

Theba pisana (Müller, 1774) (Gastropoda, Helicidae) and other alien land molluscs species in Argentina

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Abstract The presence and distribution in Argentina of the invasive snail species *Theba pisana* is presented on the basis of a survey carried out in 10 beach resorts along the Atlantic coast of Buenos Aires Province. Additionally, complementary information and complete revision of material of other exotic terrestrial gastropods housed in museum collections was carried out, reporting herein seven new species for Argentina (*Otala punctata*, *Hawaiiia minuscula*, *Paralaoma servilis*, *Opeas goodalli*, *Valtonia pulchella*, *Vertigo ovata* and *Pupisoma dioscoricola*), one for Colombia (*Subulina octona*), and two for Peru (*S. octona* and *P. dioscoricola*). At present, 42 introduced species of terrestrial gastropods have been recorded in nine countries of South America (Argentina, Bolivia, Brazil, Chile, Colombia, Paraguay, Peru, Uruguay and Venezuela). The most likely pathways for introduction of terrestrial gastropods, at

least in Argentina, are horticultural development and urban and suburban transformation of original natural habitats.

Keywords Alien species · Argentina · Land molluscs · *Theba pisana*

Abbreviations

GISP Global Invasive Species Programme
MLP Museo de La Plata, Facultad de Ciencias Naturales y Museo, Universidad Nacional de La Plata, Buenos Aires, Argentina

Introduction

Eight alien species of terrestrial snails and five of slugs have been reported from Argentina. The fundamental role played by man in the dispersion of species that once settled become invasive—as is the case of snails and slug plagues—is widely known (Baker 1988; Tadros et al. 1999). Among European snails *Helix aspersa* and *Theba pisana* are well known, the former widely spread in South America. *T. pisana* (Müller, 1774) is a native species of the South East of England and Wales, Ireland, Western France, Switzerland and the Mediterranean countries of Europe and Northern Africa (Garrison 1993; Pilsbry 1939; Burch 1960; Kerney and Cameron 1979). In North America this snail has been recorded

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for the first time in 1914 in La Jolla, San Diego, California (Chace 1915; Basinger 1923; Deisler and Stange 2001). According to Smith (1989) *T. pisana* would not be recorded further than south of North America.

Barrientos and Monge-Nájera (2003) presented an update of the fauna of terrestrial molluscs from Central America (Costa Rica, Nicaragua, Mexico and Cuba), and South America (Brazil, Chile and Peru). More recently, Simone (2006) published a catalogue of continental molluscs from Brazil. Neither of these publications mentioned *T. pisana*. Contrarily, Poppe and Poppe (2003) presented a photograph of specimens of *T. pisana* from “La Lucila del Mar”, Buenos Aires province.

The last report of the Global Invasive Species Programme (GISP) (Ziller et al. 2005): *Prevention and Management of Invasive Alien Species: Forging Cooperation throughout South America*, only mentions what it considers “outstanding species” of alien molluscs in Argentina and includes *T. pisana*, but without any geographic reference or further information.

It is worth mentioning that Bolivia, Ecuador, Guyana, French Guayana and Paraguay formally participate in the GISP program, but they do not submit any report (Zubrzycki and Molina 2005). Thus the absence of *T. pisana* cannot be ascertained. In 2006 a survey of *T. pisana* was carried out with the purpose of formally verifying its presence in the south of Latin America and Argentina.

Methods

The information assembled in this work comprised nine out of the thirteen South American countries. An extensive bibliographic recopilation was carried out for Argentina (Fernández 1973; Cuezco and Drahg 1995; Miquel et al. 1995; Carmona 2001; Manetti et al. 2002), Bolivia (Quintana 1982), Brazil (Campos Salgado and Santos Coelho 2003; Simone 2006), Chile (Letelier et al. 2003), Colombia (Hausdorf and Bermúdez 2004), Paraguay (Quintana 1982), Peru (Ramírez et al. 2003), Uruguay (Scarabino 2003), and Venezuela (Fernández 1982; Fuentes 2006). This information was complemented by a survey (southern summer and winter of 2006) of fifteen localities in beaches from Atlantic coast of Buenos Aires Province, Argentina. The material was deposited in the

MLP collection. Additional material housed in the MLP collection was also included in this study.

Results and discussion

A total of 42 introduced species were recognized, distributed in 16 families of snails and 5 families of slugs (Table 1). It is important to notice that *Thysanophora caeca* is considered by some specialists (Hylton Scott 1960; Fernández 1973; Campos Salgado and Santos Coelho 2003) a synonym of *Pupisoma dioscoricola*. Nevertheless, Simone (2006) considers it as a separate species.

As a result of the revision of the MLP collection we report here seven new species (Table 1) for Argentina thus summarizing at present 15 snails and six alien slugs at least. Likewise, one species from Colombia and two from Peru not mentioned previously in the literature (Table 2) were also detected in this collection. The fauna of terrestrial molluscs existing in Bolivia has not been included in the tables because of the lack of adequate information. Nevertheless, it is worth mentioning here that there is a lot (No 11083) of *Cochlicopa lubrica* from Cochabamba (Bolivia) in the MLP collection. Quintana (1982) mentioned two slugs from this country: *Deroceras laeve* and *Deroceras agrestes*. Ten out of fifteen localities surveyed were positive for the presence of *T. pisana* being its earliest record in June 2000 in Mar de Ajó, Buenos Aires province.

Cowie and Robinson (2003) used the word “pathway” in order to describe the way in which alien species are introduced: intentional pathways (e.g. for biologic control) or unnoticed pathways associated to the import of species and commercial products (e.g. for horticulture). Most of the introduced species in Latin America come from Europe (Table 1). According to Smith (1989) the European travellers and colonizers from the last century constituted the most important vehicle of species dispersion into the temperate regions. Tourism and urban development along the Atlantic Coast of Buenos Aires Province brought on intensification in horticulture and flower and aromatic herb production. This suggests a connection of the introduction of *T. pisana* in Argentina with the import and trade of ornamental plants and is coincident with the unnoticed pathway defined by Cowie and Robinson (2003). The Tuyú Beach Resort was originally a sand dune

Table 1 Introduced terrestrial gastropods in Argentina and other Latin American countries

	Author	Native	Arg	Bra	Chi	Col	Par	Per	Uru
Slugs									
Agriolimacidae									
<i>Deroceras agreste</i>	(Linné, 1758)	?	X	X			X		X
<i>Deroceras laeve</i>	(Müller, 1774)	Europe	X	X	X	X	X	X	X
<i>Deroceras reticulatum</i>	(Müller, 1774)	Europe	X		X	X		X	X
<i>Deroceras panormitanum</i>	(Lessona & Pollonera, 1882)	Europe			X	X			
Arionidae									
<i>Arion intermedius</i>	Normand, 1852	Europe				X			
Boettgerillidae									
<i>Boettgerilla pallens</i>	Somroth, 1912	Europe				X			
Limacidae									
<i>Limax flavus</i>	Linné, 1758	Europe	X	X	X				X
<i>Limax maximus</i>	Linné, 1758	Europe	X	X	X				
<i>Lehmannia valentiana</i>	(Férussac, 1821)	Europe		X	X	X		X	
Milacidae									
<i>Milax gagates</i>	(Draparnaud, 1801)	Europe	X	X	X	X		X	X
<i>Tandonia sowerbyi</i>	(Férussac, 1823)	Europe				X ^a			
Snails									
Achatinidae									
<i>Achatina fulica</i>	(Bowdich, 1822)	África		X					
Bradybaenidae									
<i>Bradybaena similaris</i>	(Férussac, 1821)	SE Asia		X		X ^a	X		X
Chondrinidae									
<i>Chondrina amicta</i>	(Pfeiffer, 1854)	?							X
Cochlicopidae									
<i>Cochlicopa lubrica</i>	(Müller, 1774)	Europe?				X ^a			
Discidae									
<i>Angispira alternata</i>	(Say, 1816)	?		X					
Ferussaciidae									
<i>Cecilioides acicula</i>	(Müller, 1774)	Europe	X						X
Helicidae									
<i>Helix aspersa</i>	Müller, 1774	Europe	X	X	X	X		X	X
<i>Helix pomatia</i>	Linnaeus, 1758	Europe		X					
<i>Helicella variabilis</i>	(Draparnaud, 1801)	Europe?							X
<i>Otala lactea</i>	(Müller, 1774)	Europe	X		X		X		
<i>Otala punctata</i>	(Müller, 1774)	Europe?	X ^{b?}						X
<i>Theba pisana</i>	(Müller, 1774)	Europe	X						
Oxychillidae									
<i>Oxychilus alliarius</i>	(Millar, 1822)	Europe			X	X			
<i>Oxychilus cellarius</i>	(Müller, 1774)	Europe			X			X	
Pristilomatidae									
<i>Hawaiiia minuscula</i>	(Binney, 1843)	N Amer.	X ^b			X		X	
<i>Vitrea contracta</i>	(Westerlund, 1871)	?				X			

Table 1 continued

	Author	Native	Arg	Bra	Chi	Col	Par	Per	Uru
Punctidae									
<i>Paralaoma servilis</i>	(Shuttleworth, 1852)	Oceania?	X ^b			X			X
Streptaxidae									
<i>Luntia insignis</i>	Smith, 1898	Africa?				X			
Subulinidae									
<i>Lamellaxis clavulinus</i>	(Potiez & Michaud, 1838)	SE Asia		X					
<i>Lamellaxis gracilis</i>	(Hutton, 1834)	SE Asia	X				X		X
<i>Opeas opella</i>	Pilsbry & Vanatta, 1905	?		X					
<i>Opeas goodalli</i>	(Miller, 1822)	?	X ^b						X
<i>Opeas pumilum</i>	(Pfeiffer, 1840)	?		X					
<i>Rumina decollata</i>	(Linné, 1758)	África?	X	X	X				X
<i>Subulina octona</i>	(Bruguière, 1792)	SE Asia		X		X ^b		X ^b	
Thysanophoridae									
<i>Thysanophora caeca</i>	(Guppy, 1866/8)	?		X					
Valloniidae									
<i>Vallonia pulchella</i>	(Müller, 1774)	Europe	X ^b	X				X	X
Vertiginidae									
<i>Vertigo ovata</i>	Say, 1822	?	X ^b	X					
<i>Pupisoma dioscoricola</i>	(Adams, 1845)	Oceania?	X ^b	X				X ^b	
Zonitidae									
<i>Zonitoides arboreus</i>	(Say, 1816)	N Amer	X	X		X ^a	X		X
<i>Zonitoides nitidus</i>	(Müller, 1774)	?	X	X					X

Arg Argentina, Bra Brazil, Chi Chile, Col Colombia, Par Paraguay, Per Peru, Uru Uruguay

^a Exotic species found in shipments from Colombia and not in the country

^b Material in the collection of Museo de La Plata, Argentina, verifying the presence of exotic species still not published. For taxonomic arrangement, Bouchet and Rocroi (2005) were followed

Table 2 Data from the lots of MLP which refer to the introduced species in Argentina, Colombia and Peru not present in the bibliographic records

Snails	Province	Locality	No MLP
Argentina = 8 spp.			
<i>Hawaiia minuscula</i>	Catamarca	Catamarca	11172
	Córdoba	Jesús María	11174
	Jujuy	Valle Grande	11175
<i>Opeas goodalli</i>	Misiones	San Antonio	11309
	Buenos Aires	Cap. Federal	9611
<i>Otala punctata</i>	Buenos Aires	Monte Hermoso	2479
<i>Paralaoma servilis</i>	Jujuy	Las Capillas	10027-3
	Jujuy	Jujuy	7777
	Buenos Aires	San Isidro	10924
	Buenos Aires	Castelli	10152
	Salta	Pocitos	10508

Table 2 continued

Snails	Province	Locality	No MLP	
<i>Pupisoma dioscoricola</i>	Chaco	Resistencia	10033/10034	
<i>Theba pisana</i>	Buenos Aires	Mar de Ajó	5651/12499	
	Buenos Aires	Aguas Verdes	12496	
	Buenos Aires	Costa del Este	12497	
	Buenos Aires	Las Toninas	12498	
	Buenos Aires	Mar del Tuyú	12500	
	Buenos Aires	San Bernardo	12501	
	Buenos Aires	San Clemente del Tuyú	12502	
	Buenos Aires	Santa Teresita	12503	
	Buenos Aires	Valeria del Mar	12504	
	Buenos Aires	Villa Gesell	12505	
	Buenos Aires	Claromecó	12495	
	<i>Vallonia pulchella</i>	Jujuy	Jujuy	10827/10828
		Buenos Aires	La Plata	10829/11536
La Rioja			10831	
<i>Vertigo ovata</i>	Salta	Vespucio	10832	
	Córdoba		10850	
	Córdoba	Tulumba	8897/2	
Colombia = 1				
<i>Subulina octona</i>			11500	
Peru = 1				
<i>Pupisoma dioscoricola</i>		Tingo María	10035	
<i>Subulina octona</i>		Pucalpa	10592	
	Pasco	San Ramón	11498	

landscape with practically no vegetation. The dispersion of an invasive species like *T. pisana* would have a negative effect over the few native species—only a dozen terrestrial snails are known in this area—because of the high reproductive rate of the invader.

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