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***Atlanta selvagensis*, a new species of heteropod mollusc
from the Northeastern Atlantic Ocean
(Gastropoda: Carinarioidea)**

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RESUMEN: Se describe *Atlanta selvagensis* como nueva especie de molusco heterópodo, en base a la estructura externa de la concha y pigmentación, y a la morfología de ojos y opérculo. Todos los especímenes fueron recolectados en aguas de las Islas Salvajes, en el noreste del océano Atlántico. *A. peroni*, *A. gaudichaudi* y *A. plana* son las especies que más rasgos característicos comparten con *A. selvagensis*.

Palabras clave: *Atlanta selvagensis*, nueva especie, heteropoda, Islas Salvajes, Océano Atlántico.

ABSTRACT: A new species of atlantid heteropod, *Atlanta selvagensis*, is described on the basis of external shell structure and pigmentation, and the morphologies of the eye and operculum. All specimens were collected from waters around the Selvagens Islands in the eastern North Atlantic Ocean. Species of *Atlanta* that share similar features with *A. selvagensis* are *A. peroni*, *A. gaudichaudi* and *A. plana*.

Key words: *Atlanta selvagensis*, new species, heteropoda, Selvagens Islands, Atlantic Ocean.

INTRODUCTION

The Selvagens Islands comprise a volcanic archipelago located less than 90 nmi north of the Canary Islands in the northeastern Atlantic (fig. 1). The islands are a component

of the “Makaronesia” biogeographical region (Báez & Sánchez-Pinto, 1983). Unfortunately, records of benthic and pelagic marine species from this area are limited. A new species of benthic prosobranch was described by García-Talavera (1978). Planktonic decapod larval stages were identified by Lindley & Hernández (2000) and Lindley et al. (2002), in addition to pelagic mysids (Wittmann et al., 2004) and the first record of a pelagic nemertean (Hernández, F. y S. Jiménez, 2006). In this paper we report on a new species of planktonic atlantid heteropod from zooplankton samples collected during cruise TFMCBMSV/00 to the Selvagens Islands.

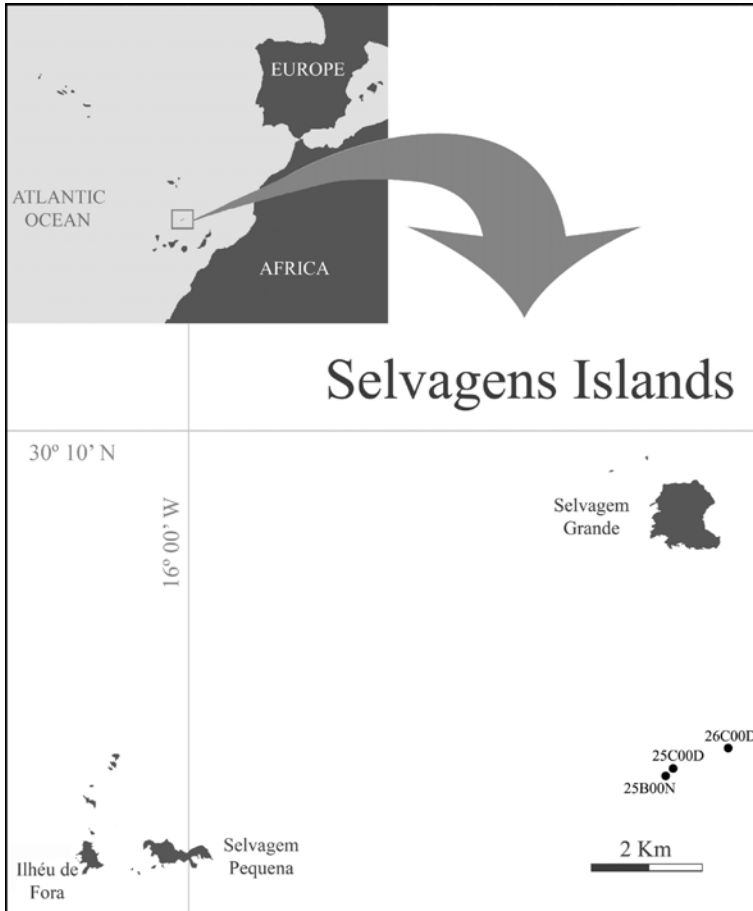


Fig. 1. Locations of the three sampling stations where *Atlanta selvagensis* was collected in waters near the Selvagens Islands.

MATERIALS AND METHODS

A total of eight specimens belonging to the new species were removed from samples collected from 25 to 30 September 2000 during Cruise TFMCBMSV/00 of the Oceanographic

Vessel “*Taliarte*” to waters around the Selvagen Islands (Table I). Due to this very limited number of specimens available for study, all of the adults have been used for the type material. For this reason, the radula could not be examined to determine its morphology. We hypothesize, however, that it is type I (Richter, 1963), since *A. selvagensis* appears to belong to the *A. gaudichaudi* species group, all of whose members share this type of radula.

Plankton samples were collected from vertical hauls, using a triple WP-2 net system, in which the three nets are banded together around the outside to form a triangular grouping, with a three-point bridle (one bridle wire attached to the outside of each net) and a fourth bridle wire in the center of the three nets. Each net had a mouth opening of 0.25 m², and the mesh size was 200 µm. A flow meter was mounted in the mouth of each net to determine volume of water filtered during each tow. All tows were taken vertically from a maximal depth of either 500 or 1,000 m. Samples were fixed in 4% formalin-seawater solution, and transferred after one week to 70% ethanol for long-term storage. Specimens belonging to the new species were collected from three stations (Table I).

Sample Code	Sample Numbers	Latitude, Longitude	Maximal Depth	Date/Time
25C00D	7-9	30° 05' 28'' N 15° 52' 05'' W	1000 m	25/09/2000 11:10 h
25B00N	13-15	30° 05' 27'' N 15° 52' 07'' W	500 m	25/09/2000 21:15 h
26C00D	19-21	30° 05' 45'' N 15° 51' 12'' W	1000 m	26/09/2000 10:36 h

Table I. Latitude/longitude, maximal sampling depths, and the dates and times where specimens of *A. selvagensis* were collected during Cruise TFMCBMSV/00 to waters near the Selvagens Islands. For the sample code, the first two numbers refer to the day of collection (from 25 to 28 September); the following letter to the maximal tow depth (B= 500 m; C= 1000 m); the next two digits (00) to the year of the cruise (2000); and, the last letter to day (D) or night (N) sampling.

SYSTEMATICS

Phylum MOLLUSCA

Clase GASTROPODA CUVIER, 1797

Subclass PROSOBRANCHIA MILNE EDWARDS, 1848

Superorder CAENOGASTROPODA COX, 1960

Superfamily CARINARIOIDEA BLAINVILLE, 1818

Family ATLANTIDAE RANG, 1829

Genus *Atlanta* LESUEUR, 1817*Atlanta selvagensis* De Vera and Seapy, sp. nov.**Description**

Shell small (diameter ranging from 1.3 to 1.5 mm in type material) and transparent. Spire relatively large, consisting of 3-3/4 whorls, with a very low conical shape (fig. 2C-D). Low spiral sculpture on shell spire variable, ranging from fully developed to absent. When present, sculpture consists of low spiral ridges of variable length that are frequently broken (not solid) (fig. 2F). The first spiral ridge appears approximately on the inner part of the third whorl. Additional spiral ridges (from 3 to 5) are progressively added from the inner to outer part of the third whorl (fig. 2E). These ridges usually end before the beginning of the fourth whorl, where they are frequently replaced by a succession of small punctae until the end of the protoconch. Umbilicus narrow (fig. 3B). Whorl sutures moderately deep and well defined, with distinct pink to light violet pigmentation. Keel moderately well developed, with a slightly truncated leading edge. Keel base from light brown to brown pigmented. Eyes type a (without transverse slit in distal pigment) (fig. 3C). Operculum type b (micro-oligogyre) (fig. 3D).

Type material

Holotype and three paratypes have been deposited at Departamento de Biología Marina, Museo de Ciencias Naturales de Tenerife, Canary Islands (TFMC). A fourth paratype will be deposited at Museo Nacional de Ciencias Naturales de Madrid (MNCN). In the list below the shell diameters were measured excluding the keel.

Holotype (fig. 3A-B):

Museum codes: TFMCBMZP/02916; HT/0039. Shell diameter: 1.3 mm. Sample code: 25C00D-8.

Paratype 1:

Museum codes: TFMCBMZP/02917; HT/0040. Shell diameter: 1.5 mm. Sample code: 25B00N-13.

Paratype 2:

Museum codes: TFMCBMZP/02918; HT/0041. Shell diameter: 1.3 mm. Sample code: 25B00N-14.

Paratype 3: Prepared for SEM; mounted on a stub.

Museum codes: TFMCBMZP/02919; HT/0042. Shell diameter: 1.4 mm. Sample code: 26C00D-19.

Paratype 4: Shell diameter: 0.7 mm. Sample code: 26C00D-19.

DISCUSSION

The genus *Atlanta* is presently considered to include 20 species that are distributed among eight species groups (Richter and Seapy, 1999, 2005). Among these 20 species, thirteen are cosmopolitan in distribution, four are Indo-Pacific, and each of the remaining three (all described in 1993) is limited to a single ocean. Distributional records for the latter three species indicate that *Atlanta fragilis* Richter, 1993 is found only in the Atlantic Ocean, *A. frontieri* Richter, 1993 is limited to the Indian Ocean, and *A. californiensis* Seapy and Richter, 1993 is narrowly restricted to the Transition Zone Faunal Province of the North Pacific Ocean (Seapy and Richter, 1993). Thus, the three most recent species descriptions were for species with geographic distributions limited to a single ocean or region of an ocean. Although we have no records of *A. selvagensis* beyond the limited number of samples collected from the Selvagens Islands, this species appears to be limited to the Atlantic Ocean or possibly the North Atlantic Ocean.

Atlanta selvagensis can be distinguished from other species in the genus on the basis of a combination of morphologic characteristics (Table II); specifically, a flattened shell with a maximal size that, hypothetically, is small, a very low conical spire of 3 and $\frac{3}{4}$ whorls (fig. 2C-D), pink to light violet spire sutures, narrow umbilicus (fig. 3B), type a eyes (fig. 3C), type b operculum (fig. 3D), and a distinctive spiral sculpture on the spire whorls (but not present in all specimens).

Comparisons of *A. selvagensis* with the three most similar species in the genus, *A. peroni*, *A. gaudichaudi* and *A. plana*, are summarized in Table II. The shell spire of the four species are similar to each other in being low, but the shape differs. In *A. peroni* the spire is rounded, while in the other three it is conical, although it has a markedly lower profile in *A. selvagensis*. The maximal shell size of *A. selvagensis* recorded here (1.5 mm) is one-half and one-third that of *A. plana* and *A. gaudichaudi*, respectively, while that of *A. peroni* (10 mm) is the largest in the genus. The number of spire whorls is similar in the four species, although *A. selvagensis* (fig. 2E) has one-fourth to one-half more than the other three species. The shallow initial spire sutures of *A. peroni* separate this species from the other three. The presence of pigmented sutures in *A. plana* and *A. selvagensis* are conspicuously different from the unpigmented sutures in the other two species, and serve as a distinguishing difference between *A. gaudichaudi* and *A. selvagensis* in the Atlantic Ocean. Although all four species have type b opercula (fig. 3C), that of *A. plana* has a unique spiral gyre with short, protruding spines (Richter, 1972). Lastly, the type (a) eye of *A. selvagensis* (and *A. plana*, which has not been recorded in the Atlantic Ocean) clearly separates the new species from *A. gaudichaudi* and *A. peroni* (fig. 3C), which have type (b) eye.

The presence of spiral sculpture on the shell spire in five of the specimens of *A. selvagensis* and its absence in the other three is problematic. Among the five shells

MORPHOLOGICAL CHARACTERS	<i>A. peroni</i>	<i>A. gaudichaudi</i>	<i>A. plana</i>	<i>A. selvagensis</i>
Shell shape	Flattened	Flattened	Flattened	Flattened
Maximal shell size	10 mm	3 mm	4 mm	1,5 mm
Spire size	Small	Small	Small	Small
Spire shape	Low rounded	Low conical	Low conical	Very low conical
Number of spire whorls	3 1/2	3 1/4	3 1/4	3 3/4
Spire sculpture	Absent	Absent	Present, starting on the second whorl	Present or absent. When present, very variable, but always starting on the third whorl
Spire whorl suture	Shallow till the end of second whorl	Deep in all whorls	Deep in all whorls	Moderately deep in all whorls
Suture pigmentation	Absent	Absent	Violet	Violet
Keel height	Low	Tall	Low	Tall
Shape of keel leading edge	Rounded	Truncated	Rounded	Truncated
Keel base pigmentation	Brown in large specimens	Brown	Golden brown	Light brown to brown
Eye type	b	b	a	a
Operculum type	b	b	b	b
Opercular gyre ornamentation	Absent	Absent	Present; about 20 spines	Absent

Table II. Comparisons of morphological characters between *Atlanta peroni*, *A. gaudichaudi*, *A. plana* and *A. selvagensis*.

having sculpture, there is a pattern of increasing development of the spiral sculpture, leading to that seen in the holotype specimen. When present, the spiral sculpture is very similar in general disposition to that seen in *A. plana*, in which the sculpture begins with one or two broken spiral ridges (fig. 2E-F). The differences in the spiral sculpture of the two species are the location and extension of the spiral ridges on the spire. In *A. plana* the sculpture starts on the second whorl, while in *A. selvagensis* it starts on the third whorl. In both species, the spiral ridges are broken frequently and extend only to the end of the

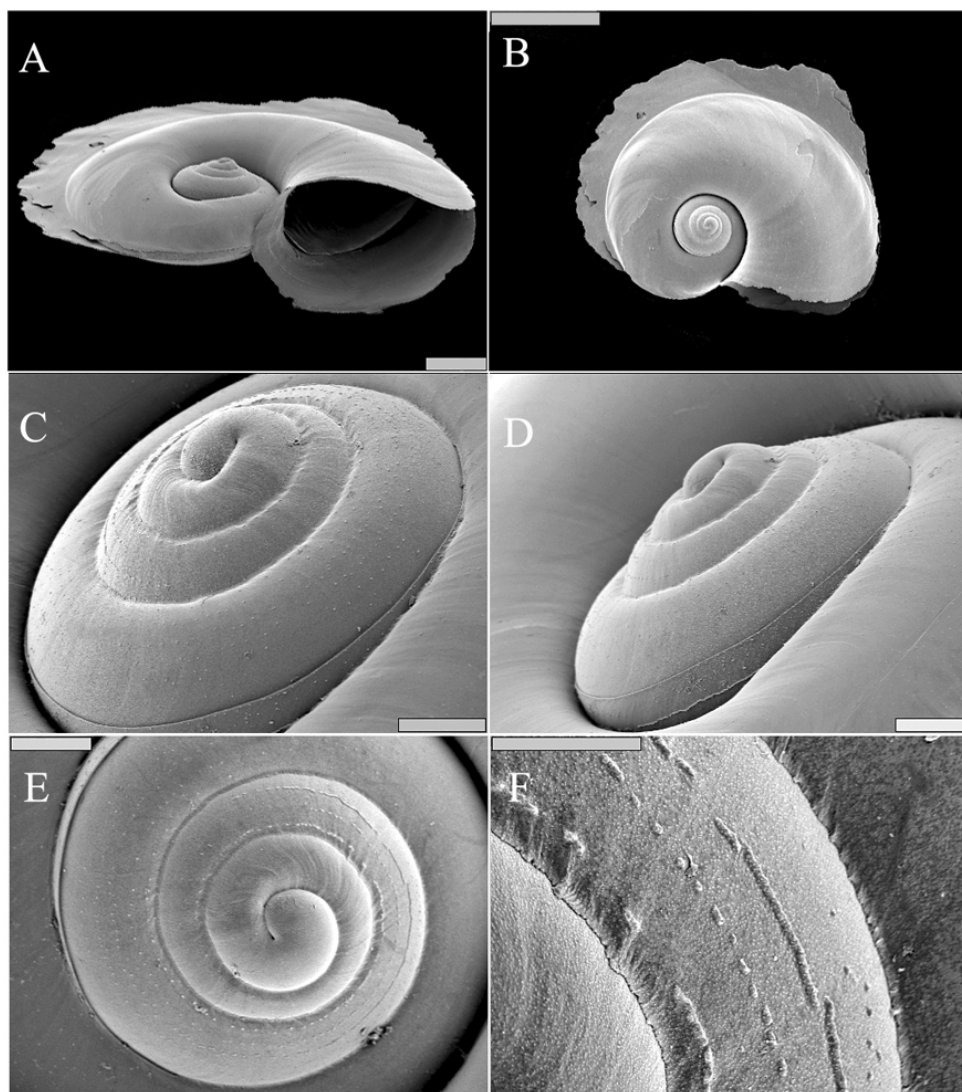


Fig. 2. Paratype 3 of *Atlanta selvagensis* n. sp., Scanning Electronic Micrographs. **A**: aperture view (scale bar= 200 μ m); **B**: apical view (scale bar= 500 μ m); **C-E**: spire detail (scale bar= 50 μ m); **F**: spiral sculpture detail (scale bar=20 μ m).

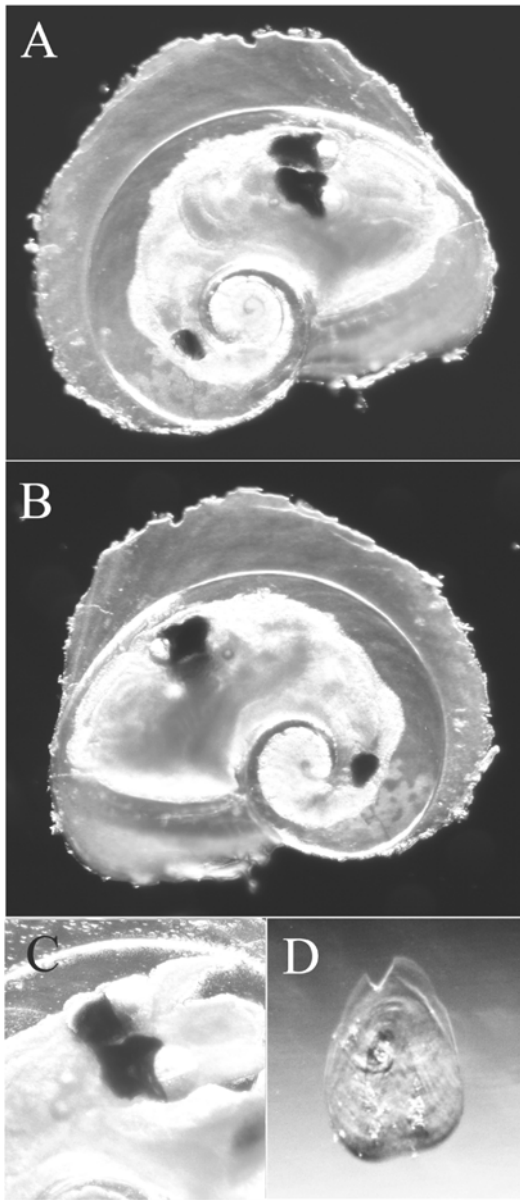


Fig 3. *Atlanta selvagensis* sp. nov. **A:** Holotype, right side of shell at 90 degrees to the shell plane; **B:** Holotype, left side of shell; **C:** Detail of the type a eyes from paratype 1; **D:** Type b operculum (micro-oligogyre) from a specimen not included among the type material.

second or third whorl, respectively. Although the senior author has analyzed material from other areas of the Eastern North Atlantic Ocean, such as the waters around the Canary Islands and Cape Verde, no specimens belonging to this new species have been identified. Nevertheless, it is not plausible that this species is restricted to the Selvagens archipelago, since there are no oceanographic or biogeographic barriers that would prevent exchange of animals between these areas.

Etymology

The specific epithet, *selvagensis*, was chosen because all of the type material was collected from waters near the Selvagens Islands, the small archipelago included in the Macaronesian region that was declared a Natural Reserve by the Portuguese government in 1971 because of its ecological importance and biodiversity, and one of the “aim” archipelagos of researchers at the Museo de Ciencias Naturales de Tenerife from its beginning as a scientific institution more than 30 years ago.

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