

# First record of *Corbicula fluminea* (Müller, 1774) in the drainage basin of the Araguari River, Minas Gerais, Brazil

Maroneze, DM.<sup>a</sup>, Coscarelli, D.<sup>b</sup>, Vidigal, THDA.<sup>b</sup> and Callisto, M.<sup>a\*</sup>

<sup>a</sup>Laboratório de Ecologia de Bentos, Departamento de Biologia Geral, Instituto de Ciências Biológicas – ICB, Universidade Federal de Minas Gerais – UFMG, Av. Antônio Carlos, 6627, Pampulha, CP 486, CEP 30161-970, Belo Horizonte, MG, Brazil

<sup>b</sup>Laboratório de Malacologia e Sistemática Molecular, Departamento de Zoologia, Instituto de Ciências Biológicas – ICB, Universidade Federal de Minas Gerais – UFMG, Av. Antônio Carlos, 6627, Pampulha, CP 486, CEP 30161-970, Belo Horizonte, MG, Brazil

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\*e-mail: callistom@ufmg.br

The Asian clam *Corbicula fluminea* (Müller, 1774) is a freshwater mollusk belonging to the family Corbiculidae (Bivalvia, Heterodonta, Veneroidea), and is native to southern China (Avelar, 1999). Because it is a species with r-strategy characteristics (e.g., rapid growth, early sexual maturity, and a short life cycle), it has a high potential for invasion, and is capable of colonising habitats with varied water regimes and physical and chemical conditions (Sousa et al., 2008a). *C. fluminea* occurs in several localities in South America (Darrigran, 2002). In Brazil, it was first recorded in 1970 in the basin of the Jacuí and Guafba rivers in the state of Rio Grande do Sul (Mansur et al., 2004), and was subsequently found in the southeast (Suriani et al., 2007), central-west (Rodrigues et al., 2007), and north regions of the country (Pimpão and Martins, 2008).

Its introduction is an important element of disturbance to biological communities, contributing to the reduction of diversity in continental aquatic ecosystems (Suriani et al., 2007). The species causes harm to the co-occurring biota because of the unequal competition for resources (e.g., space and food) (Karatayev et al., 2003; Sousa et al., 2008b). In addition to the diverse ecological problems, its presence generates economic impacts (Darrigran, 2002; Mansur et al., 2004). Pipes and heat exchangers of hydroelectric plants are frequently obstructed (“macrofouling”) because of the high densities reached by these clams (more than 200 individuals/m<sup>2</sup>), reducing the efficiency of energy production (Aldridge and Muller, 2001; Mansur et al., 2004). Darrigran (2002) discussed the environmental impacts caused by *C. fluminea*, mentioned the rapid increase in its geographical distribution and abundance in Brazil, and recorded that the first case of macrofouling in South America occurred in this country, in power plants in Rio de Janeiro and Minas Gerais.

The present study reports the occurrence of *C. fluminea* in samples of sediment from the stretch of reduced flow downstream from the Amador Aguiar I Hydroelectric Plant on the Araguari River in Minas Gerais (18° 20' S and 46° 00' W; 20° 10' S and 48° 50' W). Live specimens were collected with a Van Veen grab in July and

December 2008 (18 sample units for each period). In both periods, the species was present in high densities (293 and 48 ind.m<sup>2</sup>, respectively) and dominated the biomass of benthic macroinvertebrates in this locality (> 99%). The identification was based on characterisation of the shells, and the material was deposited in the collection of the Malacology and Molecular Systematics Laboratory of the Federal University of Minas Gerais, lot LMSM 3225.

It is worth noting that if these mollusks benefit from the artificial conditions present in the stretch studied (constant slow water flow, 7 m<sup>3</sup>.s<sup>-1</sup>), their density must increase over the years, as has been reported for other regions (Darrigran, 2002; Mansur et al., 2004), and they will be able to expand into other sections of the Araguari River, causing serious economic damage. In the state of Minas Gerais, this river is among the watercourses that are most exploited for hydropower purposes (Rodrigues, 2002). Four large dams operate in its main channel (Nova Ponte, Miranda, and Amador Aguiar I and II), which together generate 1300 megawatts, enough energy to supply a city of approximately 3 million inhabitants. As mentioned above, macrofouling in power plants was previously reported in Brazil by Darrigran (2002), demonstrating an imminent risk to the region studied.

Analyses of the stomach contents of fish caught simultaneously in the locality (*Leporinus amblyrhynchus* Garavello & Britski, *Iheringichthys labrosus* Lütken, and *Pimelodus maculatus* Lacépède) indicated that the animals are incorporating the invading bivalve into their diet, if only in small quantities. Although fish predation contributes toward controlling the population size of this invading species (Darrigran and Colautti, 1994), its consumption rather than their original food can have negative consequences for the ecosystem. In the Upper Paraná River floodplain, closed intact shells of *C. fluminea* were found in the terminal part of the digestive tract of the granulated catfish *Pterodoras granulosus* Valenciennes. Because it is a migratory fish, *P. granulosus* might be contributing to the dispersal of the invading mollusk (Catanhedê et al., 2007).

Therefore, considering the good adaptation of *C. fluminea* to environments with constant water flow and their trophic interaction with native Brazilian fishes, there is a need for further studies in the low-flow stretch below the Amador Aguiar I Hydroelectric Plant, in order to investigate its density, possible impacts on the local fauna, and dispersal by the ichthyofauna. These factors combined with artificial modes of dispersal (e.g., boat traffic, releases by aquarium hobbyists, and movement of construction and maintenance equipment for the hydroelectric dams) may be contributing to the dispersion of the species in Brazil (Catanhedê et al., 2007).

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