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ORIGINAL ARTICLE

Occurrence of *Anthalona neotropica* Sousa, Elmoor-Loureiro and Debastiani-Júnior, 2015 (Crustacea: Cladocera: Chydoridae) in Bahia State, Brazil

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ABSTRACT

Although the cladoceran *Anthalona neotropica* Sousa, Elmoor-Loureiro and Debastiani-Júnior, 2015 has a wide geographic range in Brazil, until now, it has only been reported in a few localities. The present study reports the occurrence of this species in the estuaries of the Jequitinhonha River and Una River, representing the first records of *An. neotropica* in Bahia State, Brazil.

KEYWORDS

Aloninae, delta estuary, estuarine zooplankton, hyporheic habitat, salinity

INTRODUCTION

During the last two decades, knowledge on the taxonomy and phylogenetic position of *Alona verrucosa* Sars, 1901 (Crustacea: Cladocera: Chydoridae) has increased. Initially, it became clear that it was not a single species, but a set of closely related ones (Sinev and Hollwedel, 2002; Van Damme *et al.*, 2011; Sinev and Kotov, 2012; Sousa *et al.*, 2015).

First described as *Alona verrucosa* by Sars (1901), it was transferred to the genus *Biapertura* Smirnov, 1971 and then again later considered as a member of *Alona* Baird, 1843 (Sinev and Hollwedel, 2002). The better delimitation of the genus *Alona* (see Van Damme and Dumont, 2008) showed the need for revision of the so-called *Alona*-like species, including

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the *Alona verrucosa* group (Van Damme *et al.*, 2010), which was, finally, allocated to a new genus *Anthalona* Van Damme, Sinev and Dumont, 2011.

Sousa *et al.* (2015) have synthesized the knowledge on *Anthalona* species occurring in Brazil, with *An. verrucosa* presenting the majority of the records and the widest geographic range. These authors also showed the occurrence of *Anthalona brandorffi* (Sinev and Hollwedel, 2002), *Anthalona acuta* Van Damme, Sinev and Dumont, 2011, and the new species *Anthalona neotropica* Sousa, Elmoor-Loureiro and Debastiani-Júnior, 2015 within the distribution range of *An. verrucosa*.

In contrast to other *Anthalona* species occurring in Brazil, which possess chitinized spines on setae of inner distal lobe (IDL) of the trunk limb I, *An. neotropica* presents just fine spinules on this limb. This is a typical feature of the *simplex*-branch of *Anthalona* (Van Damme *et al.*, 2011).

So far, *An. neotropica* has been reported in only a few Brazilian localities (Sousa *et al.*, 2015; Sousa and Elmoor-Loureiro, 2018), and none of them in Bahia State. The present paper aims to report the occurrence of *An. neotropica* in southern Bahia, as a result of an investigation on zooplankton of two estuarine regions.

Material and Methods

The study was conducted in two estuarine areas in southern Bahia State, Brazil, namely the Jequitinhonha River and the Una River (Fig. 1). For zooplankton sampling, 10 sites were defined along each estuary. Sampling was carried out in October 2012, at low tide, moving in the direction of the river mouth. The specimens were collected using a zooplankton net (68 µm mesh) and preserved in neutralized formaldehyde at 4 % for 48 hours. In the laboratory, the samples were transferred to 70 % alcohol for manipulation under a stereomicroscope and identification with an optical microscope. A subsample of 10 mL of each field sample was analyzed and the cladoceran specimens were separated for identification. Within the scope of the present study, only specimens of *Anthalona* are considered.

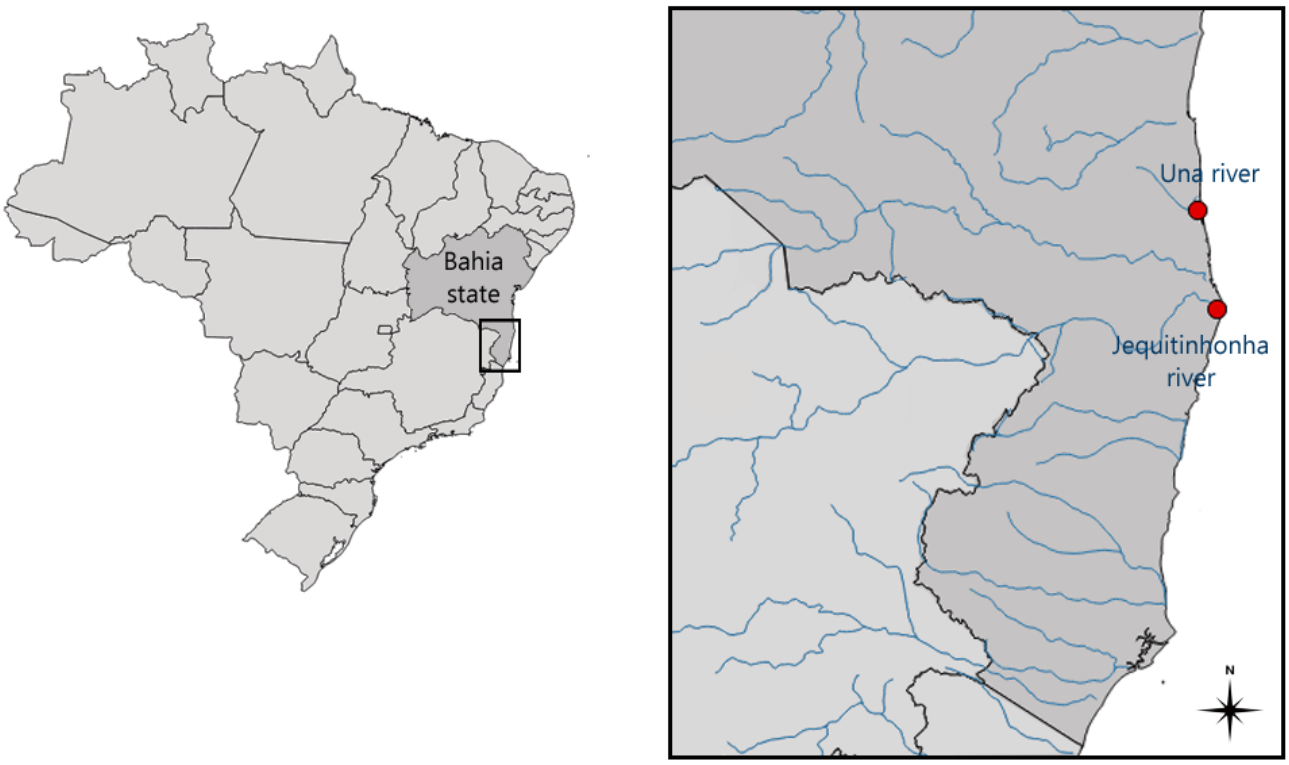

Figure 1. Occurrence records of *Anthalona neotropica* Sousa, Elmoor-Loureiro and Debastiani-Júnior, 2015 in southern Bahia State.

The voucher specimens are deposited in the personal collection of Lourdes M. A. Elmoor-Loureiro, under accession numbers EL02515 and EL02559.

In order to verify if the environment could be considered as freshwater, salinity (‰) was obtained with a multiparameter Horiba U50.

Systematics

Anthalona neotropica Sousa, Elmoor-Loureiro and Debastiani-Júnior, 2015 (Fig. 2)

Material examined. 1♀ (EL02515), Brazil, Bahia State, municipality of Belmonte, Jequitinhonha River, 15°51'47"S 38°54'13"W, October 2012, coll. S.B. Jesus; 1♀ (EL02559), Brazil, Bahia State, municipality of Una, Una River, 15°17'57"S 39°00'28"W, October 2012, coll. S.B. Jesus.

Remarks. The observed specimens (Fig. 2) match the main diagnostic characters of *An. neotropica*. Like all *Anthalona* members, they possess two main connected head pores and lateral head pores with cosmaria-like sacs below them (Fig 2I); post-abdomen S-shaped

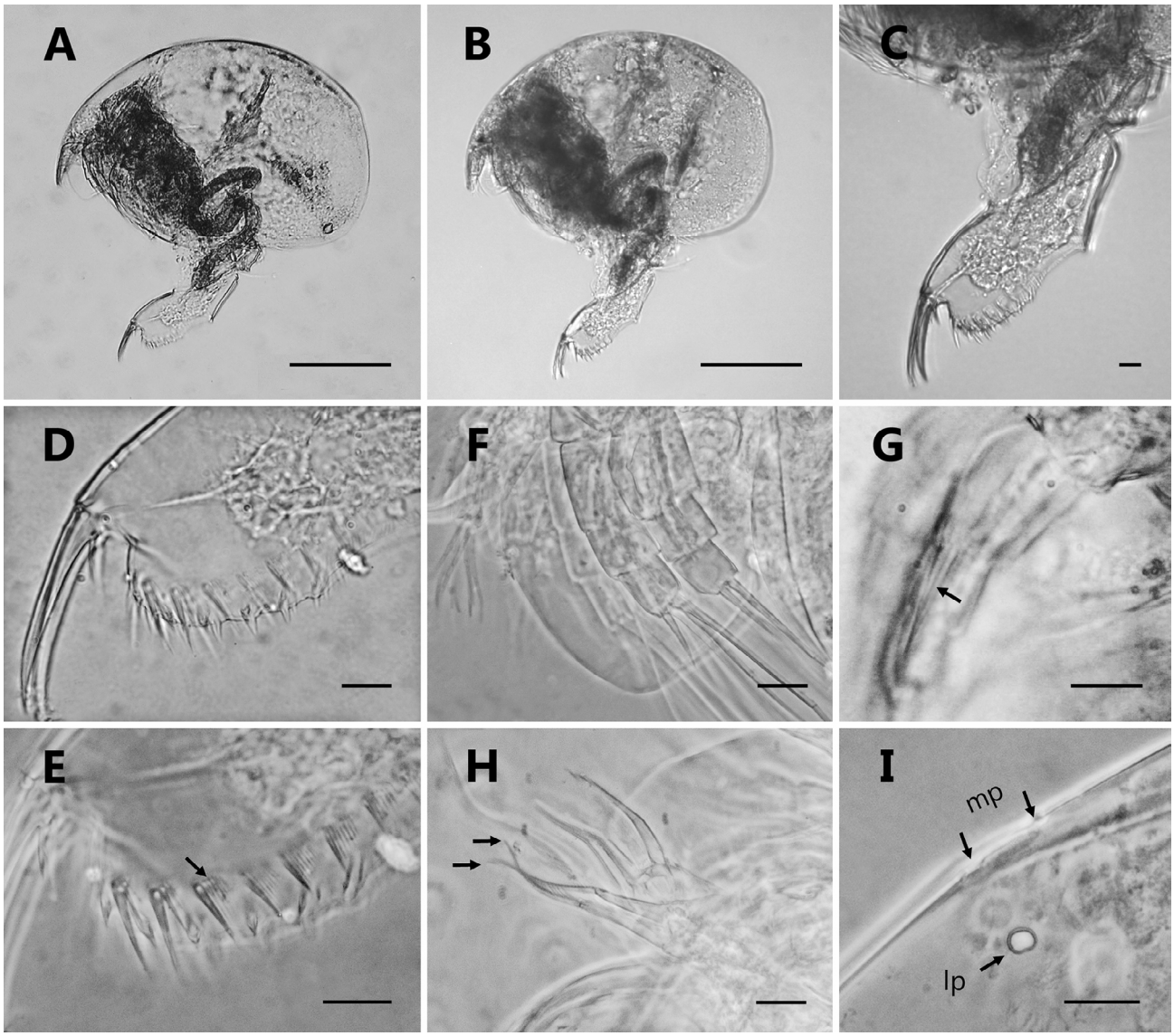

Figure 2. *Anthalona neotropica* Sousa, Elmoor-Loureiro and Debastiani-Júnior, 2015. **A**, *Habitus*, specimen from Jequitinhonha River. **B**, *Habitus*, specimen from Una River. **C–E**, Post-abdomen (arrow indicating the lateral fascicles). **F**, Labral keel and antenna. **G**, Spine on the first segment of endopod of antenna. **H**, First trunk limb, arrows showing the IDL setae. **I**, Head pores. mp: main pores, lp: lateral pore. Scale bars = 100 µm (**A, B**) or 10 µm (**C–I**).

with deep concave anal margin, unmerged marginal denticles, lateral fascicles with long distal setulae (Fig. 2C–E); IDL with two setae. The specimens were identified as *An. neotropica* based on: labrum keel convex and without denticles (Fig. 2F); IDL setae of similar size and presenting fine setulae (Fig. 2H); spine on the first segment of endopod of antenna II very long and almost reaching the end of the third segment (Fig. 2G); pecten of post-abdominal claw organized in two groups; long spinulae on the base of terminal claw.

It should be mentioned that the sites where *An. neotropica* was found were characterized by the absence of floating macrophytes and by low salinity (< 0.5 ‰), typical of freshwaters. In the samples in which *An. neotropica* was present, no other *Anthalona* species was found. In fact, in the sample from Una estuary, *An. neotropica* was the single species observed. The sample from Jequitinhonha estuary was dominated by typically planktonic species — such as *Bosmina freyi* De Melo and Hebert, 1994, *Ceriodaphnia cornuta* Sars, 1885, and *Daphnia gessneri* Herbst, 1967 — with a few specimens of *Ilyocryptus spinifer* Herrick, 1882 and *An. neotropica*.

Discussion

The specimens reported here were first identified as *Anthalona* cf. *simplex* (Jesus, 2015). At that time, it was clear that they belonged to the *simplex*-branch since they presented IDL setae with fine setules. Nevertheless, the Neotropical member of this group of species was then still under the process of description (Sousa *et al.*, 2015). Therefore, it was only after the formal publication of *An. neotropica* that our specimens could be correctly identified.

So far, *An. neotropica* was reported only in San Pedro, Argentina, and in a few Brazilian localities in Rio Grande do Sul, Rio de Janeiro, Goiás, Mato Grosso, and the Federal District (Sousa *et al.*, 2015; 2018; Sousa and Elmoor-Loureiro, 2018). Although not frequently reported, *An. neotropica* has a wide geographic range and it is expected that, as time passes, new records in other Brazilian states will be added. The present study confirms this prospect, presenting the first records of *An. neotropica* from Bahia State. Moreover, our data also represents the first occurrence in the Brazilian Northeast Region and in the East Atlantic Hydrographic Region.

Of the nine previous records of *An. neotropica*, only two came from lentic water bodies (Sousa *et al.*, 2015; Sousa and Elmoor-Loureiro, 2018), indicating that this species is easily found in a lotic environment, which is supported by the data presented here. However, it should not be simply assumed that *An. neotropica* has a preference for lotic waterbodies. Instead, this fact seems to result from living in the sediment and the resuspension action caused by water flow. Indeed, Sousa *et al.* (2015) discussed some features of *An. neotropica* that are typical of benthic cladocerans, as well as observing higher densities of this species in hyporheic habitats. The low number of specimens observed in our study — just two individuals in 20 analyzed samples — could be related to the benthic habit of *An. neotropica*.

It should also be considered that, in general *habitus*, *An. neotropica* is remarkably similar to the common *An. verrucosa* and to the less frequent *An. brandorffi* and *An. acuta*. The correct identification of these species demands observation of fine characters, such as the armature of the IDL setae (Sousa *et al.*, 2015). Because of that, it is possible that the presence of *An. neotropica* may not have been previously noticed in zooplankton studies.

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