



First record of *Telotha henselii* (Isopoda: Cymothoidae) on *Macrobrachium jelskii* (Decapoda: Palaemonidae) from Brazil

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Abstract. This paper reports for the first time an infestation of the freshwater shrimp *Macrobrachium jelskii* by the isopod *Telotha henselii* in a freshwater river system of northeastern Brazil. The prevalence of *Telotha henselii* was of 0.004%. The species was previously reported for other palaemonid shrimps, but this is the first record of *T. henselii* parasitizing *M. jelskii*.

Key words: Isopod, Freshwater shrimp, Cymothoidea, Shrimp parasite.

Resumo: Primeiro registro de *Telotha henselii* (Isopoda: Cymothoidae) em *Macrobrachium jelskii* (Decapoda: Palaemonidae) no Brasil. Este artigo registra pela primeira vez a infestação do camarão dulcícola *Macrobrachium jelskii* pelo isópode *Telotha henselii* em um rio no interior do nordeste do Brasil. A prevalência de *Telotha henselii* foi de 0,004%. A espécie foi relatada anteriormente para outros camarões palaemonídeos, mas este é o primeiro registro de *T. henselii* parasitando *M. jelskii*.

Palavras-chave: Isópode, Camarão dulcícola, Cymothoidea, Parasito de camarão.

The Cymothoidae is a large family of ectoparasitic isopods of marine, freshwater, and brackish-water teleosts (Smit *et al.* 2014). Cymothoids can exert severe damages by infecting a suitable host when they start their parasitic life feeding on blood and tissues (Ateş *et al.* 2006, Alas *et al.* 2008). For example, these ectoparasites may cause a slight decrease in host growth, and the most dramatic changes are in the host's reproductive capability (Anderson, 1977). Severe cases they can cause the death of the affected host (Papapanagiotou *et al.* 1999). In addition to parasitizing teleosts, a few cymothoid species have also been found on other organisms such as sponges, jellyfish, cephalopods, decapod crustaceans, elasmobranchs and amphibians (Trilles & Oktener 2004, Wunderlich *et al.* 2011).

In the Neotropical region, until now, only one cymothoid species, namely *Telotha henselii* Von Martens, 1869, is known to parasitize a variety of freshwater palaemonid shrimp (Wunderlich *et al.*

2011). This species was reported as an ectoparasite of *Palaemonetes argentinus* Nobili, 1901 from Taim, Rio Grande do Sul State, in Southern Brazil (Lemos de Castro & Gomes-Corrêa 1982) and from Rio Gualaguaychu, Province of Entre Rios, Argentina (Taberner 1993). Also, is an ectoparasite of *Macrobrachium brasiliense* Heller, 1862 from the Chapada dos Guimaraes and Nioaque, both in Mato Grosso do Sul State, western central part of Brazil (Lemos de Castro 1985); as well as of *Macrobrachium borelli* Nobili, 1896 and *Pseudopalaemon bouvieri* Sollaud, 1911, from the Mandisovi Chico river, in the Entre Rios region, Argentina (Grassini 1994) and from Salado River, Santa Fe Province, Argentina (Taberner 1993); of *Macrobrachium potiuna* Müller, 1880 from the Guaíba lake, in South region of Brazil (Alberto *et al.* 2001) and of *Palaemonetes carteri* Gordon, 1935 from natural lakes of the middle Amazon river region (Wunderlich *et al.* 2011).

There are no published reports on parasitic cymothoids from the Northeastern Brazil, so the present study reports the first record on the occurrence of *T. henselii* in the freshwater shrimp *Macrobrachium jelskii* Miers, 1877 (Palaemonidae) from a freshwater river system of *Caatinga* biome, in Northeast of Brazil, based on morphological examination.

Macrobrachium jelskii were collected by sieves (3 mm) from Sambito River, near the municipality of Aroazes, Piauí State ($6^{\circ} 13' S$, $41^{\circ} 51' W$), in Northeastern Brazil, on 3 June 2017, during field studies on the ecology of freshwater shrimps (Fig. 1). The specimen was identified according to the morphological description by Alberto (2008) as *Telotha henselii* and the hosts were identified as *M. jelskii* based on the description by Melo (2003). The cymothoid collected was fixed

in 70% alcohol. Parasite specimen was deposited in the Museum of Natural History of Federal University of Piauí, Teresina, Brazil. Prevalence was calculated according to the method proposed by Bush *et al.* (1997).

Among the 245 *M. jelskii* examined from the Sambito River only one was infected by *henselii* (Fig. 2) and with prevalence of 0.004%. The percentage of occurrence of *T. henselii* on *M. jelskii* collected in this study was very low when compared with previous reports (Table I). The cymothoid was identified as *T. henselii* by characters that distinguish it from other cymothoid isopods, including five well developed spines on the inner margin of the first three pereopods and irregularly starched pigments concentrated on the cephalon, lateral and posterior margins and median line of pereonites (Alberto 2008).

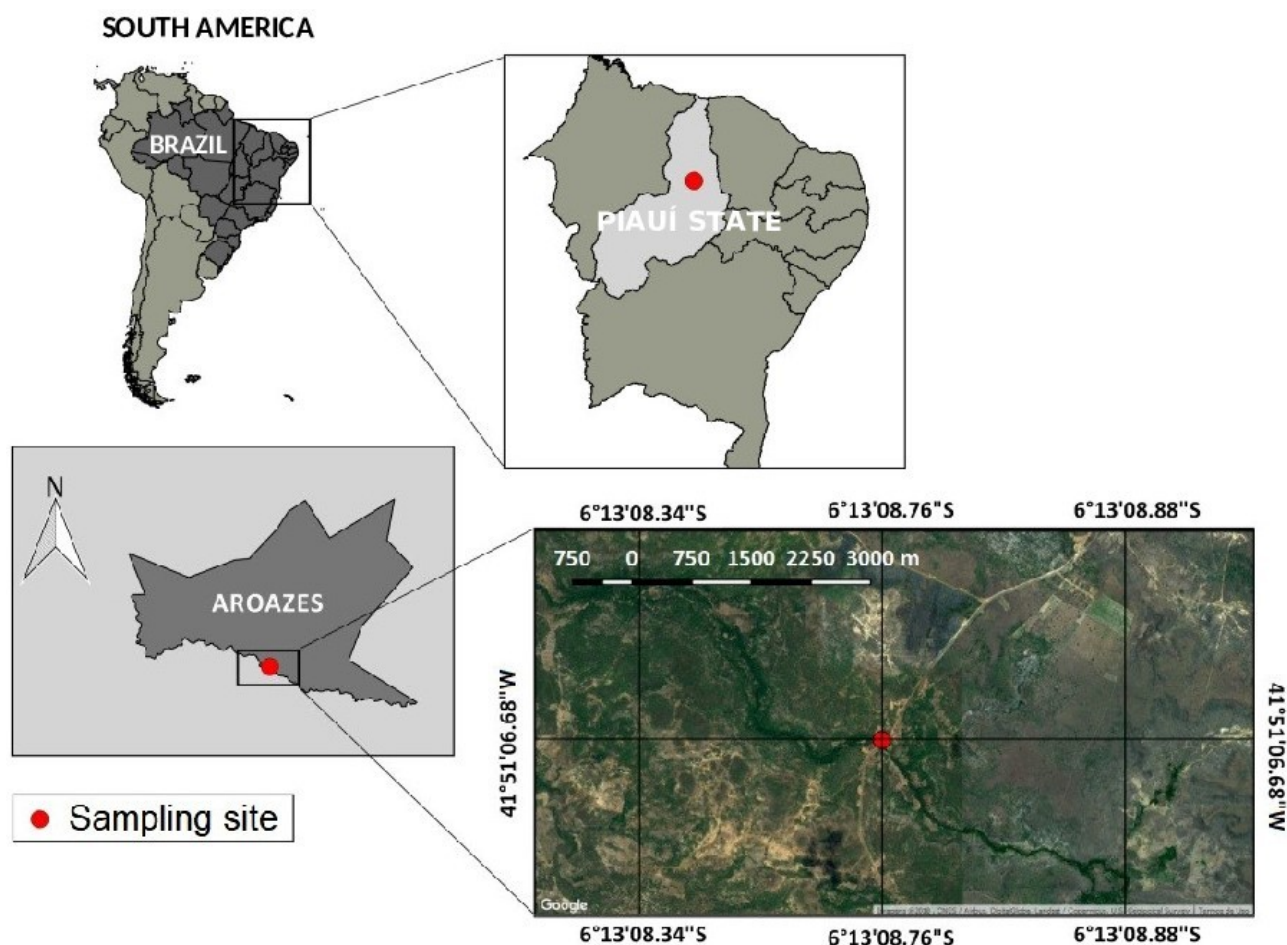


Figure 1.- Map indicating the sampling site in the Sambito River near to the municipality of Aroazes where *Telotha henselii* (Von Martens, 1869) was collected associated with *Macrobrachium jelskii* (Miers, 1877).

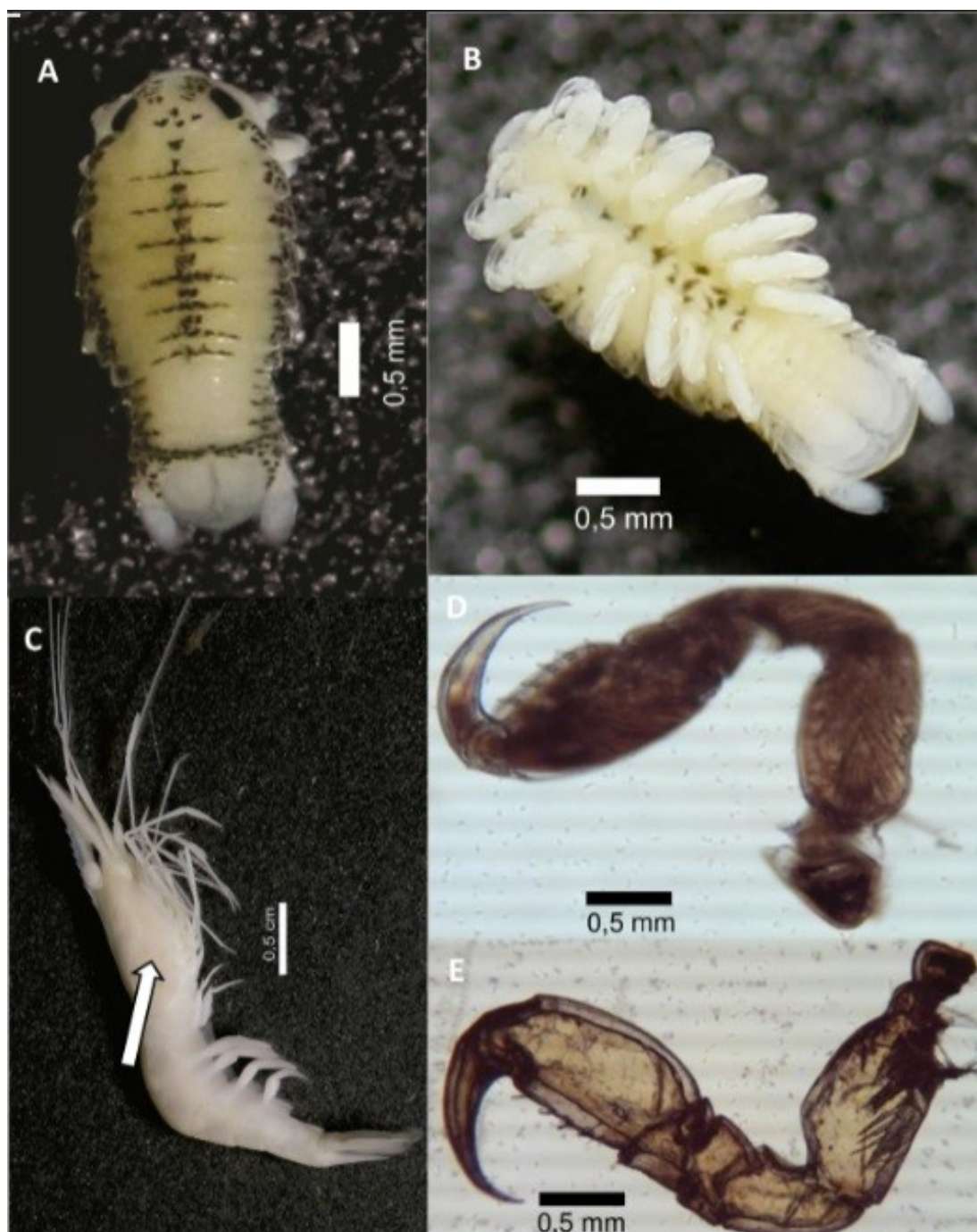


Figure 2.- A – B: *Telotha henselii* (Von Martens, 1869) male. A: dorsal view; B: ventral view; C: an overview of *Macrobrachium jelskii* (Miers, 1877). Arrow indicates the carapace region infested with *T. henselii*; D: 2nd pereopod showing five spines in the inner margin of propodus; e. 6th pereopod showing four spines in the propodus and one in merus. Scale = 0.5mm (in millimeter).

The single male specimen of *T. henselii* presented a total body length of 4.9 mm and maximum body width of 2.4 mm, while the host *M. jelskii* had a carapace length of 9.0 mm. The isopod was attached to the external surface of the shrimp, laterally on the right side of the cephalothorax (Figure 2c). There was no evidence of cuticle deterioration in the surface of the cephalothorax of

the shrimp due to isopod attachment or presence of hemolymph content in the isopod.

Macrobrachium jelskii represents a new host for *T. henselii*, and the Sambito River a new locality for Brazil. Until now, in hosts from South America, *T. henselii* has been reported parasitizing palaemonid shrimps from three localities in the central east part

Table I. List of shrimp hosts of *Telotha henselii* (Von Martens, 1869) reported from Neotropics.

Hosts	Locality	Prevalence (%)	Reference
<i>Macrobrachium brasiliense</i> Heller, 1862	Chapada dos Guimaraes and Nioaque, Brazil	NR	Lemos de Castro (1985)
<i>Macrobrachium borelli</i> Nobili, 1869	Santa Fe, Argentina	NR	Taberner (1993) Grassini (1994)
<i>Palaemonetes argentinus</i> Nobili, 1901	Banhado do Tain, Brazil; Entre Rios, Argentina; Guaiba Lake, Brazil	NR	Lemos de Castro & Gomes Corrêa (1982); Taberner et al. (2003); Alberto et al. (2001)
<i>Pseudopalaemon bouvieri</i> Sollaud, 1911	Mandisovi Chico, Middle Uruguay River, Argentina	12.2	Grassini (1994)
<i>Macrobrachium potiuna</i> Muller, 1880	Guaiba Lake, Brazil	NR	Alberto et al. (2001)
<i>Palaemonetes carteri</i> Gordon, 1935	Middle Amazon River, Brazil	4.4	Wunderlich et al. (2011)
<i>Macrobrachium jelskii</i> Miers, 1877	Sambito River, northern Brazil	0.004	Present study

of Argentina (Taberner 1993, Grassini 1994, Taberner *et al.* 2003) and from three different regions of Brazil, namely the central western, south and north (Lemos de Castro & Gomes-Corrêa 1982, Lemos de Castro 1985, Alberto *et al.* 2001, Wunderlich *et al.* 2011); thus this occurrence is already expected in the northeast of Brazil (Table I). The records available suggest that this parasite have a widespread distribution along the continental areas of the north, northeast, central and south of Neotropics (Tavares-Dias *et al.* 2015). With the new host record in a new locality presented here, we have increased the list of hosts of this species. The great variety of palaemonid hosts parasitized by *T. henselii* indicates that this isopod has a low host specificity. Furthermore, *T. henselii* seems to have also a wide tolerance to different ecological conditions, which has allowed it to occupy a vast geographic area in South America (Taberner *et al.* 2003).

It was found recently that the wide distribution of *M. jelskii* in South America is not only related to the natural dispersion during the Pliocene, but also due to human activities (Vera-Silva *et al.* 2017). Therefore, widespread success of *M. jelskii* along South American northeast river basins can be attributed to the lack of natural enemies (including parasites) during its establishment and spread (Tuttle *et al.* 2017). The low infestation rate in *M. jelskii* indicates that *T. henselii* is not and has not been likely source of

biotic resistance to the shrimp invasion (Aguilar-Perera *et al.* 2017).

The case of the association between a cymothoid and organisms other than mainly teleost, like in the present case, is considered an unusual association (Ateş *et al.* 2006). According to the same authors, the main point is to determine whether such unusual association is occasional or if such organisms are true, potential hosts for cymothoids. However, about *T. henselii*, some authors (Lemos de Castro 1985; Grassini 1994) suspect that this association is not exceptional or occasional, but that these isopods, when young (in the male phase), use shrimps as paratenic hosts. Lemos de Castro (1985) verified that a high number of *M. brasiliense* was parasitized by the male of *T. henselii*, but no cymothoids were found parasitizing fishes collected at the same localities. Another suggestion is that under experimental conditions, when the choice between fish and shrimps is equal, *T. henselii* males prefer shrimps (Grassini 1994). Indeed, whether *T. henselii* is characterized by a heteroxenic life cycle, the function of the shrimp stage remains undetermined (Trilles & Oktener 2004). On the other hand, in the other species of *Telotha* the life cycle is apparently monoxenic, with the species of parasite infecting a single host (Wunderlich *et al.* 2011). Future research are necessary to verify the complete life cycle (e.g. experimental setup) to confirm the role of shrimp in the biology of this isopod (Grassini 1994).

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