Metacercariae of *Eumegacetes medioximus* (Digenea: Eumegacetidae) in larvae of Odonata from Brazil

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Abstract: During studies on the participation of larval Odonata in the life cycle of trematodes carried out at the Pampulha reservoir, Belo Horizonte, State of Minas Gerais, Brazil, between May and September 2011, dragonfly larvae, *Orthemis discolor* (Burmeister, 1839) and *Perithemis mooma* Kirby, 1889, were found harboring metacercariae identified as *Eumegacetes medioximus* Braun, 1901. This is the first report and morphological description of metacercariae of *E. medioximus* in the Neotropical region.

Keywords: trematodes, insects, dragonfly, parasites.


Resumo: Durante estudos sobre a participação de larvas de Odonata no ciclo biológico de trematódeos realizados na represa da Pampulha, Belo Horizonte, Minas Gerais, Brasil, entre maio e setembro de 2011, larvas de libélulas, *Orthemis discolor* (Burmeister, 1839) e *Perithemis mooma* Kirby, 1889, foram encontradas apresentando metacercárias identificadas como *Eumegacetes medioximus* Braun, 1901. Este é o primeiro relato e caracterização morfológica de metacercárias de *E. medioximus* para a região neotropical.

Palavras-chave: trematódeos, insetos, libélula, parasitos.
Introduction

The involvement of insects belonging to the order Odonata Fabricius, 1793 in the life cycle of digeneans has been known since the beginning of the twentieth century (Sinitsin 1905). Several digenean that parasitize birds and amphibians, such as the species of Eumegacetes Looss, 1900 (Eumegacetidae), Gorgoderina Looss, 1902 (Gorgoderidae), Haematoolechus Looss, 1899 (Plagiorchiidae), Halipegus Looss, 1899 (Derogenidae), and Prosthogonimus Lühe, 1899 (Prosthogonimididae), have been reported parasitizing dragonfly larvae as second intermediate or paratenic hosts in North America, Europe and Asia (Stafford 1931, Boddeke 1960, Hall 1960, Snyder & Janovy Jr 1994, Kumari & Madhavi 1994, Zelmer & Esch 1998, Bolek & Janovy Jr 2007, Bolek et al. 2010). Although several species of these helminths have been recorded as adult parasites in vertebrate hosts from Brazil (Travassos et al. 1969), there are no reports of natural infection of larval dragonflies by digeneans in this country.

In the present study the natural infection of larval dragonflies with metacercariae identified as Eumegacetes medioximus Braun, 1901 is reported for the first time in the Neotropical region.

Material and Methods

During malacological surveys conducted at the Pampulha reservoir (43° 59' 35" W and 19° 50' 50" S), Belo Horizonte, Minas Gerais, Brazil, between May and September 2011, naiads of Odonata belonging to the suborder Anisoptera were collected using a hand net and transported alive to the laboratory.

After morphological identification in accordance with Santos (1973), Costa et al. (2004) and Costa & Santos (2009), the odonate naiads were teased apart using dissecting needles and examined for parasites under a stereomicroscope. The cysts recovered were initially studied in temporary mounts using light microscope. The metacercariae were mechanically excysted using metal needles, slightly pressed between glass slides, fixed in formalin at 70 °C, stained with alum acetocarmine, dehydrated in an ascending series of alcohol, cleared in beechwood creosote and mounted in Canada balsam.

Photographs were obtained using a Leica ICC50 HD digital camera attached to a light microscope and measurements were obtained by analyzing the captured images using the Leica Application Suite (LAZ EZ) software, version 2.0. A drawing was made with aid of a camera lucida. The parasite was identified based on taxonomic keys and descriptions according Travassos et al. (1969) and Lotz & Font (2008). Measurements are presented in micrometers. Specimens studied were deposited in the collection of the Invertebrate Taxonomy and Biology Laboratory (DPIC), Instituto de Ciências Biológicas, UFMG, Brazil.

Results and Discussion

Odonate naiads, identified as Orthemis discolor (Burmeister) and Perithemis mooma Kirby (Anisoptera: Libellulidae), had metacercariae in the abdominal cavity. Six similar cysts were found in the content of the proventriculus of a specimen of Striated Heron, Butorides striata (Linnaeus), found dead in the same locality. After morphological analysis and morphometry, the parasite was identified as belonging to the family Eumegacetidae Travassos, 1922 and the species characterized below.

Eumegacetes medioximus Braun, 1901 (Figure 1 and 2)

Synonyms: Eumegacetes perodiosus Travassos, 1922.
Stage: Metacercaria.

Hosts: Orthemis discolor (Burmeister, 1839) and Perithemis mooma Kirby, 1889.
Site of infection: Hemocoel.
Locality: Pampulha reservoir, Belo Horizonte, State of Minas Gerais, Brazil.
Description: Cysts oval to spherical 1254 (1117-1375) in length by 1080 (840-1375) in width. Cystic membrane transparent measuring 45 (34-60) in thickness. Excysted metacercariae oval 1953 (1812-2137) in length by 1224 (937-1428) in width. Oral sucker

Specimens deposited: DPIC 6220-6222

Remarks: Eumegacutes medioximus was described by Braun (1901) from material collected by Johann Natterer from the Great Jacamar, Galbula grandis Latham (Galbulidae), in Brazil in the mid-nineteenth century. It was subsequently recorded in several species of birds in the States of Mato Grosso do Sul and Rio de Janeiro in Brazil (Travassos 1928, Travassos & Freitas 1940, Travassos et al. 1969, Brasil & Amato 1992), and in Venezuela (Lutz 1928, Caballero & Díaz-Ungria 1958). Except for the absence of eggs in the uterus, other morphological traits of the metacercariae studied in the present study are in accordance with reported by these authors. Recently, Eumegacutes sp. was found in sparrwos, Passer domesticus (Linnaeus) (Passeridae), in the State of Rio Grande do Sul (Calegaro-Marques & Amato 2010). Other developmental stages of E. medioximus were not previously known.

Members of Eumegacutidae are intestinal parasites of birds with worldwide distribution (Lotz & Font 2008). The life cycle is known for Eumegacutes artammi Mehra, 1935, and Orthotrema monostomum Macy and Basch, 1972, and includes a prosobranch molluscs, Melanooides tuberculata (Müller) (Thiaridae), as intermediate host; xiphidiocercariae belonging to the microcotylous group emerge from infected molluscs and penetrate odonate larvae, to form metacercariae, in the case of E. artemmi, or progenetic adults in O. monostomum (Kumari & Madhavi 1994, Madhavi & Swarnakumari 1995). Different species of dragonfly larvae have been reported harboring metacercariae of Eumegacutes in the United States of America (Stafford 1931, Hall 1960) and India (Rao & Madhavi 1961, Singh & Pande 1968, Prakash & Pande 1970, Kumari & Madhavi 1994). The present study is the first report of metacercariae of Eumegacutes in larvae of Odonata in the Neotropics. The first intermediate hosts of E. medioximus remain unknown. Recently, a small xiphidiocercariae with morphological characteristics consistent with cercariae of Eumegacutidae known have been found in Pomacea lineata (Spix) (Ampullariidae) at the Pampulha reservoir (Holland et al. 1985) (Anaplasmataceae), and Heteroptera, Belostoma spp. (Belostomatidae), have been reported in Argentina and Brazil (Ostrowski de Núñez 1978, Diigan 2002, Amato & Amato 2006). Over the last decade, studying the biological interactions between insects and trematodes has become important, since metacercariae found in aquatic insects, including Odonata, have been found infected by Neorickettsia risticii (Holland et al. 1985) (Anaplasmataceae), the etiological agent for Potomac Horse Fever (Chae et al. 2000, Madigan et al. 2000, Mott et al. 2002, Gibson & Rikihisa 2008).

Despite the diversity of species of trematodes found in Brazil, studies involving the possible role of insects in the transmission of these parasites are still needed.

References


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