

# Illustrated key to the Brazilian *Dendrocephalus* (Crustacea: Anostraca: Thamnocephalidae)

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## Abstract

The Anostraca is a diversified crustacean group inhabiting essentially in temporary wetlands on all continents. The genus *Dendrocephalus* sensu stricto is endemic to tropical or subtropical Neotropical fresh water pools. Of the 13 described species, four are reported from Brazil. Species identification is based on morphological differences on the complex frontal appendage, the anterior thoracopods, and the gonopods. After a detailed comparison of the different Brazilian populations, we developed an illustrated identification key based on the variations of the frontal appendage. This key includes a new undescribed species recently found in Northern Minas Gerais. We present a simple tool to identify Brazilian *Dendrocephalus* species in order to encourage more studies on this generally neglected genus.

Key words: Branchiopoda, identification, temporary pool.

## Introduction

A part of Branchiopoda is typically restricted to temporary pools where they represent a significant part of the biodiversity. The order Anostraca (fairy shrimp) includes more than 300 species belonging to 26 genera (Belk and Brtek, 1997; Brendonck et al., 2008; Rogers, 2009). Three genera are known from Brazil: *Artemia* Leach, 1819 (Artemiidae), restricted to saline habitats; *Branchinecta* Verrill, 1869 (Branchinectidae) and *Dendrocephalus* Daday, 1908 (Thamnocephalidae) from temporary freshwater pools. *Dendrocephalus* (sometimes referred to as “branchoneta” in Brazilian literature) males have a particularly long and complex cephalic extension, called

the frontal appendage. This structure is used for mating displays, and is morphologically variable among species (Pereira, 1983; Rogers 2002). This structure is also used to identify the various species (Pereira, 1983; Rabet and Thiéry, 1996). The female lacks a frontal appendage, but is easily recognizable by its brood pouch (Pereira, 1983; Rabet and Thiéry, 1996).

*Dendrocephalus* sensu stricto includes 13 valid species that are distributed under subtropical or tropical climates in the Central and Southern Americas, and the Galapagos Islands (Rogers, 2006). Four species are recorded from Brazil, where they live in temporary pools of relatively warm subtropical and tropical regions with well defined dry and wet seasons (Rabet and Thiéry, 1996;

1998). Herein, a new as yet undescribed species, recently discovered in Minas Gerais State is reported for the first time. Because the biodiversity of Brazilian anostracans remains relatively unknown, we present an updated *Dendrocephalus* identification key in order to encourage future studies of these animals.

## Material and Methods

### Material examined

*Dendrocephalus brasiliensis* Pesta, 1921- Rio Grande do Norte: Caicó: fish tank, 10 animals, collected by N. Rabet, 6 August 1993 - Mossoró, ESAM, 2 animals, collected by Lemos de Castro and P. Coelho, 27 February 1980. Paraíba: João Pessoa: temporary pools, 10 animals, collected by N. Rabet, 18 July 1993. Minas Gerais: Januária: temporary pool, 2 animals, collected by W. Costa, G. Brasil and C. Campinha; 7 February 1994 - 15° 05' 03,3" S - 44° 05' 21,4" W, 2 animals, collected by J. Goma Pinto and D. Pillet, 06 February 2003. Ceará: Brejo Santo, Açude Atalhos (07° 38' 33,6" S 38° - 53' 27,6" W), 4 animals, collected by U. Caramaschi, R.N. Feio and H. De Nieweyer, 06 December 1998 (MNRJ 15893).

*Dendrocephalus goaisensis* Rabet & Thiéry, 1996 - Goiás: Iaciara: temporary pool, 4 paratypes, collected by W. Costa and J. C. Oliveira, 16 January 1989 - Iaciara (14° 01' 31,4" S - 46° 51' 18,7" W), 2 animals, collected by J. Goma Pinto and D. Pillet, 2 February 2003.

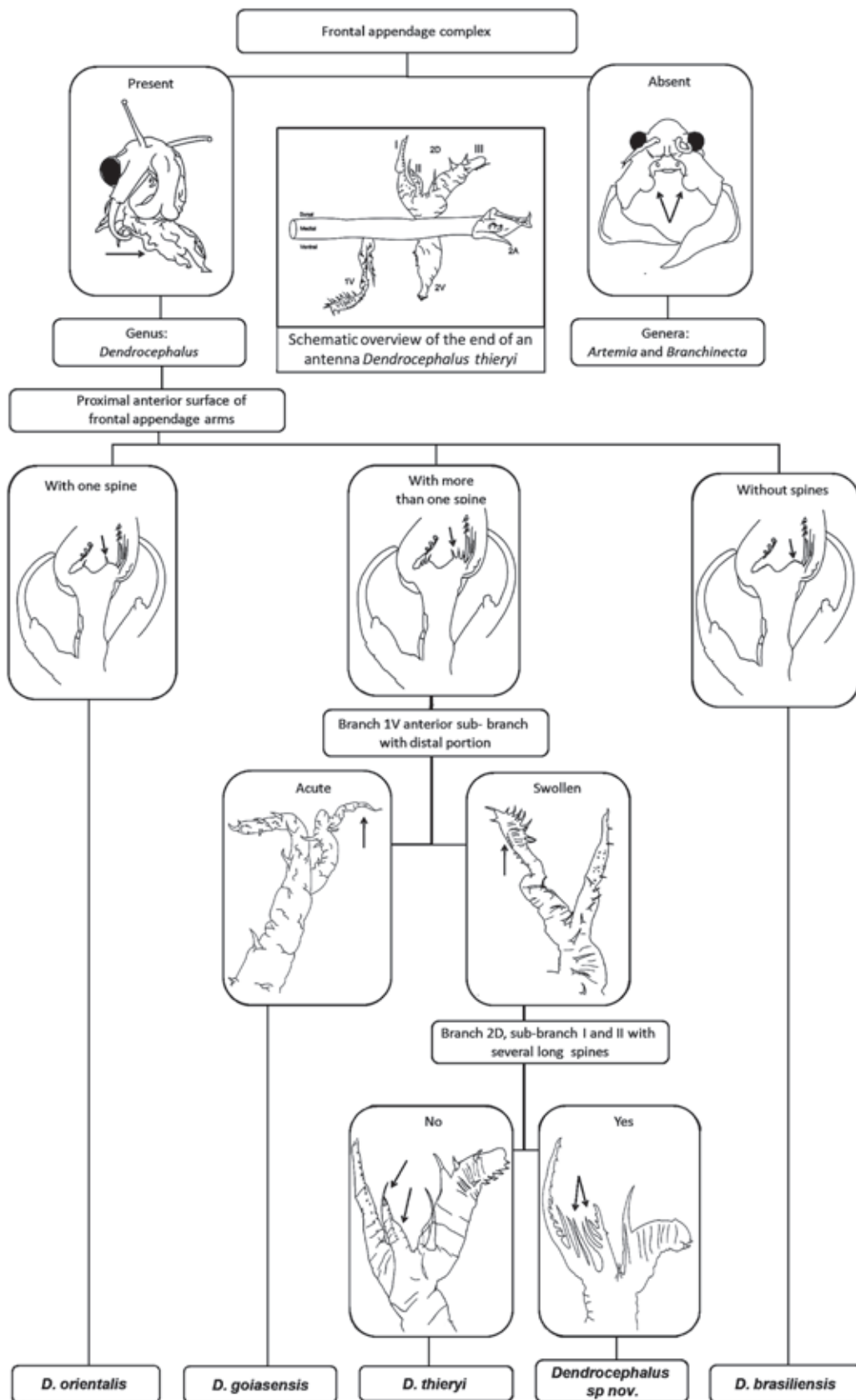
*Dendrocephalus orientalis* Rabet & Thiéry, 1996 - Paraíba: João Pessoa: Cabo Branco: temporary pools, 5 paratypes, collected by N. Rabet, 21 July 1993. Bahia: near Oliveira dos Brejinhos: temporary pond along the Caturama-Macaúbas road and along the Boquirá - Beira Rio road, 4 animals, collected by P.S. Young and M. C. Britto-Pereira, 25 and

26 January 1994 - Jequié, 4 animals, collected by S. Lacau, 23 January 2002.

*Dendrocephalus thieryi* Rabet, 2006 - Minas Gerais: Buritizeiro: temporary pool, 4 paratypes, collected by W. Costa, G. Campinha, and G. Campelo, 6 February 1994.

**Dissection:** The frontal appendage was dissected from one fixed male specimen of each species. The frontal appendage was studied in detail and compared with the descriptions and redescrptions of the various taxa in the published literature (Pesta, 1921; Lemos-de-Castro and Lima, 1986; Rabet and Thiéry, 1996; Rabet, 2006). From these specimens and the comparisons, we developed a pictorial key to the Brazilian taxa. Illustrations were made using a camera lucida or were redrawn from previous publications (Rabet and Thiéry, 1996; Rabet, 2006).

**Distribution:** The known population localities of the five Brazilian species were compiled and mapped (Fig. 1). Localities came from our collection records and from the published literature: *Dendrocephalus goaisensis* are known from two localities in Iaciara (Rabet and Thiéry, 1996 - 14 and this work - 13) but *Dendrocephalus thieryi* or the new undescribed species are known from only one locality, in Buritizeiro and Jequitinhonha (respectively Rabet, 2006 - 18 and this work -17). *D. brasiliensis* records from Pesta (1921) (states of Bahia and Piauí - not indicated in the map), from Lutz (1929) (Macaíba - 2), from Lemos-de-Castro and Lima (1986) (Mossoró - 1 and São Miguel -3), from Rabet and Thiéry (1996) (Caicó - 4, João Pessoa - 5, Januária -16), and from this work (Brejo Santo -7, Itacambira - 15). *D. brasiliensis* was also reported from Tabatinga, state of São Paulo (19), but the species was probably introduced (Mai et al., 2008). *D. orientalis* records from Rabet and Thiéry (1996) (João Pessoa - 6, Paulo Afonso - 8 near Macaúbas - 9, 10, 11) and from this work (Jequié - 12).





**Figure 2.** Distribution map of the species of *Dendrocephalus* Daday, 1908 in Brazil (following: Rabet and Thiéry, 1996, Souza and Camara, 1998; Lopes, 2002; Rabet, 2006 and this work). Localities are indicated in the text. Localities indicated from Pesta, 1921 are not enough detailed to be indicated in the map. Symbology: Star = the new species; Triangle = *D. brasiliensis*; Diamond = *D. goaisensis*; Oval = *D. orientalis* and Rectangle = *D. thieryi*. The grey area shows the location of the “cerrados” (from BIOMAS DO BRASIL: CERRADO. [www.wwf.org.br/informacoes/questoes\\_ambientais/biomas/bioma\\_cerrado/mapa\\_bioma\\_cerrado](http://www.wwf.org.br/informacoes/questoes_ambientais/biomas/bioma_cerrado/mapa_bioma_cerrado)).

## Results and Discussion

*Dendrocephalus* frontal appendage morphology provides good characters to separate all Brazilian species already used in the first Brazilian key (Rabet and Thiéry, 1996). We present a new identification key that utilizes the following characters: number of spines (0, 1 or more) at the anterior edge of arms of the frontal appendage; the shape of the anterior part of the sub-branch 1V (extremity inflated or elongated) and also the occurrence of long or short spines on sub-branch I and II of branch 2D.

We included in the key the new undescribed *Dendrocephalus* species from Minas Gerais. This species sorts out at the same couplet with the other Minas Gerais endemic, *D. thieryi*. These two species differ by the length of spines on branch 2D.

Only two species are widely distributed

in Brazil: *D. brasiliensis* and *D. orientalis* present in different type of climats, from humid costal climat to semi-arid climat called caatinga. In cerrado, a Brazilian savannah, 3 species are known: *D. goaisensis*, *D. thieryi* and the new species. However each of these species seems to have a relatively more restricted distribution indicating that the endemism level of Anostraca are probably more important in Cerrado than in other Brazilian biomes.

The diversity of Brazilian *Dendrocephalus* species is obviously underestimated because the few number of collections. In Brazil, the genus appears to be restricted to a few localities, corresponding to a small portion of the country, suggesting that more new species should be found especially in the Cerrado biome.

Through this new illustrated identification key, we hope to help non specialists in their identifications of the species

collected in Brazilian temporary waters and, by this, to lead to a better understanding of the distribution and the ecology of this genus. This point is particularly important, because these emblematic species are sometimes threatened and in need of conservation (Rogers, 2009). Some other have a great interest in aquaculture and should also be clearly identified (Lopes, 2002). Furthermore, we are convinced that more new Brazilian species will be discovered and described especially in Cerrado's ecosystems.

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