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## Occurrence of *Pteria colymbus* (Bivalvia: Pteriidae) in Argentine waters

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**Abstract:** The family Pteriidae is well represented in tropical and subtropical continental shelf regions. Two names belonging to the genus *Pteria* are usually recorded in the literature from the southwestern Atlantic: *P. colymbus* (Röding) and *P. hirundo* (Linnaeus). The study of living specimens sampled off Buenos Aires coast aboard of the R/V Puerto Deseado allows updating the geographic range of the Atlantic wing oyster *Pteria colymbus* in the region. Type materials of related species are illustrated. Ecological requirements and shell morphology description of *P. colymbus* are provided. This study constitutes the first revision of this species from Argentine waters.

**Key words:** Pteriidae, *Pteria hirundo*, *Pteria colymbus*, Argentina, R/V Puerto Deseado, Buenos Aires.

**Resumen:** Presencia de *Pteria colymbus* (Bivalvia: Pteriidae) en aguas argentinas. La familia Pteriidae se encuentra bien representada en áreas tropicales y subtropicales. A lo largo del océano Atlántico sudoccidental, dos nombres pertenecientes al género *Pteria* han sido citados en la bibliografía. Estos son: *P. colymbus* (Röding) y *P. hirundo* (Linnaeus). El estudio de nuevos ejemplares vivos recolectados frente a las costas de Buenos Aires a bordo del BO Puerto Deseado permitió actualizar el rango de distribución geográfica de la especie *Pteria colymbus*. Adicionalmente se ilustró el material tipo de las especies nominales relacionadas. Se relevaron los requisitos ecológicos y se describió la morfología de la concha de *P. colymbus*. Este estudio constituye la primera revisión de esta especie en aguas argentinas.

**Palabras clave:** Pteriidae, *Pteria hirundo*, *Pteria colymbus*, Argentina, R/V Puerto Deseado, Buenos Aires.

### INTRODUCTION

The family Pteriidae Gray, 1847 included in the superfamily Pterioidea was largely studied as a commercial source of pearls and nacre (Donkin, 1998; Landman *et al.*, 2001; Jiuani-Juan & Okutani, 2003, among others). Recent morphological works of punctual species (i.e. *Pinctada longisquamosa* (Dunker, 1852) were documented by Harper & Morton (1994) and Mikkelsen *et al.* (2004) among others. The main shell features of this group includes a particular rounded outline to strongly prosocline alate or a very irregular shell shape (Temkin, 2006). The family is well represented in tropical and subtropical continental shelf regions where it was sampled in different ecological settings (Mikkelsen *et al.*, 2004). Mikkelsen & Bieler (2007) cited seven species of Pteriidae living in the western Atlantic Ocean. The wing oyster *Pteria colymbus* was

previously reported from North Carolina, USA to the coast of Uruguay (Abbott & Dance, 1986; Temkin, 2006). However it was widely cited as *Pteria tarentina* Lamarck (Studer, 1889) and as *P. hirundo* Linnaeus in local literature (e.g. Doello Jurado, 1938; Feruglio, 1949; Castellanos, 1970; Juanicó & Rodríguez-Moyano, 1976; Scarabino, 2003; Pastorino *et al.*, 2007; Rios, 2009, among others). Scarabino *et al.* (2006) mentioned that this species requires a taxonomic revision along its distribution.

The main objective of this study is to clarify the presence of *Pteria colymbus* in the southwestern Atlantic as the unique living Pteriidae in Argentine waters.

### MATERIALS AND METHODS

New specimens of *P. colymbus* were collected off Buenos Aires coast with a bottom dredge



Fig. 1. Southernmost localities for *Pteria colymbus* and the new locality here reported: 1, Studer, 1889; 2, MACN-In 15936; 3, MACN-In 16810; 4, MACN-In 16662; 5, MACN-In 17632; 6, MACN-In 18195; 7, MACN-In 16712; 8, Pastorino *et al.*, 2007.

aboard the R/V Puerto Deseado on October 2009 (Fig. 1). All specimens were fixed in 10% formalin and preserved in 70% ethanol. In addition, morphometric parameters of new records and type material were measured with a digital caliper and listed in the Table 1. They are the antero-posterior length (APL), the greatest distance between the anterior and posterior over the dorsal margin of the shell and the dorsoventral height (DVH), the greatest dorsoventral distance measured from hinge line to the ventral edge. The relation APL/DVH is provided. Physical parameters were recorded and listed in Table 2. The latitude/longitude data were registered with a GPS Garmin. The sampling depth at each station was provided by the crew of the R/V Puerto Deseado and a Niskin bottle was used to collect seawater and to measure bottom temperature and salinity. Associated species are mentioned in Table 3 and identified based on the traditional catalogues and type material examination. Finally, material deposited at invertebrate collection of Museo Argentino de Ciencias Naturales (MACN-In) and Linnean Society of London (LSL) was revised. New collected specimens were housed at MACN-In and invertebrate collection of Centro Nacional Patagónico (CNP-Inv).

## RESULTS

Despite the 32 stations sampled along Buenos Aires province coast by the R/V Puerto Deseado, only in the station 22 living specimens of *Pteria colymbus* were collected. This area is charac-

terized by a sandy bottom with broken shells influenced by the Río de la Plata estuary (Fig. 1). Nevertheless, it is suitable to host banks of Mytilidae, which allows also the presence of the byssate *Pteria colymbus*. All the specimens of *P. colymbus* were fixed to each other by the byssus forming a sort of nest initially attached to empty shells of pectinids and venerids or small rocks (Fig. 14). This work updates the distribution of Röding's name from North Carolina (N 35° 20' - W 76° 00'), United States of America, to off Buenos Aires province coast (S 37°35' - W 55° 30'), Argentina in 100 m depth.

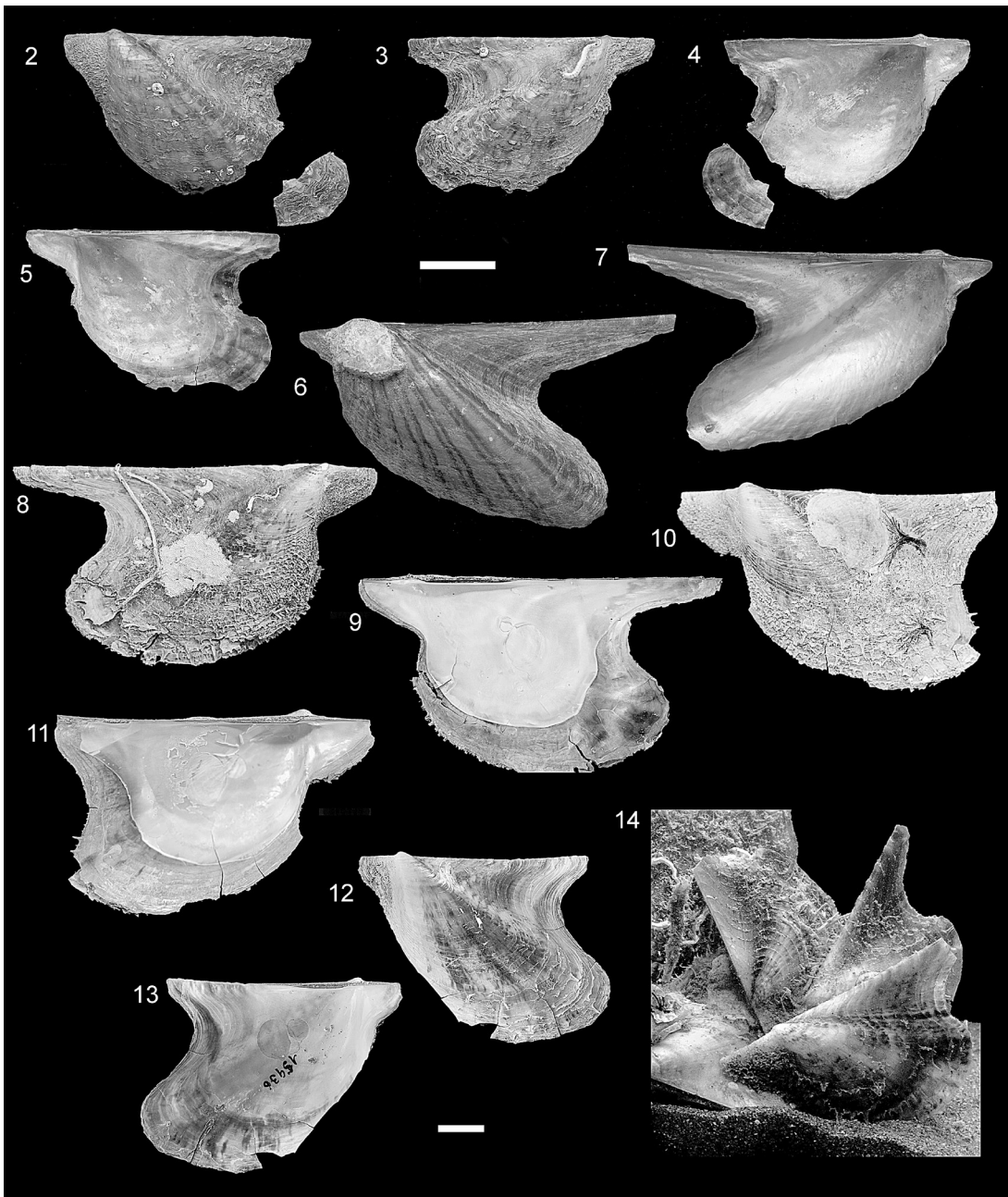
*Pteria colymbus* is characterized by a shell obliquely oval, fragile, thin, large, up to 80 mm of shell length, external surface smooth in the umbonal area, with very fine flat spines in radial rows, more aligned in the anterior part; concentric ridges present over all external surface; anterior auricle short, solid, with straight anterior edge; posterior auricle elongated; brown periostracum disposed in radial rows; internally nacreous, with wide non-nacreous margin; hinge line straight with one anterior tooth and one posterior socket in the left valve; one anterior socket and posterior ridge in the right valve.

## Comparative material examined

One complete specimen with the right valve broken, syntype of *P. hirundo* deposited in the Linnean cabinet, LSL 234; 2 valves, Santa Catarina Island, Brazil, MACN-In 29624; Uruguayan continental shelf, 29 complete specimens, 34°38'S, 52°15'W, 121-130 m, MACN-In 15936 (Figs. 12-13); 4 complete specimens, 34°42'S, 52°20'W, 112 m, MACN-In 16810; 14 complete specimens, S 34° 50' - W 52° 20', MACN-In 16662; 2 valves, S 34° 59' - W 52° 40', MACN-In 17632; 2 complete specimens, S 35° 15' - W 52° 35', 130 m, MACN-In 18195; 2 valves, S 35° 35' - W 52° 45', 130-149 m, MACN-In 22461; Argentine continental shelf, 5 complete specimens, S 36° 39' - W 55° 09', 50 m, MACN-In 38188; 6 complete specimens, S 36° 39' - W 55° 09', CNP-INV 182; 15 complete specimens, S 37° 35' - S - W 55° 30', 104 m, MACN-In 16712.

## DISCUSSION

Linnaeus (1758: 706, 1767: 1159) introduced the name *Mytilus hirundo* in the 10<sup>th</sup> and 12<sup>th</sup> edition of his "Systema Naturae" respectively. Later, Chemnitz (1785, vol. 8 pl. 81, figs. 722-728; 1788, vol. 10, pl. 171, fig. 1672) published and illustrated several species under the name



Figs. 2-14. **2-7:** Composite material of *Pteria hirundo* (Linnaeus, 1758), Syntype, LSL 234, scale bar = 1 cm; **8-14:** *Pteria colymbus* (Röding, 1798), **8-11, 14:** MACN-In 38188, specimens collected during the fieldwork; **12-13:** MACN-In 15936, scale bar = 2 cm.

*Mytilus hirundo* and varieties that Gmelin (1791: 3357) in the 13<sup>th</sup> edition, grouped again under the name *Mytilus hirundo*. This group was separated by Röding (1798: 167) and Lamarck (1801, 1819) who introduced several nominal species, including *Pteria colymbus*. Hanley (1855) and later

Dodge (1952) examined the Linnean collection and pointed out that *Mytilus hirundo* of Linnaeus is a composite species that was separated. Hanley (1855) mentioned previously that part of the examined lot belongs to the Mediterranean *Avicula tarentina*, and part, to *A. crocea*, both introduced

Table 1: Morphometric measurements of new records of *P. colymbus* during fieldwork

	Catalogue number	APL (mm)	DVH (mm)	APL/DVH
Type material	LSL 234 specimen assigned to <i>Pteria hirundo</i>	56.1	26.8	1.85
	LSL 234 specimen assigned to <i>Pteria colymbus</i> specimen 1	35.1	21.2	1.51
Additional material	MACN-In 38188 specimen 1	60.48	33.66	1.79
	MACN-In 38188 specimen 2	60.41	35.03	1.72
	MACN-In 38188 specimen 3	80.34	44.86	1.79
	MACN-In 38188 specimen 4	57.64	29.74	1.93
	MACN-In 38188 specimen 5	57.26	32.76	1.74
	CNP-Inv 182 specimen 1	44.76	27.41	1.63
	CNP-Inv 182 specimen 2	35.87	22.78	1.57
	CNP-Inv 182 specimen 3	40.74	22.64	1.79
	CNP-Inv 182 specimen 4	44.63	29.02	1.53
	CNP-Inv 182 specimen 5	40.29	23.75	1.69
CNP-Inv 182 specimen 6	37.52	23.51	1.59	

Table 2: Physical Parameters from the station where *Pteria colymbus* was collected

Date	Station	Lat.	Long.	Sampling depth	Sampling time	Bottom temperature	Bottom salinity
15-9-2009	22	S36°39.86	W55°09.77	50 m	25 min.	10.86°C	36‰

Table 3: Invertebrates and vertebrates collected with *Pteria colymbus* from station 22 (\* Egg capsules).

Phylum	Class	Family	Taxon	
Porifera	Demospongiae	Indeterminate	Gen et Spec. Indet.	
Cnidaria	Anthozoa	Corallimorphidae	<i>Corynactis</i> sp.	
Polychaeta		Aphroditidae	<i>Aphrodita longicornis</i> Kinberg, 1855	
		Chaetopteridae	<i>Chaetopterus</i> sp.	
Crustacea	Decapoda	Atelecyclidae	<i>Peltariom spinosulum</i> (White, 1843)	
		Diogenidae	<i>Dardanus insignis</i> (de Saussure, 1858)	
		Inachoididae	<i>Collodes rostratus</i> M. Edwards, 1878	
		Inachidae	<i>Eurypodius latreillei</i> Guérin, 1828	
		Inachoididae	<i>Leurocyclus tuberculatus</i> (M. Edwards & Lucas, 1842)	
		Epiplatidae	<i>Rochinia gracilipes</i> M. Edwards, 1875	
		Pinnotheridae	<i>Calyptraeotheres garthi</i> (Fenucci, 1975)	
			<i>Tummidotheres maculatus</i> (Say, 1818)	
			Platyxanthidae	<i>Platyxanthus patagonicus</i> M. Edwards, 1878
			Xanthidae	Gen et Spec. Indet.
Mollusca	Bivalvia	Mytilidae	<i>Mytilus platensis</i> d'Orbigny, 1846	
		Ungulinidae	<i>Diplodonta patagonica</i> (d'Orbigny, 1842)	
	Gastropoda	Calyptraeidae	<i>Crepidula argentina</i> Simone, Pastorino & Penchaszadeh, 2000	
			<i>Crepidula plana</i> Say, 1822	
Polyplacophora	Chaetopleuridae	<i>Chaetopleura angulata</i> (Spengler, 1797)		
		<i>Chaetopleura isabellei</i> (d'Orbigny, 1839)		
Echinodermata	Asteroidea	Astropectinidae	<i>Astropecten brasiliensis</i> (Müller & Troschel, 1842)	
Chordata	Elasmobranchii	Rajidae	<i>Psammobatis bergi</i> Marini, 1932 *	

by Lamarck (1819). Analyzing the suggestions of Hanley, Dodge (1952) concluded that the name *Pteria hirundo* (Linnaeus) long known as *A. tarentina* Lamarck, 1819, must be restricted to the Mediterranean Sea. He based his decision in the fact that Poli (1795) cited the specific epithet *hirundo* together with an illustration clearly assignable to the Mediterranean form, previously placed by Scopoli (1777) in *Pteria*. This was confirmed by Bucquoy et al. (1890) and Lamy (1935). In local literature, Doello Jurado (1938) adopted the name of Linnaeus and considered that the species living in the southwestern Atlantic is the same than the European taxon. However, he observed shell differences that attributed to intraspecific variation. After the analysis of the type material deposited in the LSL, we conclude that the single specimens of Linnean collection belongs to the European species *P. hirundo* (Figs. 6-7) and the complete specimen to the Atlantic species *P. colymbus* (Figs. 2-5). The shell morphology (Figs. 8-11, 14) coincides with the specimens collected by the R/V Puerto Deseado.

The conditions on which the new records of *P. colymbus* specimens were collected suggest a mixed bottom substrate dominated by sand and mud with a large sediment deposition coming from Rio de la Plata estuary. All revised lots deposited in the malacological collections were sampled along the mouth of Rio de la Plata estuary in a bathymetric range from 50 to 130 m depth (Fig. 1). This could suggest similar living conditions of all examined and sampled specimens of *P. colymbus* in the region. The association between pterids and other organisms were widely registered in several regions of the world. Mytilids, gorgonians and seagrass association were registered in the literature (e.g. Hedley, 1924; Mikkelsen et al., 2004; Morton, 1995; Temkin, 2006; Villafranca & Giménez, 2004; among others). These results coincide with the observed during our fieldwork where the specimens of *P. colymbus* were collected with a bottom dredge associated to banks of the mussel *Mytilus edulis* d'Orbigny. In addition, species belonging to Porifera, Cnidaria, Arthropoda, other Mollusca and Echinodermata were also sampled by the dredge at same station that specimens of *P. colymbus* (Table 3). The population abundance was not estimated during field work. However, specimens of *P. colymbus* were collected by the dredge only in one station of the field work off Buenos Aires coast. This might suggested a low abundance of the species. This study revised the taxonomic status of pterid species living in Argentine waters by the ex-

mination and illustration of the type material. Additionally, expands the range distribution and information of associated fauna of *Pteria colymbus*.

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