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# ERGASILUS THATCHERI N. SP. (COPEPODA, POECILOSTOMATOIDA, ERGASILIDAE) FROM THE GILLS OF RHAMDIA QUELEN (TELEOSTEI, SILURIFORMES, PIMELODIDAE) FROM SOUTHERN BRAZIL

Kerlen B. Engers, Walter A. Boeger\*†, and Deodoro A. Brandão\*‡

Curso de Pós Graduação em Zoologia, Departamento de Zoologia, Universidade Federal do Paraná, Curitiba, PR 81531-990, Brazil

**ABSTRACT:** The female of *Ergasilus thatcheri* n. sp. (Copepoda, Poecilostomatoida, Ergasilidae) is described from the gills of the “jundiá,” *Rhamdia quelen* (Teleostei, Siluriformes, Pimelodidae), from fish ponds in the State of Rio Grande do Sul, Brazil. The new species has a falciform semipinnate terminal seta on the first exopod, which suggests phylogenetic affinity to 10 other congeners, all from fishes of the Amazon Basin. Based on general morphology, the new species shows great similarity to *E. callophysus* Thatcher and Boeger, 1984, a parasite of another pimelodid fish *Callophysus macropterus*. *Ergasilus thatcheri* n. sp., however, can be easily differentiated from *E. callophysus* in its possession of a more distal sensillum not located on a cuticular elevation, and a row of spinules on the inner margin of the second antennal segment (first endopodal segment).

*Ergasilus* is the most species-rich genus of the family Ergasilidae in South America. Twenty-one species have been described from different hosts and locations in Brazil (see Motta Amado and Rocha, 1995; Thatcher, 1998). However, the taxonomic status and the validity of some of these species are doubtful, probably reflecting the status of the entire genus, and a more comprehensive revision is required. During a survey of parasites of the “jundiá,” *Rhamdia quelen* (Quoy and Gaimard), a new species of ergasilid was collected from the gill filaments. This new species is described herein.

## MATERIALS AND METHODS

Sixteen specimens of *R. quelen* were captured in the Barragem do Capané, Municipal District of Cachoeira do Sul, Rio Grande do Sul, Brazil, during April 1995. The gills were removed and fixed in 5% formalin. Gills were examined under a dissecting microscope, and the ergasilids were collected with the aid of probes and preserved in 70% ethanol. Copepods were cleared in lactic acid and mounted on slides with Hoyer's mounting medium (Humason, 1979). Some specimens were dissected using small glass probes. Drawings were made with the aid of a camera lucida and a phase-contrast microscope. Measurements were made with an ocular micrometer and are expressed in micrometers. Type specimens were deposited in the Helminthological Collection of the Fundação Instituto Oswaldo Cruz (IOC), the Smithsonian Institution (USNM), the USDA Parasitological Collection (USNPC), and the Harold W. Manter Laboratory Collection (HWML).

## DESCRIPTION

### Ergasilidae von Nordmann, 1832

#### *Ergasilus* von Nordmann, 1832

#### *Ergasilus thatcheri* n. sp.

(Figs. 1–13)

**Adult female:** Cephalothorax bullet shaped, slightly constricted posteriorly (Fig. 1). Granules of blue pigment extend ventrally from cephalothorax to genital complex. Four free pedigers decreasing in width posteriorly; fifth pediger reduced (Figs. 1, 5). Genital complex as wide as long, with row of spinules on posteroventral margin (Fig. 5). First free abdominal somite with row of spinules on posteroventral margin (Fig. 5); second free abdominal somite with 2 rows of spinules on posteroventral margin; anal somite with posteroventral row of spinules,

deeply incised. Caudal rami with curved row of spinules at posteroventral margin; each ramus with long, medium, and 2 short setae.

Antennule (Fig. 10) 6-segmented, aesthetacs undifferentiated from setae (arrows, Fig. 10), setal formula 1: 9: 6: 4: 2 + ae(?): 6 + ae(?).

Antenna (Fig. 11) 4-segmented with distal evenly curved claw. Coxobasis with distal seta; articulation membrane not inflated. Second segment (first endopodal segment) with medial sensillum  $\frac{2}{3}$  of distance along margin, row of spinules on internal margin proximal to sensillum. Third segment (second endopodal segment) with proximal and distal sensilla; distally recurved. Fourth segment (Figs. 12, 13) (third endopodal segment) incomplete, vestigial, with 1 proximal sensillum on anterior surface (Fig. 13). Claw about 45 length of second endopodal segment, with proximal sensillum on posterior surface (Fig. 12); small distal indentation of cuticle on inner margin.

Mandible (Fig. 9) with 3 blades; anterior delicate, median robust blades, ornamented with long teeth on anterior and posterior margins, respectively; posterior blade falciform, with delicate teeth on posterior margin. Maxillule with 2 setae. Maxilla 2-segmented, distal segment with numerous teeth on anterior margin.

Legs 1–4 (Figs. 3, 7, 8) with spinules on outer margin of coxa. Interpodal plates with concentric rows of spinules (Fig. 6). Except for first endopodal segment of leg 1, outer margins of both leg rami with row of spinules of variable extent; outer margin of first, second endopodal segments of legs 2, 3, and 4 pilose; inner margin of first endopodal segment of legs 2, 3, and 4 pilose. First seta of third exopodal segment of leg 1 falciform, semipinnate, with conspicuous thumblike spinule proximally (Fig. 4). For armature formula, see Table I. Leg 5 vestigial (Fig. 5), consisting of 2 naked setae. Egg sac (Fig. 2) multiserial with 20–40 eggs.

## Taxonomic summary

**Type host:** *Rhamdia quelen* (Quoy and Gaimard in Freycinet 1824), “jundiá.”

**Site:** Gill filaments.

**Type locality:** Barragem do Capané, Cachoeira do Sul, Rio Grande do Sul, Brazil.

**Number of specimens studied:** 82.

**Type specimens:** Holotype IOC 34008a (slide). Paratypes: IOC 34008b–f (slides), 33840a–c (3 vials with 10, 9, 9 specimens, respectively, in 70% ethanol). USNPC: 088644.00 (2 slides, whole mount; 2 slides, dissected), 1 vial with 13 specimens in 70% ethanol). USNM: 288462 (1 vial with 13 specimens in 70% ethanol). HWML: 15000 (1 slide, whole mount), 15001 (2 slides, dissected), 15002 (2 vials with 7 and 8 specimens, respectively, in 70% ethanol).

**Etymology:** The species is named after Dr. Vernon Everett Thatcher in recognition of his contribution to the knowledge of freshwater fish parasitology in South America.

## Remarks

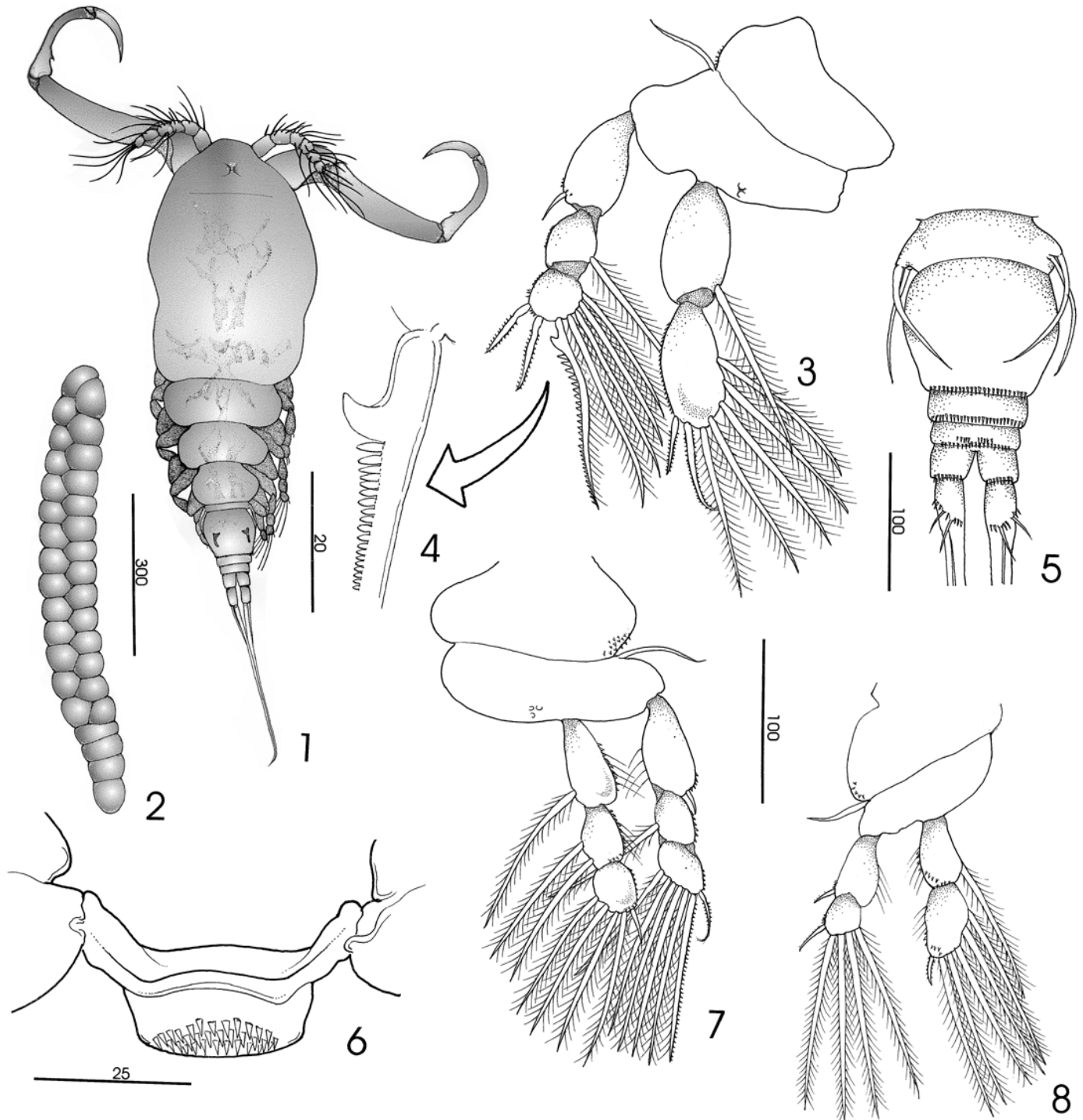
*Ergasilus thatcheri* n. sp. has a semipinnate, falciform seta on the terminal segment of the first exopod, which suggests its proximity to the following species, previously described from Amazon fishes: *E. bryconis* Thatcher, 1981; *E. jaraquensis* Thatcher and Robertson, 1982; *E. hydrolycus* Thatcher et al., 1984; *E. callophysus* Thatcher and Boeger,

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\*Departamento de Zootecnia, Universidade Federal de Santa Maria, Santa Maria, RS 97119-900, Brazil. E-mail: dabrandao@pro.via-rs.com.br.

†To whom correspondence should be addressed.

‡Research Fellow of the Conselho Nacional de Desenvolvimento Científico e Tecnológico, Brazil.

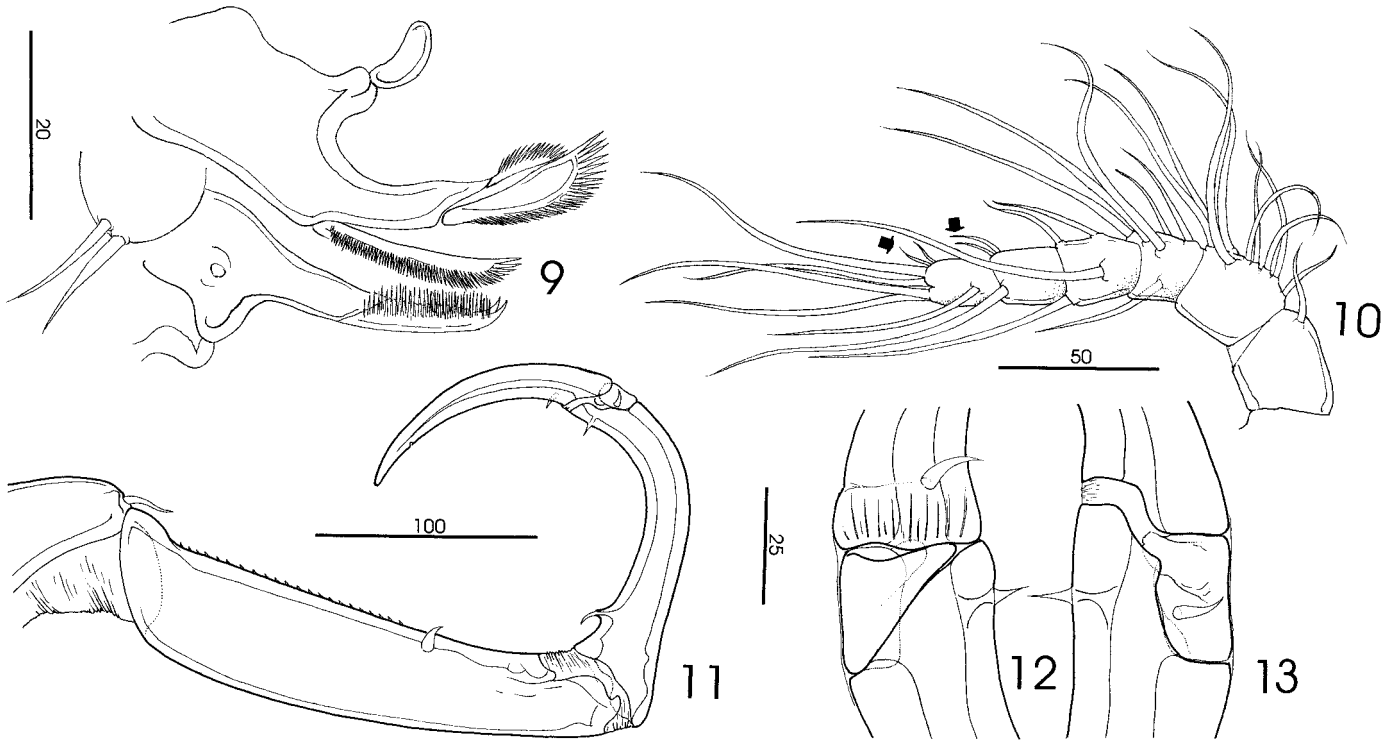


FIGURES 1–8. *Ergasilus thatcheri* n. sp. (female) from the gills of *Rhamdia quelen*. 1. Dorsal view. 2. Egg sac. 3. Leg 1. 4. Detail of thumblike projection on outer margin of first seta of third exopodal segment of leg 1. 5. Fifth pedigerous somite with leg 5, genital complex, abdominal somites, caudal rami (ventral). 6. Interpodal plate of leg 1. 7. Legs 2, 3. 8. Leg 4.

1984; *E. holobryconis* Malta and Varella, 1986; *E. hypophthalmi* Boeger et al., 1993; *E. urupaensis* Malta, 1993; *E. triangularis* Malta, 1994; *E. yumaricus*, Malta and Varella, 1995; and *E. turucuyus* Malta and Varella, 1995. These species apparently form a monophyletic assemblage, as suggested by the sharing of this type of seta and 2-segmented endopods in legs 1 and 4. Despite the original description (Thatcher and Boeger, 1984), *E. callophysus* also possesses a 2-segmented endopod on leg 4, as indicated by study of voucher specimens. The definition of

the taxonomic status of this clade awaits, however, a more complete phylogenetic analysis of the group.

Based on body shape and morphology of the legs and caudal rami, the new species shows greatest similarity to *E. callophysus* Thatcher and Boeger, 1984, a parasite of another pimelodid, *Callophysus macropterus*. Body shape, morphology of the legs, and caudal rami are very similar in both species. *Ergasilus thatcheri* n. sp., however, can be easily differentiated from *E. callophysus* by having a more distal



FIGURES 9–13. *Ergasilus thatcheri* n. sp. (female) from the gills of *Rhamdia quelen*. 9. Mouth parts. 10. Antennule. Arrows indicate probable aesthetacs. 11. Antenna. 12, 13. Fourth antennal segment (third endopodal segment) on posterior and anterior view, respectively.

sensillum and a row of spinules on the inner margin of the second antennal segment (first endopodal segment). Additionally, the pore of this sensillum in *E. callophysus* is located on a cuticular elevation, which is absent in the new species.

As suggested by Alston et al. (1996) and Boxshall and Huys (1998), aesthetacs are likely present on the antennules of most (if not all) ergasilids, reflecting the primitive state for all Poecilostomatoidea. However, aesthetacs appear variably recognizable among species of *Ergasilus*. Whereas some depict distinctive morphology, others are extremely similar to setae, making their recognition difficult. Presence and number of aesthetacs in *E. thatcheri* n. sp., thus, are postulated by their relative position within the antenna.

The existence of a third endopodal segment on the antenna of members of the family Ergasilidae was indicated for the first time by El-Rashidy and Boxshall (1999) for species of *Ergasilus* and *Acusicola*. This residual segment was also found in *E. thatcheri* n. sp. and may be present in other ergasilids as well. In the new species, the third endopodal segment is clearly incomplete (not cylinderlike), subtriangular on the posterior face (Fig. 12), and with a greatly reduced anterior surface (Fig. 13), which bears a single sensillum.

Although specimens of *E. thatcheri* n. sp. used in the present study are from jundiás collected from a large water reservoir, this host is being widely cultured in the State of Rio Grande do Sul and is considered of great potential for aquaculture in Brazil. Because ergasilids are known to cause severe pathologies on the gills of their hosts (see Thatcher and Boeger, 1983), a more complete evaluation of the effects of *E. thatcheri* infection on the culture of the jundiá is necessary.

TABLE I. Armature formula for legs 1–4 of *Ergasilus thatcheri* n. sp.

Leg	Coxa	Basis	Exopod	Endopod
1	0-0	1-0	I-0; 0-1; II, 5	0-1; II, 5
2	0-0	1-0	I-0; 0-1; I, 6	0-1; 0-2; I, 4
3	0-0	1-0	I-0; 0-1; I, 6	0-1; 0-2; I, 4
4	0-0	1-0	I-0; I, 4	0-1; I, 5

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