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A checklist of cercariae (Trematoda: Digenea) in molluscs from Brazil

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Abstract

A checklist of digenetic trematodes found in molluscs from Brazil is presented based on 127 scientific articles published after a century of studies. To date 23 families, 35 genera and 46 species of trematodes were identified infecting 25 species of molluscs in the country. Another 36 species described in the collective-group *Cercaria* were found in 15 species of molluscs and have not yet been associated with the respective adult parasites. Larvae found in 20 species of molluscs and grouped into 10 cercarian types are also listed.

Key words: trematodes, cercariae, molluscs, parasites, Brazil

Introduction

The study on the involvement of molluscs in the life cycle of trematodes began in Europe in the eighteenth century (Swammerdam 1737; Müller 1773) and since then a variety of larval trematodes (cercariae) was described and biological life cycles were elucidated by several authors in different parts of the world. Attempts to compilation the diversity of cercariae found in molluscs and life cycles known were performed for some geographic areas or localities (e.g. Nasir & Erasmus 1964; Ito 1964; Yamaguti 1975; Nasir 1984; Scholz *et al.* 2000; Ostrowski de Núñez & Gil de Pertierra 2004; Bartoli & Gibson 2007; Żbikowska & Nowak 2009; Cichy *et al.* 2011); some cercarian groups (e.g. Combes *et al.* 1980; Ostrowski de Núñez 1992); or larvae found in determined species of molluscs (e.g. Nasir 1980; Hechinger 2007, 2012; Esteban *et al.* 2011; Pinto & Melo 2011).

Despite several studies related to the biological interaction between molluscs and trematodes, the diversity of larval stages and life cycles known represent only a small portion in relation to the number of species described from the adult stage recovered in definitive hosts. In fact, although currently the diversity of trematodes described from vertebrate hosts is about 18,000 species (Cribb *et al.* 2001; Bartoli & Gibson 2007), the number of life cycles known is significantly lower (about 1350), and the larval stages and first intermediate host of several families and genera of these helminths remain unknown (Yamaguti 1975; Cribb *et al.* 2003). Besides the relevance related to biodiversity, the study of larval trematodes is also justified by their medical and veterinary importance, considering that cercariae are developmental stages involved in the life cycle of several trematode species that cause diseases (e.g. schistosomiasis, paragonimiasis, clonorchiasis, fascioliasis, cercarial dermatitis) in human or domestic animals (e.g. Muller & Wakelin 2002; Keiser & Utzinger 2005; Soldánová *et al.* 2013). Moreover, several species of trematodes are associated with the occurrence of substantial economic losses in the fish (e.g. Hoffman 1999; Lane & Moris 2000; Noga 2010) and oyster (e.g. Lauckner 1983; Bower *et al.* 1994) farming.

In Brazil, the study of larval trematodes began only in the twentieth century with the description of the *Cercaria blanchardi* by Pirajá da Silva (1912), larva which was subsequently linked to *Schistosoma mansoni* Sambon, 1907 by Lutz (1919). Since then, a diversity of larval trematodes was reported in molluscs from Brazil in the first decades of the 1900's century exclusively by Adolpho Lutz. Later, other Brazilian and foreign authors devoted to the elucidation of the diversity of larval stages and life cycles of trematodes found in molluscs in Brazil. However these studies are scattered in scientific literature, many of them published in non-English language (Portuguese) and in scientific journal of difficult access outside Brazil. In this regard, a compilation of existing data on cercariae found in molluscs in Brazil is required.