

Occurrence of *Corbicula fluminea* (Müller, 1774) and *Corbicula largillierti* (Philippi, 1844) (Bivalve: Corbiculidae) in Municipality of Ingá (State of Paraíba, Northeast Brazil)

Antônio Cláudio C. Almeida¹, Marilia Carolina Pereira da Paz² and Ronilson José da Paz³

¹Secretaria Municipal de Meio Ambiente. Prefeitura Municipal de João Pessoa. Rua Diógenes Chaves, 1777 - Água Fria - João Pessoa-PB, Brazil (CEP 58053-900). Email: acca40@gmail.com.

²Curso de Licenciatura em Ciências Biológicas. Centro de Ciências Exatas e da Natureza. Universidade Federal da Paraíba. *Campus* I. João Pessoa-PB, Brazil (CEP 58051-900).

³Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis (IBAMA). Caixa Postal 5063. João Pessoa-PB, Brazil (CEP 58051-900). Email: ronilson.paz@gmail.com.

Abstract. The Asian clams *Corbicula fluminea* (Muller, 1774) and *Corbicula largillierti* (Philippi, 1844) (Bivalve: Corbiculidae) are freshwater non-indigenous invasive species currently reported in Brazil from Ceará, Espírito Santo, Mato Grosso, Minas Gerais, Paraíba, Rio Grande do Sul, Santa Catarina, and São Paulo States. The present study relates the occurrence of this both species in Municipality of Ingá (State of Paraíba, Northeast Brazil). In this paper are reported the first occurrence of *Corbicula fluminea* and *Corbicula largillierti* in the Municipality of Ingá (State of Paraíba, Northeast Brazil). The current distribution of this Corbiculidae in State of Paraíba is certainly the consequence of its inadequate manipulation by aquarists and of an inadvertent introduction into ecosystems in Northeast Brazil, by means of plants as supplementary food sources for fish. Given the predation capacity these mollusks, a study must be carried to analyze the real impact of this animal in faunal communities of the Paraíba River Basin.

Keywords: Mollusca; Bivalve; Exotic and invasive fauna; Asian clam; Semiarid Region.

The deliberate or accidental introduction of alien species in ecosystems can have serious consequences for the environment, affecting the entire ecosystem dynamics, and is a major threat to native biodiversity.

The Asian clams *Corbicula fluminea* (Muller, 1774) and *Corbicula largillierti* (Philippi, 1844) (Bivalve:

Corbiculidae) are freshwater non-indigenous invasive species nowadays widely distributed in world.

Corbicula fluminea is recorded from British Columbia (Counts, 1981), from River Minho Estuary, Portugal (Sousa et al., 2008a, Sousa et al., 2008b), from middle Danube catchment, Hungary (Bódis et al., 2011), from Lake Maggiore, border

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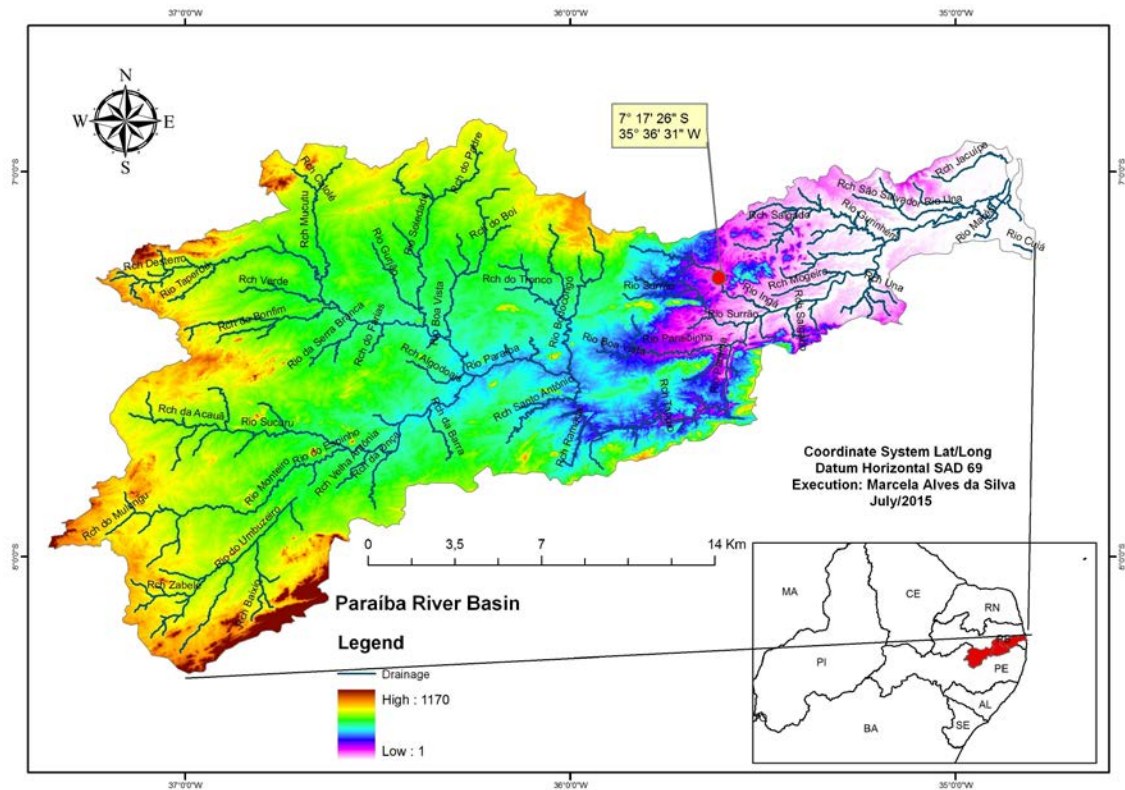


Figure 1. Location of the mollusk sampling site in the Bacamarte's Stream, Ingá Municipality, Northeast Brazil.

between Switzerland and Italy (Kamburska et al., 2013), from Morocco, Northern Africa (Clavero et al., 2012), from Patagonia (Cazzaniga, 1997) and from Northwestern Patagonia, Argentina (Cazzaniga and Pérez, 1999), and from some provinces of Argentina (Rumi et al., 2008). *Corbicula largillierti* is recorded from the Del Valle Central Basin, Catamarca Province, from Argentina (Torre and Reyna, 2013), and from some provinces of Argentina (Rumi et al., 2008).

In Brazil, the occurrence of *Corbicula fluminea* is recorded from Pantanal of Mato Grosso, at the upper part of the Paraguay River (Callil and Mansur, 2002), from Brazilian Amazon Basin (Beasley et al., 2003), from Furnas Dam, Rio Grande Basin, Minas Gerais (Hemetrio et al., 2007), from Rio Sapucaí (Vianna and Avelar, 2010), from Velhaco Stream, Laguna dos Patos, Rio Grande do Sul (Pereira et al., 2011 2014) and from Jundiá-Mirim River Basin (Beghelli et al., 2014), São Paulo, and from the Paraíba River Basin (Azevêdo et al., 2014).

Corbicula largillierti is recorded from Pantanal of Mato Grosso, at the upper part of the Paraguay River (Callil and Mansur, 2002), from the Sinos River Basin (Mansur and Pereira, 2006), and from Toropi River Basin, Rio Grande do Sul (Sá et al., 2013), from in Minas Gerais, Espírito Santo, Santa Catarina and Ceará States (Silva and Barros 2011) and from Velhaco Stream, Laguna dos Patos, Rio Grande do Sul (Pereira et al., 2011 2014).

This paper reports the first occurrence of *Corbicula fluminea* and *Corbicula largillierti* in the Municipality of Ingá (State of Paraíba, Northeast Brazil).

The sample sites is located in Ingá Municipality ($7^{\circ} 17' 26''$ S and $35^{\circ} 36' 31''$ W), Agreste Mesoregion of the State of Paraíba, Brazil (Figure 1), in the riverbed of the Bacamarte's Stream, near of the Ingá Rock (also called Ingá Stone, Pedras do Ingá, Itacoatiaras do Ingá) (Faria, 2011; Oliveira, 2011; Brito, 2013) (Figure 2), a tributary of Ingá River, tributary of the Rio Paraíba. Climate is classified as humid tropical semiarid, with intense evaporation



Figure 2. Place of occurrence of *Corbicula fluminea* and *Corbicula largillierti*, in riverbed of the Bacamarte's Stream, Paraíba River Basin, Ingá Municipality, State of Paraíba, Brazil.



Figure 3. Specimen of *Corbicula fluminea*, from riverbed of the Bacamarte's Stream, Paraíba River Basin, Ingá Municipality, State of Paraíba, Brazil.



Figure 4. Specimen of *Corbicula largillierti*, from riverbed of the Bacamarte's Stream, Paraíba River Basin, Ingá Municipality, State of Paraíba, Brazil.

and insolation, and local temperature varies between 22 °C and 34 °C (Faria, 1987). Area have a very irregular rainy season begins in November ending in April, annually receives an average rainfall of 431,8 mm (Beltrão et al., 2005).

Ingá Rock is an impressive granite boulder, located in the riverbed of the Bacamarte's Stream, in Ingá Municipality, Northeast Brazil. It features figurative and non-figurative engravings and other marks. It is one of the most important rock-art sites recorded in Brazil and was listed in 1944 as National Heritage (Lage and Lage, 2014).

The specimens of *Corbicula fluminea* (Figure 3) and *Corbicula largillierti* (Figure 4) from the present study were collected in sediment on the shores of the Bacamarte's Stream, tributary of the Paraíba River Basin, Brazilian Semiarid Region. Samples were taken in May 2015.

The clam has the following basic characteristics such yellowish brown shell, reaching up to 2.2 cm (varying according to environmental conditions), with preference for soft slope and sand.

This paper may be viewed as a sequel to Paz et al. (2013) in which was

listed the invasive exotic fauna of the State of Paraíba, and Paz et al. (2014), with addition of *Corbicula largillierti*, and expanding the area of occurrence of *Corbicula fluminea*.

The Asian clams *Corbicula fluminea* and *Corbicula largillierti* are considered most important faunal NIS (non-indigenous species) in aquatic ecosystems. Just as had occurred with the introduction of *Melanoides tuberculatus* (Müller, 1774) in State of Paraíba (Paz et al., 1995), the current distribution of this Corbiculidae is certainly the consequence of its inadequate manipulation by aquarists and of an inadvertent introduction into ecosystems in Northeast Brazil, by means of plants as supplementary food sources for fish.

Given the predation capacity these mollusks, a study must be carried to analyze the real impact of this animal in faunal communities of the Paraíba River Basin.

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