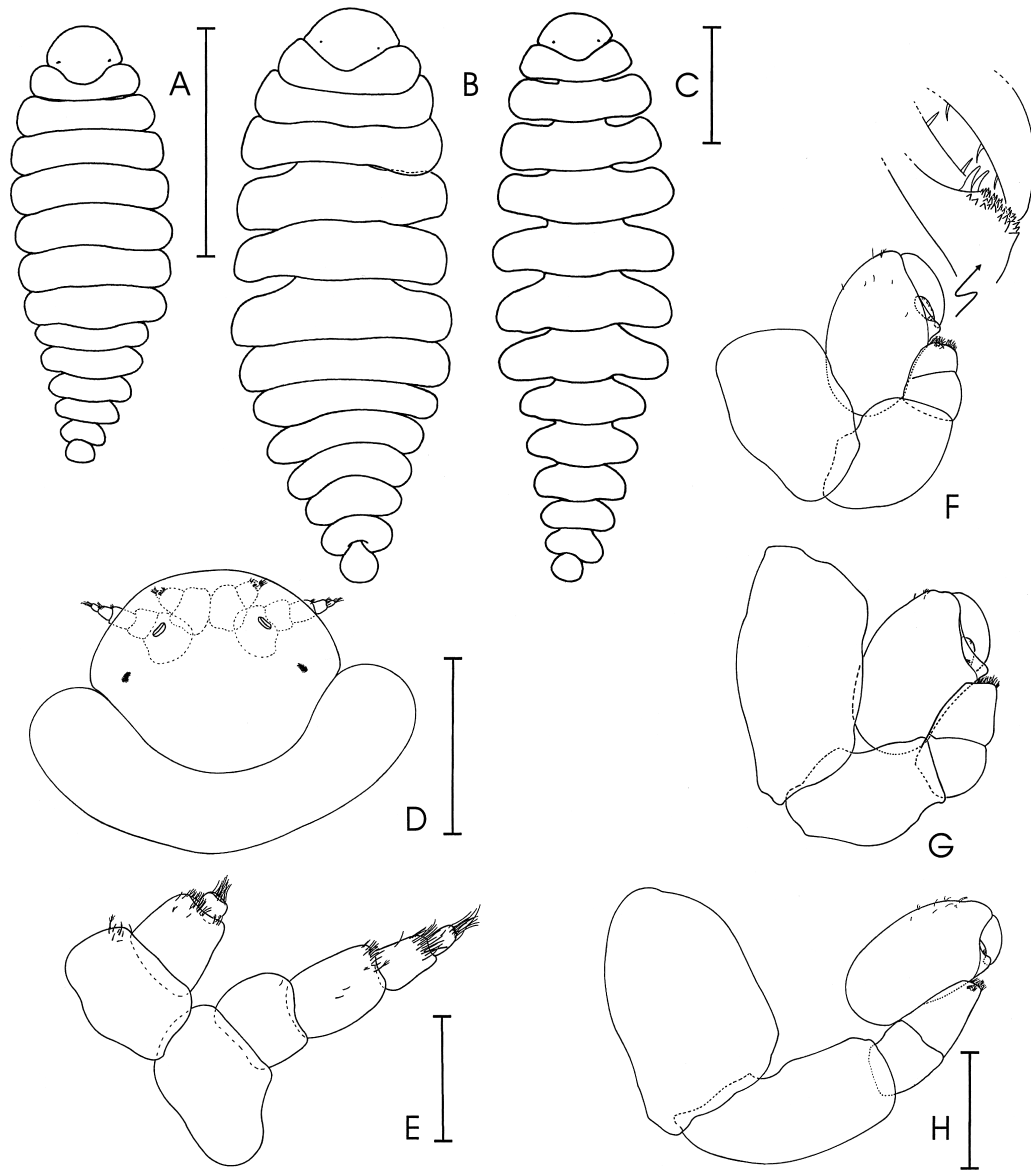
**Figure 3.** *Pseudione tuberculata* Richardson, 1904. Femelle adulte. **A.** face dorsale. **B.** antennule. **C.** antenne gauche. **D, E.** deux formes de barbules ; **F.** maxillipède droit. Échelles : A, 5 mm ; B,C, 0,5 mm ; D-F, 1 mm.

Propodi with few scattered minute setae, receptacles for dactyli with 2 contiguous tiny spines (see detail Fig. 4F; note that in females these spines are absent or hardly visible). Dactyli long and acute on first four pereopods and short and thick on last three.

Pleon (Figs 4A-C) of 6 distinct pleomeres, slightly or deeply separated, progressively narrower towards distal end. No midventral tubercles. Pleopods absent or visible as diffuse pale areas, sometimes slightly raised from ventral surface, particularly first pair; recognizable as wrinkled

areas in SEM photograph (Fig. 6A). Last pleomere (Figs 6E, 6F) without true uropods but with few spines at each side; anal slit crescent-shape, with major axes in dorso-ventral position.

*Variation* (Figs 5A-F). Of the 290 adult males examined, 21 had anomalous pleons, with 2 to all pleomeres fused; incipient constrictions sometimes remain visible (probably an indication of aborted divisions). In one specimen (Fig. 5A), all pleomeres were fused on the left side but free on the right side.



**Figure 4.** *Pseudione tuberculata* Richardson, 1904. Adult male. **A-C.** specimens in dorsal view with segments slightly to deeply separated. **D.** head in dorsal view. **E.** left first and second antennae. **F.** left second pereopod and detail of tiny spines on dactylus receptacle. **G-H.** left fourth and seventh pereopods. Scales: A-C, 2 mm (B and C share the same scale); D, 1 mm; E, 0.25 mm, F-H, 0.5 mm.

**Figure 4.** *Pseudione tuberculata* Richardson, 1904. Mâle adulte. **A-C.** face dorsale de différents spécimens avec segments légèrement à profondément séparés. **D.** céphalon, face dorsale. **E.** antennule et antenne gauches. **F.** deuxième péréiopode gauche et détail des minuscules épines situées sur le réceptacle du dactyle. **G-H.** quatrième et septième péréiopodes gauches. Échelles : A-C, 2 mm (B et C avec la même échelle); D, 1 mm; E, 0,25 mm, F-H, 0,5 mm.

*Descriptive notes on specimens found on* *Lithodes santolla*  
*Marsupial female*

Length: 5.9-24.4 mm.

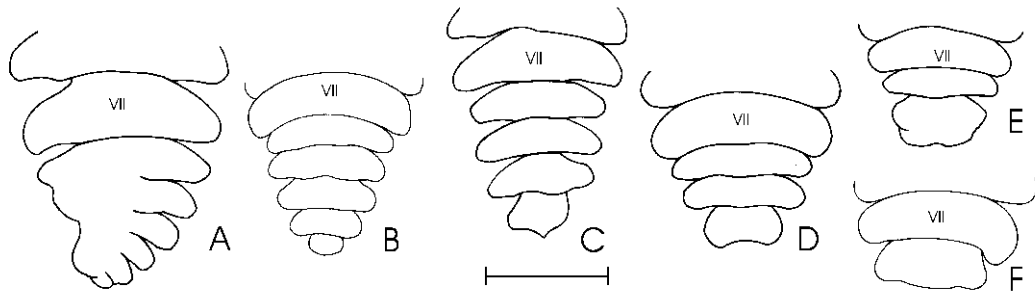
Oostegite I (Fig. 3C) slightly broader than in *P. tuberculata* from *Paralomis granulosa* and the type material; posterolateral projection roughly similar to that of type material and definitely not so curved as in the specimens

found on *P. granulosa*. In dorsal view, all females with distal ends of pleopods visible on both sides. Other features as in the females found on *P. granulosa*.

*Adult male*

Length: 3.1-8.8 mm.

No differences with the males found on *P. granulosa* were observed. Separation among body segments is highly



**Figure 5.** *Pseudione tuberculata* Richardson, 1904. Adult male. **A-F.** anomalous abdomens with 6, 5, 4, 3, 2 or only one segment. The number VII refers to the last thoracic segment. Scales: A-F, 1 mm.

**Figure 5.** *Pseudione tuberculata* Richardson, 1904. Mâle adulte. **A-F.** abdomens anormaux avec 6, 5, 4, 3, 2 ou seulement un segment. Le numéro VII indique le dernier segment thoracique. Échelles : A-F, 1 mm.

variable. One of the 16 males examined has an abnormal pleon, its last two pleomeres being fused.

*Complementary description of type material* (USNM 29092)

#### *Marsupial female*

Length: 7.8-17.6 mm (largest specimen broken in two).

Morphology as in the females described above except for the following features: first antenna, in most specimens, with left and right basal articles separated from each other; epimera of pleomeres slightly less produced (as shown by Richardson, 1904: fig. 83b); first oostegite, postero-lateral projection extending almost straight back (see Fig. 3D); tubercles on marsupium and pleopods more evident, but only in a few specimens as abundant as shown by Richardson (1904: fig. 83a); pleopods in all specimens barely extending beyond sides of pleon (as shown by Richardson, 1904: figs 83a, b), and leaving mid-ventral surface of pleon exposed; uropods covered by pleopods (as shown by Richardson, 1904: fig. 83a), or partially to completely exposed.

#### *Adult male*

Length: unbroken specimens 4.8 to 5.8 mm, but some fragments clearly from other smaller or larger specimens.

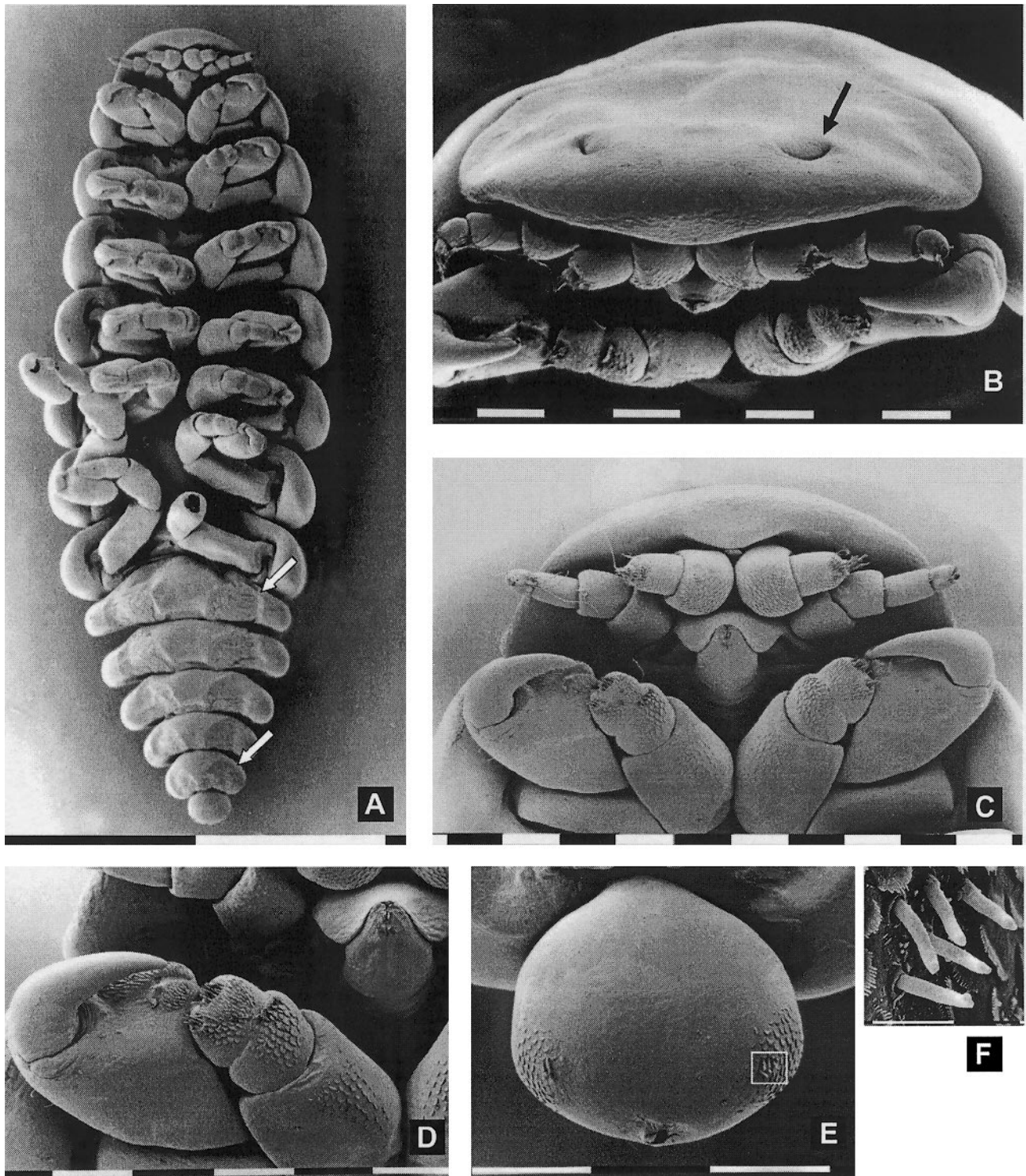
Eyes wanting in all specimens examined. This old preserved material brownish, with pleopodal pale areas more evident than in the Beagle Channel specimens. Body segments more or less fused (as shown by Richardson, 1904: fig. 87) or deeply separated. No other differences from material collected in Beagle Channel visible without dissection.

## Discussion

The genus *Pseudione* has more than 50 recognized species worldwide and is by far the largest genus of the family Bopyridae.

*Pseudione tuberculata* seems to be closely related to *P. brattstroemi* (central Chile) and *P. humboldtensis* (northern Chile). The females of these three bopyrids are characterized by a body shape almost or completely symmetrical, but they clearly differ from one another. In *P. tuberculata* the coxal plates are not visible in dorsal view (these are visible in *P. brattstroemi*), the pleonal lateral plates and pleopods are moderately developed (these are extremely extended in *P. humboldtensis*), and the uropods are uniramous (these are biramous in *P. brattstroemi*). In addition, *Pseudione galacanthae* also appears to be closely related to *P. tuberculata*. The former species, originally described by Hansen (1904) from the Gulf of California, has also been recorded for the Magellan Region (Richardson, 1904; Rayner, 1935; Stuardo et al., 1986). We have had the opportunity to examine a few specimens of *P. galacanthae* found in the branchial chambers of *Munida sp.* off Puerto Deseado (Santa Cruz Province, Argentina). These specimens are roughly similar to that illustrated by Richardson (1904, fig. 80), i.e., it is pyriform and slightly asymmetrical (*P. tuberculata* is oval and symmetrical). A complete description of the specimens of *P. galacanthae* from the Magellan Region will be presented elsewhere.

Intraspecific variations and abnormal specimens have been reported for several species of the genus *Pseudione* (see Bourdon, 1968). In *P. tuberculata*, the females show a great variation in their barbulae, and the males show various degrees of separation among body segments: at one extreme all the segments were in contact and on the other all the segments were distinctly apart, leaving wide gaps in between. In addition, 7.2% of males have their pleomeres partially or totally fused. Most of the 22 males showing abnormal pleons were mates of females bearing eggs (or embryos) in their marsupia. Therefore, it seems that the fertility of these males is at the most only slightly affected by this malformation.



**Figure 6.** *Pseudione tuberculata* Richardson, 1904. SEM photos. Adult male. **A.** ventral view, arrows indicate pleopods 1-5 (recognizable as wrinkled areas). **B.** frontal view of head, arrow indicates one of the slits. **C.** ventral view of the head and first pair of pereopods. **D.** oral cone and right first pereopod. **E.** telson. **F.** detail of square area in Fig. E showing lateral spines (uropods). Scales: A, 1 mm; B-E, 0.1 mm; F, 10  $\mu$ m.

**Figure 6.** *Pseudione tuberculata* Richardson, 1904. Photographies au MEB. Mâle adulte. **A.** Face ventrale, les flèches indiquent les pléopodes 1-5 (reconnus comme des régions ridées). **B.** face dorsale du céphalon, la flèche indique une des fentes céphaliques. **C.** face ventrale du céphalon et première paire de péréiopodes. **D.** cône buccal et premier péréiopode droit. **E.** telson. **F.** détail de la partie encadrée en E, montrant les épines latérales (uropodes). Échelles : A, 1 mm; B-E, 0,1 mm ; F, 10  $\mu$ m.



Eyes are absent in the males of the type material but usually present in the specimens from the Beagle Channel; this may be because the former was collected in much deeper waters than the latter. Each of the males from the type series of *P. tuberculata* shows a pair of slits on its head (similar to those shown in Figs 4D, 6B). These slits are easily observable under a dissecting microscope but not mentioned in the original description.

*Pseudione tuberculata* has been reported as parasitic on *Neolithodes diomedae* and *Paralomis granulosa* (Richardson, 1904; Roccatagliata & Lovrich, 1999). It is now reported for a third host, *Lithodes santolla*. These three lithodids from the Magellan Region occur in both the Pacific and the Atlantic Oceans: *N. diomedae* reaches depths of 640-2450 m, *P. granulosa* is restricted to shallow waters (from inshore to 50 m), and *L. santolla* ranges from inshore to 700 m (with maximal concentrations at 10-50 m). In addition, there are five other lithodids in the Magellan area, ranging from depths of 50 to 1600 m (see MacPherson, 1988); none of these has been reported as infested by bopyrid isopods. A single parasite with multiple hosts has also been found in other species of *Pseudione*: *P. hyndmanni* (Bate & Westwood, 1868) and *P. giardi* Calman, 1898, each parasitic on several species of hermit crabs from the boreal region (Markham, 1986).

Some slight morphological differences were observed among the specimens of *P. tuberculata* found on *Neolithodes diomedae*, *Paralomis granulosa* and *Lithodes santolla* (see description). We consider these slight differences not sufficient to establish distinct species for each host. However, the taxonomic status of this material should be revised when new geographic records, and probably new hosts, are available.

The following remarks about the type locality of *P. tuberculata* are worth mentioning. The specimens studied by Richardson (1904), parasitic on *Neolithodes diomedae* were obtained by the U.S. Fish Commission steamer *Albatross*, from off Port Otway, Patagonia, at a depth of 1921 m (USNM cat. no. 29092). The type material of this parasite has two labels: one reproduces most of the data above mentioned, the other one reads “*Bopyrus* from *Lithodes*, Sta. 2788”. The data of the *Albatross*, Sta. 2788 are: Darwin Bay, Archipelago de los Chonos, 45°35’S, 75°55’W, Chile, 1921 m, 11 Feb. 1888. (Dr. Brian Kensley, pers. comm.). Besides, in the original description of *Lithodes diomedae*, Benedict (1894) stated that numerous young specimens had been taken at the *Albatross* station 2788, in latitude 45°35’S. Therefore, we can infer that the parasites studied by Richardson (1904) come from these small hosts. Regarding the locality “Port Otway” (incorrectly spelled as Ortway by Richardson), we were not able to find it on recent maps, but in a table of positions of the voyages of HMS *Adventure* and *Beagle* between 1826 and 1836, FitzRoy (1839) listed “Port Otway” on page 78

under the heading “Chonos Archipelago”. Finally, to avoid further confusion, we would remark that the type locality “off Port Otway” should not be mistaken for the “Seno Otway” from the Magellan Strait.

To date there are only two unconfirmed records of lithodids infested by branchial bopyrids from the northern Hemisphere. In the collection of the USNM there is one female (with its male) of *Pseudione giardi* (cat. no. 43313) with the following collection data “Dutch Harbor, Alaska, H. Heath, collection, September 1, 1910 from *Dermaturus mandtii* Brandt”. Markham (1974) confirmed the identification of this parasite, but since it was separated from the host, he couldn’t determine whether the latter was correctly reported. More recently Minemizu (2000) published the photograph of a specimen of *Dermaturus mandtii* from Hokkaido, Japan, with a marked swelling on its left branchial chamber. Most probably this bulge was produced by a bopyrid; however, the parasite remains unknown.

Most branchial bopyrids occur in about equal numbers in the left and right branchial chambers of their hosts. However, for completely unknown reasons, a few species occur exclusively or predominantly on only one side (Markham, 1986). Roccatagliata & Lovrich (1999) found *Pseudione tuberculata* in the left chambers in 99.6% of the false king crabs *Paralomis granulosa* examined. In the present paper, all the king crabs *Lithodes santolla* examined (17 specimens) harbored female parasites in their left branchial chambers. This suggests that the preference of the parasite for the left chamber observed in *P. granulosa* is also applicable to *L. santolla*.

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#### References

- Bourdon R. 1968.** Les Bopyridae des mers Européennes. *Mémoires du Muséum National d’Histoire Naturelle*, A **50**: 77-424.

- Caspers H. 1939.** Zwei neue Epicariden-Arten aus der Nordsee (*Pseudione borealis* n. sp. und *Ps. tuberculata* n. sp.). *Zoologischer Anzeiger*, **125**: 236-244.
- FitzRoy R. 1839.** *Narrative of the surveying Voyages of His Majesty's Ships Adventure and Beagle between the years 1826-1836* (appendix to Volume 2). H. Colburn, London. 352 pp.
- Gruner H.-E. 1966.** Die Tierwelt Deutschlands und der angrenzenden Meeresteile nach ihren Merkmalen und nach ihrer Lebensweise. 53. Krebstiere oder Crustacea, V. Isopoda, 2. Lieferung: 151-380.
- Lovrich G.A. 1991.** *Reproducción y crecimiento del centollón, Paralomis granulosa* (Crustacea, Anomura, Lithodidae) en el Canal Beagle. Ph.D. dissertation, Universidad de Buenos Aires. 160 pp.
- MacPherson E. 1988.** Revision of the family Lithodidae Samouelle, 1819 (Crustacea, Decapoda, Anomura) in the Atlantic Ocean. *Monografías de Zoología Marina, Instituto de Ciencias del Mar. Barcelona*, **2**: 1-153.
- Markham J.C. 1974.** Extension of range and new host records for the parasitic isopod *Pseudione giardi* Calman in the northeastern Pacific. *The Wasmann Journal of Biology*, **32**: 195-201.
- Markham J.C. 1978.** Bopyrid isopods parasitizing hermit crabs in the northwestern Atlantic Ocean. *Bulletin of Marine Science*, **28**: 102-117.
- Markham J.C. 1986.** Evolution and zoogeography of the Isopoda Bopyridae, parasites of Crustacea Decapoda. In: *Crustacean issues* (F.R. Schram ed), pp.143-164. A.A. Balkema: Rotterdam.
- Markham J.C. 2003.** A worldwide list of hermit crabs and their relatives (Anomura: Paguroidea) reported as host of Isopoda Bopyridae. *Memoirs of Museum Victoria*, **60**: 71-77.
- Minemizu R. 2000.** *Marine decapod and stomatopod crustaceans mainly from Japan*. Bunichi Sogo Shuppan, Tokyo. 344 pp. [In Japanese]
- Nierstrasz H.F. & Brender à Brandis G.A. 1923.** Die Isopoden der Siboga-Expedition. II. Isopoda Genuina I. Epicaridea. *Siboga-Expeditie*, **32b**: 57-121.
- Nierstrasz H.F. & Brender à Brandis G.A. 1931.** Papers from Dr. Th. Nortensen's Pacific Expedition 1914-16. LVII. Epicaridea II. *Videnskabelige Meddelelser fra Dansk naturhistorisk Forening i København*, **91**: 147-226.
- Pardo L.M. 1998.** La familia Bopyridae en Chile. *Physalia*, **3**: 5-6.
- Pardo L.M., Guisado C. & Acuña E. 1998.** *Pseudione humboldtensis*, a new species (Isopoda: Bopyridae) of parasite of *Cervimunida johni* and *Pleuroncodes monodon* (Anomura: Galatheidae) from the northern coast of Chile. *Proceedings of the Biological Society of Washington*, **111**: 272-277.
- Rayner G.W. 1935.** The Falkland species of the crustacean genus *Munida*. *Discovery Reports*, **10**: 211-245.
- Richardson H. 1904.** Contributions to the natural history of the Isopoda. *Proceedings of the United States National Museum*, **27**: 1-89.
- Roccatagliata D. & Lovrich G.A. 1999.** Infestation of the false king crab *Paralomis granulosa* (Decapoda: Lithodidae) by *Pseudione tuberculata* (Isopoda: Bopyridae) in the Beagle Channel, Argentina. *Journal of Crustacean Biology*, **19**: 720-729.
- Román-Contreras R. & Wehrtmann I. 1997.** A new species of bopyrid isopod, *Pseudione chiloensis*, a parasite of *Nauticarica magellanica* (A. Milne-Edwards, 1891) (Crustacea: Decapoda: Hippolytidae). *Proceedings of the Biological Society of Washington*, **110**: 242-248.
- Shiino S.M. 1952.** Phylogeny of the family Bopyridae. *Annual Report of the Prefectural University of Mie* (Section 2, Natural Science) **1**: 33-56. [In Japanese]
- Stuardo J., Vega R. & Céspedes I. 1986.** New bopyrid isopod parasitic on *Callinassa uncinata* H. Milne-Edwards: with functional and ecological remarks. *Gayana (Zool.)*, **50**: 3-15.
- Vinuesa J.H. 1989.** Efectos e incidencia del parasitismo en la centolla (*Lithodes santolla*) y centollón (*Paralomis granulosa*) del Canal Beagle. *Physis* (Buenos Aires), **A 47**: 45-51.