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ORIGINAL PAPER

Sepiolids (Mollusca: Cephalopoda) from the southern Caribbean, Colombian coast, and a redescription of *Nectoteuthis pourtalesii* Verrill, 1883

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Abstract Sepiolids are a lesser known group of cephalopods. This paper deals with the sepiolids of the southern Caribbean in Colombian waters. Six species can be found. *Semirossia tenera*, *Semirossia* sp. *Austrorossia antillensis*, *Austrorossia* sp., *Heteroteuthis* cf. *dispar*, *Nectoteuthis pourtalesii*. A short description for each species is given. A redescription of *Nectoteuthis pourtalesii* is given, including the digestive and reproductive tract. Two new species, one *Austrorossia* and one *Semirossia* were found. A partial description for each of these species is provided. The appendix contains morphometric measurement and indexes. (Tables 1—6). With this, the number of sepiolids from the southern Caribbean is increased to eight species.

Keywords Cephalopoda · Sepiolids · Southern Caribbean · *Nectoteuthis* · Biogeography

Introduction

The family Sepiolidae Leach, 1817 is one of the least known families among the decabrachian cephalopods. The members of this family are relatively small (with mantle lengths (ML) up to 100 mm), have lateral round fins on the mantle, and can be found in all oceans. Three subfamilies are recognized: Heteroteuthinae Appellöf, 1898; Rossiinae Appellöf, 1898 and Sepiolinae Appellhöf, 1898. Most of them are benthopelagicic; only the Heteroteuthinae are fully pelagic (Naef 1923; Nesis 1982; Reid and Jereb 2005; Bello and Biagi 1995). Representatives of only two subfamilies are known in the Caribbean Sea: the pelagic Heteroteuthinae Appellöf, 1898 and the benthic Rossinae Appellöf, 1898. The seven known species of sepiolids in the southern Caribbean are: *Rossia tortugaensis* Voss, 1956, *Semirossia equalis* (Voss, 1950), *Semirossia tenera* (Verrill, 1880), *Austrorossia antillensis* (Voss, 1955), *Rossia bullisi* Voss, 1956, *Heteroteuthis dispar* (Rüppell, 1844), and *Nectoteuthis pourtalesii* Verrill, 1883 (Arocha et al. 1991; Salcedo-Vargas 1991; Reid and Jereb 2005; Judkins et al. 2010).

The benthopelagic species *R. tortugaensis*, *S. equalis*, *S. tenera*, *A. antillensis*, and *R. bullisi* are present in the Caribbean Sea and the Gulf of Mexico. The pelagic species *Heteroteuthis dispar* can be found in the North Atlantic Ocean (its distribution is related to the North Atlantic Gyre) and in the Mediterranean Sea (Rotermund and Guerrero-Kommritz 2010), but its presence in the Caribbean is not clear. Until now, *Nectoteuthis pourtalesii* was only known to exist near the islands of Barbados and Cuba (Verrill 1883; Jereb and Roper 2005; Judkins et al. 2010). In Colombian waters (Caribbean coast as well as Pacific coast), only *S. tenera*, *S. equalis*, and *Heteroteuthis cf. dispar* have reference material in Museum collections (Díaz et al. 2000; Gracia et al. 2002).

This paper reexamines the sepiolids from the Caribbean coast of Colombia based on collections in the Museo de Historia Natural Marino de Colombia (MHNMC), where several sepiolids were deposited. A redescription of *Nectoteuthis pourtalesii* is given, including the digestive and reproductive tract.

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Material and methods

The studied material is part of the malacology collection of the Museo de Historia Natural Marina de Colombia (MHNMC Mol) at the Instituto de Investigaciones Marinas y Costeras José Benito Vives de Andréis (INVEMAR). Several collecting expeditions along the Caribbean coast were undertaken by the INVEMAR in an effort to better document the marine biodiversity of the region (Fig. 1). All samples were collected during diverse research cruises: Macrofauna-Corpoguajira, INVEMAR-Macrofauna I and II, Autoridad Nacional de Hidrocarburos (ANH) I and II, using open bottom trawl nets at depths between 150 and 790 m with hauls of 10 min bottom time in depths of less than 500 m and 20 min in greater depths.

The material was fixed in 10 % formalin in seawater and preserved in 70 % ethanol. Counts, measurements, and indices follow: Roper and Voss (1983); Reid (1991); Jereb and Roper (2005). The classification used in this paper is taken from Sweeney and Roper (1998). Measurements for the species are given in mm. Material from the Museum of Comparative Zoology Harvard University (MCZ) and Smithsonian Institution Museum of Natural History (USNM) was consulted for comparative purposes.

The abbreviations and definitions are as follows:

TL, total length; ML, mantle length; MW, mantle width; MWI, mantle width index; FI R, fin insertion right side; FL R, fin length right side; FWS R, fin width right side; FP R, fin position right side distance from the anterior margin of fin insertion to anterior mantle margin; FLRI, fin length right index; FLLI, fin length left index; FI L, fin insertion left side; FL L, fin length left side; FWS L, fin width left side; FP L, fin position left side distance from the anterior margin of fin insertion to anterior mantle margin; HW, head width; HWI, head width index; HL, head length; HLI, head length index; ED, eye diameter; EDI, eye diameter index; AF, arm formula; AL I R, arm length arm I right side; ALI I R, arm length index arm I right side; AL II R, arm length arm II right side; ALI II R, arm length index arm II right side; AL III R, arm length arm III right side; ALI III R, arm length index arm III right side; AL IV R, arm length arm IV right side; ALI IV R, arm length index arm IV right side; AL I L, arm length arm III left side; ALI I L, arm length index arm I left side; AL II L, arm length arm II left side; ALI II L, arm length index arm II left side; AL III L, arm length arm III left side; ALI III L, arm length index arm III left side; AL IV L, arm length arm IV left side; ALI IV L, arm length index arm IV left side; HcLI I R, hectocotylized arm index arm I right side; HcLI II R, hectocotylized arm index arm II right side; TL L, tentacle length left side; TL R, tentacle length right side; CIL R, club length right side; CIL L, club length left side; CILI, club length index; SC I-IV R, sucker count arm I to IV right side; SC I-IV L, sucker count arm I to IV left side; SC Club, club sucker count; Web A, web depth between arm I right and arm I left side; Web B, web depth between arm I and II; Web C, web depth between arm II and III; Web D, web depth between arm III and IV; Web E, web depth between arm right IV and arm IV left; FuL, funnel length; FuF, free funnel; GiL, number of outer gill lamellae.

Results

Class CEPHALOPODA Cuvier, 1797
Order SEPIOLIDA Kefferstein, 1866

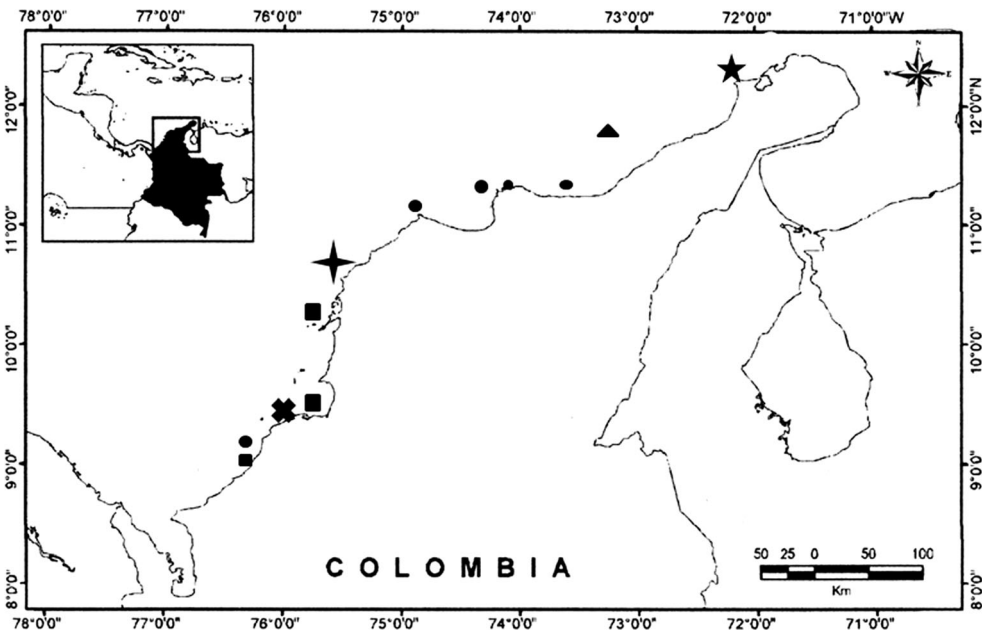

Fig. 1 Map showing study area with capture locations. (●) *Semirossia tenera*, (▲) *Semirossia* sp., (★) *Austrorossia antillensis*, (✦) *Austrorossia* sp., (✖) *Heteroteuthis* cf. *dispar*, (■) *Nectoteuthis pourtalesi*.

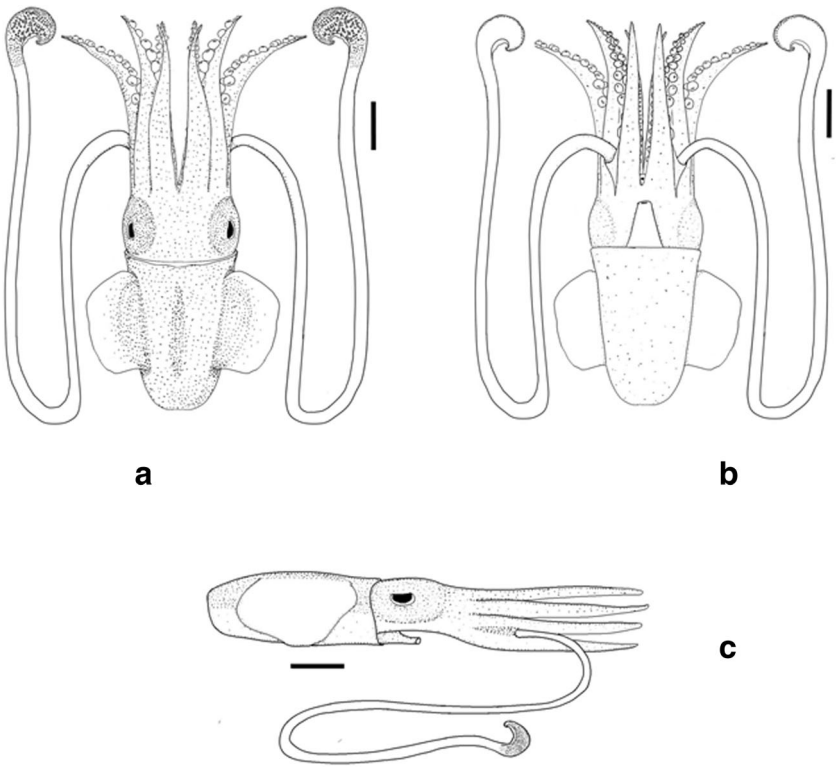

Fig. 2 *Semirossia tenera* (Verrill, 1880), MHNMC Mol 3548. *Habitus*. **a** Dorsal view. **b** Ventral view. **c** Lateral view. (*Scale bar* = 10 mm)

Family SEPIOLIDAE Leach, 1817
Subfamily ROSSINAE Appellöf, 1898
Genus *Semirossia* Steenstrup 1887
Semirossia tenera (Verrill, 1880)
(Figs. 2 and 3)
Synonyms
Heteroteuthis tenera Verrill, 1880 (original combination)

Material examined: 21 animals, 14 males and seven females.

Three males MHNMC MOL 1602; 25 mm, 24 mm, 21 mm ML; Punta Gloria; Macrofauna I E45, 11° 12′10.8″ 74° 17″ 15.6 W to N 11° 11′48″N 74° 17′24.6 W; depth 276 m; 1998. Three males MHNMC MOL 1603; 31 mm, 24 mm, 22 mm ML; Punta Gloria; Macrofauna I E46, 11° 11′44.9″N 74° 17′53″ W to 11° 11′48″ N 74° 17′16.8″ W; depth 282 m; 1998. Two males,

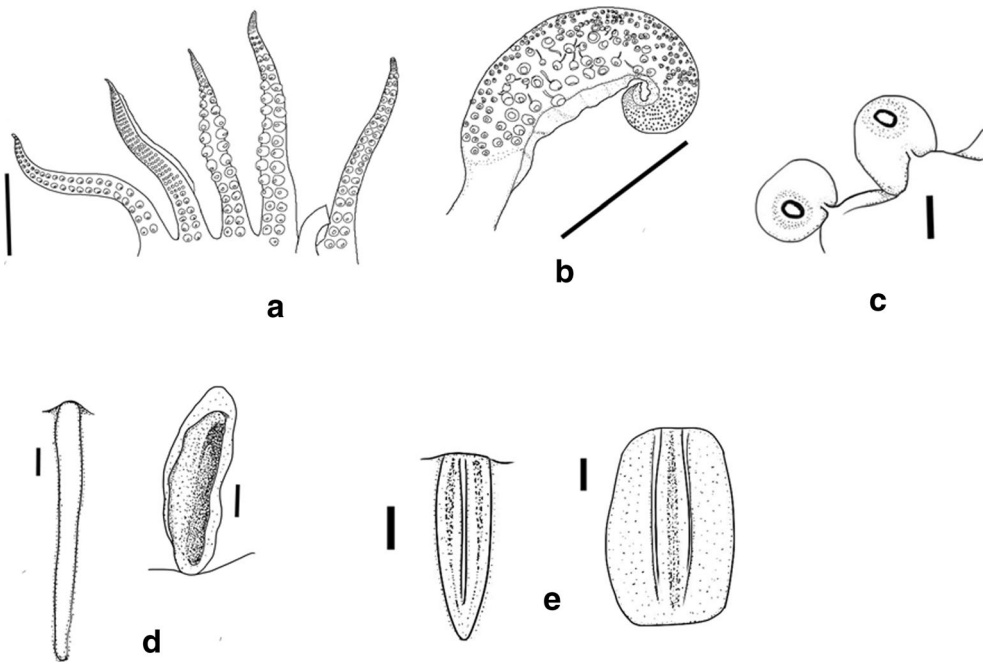

Fig. 3 *Semirossia tenera* (Verrill, 1880), MHNMC Mol 3548. **a** Arm crown. **b** Tentacular club. **c** Detail of arm suckers. **d** Funnel-locking apparatus. **e** Nuchal cartilage. (*Scale bar* **a**, **b** = 10 mm; **c**, **d**, **e** = 1 mm)

one female MHNMC MOL 1610; 25 mm, 24 mm, 23 mm ML; Puerto Escondido; Macrofauna I E59, 9° 16′ 21″ N 76° 28′ 41,4″ W to 9° 15′ 56,4″ N 76° 28′ 45,5″ W; depth 315 m; 1999. Two females MHNMC MOL 2859; 28 mm, 18 mm ML; Este de bocas de ceniza; Macrofauna E4, 11° 9′ 44.3″ N 74° 40′ 0.5″ W to 11° 9′ 42.5″ N 74° 39′ 39.6″ W; depth 204 m; 1998. One male and one female MHNMC MOL 3537; 27 mm, 23 mm ML; Palomino; Macrofauna I E25, 11° 26′ 17.9″ N 73° 31′ 46.2″ W to 11° 25′ 57.6″ N 73° 32′ 6″ W; depth 304 m; 1998. One male MHNMC MOL 3548; 32 mm ML; Palomino; Macrofauna E26, 11° 26′ 13.2″ N 73° 33′ 0″ W to 11° 26′ 22.8″ N 73° 32′ 34.8″ W; depth 306 m; 1998. One male MHNMC MOL 3550; 38 mm ML; Dibulla; Macrofauna I E23, 11° 29′ 25.8″ N 73° 22′ 49.8″ W to 11° 29′ 8.4″ N 73° 23′ 16.1″ W; depth 298 m; 1998. Three males MHNMC MOL 4527; 28 mm, 16 mm, 15 mm ML; Neguanje; Macrofauna II E120, 11° 23′ 7″ N 74° 8′ 40.9″ W to 11° 23′ 4.9″ N 74° 8′ 3″ W; depth 151 m; 2001. Three females MHNMC MOL 4529; 29 mm, 28 mm, 27 mm ML; Neguanje;, Macrofauna II E121, 11° 23′ 12.9″ N 74° 8′ 56″ W to 11° 23′ 15″ N 74° 9′ 5″ W; depth 150 m; 2001.

Description:

Body (Fig. 2a,b,c): firm. Mantle: dome-shaped, broad, short in length, subcylindrical, dorsolaterally slightly compressed and about as wide as long; anterior mantle margin sinuous and projecting anteriorly in the mid-dorsal line. Dorsal mantle not fused to head. Fins (Fig. 2a,b,c): ovate of moderate size, occupy about 66.0 % ML. Anterior lobe free. Head: large and bears prominent eyes. Funnel: long, slender, free for most of its length. Funnel organ stout, shaped like an inverted V, and angled on lower external border, with broad members. Ventral pads strongly angled and boomerang shaped. Funnel-locking apparatus (Fig. 3d): composed of long cartilaginous rod on mantle and an oval shaped structure on funnel, with broad central grove. Nuchal cartilage (Fig. 3e): head anterior edge broad and rectangular, with two thin longitudinal groves. Mantle posterior end elongated and pointed distally, with a central longitudinal rod.

Arms (Fig. 3a): moderately long (ALI 93-131). Arm formula II: III: I: IV. Left dorsal arm in males hectocotylized: proximally six pairs of normal suckers, that decrease in size distally, becoming tetraserial in arrangement. At level of fifth pair of proximal suckers a broad membrane originates, which borders arm on the ventral side for about 1/3 of its length. Distal to membrane, arm attenuated, and suckers are again in two transverse rows. Sucker pedicels bordering membrane form a palisaded effect, which continues on oral surface of membrane as a fine pleat. Suckers (Fig. 3c): pedunculated and globose with small round apertures lacking dentition. The suckers of the male are distinctly enlarged in the mid-portion of arm II and III, and extend to within a short distance of the tip, where they abruptly decrease in size. Web formula: D: B: C: A: E. Tentacles (Fig. 3b): long, with expanded clubs bordered dorsally by a protective membrane, which originates proximal to basal suckers and extends to distal tip of the club. Club suckers arranged in six or seven rows. Dorsal suckers are about twice as large as others. In all suckers ring is toothed around entire margin. Gills: 22 to 30 lamellae on outer demibranch. Ink sac: present, with a round photophore embedded. Anal flaps: present.

Distribution: Western North Atlantic and Caribbean Sea.

Remarks:

This is a common species in the Caribbean. More taxonomical work is needed to determine the real range of variability of the species.

Semirossia sp.

(Figs. 4 and 5)

Material examined: five individuals.

Semirossia equalis Voss, 1950 USNM 574599; Holotype male; 26 mm ML; Florida Pelican Shoal; 06.08.1949. One male and one female MHNMC MOL 8752; 21 mm, 19 mm ML; in front of Bahía Honda; ANH Exploración I EA 266, 12° 32′ 49.2″ N 71° 51′ 57.3″ W to 12° 32′ 58.5″ N 71° 51′ 33.8″ W depth 500 m, 2008. Two males MHNMC MOL 8754; 28 mm, 23 mm ML; in front of Cabo de la Vela; ANH Exploración I EA268, 12° 20′ 6.2″ N 72° 27′ 3.9″ W to 12° 20′ 16.5″ N 72° 26′ 43.1″ W; depth 500 m; 2008.

Description:

Body (Fig. 4a,b,c): soft, fleshy. Mantle: dome-shaped, broad, short in length, subcylindrical, dorso-laterally slightly compressed, and about as wide as long. Anterior mantle margin is sinuous and slightly advanced in mid-dorsal line. Dorsal mantle not fused to head. Fins: ovate, of moderate size, and occupy about 70 per cent of mantle length. Anterior lobe free. Head: large and bears prominent eyes. Funnel: long, slender, and free for most of its length. Funnel organ stout, shaped like an inverted V, and angled on lower external border, with broad members. Ventral pads are strongly angled and boomerang-shaped. Funnel-locking apparatus (Fig. 5d): composed of a long club-shaped cartilaginous rod on the mantle and an oval-shaped structure on funnel side, with a broad central grove. Nuchal cartilage (Fig. 5e): broad and ovoid in shape, with broad longitudinal grove. Mantle component an elongated longitudinal rod that is pointed distally. Arms (Fig. 5a): moderately long. Arm formula VI:III:II:I. Suckers of male are distinctly enlarged in mid-portions of arms II and III, and extend to within a short distance of tip, where they abruptly decrease in size. The left dorsal arm in males hectocotylized: proximally

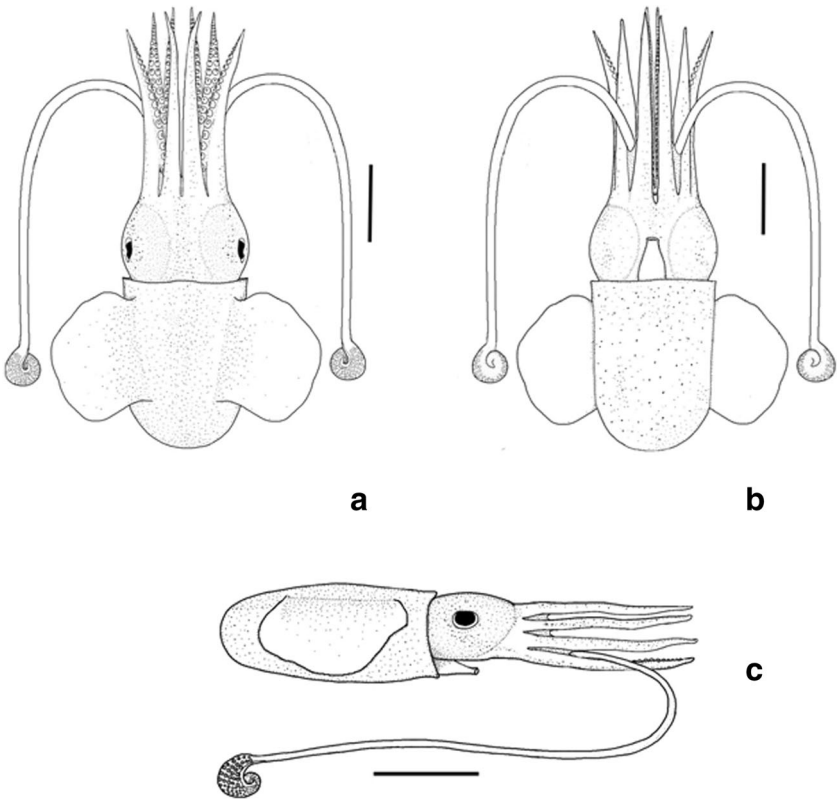

Fig. 4 *Semirossia* sp., MHNMC Mol 8752. *Habitus*. **a** Dorsal view. **b** Ventral view. **c** Lateral view. (*Scale bar* = 10 mm)

five pairs of normal suckers, that decrease in size distally, becoming tetraserial in arrangement. No lateral membrane on arm. At tip of arm suckers again in two transverse rows. Suckers (Fig. 5c): Pedunculated and globose with

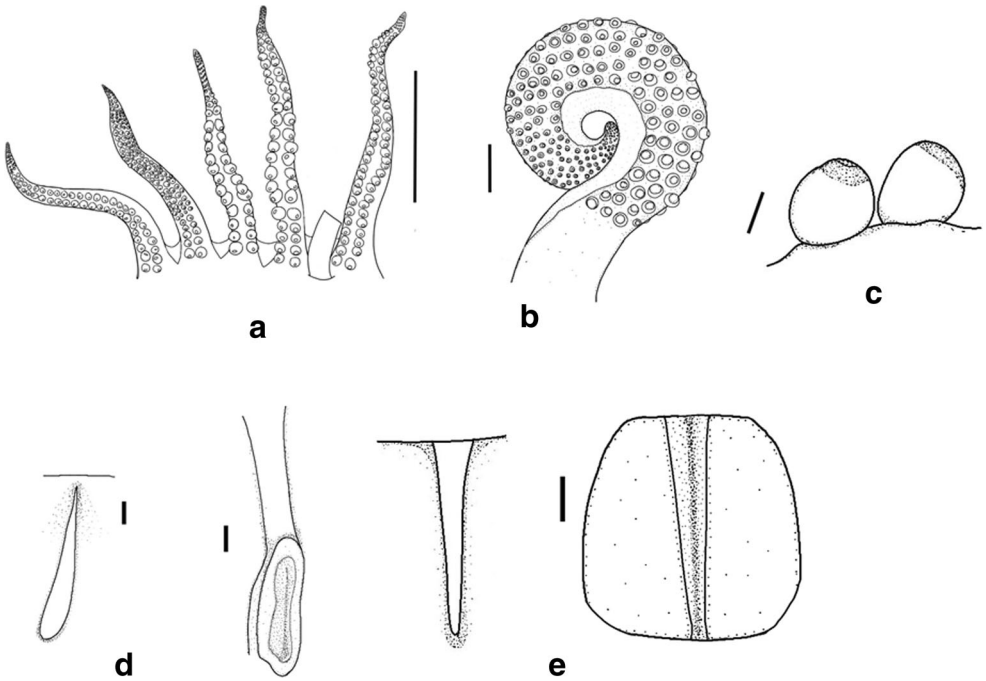

Fig. 5 *Semirossia* sp., MHNMC Mol 8752. **a** Arm crown. **b** Tentacular club. **c** Detail of arm suckers. **d** Funnel-locking apparatus. **e** Nuchal cartilage. (*Scale bar* **a** = 10 mm; **b**, **c**, **d**, **e** = 1 mm)

small round apertures that lack dentition. Web formula D:C:B = A:E. Tentacles (Fig. 5b): long, with expanded clubs bordered dorsally by a membrane, that originates proximal to basal suckers and extends to the distal tip of club. Keel present. Suckers are arranged in seven transverse rows. The dorsal suckers are slightly larger than the rest. For all suckers, the apertures are toothed around the entire margin. Gills: 22 to 30 lamellae on outer demibranch. Ink sac: present, with a photophore. Anal flaps present.

Distribution: Only known from the capture locality at 500 m depth.

Remarks:

This species is found in deep waters around 500 m. It is smaller than both *Semirossia tenera* and *Semirossia equalis*. It can be distinguished from *S. tenera* by the smaller size, shorter tentacles, fins that are more terminal (FLI around 66 and in *S. tenera* FLI around 60), a mantle that is more apically rounded, and a club that is shorter. Arms are shorter (ALI 80–100 and in *S. tenera* ALI 90–131). It is very similar to *S. equalis* and could, under circumstances, be identified as a juvenile of this species, but differs due to the size of the fins (FLI around 66 and in *S. equalis* FLI around 50), shorter arms, and longer tentacles (*Semirossia* sp. TLI 150–290) than in *S. equalis* (TLI 92)), and fewer but larger club suckers. *Semirossia equalis* has 51 longitudinal suckers in seven to eight transverse rows, while *Semirossia* sp. has 38 longitudinal suckers on the club in seven transverse rows. A full description will be made when more material becomes available.

Genus *Austrorossia* Berry, 1918

Austrorossia antillensis (Voss, 1955)

(Figs. 6 and 7)

Synonyms

Rossia antillensis Voss, 1955 (original combination)

Material examined: Two individuals.

One female, USNM 814084; 77 mm ML; Colombian Basin, Caribbean Sea; 05.12.1968. One male, MHNMC Mol 3543; 35 mm ML; Cabo de la Vela; Macrofauna E17. 12° 15′ 22.7″ N 72° 32′ 57.5″ W to 12° 14′ 56.4″ N 72° 33′ 7.8″ W; depth 318 m; 1998.

Description:

Based on Reid and Jereb (2005) and the present material. Body (Fig. 6a,b,c): soft and fleshy. Mantle is oval, saccular, rounded posteriorly, with dorso-median border slightly protruding. About two-thirds as wide as long. Dorsal mantle not fused to head. Fins: large, fleshy, oval, with the anterior lobe free, flabby in consistency. Head: slightly broader than mantle and bears prominent and large eyes (EDI around 50). Funnel: stout, tubular, and free for half of its length. Funnel-locking apparatus (Fig. 7d): club-shaped cartilage on mantle component and a corresponding teardrop-shaped cartilage with central groove on funnel component. Nuchal cartilage (Fig. 7e): rounded, rectangular-shaped, with central groove and corresponding longitudinal rod on mantle. Arms (Fig. 7a): medium length and stout. In male, dorsal arms are hectocotylized, base of third pair of suckers is a fleshy pad, or fold, on the outer, or ventral, margin of arm. This peculiar pad extends to the base of the eighth pair of suckers and is similar on both arms. Non-hectocotylized arm sucker arrangement is the same in both sexes: arm suckers biserial and sparsely arranged; mid-arm suckers enlarged in males, larger than female arm suckers. Suckers (Fig. 7c): on arms arranged in two distinct rows and uncrowded. Web formula: D > C > B:A > E. Tentacles (Fig. 7b): long, stout, and generally oval in cross section, but squared on oral edge. Clubs are recurved, short, not wider than stalk, and rounded with a dorsal keel. Suckers are very minute and of similar size. There are about 150 longitudinal and 30–40 transverse rows. Gills: 17 lamellae on outer demibranch. Anal flaps: well developed. Ink sac: well developed.

Body: smooth and reddish purple in color, ventral coloration paler than dorsal. Densely distributed chromatophores, which extend onto both the dorsal and ventral surfaces of the fins.

Distribution: the Caribbean Sea.

Austrorossia sp.

(Figures 8 and 9)

Material examined: two individuals.

One female, USNM 814084; 77 mm ML; Colombian Basin Caribbean Sea; 05.12.1968; one male; MHNMC Mol 9393; 32 mm ML; Costa afuera de Galera Samba, Cartagena; ANH, Exploración II EA 283, 10° 54′ 42.9″ N 75° 35′ 45.9″ W; depth 790 m; 2009.

Description:

Mature male. Body (Fig. 8a,b,c): soft and fleshy. Mantle: conical, saccular, rounded posteriorly, with dorso-median border slightly protruding (MWI 71,8). About two-thirds as wide as long. Dorsal mantle not fused to head. Fins: large, fleshy, triangular, with anterior lobe free, flabby in consistency. Head: broader than mantle (HWI 78,13) and bears prominent and large eyes (EDI 37,5). Funnel: stout, tubular, and free for half of its length. Funnel organ composed of an inverted V and two lateral elongated pads. Funnel-locking apparatus (Fig. 9d): elongated cartilaginous pad on mantle component and a corresponding oval-shaped groove on funnel

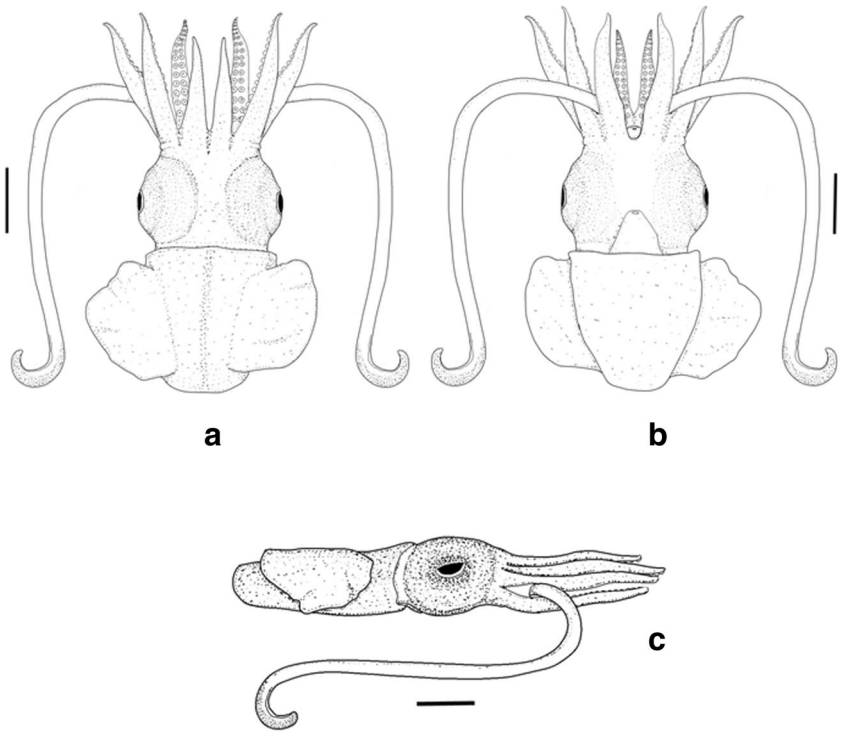

Fig. 6 *Austrorossia antillensis* (Voss, 1955), MHNMC Mol 3543. *Habitus*. **a** Dorsal view. **b** Ventral view. **c** Lateral view. (*Scale bar* = 10 mm)

component with a tissue isthmus connecting to the head. Nuchal cartilage (Fig. 9e): oval with a central groove on the head and on mantle a longitudinal rod. Arms (Fig. 9a): longer than mantle (ALI 103–118) and stout. Dorsal arms longest. Arm formula I:III > II > IV. Dorsal arms have only a small glandular crest on the inner surface of arms, at the basis of

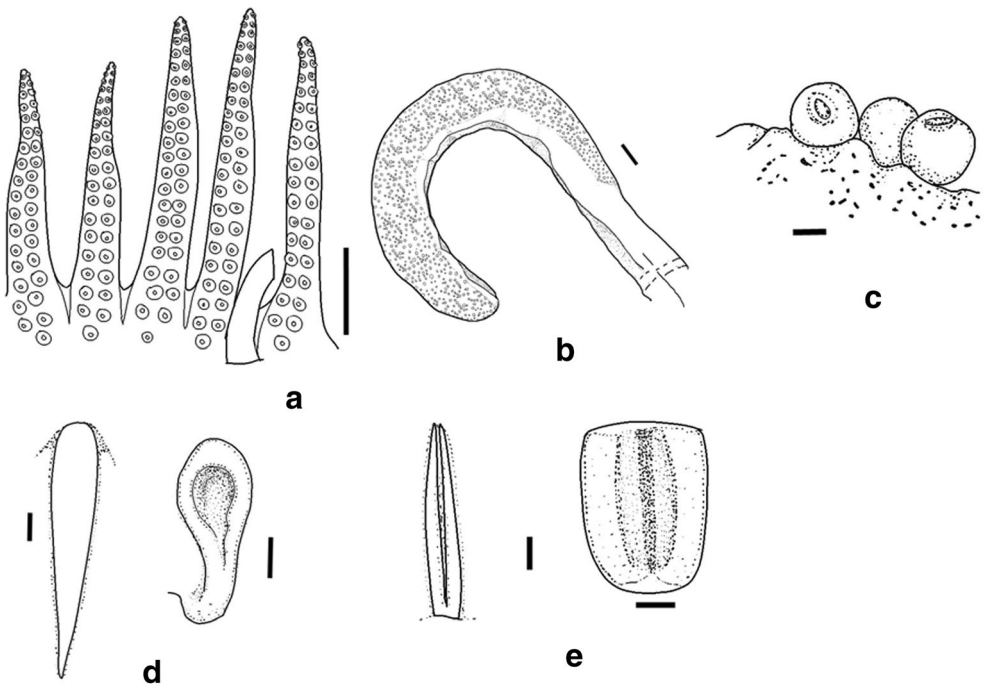

Fig. 7 *Austrorossia antillensis* (Voss, 1955), MHNMC Mol 3543. **a** Arm crown. **b** Tentacular club. **c** Detail of arm suckers. **d** Funnel-locking apparatus. **e** Nuchal cartilage. (*Scale bar* **a** = 10 mm; **b**, **c**, **d**, **e** = 1 mm)

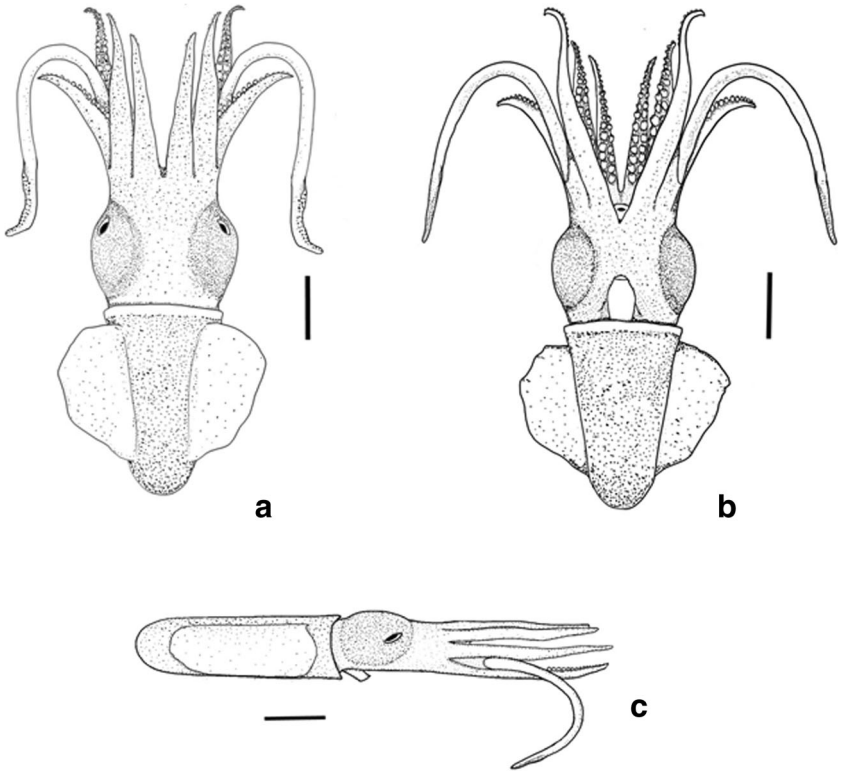

Fig. 8 *Austrorossia* sp. MHNMC Mol 9393. *Habitus*. **a** Dorsal view. **b** Ventral view. **c** Lateral view. (*Scale bar* = 10 mm)

web; suckers about one third smaller than the ones in other arms; no other modification on dorsal arms. Suckers (Fig. 9c): barrel shaped, arranged in two distinct rows and uncrowded. Suckers are larger in arms II, III and IV in the mid portion of the arms. Web formula: C:D > A > B > E. Tentacles (Fig. 9b): short, stout, and generally oval in cross section, but squared on oral edge. Clubs are straight, short, not narrower than stalk, rounded with a dorsal keel. There are 42 longitudinal suckers and nine transverse rows of minute similar size. Gills with 12 lamellae on outer demibranch. Anal flaps present, well developed. Ink sac well developed.

The color is reddish purple with densely distributed chromatophores that extend onto both the dorsal and ventral surfaces of the fins.

Distribution: This species is known only from the capture location at 790 m depth.

Remarks:

By the form of the mantle and club it can easily be distinguished from *A. antillensis*. Body consistency is more firm than *A. antillensis*. Mantle and general body form is different; more oval in *A. antillensis* and more conical in *Austrorossia* sp. The number of sucker rows on club is also different. Suckers are minute in *A. antillensis* with 146 longitudinal suckers and about 40 transversal rows. *Austrorossia* sp. has 42 longitudinal suckers and eight transverse rows. A more detailed description cannot be made at the moment due to a lack of material. Inner anatomy can only be observed by making dissections. As more material becomes available in the future, a complete description can be made of this new species.

A revision of the genus *Austrorossia* is urgently needed, with redescription of all species.

Subfamily HETEROTEUTHINAE Appellöf, 1898

Genus Heteroteuthis Grey, 1849

Heteroteuthis cf. *dispar* (Rüppell, 1844)

(Figures 10 and 11)

Material examined: One female, MHNMC Mol 9398; 26 mm ML; Costa afuera de Tinajones; 09° 27′ N 75° 57′ W; 2009.

Description:

Males have at least two greatly enlarged suckers (about nine times as large as normal ones) on distal half of arm pair III. Ventral shield not covering the funnel. Body (Fig. 10a,b,c): firm and muscular. Mantle: oval, longer than wide. Mantle sometimes covers distal part of the eyes, leaving a short free neck, ventrally extended anteriorly but not covering funnel. Fins: oval, positioned dorsally on mantle, about half as long as mantle, reaching the dorsal midpoint of the mantle with their

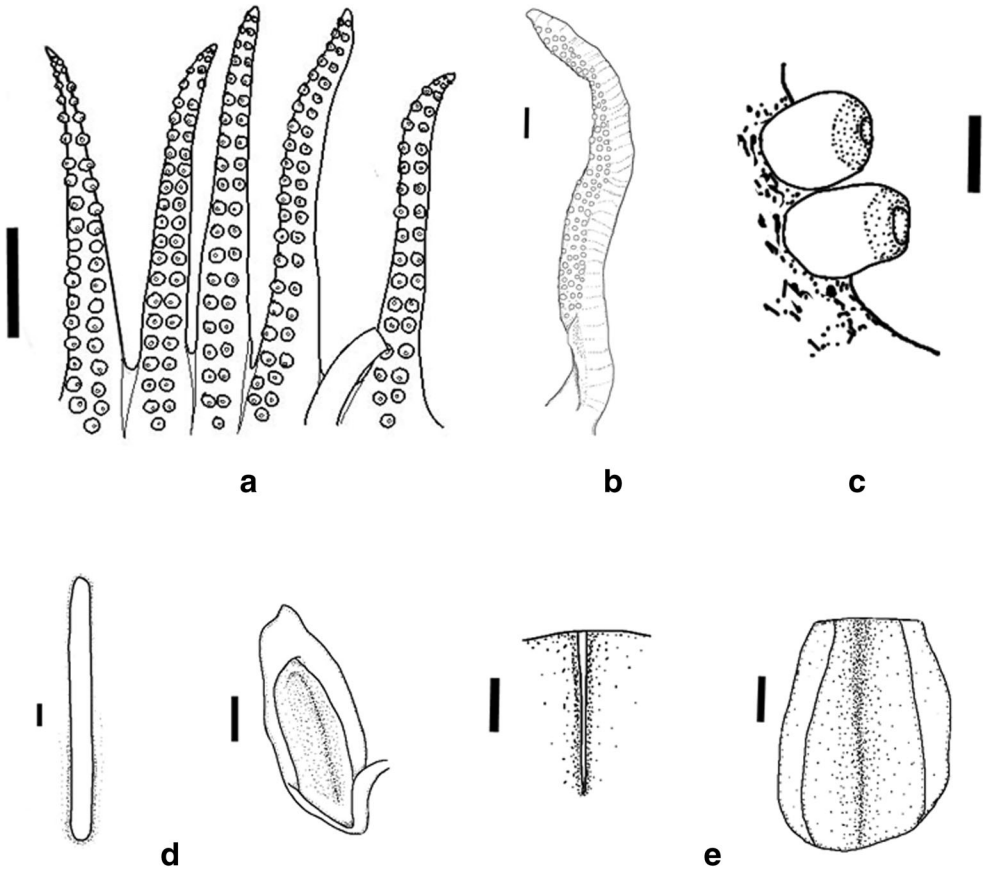

Fig. 9 *Austrorossia* sp. MHNMC Mol 9393. **a** Arm crown. **b** Tentacular club. **c** Detail of arm suckers. **d** Funnel-locking apparatus. **e** Nuchal cartilage. (*Scale bar* **a** = 10 mm; **b**, **c**, **d**, **e** = 1 mm)

frontal end and slightly overlapping distal part of mantle. Head: narrower than mantle, length about 40 % of ML in both sexes. Eyes: large, round, located mediolaterally on the head. Funnel: tubular, free, at least at the distal part; about 1/3 of ML. Arms (Fig. 11a,b): arms male (Fig. 11b): arm formula: III: IV: I: II. First arm pair generally slightly longer than second arm pair, which is shortest. Third arm pair longest, fourth pair second longest (ALI 39–66). First and second right arms hectocotylized in males, fused, and connected with a muscular band. Second right arm has thick glandular tissue at base. Suckers (Fig. 11a,b): Suckers pedunculated, arranged in two rows, and attached ventrolaterally. Suckers on right arms I and II only appear from the distal third to the tips. Suckers on left arms I and II are normal-sized. Distal arm III has two greatly enlarged suckers on its second half, relatively close to tips, eventually followed by some smaller suckers. Relatively inconspicuous keel on arms I, II and IV. Normal suckers with a smooth chitinous ring. Web formula: D: B: A: C. Tentacles (Fig. 11c): long, at least twice as long as total body length, as wide as arms, width decreasing towards the end. Small keels are observable at clubs basis. Clubs moderately thickened and covered by very small suckers in about 16 rows crosswise and 55 rows lengthwise with more than 400 suckers per club. Club suckers of tentacles attached ventrolaterally. Gills: 17 to 21 lamellae on outer demibranch. Anal flaps present. Ink sac: cushion-shaped, covering photophore dorsally. Photophore rounded to lobe-shaped in different expressions, with two papillae and two openings.

Distribution: North Atlantic Ocean, and Mediterranean Sea.

Remarks:

Only one individual was present in the collection. This female is one of the largest known for the genus, with 26 mm ML. Identification of females at species level is almost impossible; several females of *Heteroteuthis*

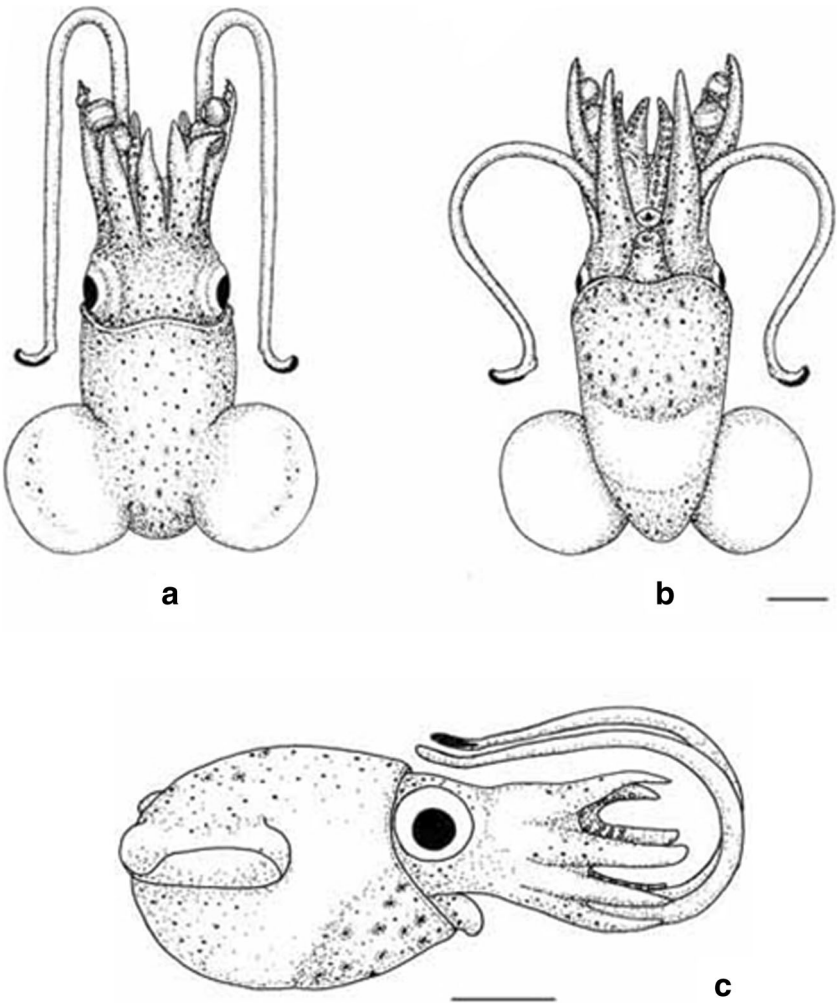

Fig. 10 *Heteroteuthis* cf. *dispar* (Rüppell, 1844) modified after Rotermund and Guerrero, 2010. *Habitus*. **a** Dorsal view. **b** Ventral view. **c** Lateral view. (*Scale bar* = 5 mm)

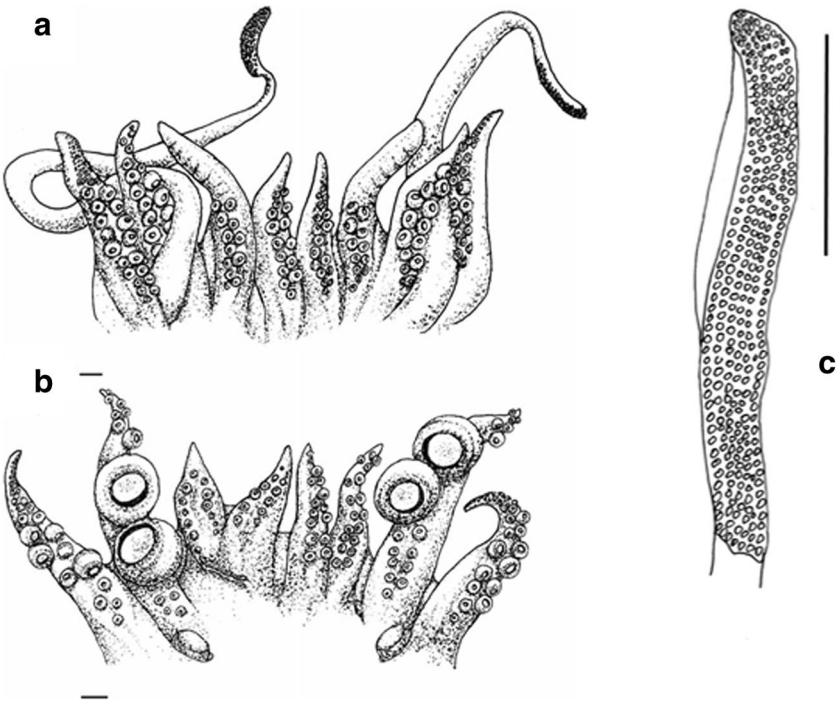

Fig. 11 *Heteroteuthis* cf. *dispar* (Rüppell, 1844) modified after Rotermund and Guerrero, 2010. **a** Arm crown female. **b** Arm crown male. **c** Tentacular club. (*Scale bar* **a**, **b**, **c** = 1 mm)

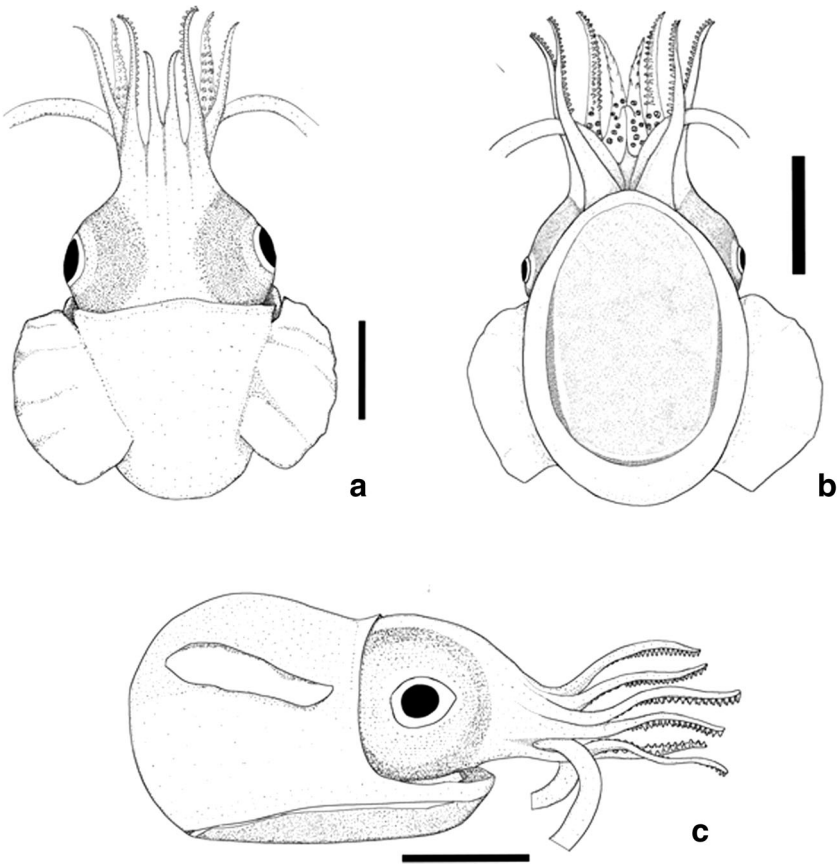

Fig. 12 *Nectoteuthis pourtalsii* Verrill, 1883 MHNMC Mol 1600. *Habitus*. **a** Dorsal view. **b** Ventral view. **c** Lateral view. (*Scale bar* = 5 mm)

species are almost identical. It is assumed that this individual is probably *Heteroteuthis dispar* or a closely related species, which must be confirmed. More material is needed specially of males to establish with no doubt the identification. The presence of other species of *Heteroteuthis* in the Caribbean is under study now.

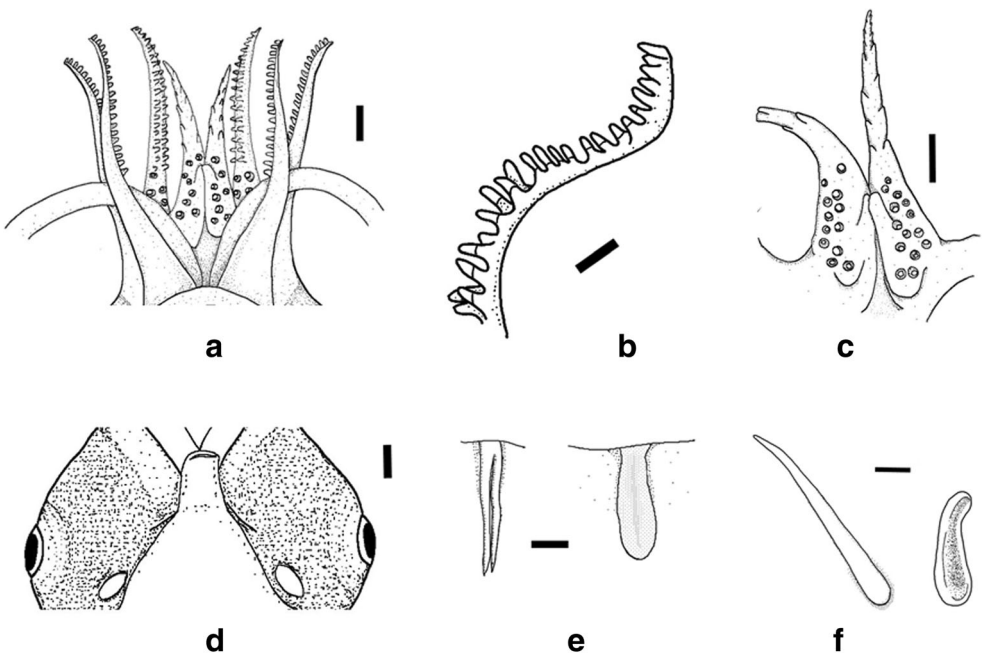

Fig. 13 *Nectoteuthis pourtalsii* Verrill, 1883 MHNMC Mol 1600. **a** Arm crown. **b** Detail of arm showing conical pedicels of suckers. **c** Hectocotilized arms in male. **d** Funnel and ventral photophores. **e** Nuchal cartilage. **f** Funnel-locking apparatus. (*Scale bar* **a**, **b**, **c**, **d**, **e**, **f** = 1 mm)

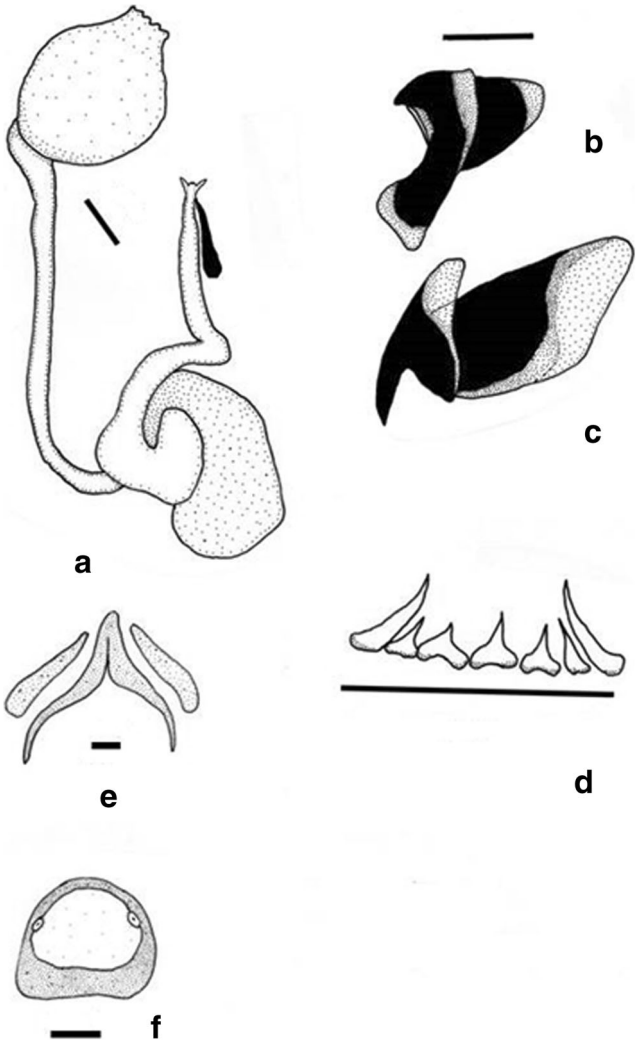

Fig. 14 *Nectoteuthis pourtalsii* Verrill, 1883 MHNMC Mol 1600. **a** Digestive tract. **b** Upper beak. **c** Lower beak. **d** Radula. **e** Funnel organ. **f** Photophore on digestive gland. (*Scale bar* = 1 mm)

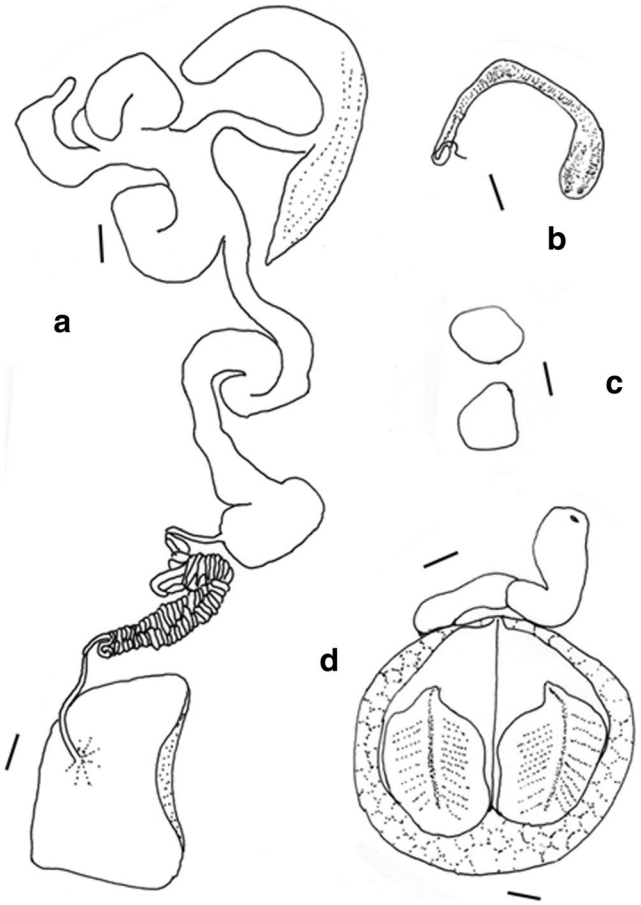

Fig. 15 *Nectoteuthis pourtalsii* Verrill, 1883 MHNMC Mol 1600. **a** Male genitalia. **b** Spermathophore. **c** Eggs. **d** Female genitalia. (*Scale bar* = 1 mm)

Genus *Nectoteuthis* Verrill, 1883

Nectoteuthis pourtalesii Verrill, 1883

(Figures 12, 13, 14, 15, 16, and 17)

Material examined: Six individuals: two males and four females.

Holotype: male USNM 7297734; 10 mm ML; Barbados; Capture date 9.03.1879. One male and one female MHNMC MOL 1600; 10 mm and 9 mm ML; Puerto Escondido; Macrofauna I E, 60 09° 15′49″ N 76° 29′10″ W; depth 288 m; 09.04.1999. Female MHNMC MOL 2804; 8 mm ML; Cartagena; Macrofauna II E 140, 10° 32′56″ N 75° 37′20″ W; depth 309 m; 2001. Female MHNMC MOL 2805; 9 mm ML; near Cartagena; depth 309 m. Female MHNMC MOL 2806; 9 mm ML; Tolú; Macrofauna II E, 154 9° 44′49″ N 76° 15′38″ W; depth 280 m; 2001.

Description:

Body (Fig. 12a,b,c; 16a,b,c): small, with maximum mantle length of 10 mm. Mantle firm and muscular, oval, longer than wide, ventrally extended anteriorly covering funnel, forming a ventral shield. Mantle wide (MWI 100–110), dorsally covering the distal part of eyes, ventrally covering them completely. Fins: elongated, oval, positioned dorsally on mantle, more than half as long as mantle (FLI 66–80); anterior and posterior fin lobes extend to anterior and posterior mantle margin respectively. Head: as wide as mantle, length about 70–77 % of ML in both sexes. Eyes large, round, located mediolaterally on the head (EDI 60–66). One small photophore located under each eye just at the border of the shield. No olfactory papillae observed. Funnel (Fig. 13d): tubular, free, at least at the distal part. About 2/3 of ML (FuLI 60–66). Funnel organ (Fig. 14e): consisting of three parts. One large central inverted triangle with basal elongated apices and one lateral, long, club-shaped pad on each side. Funnel-locking apparatus (Fig. 14f): well defined, mantle

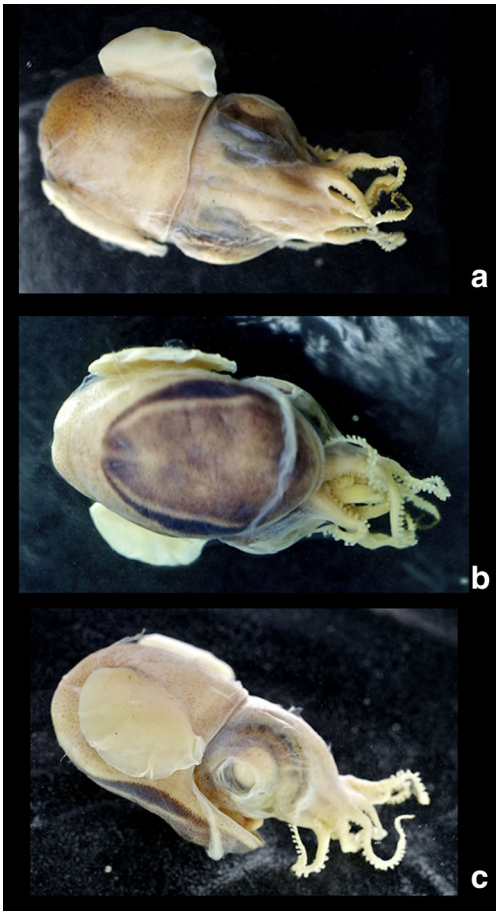

Fig. 16 *Nectoteuthis pourtalsii* Verrill, 1883 MHNMC Mol 1600. Photographs of *habitus*. **a** Dorsal view. **b** Ventral view. **c** Lateral view

component large, Club-shaped, anterior part rounded, distal part pointed, Funnel component oblong oval, deeply curved distally and with pronounced edges medially, proximally shallow and flat. Nuchal cartilage (Fig. 14e) saddle-shaped, anterior part narrow, posterior part rounded and wide. Arms in both sexes (Fig. 13a): longer than mantle (ALI 111–150). Distal part of arms with modified suckers. In male arms formula: IV:III = II: I first arm pair shorter than the rest, fused basally basis and connected with a small muscular band, and modified with distinctive structures (Figs. 13c and 17b,c). Fourth arm pair longest. Third arm pair second longest and as long as second pair. Female: Arm formula I = II = III:IV. Fourth pair longest. First, second, and third pair of almost equal length. First third of ventral arms with biserial suckers. Remainder of arms with suckers modified to fingerlike papillae. Papillae not as large as in males. Suckers (Figs. 13b and 17b,c,d) arranged in two rows, and attached laterally. Suckers on proximal third of arms, rest of arm with pedicels modified as fingerlike papillae. The papillae are long, five times as long a normal sucker, opaque at the base, and translucent at the tip; with a chitinous smooth ring on the sucker opening. There are 58 to 66 papilae on an arm, with between 16 and 20 normal suckers at the base of each arm. There are no enlarged suckers on the arms of the males. All suckers equal in size. (ASD 0.3). Web formula: A < B:C:D < E. Web A largest. Web B, C, D almost of equal length, web E shortest. No tentacles were attached

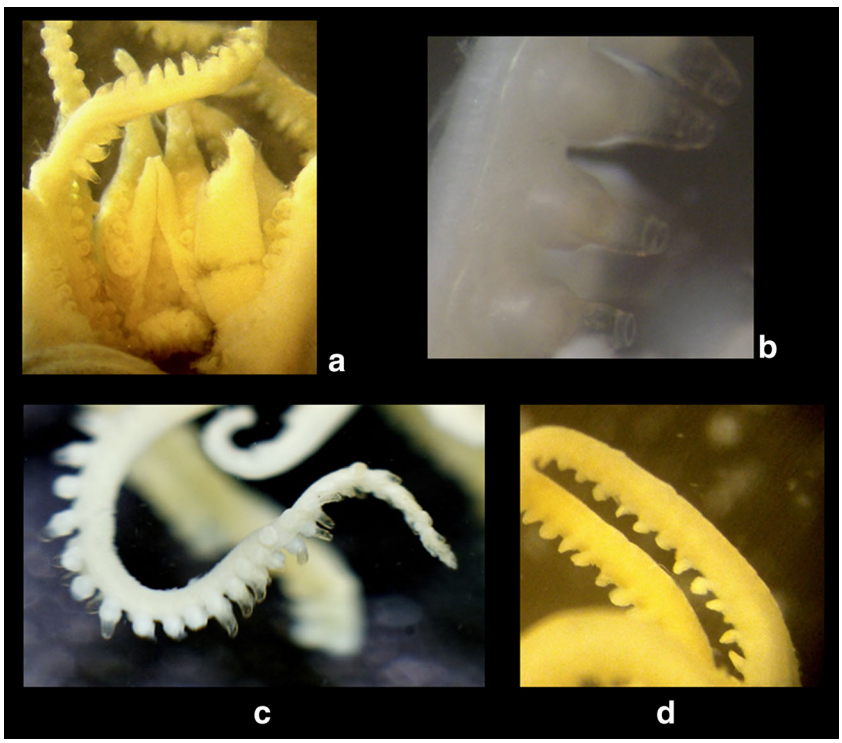

Fig. 17 *Nectoteuthis pourtalsii* Verrill, 1883 MHNMC Mol 1600. Photographs of: **a** Hectocotylus ventral view. **b** Detail of conical "fingerlike" projections of arm suckers in male. **c** End part of arm in male. **d** Detail of conical "fingerlike" projections of arm suckers in female

to the animals, all were lost. Gills with 12 lamellae on outer demibranch.

Digestive tract (Fig. 14a): buccal mass oval, compact, large. Lower beak (Fig. 14b): hood strong and short, wings slender, and at the border almost translucent. Crest straight. Lateral walls distally almost translucent. Upper beak (Fig. 14c): with long, curved, pointed rostrum; hood slender and almost translucent. Lateral walls thin, distally almost translucent. Radula (Fig. 14d): rachidian tooth pointed, margins smooth, smoothly rounded. First lateral tooth with one central point, margins smooth, base is wide. Second lateral tooth as large as first, margins smooth without teeth. Third lateral tooth very large, twice as long as rachidian, strongly curved, without sharp margins, and blunt keels on frontal and posterior edge. No lateral plates. Oesophagus: slender and tubular. Posterior salivary glands elongated. Stomach sac-like. Caecum kidney-shaped, covered with striae. Digestive gland twice as large as stomach, cushion shaped, ventral margin covered by photophore. Intestine: slender, about as long as oesophagus. Anal flaps present. Ink sac short, tubular next to the intestine not reaching the photophore. Photophore (Fig. 14f) rounded, with two lateral mushroom-like papillae and two openings. Male reproductive tract (Fig. 15b): testis located on posterior dorsal mantle cavity, covering spermatophoric complex. Testis rectangular cushion-shaped. Vas deferens coiled and long. Spermatophoric gland: tubular, with one small bag-like diverticle distally. Seminal vesicle coiled. Accessory gland: lobe-like, appendage of accessory gland ovoid. Needham sac spindle-shaped. Genital opening short. Spermatophores (Fig. 15d) very large (SpLI 70), long and slender 14 times longer than wide, sperm cord with only one coil, light brown colored. Cement body small. Ejaculatory apparatus short, about one-fifth of spermatophore length and translucent. Female reproductive tract (Fig. 15a): ovary ovoid, positioned in the posterior part of mantle cavity, in mature females large, displacing other organs. Nidamental glands paired, tear-shaped, located ventrally, covering half of ovary. Accessory nidamental glands large, tear-shaped, located ventrally, covering two thirds of ovary located ventrally to nidamental glands. Oviductal gland: long and tubular. Only one oviduct on the left side developed, opening short. Mature oocytes (Fig. 15c): ovoid, largest 2.10 mm (EgLI 22.22). Ovary with about 44 mature and few immature oocytes. Seminal receptacle not observed. Spermatangium not observed.

Preserved animals mantle and base of arms of reddish-brown color. Dorsally between eyes pigmented dark-brown with dense chromatophores. Ventral body and periocular region, with a silvery metallic glance. Ventral shield darker than the rest of the body.

Distribution: the Caribbean Sea.

Remarks:

Nectoteuthis pourtalesii was described on the basis of a single specimen collected near Barbados. The type specimen is most probably a male. It differs from the here-studied animals by having arm I more fused and swollen. *Nectoteuthis pourtalesii* is a very small cephalopod with no more than 11 mm ML recorded. The original description states the animal was 11 mm. The type was measured in 2014 and has only 10 mm, possibly indicating a shrinking of the material as observed in several other cephalopods by the senior author. Only one other animal was known from north Cuba, off Cayo Coco, captured in 1930 at 330 m depth (22° 34′N 78°15′W.) and deposited in the MZC. These animals are nektonic, living at depths of around 300 m in the water column. No observations of living animals have been made. The function of the modified suckers is unknown. It is possible that they are used in capturing prey or that they have a secondary sexual function, as they are more developed in males than in females.

The correct spelling of this species by original designation is *Nectoteuthis pourtalesii* after article 33.4 of the ICZN any subsequent spellings are incorrect. The spelling *Nectoteuthis pourtalesi* used by Naef 1923 is a misspelling of the name and therefore unavailable.

Discussion

The status of knowledge of the marine fauna in the southern Caribbean is far from complete. Most of the descriptions of sepiolids from the area are very simple, and many characteristics are not available for comparative work. All species included in the genus *Autrorossia* are not described well, especially *A. enigmatica* Robson 1924. The descriptions of the species are poor and the ranges of many characters are very wide; a revision of the genus including all species should be done in the near future. The genus *Semirossia* in the southern Caribbean shows a clear division of species; the deep-living *Semirossia* sp. and the upper mesopelagic *S. tenera*. In the very small collection revised in this study, which composed of only 36 animals, two morphs do not fit into the criteria for the known species and are most probably new species; more material is needed to describe them properly. In the future, with new specimens and with the aid of molecular data, when legal regulation on molecular analysis in Colombia has been modified, hopefully more information can be given on these interesting animals. A revision and redescription of all sepiolid species present in the Caribbean is urgently needed to see if there are more cryptic species hiding in the area.

Acknowledgments The authors are grateful to Luis Sendoya, Lucero Zamudio, Diana Bermudez, Joao Blanco, Juan Pablo Assmus, for their help, and Adriana Gracia, Andres Merchan, Guiomar Botero and Erika Montoya from the Museo Marino Natural de Colombia INVEMAR for loan of the material, and thanks to Ingo Stoessel and Tinka Stoessel for reading the manuscript.

Appendix

Table 1 Morphometric measurements of *Semirossia* sp., *Autrorossia antillensis*, *Austrorossia* sp., and *Nectoteuthis pourtalesii* (in mm)

Species	*Semirossia sp.*	*Semirossia sp.*	*Semirossia sp.*	*Semirossia sp.*	*Austrorossia antillensis*	*Austrorossia sp.*	*Nectoteuthis pourtalesii*	*Nectoteuthis pourtalesii*
Number	MHNMC Mol 8752	MHNMC Mol 8752	MHNMC Mol 8754	MHNMC Mol 8754	MHNMC Mol 3543	MHNMC Mol 9393	MHNMC Mol 1600	MHNMC Mol 1600
sex	F	M	M	M	M	M	M	F
TL	46	53	67	56	90	90	32	29
ML	19	21	28	23	35	32	10	9
MW	12	14	18	14	26	23	11	10
FI R	11	12	15	12	22	20	6	5
FL R	14	14	20	15	22	22	8	7
FWSR	8	8	12	9	19	12	6	5
FI L	11	11	15	12	22	19	6	5
FL L	14	14	18	14	26	21	7	6
FWS L	7	9	11	8	19	12	5	5
HW	15	15	19	16	29	25	9	10
HL	10	11	10	10	21	20	7	7
ED	8	9	11	9	18	12	6	6
AF	#	3 > 2 > 4 > 1	3 > 4 > 2 > 1	3 > 2 > 4 > 1	#	1 > 3 > 2 > 4	#	2 > 1 > 3 > 4
AL I R	13	17	22	18	#	37	#	11
AL II R	15	18	23	21	42	36	#	13
AL III R	16	20	29	23	#	37	#	10
AL IV R	16	17	26	19	#	34	15	10
AL I L	14	14	#	18	#	38	7	10
AL II L	16	19	25	20	44	33	#	12
AL III L	17	21	29	19	44	38	11	11
AL IV L	15	17	#	18	32	35	#	11
TL R	40	#	38	51	130	54	#	#
TL L	32	61	42	38	133	42	#	#
CIL R	9	#	13	13	22	15	#	#
CIL L	8	12	11	14	24	16	#	#
SC I R	68	79	92	77	#	48	14	16
SC II R	58	58	29	47	46	40	#	20
SC III R	58	69	77	41	#	44	#	18
SC IV R	52	79	109	71	#	48	15	18
SC I L	68	107	177	136	#	46	7	16
SC II L	66	58	59	61	46	4242	#	18
SC III L	60	57	90	43	44	46	11	18
SC IV L	76	75	7	79	32	48	#	18
SC R	360	#	234	336	#	294	#	18
SC L	342	378	206	294	#	378	#	#
WED A	2	2	3	2	6	5	#	3
WEB B	2	2	2	3	5	4	2	3
WEB C	3	3	3	2	6	6	2	2
WEB D	4	4	5	5	7	6	2	2
WEB E	–	#	1	1	3	2	1	1
FuL	9	11	15	11	15	14	6	6
FuF	4	5	7	5	2	6	2	3
Gill	18	20	23	24	17	12	12	12

Table 2 Morphometric measurements of *Semirossia tenera* (in mm)

Number	MHNMC Mol 1602	MHNMC Mol 1602	MHNMC Mol 1602	MHNMC Mol 1603	MHNMC Mol 1603	MHNMC Mol 1603	MHNMC Mol 1610	MHNMC Mol 1610	MHNMC Mol 1610
sex	M	M	M	M	M	M	M	M	F
TL	71	66	56	90	63	58	70	62	55
ML	25	24	21	31	24	22	25	24	23
MW	15	15	13	21	13	14	18	17	12
FI R	12	12	10	18	13	11	15	13	12
FL R	17	16	14	22	17	14	19	16	16
FWSR	10	10	8	13	9	10	12	10	10
FI L	12	12	10	17	11	10	15	13	12
FL L	16	16	14	22	15	13	19	17	16
FWS L	11	10	9	14	10	9	12	10	10
HW	18	18	16	22	17	16	19	18	13
HL	15	13	11	17	13	11	13	11	13
ED	12	11	11	11	9	11	12	10	9
AF	3 > 2 > 4 > 1	3 > 2 > 4 > 1	2 > 3 > 1 > 4	4 > 2 > 3 > 1	3 > 4 > 2 > 1	3 > 2 > 4 > 1	3 > 4 > 2 > 1	3 > 2 > 4 > 1	3 > 4 > 2 > 1
AL I R	25	24	23	30	21	17	21	18	15
AL II R	28	25	24	41	24	23	27	21	20
AL III R	30	29	24	34	26	25	32	27	21
AL IV R	26	26	22	37	20	21	25	21	19
AL I L	25	23	22	30	20	18	#	14	16
AL II L	29	26	24	37	18	20	#	21	18
AL III L	31	29	23	41	25	22	#	17	18
AL IV L	25	25	21	42	25	17	28	13	20
TL R	90	85	85	77	109	81	104	76	73
TL L	108	77	#	31	101	76	79	78	#
CIL R	16	12	13	15	15	14	16	11	16
CIL L	15	15	#	17	19	15	20	13	#
SC I R	89	49	73	88	97	41	83	55	55
SC II R	68	39	54	101	127	73	81	77	61
SC III R	67	56	71	79	91	45	67	81	51
SC IV R	64	67	71	54	89	67	107	62	51
SC I L	161	137	131	73	159	133	#	124	53
SC II L	41	61	55	72	47	39	9	47	51
SC III L	81	79	75	71	91	77	7	9	65
SC IV L	78	86	70	95	83	101	117	33	61
SC R	294	301	315	474	378	306	570	498	414
SC L	329	364	#	432	612	414	468	492	#
WED A	3	3	3	2	2	2	3	2	2
WEB B	3	3	2	4	3	3	4	2	2
WEB C	3	3	3	5	3	3	5	2	3
WEB D	5	4	4	6	4	3	4	3	4
WEB E	1	1	1	2	1	1	1	1	1
FuL	11	11	11	14	13	9	13	11	11
FuF	7	5	4	9	7	5	7	6	6
Gill	24	24	24	27	22	25	24	24	18

Table 3 Morphometric measurements of *Semirossia tenera* (in mm)

Number	MHNMC Mol 2859	MHNMC Mol 2859	MHNMC Mol 3537	MHNMC Mol 3537	MHNMC Mol 3548	MHNMC Mol 3550	MHNMC Mol 4527	MHNMC Mol 4527	MHNMC Mol 4527	MHNMC Mol 4529	MHNMC Mol 4529	MHNMC Mol 4529
sex	F	F	F	M	M	M	M	M	M	F	F	F
TL	71	44	56	66	66	87	69	42	39	72	76	75
ML	28	18	23	27	32	38	28	16	15	27	29	28
MW	18	11	15	15	23	28	15	10	9	16	15	15
FI R	15	10	12	14	15	16	13	8	7	13	12	11
FL R	18	11	16	17	19	21	17	11	9	15	15	14
FWSR	11	7	11	11	14	12	12	6	6	11	11	9
FI L	15	10	12	14	16	16	14	9	7	13	12	11
FL L	16	11	16	17	20	21	19	12	9	14	15	14
FWS L	10	7	12	10	14	13	11	7	6	10	12	10
HW	20	12	16	16	17	22	16	11	10	18	17	17
HL	10	6	11	11	24	15	12	8	9	12	12	15
ED	9	8	10	10	12	12	12	7	7	11	11	13
AF	2 > 4 > 3 > 1	3 > 2 > 4 > 1	3 > 2 > 4 > 1	2 > 3 > 4 > 1	4 > 3 > 2 > 1	3 > 2 > 4 > 1	3 > 2 > 1 > 4	3 > 2 > 4 > 1	3 > 2 > 4 > 1	2 > 4 > 3 > 1	3 > 2 > 4 > 1	4 > 3 > 2 > 1
AL I R	27	13	14	22	#	25	25	14	12	#	26	26
AL II R	33	16	22	28	36	33	28	16	14	33	35	30
AL III R	29	20	22	24	42	34	28	18	15	33	35	31
AL IV R	30	17	20	24	#	32	24	16	#	31	27	28
AL I L	26	13	13	20	34	28	24	14	10	21	28	37
AL II L	30	15	20	23	30	31	26	16	13	32	28	36
AL III L	29	18	22	22	35	31	29	17	14	24	28	38
AL IV L	29	15	20	22	34	29	24	15	13	37	30	32
TL R	90	59	111	125	150	89	#	#	#	#	122	97
TL L	83	54	105	125	#	33	#	#	#	#	111	105
CIL R	16	11	17	19	20	#	#	#	#	#	17	16
CIL L	17	11	17	18	#	#	#	3	#	#	17	16
SC I R	62	59	67	64	#	71	63	52	#	#	16	18
SC II R	57	#	61	47	87	63	47	37	39	#	73	73
SC III R	57	49	53	59	83	52	61	41	42	53	61	65
SC IV R	63	#	61	80	#	49	68	50	33	73	57	59
SC I L	60	51	75	112	157	129	129	93	#	65	77	79
SC II L	64	67	57	65	59	77	37	33	14	49	65	95
SC III L	50	51	67	71	39	56	62	51	36	51	63	63
SC IV L	60	73	73	66	69	81	60	40	42	61	48	71
SC R	300	240	486	282	532	492	#	#	#	#	432	402

Table 3 (continued)

Number	MHNMC Mol 2859	MHNMC Mol 2859	MHNMC Mol 3537	MHNMC Mol 3537	MHNMC Mol 3548	MHNMC Mol 3550	MHNMC Mol 4527	MHNMC Mol 4527	MHNMC Mol 4527	MHNMC Mol 4529	MHNMC Mol 4529	MHNMC Mol 4529
SC L	270	#	432	402	#	#	#	#	#	#	372	390
WED A	4	2	2	2	4	5	4	1	1	2	3	3
WEB B	4	3	3	3	4	4	3	2	2	3	4	2
WEB C	3	1	4	3	3	4	3	2	2	3	3	3
WEB D	5	3	6	5	5	8	6	3	2	5	4	4
WEB E	1	1	1	1	1	2	1	1	1	1	1	1
FuL	17	10	13	13	15	17	12	7	6	14	16	13
FuF	8	6	7	7	8	7	6	5	4	7	9	8
Gill	20	21	22	26	30	22	22	21	#	23	26	22

Table 4 Indexes of *Semirossia* sp, *Austrorossia antillensis*, *Austrorossia* sp, and *Nectoteuthis pourtalesii*

Species	*Semirossia* sp.	*Semirossia* sp.	*Semirossia* sp.	*Semirossia* sp.	*Austrorossia antillensis*	*Austrorossia* sp.	*Nectoteuthis pourtalesii*	*Nectoteuthis pourtalesii*
Number	MHNMC Mol 8752	MHNMC Mol 8752	MHNMC Mol 8754	MHNMC Mol 8754	MHNMC Mol 3543	MHNMC Mol 9393	MHNMC Mol 1600	MHNMC Mol 1600
Sex	F	M	M	M	M	M	M	F
ML	19	21	28	23	35	32	10	9
MWI	63.16	66.67	64.29	60.87	74.29	71.88	110.00	111.11
HWI	78.95	71.43	67.86	69.57	82.86	78.13	90.00	111.11
HLI	52.63	52.38	35.71	43.48	60.00	62.50	70.00	77.78
FI RI	57.89	57.14	53.57	52.17	62.86	62.50	60.00	55.56
FI LI	57.89	52.38	53.57	52.17	62.86	59.38	60.00	55.56
FL RI	73.68	66.57	71.43	65.22	62.86	68.75	80.00	77.78
FL LI	73.68	66.57	64.29	60.87	74.29	65.63	70.00	66.67
EDI	42.11	42.86	39.29	39.13	51.43	37.50	60.00	66.67
ALI I R	68.42	80.95	78.57	78.26	#	115.63	#	122.22
ALI II R	78.95	85.71	82.14	91.30	120.00	112.50	#	144.44
ALI III R	84.21	95.24	103.57	100.00	#	115.53	#	111.11
ALI IV R	84.21	80.95	92.86	82.61	#	106.25	150.00	111.11
ALI I L	73.68	66.67	#	78.26	#	118.75	70.00	111.11
ALI II L	84.21	90.48	89.29	86.96	125.71	103.13	#	133.33
ALI III L	89.47	100.00	103.57	82.61	125.71	118.75	110.00	122.22
ALI IV L	78.95	80.95	#	78.26	91.43	109.38	#	122.22
HcLII R	68.42	80.95	78,57	78.26	#	115.63	#	122.22
HcLI II R	73.68	66.67	#	78.26	#	118.75	70.00	111.11
FuLI	47.37	52.38	53.57	47.83	42.86	43.75	60.00	66.67

Table 5 Indexes of *Semirossia tenera*

Number	MHNMC Mol 1602	MHNMC Mol 1602	MHNMC Mol 1602	MHNMC Mol 1603	MHNMC Mol 1603	MHNMC Mol 1603	MHNMC Mol 1610	MHNMC Mol 1610	MHNMC Mol 1610	MHNMC Mol 2859	MHNMC Mol 2859	MHNMC Mol 3537
Sex	M	M	M	M	M	M	M	M	F	F	F	F
ML	25	24	21	31	24	22	25	24	23	28	18	23
MWI	60.00	62.50	61.90	67.74	54.17	63.64	72.00	70.83	52.17	64.29	61.11	65.22
HWI	72.00	75.00	76.19	70.97	70.83	72.73	76.00	75.00	56.52	71.43	66.67	69.57
HLI	60.00	54.17	52.38	54.84	54.17	50.00	52.00	45.83	47.83	35.71	33.33	47.83
FI RI	48.00	50.00	47.62	58.06	54.17	50.00	60.00	45.83	52.17	53.57	55.56	52.17
FI LI	48.00	50.00	47.62	54.84	45.83	45.45	60.00	54.17	52.17	53.57	55.56	52.17
FL RI	68.00	66.67	66.67	70.97	70.83	63.64	76.00	66.67	69.57	64.29	61.11	69.57
FL LI	64.00	66.67	66.67	70.97	62.50	59.09	76.00	70.83	69.57	57.14	61.11	69.57
EDI	48.00	45.83	52.38	35.48	37.50	50.00	48.00	41.67	39.13	32.14	44.44	43.48
ALI I R	100.00	100.00	109.52	96.77	87.50	77.27	84.00	75.00	65.22	96.43	72.22	60.87
ALI II R	112.00	104.17	114.29	132.26	100.00	104.55	108.00	87.50	86.96	117.86	88.89	95.65
ALI III R	120.00	120.83	114.29	109.68	108.33	113.64	128.00	112.50	91.30	103.57	111.11	95.65
ALI IV R	104.00	108.33	104.76	119.35	83.33	95.45	100.00	87.50	82.61	107.14	94.44	86.96
ALI I L	100.00	95.83	104.76	96.77	83.33	81.82	#	58.33	69.57	92.86	72.22	56.52
ALI II L	116.00	108.33	114.29	119.35	75.00	90,91	#	87.50	78.26	107.14	83.33	86.96
ALI III L	124.00	120.83	109.52	132.26	104.17	100.00	#	70.83	78.26	103.57	100.00	95.65
ALI IV L	100.00	104.17	100.00	135.48	104.17	77.27	112.00	54.17	86.96	103.57	83.33	86.96
HcLII R	100.00	100.00	109.52	96.77	87.50	77.27	84.00	75.00	65.22	96.43	72.22	60.87
HcLI II R	100.00	95.83	104.76	96.77	83.33	81.82	#	58.33	69.57	92.86	72.22	56.52
FuLI	44.00	45.83	52.38	45.16	54.17	40.91	52.00	45.83	47.83	60.71	55.56	56.52

Table 6 Indexes of *Semirossia tenera*

Number	MHNMC Mol 3537	MHNMC Mol 3548	MHNMC Mol 3550	MHNMC Mol 4527	MHNMC Mol 4527	MHNMC Mol 4527	MHNMC Mol 4529	MHNMC Mol 4529	MHNMC Mol 4529
Sex	M	M	M	M	M	M	F	F	F
ML	27	32	38	28	16	15	27	29	28
MWI	55.56	71.88	73.68	53.57	62.50	60.00	59.26	51.72	53.57
HWI	59.26	53.13	57.89	57.14	68.75	66.67	66.67	58.62	60.71
HLI	40.74	75.00	39.47	42.86	50.00	60.00	44.44	41.38	53.57
FI RI	51.85	46.88	42.11	46.43	50.00	46.67	48.15	41.38	39.29
FI LI	51.85	50.00	42.11	50.00	56.25	46.67	48.15	41.38	39.29
FL RI	62.96	59.38	55.26	60.71	68.75	60.00	55.56	51.72	50.00
FL LI	62.96	62.50	55.26	67.86	75.00	60.00	51.85	51.72	50.00
EDI	37.04	37.50	31.58	42.86	43.75	46.67	40.74	37.93	46.43
ALI I R	81.48	#	65.79	89.29	87.50	80.00	#	89.66	92.86
ALI II R	103.70	112.50	86.84	100.00	100.00	93.33	122.22	120.69	107.14
ALI III R	88.89	131.25	89.47	100.00	112.50	100.00	122.22	120.69	110.71
ALI IV R	88.89	#	84.24	85.71	100.00	#	114.81	93.10	100.00
ALI I L	74.07	106.25	73.68	85.71	87.50	66.67	77.78	96.55	132.14
ALI II L	85.19	93.75	81.58	92.86	100.00	86.67	118.52	96.55	128.57
ALI III L	81.48	109.38	81.58	103.57	106.25	93.33	88.89	96.55	135.71
ALI IV L	81.48	106.25	76.32	85.71	93.75	86.67	137.04	103.45	114.29
HcLII R	81.48	#	65.79	89.29	87.50	80.00	#	89.66	92.86
HcLI II R	74.07	106.25	73.68	85.71	87.50	66.67	77.78	96.55	132.14
FuLI	48.15	46.88	44.74	42.86	43.75	40.00	51.85	55.17	46.43

References

Arocha F, Marcano L, Cipriani R (1991) Cephalopods trawled from Venezuelan waters by the R/V Dr. Fridtjof Nansen in 1988. Bull Mar Sci 49(1–2):231–234

Bello G, Biagi V (1995) How bentic are sepiolids? Bull Inst Ocean Monaco Special No 16:57–61

Díaz JM, Ardila N, Gracia A (2000) Calamares y Pulpos (Mollusca: Cephalopoda) del Mar Caribe Colombiano. Bio Col 1(2):195–201

Gracia A, Ardila N, Díaz JM (2002) Cefalopodos (Mollusca, Cephalopoda) del talud superior del caribe Colombiano. Bol Invest Mar Cost 31:219–238

Jereb P, Roper CFE (2005) Cephalopods of the world. Annotated and illustrated catalogue of cephalopod species known to date. Volume 1. Chambered nautiluses and sepioids (Nautilidae, Sepiidae, Sepiolidae, Sepiadariidae, Idiosepiidae and Spirulidae) FAO Species Catalogue for Fishery Purposes No 4 Vol 1. FAO, Rome, 262 pp, 9 colour plates

Judkins H, Vecchione M, Roper CFE, Torres J (2010) Cephalopod species richness in the wider Caribbean region — ICES. J Mar Sci 67: 1392–1400

Naef A (1923) Die Cephalopoden. Fauna e Flora de Golfo di Napoli. Monograph 35:595–600

Nesis K (1982) Cephalopods of the world. T.F.H. Publications, Neptune City NJ, 351pp

Reid A (1991) Taxonomic review of the Australian Rossiinae (Cephalopoda: Sepiolidae), with a description of a new species, *Neorossia leptodons*, and redescription of *N. caroli* (Joubin, 1902). Bull Mar Sci 49(3):748–831

Reid A, Jereb P (2005) Family Sepiolidae. In Jereb P, Roper CFE (Eds) Cephalopods of the world. An annotated and illustrated catalogue of species known to date. Volume 1. Chambered nautiluses and sepioids (Nautilidae, Sepiidae, Sepiolidae, Sepiadariidae and Spirulidae), 153–203. FAO Species Catalogue for Fisheries Purposes No 4 Vol 1. FAO, Rome, 262 pp, 9 colour plates

Robson GC (1924) Preliminary report on the Cephalopoda (Decapoda) procured by the S.S. "Pickle". Rep Fish Mar Biol Surv Union S Afr 3:1–14

Roper CFE, Voss GL (1983) Guidelines for taxonomic descriptions of cephalopod species. Mem Natn Mus Vic 44:49–63

Rotermund N, Guerrero-Kommritz J (2010) Taxonomy and Biogeography of the genus *Heteroteuthis* Gray, 1849 (Mollusca: Cephalopoda) in the Atlantic Ocean. J Mar Biol Assoc UK 90(2): 367–390

Rüppel E (1844) Intorno ad alcuni cefalopodi del mare di messina. Lettera del D. Eduardo Rüppel di Frankfort sul Meno al Prof. Anastasio Cocca. Giornale del Gabinetto Letterario di Messina 5:129–135

Salcedo-Vargas MA (1991) Cheklist of the cephalopods from the Gulf of Mexico. Bull Mar Sci 49(1–2):216–220

Sweeney MJ, Roper CFE (1998) Classification, type localities and type repositories of recent cephalopoda. In: Voss NA, Vecchione RB, Toll

RB, Sweeney MJ (eds) Systematics and biogeography of cephalopods, Vol 2. Smithsonian Institution Press, Washington, pp 561–599

Verrill AE (1880) Notice of the remarkable marine fauna occupying the outer banks off the southern coast of New England. Am J Sci 20(41): 390–403

Verrill AE (1883) Supplementary report on the "Blake" cephalopods. Bull Mus Comp Zool 11(5):105–115

Voss GL (1950) Two new species of cephalopods from the Florida Keys. Rev Soc Malac "Carlos de la Torre" 7(2):73–79

Voss GL (1955) The Cephalopoda obtained by the Harvard–Havana expedition off the coast of Cuba in 1938-39. Bull Mar Sci 5(2): 81–115

Voss GL (1956) A review of the Cephalopods of the Gulf of Mexico. Bull Mar Sci 6(2):85–178