

Filling large gaps in distribution areas: the Philinidae of NW Spain

J.G.M. (HAN) RAVEN 

Research Associate, Naturalis Biodiversity Center, Leiden, The Netherlands; han.raven@naturalis.com.



RAVEN, J.G.M., 2023. Filling large gaps in distribution areas: the Philinidae of NW Spain. – *Basteria*, 87 (1): 97-106. Leiden. Published 20 March 2023.

Abstract

Based on sampling from beaches and shallow water 8 species of Philinidae are recorded from the Cantabrian Sea (NW Spain). Several are first records for NW Spain and/or SW France, filling a large gap in known distribution areas: *Philine angulata* Jeffreys, 1867, *P. denticulata* (J. Adams, 1800) and *P. intricata* Monterosato, 1884. The first records of *P. iris* Tringali, 2001 from the Cantabrian Sea and western France represent a substantial expansion from its known distribution range. Besides *P. quadripartita* Ascanius, 1772 all species have shells that are only a few millimetres long which likely caused several to be overlooked. Literature records from deep water bring the total number of species from the study area to 11.

Resumen

Basado en un muestreo de playas y aguas someras se citan 8 especies de Philinidae del Cantábrico (NO de España). Varias son primeras citas del NO de España y/o SO de Francia., rellenando un gran vacío en sus áreas de distribución conocidas: *Philine angulata* Jeffreys, 1867, *P. denticulata* (J. Adams, 1800) y *P. intricata* Monterosato, 1884. Las primeras citas de *P. iris* Tringali, 2001 del Cantábrico y occidente de Francia representan una expansión substancial de su área de distribución conocida. Aparte de *P. quadripartita* Ascanius, 1772 todas las especies tienen conchas de solo unos milímetros de largura, probablemente la causa por la cual varias especies han pasado desapercibidas hasta ahora. Citas en la literatura de aguas profundas elevan el número de especies del área de estudio a 11.

Key words: *Philine*, *Hermania*, Spain, Asturias, Cantabria.

INTRODUCTION

Philinidae generally have a fragile shell that is small compared to the body size, there is no operculum, and the per-

iostracum is lost quickly after death. Philinidae are mostly carnivorous. A good overview of NE Atlantic species is given in Ohnheiser & Malaquias (2013) who documented the animals and their shells. In the guide of European molluscs (Alf et al., 2020) only four species of Philinidae are documented: *Hermania scabra* (O. F. Müller, 1784), *Philine catena* (Montagu, 1803), *P. punctata* (J. Adams, 1800) and *P. quadripartita* Ascanius, 1772. The same four species have been recorded from the Basque Country (Borja & Muxica, 2001; Urgorri et al., 2017). Cadée (1968) and Rolán (1983) recorded these species from shallow water in Galicia. Trigo et al. (2018) also record four species from Galicia, but one is different (*Philine catena*, *P. iris* Tringali, 2001, *P. punctata* and *P. quadripartita*). Based on further sampling in Asturias and Cantabria and the review of collections it became clear more species inhabit this area. See Table 1 for an overview of literature records and new data.

MATERIAL AND METHODS

Shells were collected along the coast of Asturias and Cantabria. An introduction on the main sampling points is given in Alonso & Raven (2020). The most intense collecting was done around Gijón in Asturias (Fig. 1). Although the observations stretch over the last five decades, most observations are from the last 20 years and based on shell grit



Fig. 1. Map of NW Spain and surrounding seas. Key sample localities in yellow. Note the narrow continental shelf along the western and northern sides of the Iberian peninsula, and the wide shelf along the northern side of the Bay of Biscay. Base map Google Earth.

Species	Lista	Atlantic Ocean		Bay of Biscay			
	Patrón			Cantabrian Sea			
	Norte	Galicia Bank	Galicia	Asturias	Can-tabria	Basque region	Deep water
Philinidae (11 species)							
<i>Hermania scabra</i> (O.F. Müller, 1784)	LP	•	• C, H, R	• H	•	• BM, U	L
<i>Philine angulata</i> Jeffreys, 1867				•	•	•	
<i>Philine approximans</i> Dautzenberg & H. Fischer, 1896	LP	S					
<i>Philine catena</i> (Montagu, 1803)	LP		C, R, T	•	•	• BM, U	L
<i>Philine denticulata</i> (J. Adams, 1800)					•		
<i>Philine intricata</i> Monterosato, 1884				•	•	•	
<i>Philine iris</i> Tringali, 2001			T	•	•	•	
<i>Philine monterosati</i> Monterosato, 1874	LP						B, H
<i>Philine punctata</i> (J. Adams, 1800)	LP		• C, R, T	•	•	BM, U	
<i>Philine quadripartita</i> Ascanius, 1772	LP		• C, R, T	•	•	• BM, U	
<i>Philine talismani</i> Sykes, 1905	LP						L
	7	2	5	7	8	7	4
Laonidae (3 species)							
<i>Laona pruinosa</i> (W. Clark, 1827)		G, U	R, T				
<i>Laona quadrata</i> (S. Wood, 1839)	LP	G, U		O			L, PV
<i>Retusophilina lima</i> (Brown, 1827)			R				

Table 1. Records of Philinidae and Laonidae from NW Spain. The dots indicate records from the present study. Other records are literature data: B = Bouchet (1975); BM = Borja & Muxica (2001); C = Cadée (1968); G = Gofas et al. (2021); H = Hidalgo (1917); L = Locard (1897); LP = Lista Patrón (version 2017; introduced in Gofas et al., 2017); O = Ortea (1977); PV = Pruvot-Fol (1954); R = Rolán (1983); S = Serrano (2014); T = Trigo et al. (2018); U = Urgorri et al. (2017). In bold typeface the total number of Philinidae species recorded per area.

collected from beaches. Besides this, rocky littoral areas, shallow subtidal (snorkelling, scuba diving) and estuaries were sampled, but this delivered hardly any additional records. Only shells have been collected, no living specimens. Recently, the author and Alvaro Alonso (Gijón) collected mud in the yacht harbour of Gijón (Asturias) using a Van Veen grab constructed by Alvaro, which demonstrated at least four species live there. The material is kept in the private collection of the author.

Subsequently material from other collections was reviewed. This includes the private collections of Joop Eikenboom, Dick Hoeksema and George Simons. Dick Hoeksema, Hans Keukelaar and Els and George Simons reviewed shell grit collected at Salvé beach in Laredo by various Dutch collectors: A. Haandrikman, G. Geuze, F. van Nieulande and R. Outryve. Lots identified as *Philine intricata* Monterosato, 1884 from western France were checked. Lots of *Philine catena* (Montagu, 1803) from western France and Ireland were included to check on the possible presence of *Philine iris*. Quite a number of lots were found to be misidentified or to comprise shells of other species. All concern empty shells, only the record of *Philine quadripartita* from

the Villaviciosa estuary concerns living specimens.

Abbreviations and acronyms

- A Alvaro Alonso Suárez, Gijón, Asturias, Spain
- BOS Biological Collection, Zoology, Department of Organisms and Systems, Oviedo University, Oviedo, Asturias, Spain
- Ca M.C. Cadée (Naturalis)
- Co M. van Couwelaar (Naturalis)
- E Joop Eikenboom, Brielle, The Netherlands
- H Dick Hoeksema, Middelburg, The Netherlands
- HH H.J. & J. Hoenselaar (Naturalis)
- Naturalis Naturalis Biodiversity Center (Leiden, The Netherlands).
- OS Omar Sánchez, Oviedo, Asturias, Spain
- R Han Raven, The Hague, The Netherlands
- S George Simons, Middelburg, The Netherlands
- V A. Verduin (Naturalis)
- VA J.J. van Aartsen (Naturalis)
- VL J. van der Linden (Naturalis)
- Z B. Zoder (Naturalis)

For each species a short description of material found is given, as well as information on their distribution. The collection numbers are preceded by the initials of the owner, the number after the slash refers to the number of specimens).

Most Philinidae have a marked spiral sculpture of pits or ovals. With size additional spirals appear in between others, first a narrow line, then small pits, quickly growing to the normal size. Towards the base and apex the spirals become narrower.

SYSTEMATIC RESULTS

Family Philinidae Gray, 1850

Genus *Hermania* Monterosato, 1884

Hermania scabra (O. F. Müller, 1784)

Figs 2-4

Material examined. — **Spain**, GALICIA: Galicia Bank, OMEX II.CO, 154 m, 42°66283N 9°47333W (RMNH.MOL.117195/1); A CORUÑA: 2.7 km SE of Polvos, 45-55 m depth, leg. G.C. Cadée (E 17805/4); ASTURIAS: San Lorenzo beach, Gijón, leg. Ca (RMNH.MOL.231038/2), leg. HH (ZMA.MOLL.2273381/9), leg. R (R 1197, 3 sp.); CANTABRIA: El Sardinero beach, Santander, leg. E (E 9638/4); Salvé beach, Laredo (H 3770/115; S 5860/3), leg. E (E 17498/2), leg. HH (ZMA.MOLL.2273382/145), leg. R (R 1318/5); NW side of isthmus, Laredo, leg. HH (ZMA.MOLL.21403/8); **France**, PYRÉNÉES-ATLANTIQUES: Hendaye, leg. HH (ZMA.MOLL.2273429/1).

Description. — The shell of this species is characterised by an elongate, almost cylindrical shell that can be up to 15 mm long, albeit in this study only shells up to 4 mm long have been recorded from the Cantabrian Sea. The shell is matt, but may have a transparent zone above the middle. Its surface has rather coarse spirals formed by relatively large ellipse shaped pits. On some specimens the spirals of pits leave only narrow spaces in between (Fig. 4).

Remarks. — Juveniles can be wider, with an outline similar to adult *Philine catena* (Montagu, 1803), but the sculpture demonstrates it concerns *Hermania scabra* (Fig. 4). Ohnheiser & Malaquias (2013) described a cryptic sister species *Hermania indistincta* from mud between 18-20 m in Norway that cannot be differentiated based on the shell, but that has a different anatomy and genetics. Both *H. scabra* and *H. indistincta* have their type localities in northern Europe (Denmark and/or Norway for *H. scabra*), but the latter species has thus far only been recorded from Norway and the Barents Sea, Russia (Chaban *et al.*, 2015) so here it is assumed that all records from NW Spain concern *H. scabra*.

Hermania scabra lives on mud, sand and shell gravel at depths to 900 m, from Greenland to western Africa and the Mediterranean (Ohnheiser & Malaquias, 2013). Locard (1897) recorded the species from deep water (375 – 1081 m) north of the study area. Hidalgo (1917) recorded the species from Vigo (Galicia) and Gijón (Asturias). Although Cadée (1968) and Rolán (1983) also recorded specimens from the Arousa and Vigo bays, it was not included in Trigo *et al.* (2018). Borja & Muxica (2001) recorded it from the yacht harbour of Bilbao (Basque Country). Specimens were found in shell grit at San Lorenzo beach, Gijón and at Laredo, and also at Hendaye, just across the border from the Spanish Basque Country. A lot from deep water at the Galicia Bank, NW of Galicia is the first record of this species from that area.

Genus *Philine* Ascanius, 1772

Philine angulata Jeffreys, 1867

Figs 5-8

Material examined. — **Spain**, ASTURIAS: Puerto de Figueras, Castropol, leg. OS (OS 1118-MU/3); CANTABRIA: Salvé beach, Laredo (H 3769/42; S 5859/13), leg. E (E 17762/4), leg. HH (ZMA.MOLL.2273468/17); **France**, PYRÉNÉES-ATLANTIQUES: Hendaye, leg. HH (ZMA.MOLL.6271/1); CÔTES-D'ARMOR: Trébeurden, leg. E (E 17786/1).

Description. — A small shell (L to 2.5 mm) with a characteristic squarish outline and a marked keel, the flaring upper edge has a pointed end, from the rather straight outer edge that sharply bends into straight lower edge. There is a marked knob high on the columella. Shell opaque, with a broad translucent band above the middle. The protoconch is visible in very young specimens (Fig. 6), in older specimens it is largely covered by the teleoconch.

Remarks. — The surface is covered with narrow spirals formed by elongated pits that mostly fuse forming grooves (Ohnheiser & Malaquias, 2013: fig. 2). The outline and the fused pits differentiates this species from *P. punctata* which as a more rounded shell with spirals of unfused pits.

This is a species mostly known from mud to coarse sand and shell gravel on the deeper parts of the shelf and continental slope, in NE USA, northern Europe, western Africa and the Mediterranean (Gofas *et al.*, 2011; Ohnheiser & Malaquias, 2013). There are no published records from the Atlantic coast of SW Europe. Numerous specimens were found at the beach of Laredo. Also, three specimens were recovered by Oman Sánchez from 17 m deep in the harbour of Figueras in the Eo estuary in westernmost Asturias using a Van Veen grab. And one specimen was found in shell grit on the beach of Hendaye in France. This demonstrates that the species clearly also lives in shallower waters, including estuaries.



Figs 2-4. *Hermania scabra* (O. F. Müller, 1784). **2a-c.** San Lorenzo beach, Gijón, Asturias, Spain, leg. R (L 3.8 mm; R 01197/001). **3-4.** Salvé beach, Laredo, Cantabria, Spain, leg. HH. **3.** (L 2.8 mm; ZMA.MOLL.21403). **4.** (L 2.4 mm; ZMA.MOLL.21403). **Figs 5-8.** *Philine angulata* Jeffreys, 1867. **5-6.** NW side of isthmus, Laredo, Cantabria, Spain. **5a-c.** Leg. HH (L 1.9 mm; ZMA.MOLL.2273468). **6a-b.** Juvenile (L 0.8 mm; H 3769). **7a-b.** Trébeurden, Cotes-d'Armor, France, leg. E (L 2.5 mm, E17786). **8a-b.** Hendaye, Pyrénées-Atlantiques, France, leg. HH (L 3.4 mm; ZMA.MOLL.66271). **Fig. 9a-c.** *Philine denticulata* (J. Adams, 1800), Salvé beach, Laredo, Cantabria, Spain, leg. HH (L 1.6 mm; ZMA.MOLL.2278831). **Figs 10-11.** *Philine intricata* Monterosato, 1884. **10a-c.** Yacht harbour, Gijón, Asturias, Spain, leg. R & A (L 1.6 mm; R 02349). **11a-b.** Salvé beach, Laredo, Cantabria, Spain, leg. E (L 1.5 mm; E 17752).

***Philine catena* (Montagu, 1803)**

Figs 12-14

Material examined. — **Spain**, GALICIA: Vigo Bay, E. Rolán (ZMA.MOLL.2273410/1); ASTURIAS: Peñarronda beach, Tapia de Casariego, leg. R (1 sp., not kept); Luarca, leg. HH (ZMA.MOLL.2273399/1); El Arbeyal beach, Gijón, leg. R (R 02257/4); Poniente beach, Gijón, leg. R (R 01159/1); yacht harbour, Gijón, leg. R & AA (R 02346/14); San Lorenzo beach, Gijón, leg. Ca (RMNH.MOL.231035/17), leg. HH (ZMA.MOLL.2274318/49), leg. R (R 01196/37); Lastres, Colunga, leg. R (R 00860/2); La Isla, Colunga, leg. R (R 01602/1); La Franca, 10 km E of Llanes, leg. E (E 10956/78); Ria de Tina Mayor, leg. E (E 17434/3); CANTABRIA: El Sardinero beach, Santander, leg. E (02966/1); Los Peligros beach, Santander, leg. R (1 sp., not kept); Santander, leg. V (RMNH.MOL.21379/1); Ris beach, Noja, leg. R (R 01830/19); Salvé beach, Laredo (H 3771/>100; S 5961/40), leg. HH (ZMA.MOLL.2273425/14), leg. R (R 01317/1); NW side of isthmus, Laredo, leg. HH (ZMA.MOLL.21394/5); **France**, PYRÉNÉES-ATLANTIQUES: Hendaye, leg. HH (ZMA.MOLL.2273428/26); CHARENTE-MARITIME: Ile-d'Oléron, leg. H. van Haren (RMNH.MOL.232083/1); Vertbois, Ile-d'Oléron, leg. E (E 00536/4); MORBIHAN: leg. H. van Haren (RMNH.MOL.323984/2), leg. V (RMNH.MOL.21381/24), leg. Z (RMNH.MOL.231069/1); Penthièvre, leg. E (E 07539/3); Kerhorstin, Quiberon, leg. F.J. Janssen (RMNH.MOL.231033/5); FINISTÈRE: Ile Tudy, Loctudy, leg. E (E 07607/4); CÔTES-D'ARMOR: St. Jacut, leg. E (E 12538/2); **Ireland**, GALWAY: Gurteen Bay, 5 km W of Roundstone, Connemara, leg. Han Reudink (R 01677/9).

Description. — The medium elongate shell of this species (L to 6 mm, but in the study area only to 4 mm) has a uniform matt surface with narrow chain-like spirals formed by long and narrow ovals.

Remarks. — The similar species, *Philine iris*, was generally overlooked. It has generally broader spirals of wide and short ovals (see further under *Philine iris*). *Philine catena* is known from tidal pools and beach down to 2000 m, from northern Norway to the Canaries and the Mediterranean (Ohnheiser & Malaquias, 2013). Locard (1897) recorded it from a drag at 1081 m north of Cape Matxitxako near Bilbao. Borja & Muxica (2001) recorded it from the Basque Country and Gofas et al. (2017) include it in their listing of species from their 'northern region' of Spain, but for several of these records it is unclear whether they refer to *P. catena* or *P. iris*, as the latter species has only recently been described and its shells have generally been recorded as *P. catena* with which it generally co-occurs. Shells were collected at various points in Asturias and Cantabria, mostly from shell grit, but also several fresh shells from the mud of the yacht harbour of Gijón where it lives syntopic with *P. iris*. Lots from western France confirm that also there it generally lives sympatric with *P. iris*.

***Philine denticulata* (J. Adams, 1800)**

Fig. 9

Material examined. — **Spain**, CANTABRIA: Salvé beach, Laredo (H 3773/25; S 1846/18), leg. E (E 25391/3), leg. HH (ZMA.MOLL.2273431/5), leg. R (R 02479/1).

Description. — This is a very small species (L to 1.5 mm) that has a transparent shell with a clearly protruding apex and strong shoulder. The flat shoulder has a thick inner spiral rib and a very slender riblet on the periphery, both ending in a minute spine. The surface is smooth, with microscopic spiral lines.

Remarks. — The species has been recorded from intertidal to shallow subtidal mud, sand and shell gravel in northern Europe (Norway, Denmark, British Isles) and the Mediterranean (Ohnheiser & Malaquias, 2013). Numerous specimens were found in very fine shell grit at Laredo (Cantabria), the first record from NW Spain, filling a large gap in the distribution area of this species.

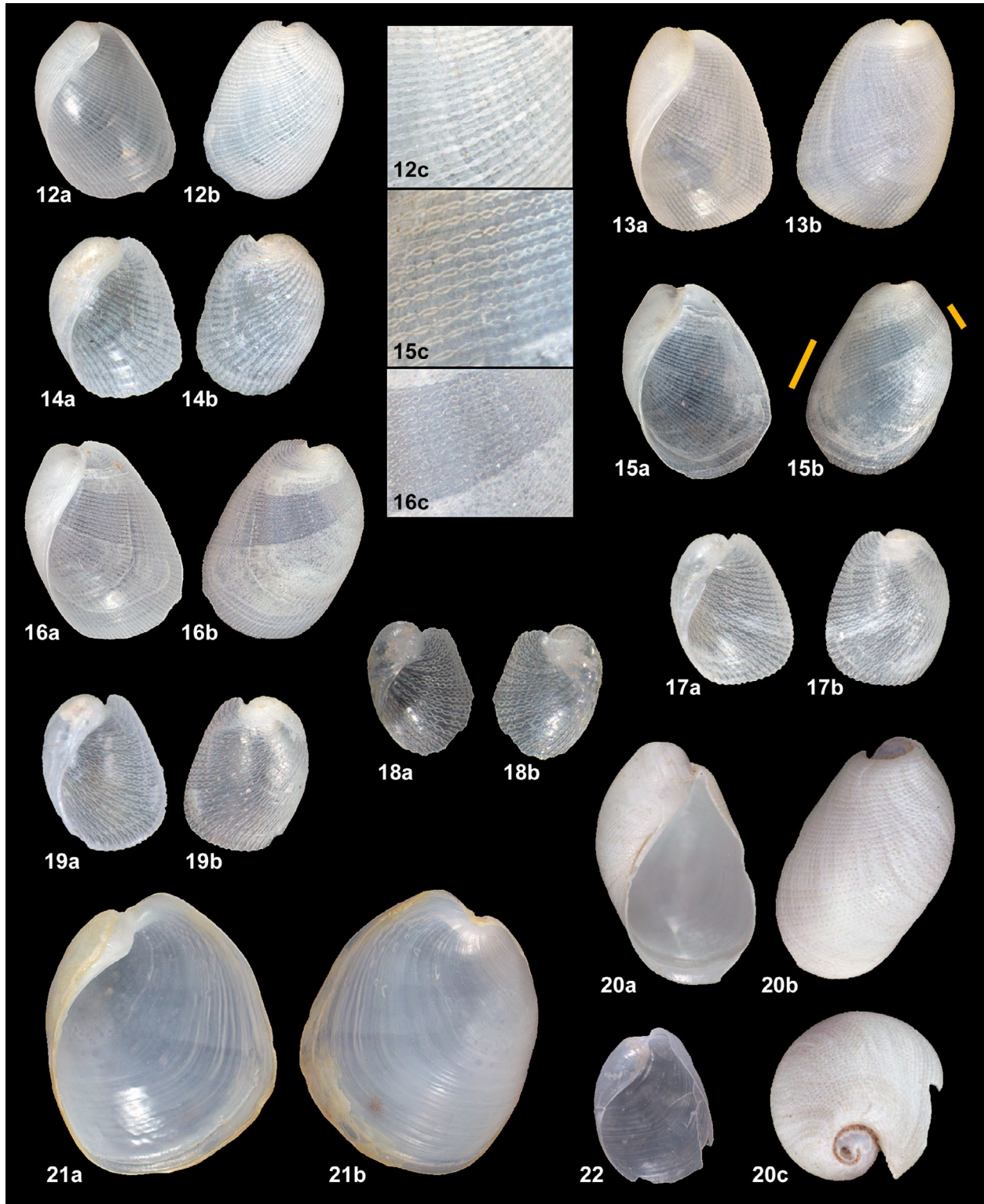
***Philine intricata* Monterosato, 1884**

Figs 10-11

Material examined. — **Spain**, ASTURIAS: Yacht harbour, Gijón, leg. R & AA (R 02349/2); San Lorenzo beach, Gijón, leg. Ca (RMNH.MOL.347736/1), leg. HH (ZMA.MOLL.2273394/1); CANTABRIA: Salvé beach, Laredo (H 5132/2), leg. E (E 17752/2); **France**, PYRÉNÉES-ATLANTIQUES: Hendaye, leg. HH (ZMA.MOLL.2273396/1); MORBIHAN: Penthièvre, Quiberon, leg. E (E 17810/1); CÔTES-D'ARMOR: Trébeurden, leg. E (E 7618/2).

Description. — Shells (L to 3 mm, most much smaller) of this species have a marked broad apical part of the aperture on which the spiral ribs curve towards the apex, forming a serrated edge. The spirals are formed by small circles and ovals. Also characteristic are the squarish outline in ventral view, and depressed shape in apical view. The upper half of the narrow spire is bordered by a ridge, separated by a groove. In mature specimens, near the apex the ridge curves outward, forming a narrow or somewhat thickened apertural edge. The ridge is the best character to differentiate it from *Philine catena*.

Remarks. — Two fresh shells were collected from the mud of the yacht harbour of Gijón where it lives. Several more specimens were found in the shell grit from San Lorenzo beach in Gijón, from Laredo and various localities in western France. Although the species has a distribution from French Brittany to the Canary Islands, Cape Verde and the Mediterranean (Van der Linden, 1994), thus far no records were known from NW Spain or SW France.



Figs 12-14. *Philine catena* (Montagu, 1803). **12a-c.** Poniente beach, Gijón, Asturias, Spain, leg. R (L 2.8 mm; R 01159/001). **12c.** Detail of the sculpture. **13a-b.** Salvé beach, Laredo, Cantabria, Spain (L 3.2 mm; S 5861). **14a-b.** Juvenile, Quiberon, Morbihan, France, leg. VA (L 1.0 mm; RMNH.MOL.21381). **Figs 15-19.** *Philine iris* Tringali, 2001. **15-17.** San Lorenzo beach, Gijón, Asturias, Spain. **15a-c.** Leg. R (L 2.9 mm; R 01605/001), the yellow lines indicate the transparent band. **15c.** Detail of the sculpture. **16a-c.** Leg. HH (L 2.7 mm; ZMA.MOLL.2272381). **16c.** Detail of the sculpture. **17a-b.** Juvenile (L 1.1 mm; ZMA.MOLL.2273429). **18a-b.** Juvenile, Salvé beach, Laredo, Cantabria, Spain (L 0.75 mm; H 3771). **19a-b.** Juvenile, Quiberon, Morbihan, France, leg. VA (L 0.9 mm; RMNH.MOL.21381). **Figure 20a-c.** *Philine punctata* (J. Adams, 1800), yacht harbour, Gijón, Asturias, Spain, leg. R (L 2.3 mm; R 02348/001). **Figures 21-22.** *Philine quadripartita* Ascanius, 1772, Salvé beach, Laredo, Cantabria, Spain. **21a-b.** Fresh adult shell with periostracum (L 12.3 mm; S 1111); **22.** Juvenile, Leg. R (L 2.1 mm; R 01301/001).

***Philine iris* Tringali, 2001**

Figs 15-19

Material examined. — **Spain**, ASTURIAS: Luarca, leg. HH (ZMA.MOLL.2273412/1); El Arbeyal beach, Gijón, leg. R (R 02258/1); Poniente beach, Gijón, leg. R (R 1604/7); yacht harbour, Gijón, leg. R & AA (R 02347/13); San Lorenzo beach, Gijón, leg. Ca (RMNH.MOL.347737/83), leg. HH (ZMA.MOLL.434986/> 100), leg. R (R 01605/113); La Isla, Colunga, leg. R (R 1603/4); La Franca, 10 km E of Llanes, leg. E (E 26748/37); Ria de Tina Mayor, leg. E (E 26750/10); CANTABRIA: Santander, leg. V (RMNH.MOL.347732/10); Ris beach, Noja, leg. R (R 01829/4); Salvé beach, Laredo (H 5131/>100 sp.; S 5862/~100), leg. E (E 11893, 17499, 23 exx), leg. HH (ZMA.MOLL.2273424/23), leg. R (R 1606/12); GUIPÚZCOA: Zarauz, leg. V (RMNH.MOL.21388/10); **France**: Hendaye, leg. HH (ZMA.MOLL.2273422/66); CHARENTE-MARITIME: Vertbois, Ile-d'Oléron, leg. E (E 26749/9); **France**, MORBIHAN: Quiberon, leg. E (E 26751/7), leg. J. van Dalsum (RMNH.MOL.232987/2), leg. H. van Haren (RMNH.MOL.347735/12), leg. V (RMNH.MOL.347730/14), leg. Z (RMNH.MOL.347733/4); Penthievre, Quiberon, leg. V (RMNH.MOL.21380/1).

Description. — Shell small (L to 3 mm), stout, opaque with a transparent band above the middle, broad spirals of ovals that are up to twice as long as wide.

Remarks. — According to previous publications (e.g. Gofas et al., 2011), the shells of *Philine iris* can be differentiated from those of *P. catena* by the chain-like spirals which have short ovals (less than twice longer than wide) in *P. iris* and long ones (two to three times longer than wide). Also, *P. catena* generally has a more elongated shell (well visible in Fig. 13, but not all are so long, e.g. Fig. 12). Reviewing numerous large lots from NW Spain and western France the spirals were found to be wider in *P. iris*, but also variable, in specimens of both species and on individual shells where the ovals become more elongated along spirals as the shell grows, and across the shell towards the base and the apex. Therefore it is important to always focus on the same part of each shell, preferably just above the middle. Also, both the spirals and interspaces are wider in *P. iris*, whereas in *P. catena* the interspaces may become narrow lines.

It was noticed most shells have three zones: opaque above and below, transparent in between (indicated by the yellow lines in Fig. 15b), whereas a poorly defined patch near the apex may also be transparent. Consistently these shells are short and have wide and short ovals, thus representing *Philine iris*. The shells of *P. catena* have a uniform opaque surface with narrower spirals of more elongated ovals. Fresh, juvenile shells of both species are generally fully transparent and have shorter ovals, which makes them somewhat harder to classify. Still the general rule applies: those with wider and shorter ovals are *P. iris*, those with narrower and longer ovals are *P. catena*. Juvenile specimens

of both species are figured in Scaperotta et al. (2013: 105, 107, 174), showing the same differences.

The separation of shells with this zonation helps in making a first split within a lot. Even very juvenile shells may show the zonation. This zonation is not seen in figured specimens of *P. iris* from the south, including the Mediterranean (e.g. Tringali, 2001; Gofas et al., 2011). It was found to be easier to split large lots with both species as they better document the full range in variability at a specific locality.

According to Van der Linden (1995), based on his study of material from the CANCAP expedition to the Canary Islands, fresh shells of *Philine* are fully transparent and after death the matt zones spread from top and base of the shell. Shells from the Cantabrian Sea, however, consistently are transparent, fully opaque or opaque with a well-defined, sharply bordered transparent zone. This indicates that post-mortem, in seawater, the shells soon become opaque, except for a pre-defined zone, which in *P. iris* is always present in the same position. Such zones are seen in other species of Philinidae and may not always be species specific, but for the material of the Cantabrian Sea they are a useful character.

Study of live collected animals can further confirm the validity of using the zonation to differentiate between shells of both species. *Philine iris* has a uniformly bright red coloured animal, whilst that of *P. catena* is whitish with fine red and yellow speckles (Ballesteros et al., 2022).

Juvenile *Hermania scabra* can be differentiated from *P. iris* based on their more cylindrical outline and the flat upper part of the shell, besides the much larger ovals.

Philine iris has been described from Morocco (Tringali, 2001), but was recognised in samples from a much larger area, including the western Mediterranean and nearby Atlantic (Gofas et al., 2011). It was recorded as occurring throughout Galicia by Trigo et al. (2018), without mention of any specific localities. It is not included in the 'northern section' in the listing of Gofas et al. (2017). It has generally not been differentiated from *P. catena* and a further review of lots of that species from the eastern Atlantic is required to establish its northward distribution.

Herein the first records from the Cantabrian Sea are given, where it is a widespread and locally abundant species, generally together with and more abundant than *P. catena*. Records are also provided from western France, again together with *P. catena*. No *P. iris* were found in lots of *P. catena* from Connemara, Ireland in the author's collection. Specimens were found together with other species of *Philine* on numerous beaches bordering sandy embayments. Fresh specimens were also found in a tidal pool at El Arbeyal beach (Gijón) and in mud of the yacht harbour (Gijón). Gofas et al. (2019) state the species does not occur in soft sediment but on hard substrate in sediment retained in biological concretions. Scaperotta et al. (2013) record it from infralittoral sandy and slimy substrates. In the Cantabrian Sea it lives in various habitats.

***Philine punctata* (J. Adams, 1800)**

Fig. 20

Material examined. — **Spain**, ASTURIAS: Puerto de Figueras, Castropol, leg. OS (OS 295-MU/1); Serantes beach, 2 km SW of Tapia de Casariego, leg. R (R 00973/1); Cudillero, leg. Co (ZMA.MOLL.66129/1); Bañugues beach, Gozón, leg. OS (OS 295-K/1); yacht harbour, Gijón, leg. R & AA (R 02348/7); San Lorenzo beach, Gijón, leg. Ca (RMNH.MOL.347738/1), leg. E (E 11984 + 17502, 6 exx), leg. HH (RMNH.MOL.2273443/4), leg. OS (OS 295-C/3), leg. R (R 1714/1); La Franca, 10 km E of Llanes, leg. E (E 17808/10); CANTABRIA: Ris beach, Noja, leg. R (R 01831/1); Salvé beach, Laredo (H 3772/>100, S 5858/60), leg. HH (ZMA.MOLL.2273442/ ~70), leg. R (R 1319/4); **France**, MORBIHAN: Quiberon, leg. V (RMNH.MOL.347731/1); leg. Z (RMNH.MOL.347734/3); CÔTES-D'ARMOR: Trébeurden, leg. E (E 17759/7).

Description. — Small shell (L to 3 mm) with squarish-oval outline, apex obtuse; shell opaque, in some specimens with a transparent band above the middle; spiral sculpture of small, separated pits.

Remarks. — The species is known from mud to gravel between 6 and 200 m from the Arctic to the Mediterranean (Ohnheiser & Malaquias, 2013). The records from Asturias and Cantabria are from beached shell grit, apart from the specimen from Cudillero, which was collected in a tidal pool, and those from the mud of the yacht harbour of Gijón. Borja & Muxica (2001) recorded it from the Basque Country.

***Philine quadripartita* Ascanius, 1772**

Figs 21-22

Material examined. — **Spain**, A CORUÑA: SW of Punta de Sinas, Ria de Arousa, leg. G.C. Cadée (E 16572/3); 3 km SW of Villajuan, leg. G.C. Cadée (E 16689/1 broken adult, 11 juv.); ASTURIAS: El Puntal, Villaviciosa estuary, living specimens, leg. Nuria Anadón (BOS-MOL-GAS-309-886); CANTABRIA: Salvé beach, Laredo (H 3768/1 adult & >100 juv.; S 1111/2 adult, & 43 juv.), leg. E (E 13059 + 17470, 1 adult, 5 juv.), leg. HH (ZMA.MOLL.2278831/32 juveniles), leg. R (R 01301/11 of which 10 juveniles); **France**, PYRÉNÉES-ATLANTIQUES: Hendaye, leg. HH (ZMA.MOLL.2273395/1 juv.); CÔTES-D'ARMOR: St. Cast, leg. E (E 12350/1 adult); St. Jacut-de-la-Mer, leg. R (R 00051a/1); ILLE-ET-VILAINE: Vildé-la-Marine, leg. E (R 00051a/2).

Description. — Oval shaped shell (L up to 17 mm, in the study area max. 12 mm), very wide aperture, apex slightly sunken, shell smooth apart from growth lines.

Remarks. — This species was commonly identified as *Philine aperta* (Linnaeus, 1767), but that is a species from South Africa (Price et al., 2011). *Philine quadripartita* has a much larger shell than all others here discussed.

Although adult specimens of this species can be recognised in the field we only found shells of juvenile specimens at a single locality (Laredo, Cantabria). In 1981 Nuria Anadón collected 14 living specimens near El Puntal, on the west bank of the Villaviciosa estuary (pers. comm. Omar Sánchez).

Hidalgo (1917) recorded it from Gijón, Santander and Guetaria and various localities in Galicia. Flor (1981) recorded it from San Lorenzo beach, Gijón. Borja & Muxica (2001) recorded it from the Basque Country. It is not uncommon in Galicia (Rolán, 1983; Rolán & Otero-Schmitt, 1996). However, it has not been recorded in popular guides for Cantabria and Asturias (Palacios & Vega, 1997; Mexia, 2000), confirming its rarity there.

DISCUSSION

Herein 11 species of Philinidae are recorded from NW Spain, of which 8 in the shallow waters of the Cantabrian Sea. Of these only the shell of *Philine quadripartita* is large enough to be recognised in the field (*Hermania scabra* can reach 15 mm, but only much smaller specimens have been recorded from Asturias and Cantabria). All others are only a few millimetres long and require substantial magnification for proper identification. Shape and sculpture are key differentiating characters. For *Philine angulata*, *P. denticulata* and *P. intricata* this are the first records from NW Spain. For *P. iris* the first records from the Cantabrian Sea and western France are provided, but it would be good to get further confirmation through living animals.

Mud collected from a very small area (several square metres only) in the Gijón yacht harbour at a depth of 3 metres (reference Nivel Medio del mar, NM) delivered 4 species, which therefore are interpreted to live syntopic.

The rich shell grit found on the beach of Laredo delivered 8 species of *Philine*, making it the locality with most species of this genus in NW Spain. This 4 km long beach borders a wide sandy embayment with deeper water nearby, but part of the shells may originate from the sandy and muddy habitats in the estuary of the Tretro river which flows into the sea at the northern tip of the beach. Therefore it is not sure how many of these species live sympatric. The shell grit on the beach comprises shells of the larvae of many mollusc species, which suggests the estuary and embayment are good breeding grounds.

The records of Philinidae from the Cantabrian Sea discussed above are from shallow water. The Cantabrian Sea covers the narrow continental shelf (to 200 m water depth), beyond which the water depth drops quickly to 4,000 m, from which the literature records several deepwater species.

A single specimen of *Philine monterosati* Monterosato, 1874 has been recorded from the station Thalassa W343 at

505 m, offshore Cantabria (Bouchet, 1975), but the given coordinates (44°20'N, 2°07'W) do not fit with the recorded depth (Alvaro Alonso pers. comm.). Hidalgo (1917) also recorded it from 180 m depth in the "Golfo de Gascuña" (= southeastern part of the Bay of Biscay) but no specific locality is given.

Locard (1897) recorded 3 mm high specimens of "*Philine striatula*" from deep water dredging in the Bay of Biscay by the "Travailleur" expedition in 1880 (Fig. 23). The shell has a shape unlike that of any of the species described herein, with a very wide and obtuse upper part and rather narrow aperture, and a sculpture of widely spaced, narrow spirals of small partially rounded pits. Specimens were recorded from drag 9 at 1100 m offshore from Suances (Cantabria) and drags 11-15 at 335-667 m offshore from respectively Bilbao and San Sebastián (Basque Country). MolluscaBase (2022b) clearly describes how there has been confusion about this name and *Philine striatula* Monterosato, 1874, because both are based on a manuscript name by Jeffreys. Monterosato's species was described from Sicily. The shells dredged in the Bay of Biscay remain an enigmatic species that was renamed as *Philine talismani* Sykes, 1905. Locard (1897) states that based on material from the Porcupine expedition Jeffreys named it in his manuscript (but never formally described it), and that Jeffreys confirmed the specimens from the Travailleur expedition belong to the same species.

Philine approximans Dautzenberg & H. Fischer, 1896 has been recorded from the Galicia Bank, to the W of Galicia (Fig. 1; Serrano, 2014).

Some species have long been classified within the genus *Philine*, but as they lack gizzard plates they are now included in a separate family, the Laonidae (Oskars et al., 2015; MolluscaBase 2022a). *Retusophilina lima* (Brown, 1827) was recorded from deep water at the Galicia Bank but the specimen was lost in an attempt to make a photograph (Rolán, 1983). Rolán (1993: 170) lists the species again, but is not included in Trigo et al. (2018). *Laona pruinosa* (W. Clark, 1827) and *Laona quadrata* (S. Wood, 1839) were recorded from the Galicia Bank (Urgorri et al., 2017; Gofas et al.,

2021). *Laona pruinosa* has also been recorded from the Ria de Arousa in Galicia (Trigo et al. (2018). *Laona quadrata* has been recorded from deep water north of the Cantabrian Sea, e.g. drag 10 at 1960 m depth north of Santander (Locard, 1897; Pruvot-Fol, 1954) and Asturias (Ortea, 1977; as only the summary is available it is unclear where).

ACKNOWLEDGEMENTS

Jeroen Goud and Bram van der Bijl (Naturalis) provided access to the Naturalis collection. Joop Eikenboom, Dick Hoeksema and George Simons allowed me to study material from their collections. Alvaro Alonso joined me on many field trips and shared his database of literature data from the study area. Omar Sánchez shared data regarding some lots from Asturias. In 2018 Joop Eikenboom gave a lecture for the Nederlandse Malacologische Vereniging which helped in the preparation of this paper, and he also reviewed the manuscript. Frank Wesselingh (Naturalis) provided access to the stereomicroscope with which the photos were made.

REFERENCES

- ALF, A., BREZINGER, B., HASZPRUNAR, G., SCHRÖDEL, M. & SCHWABE, E., 2020. A guide to marine molluscs of Europe: 1-803. ConchBooks, Harxheim.
- ALONSO SUÁREZ, A. & RAVEN, J.G.M., 2020. Primeras citas de varios moluscos marinos para la costa de Asturias (NO de España). I. – *Elona*, 2: 102-113.
- BORJA, A. & MUXIKA, I., 2001. Actualización del catálogo de los moluscos marinos de la costa vasca, en campañas realizadas por AZTI. – *Iberus*, 19 (2): 67-85.
- BOUCHET, P., 1975. Opisthobranches de profondeur de l'Océan Atlantique. I - Cephalaspidea. – *Cahiers de Biologie Marine*, 16 (3): 317-365.
- CADÉE, G.C., 1968. Molluscan biocoenoses and thanatocoenoses in the Ría de Arosa, Galicia: 1-121. E. J. Brill, Leiden.
- CHABAN, E.M., CHABNEKHAEV, L.O. & LUBIN, P.A., 2015. *Hermania indistincta* comb. nov. (Gastropoda: Opisthobranchia: Cephalaspidea) from the Barents Sea - New species and genus for the fauna of the Russian Seas. – *Zoosystemica Rossica*, 24 (2): 148-154.
- GOFAS, S., MORENO, D. & SALAS, C., 2011. Moluscos marinos de Andalucía. Volúmenes I y II. Málaga: Servicio de Publicaciones e Intercambio Científico, Universidad de Málaga.
- GOFAS, S., LUQUE, Á.A., OLIVER, J.D., TEMPLADO, J. & SERRANO, A., 2021. The Mollusca of Galicia Bank (NE Atlantic Ocean). – *European Journal of Taxonomy*, 785: 1-114.
- GOFAS, S., LUQUE, Á.A., TEMPLADO, J. & SALAS, C., 2017. A national checklist of marine Mollusca in Spanish waters.

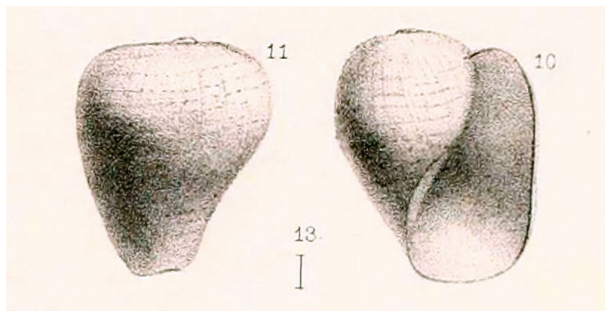


Fig. 23. Drawing of *Philine striatula* Locard, 1897 (now called *Philine talismani* Sykes, 1905) in Locard (1897: pl. 1 figs 10-11).

- Scientia Marina, 81 (2): 241-254.
- HIDALGO, J.G., 1917. Fauna malacológica de España, Portugal y Baleares. Moluscos testáceos marinos. – Trabajos del Museo Nacional de Ciencias Naturales, Serie Zoológica, 30: 1-752.
- LINDEN, J. VAN DER, 1994. *Philine intricata* Monterosato, 1884, an overlooked species from the North-East Atlantic and the Mediterranean Sea (Gastropoda, Opisthobranchia: Philinidae). – Basteria, 58 (1-2): 41-48.
- LINDEN, J. VAN DER, 1995. Philinidae dredged by the CANCAP expeditions (Gastropoda, Opisthobranchia). – Basteria, 59 (1-3): 65-83.
- LOCARD, A., 1897-1898. Expéditions scientifiques du Travailleur et du Talisman pendant les années 1880, 1881, 1882 et 1883. Mollusques testacés. Tome 1: 1-516 pls 1-22 (1897); Tome 2: 1-515, pls 1-18 (1898). Paris, Masson.
- MEXIA, F., 2000. Conchas marinas de Asturias. – Guías Cajastur, 4: 1-178.
- OHNEISER, L.T. & MALAQUIAS, M., 2013. Systematic revision of the gastropod family Philinidae (Mollusca: Cephalaspidea) in the north-east Atlantic Ocean with emphasis on the Scandinavian Peninsula. – Zoological Journal of the Linnean Society, 167 (2): 273-326.
- ORTEA, J.A., 1977. Moluscos marinos gasterópodos y bivalvos del litoral asturiano entre Ribadesella y Ribadeo con especial atención a la subclase de los opistobranquios. Universidad de Oviedo, Unpublished doctoral tesis.
- OSKARS, T.R., BOUCHET, P. & MALAQUIAS, M.A.E., 2015. A new phylogeny of the Cephalaspidea (Gastropoda: Heterobranchia) based on expanded taxon sampling and gene markers. – Molecular Phylogenetics and Evolution, 89: 130-150.
- PALACIOS, N. & VEGA, J.J., 1997. Guía de conchas de las playas y rías de Cantabria: 1-239. Nieves Palacios, Santander.
- PRICE, R.M., GOSLINER, T., VALDÉS, Á., 2011. Systematics and phylogeny of *Philine* (Gastropoda: Opisthobranchia), with emphasis on the *Philine aperta* species complex. – The Veliger, 51 (2): 1-58.
- PRUVOT-FOL, A., 1954. Mollusques Opisthobranches. – Faune de France, 58: 1-460.
- ROLÁN, E., 1983. Moluscos de la Ría de Vigo (I Gasterópodos). – Thalassas Vol. 1, Nº 1, Anexo 1: 1-383.
- ROLÁN, E., 1993. Guía ecológica das cunchas e moluscos de Galicia: 1-196. Edicións Xerais de Galicia.
- ROLÁN, E. & OTERO-SCHMITT, J., 1996. Guía dos moluscos de Galicia: 1-317. Editorial Galaxia, Vigo.
- SCAPEROTTA, M., BARTOLINI, S. & BOGI, C., 2013. Accrescimenti. Stadi di accrescimento dei molluschi marini del Mediterraneo. Volume V: 1-192. L'informatore Piceno, Ancona.
- SERRANO, A. (ed.), 2014. Informe final del proyecto LIFE+ INDEMARES (LIFE07/NAT/E/000732), subproyecto LIC “Caracterización ecológica del banco de Galicia”. Instituto Español de Oceanografía, Centro Oceanográfico de Santander. Coordinación: Fundación Biodiversidad, Madrid: 237 pp.
- TRIGO, J.E., ROLÁN-MOSQUERA, E. & TRONCOSO, J.S., 2017. Filo Mollusca, Clase Bivalvia. In: Bañón, R. (ed.), Inventario de la biodiversidad marina de Galicia. Proyecto LEMGAL: 340-357. Xunta de Galicia, Santiago de Compostela.
- TRIGO, J.E., DÍAZ AGRAS, G., GARCÍA ÁLVAREZ, O., GUERRA, A., MOREIRA DA ROCHA, J., PÉREZ DIESTRE, J., ROLÁN, E., TRONCOSO, J., URGORRI, V., 2018. Guía de los Moluscos Marinos de Galicia: 1-832. Servizo de Publicacións da Universidade de Vigo.
- TRINGALI, L.P., 2001. Marine malacological records (Gastropoda, Prosobranchia, Heterobranchia, Opisthobranchia and Pulmonata) from Torres de Alcalá, Mediterranean Morocco, with the description of a new philinid species. – Bollettino Malacologico, 37 (9-12): 207-222.
- URGORRI, V., TRIGO, J.E., GARCÍA-ÁLVAREZ, O., ROLÁN-MOSQUERA, E., DÍAZ-AGRAS, G., SEÑARÍS, M.P. & TRONCOSO, J.S., 2017. Filo Mollusca, Clase Gastropoda. In: Bañón, R. (ed.), Inventario de la biodiversidad marina de Galicia: Proyecto LEMGAL: 277-300. Xunta de Galicia, Santiago de Compostela.

Online sources

- BALLESTEROS, M., MADRENAS, E. & PONTES, M., 2022. OPK Opistobranquis. *Philine iris* Tringali, 2001. Accessed at: <https://opistobranquis.info/> on 2022-12-10.
- LISTA PATRÓN DE ESPECIES SILVESTRES DE ESPAÑA (version 2017) [Accessed at https://www.miteco.gob.es/es/biodiversidad/servicios/banco-datos-naturaleza/informacion-disponible/BDN_Listas_Patron_2017.aspx_on_2022-10-15; the 2022 version could not be used as it only lists species for the whole Iberian Peninsula]
- MALAQUIAS, M.A.E., 2014. *Philine denticulata* (J. Adams, 1800). Accessed at: www.biodiversity.no/Pages/149278_on_2022-12-05.
- MOLLUSCABASE EDS., 2022a. MolluscaBase. *Laona* A. Adams, 1865. Accessed through: World Register of Marine Species at: https://www.marinespecies.org/aphia.php?p=taxdetails&id=138338_on_2022-11-06.
- MOLLUSCABASE EDS., 2022b. MolluscaBase. *Philine talismani* Sykes, 1905. Accessed through: World Register of Marine Species at: https://www.marinespecies.org/aphia.php?p=taxdetails&id=181202_on_2022-11-08.