

# First record of Cladocera (Crustacea: Chydoridae) from Parque Nacional do Itatiaia, Southeastern Brazil

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**ABSTRACT:** Surveying the fauna in conservation areas is an important strategy to recognize patterns of richness and endemism and to reduce gaps related to geographical distribution. This study presents the first record of cladocerans in the Parque Nacional do Itatiaia, Southeastern Brazil. *Alona ossiani*, *Alona guttata*, *Alona iheringula*, *Alona yara*, and *Briospylus repens* were observed in different environments. Here, we provide the taxonomic status and geographic distribution of each species observed in the Parque Nacional do Itatiaia.

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Faunal surveys and inventories focusing on microcrustaceans belonging to the superorder Cladocera Latreille, 1829 have produced data on occurrence patterns and species diversity of this group, and they are especially useful for their contribution to filling in the blanks in the knowledge about the fauna in various Brazilian regions (Santos-Wisniewski *et al.* 2002; Lansac-Tôha *et al.* 2009; Elmoor-Loureiro and Soares 2010; Van Damme and Dumont 2010; Ghidini and Santos-Silva 2011). Also, studies with this purpose support taxonomic investigation, because the populations found often become available in public or private collections, free to be used for morphological re-description and publication of new species (*e.g.* Kotov and Elmoor-Loureiro 2008; Bekker *et al.* 2010; Sinev and Elmoor-Loureiro 2010; Elmoor-Loureiro *et al.* 2013).

For a long time, one of the main gaps in the knowledge on Cladocera, as well as on most groups of the aquatic biota, had been related to areas destined for the protection of fauna and flora, as suggested by Agostinho *et al.* (2005). This has been changing due to studies promoting faunal surveys in protected areas, like some in the states of Minas Gerais, São Paulo, and Rio Grande do Sul (Gazulha *et al.* 2011; Rocha *et al.* 2011; Santos-Wisniewski *et al.* 2011). In the Brazilian Cerrado, at least six areas destined for protection have already been sampled, and the results for the survey of Cladocera are available in the literature (Elmoor-Loureiro and Mendonça-Galvão 2008; Sousa and Elmoor-Loureiro 2008, 2012, 2013; Sousa *et al.* 2013).

However, new efforts are needed in order to broaden knowledge on the fauna, since records of Cladocera in many Brazilian conservation units are still obscure. This study reports for the first time the occurrence of species of Cladocera in the Parque Nacional do Itatiaia, located in the

states of Rio de Janeiro, Minas Gerais and São Paulo, in the Serra da Mantiqueira.

The Parque Nacional do Itatiaia was the first national park declared in Brazil, considered one of the most important protected areas for housing a large part of the Mata Atlântica biome. It lies between the parallels 22°19' and 22°45' S and the meridians 44°15' and 44°50' W and on the border of the states of Rio de Janeiro, Minas Gerais, and São Paulo, in the Serra da Mantiqueira. It is in the southwest of the state of Rio de Janeiro, in the municipality of Itatiaia, and in the south of the state of Minas Gerais, comprising the municipalities of Itamonte (MG), Alagoa (MG), and Bocaina de Minas (MG) (ICMBio 2012).

Five species of Cladocera have been registered in this study for the Parque Nacional do Itatiaia: *Alona iheringula*, *Alona guttata*, *Alona ossiani*, *Alona quadrangularis* (= *Alona yara*), and *Briospilus repens*. The species have been identified according to the specialized bibliography (Frey 1980; Elmoor-Loureiro 1997). *Alona iheringula*, *Alona quadrangularis* (= *Alona yara*), and *Briospilus repens* are deposited in the crustacean collection of the Museu Nacional do Rio de Janeiro, with access numbers MNRJ20218/MNRJ13630, MNRJ13620, and MNRJ13624 respectively. *Alona ossiani* and *Alona guttata* are deposited in the collection of Laboratório de Biodiversidade Aquática, Universidade Católica de Brasília, with access numbers EL02480 and EL02481 respectively.

## Family Chydoridae Stebbing, 1902 *Alona ossiani* Sinev, 1998 (Figure 1A-F)

This species was collected in the Campo Belo River, in the Itatiaia Plateau (22°24' S - 044°41' W), altitude 2200 m. Material was collected by A.R. Senna, A. Quadra and R. Figueiró, on 21/III/2013.

*Alona ossiani* is the only Neotropical representative of the *affinis*-group. The status of species was suggested after the revision of Neotropical populations of *Biapertura affinis* (Sinev 1998). Smirnov (1971) allocated species of the *affinis*-group to the genus *Biapertura* Smirnov, 1971 based mostly on the occurrence of two main connected cephalic pores. However, Frey (1987) considered that the character chosen was not enough for the separation from *Alona*, a fact rectified in recent studies that consider this character convergent in some Chydoridae (*Anthalona*, *Nicsmirnovius*, *Geoffreyia*, *Karualona*). The genus *Alona* is going through intense taxonomic revision and the validity of *Biapertura* is being assessed (Van Damme et al. 2010).

*Alona ossiani* is a large cladoceran, reaching over 1mm of length. On the head, there are two connected main cephalic pores and a short rostrum. The post-abdomen is long, and the post-anal region is distally rounded with 15–17 marginal spines. The basal spine is rather short. Further details are found in Sinev (1998).

Distribution: Neotropical Region. In Brazil, *Alona ossiani* has been recorded from Roraima, Pará, Maranhão, Paraíba, Pernambuco, Bahia, Mato Grosso, Mato Grosso do Sul, Goiás, Distrito Federal, Minas Gerais, Rio de Janeiro, São Paulo, Paraná and Rio Grande do Sul (hydrographic regions Amazônica, Tocantins/Araguaia, Paraná, Paraguai, São Francisco/ Atlântico Nordeste Ocidental, Nordeste Oriental, Leste, Sudeste and Sul; Source <http://cladocera.wordpress.com>).

#### ***Alona guttata* Sars, 1862 (Figure 1G-I)**

This species was collected in the Campo Belo River, on the Itatiaia Plateau (22°24' S - 044°41' W), altitude 2200 m. Material was collected by A.R. Senna, A. Quadra and R. Figueiró, on 21/III/2013.

*Alona guttata* is among the most common Aloninae. It is a cosmopolitan taxon, with records from various regions of the world. It is currently considered a group of species with cryptic morphology. According to Van Damme et al. (2010), this taxon needs a comprehensive revision study for the translocation of genus and the verification of the validity of the species outside the type region (Norway). *Alona guttata* is an easily identifiable taxon, recognized by the post-abdomen armature in the post-anal region, with distal extremity truncated, acuminate and projected beyond the base of the claw. On the head, three main pores with narrow connection, diminute lateral pores.

Distribution: In Brazil, *Alona guttata* has been recorded from Pará, Maranhão, Mato Grosso do Sul, Goiás, Distrito Federal, São Paulo, Minas Gerais, Paraná, Santa Catarina and Rio Grande do Sul (hydrographic regions Amazônica, Tocantins/Araguaia, Paraná, Paraguai, São Francisco, Atlântico Sudeste and Sul; Source <http://cladocera.wordpress.com>).

#### ***Alona iheringula* Sars, 1901**

This species was collected in two locations: (i) shore of a brook on the plateau near the top of Agulhas Negras (22°23'57" S, 44°38'07" W) and (ii) shore of a brook at the entrance to Agulhas Negras (22°28'31" S, 44°34'44" W). Material was collected by J.W. Reid et al. on 09/VI/1998.

Initially described as *Alona iheringi* Sars, 1901, it was

considered a synonym of *Alona rustica* Scott, 1895 by Smirnov (1971). Sinev (2001) revalidated the status of species of *Alona iheringi* after its redescription based on material from Sars. Kotov and Sinev (2004) created a *nomem novum*, *Alona iheringula*. The records of *Alona rustica* in Brazil correspond to *Alona iheringula*. The species can be recognized by having wide labral keel, rounded apex, with at least two groups of setae; three main cephalic pores with narrow connections between each other, transverse lateral pores. Post-abdomen tapering distally, post-anal region rounded distally, 9–10 well developed marginal spines. Further details on the morphology are found in Sinev (2001).

Distribution: South America. In Brazil, there are records of *Alona iheringula* from Pará, Mato Grosso do Sul, Goiás, Distrito Federal, Minas Gerais, Rio de Janeiro, São Paulo and Rio Grande do Sul (hydrographic regions Tocantins/Araguaia, Paraná, Paraguai, Atlântico Nordeste Ocidental and Sudeste; Source <http://cladocera.wordpress.com>).

#### ***Alona yara* Sinev & Elmoor-Loureiro, 2010**

This species was collected on the shore of a brook on a plateau near the top of Agulhas Negras (22°23'57" S, 44°38'07" W). Material was collected by J.W. Reid et al. on 09/VI/1998.

*Alona yara* has been recently described from Brazilian populations previously named *Alona quadrangularis* (Sinev and Elmoor-Loureiro 2010). Van Damme and Dumont (2008) redescribed *Alona quadrangularis* and indicated its exclusive occurrence in the Palearctic region, indicating that records outside of it are misidentified, like the case of *Alona boliviana* Sinev and Coronel, 2006 (endemic to the Andes) and *Alona kotovi* Sinev, 2012, only present in South Vietnam (Sinev and Coronel 2006; Sinev 2012). All the species cited belong to the *quadrangularis*-group, representing the "true *Alona*". The records of *Alona quadrangularis* from Brazil probably refer to *Alona yara*.

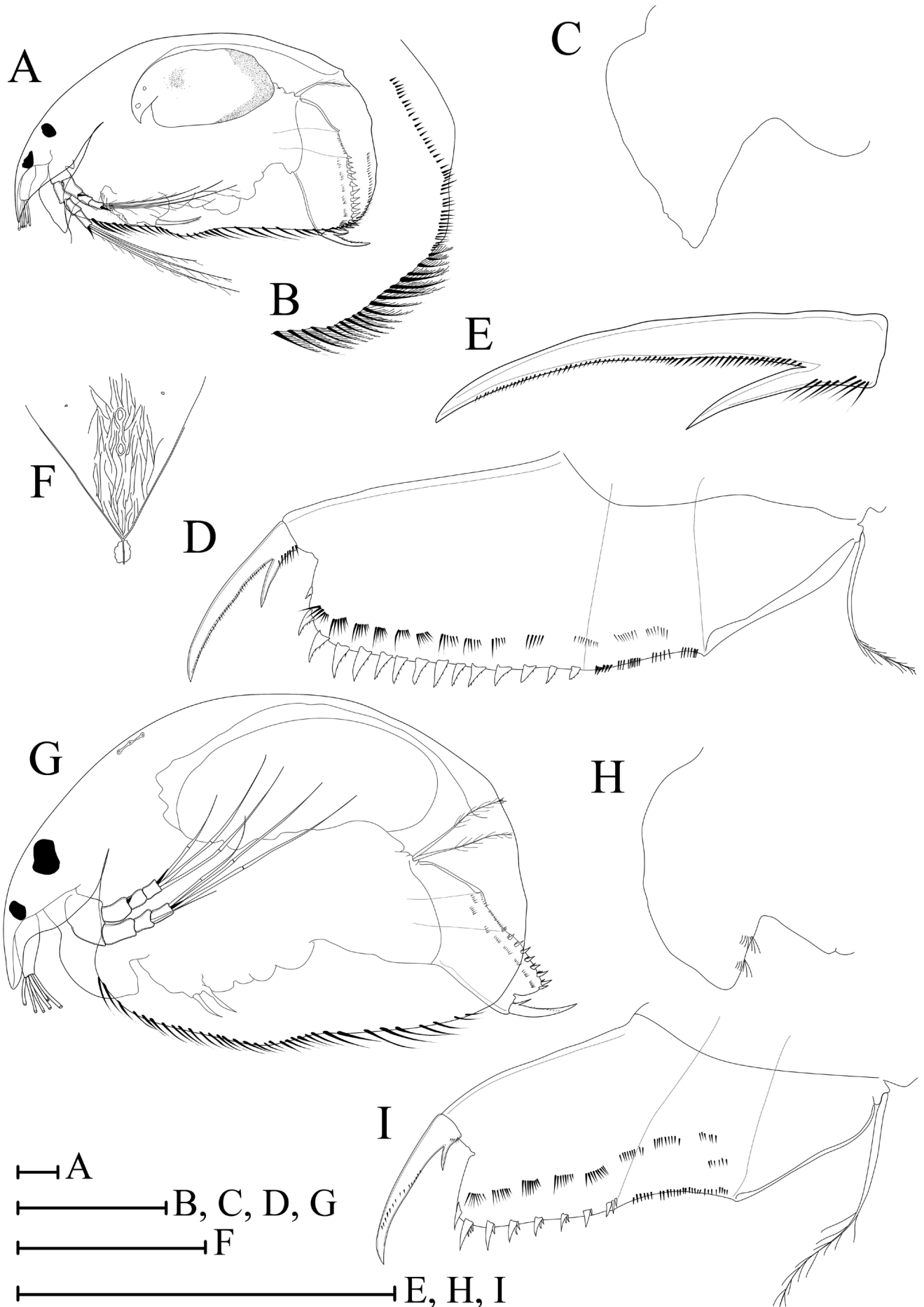
*Alona yara* can be recognized by having three connected main cephalic pores, setae over the body of leg I not arranged in groups, post-anal region of the post-abdomen convex, with 10–12 marginal spines. Further details on the morphology are found in Sinev and Elmoor-Loureiro (2010).

Distribution: So far, only known in Brazil: Tocantins, Distrito Federal, São Paulo and Rio Grande do Sul (Paraná, Tocantins/Araguaia and Atlântico Sudeste; Source <http://cladocera.wordpress.com>).

#### ***Bryospilus repens* Frey, 1980**

This species was collected on moss near the road to Agulhas Negras (22°28'31" S, 44°34'44" W). Material was collected by J.W. Reid et al on 09/VI/1998.

*Bryospilus repens* was described by Frey (1980). It presents peculiar biology, occurring only in bryophytes and in the leaf litter of humid forests, which makes it a rare species, since there are few studies that investigate semi-terrestrial ecosystems. *Bryospilus repens* has ovoid body, without lateral compression; rostrum elongate, curved at the top; labrum bulbous; two isolated main cephalic pores, diminute lateral pores near the margin of the cephalic shield; post-abdomen tapering distally, anal and post-anal



**FIGURE 1.** (A-F) *Alona ossiani* Sinev, 1998 (EL02480) - (A) Lateral view, (B) Postero-ventral angle, (C) Labral keel, (D) Post-abdomen, (E) Terminal claw, (F) Head pores; (G-I) *Alona guttata* Sars, 1862 (EL02481) - (G) Lateral view, (H) Labral keel, (I) Post-abdomen. Scale bars = 100µm

regions with strong marginal spines. Further details are found in Frey (1980).

Distribution: Venezuela, Puerto Rico, New Zealand. In Brazil, it is a rather rare animal, occurring in São Paulo, Rio de Janeiro and Minas Gerais (Atlântico Sudeste region; Source <http://cladocera.wordpress.com>).

This study presents the first record of the suborder Cladocera from Parque Nacional do Itatiaia, contributing to the knowledge on the local biodiversity, besides increasing knowledge on the fauna of highland-dwelling Crustacea in Brazil.

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