



## *Cyphoma aureocinctum* (Dall, 1889) (Gastropoda: Ovulidae) in the Canary Islands, with notes on the type material and type locality

### *Cyphoma aureocinctum* (Dall, 1889) (Gastropoda: Ovulidae) en Canarias, con notas sobre el material tipo y la localidad tipo

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#### ABSTRACT

New information about the habitat and distribution of the rare, medium deep-water Atlantic ovulid *Cyphoma aureocinctum* (Dall, 1889) in the Canary Islands is provided, and the spawn of this species is described and illustrated. Living specimens were found on the antipatharian *Antipathella wollastoni* (Gray, 1857), between 25-40 m in depth, and in shrimp fishing pots between 100-180 m. The shell of fully and not fully grown specimens is described and compared with that of the lectotype, an additional W. Atlantic specimen and the closely related *Cyphoma eludens* Lorenz & Brown, 2015, from St. Helena Island. The colour pattern of the mantle and head-foot in the living animal is similar in specimens from the Canary and Cape Verde Islands, and also similar to that of *C. eludens*. The spawn consists of transparent egg capsules of more or less rounded cushion-like shape, arranged in lines along dead branches of the black coral and contain some hundred eggs, embryos or larvae. The distribution, habitat and some taxonomical issues of this still poorly known species are discussed.

The revision of the type material of *Cyphoma aureocinctum* has resulted in no syntypes being found of this species in collections of the Museum of Comparative Zoology, Harvard, and only one syntype found in the National Museum of Natural History, Washington, which is designated as lectotype. The first locality given in the original description for *C. aureocinctum* ("off Sombrero") is discussed, concluding that it is a locality in Florida, not in the West Indies.

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## RESUMEN

Se proporciona nueva información sobre el hábitat y la distribución del raro ovúlido atlántico de profundidad media *Cyphoma aureocinctum* (Dall, 1889) en las islas Canarias, y se describe e ilustra la puesta de esta especie. Los ejemplares vivos se encontraron sobre el antipatario *Antipathella wollastoni* (Gray, 1857) entre 25-40 m y en nasas de pesca de camarones entre 100-180 m. Se describe la concha de ejemplares completamente y no completamente desarrollados, y se compara con la del lectotipo, con la de un ejemplar adicional del Atlántico occidental y con la especie estrechamente relacionada *Cyphoma eludens* Lorenz & Brown, 2015, de la isla de Santa Elena. El patrón de coloración del manto y del pie de la cabeza en el animal vivo es similar en los individuos de las islas Canarias y de Cabo Verde, y también similar al de *C. eludens*. La puesta consiste en cápsulas de huevos transparentes en forma de cojín más o menos redondeadas, dispuestas en líneas a lo largo de las ramas muertas del coral negro y que contienen unos cientos de huevos, embriones o larvas. Se discuten la distribución, el hábitat y algunas cuestiones taxonómicas de esta especie aún poco conocida.

La revisión del material tipo de *Cyphoma aureocinctum* ha dado como resultado que no se han encontrado sintipos de esta especie en las colecciones del Museo de Zoología Comparada de Harvard, y sólo se ha encontrado un sintipo en el Museo Nacional de Historia Natural de Washington, que se designa como lectotipo. Se discute la primera localidad dada en la descripción original para *C. aureocinctum* ("off Sombrero"), concluyendo que se trata de una localidad en Florida, no de las Antillas.

KEY WORDS: *Cyphoma aureocinctum*, Ovulidae, Canary Islands, distribution, habitat, spawn, taxonomy.

PALABRAS CLAVE: *Cyphoma aureocinctum*, Ovulidae, Islas Canarias, distribución, hábitat, puesta, taxonomía.

## INTRODUCTION

The Ovulidae Fleming, 1828 is a widespread, mainly tropical and subtropical family of specialised carnivorous gastropods that live and feed on polyps and tissues of Anthozoa (specially Alcyonacea, but also Hexacoralia; SCHIAPARELLI ET AL., 2005; LORENZ & FEHSE, 2009). This family currently comprises 253 Recent accepted species in 38 genera, grouped into four subfamilies (WoRMS, 2022). The intra- and interspecific variation in many ovulids is still not well known, since many species have been described on the basis of only shell characters of one or a few shells (ROSENBERG, 1992) and integrative taxonomy including morphological and molecular characters is still in its infancy (REIJNEN & VAN DER MEIJ, 2019). The taxonomy of the whole family was revised by CATE (1973) based on shell morphology, and a further monograph by LORENZ & FEHSE (2009) provided information about

external morphological features of the ovulid animal for many species.

The genus *Cyphoma* Röding, 1798 currently includes 14 species (WoRMS, 2022). Some of the shallow water Caribbean *Cyphoma* species have been recently reviewed on the basis of shell and mantle pattern characters and molecular analyses (REIJNEN & VAN DER MEIJ, 2017). *Cyphoma aureocinctum* (Dall, 1889) is a rarely found, medium deep-water species described by DALL (1889) in the genus *Amphiperas*, subgenus *Simnia*, as *Simnia* (*Neosimnia*) *aureocincta* from "off Sombrero" and from near Havana (Cuba). It has been further recorded from other western and eastern Atlantic localities, and has recently been reported from the Canary Islands by LORENZ & BROWN (2015) and HERRERA ET AL. (2016). The former authors also described a closely related new species, *Cyphoma eludens* Lorenz & Brown, 2015, from Saint Helena Island and the Florida Straits.

DALL (1889) did not illustrate or designate types for *Cyphoma aureocinctum* in the original description or in subsequent publications, and there is some confusion about the subsequent citation of the “holotype” by CATE (1973), since DALL (1889) gave two localities and, thus, there should be at least two syntypes. CATE (1973) noted that “... one difficulty encountered in the search for the type specimens [in Ovulidae] was the presence of more than one species in some of the type lots...”. This is the case in *C. aureocinctum*, with the additional difficulty that the lack of an illustration in the original description does not facilitate the correct identification of syntypes.

In this paper, we describe and illustrate new specimens of *Cyphoma aureocinctum* found in the Canary Islands and the spawn of this species, commenting

on their distribution and habitat, and discussing additional taxonomical issues. The type material and the type locality of *Cyphoma aureocinctum* are reviewed and discussed, and a lectotype is formally designated. The first locality given in the original description for *C. aureocinctum* (“off Sombrero”) is also discussed.

#### Abbreviations

BHL: Biodiversity Heritage Library.

MCZ: Museum of Comparative Zoology, Harvard University.

MNCN: Museo Nacional de Ciencias Naturales, Madrid.

MNH: Muséum National d'Histoire Naturelle, Paris.

NMNH (USNM): National Museum of Natural History, Smithsonian Institution, Invertebrates collection.

## SYSTEMATIC PART

Family OVULIDAE J. Fleming, 1822  
Subfamily SIMNIINAE F. A. Schilder, 1925  
Genus *Cyphoma* Röding, 1798

*Cyphoma aureocinctum* (Dall, 1889) (Figs. 1A-C, E, F, 2A-H, 3 A)

*Amphiperas* (*Simnia*) [section *Neosimnia*] *aureocincta* DALL, 1889: 236-237 (as “*Simnia* (*Neosimnia*) *aureocincta*” p. 236).

*Simnia aureocincta* Dall, 1889: SCHILDER, 1941: 109.

“*Neosimnia*” *aureocincta* Dall, 1889: ALLAN, 1956: 135.

*Simnia* (*Neosimnia*) *aureocincta* Dall, 1889: BOSS, ROSEWATER & RUHOFF, 1968: 38.

*Cyphoma aureocinctum* (Dall, 1889) [sic, 1889]: CATE, 1973: 68-69, figs. 153, 153a.

*Cyphoma* (*Pseudocyphoma*) *aureocinctum* (Dall, 1889) [sic, 1889]: ABBOTT, 1974: 153.

*Pseudocyphoma aureocinctum* Dall, 1889 [sic, 1889]: ABBOTT & DANCE, 1983: 99.

*Cyphoma aureocincta*: LIGHTBOURN, 1991: 5.

*Cyphoma aureocinctum* (Dall, 1889): JENSEN & PEARCE, 2009: 64, pl. 4.

*Cyphoma aureocincta* (Dall, 1889) [error in gender ending]: LORENZ & FEHSE, 2009: pl. 120.

*Pseudocyphoma aureocinctum* (Dall, 1889) [sic, 1889]: ROLÁN, 2005: 85, fig. 354.

*Cyphoma aureocinctum* (Dall, 1889): HERRERA ET AL., 2016: 234, pl. 2C.

*Cyphoma aureocinctum* Dall, 1889: LORENZ & BROWN, 2015: 9, pl. 1, Figs. 1-6.

**Material examined:** SPAIN, CANARY ISLANDS • 2 specimens (a fully grown one of 29 mm length, Fig. 1A, and an almost fully grown one of 30.2 mm), Tenerife Island, Teno Peninsula; 28°20'29" N, 16°55'19" W; 25 m depth; on *Antipathella wollastoni* (Gray, 1857); 12 Aug. 2020; Rodolfo Vega leg.; Museo Nacional de Ciencias Naturales, Madrid • 1 not fully grown shell of 27.3 mm length (Fig. 1C) Tenerife Island, Teno Peninsula; 28°20'29" N, 16°55'19" W; 25 m depth; on sand, close to a colony of *Antipathella wollastoni*; 2014; Ricardo Vega leg.; Museo Nacional de Ciencias Naturales, Madrid • 3 fully grown specimens (22.9 mm, 21.5 mm, 21.5 mm); Tenerife Island, Güímar; 180 m depth; from shrimp fishing pots of artisanal fishing boats; Nov.- Dec. 2011; Javier Martín leg. • 2 fully grown specimens (27.8 mm, Fig. 2A-C; 25.4 mm); Tenerife Island, Valle de Güímar, San Pedro;

150 m depth; from shrimp fishing pots; Jan. 2012; Javier Martín leg. • 1 fully grown specimen (16.4 mm); Tenerife Island, Güímar, 120 m depth; from shrimp fishing pots; Dec. 2019; Javier Martín, leg. • 1 fully grown specimen (22.9 mm), La Palma Island, Punta Llana; 100 m depth; from shrimp fishing pots; Nov. 2014; Javier Martín leg.

**Material sighted (not collected):** SPAIN, CANARY ISLANDS • 3 specimens (Fig. 2G, H) of about 26 mm long with spawn; El Hierro Island, El Bajón, La Restinga; 40 m depth; on *Antipathella wollastoni*; 30 Jul. 2012; after the volcano eruption • 2 specimens of about 27 mm; El Hierro Island, El Bajón, La Restinga; 36 m depth; on *Antipathella wollastoni*; Sep. 2012 • 1 specimen; El Hierro Island, Punta Restinga; 55 m depth; on *Antipathella wollastoni*; 14 Jul. 2012 • 3 spms. with spawn; El Hierro Island, El Bajón; 33 m depth; on *Antipathella wollastoni*; 27 Jul. 2012 • 1 spm.; El Hierro Island, El Bajón; 33 m depth; on *Antipathella wollastoni*; 03 Aug. 2012. • 1 shell with hermit crab; El Hierro Island, El Bajón; 13 m depth; 27 Jul. 2012. CAPE VERDE ISLANDS • 1 spm. (Fig. 2D-F); São Vicente, between Morro Branco and Ponta de Ladra Cachorro, near Mindelo; 10 m depth; on *Antipathella wollastoni*; 06 Nov. 2014; photographed by Peter Wirtz.

**Type material (only photographs examined):** CUBA • 1 shell, 19.2 mm long (measured from photograph, Figs. 1E, 3A), here designated as lectotype of *Amphiperas (Simnia) aureocincta* Dall, 1889 (treated as "holotype" by CATE, 1973; see under notes on the type material); off Havana; 23° 10' 42" N, 82° 18' 24" W; 67 fathoms (123 m) depth; 19 Jan. 1885; United States Fish Commission R/V "Albatross" sta. 2334; bottom of white coral, instrument used tangles (station data from SMITH, 1888: 945); National Museum of Natural History, Smithsonian Institution (USNM 87124). UNITED STATES • 1 dry specimen, alleged syntype of *Amphiperas (Simnia) aureocincta* Dall, 1889 (labelled as *Simnia acicularis* Lam.), 8.4 mm (measured from photograph, Fig. 3B); off Sombrero; 70 fms. (128 m) depth; "Blake" Exp. 1877-78 (no number station or coordinates are given in the original description, or MCZ ledger or labels); Museum of Comparative Zoology at Harvard University (MCZ 7349).

**Other material examined (only photographs):** UNITED STATES • 1 shell of *Cyphoma aureocinctum* (Dall, 1889), 23 mm (measured from photograph, Fig. 1F); Florida Keys, SW of Dry Tortugas; 25.63° N, -82.92° W; 35 fathoms (64 m) depth; 14 Aug. 1933; Tortugas Expedition Carnegie Lab, W. Schmitt leg.; National Museum of Natural History, Smithsonian Institution (USNM 421653) • 1 shell labelled as *Simnia aureocincta* Dall (young), 8.4 mm (measured from photograph, Fig. 3C); off Sombrero; 70 fms. (128 m) depth; "Blake" Exp., 1877-78 (no number station or coordinates are given in MCZ ledger or labels); Museum of Comparative Zoology at Harvard University (MCZ 7353). CUBA • 1 dry specimen labelled as *Simnia uniplicata* Sby., 8.9 mm (measured from photograph, Fig. 3D); 4 mi. off Morro Light, North of Havana; 23° 14' 0" N, 82° 25' 0" W; 805 fms. depth; Dec. 1877-Mar. 1878; "Blake" Exp., sta. 2, station data from SMITH, 1888: 963; Museum of Comparative Zoology at Harvard University (MCZ 7352). • 1 shell labelled as *Simnia acicularis*, 13.5 mm (measured from photograph, Fig. 3F); off Havana; 80 fms. (146 m) depth; "Blake" Exp. (no station number or coordinates are given in MCZ ledger or labels); Museum of Comparative Zoology at Harvard University (MCZ 7350). ST. HELENA ISLAND • 1 shell (Fig. 1D), holotype of *Cyphoma eludens* Lorenz & Brown, 2015, 30.9 mm; Bennetts Point on the western coast; 10-12 m depth; on *Plumapathes pennacea* (Pallas, 1766); Muséum National d'Histoire Naturelle, Paris (MNHN-IM-2000-27250).

## Description

Shell of the fully grown specimen 29 mm length from Teno (Fig. 1A) rather solid, fusiform, angulated at the mid part by a clear spiral ridge and with blunt protruding, dorsally calloused ends; shell of the small fully grown specimen from Güímar of 16.4 mm length (Fig. 1B) shows almost no central angulation. Funiculum is a slight thickening separated from the posterior canal by a shallow groove and forms a slight tooth-like protrusion which is also visible in dorsal view. Aperture slightly narrower towards the posterior end and

somewhat wider at the anterior end. Outer lip thick, calloused, rolled, edentate and of about the same thickness along the aperture, separated from the dorsum by a slight shoulder. Inner lip calloused along the aperture, with a slight columellar depression and a weak ridge mainly visible on the anterior half forming a narrow fossula. Shell smooth except for very fine spiral striations at both ends visible dorsally, glossy, pure white, with a 2-3 mm wide orange-brown band encircling the shell along the margins and above the ends, separating the base from the dorsum. This

perimarginal band is only visible in ventral view along the outer edge of the columellar side. There are also two faint dorsal spiral orange bands, the adapical more intense than abapical. Intensity of both the orange-brown band encircling shell and the orange spiral bands may vary in different specimens, and the latter two are greatly attenuated or almost indistinguishable on the columellar side, never reaching the outer lip.

The not fully grown shell of 27.3 mm length from Teno (Fig. 1C) is fusiform, thin and fragile, with no distinct central angulation, and slightly calloused ends. Funiculum distinct, but less developed, without tooth-like protrusion. Aperture of about the same width at both ends. Outer lip with a simple, sharp edge. Inner lip less calloused and columellar ridge and fossula not very distinct. Shell smooth except for very fine spiral striations at both ends visible dorsally, glossy, white, with the band encircling the shell weaker and only evident towards the ends, and fainter spiral bands, the adapical more intense than abapical.

The lectotype (Figs. 1E, 3A; see under notes on the type material) is a fully grown, solid shell of 19.2 mm, that fits the description above except for being smaller, relatively more elongated and fusiform, and because it lacks the central angulation and only the adapical spiral "golden" band is evident.

The USNM 421653 (Fig. 1F) specimen from Dry Tortugas is an almost fully grown specimen of 23 mm, with a thin shell and the outer lip not yet completely thickened, centrally angulated with a marked mid spiral ridge, and having the peripheral orange-brown band characteristic of this species but lacking the two faint dorsal spiral orange bands.

The mantle of the fully grown specimen 27.8 mm in shell length from Güimar (Fig. 2A-C) is smooth, thin, almost transparent, with an orange-brown line bordering the edge, with relatively large unpigmented areas between this line and the rest of the

mantle, which is orange-brown dotted by small rounded or irregular unpigmented patches, which in some areas are larger and crossed by irregular anastomosing orange-brown lines. The orange-brown band around the periphery of the shell is visible through the mantle. Foot milky white, dorsally with a fine dark brown line bordering the entire edge with which meet numerous thick dark brown lines of irregular width more or less regularly spaced radiating from the central axis of the foot. Dorsal posterior part of the foot marked posteriorly by a wider axial stripe very dark brown in the centre and lightening towards the sides. Head white, with a brown stripe across the eye; cephalic tentacles white at the base and tip, pigmented with brown on the rest, darker dorsally. Siphon translucent, whitish, irregularly pigmented of light brown with darker edge.

#### Habitat

The two specimens of *Cyphoma aureocinctum* from Punta de Teno (Tenerife) at 25 m depth were found on the same colony of *Antipathella wollastoni*, together with some specimens of *Corallophilus kaofitorum* Vega, Vega & Luque, 2002, and right at the type locality of this latter species that probably feed on the coral (VEGA, VEGA & LUQUE, 2002). All other living specimens sighted or photographed in the Canary Islands were found on this black coral. LORENZ & BROWN (2015, pl. 4, figs. 1-2) illustrated a living specimen with spawn, photographed by Michael J. Sealey in "the Canary Islands, at 40 m". This specimen is one of the three illustrated here from El Bajón, La Restinga, El Hierro, on *Antipathes wollastoni* (Fig. 2G, H). The specimen photographed by Peter Wirtz in São Vicente, Cape Verde Islands, also figured in LORENZ & BROWN, 2015, text figs. 1-2) was also on *A. wollastoni*, close to a colony of the zoantharian *Antipathozoanthus macaronesicus* (Ocaña & Brito, 2003) growing on a dead part of the coral branch (Fig. 2D-F). Thus, up to now *Cyphoma aureocinctum* was only found living in the eastern Atlantic asso-



ciated to *Antipathes wollastoni*. This antipatharian is a characteristic species of the circalittoral bottoms in the Canary Islands and there are usually abundant populations on the points and other coastal salients of the islands. It is found between 15 and 520 m, and in shallower depths (up to 40 m) lives in dark or semi-dark environments (vertical walls, overhangs or caves) with good water circulation. Large populations are common below 50 m on open rocky bottoms, forming characteristic facies, and it is also common in the biocoenosis of *Dendrophyllia ramea* (Linnaeus, 1758). The zoantharian *Antipatozoanthus macaronesisicus* are often found growing on the axes and branches, sometimes covering much of the coral (OCAÑA & BRITO, 2018; OCAÑA ET AL., 2022).

Except for living specimens caught between 100 and 180 m in the Canary Islands by fishing boats in shrimp fishing pots, all specimens of *C. aureocinctum* here studied or observed were found on *Antipathella wollastoni* at shallower depths (13-55 m). The two specimens recorded by HERRERA ET AL. (2016) from Valle de Güímar (Tenerife) were also found in shrimp fishing pots, in 150 m depth. The lectotype of *Cyphoma aureocinctum* in NMNH (USNM 87124) is an apparently live or fresh collected specimen, being the type locality "Albatross" station 2334, near Havana, Cuba, at 67 fathoms (123 m). DALL (1889) mentioned "on white coral, in 67 fms." as the habitat for the lectotype but, as discussed below (see under notes on the

type material), Dall referred to the type of bottom of station 2334 and not to a particular anthozoan species. The instrument used to collect samples in this station were tangles (SMITH, 1888), that were devised by A. E. Verrill for the Fish Commission in 1871 and were used ever since with some modifications (RATHBUN, 1883). Tangles were described by RATHBUN (1883), and described and illustrated by AGASSIZ (1888) and, according to the latter author, were frequently used on rocky or coral bottoms and "... in them become entangled all sort of starfish, sea urchins, crabs, corals, sea-fans, sponges and even fishes". It is therefore likely that the lectotype was collected alive on its anthozoan host or, alternatively, freshly dead or occupied by a hermit crab. A search in NMNH database using as key words "Antipatharia" and the type locality and depth (123 m) of *Cyphoma aureocinctum* resulted in only one antipatharian, *Tanacetipathes tanacetum* (Pourtales, 1880). Thus, this black coral might be a potential host for *C. aureocinctum*. Another search using "Gorgonacea" resulted in five species from this station and depth: *Acanthacis* sp., *Ellisella* sp., *Ilciligorgia schrammi* Duchassaing, 1870, and *Villogorgia nigrescens* Duchassaing & Michelotti, 1860. None of these "Gorgonacea" species were recorded from sta. 2334 by DEICHMANN (1936). No Zoantharia ("Zoanthidea" as key word) was found from this station, and there are also some scleractinian species but, as said

(Right page) Figure 1. A: *Cyphoma aureocinctum* (Dall, 1889), fully grown specimen from Teno Peninsula (Tenerife), 29 mm; B: fully grown specimen from Güímar (Tenerife), 16.4 mm; C: not fully grown specimen from Teno Peninsula (Tenerife), 27.3 mm; D: *Cyphoma eludens* Lorenz & Brown, 2015, holotype (MNHN-IM-2000-27250), Bennetts Point on the western coast of St. Helena Island, 30.9 mm (photograph by Manuel Caballer 2015 - MNHN RECOLNAT (ANR-11-INBS-0004)); E: Lectotype (here designated) of *Amphiperas* (*Simnia*) *aureocincta* Dall, 1889 (USNM 87124), from United States Fish Commission R/V "Albatross" sta. 2334 (23° 10' 42" N, 82° 18' 24" W), off Havana, Cuba, 67 fathoms (123 m) depth, 19.2 mm (Department of Invertebrate Zoology, NMNH), see also Fig. 3A; F: *Cyphoma aureocinctum* (Dall, 1883), almost fully grown specimen (USNM 421653), from SW of Dry Tortugas, Florida, in 35 fms. (64 m), 23 mm (Department of Invertebrate Zoology, NMNH). All figures at the same scale for size comparison; scale bar: 10 mm.

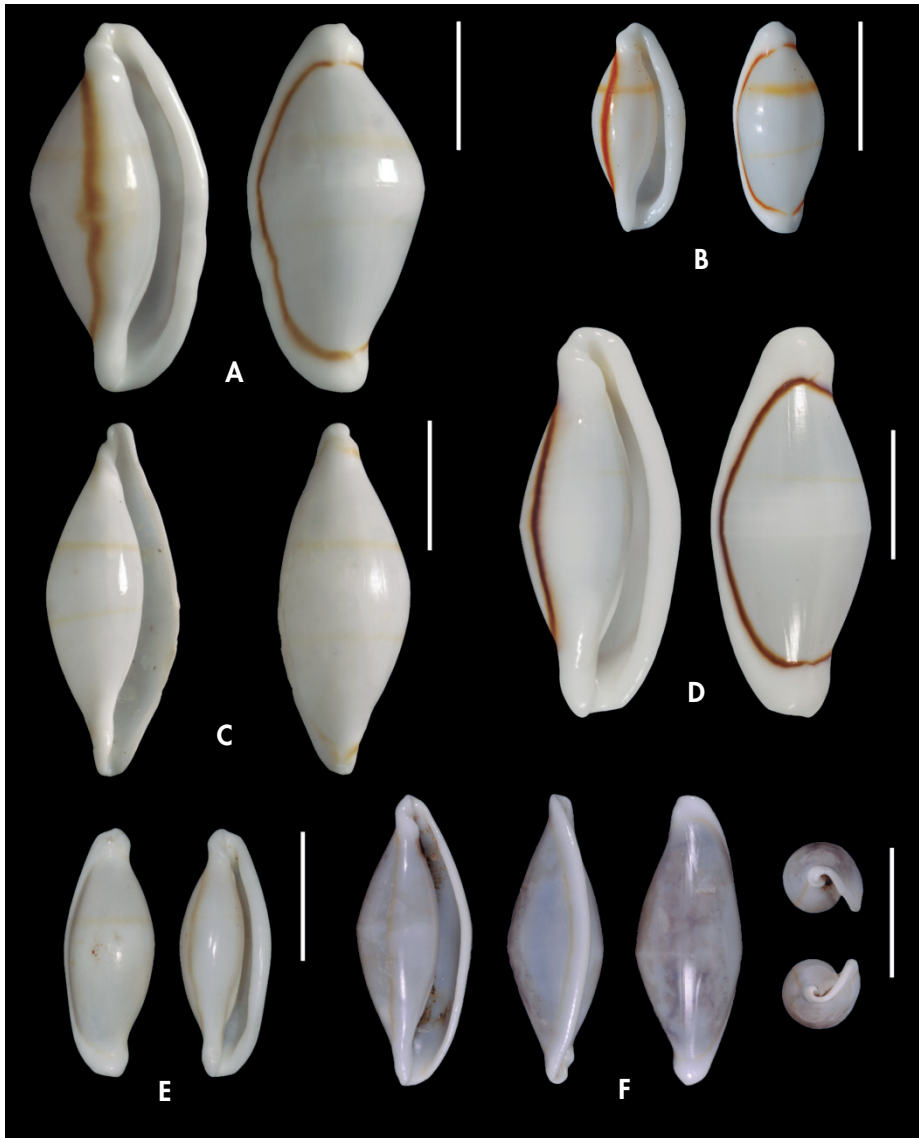


Figura 1. A: *Cyphoma aureocinctum* (Dall, 1889), ejemplar completamente desarrollado de la península de Teno (Tenerife), 29 mm; B: ejemplar completamente desarrollado de Güimar (Tenerife), 16,4 mm; C: ejemplar no completamente desarrollado de la península de Teno (Tenerife), 27,3 mm; D: *Cyphoma eludens* Lorenz & Brown, 2015, holotipo (MNHN-IM-2000-27250), Bennetts Point, en la costa occidental de la isla de Santa Elena, 30,9 mm (Manuel Caballer 2015 - MNHN RECOLNAT (ANR-11-INBS-0004)); E: Lectotipo (designado aquí) de *Amphiperas* (Simnia) *aureocincta* Dall, 1889 (USNM 87124), United States Fish Commission R/V "Albatross" sta. 2334 (23° 10' 42" N, 82° 18' 24" W), frente a La Habana, Cuba, 67 brazas (123 m) de profundidad, 19,2 mm (Department of Invertebrate Zoology, NMNH), véase también Fig. 3A; F: *Cyphoma aureocinctum* (Dall, 1883), ejemplar casi completamente desarrollado (USNM 421653), del SO de Dry Tortugas, Florida, 35 brazas (64 m) de profundidad, 23 mm (Department of Invertebrate Zoology, NMNH). Todas las figuras a la misma escala para comparar el tamaño; escala gráfica: 10 mm.

above, the statement “on white coral” was referred to the type of bottom. No detailed habitat is given for the apparently live or fresh collected specimen at NMNH (USNM 421653; Fig. 1F) from SW of Dry Tortugas, Florida in 35 fathoms (64 m), and no anthozoans were found at NMNH collection associated to this sample.

LORENZ & BROWN (2015: 9, pl. 1, Figs. 2-6) recorded and illustrated five specimens of *C. aureocinctum* from Colombia (1 specimen off 360 m), Jamaica (1, no depth given), Bermuda (2, off 330 m) and Cape Verde Islands (1, off 45 m), identified on the basis of the lectotype, but no indication was given about if these specimens were live collected. These authors stated that *C. aureocinctum* has a wide depth-range (10-1200 m) based on the deepest record (1200 m, off Florida) given by ABBOTT & DANCE (1983). Nevertheless, this depth record, also mentioned by LORENZ & FEHSE (2009), has not been found in any source, and ABBOTT (1974) gave only 123 m, the depth corresponding to the type locality. JENSEN & PEARCE (2009) mentioned a specimen of the Lightbourn-Guest collection (perhaps that recorded by LIGHBOURN, 1991) trapped from Bermuda, 1.5 miles of Castle Roads at 324 m, but it is not clear if it was a live collected specimen because most shells collected by Lightbourn in lobster pots

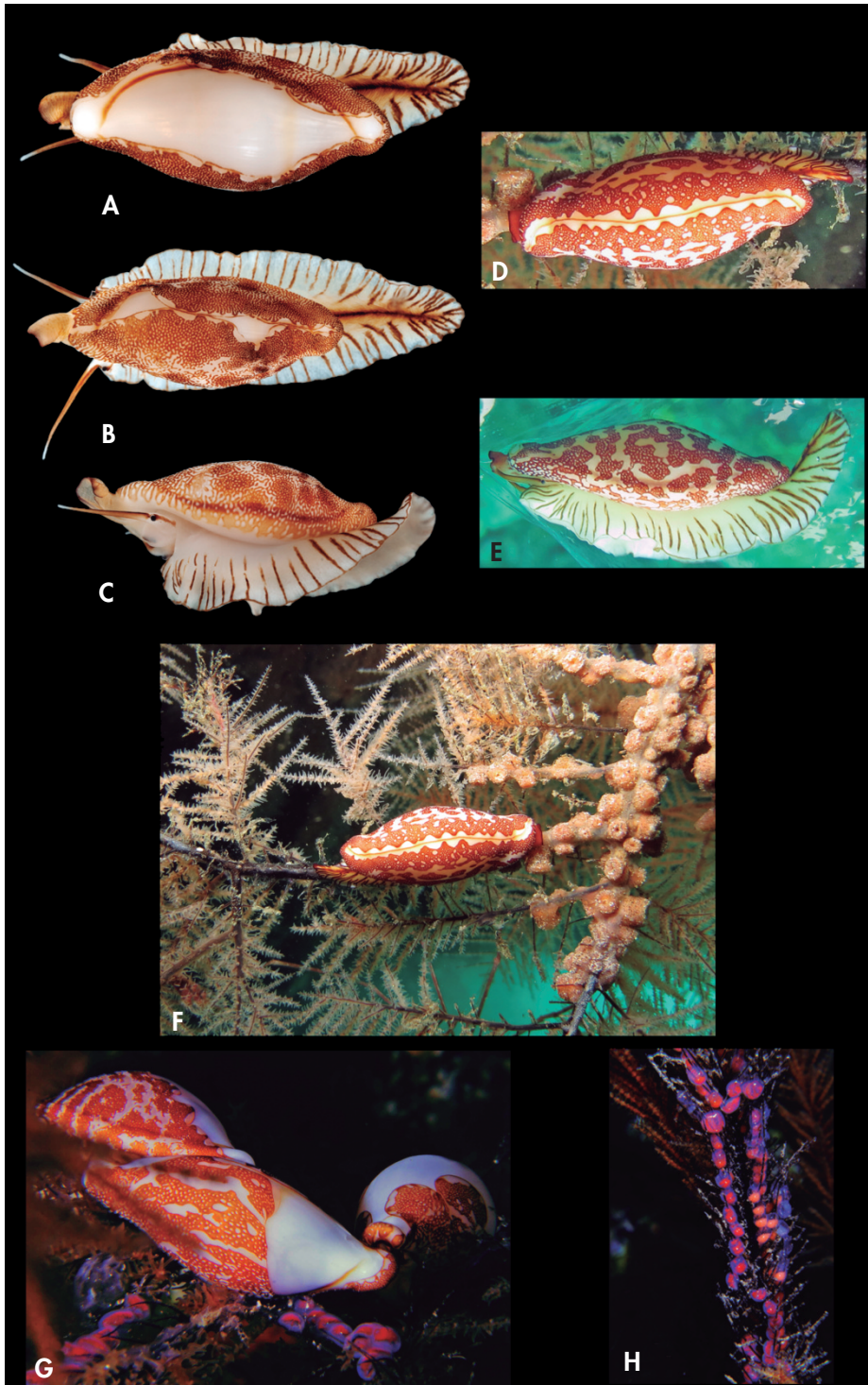
were inhabited by hermit crabs. FRANK (2022) recorded another specimen dredged off Florida Straits in 180 m but did not indicate whether it was found alive. On the other hand, it should be taken into account that shells or even live specimens of shallow water molluscs may fall to great depths given the steep profile of the continental slope eastern of Florida and northern of Cabo de la Vela (Colombia), and the southern insular slope of Bermuda. Thus, as far as is known, there are no reliable published records of any living specimen of *C. aureocinctum* collected at depths below 123 m (that of the apparently live or fresh caught lectotype off near Havana).

*Cyphoma eludens*, a species closely related to *C. aureocinctum* (if not conspecific, see discussion) was found by LORENZ & BROWN (2015) living from 10 to 22 m in St. Helena Island; these authors also mentioned two dredged specimens at 925 m off Miami Beach in 1959, and other off Florida Straits at 500-550 m, but did not clarify whether they were collected alive. The subsequent comment by these authors about the wide range of water temperature in the distribution area of the two species, from 6-10°C in the deep water of the Florida Straits (from data by SCHMITZ & RICHARDSON, 1991) and up to 24°C in St. Helena, probably referred to their

(Right page) Figure 2. *Cyphoma aureocinctum* (Dall, 1889). A-C: dorsal and lateral views of a living, fully grown specimen 27.8 mm in shell length from Tenerife Island, Valle de Güimar, San Pedro, 150 m depth, from shrimp fishing pots; D-E: dorsal and lateral views of a living specimen from near Mindelo, São Vicente, Cape Verde Islands; F: the same specimen on a branch of *Antipathella wollastoni*, close to the zoantharian *Antipathozoanthus macaronesicus*; G: three specimens of about 26 mm length with spawn, from El Bajón, La Restinga, El Hierro, 40 m depth, on *Antipathella wollastoni*; H: detail of this spawn (see text). Photographs: A-C, Leopoldo Moro; D-F, Peter Wirtz; G-H, Belén Caro.

(Página derecha) Figura 2. *Cyphoma aureocinctum* (Dall, 1889). A-C: vistas dorsal y lateral de un ejemplar vivo completamente desarrollado de 27,8 mm de longitud, de Tenerife, Valle de Güimar, San Pedro, 150 m de profundidad, en nasas para gambas de pescadores; D-E: vistas dorsal y lateral de un ejemplar vivo, cerca de Mindelo, São Vicente, islas de Cabo Verde; F: el mismo ejemplar, sobre una rama de *Antipathella wollastoni*, cerca del zoantario *Antipathozoanthus macaronesicus*; G: tres ejemplares de unos 26 mm de longitud con la puesta, de El Bajón, La Restinga, El Hierro, 40 m de profundidad, sobre *Antipathella wollastoni*; H: detalle de esta puesta (ver texto). Fotografías: A-C, Leopoldo Moro; D-F, Peter Wirtz; G-H, Belén Caro.





deepest record of *C. eludens* (925 m) and the doubtful deepest record of *Cyphoma aureocinctum* (1200 m) mentioned above, since the temperature is much higher than 6-10°C at the deepest known record for any living specimen of *C. aureocinctum* from the western Atlantic (123 m). *Cyphoma eludens* was found in St. Helena Island living on *Plumapathes penancea* (Pallas, 1766) at 10-12 m (LORENZ & BROWN, 2015). According to these authors, "the black coral branches in the vicinity of the ovulids show fresh feeding traces, which implies that the ovulids are true parasites and feed directly on the polyps of their host". In the western Atlantic, *Plumapathes penancea* is most common at depths of 15 to 75 m but has been recorded up to 305 m (WAGNER ET AL., 2012); in shallow waters, it inhabits caves and is found under large overhangs (HUMANN, 1993).

LORENZ & BROWN (2015) also stated that *C. aureocinctum* and *C. eludens* are the only Atlantic ovulids occurring on black corals, and that less of 5% of ovulid species have an antipatharian host, but they did not give the source of this percentage. Of the 23 species in the Indo-Pacific genus *Phenacovolva* Iredale, 1930 (WoRMS, 2022), the host anthozoan is known for 16. Eleven of these 16 species were recorded living on black corals of the genus *Antipathes*, between 10 and 250 m depth (CATE, 1969; REHDER & WILSON, 1975; LORENZ & FEHSE, 2009), of which at least four were recorded living both on antipatharians and gorgonians (OKUTANI, 2000; LORENZ & FEHSE, 2009), and five others only on alcyonaceans. *Phenacovolva lahainaensis* (C. N. Cate, 1969) was recorded (as *Phenacovolva weaveri* Cate, 1973) living and grazing on the coenenchyme of *Cirripathes* and *Antipathes* spp. (SCHIAPARELLI ET AL., 2005; TAZIOLI ET AL., 2007), both genera belonging to the family Antipathidae. It is remarkable that the host genera of both *Cyphoma aureocinctum* and *C. eludens* (*Antipathella* and *Plumapathes*, respectively) show affinities, and both belong to the family Myriopathidae (OPRESKO, 2001). *Tanacetipathes tanacetum*, that was found at the

same station than the lectotype of *C. aureocinctum* belongs also to Myriopathidae, and has been reported on its whole range of distribution (see under distribution) at depths ranging between 20 and 1293 m, and between 55 and 96 m in Bermuda (WAGNER & SCHULER, 2017).

In regard to the presence of *Cyphoma aureocinctum* in the Canary Islands throughout the year, Michael K. Sealy (pers. comm., 2013, in LORENZ & BROWN, 2015) "reported that this species was abundant on black corals at 15-30 m, but only during a few months, after which they disappeared", but there is no mention of which were those months. All specimens examined or sighted in the Canary Islands were found in summer (between July and September), except for those from shrimp fishing pots of artisanal fishing boats, that were collected at November-December, and the ones recorded by HERRERA ET AL. (2016) which were found in January. The specimen from São Vicente, Cape Verde Islands was photographed in November. The scant information still available seems to suggest that this species is more common in the Canary Islands in summer, but this may simply be an artefact since it is the most favourable season for diving.

### Spawn

The three specimens with spawn in Fig. 2G were photographed at El Bajón, La Restinga (El Hierro) at 40 m depth in July (specimens or spawn not collected), and one of them was also photographed by Michael J. Sealey (LORENZ & BROWN, 2015, pl. 4, figs. 1-2). As counted from photographs (Fig. 2H), the spawn consists of at least 45 egg capsules arranged in lines along dead branches of the black coral colony and each capsule somewhat separated from the closest ones. The spawn probably corresponds to more than one specimen or more than one laying event, since some capsules appear to have eggs or embryos at an early stage of development (Fig. 2H, left line of capsules), others appear to have embryos or larvae at a more advanced stage (Fig. 2H, middle line of capsules)

and a few appear to be broken and empty (Fig. 2H, center right of the middle line). The egg capsules have a more or less rounded cushion-like shape with convex walls, are transparent with a violet tinge mainly on the edges, and contain some hundred eggs, embryos or larvae of a deep orange colour. It is not visible in the photographs whether the capsule has an escape aperture.

LORENZ & BROWN (2015: 8, fig. 7) described and illustrated the spawn of *Cyphoma eludens* from St. Helena at 10 m depth. Egg capsules are arranged in chains attached to the branches of the host coral and are described as spherical and approximately 3 mm in diameter, but the 21 capsules shown in their figure 7 seem to be similar in shape to those of *C. aureocinctum* from El Hierro; however, the capsules are transparent and colourless unlike this latter species. According to these authors, each capsule contains approximately 100 to 200 larvae (of orange colour as shown in the photograph). It is not visible in the photograph whether the capsule has an escape aperture.

The egg capsules of *Cyphoma gibbosum* described by BANDEL (1973, fig. 2) are similar in shape to those of *C. aureocinctum* and *C. eludens*, but they are transparent and colourless as in the latter species. This author described the spawn of a single female containing 4-34 capsules (average, 18) each in contact with adjacent ones, containing 250 to 500 embryos (average, 300); embryos in just produced capsules are arranged in curved rows, giving the capsule a striped appearance. Some of the capsules on the left line in Fig. 2H seem to show this arrangement of the embryos in bands. BANDEL (1973) reported that after 10 to 11 days of development the capsule walls disintegrate and pink long-term planktotrophic veligers hatch.

The egg capsules of *Cyphoma aureocinctum*, *C. eludens* and *C. gibbosum* are similar in shape to those of *Simnia spelta* (Linnaeus, 1758) and *Simnia patula* (Pennant, 1777) described by THEODOR (1967) and THIRIOT-QUIÉVREUX (1967) and by LEBOUR (1932), respectively. In the two

species of *Simnia*, the capsules are arranged around the gorgonian branches in more densely packed patches or clusters, with each capsule in close proximity to the adjacent one. BANDEL (1973) said that the main difference with capsules of *C. gibbosum* is that in *Simnia* there is an escape aperture; however, only THIRIOT-QUIÉVREUX (1967) notes that the capsule cap is visible at the top of the capsule in *S. spelta*. As described for *Cyphoma gibbosum*, long-term planktotrophic larvae hatch from the capsule in both species of *Simnia*.

### Distribution

Up to now, *Cyphoma aureocinctum* has been found on three of the four western Canary Islands, El Hierro, Tenerife and La Palma, and has been observed breeding on the first two islands.

As stated above, *Cyphoma aureocinctum* was originally described from off Sombrero Island (Florida) and near Havana (Cuba) (DALL, 1889). It was further recorded from Florida (ABBOTT & DANCE, 1983), the Florida Straits (FRANK, 2022), the Gulf of Mexico (off Louisiana, GARCÍA, 2020; GARCÍA & LEE, 2020), Jamaica and Colombia (LORENZ & BROWN, 2015), Bermuda (LIGTHBOURN, 1991; JENSEN & PEARCE, 2009; LORENZ & FEHSE, 2009; LORENZ & BROWN, 2015), the Cape Verde Islands (Maio, ROLÁN, 2005; São Vicente, LORENZ & BROWN, 2015) and the Canary Islands (LORENZ & BROWN, 2015; HERRERA ET AL., 2016; present study). An additional specimen from SW of Dry Tortugas, Florida is here described and illustrated (Fig. 1F). The closely related *Cyphoma eludens* was described from St. Helena Island and also recorded from the Florida Straits, but there are no known records elsewhere (LORENZ & BROWN, 2015). Therefore, both species have an amphiatlantic distribution, although they have so far not been found in sympatry.

The only known anthozoan hosts so far for *Cyphoma aureocinctum* and *C. eludens* are *Antipathella wollastoni* and *Plumapathes pennacea*, respectively. Therefore, it is interesting to know the geographical distribution of both black coral

species in order to establish a possible potential distribution of these gastropods. *Antipathella wollastoni* seems more abundant and is found at shallower depths in the westernmost Canary Islands (BRITO & OCAÑA, 2004). It is only known from the eastern Atlantic (Madeira, Selvagens, Cape Verde, Ascension, Azores and Canary Islands) and the western Mediterranean (a single record from Ceuta, near the Gibraltar Strait at 35 m depth, OCAÑA *et al.*, 2007), but other *Antipathella* species are known from the Mediterranean (*A. subpinnata* Ellis & Solander, 1786) and from New Zealand (OPRESKO, 2001). *Plumapathes pennacea* is known from the Caribbean and the south Atlantic (St. Helena Island) and has been rarely reported from the Indo-Pacific, the type locality, but it is quite likely that more than one species is currently included under this name. The only other species of *Plumapathes*, *P. fernandezi* (Pourtalès, 1874), is known from the eastern Pacific (OPRESKO, 2001).

*Tanacetipathes tanacetum*, the possible black coral host for the lectotype of *Cyphoma aureocinctum*, is known from the Gulf of Mexico to Brazil, and Bermuda (OPRESKO, 1972; PÉREZ, COSTA & OPRESKO, 2005; WAGNER & SCHULER, 2017). There are three more species of *Tanacetipathes* in the western Atlantic, and three others in the eastern Atlantic (OPRESKO, 2001).

### Discussion

Fully grown (adult) shells of *C. aureocinctum* from the Canary Islands here studied measured between 16.4 and 29 mm in length, being the not fully grown specimen from Teno 27.3 mm. The almost fully grown specimens from Teno and Florida (USNM 421653; Fig. 1F) measured 30.2 mm and 23 mm in length, respectively. Adult specimens have a more solid shell, with the external and internal lips more developed and a more conspicuous coloration pattern than the not fully grown specimens. Not fully grown shells (Figs. 1C, F) and smaller adults (Fig. 1B; lectotype, Figs. 1E, 3A) have a faint or not distinct central angulation. LORENZ & BROWN (2015, pl. 2, figs. 2-6) illustrated five adult shells from

the W Atlantic (Colombia, Jamaica and Bermuda) and the Cape Verde Islands measuring between 18.6 and 28.1 mm, together with the lectotype (18.5 mm) from near Havana (Cuba). Although DALL (1889) indicated 18.5 mm in the original description, CATE (1973) gave 19.1 mm for the “hypotype” (see under notes on the type material), and a measurement on photograph (Figs. 1E, 3A) gives 19.2 mm. The adult specimen figured by FRANK (2022) from the Florida Straits is 30.7 mm in length. The holotype of the closely related *Cyphoma eludens* is 30.9 mm in length, and the five paratypes measure between 27.0 and 31.6 mm (LORENZ & BROWN, 2015; pl. 2, figs. 1-3, pl. 3, figs. 1-3), and all of them are adults. Little is known about shell growth-stages in ovulid species, and particularly in *Cyphoma*, except for that described by REIJNEN *ET AL.* (2010) for the common *Cyphoma gibbosum*. Shell growth in this species seems similar to that of cowries (Cypraeidae), in which individuals reach sexual maturity at different sizes infolding the outer lip and thickening the shell, without further growth in the adult stage. As also occurs in many cypraeids, in many ovulid species the smallest known adults are one half the size of the largest ones (ROSENBERG, 1992). The variation of shell thickness either in ovulids or cypraeids has been explained as being due to environmental factors like predation, seawater temperature or food abundance (e.g., ROSENBERG, 1989; IRIE & IWASA, 2003; IRIE, 2006). ROSENBERG (1989, 1992) pointed out that, despite its aposematic colour pattern and its distastefulness to predators, *Cyphoma* species have unusually thick shells for ovulids, that potentially allowing them to survive tasting attacks. In contrast to the adults, juvenile *Cyphoma gibbosum* have thin shells, are often the same colour as their host gorgonians and are cryptic and nocturnal in habits (ROSENBERG, 1989).

According to ROSENBERG (1992), colour pattern in ovulid shells is a more reliable characteristic than only shell colour. The shell colour pattern is very similar in all adult specimens of *Cyphoma*



*aureocinctum* here described, and also very similar to that of *Cyphoma eludens*, except for the more or less intensity of the orange-brown band encircling the shell along the margins and the two dorsal spiral orange bands.

The identification of the Canary Islands specimens as *Cyphoma aureocinctum* is based on the comparison of its shell morphology and colour pattern with those of the lectotype (USNM 421653), as LORENZ & BROWN (2015) did with their specimens from the W. Atlantic and Cape Verde Islands. The lectotype (Figs. 1E, 3A) is the third smallest adult specimen of the species studied so far (18.5 mm in the original description, 19.2 by measurement in the photograph), is more fusiform and lacks the characteristic central angulation that other specimens studied (not all) show, and only the adapical spiral golden band is evident, which is also the only one mentioned in the original description. Nevertheless, *Cyphoma aureocinctum* and the closely related *C. eludens* are the only described species of *Cyphoma* with this unique combination of shell characters and pattern of coloration in fully grown shells.

The mantle colour and pattern may be also diagnostic in Ovulidae (MASE, 1989), and may allow the identification of live collected juveniles, which is very difficult on the basis of the shell only due to the lack of diagnostic characters (REIJNEN ET AL., 2010). No remarkable differences have been observed in the pigmentation pattern of the living animal of the two Teno specimens, those of Valle de Güímar (Tenerife) (Fig. 2A-C) and La Restinga (El Hierro) (Fig. 2G; LORENZ & BROWN, 2015; pl. 4, figs. 1-2). The specimen from the Cape Verde Islands photographed by P. Wirz (Fig. 2D-F) shows more extensive unpigmented mantle patches than those of the Canary Islands, but the pattern of colouration is essentially the same, very similar to the specimens from El Hierro in Fig. 2G. No descriptions or photographs of living animals were published of W Atlantic specimens of *Cyphoma aureocinctum* or *C. eludens*. The

mantle of the latter species from St. Helena Island is also thin and smooth, and according to LORENZ & BROWN (2015), the density of the mantle darker blotches varies individually. These authors differentiated *C. eludens* from *C. aureocinctum* by the transparent mantle which shows sparse, irregular darker blotches and no ornamentation along the edges of the mantle, except for a dark brown border. Nevertheless, photographs by LORENZ & BROWN (2015; pl. 4, figs. 3-7) show a mantle colour pattern similar to that of *C. aureocinctum* from the Canary Islands (including the dark brown mantle border), but paler, with more extensive unpigmented areas and less variegated dark patches. Colour pattern of head, foot and siphon is closely similar in specimens of both *Cyphoma aureocinctum* and *C. eludens*. Thus, with regard to the living animal colour pattern, both species only differs in the density of darker blotches on the mantle.

Apart from the different density of the mantle dark blotches, LORENZ & BROWN (2015) differentiated *Cyphoma aureocinctum* from *C. eludens* by small differences in shell size, solidity and shape, and in the width and intensity of colouring of the perimarginal band, indicating that it is unknown whether both species can occur sympatrically. These differences could rather correspond to intraspecific variation in a single, widely distributed amphiatlantic species, only known from fewer than 20 described or illustrated specimens, and that, as can be inferred from its spawn, would have a long-term planktotrophic development like other ovulids and thus a great dispersal capacity. According to REIJNEN (2015), minor shell morphological characters in Ovulidae, used for separating nominal species, should be considered morphological variety within a single species, and the presence of different morphotypes within a species is not uncommon within the Ovulidae (REIJNEN & VAN DER MEIJ, 2017). Therefore, only further detailed anatomical and molecular studies can definitively establish whether *Cyphoma aureocinctum* and *C. eludens* are different species.



DALL (1889: 236-237) originally described *Cyphoma aureocinctum* (as "*Simnia* (*Neosimnia*) *aureocincta* n. s."), by comparison with *Simnia spelta* (Linnaeus, 1758), considering his new species as "...the Antillean analogue of *Simnia spelta*...", and including it in the genus *Amphiperas* Gronovius, subgenus *Simnia* Risso and section *Neosimnia* Fischer. Nevertheless, DALL (1889) pointed out several clear differences between both species, such as the shell surface of *C. aureocinctum* almost entirely destitute of the fine spiral striations of *Simnia spelta*, the base much more arched, the canals at either end broad, blunt and recurved instead of pointed and straight, the ends heavily calloused, and a very different shell colour pattern. DALL (1889) also discussed about the different shell characters of young specimens of *Simnia spelta* and other related *Simnia* species, and compared his new species with "the only member of this family from this region, ... *Amphiperas* (*Ultimus*) *gibbosus* Linné, which is common", describing the mantle colour pattern and the habitat ("on corals and Gorgonians") of this latter species.

CATE (1973) was the first author to include *Cyphoma aureocinctum* in the genus *Cyphoma*, commenting on that DALL (1889) compared it with *Simnia spelta* and that more material should be seen to eliminate the possibility of intermediate shell forms within the *gibbosum-intermedia* complex. CATE's (1973) diagnosis of *Cyphoma* (shell fairly large, oblong, often heavily calloused, with broad terminal ends and a characteristic, usually exaggerated transverse angular dorsal ridge) fits well to shell characters of *C. aureocinctum*. LORENZ & BROWN (2015) included tentatively *C. aureocinctum* and *C. eludens* in *Cyphoma*, since the host and exceptional shell coloration of both species are untypical from that genus, and pointed to further molecular studies to clarify this issue.

The phylogenetic analysis by SCHIAPARELLI ET AL. (2005) based on mitochondrial 16S rRNA gene grouped in the same clade *Cyphoma gibbosum*, *Neosimnia spelta* (currently *Simnia spelta*) and *Neosimnia*

*aequalis* (G. B. Sowerby I, 1832) (currently *Simnia avena* (G. B. Sowerby I, 1833)). FEHSE (2007) and LORENZ & FEHSE (2009) included *Cyphoma* within the subfamily Simniinae F. A. Schilder, 1927, together with *Neosimnia* P. Fischer, 1884 and *Simnia* Risso, 1826. *Neosimnia* is currently considered an objective synonym of *Simnia*, since DOLIN & LEDON (2002) considered that the lectotype of *Simnia nicaeensis* Risso, 1826, the type species of *Simnia*, is a juvenile specimen of *Simnia spelta* (Linnaeus, 1758), the type species of *Neosimnia*. According to editor's note in WoRMS (2022), all the species treated in LORENZ & FEHSE (2009) under *Neosimnia* should thereby be accepted under *Simnia*, whereas all those treated by these authors under *Simnia* should thereby be accepted under *Xandarovula* Cate, 1973 (see also FEHSE, 2018). Phylogenetic analysis based on mtDNA markers CO-I and 16S sequence data by REIJNEN ET AL. (2010) grouped the genera *Cyphoma*, *Simnialena* C. N. Cate, 1973 and *Cymbovula* C. N. Cate, 1973 in the same clade that *Simnia* and *Neosimnia*, together representing Simniinae. The type species of *Simnialena* is *Simnialena uniplicata* (G. B. Sowerby II, 1849); the type species designated by CATE (1973), *Simnialena marferula* C. N. Cate, 1973, is currently considered a synonym by ROSENBERG ET AL. (2009). *Simnialena uniplicata* appeared in the same subclade as *Cyphoma* in the analysis by REIJNEN ET AL. (2010), but these authors did not synonymize *Simnialena* with *Cyphoma* as they were uncertain of the identity of the type species *Simnialena marferula* Cate, 1973. However, REIJNEN & VAN DER MEIJ (2017) recognized that the specimen of *Simnialena uniplicata* sequenced in REIJNEN ET AL. (2010) is likely a misidentified juvenile of the "black morph" of an unidentified *Cyphoma* species. This black morph of *Cyphoma* was then described as *Cyphoma cassidyae* Lorenz, 2020 (LORENZ, 2020). Thus, *Simnialena* is not treated in WoRMS (2022) as a synonym of *Cyphoma*, and *S. uniplicata* is retained in the genus *Simnialena*. The type species of *Cymbovula* is *Cymbovula acicularis* (Lamarck, 1810).

The genera *Cyphoma*, *Simnia*, *Simnialena* and *Cymbovula* can be distinguished

by shell and mantle characters. Thus, species of the genus *Cyphoma* (including *C. aureocinctum* and *C. eludens*) have a large (18-40 mm), solid, calloused, smooth (except for a fine spiral striation at the ends in some species) and glossy adult shell, usually with a marked dorsal spiral ridge (CATE, 1973; LORENZ & FEHSE, 2009), and a smooth mantle with different colouration patterns depending on species (SIMONE, 2004; REIJNEN & VAN DER MEIJ, 2017). The type species of *Simnia*, *Simnia spelta*, and most other species of this genus are smaller (8-20 mm) and have a thinner, less calloused, fusiform and smooth adult shell (except for fine spiral striation at both ends) lacking dorsal spiral ridge and with a funicular cord (CATE, 1973; LORENZ & FEHSE, 2009), and mantle with simple conical papillae, with some tiny branches at the tip (GHISOTTI & MELONE, 1969; LORENZ & MELAUN, 2011). The type species of *Simnialena*, *Simnialena uniplicata*, also has a small (7-21 mm), fusiform, thin adult shell, with fine wavy-spiral striations covering the entire dorsal area and without spiral ridge and (CATE, 1973; LORENZ & FEHSE, 2009), and mantle with simple papillae, the larger ones with narrow projections (SIMONE, 2004). Finally, the type species of *Cymbovula*, *Cymbovula acicularis*, has a small (5-19 mm), oblong, almost cylindrical, thin, smooth and glossy shell lacking spiral ridge and with reduced funiculum (CATE, 1973; LORENZ & FEHSE, 2009); mantle papillae are very small, simple and of uniform size (SIMONE, 2004). The mantle colour pattern of *Cyphoma aureocinctum* and *C. eludens* is unique among the other known species of *Cyphoma*, and very different from that of the type species of the genus, *C. gibbosum*, which is characterized by bright orange spots, encircled with a black line at a whitish background. Interestingly, the mantle colour pattern of both *C. aureocinctum* and *C. eludens* resembles more closely to that of *Simnia spelta*, whereas the general colour pattern of the head, foot and siphon is similar in all four genera, and also in other ovulids.

With the available information on the anthozoan hosts of the species of

these four genera included in the subfamily Simniinae it seems still premature to establish a relationship between ovulid and their anthozoan hosts (preys). Thus, with the exception of *C. aureocinctum* and *C. eludens*, which have so far only been found on antipatharians (Myriopathidae, LORENZ & BROWN, 2015; this paper), the other species of *Cyphoma* feed mainly on gorgonians of the families Gorgoniidae and Plexauridae, with more or less trophic specialization (REIJNEN ET AL., 2010; REIJNEN & VAN DER MEIJ, 2017). *Simnia spelta* is a generalist predator, also preying on different species of these same two anthozoan families, whereas *Simnialena uniplicata* and *Cymbovula acicularis* only prey on a few species of Gorgoniidae.

Recently, NOCELLA ET AL. (2022) presented a summary of a molecular approach to produce a large-scale phylogeny of Ovulidae and to reconstruct the evolution of their trophic ecology. Awaiting publication of the full paper, further studies based on integrative taxonomy will be needed to clarify ovulid relationships and species identification and to get a better understanding of the phylogeny and trophic specialization in this family.

#### Notes on the type material

The original description of "*Simnia* (*Neosimnia*) *aureocincta* n. s." (being *Simnia* stated as a subgenus of *Amphiperas* and *Neosimnia* as a "section of *Simnia*") by DALL (1889: 236-237) mentioned two localities, "Living on Gorgonia, off Sombrero, in 70 fms." (no station data or coordinates), and "Also at U. S. Fish Commission Station 2334, near Havana, Cuba, on white coral, in 67 fms.". Logically, there should be at least one syntype from each of these two localities. There was no figure of the new species accompanying the original description, and Dall never illustrated it in subsequent works.

CATE (1973: 68-69, figs. 153-153a) mentioned three specimens in relation with his account of *C. aureocinctum*:

(1) One shell, USNM 87124 (fig. 153), cited as the "holotype", from "U. S. Fish Commission, Station 2334, near Havana,

Cuba, in 123 m, living on white gorgonian", and currently considered as "lectotype" in the NMNH Invertebrate Zoology Collections database. CATE gave for this "holotype" the maximum measurements given by DALL (1889), i.e., 18.5 mm in length and 8.0 mm in width. The depth is converted from the 70 fathoms stated by Dall. The indication as "holotype" on p. 69 bears a manuscript correction to "lectotype herein" on the BHL copy of CATE (1973), digitized from an original in Smithsonian Libraries.

(2) "Another specimen (USNM) [no catalogue number was given] was taken in 70 fathoms, off Sombrero Island [in Anegada Passage, between Anegada and Anguilla Islands, a part of the Saint Kitts-Nevis Presidency], West Indies." On the BHL copy of CATE (1973), the indication " (USNM)" is crossed out and annotated "MCZ 7349 (paralectotype)". The assumed location in the West Indies is unsupported (see below notes on this locality, "off Sombrero").

(3) "A specimen bearing the No. 7352, MCZ collection, was collected off Morro Light, Havana, Cuba (Blake Expedition, 1877-78) (Figure 153a: MCZ 7352); curiously, Dall had identified it as '*Simnia uniplicata*', perhaps because the marginal and terminal calluses are not fully developed". This locality is not mentioned in the original description, and therefore this specimen is not a type.

The treatment of USNM 87124 shell (Figs. 1E, 3A) as "holotype" by CATE (1973), later repeated by LORENZ & BROWN (2015), does not amount to a lectotype designation under provisions of ICZN Art. 74.5 ("When the original work reveals that the taxon had been based on more than one specimen, a subsequent use of the term "holotype" does not constitute a valid lectotype designation unless the author, when wrongly using that term, explicitly indicated that he or she was selecting from the type series that particular specimen to serve as the name-bearing type"). This syntype is an apparently live or fresh collected specimen, for which DALL (1889) mentioned as habitat "on

white coral, in 67 fms." [123 m]; therefore CATE's (1973) statement that it was found "living on white gorgonian" is wrong and probably influenced by the statement "on Gorgonia" which DALL (1889) gave for the other locality "off Sombrero" in the original description. LORENZ & BROWN (2015, pl. 1, Fig. 1), who also illustrated this syntype, also wrongly stated that it was collected "with white seafans", based on Cate's statement.

The specimen (2) is not at USNM but indeed in MCZ collections (MCZ 7349, Fig. 3B herein) and is currently recorded both as a "paralectotype of *Cyphoma aureocincta*" or a "syntype of *Simnia* (*Neosimnia*) *aureocincta*" in MCZbase (The Database of the Zoological Collections, Museum of Comparative Zoology-Harvard University). The apparently oldest label within lot MCZ 7349 is printed with "«Blake» Exp. 1877-78, Iden. W. H. Dall", and handwritten "*Simnia acicularis* Lam., off Sombrero, W. I., 70 fms.". The second oldest label is printed with "U. S. Coast Survey, C. P. Patterson, Supt., Gulf Stream and Gulf Mexico Explor. U. S. C. S., S. Blake, Alex. Agassiz, 1877-78", and handwritten "*Simnia acicularis* Lam., off Sombrero, 70 fms.". A third label by Crawford N. Cate is handwritten with "*Cymbula acicularis* (Lamarck, 1810)" and "6-7-70, det.". Finally, the fourth and most recent typewritten label indicates that this specimen is the "paralectotype" of "*Amphiperas* (*Simnia*) *aureocincta* Dall, 1889", but shows a footnote indicating that it is "currently identified as *Cymbovula acicularis*".

In the MCZ register book (ledger), the original handwriting entry indicates that lot 7349 contained one specimen "Off Sombrero" from "Blake, 1878-79" [sic?], identified by Dall ("Id. by W. H. Dall") as "*Simnia acicularis* Lamk.", but a more recent handwritten annotation by an unknown cataloguer (circa 1995) states that this is the "paralectotype" of "*Amphiperas* (*Simnia*) *aureocincta* Dall, 1889" and also that it is "currently identified as *Cymbovula acicularis*". However, the corresponding lectotype designation was never published (Alan Kabat, pers.

comm.) or was the invalid one by CATE (1973) holding the USNM 87124 specimen as "holotype". The specimen currently in lot MCZ 7349 is neither *Cymbovula acicularis* (Lamarck, 1810) as indicated in three of the labels, nor *Cyphoma aureocinctum*, but a specimen 8.4 mm in length of *Simnialena uniplicata* (G. B. Sowerby II, 1848), apparently collected alive and retaining the dried soft parts (Fig. 3B).

The statement on the habitat of *Cyphoma aureocinctum* off Sombrero in the original description by DALL (1889), "Living on Gorgonia, in 70 fms.", may give some clues on this issue, though there is no reference to that habitat statement neither in the ledger nor on the labels accompanying lot MCZ 7349. Dall likely obtained this information from a reliable source as he did not usually give such habitat details in his descriptions. The source must have been an older label or notes by Louis F. de Pourtales, who was on board the "Bibb" when samples were taken "off Sombrero" in the 1868 cruise (POURTALES, 1868, 1871; see below, under notes on the locality "off Sombrero") and could hardly have mistaken a gorgonian for another anthozoan.

*Simnialena uniplicata*, the species to which the apparently live collected specimen currently in lot MCZ 7349 belongs, is a fairly common Caribbean ovulid living at depths between 15 and 30 m on gorgonians of the genera *Leptogorgia* Milne-Edwards, 1857 (*Lophogorgia* Milne-Edwards & Haime, 1857 is a synonym) (LORENZ & FEHSE, 2009), mainly on *L. virgulata* (Lamarck, 1815) (PATTON, 1972). This gorgonian species is distributed from Chesapeake Bay to Florida and the Gulf of Mexico, in depths from 2 to 59 m (one record from 220 m) and Brazil (DEVICTOR & MORTON, 2010). Thus, the habitat mentioned by DALL (1889) ("Living on Gorgonia, in 70 fms. [123 m]") would be consistent with the depth range of the known host of *Simnialena uniplicata*, *Leptogorgia virgulata*.

Nevertheless, DALL (1889: 235-236) distinguished "*Simnia* (*Neosimnia*) *uniplicata*" from both *Cyphoma aureocinctum*

and *Cymbovula acicularis*, and did not mention any specimen of the former species from off Sombrero, but recorded *C. acicularis* "off Sombrero, in 70 fms." (DALL, 1889: 234, as *Simnia acicularis*). No gorgonians off Sombrero in 70 fathoms were found in MCZBase using "off Sombrero" and "Anthozoa" as search key words. Both names of the collector (Louis François de Pourtales) and ship ("Bibb") figure in MCZBase as "collectors" of three anthozoan lots "off Sombrero" but at different depths: the alcyonaceans *Thesea solitaria* (Pourtales, 1868) and *Telesto flavula* Deichman, 1936, off 126 and 54 fathoms (230 and 99 m), respectively, and the antipatharian *Leiopathes glaberrima* (Esper, 1792), off 195 fathoms (357 m). Both alcyonacean species were also recorded by DEICHMANN (1936). POURTALES (1868) described *Thesea solitaria* as new species, and recorded two species under the genus *Gorgonia* and other gorgonians and *Antipathes* from the "Bibb" cruise, but none off Sombrero in 70 fathoms. Consequently, and with the available information, the specimen of *Simnialena uniplicata* currently in lot MCZ 7349 could have been misidentified by Dall as *Simnia acicularis*, but in no way can it be considered a syntype (or paralectotype) of *Cyphoma aureocinctum*.

To further complicate the situation, CATE (1973, fig. 153a, no size was given) illustrated the specimen (3) (MCZ 7352) of *Cyphoma aureocinctum* collected off Morro Light, Havana, Cuba, Blake Expedition 1877-78 sta. 2, 805 fathoms. The apparently oldest label within lot MCZ 7352 is printed with "«Blake» Exp. 1877-78, Iden. W. H. Dall", and the specimen is identified as "*Simnia uniplicata* Sby., off Morro Light, Havana, 805 fms." (handwritten). The second old label is printed with "U. S. Coast Survey, C. P. Patterson, Supt., Gulf Stream and Gulf Mexico Explor. U. S. C. S., S. Blake, Alex. Agassiz, 1877-78", and handwritten with "*Simnia uniplicata* Sby., 805 fms., 2". There are also two more labels by Crawford N. Cate (both dated 7-15-70), handwritten with "*Cyphoma aureocinctum* (Dall, 1889), Paratype?", and one of



them is handwritten on the back with “side + terminal callus is a bit scant, but it would seem to agree otherwise, from approx. type locality! Type in U. S. Mus., 7/70, C. N. Cate”.

In the MCZ ledger, the handwriting entry indicates that lot MCZ 7352 contained one specimen that was also identified by Dall (“Id. by W. H. Dall”) as “*Simnia uniplicata* Sowb.”, and indicated the same locality (“Sta. 2”), depth and collector (“Blake”, 1877-78) as the labels. DALL (1889: 236) recorded “*Simnia* (*Neosimnia*) *uniplicata* Sowerby, ... Dead at Station 2, in 805 fms. Living in 2-20 fms., dead in 12-100 fms.”.

CATE (1973: 69) commented that “...curiously, Dall had identified it as ‘*Simnia uniplicata*’, perhaps because the marginal and terminal calluses are not fully developed”. However, the specimen currently in lot MCZ 7352 is neither that figured by CATE (1973, fig. 153a), which could be *Cyphoma aureocinctum*, nor *Simnialena uniplicata*, but an 8.9 mm specimen of *Cymbovula acicularis* (Lamarck, 1810), apparently collected alive and retaining the dried soft parts (Fig. 3D). This does not agree with the dead specimen of *Simnialena uniplicata* recorded by DALL (1889: 236) at that locality and depth. Moreover, *Cymbovula acicularis* is a common Caribbean species living between 2 and 100 m (LORENZ & FEHSE, 2009). It has been reported from North Carolina to south-east Florida, Texas, the West Indies and Bermuda, living on and eating sea whips, between 1 and 60 m (TUNNELL ET AL., 2010), and was found in Texas on *Lepetogorgia hebes* (3-5 m in depth) and *L. virgulata* (9.5 m) (WICKSTEN & COX, 2011). Thus, it seems unlikely that a living specimen of *C. acicularis* could be found alive on its known host gorgonian as deep as 1472 m.

In this regard, it should be added that lot MCZ 7350 (Fig. 3F) currently contains one shell in poor condition initially identified by Dall as “*Simnia acicularis*, off Havana, in 80 fms.”. However, it seems to be a large specimen of *Simnialena uniplicata* and its bad condition is compatible with an old shell that could have fallen from shallow to deep

depths in areas such as Morro Light, which has a very steep island slope. This is consistent with what DALL (1889: 141) suggested for a dead shell of *Volvarina avena* (Kiener, 1834) (as *Volvarina avena* Valenciennes), dredged “... at Station 2, in 805 fms., probably from shallower water”. Thus, an incorrect transfer of specimens between MCZ lots 7352 and 7350 seems likely. In any case, this shell should not be considered a syntype of *Simnia* (*Neosimnia*) *aureocincta*, as it was collected from a locality other than the two mentioned under the original description.

The specimen illustrated by CATE (1973, fig. 153a, as from lot MCZ 7352; Fig. 3E), which could be a specimen of *Cyphoma aureocinctum*, has so far not been found in the MCZ collections (Jennifer Trimble, pers. comm.). CATE (1973) gave on p. 68 the measurements of a “hypotype” at USNM (no catalogue number) having 19.1 mm in length and 7.2 mm in width; he did not give any definition of “hypotype”, but this (also known as “plesiotype”) is generally understood (EVENHUIS, 2008), as a specimen, other than the name bearing type, upon which a subsequent or supplementary description or figure is based” and this could have applied either to the “holotype” or to the missing specimen.

There is one more lot at MCZ (MCZ 7353) with both labels and ledger entry indicating “*Simnia aureocincta* Dall, off Sombrero, 70 fms.”. The apparently oldest label within lot MCZ 7353 is printed with “«Blake» Exp. 1877-78, Iden. W. H. Dall”, and the specimen is identified as “*Simnia aureocincta* Dall (young), off Sombrero, W. I., 70 fms.” (handwritten). The second old label is printed with “U. S. Coast Survey, C. P. Patterson, Supt., Gulf Stream and Gulf Mexico Explor. U. S. C. S., S. Blake, Alex. Agassiz, 1877-78”, and handwritten with “*Simnia aureocincta* Dall (young), off Sombrero, 70 fms.”. There are also two recent labels, one by Crawford N. Cate (dated 8-18-70), handwritten with “*Neosimnia spelta capitia* Cate, subsp. n., Holotype”, and the most recent with “*Neosimnia spelta capitia* Cate, 1973, Holotype, Off Sombrero, 70 fms., W. I., Blake



Exp. 1877-78" handwritten. In the MCZ ledger, the handwriting entry indicates that lot MCZ 7353 was also identified by Dall ("Id. by W. H. Dall") as "*Simnia aureocincta* Dall", and indicated the same locality ("Off Sombrero"), depth and collector ("Blake", 1877-78) as the labels. The specimen currently in lot MCZ 7353 (Fig. 3C, 8.4 mm) is not *Cyphoma aureocinctum*, but that designated as holotype of *Neosimnia spelta capitia* C. N. Cate, 1973 (CATE, 1973: 91, fig. 206). However, *Neosimnia capitia* is currently considered a synonym of *Simnia avena* (G. B. Sowerby I, 1833), since it is "most probably based on a specimen with incorrect locality data" (LORENZ & FEHSE, 2009: 100). According the latter authors, *Simnia avena* lives in W. American coasts from California to Peru and Galapagos (type locality: Estero Soldado, Guaymas, Sonora, W. Mexico).

There are at least three possibilities about the confusion regarding species identification in MCZ lots 7349, 7352, 7353 and 7350: that Dall misidentified these specimens when he studied them, that specimens or labels have later been wrongly switched between these lots and/or other lots, or a combination of the two. William Healy Dall was an expert malacologist and it seems unlikely that he misidentified such different shells as *Cyphoma aureocinctum*, *Cymbovula acicularis*, *Simnialena uniplicata* and *Simnia avena*. However, DALL (1889) studied over several years thousands of specimens of about 700 species of molluscs, and he probably did not study all lots of Ovulidae at the same time and could make mistakes. It also should be remembered that Dall did not participate in the "Bibb", "Blake" or "Albatross" expeditions, since Louis François de Pourtales was the collector on board the "Bibb" (1868, stations "off Sombrero"; PEIRCE & PATTERSON, 1880: 1; SMITH, 1888: 958), Alexander Agassiz and his colleagues were on board the "Blake" (1877-1878; AGASSIZ, 1888), and James E. Benedict was on board the "Albatross" 1885 cruise (sta. 2334, 1885-01-19; TANNER, 1887; ALLARD, 1999). DALL (1889) only studied and identified the material in the "Blake" collection,

complemented by dredgings made in the south by the "Albatross", "...and other material collected in the region and now in the National Museum", as he himself indicated. Among this material identified by Dall are the specimens MCZ 7349 ("Blake" expedition, 1877-78) and MCZ 7352 ("Blake" expedition, 1877-78), as recorded in the MCZ ledger. Original information about dredgings in which these specimens were collected may therefore have been lost, or wrongly transcribed on the labels or ledgers, or specimens switched between lots.

### Lectotype designation

Up to this point, there are two different specimens recorded as syntypes of *Cyphoma aureocinctum*, with no valid designation of a lectotype. The specimen "off Sombrero" at MCZ (MCZ 7349), currently labelled either as "paralectotype" or "syntype" of *Cyphoma aureocinctum*, corresponds to another species, *Simnialena uniplicata*. The other lot from "off Sombrero" in MCZ (MCZ 7353), labelled as "*Simnia aureocincta* Dall (young)", actually contains a specimen of the Eastern Pacific ovulid *Simnia avena*. Finally, the specimen illustrated by CATE (1973, fig. 153a), as from lot MCZ 7352 (labelled as *Simnia uniplicata*, off Morro Light, Havana, 805 fms., a locality not mentioned in the original description), which could be a specimen of *Cyphoma aureocinctum*, has not been found in the MCZ collections, and lot MCZ 7352 currently contains a specimen of *Cymbovula acicularis*. Therefore, with the available information it is concluded that there is no reliable type material of *Cyphoma aureocinctum* in MCZ, and the possible syntype of *Cyphoma aureocinctum* "off Sombrero" in MCZ is likely lost, misplaced or wrongly identified as some other ovulid.

Since, as mentioned above, the "holotype" citation by CATE (1973) does not amount to a lectotype designation under provisions of ICZN Art. 74.5 and Art. 74.6, the shell USNM 87124 currently at NMNH, from United States Fish Com-

mission R/V “Albatross” sta. 2334 (23° 10' 42" N, 82° 18' 24" W), off Havana, Cuba, 67 fathoms (123 m) depth, is here designated as lectotype (Figs. 1E, 3A). Measurements of this shell on photograph (Fig. 1A) give 19.2 mm in length, which fits well with 18.5 mm in the original description (DALL, 1889), and also with measurements (19.1 mm) of the “hypotype” (or “holotype”) by CATE (1973). All other shell characters in the original description (DALL, 1889: 236-237) match those of this specimen. According to the coordinates of station 2334, it is located offshore of Cojimar, a small town east of Havana.

#### Notes on the locality “off Sombrero”

To add to the confusion about the type material of *Cyphoma aureocinctum*, the locality labelled in MCZ lot 7349 (“off Sombrero”) as from “Blake” expeditions was wrongly interpreted by CATE (1973: 69, 91) as “off Sombrero Island [in Anegada Passage, a part of the Saint Kitts-Nevis Presidency], West Indies”. Sombrero Island is located 34 miles North West of Anguilla in the Leeward Islands. However, DALL (1889: 236-237) only mentioned “off Sombrero, 70 fms.” in the original description, and there is

no “Blake” station with the name “off Sombrero” or “off Sombrero Island”, nor any station 70 fathoms deep sampled between 1877 and 1879 from near Sombrero Island (PEIRCE & PATTERSON, 1880; SMITH, 1888). The nearest stations to Sombrero or Anguilla Islands by the “Blake” are 140 and 141, as “off Virgin Gorda”, of January, 8, 1879, but both are much deeper (861 and 1,097 fms., respectively; SMITH, 1889: 967).

To further complicate this matter, there are at least 15 new mollusc species described and 36 others recorded by DALL (1881, 1886, 1889) at MCZ and NMNH collections, as collected “off Sombrero” (sometimes as “off Sombrero Island”) either in 54, 72 or 54-72 fathoms (99-132 m). The specimens of these species, including syntypes, have been assigned in both museums to either Florida or Anguilla, from the “Blake” 1877-1879 expeditions. An example is *Volvarina styria* (Dall, 1889), “dredged near Sombrero Island, in 54 fms., also at Station 5, in 229 fms., with the preceding” (DALL, 1889: 140, as *Marginella styria* n. s.). However, there is no “Blake” station in 54 fms., nor station 5 in 229 fms., but at 111 fms. (203 m) (PEIRCE & PATTERSON, 1880; SMITH, 1888). BOSS ET AL. (1968) indicated for

(Right page) Figure 3. A: lectotype (here designated, see under notes on the type material, and Fig. 1E) of *Amphiperas (Simnia) aureocincta* Dall, 1889 (USNM 87124), from United States Fish Commission R/V “Albatross” sta. 2334 (23° 10' 42" N, 82° 18' 24" W), off Havana, Cuba, 67 fathoms (123 m) depth, 19.2 mm (Department of Invertebrate Zoology, NMNH); B: alleged syntype (shell with dry soft parts) of *Amphiperas (Simnia) aureocincta* Dall, 1889 (MCZ 7349), off Sombrero, Florida, United States, 70 fathoms (128 m), 8.4 mm (here identified as *Simnialena uniplicata* (G. B. Sowerby II, 1848), see text); C: shell labelled as *Simnia aureocincta* Dall (young) (MCZ 7353), off Sombrero, 70 fms. (128 m), 8.4 mm (currently identified as *Simnia avena* (G. B. Sowerby I, 1833), see text); D: shell (with dry soft parts) labelled as *Simnia uniplicata* Sby. (MCZ 7352), off Morro Light, Havana, 805 fms. (1472 m), 8.9 mm (currently identified as *Cymbovula acicularis* (Lamarck, 1810), see text); E: shell probably of *Cyphoma aureocinctum* figured by CATE (1973, fig. 153a) as from lot MCZ 7352, off Morro Light, Havana, Cuba, Blake Expedition 1877-78, sta. 2, 805 fathoms (reproduced from CATE, 1973; no size was given), but which has not been found so far in the MCZ collections (see text); F: shell labelled as *Simnia acicularis* Lam. (MCZ 7350), off Havana, 80 fms. (146 m), 13.5 mm (probably a specimen of *Simnialena uniplicata*, see text). All figures but E at the same scale; scale bars: A, 10 mm; B-D, F, 2 mm. Photographs: 3A, Ellen Strong, Department of Invertebrate Zoology, NMNH, available from <<https://collections.nmnh.si.edu/>>; 3B-D, F, MCZ, Alana Rivera, available from <<https://mczbase.mcz.harvard.edu/>>.



Figura 3. A: lectotipo (designado aquí, ver notas sobre el material tipo y Fig. 1E) de *Amphiperas* (*Simnia*) *aureocincta* Dall, 1889 (USNM 87124), United States Fish Commission R/V "Albatross" sta. 2334 (23° 10' 42" N, 82° 18' 24" W), frente a La Habana, Cuba, 67 brazas (123 m) de profundidad, 19,2 mm (Department of Invertebrate Zoology, NMNH); B: presunto sintipo (concha con partes blandas secas) de *Amphiperas* (*Simnia*) *aureocincta* Dall, 1889 (MCZ 7349), frente a Sombrero, Florida, Estados Unidos, 70 brazas (128 m), 8,4 mm (identificada aquí como *Simnialena uniplicata* (G. B. Sowerby II, 1848), ver texto); C: concha etiquetada como *Simnia aureocincta* Dall (juven) (MCZ 7353), frente a Sombrero, 70 brazas (128 m), 8,4 mm (identificada actualmente como *Simnia avena* (G. B. Sowerby I, 1833), ver texto); D: concha (con partes blandas secas) etiquetada como *Simnia uniplicata* Sby. (MCZ 7352), frente al faro del castillo del Morro, La Habana, Cuba, 805 brazas (1472 m), 8,9 mm (identificada actualmente como *Cymbovula acicularis* (Lamarck, 1810), ver texto); E: concha probablemente de *Cyphoma aureocinctum* ilustrada por CATE (1973, fig. 153a) como perteneciente al lote MCZ 7352, frente al faro del castillo del Morro, La Habana, Cuba, Blake Expedition 1877-78, sta. 2, 805 brazas (reproducida de CATE, 1973, que no indicó el tamaño), pero que no se ha encontrado hasta ahora en las colecciones del MCZ (ver texto); F: concha etiquetada como *Simnia acicularis* Lam. (MCZ 7350), frente a La Habana, 80 brazas (146 m), 13,5 mm (probablemente, un ejemplar de *Simnialena uniplicata*, ver texto). Todas las figuras, excepto E, a la misma escala; escala gráfica: A, 10 mm; B-D, F, 2 mm. Fotografías: 3A, Ellen Strong, Department of Invertebrate Zoology, NMNH, disponible en <<https://collections.nmnh.si.edu/>>; 3B-D, F, MCZ, Alana Rivera, disponible en <<https://mczbase.mcz.harvard.edu/>>.

this species “near Sombrero Island; Blake sta. 5 [off Marquesas Keys, Florida]”, but the locality currently recorded in the NMNH database for the syntype of *Marginella styria* (USNM 62782) is “Sombrero Island, Anguilla, Blake, 99-132 m”.

The confusion about this Dall’s often cited locality was first pointed out by MIKKELSEN & BIELER (2004: 547). These authors commented on that the interpretation of the locality “off Sombrero, 54 fms.” as an “...station collected by the “Blake” (or “Bache?”)...” and pertaining to the island of Sombrero, east of the Virgin Islands, might refer to Sombrero Key/Reef in the Middle Florida Keys. MIKKELSEN & BIELER (2004) also pointed out that this situation “... is further complicated by the fact that this station was unnumbered, and no [“Blake”] 54-fms station, from either Sombrero locality, appears in SMITH (1889)”.

Moreover, there are some lots of molluscs and decapod crustaceans in MCZBase (ledger) collected “off Sombrero” in depths of 54 and 72 fathoms, as from “Bache” expedition in April, 2, 1872, with W. M. Stimpson as collector; however, no stations or coordinates are given in ledger. SMITH (1888: 962) did not list any “Bache” station in 1872 between March, 29, 1872 (33S, Sand Key, 24° 17’ 00” N, 81° 54’ 00” W) and April, 19, 1872 (41S, off west coast of Florida, 27° 07’ 00” N, 82° 47’ 00” W). These localities were in the Gulf of Mexico, quite far from Sombrero Light in Florida. Thus, there are no “Bache” samples at April, 2, 1872. Also, according to SMITH (1888) “all the Bache’s dredgings were on the west coast of Florida, except 56 to 60 S., which were southwest of the Tortugas”.

As MIKKELSEN & BIELER (2004) stated, “... the 54-fm Sombrero station was never called “Key” by Dall, although it was later and probably erroneously called Sombrero Key by CLENCH & SMITH (1944) ...”. These authors also referred that six bivalve accounts as “off Sombrero, 54-72 fms” lend support to their co-identity, if not

their exact location. The review of stations from other contemporary expeditions (“Bibb”, 1868; “Challenger”, 1872; “Blake”, 1879; “Albatross”, 1887) by MIKKELSEN & BIELER (2004) resulted in stations “off Sombrero”, either for Sombrero Reef (Florida) or the vicinity of Sombrero Island (Virgin Islands), but all are deeper than 54-72 fms., and do not clarify this matter. Finally, MIKKELSEN & BIELER (2004) decided to exclude from Florida Keys records both 54 and 72 fms. stations listed by Dall as “off Sombrero”.

TAYLOR & GLOVER (2016), who did not cite the paper by MIKKELSEN & BIELER (2004), also treated this problem regarding the type locality of *Pleurolucina sombreroensis* (Dall, 1886), one of the bivalve species with type locality “off Sombrero” excluded by the latter authors from the Florida Keys records. *Pleurolucina sombreroensis* was originally described by DALL (1886) “off Sombrero, in 52 fms; ... West Florida, 50 fms.”, with no station number. According to these authors “there is some confusion concerning the type locality, as there is a Sombrero Key (with lighthouse) off-shore and south of Marathon in the Florida Keys and Sombrero Island off Anguilla and the latter appears on the most recent label at USNM”. Dall himself contributed to this confusion, because in a later work (DALL, 1890: 263; not cited by TAYLOR & GLOVER, 2016) in which he illustrated *Lucina sombreroensis*, he mentioned “off Sombrero Island, West Indies, by the “Blake”, in 50 to 72 fathoms”. As MIKKELSEN & BIELER (2004), TAYLOR & GLOVER (2016) did not find any “Blake” station of 72 fms. from near Anguilla, but they restricted the type locality of *P. sombreroensis* to “off Sombrero Key, south of Marathon, Florida Keys’ ca 24° 37’ 28” N, 81° 06’ 30.6” W, since “this species has been commonly recorded at depths of 35-180 metres off the eastern side of the Florida Keys”. However, the latter authors overlooked the revision of taxa described by Dall of BOSS ET AL. (1968), who indicated for this species the locality “off Sombrero, W. Florida”, and also did not con-



sider that there is no Sombrero Key offshore and south of Marathon, but instead there is the Sombrero lighthouse (sometimes called Sombrero Key lighthouse, see below).

Nevertheless, it is worth pointing out that there are nine dredging stations in Florida between 111 and 517 fathoms under the common name “off Sombrero”, sampled by the “Bibb” in 23 April and 1 May 1868, and not by the “Blake” or “Bache” (PEIRCE & PATTERSON, 1880: 1; SMITH, 1888: 958). The first two stations off Sombrero (195 and 115 fathoms, respectively; 23 April) lack coordinates, and no data on “nature of bottom” are given. The seven other stations are of May, 1 (111 to 517 fathoms), being nature of bottom “hard” for those in 111 and 121 fathoms, and “rocky” for the other three “shallower” stations (140, 152, 180 fathoms) (SMITH, 1888: 958). Although all these stations were deeper than 54, 70 or 72 fathoms, it is of relevance that SMITH (1888: 957) commented on that all “Bibb” dredgings in 1868 and 1869 are situated in the Florida straits, “... between Tortugas and Cape Florida. The positions, as published in the *Bulletin of the Museum of Comparative Zoology*, were only given in a general way, and are here taken from Count Pourtales’s original charts, preserved in the Coast Survey Office. A separate series of numbers is attached to each day’s work, both on the charts and in the bulletin, and these numbers and the depths given correspond for the most part, except that the depth of the charts have been corrected whilst those in the bulletin are apparently from the original rough notes. In some cases, however, a different number is given to the hand on the chart from that in the *Bulletin*. All notes here given on the character of the bottom are also derived from the charts... A few hauls, mostly shallow water ones, it has been impossible to place exactly”. These not exactly placed shallower hauls might correspond to the two dredging stations of April, 23, 1868 (195, 115 fathoms), which were the only stations lacking coordinates, or even to some unnumbered stations shallower

than these and not detailed in the available publications.

In addition, POURTALES (1868: 121, 122), who was on board the “Bibb” in these seven dredgings of 1868 at Sombrero and collected specimens, named this location as “off Sombrero Light” or “Sombrero, or Dry Rocks light-house, on the Florida reef”. POURTALES (1868: 123), also stated that this area (“off Sombrero Light”) “is remarkably rich in animal forms, which may be in part attributed to the hard and rough bottom offering points of attachment and shelter”, and found many genera of molluscs, anthozoans and crustaceans matching with species then recorded “off Sombrero” by DALL (1881, 1886, 1889), POURTALES (1868), DEICHMANN (1936) or in MCZbase.

The name Sombrero Key goes back to the Spanish, and old charts show a small island at the spot, but by the later 19th Century the island had eroded away, with some parts of the reef exposed at low tide (WIKIPEDIA, 2022); the reef and the lighthouse have also been called Dry Banks. The construction of the lighthouse began on the almost totally submerged reef bank in 1856, since that date there was no trace of the Key. The U. S. Geological Survey’s *Gazetteer* for Florida specifies that Sombrero Key is located in Monroe County, at 24° 37’ 34” N, 81° 06’ 40” W (ANONYMOUS, 1992: FL 465). The coordinates of the Sombrero lighthouse are 24° 37’ 40.46” N, 81° 06’ 41.78” W, offshore and south of Vaca Key, Marathon, Florida.

From the above, we conclude that the attribution of the “off Sombrero” locality to the vicinity of Anguilla, Virgin Islands, which appears in both MCZ or NMNH databases for many molluscs described or cited by Dall, are likely to be wrong. Therefore, to solve this problem, it is recommended that the appropriate solution is to consider Dall’s lots both in NMNH and MCZ that were originally labelled as from “off Sombrero” or “off Sombrero Island” at depths from 40 to 111 fathoms (73 to 193 m) as collected off Sombrero in SE Florida. It is also suggested to relabel all



these lots with data of the closest “Bibb” station: “Serial number dredging 7, 1868, May 1, off Sombrero, 24° 28’ 50” N, 81° 03’ 10” W, 111 fathoms, hard bottom”, as indicated by SMITH (1888: 958), if no other information to the contrary is found. Nevertheless, there is some previous additional work required for curators at USNM and MCZ, and it

would be interesting to check 1) whether all of these mollusc species are commonly found in east Florida, and 2) if any of the older labels in mollusc or other invertebrate lots as “off Sombrero” from shallower depths, especially those of Anthozoans, were handwritten by Pourtalès, which would confirm that the samples were taken by the “Bibb”.

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