

# Biodiversity of molluscs in the Multiple-Use Natural Reserve Guillermo Enrique Hudson in Florencio Varela, Buenos Aires, Argentina

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**ABSTRACT:** The present study provides a list of freshwater molluscs species from the Davidson Stream in the Multiple Use Natural Reserve Guillermo Enrique Hudson, Florencio Varela, Buenos Aires, Argentina. In the survey performed in the months of March, April, and September 2009, 505 specimens were captured. Analysis of the taxocenosis of the molluscs of the stream revealed the presence of nine taxa belonging to 8 different families with five of the species being Gastropoda and four Bivalvia.

## INTRODUCTION

The Multiple Use Natural Reserve Guillermo Enrique Hudson (34°54'22" S, 58°13'47" W) is located 7 km from Florencio Varela Railway Station, Buenos Aires, Argentina. The reserve is a complex comprising 54 hectares of forest, grassland, and wetland and is part of the urban nature reserves of the City of Buenos Aires and Gran Buenos Aires. While the survey and monitoring of the biological richness of this reserve have been the objective of scientific research, educational motivations have also prompted investigation at the site since this historical area is visited by both domestic and foreign tourists in addition to school children (Lareschi *et al.* 2003; Montenegro *et al.* 2001). The urban nature reserves are open spaces, homes to the local wildlife, and located near or in towns or cities; preferably not farther than 30 km away. The objective of the reserve was to generate opportunities for ecological education; the training of environmental leaders; and public participation in topics concerning environmental care, scientific research, the protection of interesting objects both from the human past and the species inhabiting these areas. Within this context, the urban reserves constitute consequential tools for the promotion of the value of the natural environment (Moschione 2001; Casañas 2001).

The Davidson (known as "Las Conchitas") and Santo Domingo streams and their flood valleys are found in this reserve and cover an area of 120 square kilometers. On its way traverses the Multiple Use Natural Reserve Guillermo Enrique Hudson, The soft geophysical undulations that characterized the so-called *undulated pampas* and the included landscape in colonial times can still be observed at the site ([www.hudsonmuseoyparque.org.ar](http://www.hudsonmuseoyparque.org.ar)). The vegetation in the reserve consisting in predominantly grass steppes, but also with ravines with the Argentine tala trees (*Celtis tala* Gillies ex Planch), bulrushes, Argentine cortaderia grasslands, and tala woodlands can still be found there along with some of their accompanying fauna species (Cabrera and Zardini 1978). The reserve can be characterized as ecotonal between the Espinal and the

Pampeana Oriental phytogeographic provinces, both of which areas have their origin in the region of Chaco within the north northeastern portion of Argentina. The basins of the streams are home to native species and contain areas that are representative of the Pastizal Pampeano phytogeographic region's riparian flora and fauna.

The aim of the present study was to report on species of freshwater molluscs from the Davidson Stream, since no previous taxonomical or ecological records on such fauna had been available. Since the reserve is considered a cultural and ecological park because of its circumstance as a multiple-use reserve, this site of natural conservation remains at a high priority for continued protection and maintenance. Finally, some appropriate steps to insure the conservation of the malacofauna are recommended for the continued maintenance of the existing species.

## MATERIALS AND METHODS

To perform the present works surveys of the malacological fauna were conducted in March, April, and September 2009. Samples were collected by hand and with sieves of 15 cm diameter and 0.14 mm mesh size (captures per unit of effort (CPUE) that is, specimens/60min/person) (Barbosa 1995; Rumi *et al.* 2004) along the basin of the Davidson Stream in the Natural Reserve of Multiple Use E. Hudson. Gastropods and bivalves were anesthetized with vaporized menthol before being fixed with 70% (v/v) aqueous ethanol (Araujo *et al.* 1995) and were then identified and characterized under a stereoscopic microscope. For the taxonomic identification the appropriated literature was used (Bonetto 1965; Castellanos and Fernández 1976; Gaillard and Castellanos 1976; Fernández 1981a; b ; Castellanos and Gaillard 1981; Castellanos and Landoni 1990; 1995; Castellanos and Miquel 1991; Rumi 1991; and the specimens were compared with those deposited in the Malacological Collection of La Plata Museum [MLP] (Table 1). The collected material was deposited in that same collection under the numbers 13.605, 13.606, 13.607, 13.608, 13.609, 13.610, 13.611 and 13.612.

## RESULTS AND DISCUSSION

The results from the taxocenosis analysis of the molluscs from Davidson Stream revealed nine (9) species of which five (5) species are Gastropods and four (4) are Bivalves. The species of Gastropods and Bivalves belong to eight (8) different families. This survey is a new contribution to the existing information on malacological biodiversity of freshwater bodies of the Plata Basin that will serve to promote the value of the Reserve and the surrounding area as a result its faunistic richness. These findings also contribute to the present body of information on the geographical distribution of the Argentine continental molluscs.

An updated list of the species of Gastropoda and Bivalvia among the freshwater molluscs is presented here. The nomenclature of the species listed in Table 1 was assigned according to the review by Bouchet and Rocroi (2005; 2010)

The survey revealed that the most abundant Gastropoda family was the Cochliopidae with 153 individuals found on diverse substrates (*Eichhornia azurea* Kunth, *E. crassipes* (Mart.) Solms) in the surface sediments of the loamy stream bottom. The most abundant Bivalves belonged to the family Corbiculidae: *Corbicula fluminea* (Müller, 1774) an invasive species, along with a sizeable population of *Diplodon* Spix species (Hyriidae), while the least abundant family was Mycetopodidae. Both of these recordings are of relevance to the issue of conservation. This last group is at present in marked reduction in the streams of the Plata Basin mainly because of the environmental deterioration caused by urbanization and the consequent contamination of the area. Accordingly, many members of this family have been placed in the catalogue of endangered species, including those that are in the process of extinction (Bonetto 1961; 1973; Gordillo 2010)

In order to protect the malacological fauna, the helophytic vegetation and the borders of the stream should

be respected diligently and maintained scrupulously. Within this context, a set of rules need to be established in order to limit the impact produced by the public use of the area through controlling the influx of visitors throughout certain key sectors of the stream course. In the urban areas of Florencio Varela and Berazategui a manufacturing zone is in operation, next to the stream. In 2006 the Department of Environmental Policy of the Buenos Aires province and those two municipalities inaugurated the program "Environmental Crisis": "Las Conchitas", to combat pollution along the water course. [www.hudsonmuseoyparque.org.ar](http://www.hudsonmuseoyparque.org.ar). The state of environmental alarm signalled by this new policy clearly indicates that certain species of snails and clams are likely to be adversely affected by the present degree of watercourse pollution.

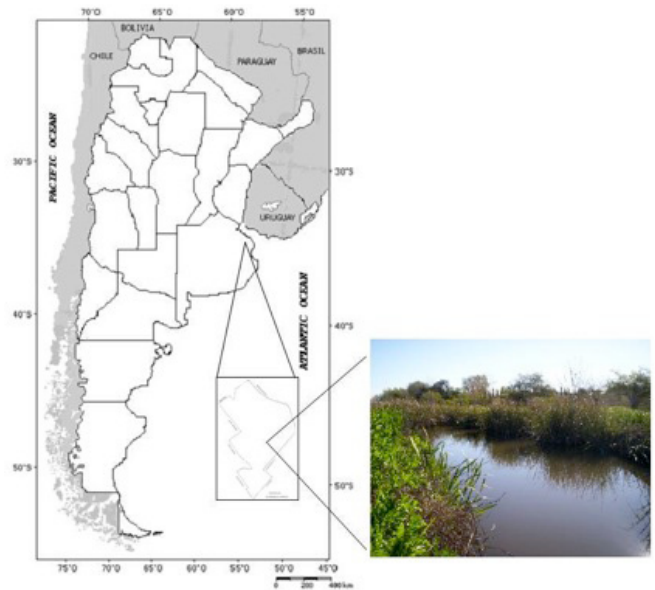


FIGURE 1. Map of Argentina showing the location of Florencio Varela within the Davidson stream photograph of the Reserva Natural G. E. Hudson

TABLE 1. List of Gastropoda and Bivalvia (Davidson Stream, Florencio Varela, Buenos Aires, Argentina).

CLASS	SUPERORDER	ORDER	FAMILY	SPECIES	Nº
<b>Gastropoda</b>	Caenogastropoda	Architaenioglossa	Ampullariidae	<i>Pomacea canaliculata</i> (Lamarck, 1822)	48
			Cochliopidae	<i>Heleobia parchappii</i> (d'Orbigny, 1835)	153
		Pulmonata	Ancylidae	<i>Uncancylus concentricus</i> (d'Orbigny, 1835)	51
			Physidae	<i>Stenophysa marmorata</i> (Guilding, 1828)	2
			Planorbidae	<i>Biomphalaria straminea</i> (Dunker, 1848)	3
<b>Bivalvia</b>	Unionida	Mycetopodidae	<i>Anodontites trapesialis</i> (Lamarck, 1819)	2	
			Hyriidae	<i>Castalia ambigua inflata</i> (d'Orbigny, 1835)	1
		Veneroidea	Corbiculidae	<i>Diplodon</i> sp.	94
				<i>Corbicula fluminea</i> (Müller, 1774)	151

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### LITERATURE CITED

Araujo, R., J.M. Remón, D. Moreno, and M.A. Ramos. 1995. Relaxing techniques for freshwater molluscs: trials for evaluation of different methods. *Malacologia* 36(1-2): 29-41.  
Barbosa, F.S. 1995. Tópicos en malacología médica. Rio de Janeiro: Ed. FIOCRUZ. 314 p.

Bonetto, A. 1961. Acerca de La distribución geográfica de las náyades en la República Argentina. *Physis*. 22(63): 259-268, 2 Láms.  
Bonetto, A. 1965. Las almejas sudamericanas de la Tribu Castaliini. *Physis*. 25(69): 187-196.  
Bonetto, A. 1973. Estudio Revisivo de las Colecciones de Náyades de D'Orbigny existentes en el Museo Británico. *Sociedad Científica Argentina* 1: 17-25.  
Bouchet, P and J-P. Rocroi. 2005. Classification and Nomenclator of Gastropod Families. *Malacologia* 47(1-2): 1-369.  
Bouchet, P and J-P. Rocroi. 2010. Nomenclator of Bivalve Families, with a Classification of Bivalve Families by Rüdiger Bieler, J.C Carter & E. Cohan. *Malacologia* 52(2): 1-173.  
Cabrera, A.L. and E.M. Zardini. 1978. *Manual de la Flora de los Alrededores*

- de Buenos Aires. Buenos Aires: ACME. 755 p.
- Casañas, H. 2001. Reservas Urbanas en Córdoba: Un desafío futuro. El caso de la Reserva del Suquia. *Resúmenes y Simposios Primeras Jornadas Nacionales sobre Reservas Naturales Urbanas*. S1. Buenos Aires: Capital Federal. Buenos Aires. 114 p.
- Castellanos, Z.A de and D. Fernández. 1976. Moluscos Gasteropodos Ampullariidae; p. 7-33 In R.A. Ringuelet (ed.). *Fauna de agua dulce de la República Argentina*. Buenos Aires: FECIC 15(1).
- Castellanos, Z.A de and M.C. Gaillard. 1981. Molusca Gasteropoda Chiliniidae; p. 21-51 In R.A. Ringuelet (ed.). *Fauna de agua dulce de la República Argentina*. Buenos Aires: FECIC 15(1).
- Castellanos, Z.A. de and N.A. Landoni. 1990. Moluscos Pelecípodos Mycetopodidae; p. 7-86 In Z.A. Castellanos (ed.). *Fauna de agua dulce de la República Argentina*. Buenos Aires: FECIC 16(1).
- Castellanos, Z.A de and S.E. Miquel. 1991. Mollusca Gastropoda. Distribución de Pulmonata; p. 3-11 In Z.A. Castellanos (ed.). *Fauna de agua dulce de la República Argentina*. Buenos Aires: FECIC, 15(9).
- Castellanos, Z.A de and N.A. Landoni. 1995. Moluscos Pelecypoda y Gastropoda; p. 759-801 In Lopretto and Tell (ed.) *Ecosistemas de aguas continentales. Metodologías para su estudio*. Buenos Aires: Ediciones Sur. 1401p.
- Fernández, D. 1981a. Molusca Gasteropoda Physidae; p. 85-98 In R.A. Ringuelet (ed.). *Fauna de agua dulce de la República Argentina*. Buenos Aires: FECIC 15(6).
- Fernández, D. 1981b. Molusca Gasteropoda Ancyliidae; p. 101-114 In R.A. Ringuelet (ed.). *Fauna de agua dulce de la República Argentina*. Buenos Aires: FECIC 15(7).
- Gaillard, M.C. and Z.A. de Castellanos 1976. Mollusca Gasteropoda Hydrobiidae; p. 7-40 In R.A. Ringuelet (ed.). *Fauna de agua dulce de la República Argentina*. Buenos Aires: FECIC 15(2).
- Gordillo, S. 2010. *Las almejas nacaríferas de la cuenca parano-platense: patrimonio natural y cultural de Sudamerica*. Cartilla de Difusión N° 15. Santa Fé: Museo Provincial de Ciencias Naturales "Florentino Ameghino". 28 p.
- Hudson Museo y Parque. 2005. Version 2005. Electronic Database accessible at <http://www.hudsonmuseoyparque.org.ar/>. Captured on 15 October 2012.
- Lareschi, M., J. Notarnicola, G. Navone and P.M. Linardi. 2003. Arthropod and Filarioid Parasites Associated with Wild Rodents in the Northeast Marshes of Buenos Aires, Argentina. *Memórias do Instituto Oswaldo Cruz* 98(5): 673-677.
- Montenegro, M.J., C.I. Echeverría and C. Sawicki. 2001. Riqueza de Vertebrados en una Reserva Natural Periurbana. *Resúmenes y Simposios Primeras Jornadas Nacionales sobre Reservas Naturales Urbanas*. M26. Capital Federal. Buenos Aires.
- Moschione, F.N. 2001. Las Reservas Naturales Urbanas como parte de un sistema de Areas Naturales Protegidas, el caso de la provincia de Buenos Aires. *Resúmenes y Simposios Primeras Jornadas Nacionales sobre Reservas Naturales Urbanas*. S3. Buenos Aires: Capital Federal. Buenos Aires. 114 p.
- Rumi, A.1991. Mollusca Gastropoda Planorbidae; p. 5-51 In Z.A. Castellanos (ed.). *Fauna de agua dulce de la República Argentina*. Buenos Aires: FECIC 15(8).
- Rumi, A., D.E. Gutierrez Gregoric, M.A. Roche, and M.P. Tassara. 2004. Population structure in *Drepanotrema kermatoides* and *D. cimex* (Gastropoda: Planorbidae) in natural conditions. *Malacologia* 45(2): 453-458.

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