

Probopyrus pandalicola (Isopoda: Bopyridae) infesting
Palaemonetes hiltonii (Crustacea: Caridea),
along the Pacific coast of Costa Rica.

Patricia Jiménez M.

Sistema de Estudios de Posgrado, Universidad de Costa Rica. Mailing address: CIMAR-Universidad de Costa Rica.

Mario Vargas V.

Depto. Parasitología, Facultad de Microbiología, Universidad de Costa Rica, Costa Rica.

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Abstract: We report the finding of the isopod *Probopyrus pandalicola* in the branchial cavity of the caridean shrimp, *Palaemonetes hiltonii*. Specimens were collected during 1986 and 1987 in Cocoroca and Punta Morales estuaries, Golfo de Nicoya (10 N y 85 W) Costa Rica. Morphological details of male, female, and epicaridean larvae are included.

Key words: Crustacea, *Probopyrus pandalicola*, *Palaemonetes hiltonii*, Costa Rica.

Epicaridean isopods are parasitic only on other crustaceans. The bopyrids are typically ectoparasites, and usually sterilize or reduce gametogenesis and may modify the secondary sexual characteristics in the definitive host (Beck 1980).

The genus *Probopyrus* includes 46 species, most of which occur in brackish to fresh water in Indo-West Pacific and Western Tropical and subtropical Atlantic regions. Of these species, fewer than 30 are valid, and many are considered synonyms of *P. pandalicola* by Markham (1985). Species of *Probopyrus* have been found on *Macrobrachium*, *Palaemon* and *Palaemonetes* (Markham 1985). There are two reports of *Probopyrus* collected on *Macrobrachium acant-*

hurus, one from Río Palacio Tortuguero and the other from Tortuguero river, Costa Rica (Markham 1985).

MATERIAL AND METHODS

Five caridean shrimps, *Palaemonetes hiltonii*, infested with a bopyrid isopod each (Fig.1) were collected from Cocoroca estuary, Golfo de Nicoya, Costa Rica. In addition, three shrimps collected at Punta Morales estuary in 1986 were found positive.

Adults were identified to genus following Schultz (1969) and larvae according to Dale & Anderson (1982). These authors distinguish



Fig.1. Lateral view of *P. biltonii* infested.

P. pandalicola from *P. floridensis* and *P. bithynis*, based on body shape, antennae, pigmentation and other characters.

RESULTADOS

Description

Female (n=1): Length: 2664 μm . Width: 2016 μm (maximum). Cephalon: length 576 μm , width: 648 μm transversal diameter: 1728 μm and markedly asymmetrical.

Dorsal view: Cephalon light brownish, anterior margin convex in medial area, with antero-lateral angles well defined. Detaches from the anterior margin a pair of laminated structures, poorly sclerotised, with five or six tubercles at its borders. Pereon dark, with seven corrugated segments and

accumulated pigment irregularly distributed. Pleon cream, with five segments, the last ones almost translucent. Final pleomere bilobed with a medial indentation (Fig.7).

Ventral view (Fig.2): Palps of maxillipeds capitated with 8-10 spiniform projections (Fig.3). Oral opening ovoid, bordered by minute denticles.

Five pairs of oostergites strongly pigmented in a trabecular pattern. Both oostergites V strongly different, with a marked asymmetry. One oostergite sawer-shaped and with a fringe of about 55 projections; surface granulated, distal end with a small roundish protuberance, 2160 μm long and 430 μm width (without fringe) (Fig.4). The other oostergite is reniform and with a rugose surface and abundant microtrichiae. Fringe formed by about 40 tubuliform, fleshy projections, 1870 μm long and 720 μm wide (Fig.5).

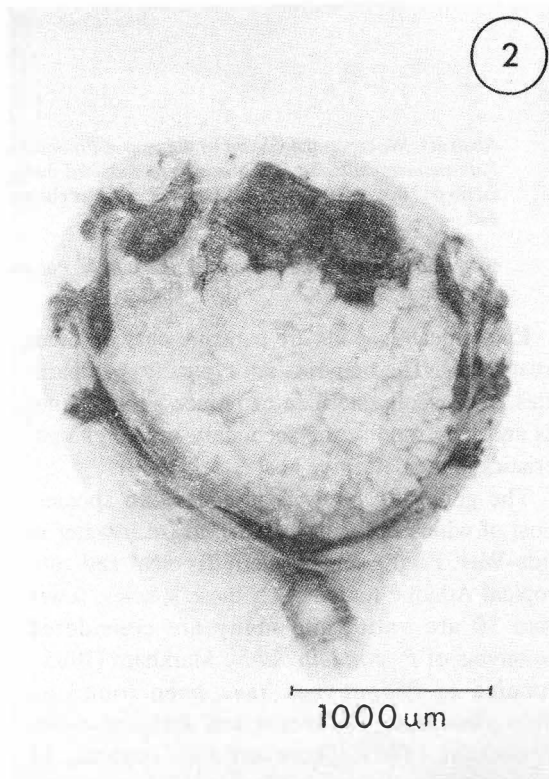


Fig. 2. Female of *P. pandalicola* (ventral view).

Marsupium: septate, with grossly pentagonal cells that contain bodies of cristaline appearance and with several discoid inclusions of varied sizes. Pereiopod: with five segments and a terminal dactylus (Fig. 6). Segment I: with a few microsetules and scales at the inner border. Segment II: triangular with a few scales at the external margin. Segment III: with curved and smooth external end. Segment IV: with scales and microsetules on the external margin. Segment V: with scales on the external border and a group of 3-5 blunt setae located at the junction with the dactylus. Dactylus racket-shaped, with a hooked structure of $68.4\ \mu\text{m}$ from base to distal end by $46.8\ \mu\text{m}$ at basal diameter, strongly curved, with apical end touching a group of distal spines.

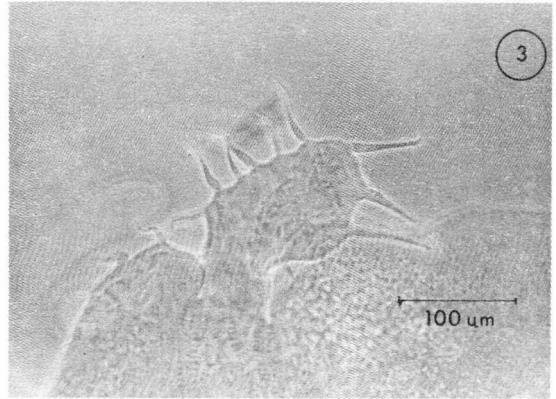


Fig.3. Maxilliped of female *P. pandalicola*.

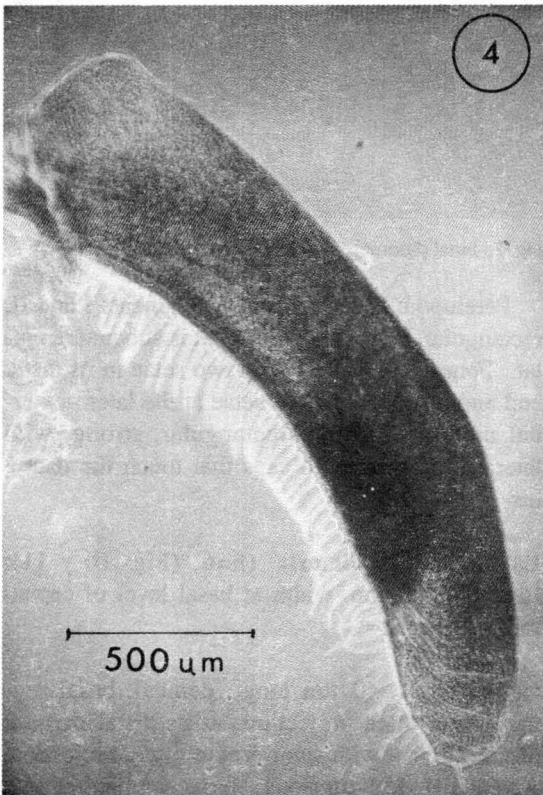


Fig. 4. Oostergite V (right), female *P. pandalicola*

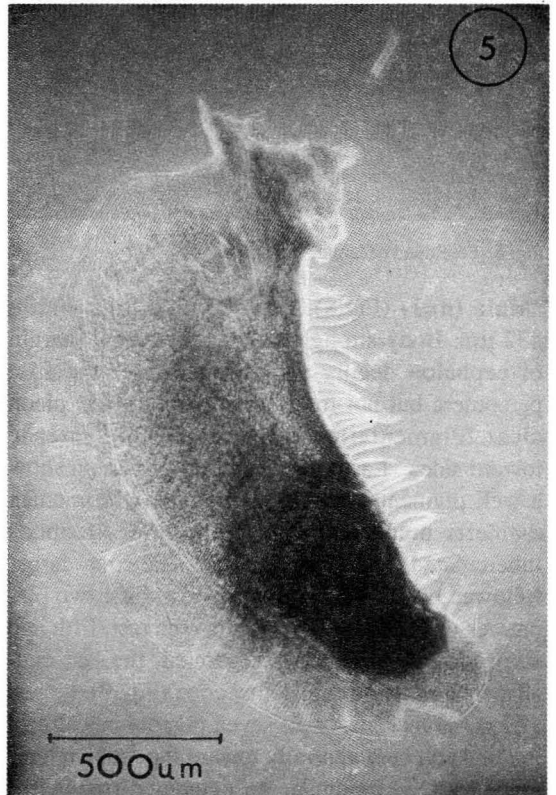


Fig. 5. Oostergite V (left), female *P. pandalicola*.



Fig. 6. Pereiopod of female *P. pandalicola*.

Male (n=1) (Fig.8): Length: 970 μm . Width: 422 μm . Body strongly convex. Proximal margin of cephalon deeply emarginated over the first pereomere but not fused to it. Pereon dark, pleon clear. Pigmentation of tergites more intense toward sides. Last three segments of pereon show a well pigmented strand. Pereomere with median diameter much less than the lateral. Pleopods tuberculated, with microsetulae. The first larger followed by four smaller pleopods. First two pleomeres with larger diameter than the rest, fifth and sixth pleomeres laterally separated, the last cup-shaped with the terminal anal cone (Fig. 9).

Lateral margins of all seven pereomeres almost parallel and bent ventrally toward the median line.

Antenna I, triangular unsegmented (monoarticulated) and with a distal seta. Antenna II with three segments and five distal setae.

Anterior margin of cephalon with scattered microsetae. Maxillipedes hook-shaped.

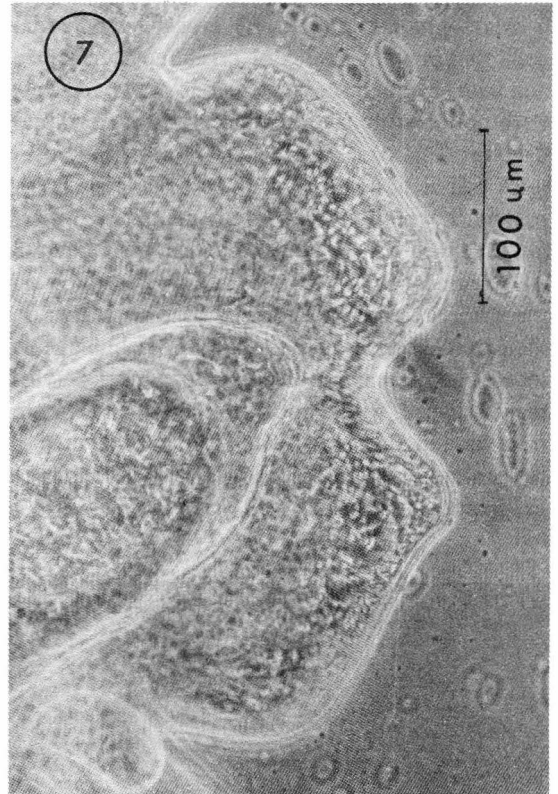


Fig. 7. Final pleomere of female *P. pandalicola*.

Pereopod: Five segmented. Segments I and II, rectangular, larger than third that is subquadrangular. Fourth, subconical with two setae in its distal end and a small group of setae at the latero-external margin. Fifth, subrectangular, strong, with lateral projection with caps that touch the dactylus.

Larva (Epicaridean): (n=6) (Figs.10 y 11): Length: 285 μm . width at basal level of cephalon, 170 μm .

Antenna I. 40 μm long, conical; basal segment with three projections at its distal margin; distal segment with spiniform terminal projection. Antenna II. 154 μm long, basal segment strong, with a long spiniform projection at distal end and a small subdistal spine. Terminal segment with two processes, one short and the other three times larger.

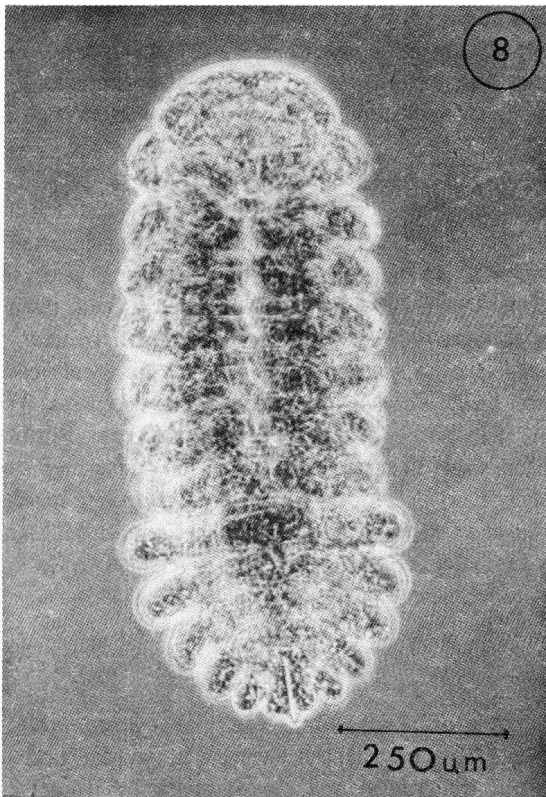


Fig. 8. Male of *P. pandalicola* (dorsal view).

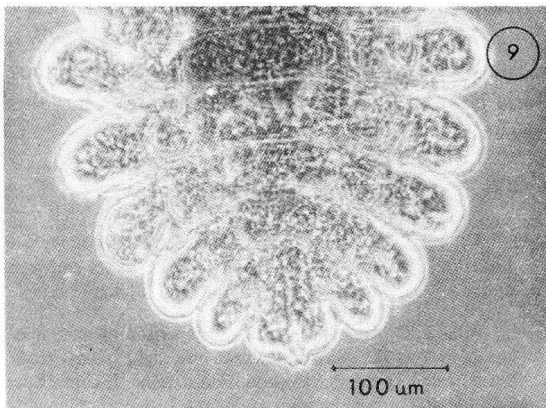


Fig. 9. Pleon of male of *P. pandalicola*.

Cephalon: Length 72 μm . Dorsally with slight longitudinal and transverse corrugation in the pereon-pleon region. With 12 pairs of appendages, 6 pairs of pereopods, 5 pairs of pleopods

which terminate in three projections. One pair of uropods. Terminal segments of uropods subtriangular, ending in two digitiform processes.

DISCUSSION

The previous descriptions of *Probopyrus pandalicola* do not fit our specimens because of the following details:

- male uropods are present and end in two digitiform processes,
- male pleurites are bent ventrally, a character not mentioned in the literature,
- the maxillary and maxilliped palps of the female are not articulated and show projections that are coincident with J. C. Markham's descriptions (pers. comm.). Detailed descriptions of

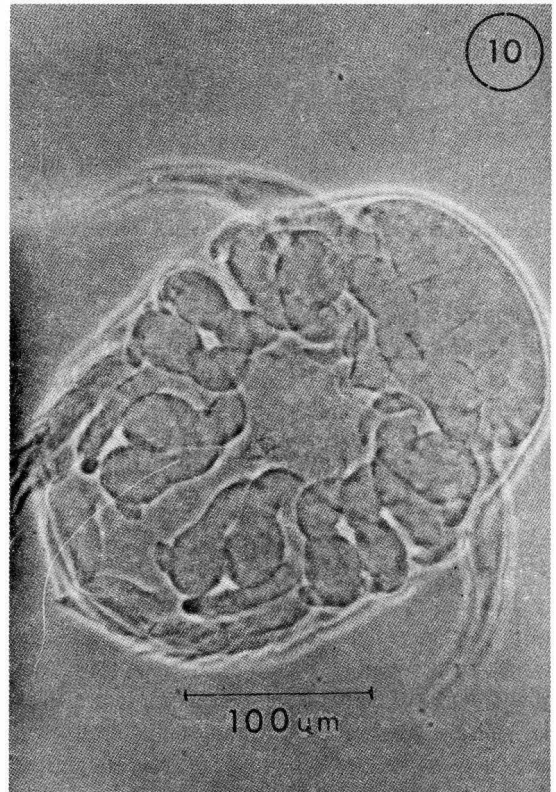


Fig. 10. Epicaridean larva of *P. pandalicola* (ventral view).

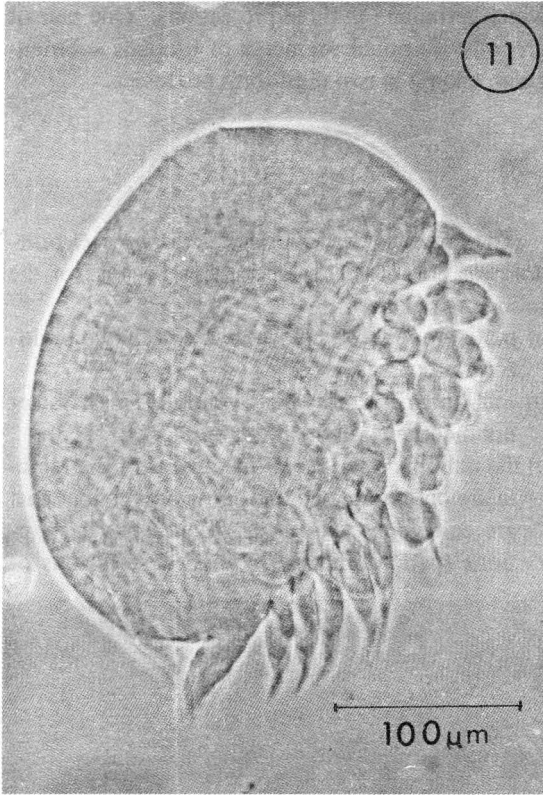


Fig. 11. Epicaridean larva *P. pandalicola* (lateral view).

P. pandalicola are needed to be sure on this character.

The description of Dale and Anderson (1982) larval of *P. pandalicola*, *P. floridensis* and *P. bithynis* differ from our specimens in the following details:

- a) The dorsal cuticle of the epicaridean of *P. bithynis* is smooth. Our specimens are covered by plates.
- b) *P. bithynis* has no pigmented spots, while in ours the spots are present.

In addition, it is impossible to separate the larvae of *P. pandalicola* and *P. floridensis* because all eight characteristics used by Dale and Anderson (1982) are similar. Our specimens have the antenna II (antennula) with the basal tubercle bearing three distal setae and three basal setae, both groups of setae are present in *P. pandalicola* and *P. floridensis*.

Following the criteria of Dale and Anderson (1982) and Markham (1982), we prefer, at present, to consider the species here presented as *P. pandalicola*. Future decisions regarding what charac-

ters should be used to separate and to recognise species in the genus *Probopyrus* will depend on the availability of longer series of specimens, to evaluate the weight of the several characters used.

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RESUMEN

Se informa del hallazgo de *Probopyrus pandalicola* (Isopoda: Bopyridae) en la cavidad branquial de camarones carideos de la familia Palaemonidae (*Palaemonetes hiltonii*), colectados durante 1986 y 1987 en los esteros de Cocoroca y Punta Morales, Golfo de Nicoya (10 N y 85 W), Costa Rica. Se dan además detalles morfológicos de la hembra, del macho y de las formas larvales epicarideas del boprido.

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