

Brittle-stars (Echinodermata: Ophiuroidea) from the continental shelf and upper slope of the Colombian Caribbean

G.H. Borrero-Pérez¹, M. Benavides-Serrato², Ó. Solano³ & G.R. Navas S.²

1. Department of Ecology and Hidrology, Faculty of Biology, University of Murcia, 30100 Murcia, Spain; gborrero@um.es
2. Colombian Museum of Marine Natural History (MHNMC), Institute of Marine and Coastal Research, "José Benito Vives de Andreis" (INVEMAR), Santa Marta, Colombia. A.A. 1016; milbese@hotmail.com, gnavas@invemar.org.co
3. Scientific Service, INVEMAR, Santa Marta, Colombia. A.A. 1016 y 873; odsolano@invemar.org.co

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Abstract: An annotated brittle star list (Echinodermata: Ophiuroidea) collected by bottom trawling between 20 and 520 m depth during the INVEMAR-MACROFAUNA campaigns (1998-2001) along the continental shelf and upper slope of the Colombian Caribbean is presented. A total of 58 species were identified: 41 genera, 13 families and 2 orders, in which 35 species are new records for the Colombian Caribbean (28 are also new for the continental part of the Caribbean Sea). General and detailed figures are provided. Rev. Biol. Trop. 56 (Suppl. 3): 169-204. Epub 2009 January 05.

Key words: Echinodermata, Ophiuroidea, new records, Colombia, Caribbean Sea.

The Ophiuroid fauna of the Colombian Caribbean Sea has been specifically studied by Gallo (1988) who presented 17 shallow water brittle-star species from Tayrona National Natural Park. Caycedo (1979) and Álvarez (1981) mentioned some ophiuroid species in their revisions and Schoppe (1996) described a new Colombian species, *Ophiothrix synoecina*. In addition, there are Caribbean Sea studies and marine explorations where Colombian material has been included (Thomas 1962, Bayer *et al.* 1970, Thomas 1973, Hendler *et al.* 1995, González *et al.* 2002).

The knowledge of this group in the Colombian Caribbean Sea is isolated and outdated. This study presents the most complete and updated taxonomic list of the ophiuroid fauna from continental shelf zones and the upper slope in the Colombian Caribbean Sea. The present paper is part of an inventory program of marine biodiversity in Colombia.

MATERIAL AND METHODS

Between 1998 and 2001, the Taxonomy, Systematic and Ecology Group (GTSEM) from the Colombian Institute for Marine and Coastal Research (INVEMAR), carried out marine explorations (INVEMAR-MACROFAUNA on board of the *R/V Ancon* along the continental shelf and upper slope, between the Guajira Peninsula (12°34'N-71°50'W) and the Gulf of Urabá (09°02'N-76°02'W). Bottom trawls of 20 minutes at 80 stations from 20 to 520 m were done. The stations were located according to the seven marine regions from the Colombian Caribbean Sea: Guajira, Palomino, Tayrona, Magdalena, Archipiélagos coralinos, Darién and Caribe Océánico (Fig. 1 A, B) (INVEMAR 2000). The first six marine regions are located between 0 and 200 m of deep, while Caribe Océánico is located after 200 m, in front of the others. The specimens

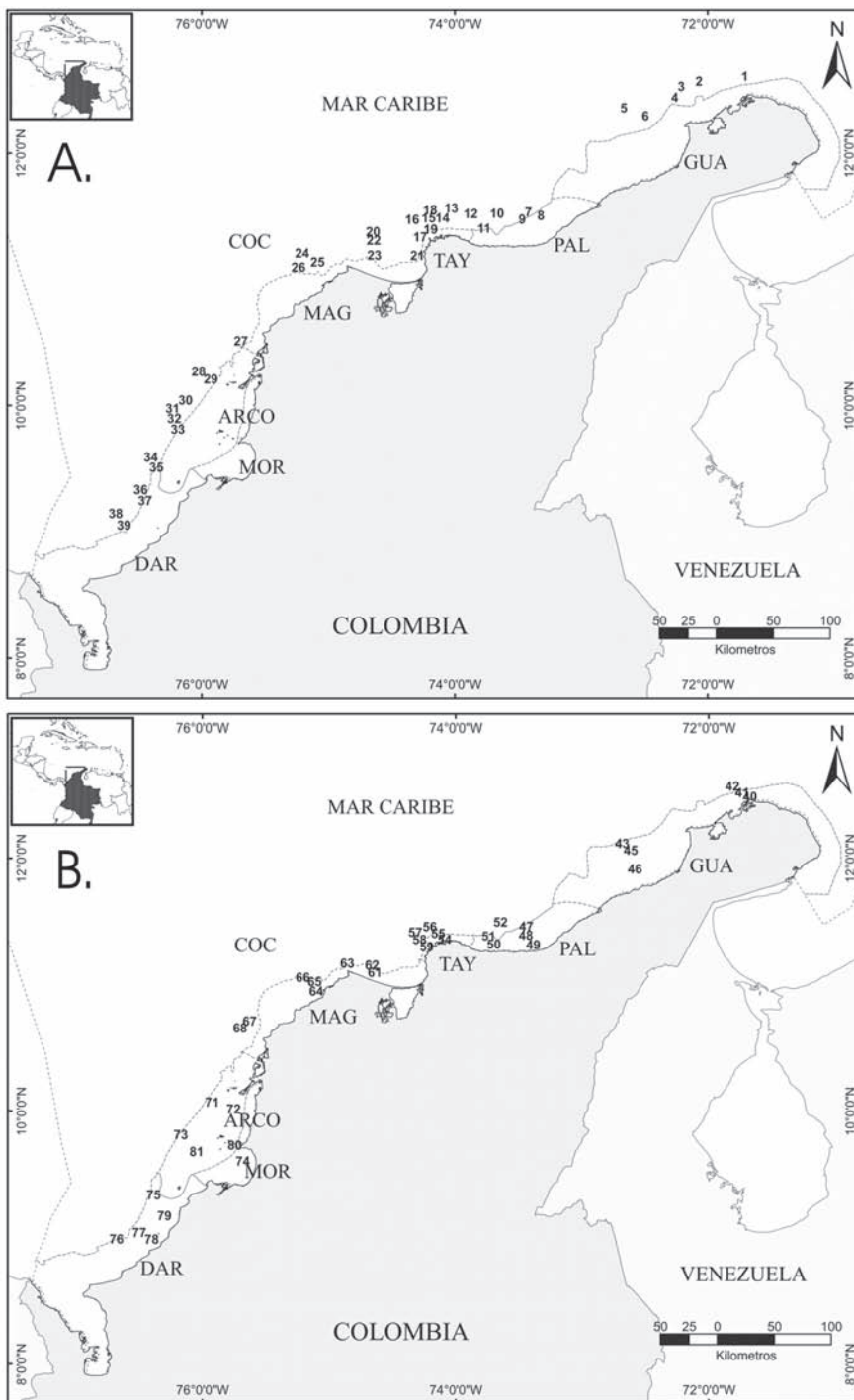


Fig. 1. (A) Sampling stations of INVEMAR MACROFAUNA I expedition. (B) Sampling stations of INVEMAR MACROFAUNA II expedition. Abbreviation at the maps meaning ecological sectors: Caribbean Sea (COC), Guajira (GUA), Palomino (PAL), Tayrona (TAY), Magdalena (MAG), Archiélagos coralinos (ARCO), Morrosquillo (MOR) and Darién (DAR).

collected were photographed with a conventional scanner (Reyes and Navas 2000) and cameras and they were preserved in 70% ethanol. For generic identification of specimens was used mostly Fell (1960) and for specific identification were used specific taxonomic keys, original descriptions, papers from the Atlantic and Caribbean Sea and echinoderm collections from National Museum of Natural History (NMNH) and Museum of Comparative Zoology (MCZ) were used to confirm the identifications. The voucher specimens of the material collected were deposited at the Colombian Museum of Marine Natural History (MHNMC). Each taxon is accompanied by taxonomic references, material examined, previous Colombian records and geographic and bathymetric distribution. A list of Colombian marine regions is provided for the new records and measurements of the largest specimens and figures for most taxa are also given.

Abbreviations: GUA: Guajira, PAL: Palomino, TAY: Tayrona, MAG: Magdalena, ARCO: Archipiélagos coralinos, DAR: Darién. NMNH: National Museum of Natural History, U. S. National Museum Collection (USNM), Smithsonian Institution, Washington, D.C., MCZ: Museum of Comparative Zoology, Harvard University, MHNMC: Colombian Museum of Marine Natural History. INV EQU: MHNMC Catalog number. dd: disc diameter, al: arm length. St.: Station. Species recorded for first time from Colombian Caribbean Sea are indicated with an asterisk (*), or two (**) if they are news to the continental coast of the Caribbean Sea.

RESULTS

A total of 58 species were identified, belonging to 41 genera, 13 families and 2 orders (Table 1). Higher taxonomic order is according to Smith *et al.* (1995) and the species are in alphabetical order.

Order Euryalida Lamarck, 1816

Family Gorgonocephalidae Ljungman

**Asteropora annulata* Örstedt in: Lütken, 1856
(Fig. 2 D, E)

References: Hendler *et al.* (1995): 100-101, fig. 35.

Material examined: 2 INV EQU1924 (St.73, dd: 28-30 mm, al: 136-180 mm).

Previous records in Colombia: New record.

Distribution: North Carolina, Bermuda, Bahamas, Gulf of Mexico, across to Antilles, Caribbean Sea to Brazil, including Panama (Clark 1915, Bayer *et al.* 1970, Hendler *et al.* 1995), Mexican Caribbean (Laguarda-Figuera *et al.* 2005). In Colombia it was collected at ARCO.

Depth range: 37-305 m (Hendler *et al.* 1995).

Remarks: Both specimens collected exceed the maxim size (22 mm) recorded by Hendler *et al.* (1995).

** *Astrocnida isidis* (Duchassaing, 1850)
(Fig. 2 F, G)

References: H.L Clark (1915): 183.

Material examined: 1 INV EQU1917 (St.46), 1 INV EQU1918 (St.57), 1 INV EQU1921 (St. 73, dd: 15-40 mm, al: 190-233 mm), 7 INV EQU1922 (St.73), 1 INV EQU1923 (St.73).

Previous records in Colombia: New record.

Distribution: Caribbean Sea, Montserrat, Barbados (Clark 1915, Fell 1960). In Colombia it was collected in GUA, TAY and ARCO.

Depth range: 20-180 m.

Remarks: This record extends the previous depth range of 100-180 m, recorded by Clark (1915).

Astrophyton muricatum (Lamarck, 1816)

References: Zoopi De Roa (1967): 283, Tommasi (1970): 11-12, fig. 3, Álvarez (1981): 148.

Material examined: 1 INV EQU1925 (St.62, dd: 77 mm).

TABLE 1

Species collected. Higher taxonomic order is according to Smith et al. (1995) and the species are in alphabetical order

Class Ophiuroidea Gray, 1840	<i>Ophiomusium eburneum</i> Lyman, 1869
Order Euryalida Lamarck, 1816	** <i>Ophiomusium testudo</i> Lyman, 1875
Family Gorgonocephalidae Ljungman, 1867	<i>Ophiomusium validum</i> Ljungman, 1872
* <i>Asteropora annulata</i> Örstedt in: Lütken, 1856	** <i>Ophiostriatulus atlanticus</i> (Mortensen, 1933)
** <i>Astrocnida isidis</i> (Duchassaing, 1850)	** <i>Ophiothreus goesi</i> Ljungman, 1872
<i>Astrophyton muricatum</i> (Lamarck, 1816)	** <i>Ophiura tenera</i> (Lyman, 1883)
Family Astroschematidae Verrill, 1899	* <i>Ophiura acervata</i> (Lyman, 1869)
** <i>Astroschema oligactes</i> (Pallas, 1788)	* <i>Ophiura falcifera</i> (Lyman, 1869)
Order Ophiurida Müller and Troschel, 1840	Family Amphiuroidae Ljungman, 1867
Family Ophiomyxidae Ljungman, 1867	** <i>Amphilimna mirabilis</i> (H.L. Clark, 1941)
** <i>Ophiomyxa stimpsonii</i> (Lyman, 1875)	<i>Amphilimna olivacea</i> (Lyman, 1869)
** <i>Ophiomyxa tumida</i> Lyman, 1883	<i>Amphiodia atra</i> (Stimpson, 1852)
<i>Ophisosyngus disacanthus</i> H. L. Clark, 1911	* <i>Amphiodia planispina</i> (v. Martens, 1867)
Family Ophiacanthidae Perrier, 1891	** <i>Amphioplus tumidus</i> (Lyman, 1878)
** <i>Ophiacantha echinulata</i> Lyman, 1878	<i>Amphiura otteri</i> Ljungman, 1872
** <i>Ophiacantha mesembria</i> H.L. Clark, 1915	* <i>Amphiura rathbuni</i> Koehler, 1914
** <i>Ophiocamax fasciculata</i> Lyman, 1883	* <i>Ophiophragmus riisei</i> (Lütken, 1859)
** <i>Ophiocamax hystrix</i> Lyman, 1878	<i>Ophio stigma isocanthum</i> (Say, 1825)
** <i>Ophiomitra valida</i> Lyman, 1869	Family Ophiothricidae Ljungman, 1867
** <i>Ophiomitrella laevipellis</i> (Lyman, 1883)	<i>Ophiothrix (Ophiothrix) angulata</i> (Say, 1825)
** <i>Ophiomyces frutescens</i> Lyman, 1869	<i>Ophiothrix (Acanthophiothrix) suensonii</i> Lütken, 1856
** <i>Ophiopristis hirsuta</i> (Lyman, 1875)	Family Ophiactidae Matsumoto, 1915
** <i>Ophiopristis sertata</i> (Lyman, 1869)	<i>Histampica duplicata</i> (Lyman, 1875)
** <i>Ophiotrema gracilis</i> Koehler, 1914	<i>Ophiactis savignyi</i> (Müller & Troschel, 1842)
** <i>Ophiotrema valenciennesi rufescens</i> Koehler, 1896	Family Ophionereididae Ljungman, 1867
Family Hemieuryalidae Verrill, 1899	<i>Ophionereis dolabriformis</i> John & A.M. Clark, 1954
** <i>Ophiochondrus convolutus</i> Lyman, 1869	Family Ophiocomidae Ljungman, 1867
Family Ophiuridae Lyman, 1865	<i>Ophiopsila hartmeyerii</i> Koehler, 1913
** <i>Amphiophiura oedignatha</i> H.L. Clark, 1915	** <i>Ophiopsila fulva</i> Lyman, 1878
<i>Amphiophiura metabula</i> H.L. Clark, 1915	Family Ophiochitonidae Matsumoto, 1915
** <i>Amphiphilozona delicata</i> H.L. Clark, 1915	<i>Ophiochiton ternispinus</i> Lyman, 1883
** <i>Ophiambix devaneyi</i> Paterson, 1985	<i>Ophioplax ljunmani</i> Lyman, 1875
<i>Ophiernus adpersus adpersus</i> Lyman, 1883	Family Ophiidermatidae Ljungman, 1867
<i>Ophirolepis elegans</i> Lütken, 1859	* <i>Bathypectinura heros</i> (Lyman, 1879)
<i>Ophirolepis impressa</i> Lütken, 1859	<i>Ophioderma appressa</i> (Say, 1825)
** <i>Ophiomastus secundus</i> Lyman, 1878	<i>Ophioderma rubicunda</i> Lütken, 1856
<i>Ophiomusium acuferum</i> Lyman, 1875	** <i>Ophiopaepale goesiana</i> Ljungman, 1872

Previous records in Colombia: Bayer *et al.* (1970), Caycedo (1979), Álvarez (1981), Gallo (1988), González *et al.* (2002).

Distribution: From North Carolina to Florida and Gulf of Mexico, Bahamas, Cuba, Jamaica, Haiti, Puerto Rico, Virgin Islands, Barbados, Curaçao, Mexican Caribbean, Central and South American coasts to Brazil, including Colombia (Bayer *et al.* 1970, Hendler *et al.* 1995, González *et al.* 2002, Laguarda-Figueroa *et al.* 2004, 2005).

Depth range: 2-508 m (Hendler *et al.* 1995).

Family Astroschematidae Verrill, 1899

***Astroschema oligactes* (Pallas, 1788)
(Fig. 2 A, B, C)

References: Lyman (1875): 26.

Material examined: 2 INV EQU1086 (St. 19, dd: 3 mm, al: 23-30 mm).

Previous records in Colombia: New record.

Distribution: Gulf of Mexico, Cuba, Lesser Antilles (Clark 1915, Lalana *et al.* 2004). In Colombia it was collected at TAY and ARCO.

Depth range: 124 - 518 m (Clark 1915).

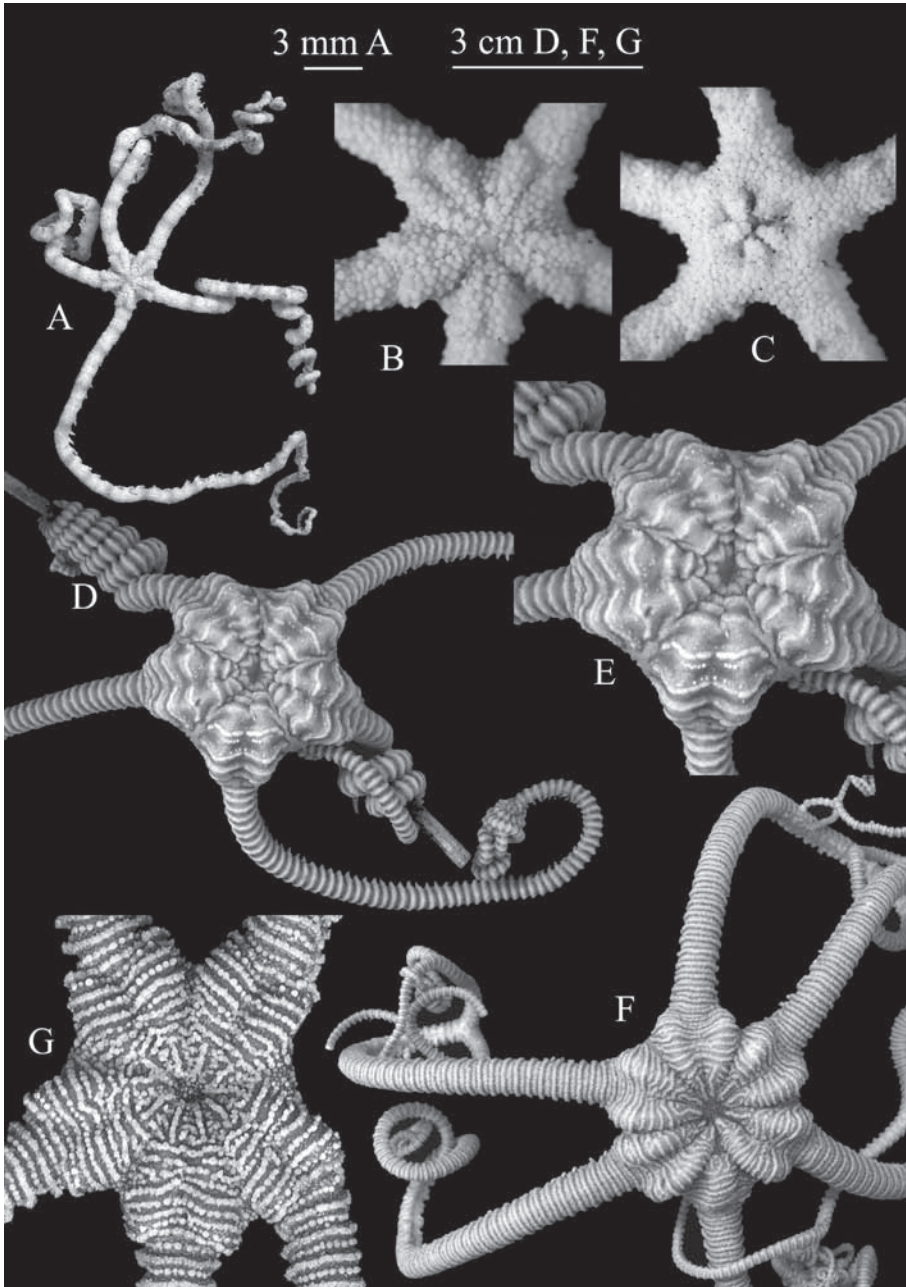


Fig. 2. *Asteroschema oligactes*. (A) Aboral view. (B) Aboral disc. (C) Oral disc. *Asteroporpa annulata*. (D) Aboral view. (E) Aboral disc. *Astrocnida isidis*. (F) Aboral view. (G) Aboral disc.

Order Ophiurida Müller and Troschel, 1840

Family Ophiomyxidae Ljungman, 1867

***Ophiomyxa stimpsonii* (Lyman, 1875)
(Fig. 3 A, B)

References: Lyman (1875): 23, 24, pl. I: figs. 11-15, Verrill (1899a): 67-69, pl. II: figs. 4, 4a.

Material examined: 1 INV EQU365 (St.20), 5 INV EQU366 (St. 23, dd: 14-24 mm), 2 INV EQU370 (St.35).

Previous records in Colombia: New record.

Distribution: Antilles (Verrill 1899a, b). In Colombia it was collected in front of MAG and DAR.

Depth range: 108-472 m.

Remarks: This record extends the known depth range of 108-432 m recorded by Verrill (1899b).

***Ophiomyxa tumida* Lyman, 1883
(Fig. 3 C, D, E)

References: Lyman (1883): 272-274, pl. I: figs. 1-3.

Material examined: 1 INV EQU1093 (St. 19, dd: 12mm), 1 INV EQU1919 (St.45).

Previous records in Colombia: New record.

Distribution: Greater Antilles (Lyman 1883, Clark 1915, 1941). Hendler *et al.* (1995) mention possible records from the middle equatorial Atlantic. In Colombia it was collected in front of GUA, TAY and ARCO.

Depth range: 23-601 m (Clark 1915).

Ophiosyzygus disacanthus H.L. Clark, 1911
(Fig. 3 F)

References: Turner and Heyman (1995): 292-297, figs. 1, 2.

Material examined: 2 INV EQU1927 (St. 73, dd: 10-15 mm).

Previous records in Colombia: Borrero-Pérez and Benavides-Serrato (2004).

Distribution: Japan, Gulf of Mexico, Colombia (Turner and Heyman 1995, Borrero-Pérez and Benavides-Serrato 2004).

Depth range: 127-278 m (Turner and Heyman 1995).

Remarks: This species was only collected in the station 73, one of the localities where a community of azooxanthellate coral has been described in the Colombian Caribbean Sea (Reyes *et al.* 2005).

Family Ophiacanthidae Perrier, 1891

Subfamily Ophiacanthinae Paterson, 1985

***Ophiacantha echinulata* Lyman, 1878
(Fig. 4 C, D, E)

References: Lyman (1878): 229, figs. 405-407.

Material examined: 7 INV EQU1285 (St.17), 1 USNM E52018 (St.17), 1 INV EQU483 (St.32, dd:18 mm, al:120 mm), 1 INV EQU486 (St.31), 3 INV EQU488 (St.31), 1 INV EQU489 (St.28), 2 INV EQU491 (St.28), 6 INV EQU1999 (St.68), 2 INV EQU2001 (St.71), 2 INV EQU2002 (St.32), 3 MCZ 6315, 3 MCZ 6319, 1 MCZ 6321, 3 MCZ 6324, 9 MCZ 6325.

Previous records in Colombia: New record.

Distribution: Gulf of Mexico, Cuba and Lesser Antilles (Lyman 1878, Clark 1915, Lalana *et al.* 2004). In Colombia it was collected in front of TAY, MAG and ARCO.

Depth range: 304-1719 m.

Remarks: This record extends the previous depth range of 516-1719 m, recorded by Clark (1915).

***Ophiacantha mesembria* H. L. Clark, 1915
(Fig. 4 F, G, H)

References: Koehler (1914): 91-94, pl. 9: figs. 1-2, Clark (1915): 201, 202.

Material examined: 11 INV EQU493 (St.25), 1 INV EQU494 (St.25, dd: 7 mm al: 49 mm), 1 INV EQU2184 (St.52), 1 INV EQU2185 (St.52), 1 MZC 6327, 5 MZC 6328.

Previous records in Colombia: New record.

Distribution: Cuba and St. Cruz, Dominica, Martinique, Grenada, Barbados (Clark 1915, Clark 1941, Lalana *et al.* 2004). In Colombia it was collected in front of PAL, MAG and DAR.

Depth range: 252-1125 m (H.L. Clark 1941).

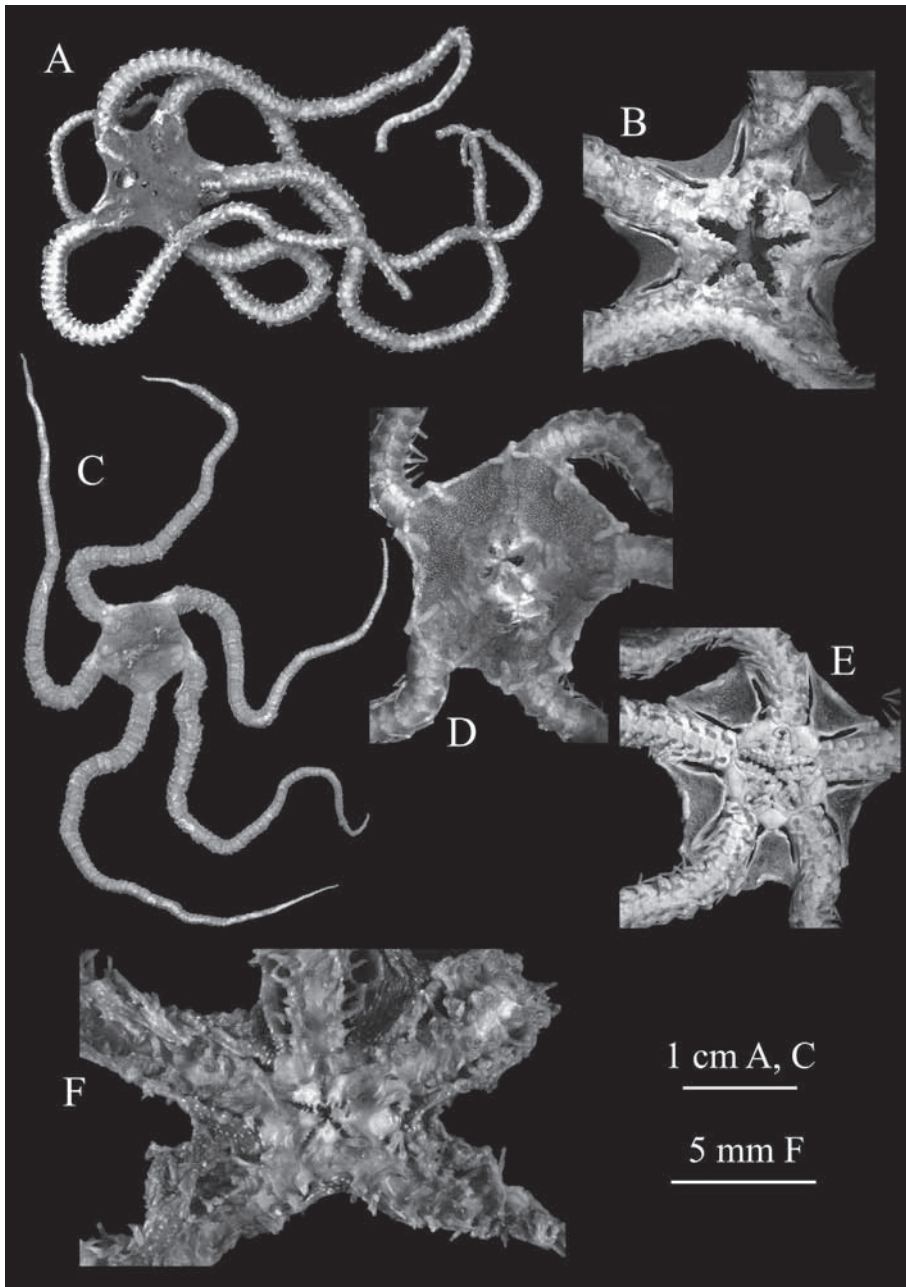


Fig. 3. *Ophiomyxa stimpsonii*. (A) Aboral view. (B) Oral disc. *Ophiomyxa tumida*. (C) Aboral view. (D) Aboral disc. (E) Oral disc. *Ophiosyzygus disacanthus*. (F) Oral disc.

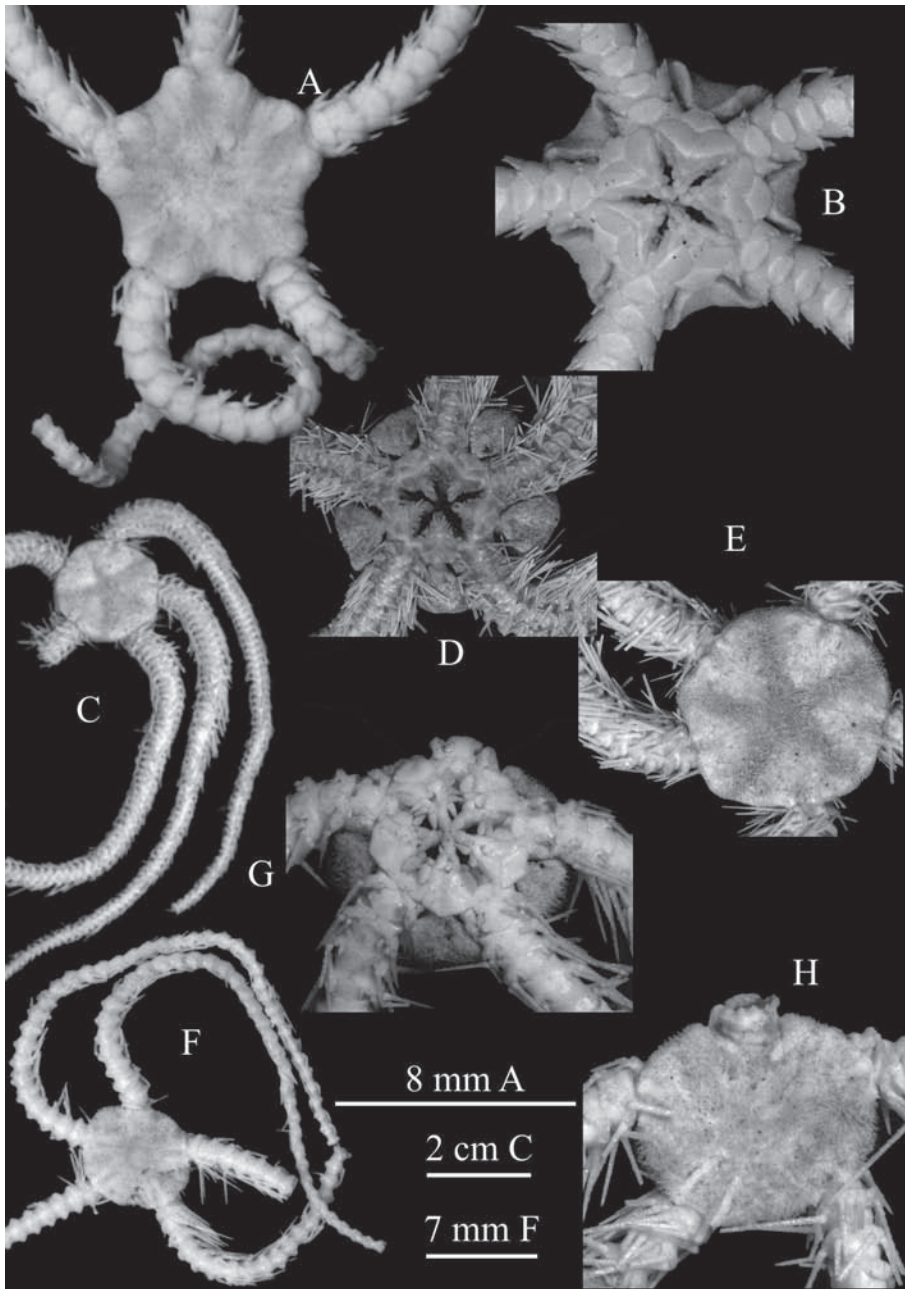


Fig. 4. *Ophiochondrus convolutus*. (A) Aboral view. (B) Oral disc. *Ophiacantha echinulata*. (C) Aboral view. (D) Oral disc. (E) Aboral disc. *Ophiacantha mesembria*. (F) Aboral view. (G) Oral disc. (H) Aboral disc.

*****Ophiocamax fasciculata* Lyman, 1883**
(Fig. 5 A, B, C)

References: Lyman (1883): 265, 266, pl. VII: figs. 92-94, Verrill (1899b): 354, 355, Paterson (1985): 66, fig. 29.

Material examined: 3 INV EQU518 (St.22, dd: 15-19 mm, al: 155-171 mm), 1 INV EQU1270 (St.7), 1 INV EQU1271 (St.13), 2 INV EQU1274 (St.13), 1 INV EQU1273 (St.14), 2 INV EQU1275 (St.14), 1 INV EQU1272 (St.17), 2 INV EQU528 (St.25), 1 INV EQU531 (St.38, dd: 20 mm), 2 INV EQU535 (St.29).

Previous records in Colombia: New record.

Distribution: Cuba and Lesser Antilles (Lyman 1883, Verrill 1899a, Clark 1915, 1941, Lalana *et al.* 2004). In Colombia it was collected in all marine regions.

Depth range: 208-963 m.

Remarks: This record extends the previous depth range of 270-963 m recorded by H. L. Clark (1941).

*****Ophiocamax hystrix* Lyman, 1878**
(Fig. 5 D, E, F)

References: Lyman (1878): 232, pl. 1: figs. 13-15; Verrill (1899a): 63; Verrill, (1899b): 354, 355; Paterson (1985): 66, fig. 29.

Material examined: 4 INV EQU537 (St.26, dd: 14-17 mm, al: 175mm), 4 INV EQU00539 (St.26, dd: 16-21 mm, 1 specimen with six arms dd: 21 mm).

Previous records in Colombia: New record.

Distribution: Cuba and Lesser Antilles (Lyman 1882, Lyman 1883, Clark 1915, 1941, Lalana *et al.* 2004). In Colombia it was collected in front of MAG. **Depth range:** 171-684 m (Clark 1915, 1941).

*****Ophiomitra valida* Lyman, 1869**
(Fig. 6 A, B)

References: Lyman (1869): 325-326.

Material examined: 1 INV EQU1217 (St.18). 3 INV EQU1216 (St.19, dd: 3-8 mm).

Previous records in Colombia: New record.

Distribution: Florida, Cuba and Lesser Antilles (Lyman 1869, Clark 1915, 1941, Lalana *et al.* 2004). In Colombia it was collected in front of TAY.

Depth range: 131-608 m (Clark 1915).

*****Ophiomitrella laevipellis* (Lyman, 1883)**
(Fig. 6 C, D)

References: Lyman (1883): 259, pl. VI: figs. 82-84.

Material examined: 1 INV EQU1215 (St.13, dd: 3 mm, al: 15 mm), 1 specimen INV EQU2018 (St.32, dd: 2 mm, al: 7 mm), 1 INV EQU2019 (St.73), 1 INV EQU2020 (St.73, dd: 3.5 mm), 1 INV EQU2021 (St.73).

Previous records in Colombia: New record.

Distribution: St. Vincent and Martinique (Lyman 1883). In Colombia it was found in front of TAY, ARCO.

Depth range: 155-507 m.

Remarks: This record extends the previous depth range, 158-223 m recorded by Clark (1915).

*****Ophiomyces fructosus* Lyman, 1869**
(Fig. 6 E, F)

References: Lyman (1869): 345-347, Paterson (1985): 74-75, fig. 31

Material examined: 2 INV EQU2202 (St.43, dd: 5 mm, al: 12-15 mm); 44 INV EQU2203 (St.43, dd: 4-5 mm, al: 13 mm).

Previous records in Colombia: New record.

Distribution: Caribbean Sea and Florida, but there is a record from the Josefina Bank, west of Portugal (Lyman 1869, Paterson 1985). In Colombia it was collected in front of GUA.

Depth range: 151-410 m (Paterson 1985).

Remarks: This record extends the previous depth range, 210-410 m recorded by Paterson (1985). These specimens are of a smaller size than those recorded by Lyman (1869) (7 mm d.d.).

*****Ophiopristis hirsuta* (Lyman, 1875)**
(Fig. 7 F, G, H)

References: Lyman (1875): 12-13, pl. II, figs. 21-23, Paterson (1985): 53, 55.

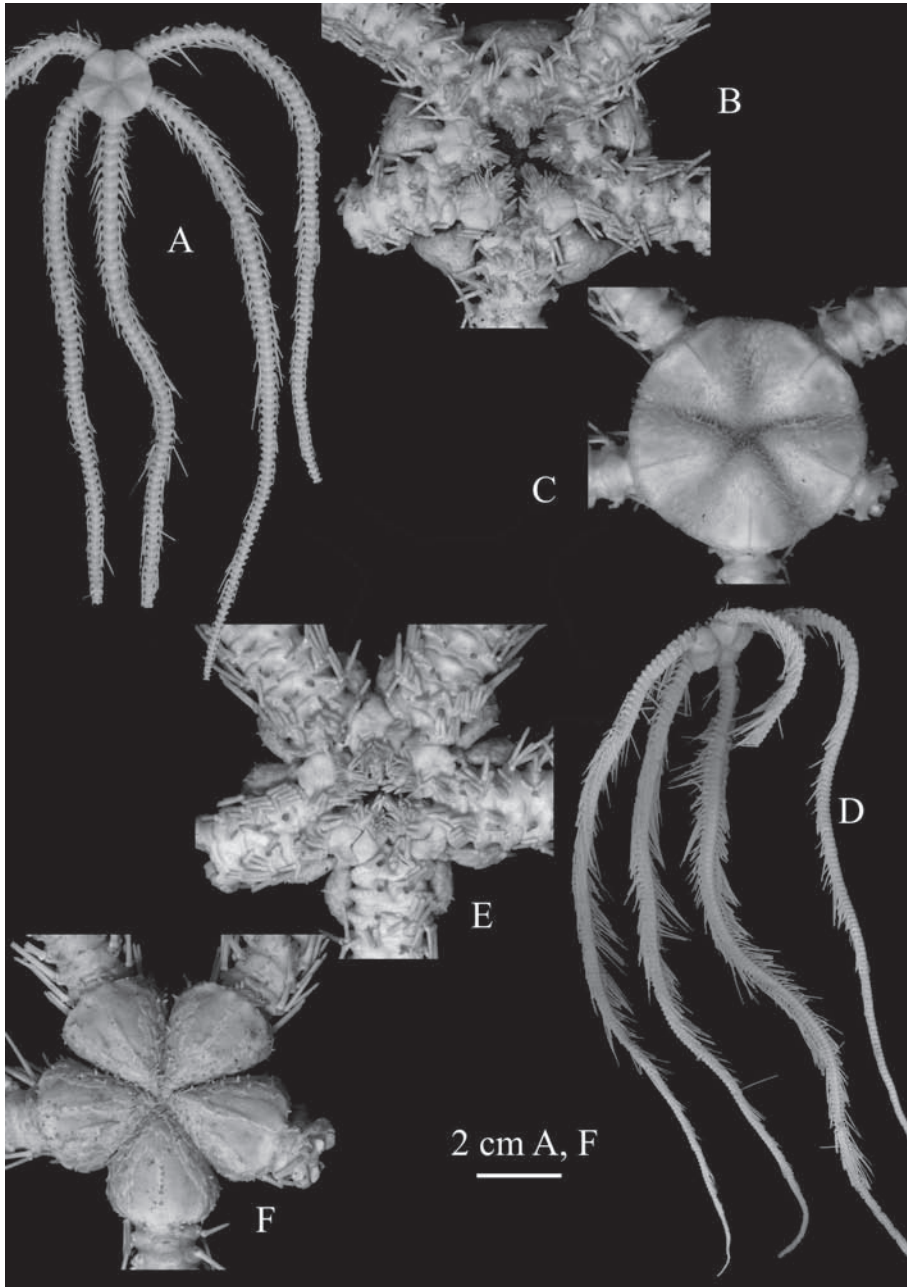


Fig. 5. *Ophiocamax fasciculata*. (A) Aboral view. (B) Oral disc. (C) Aboral disc. *Ophiocamax hystrix*. (D) Aboral view. (E) Oral disc. (F) Aboral disc.

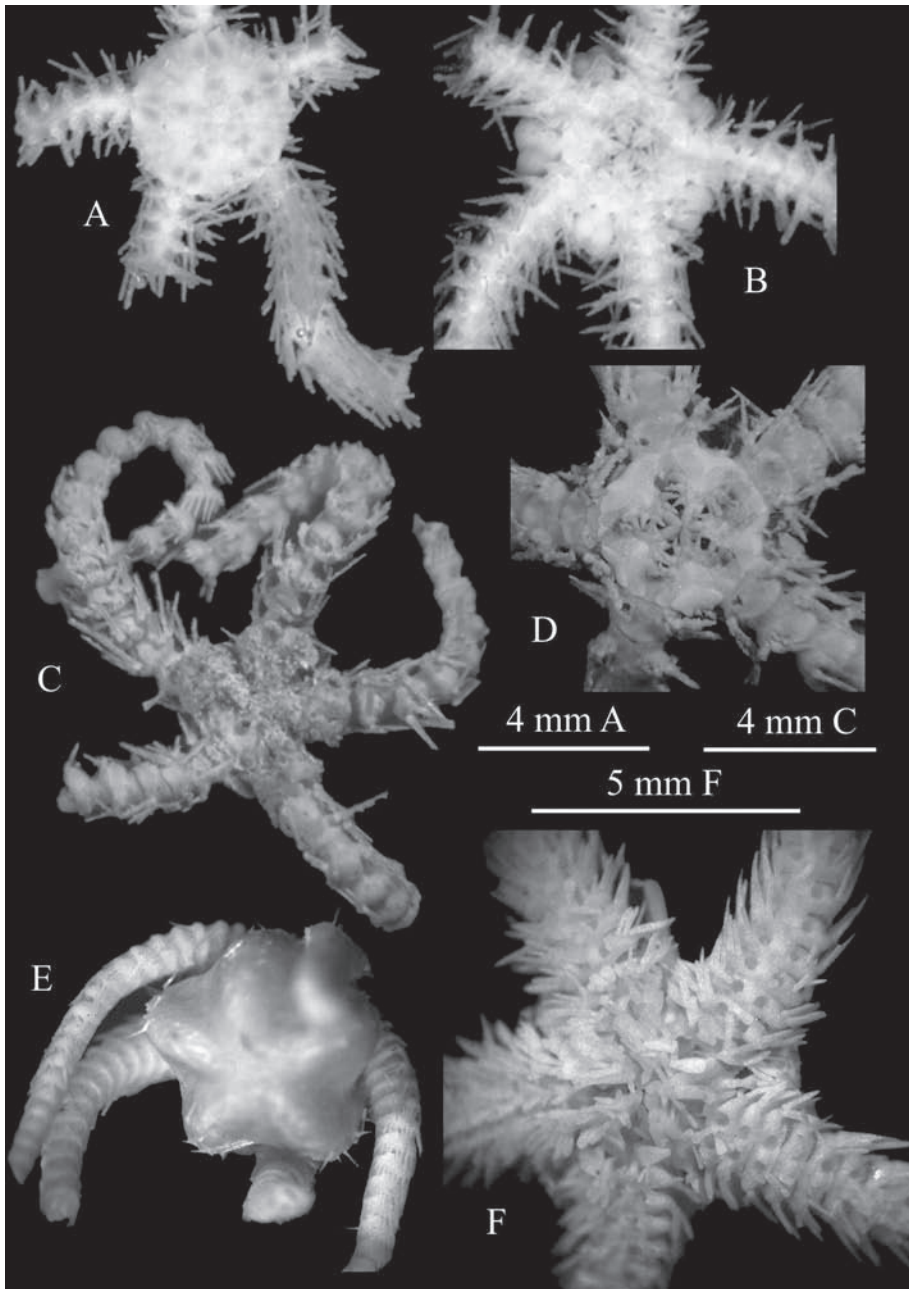


Fig. 6. *Ophiomitra valida*. (A) Aboral view. (B) Oral disc. *Ophiomitrella laevipellis* (C) Aboral view. (D) Oral disc. *Ophiomyces frutescosus*. (E) Aboral view. (F) Aboral disc.

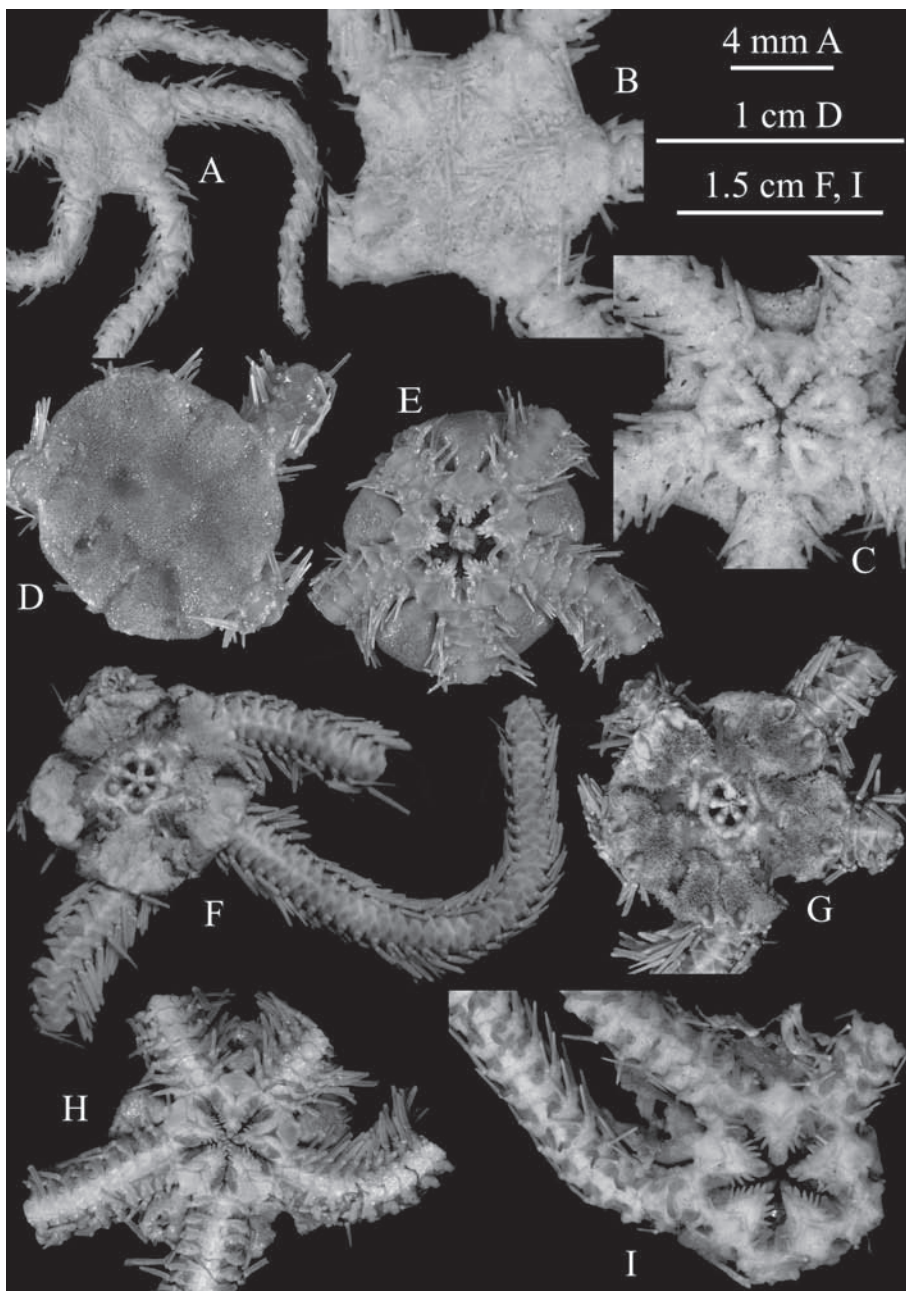


Fig. 7. *Ophiopristis sertata*. (A) Aboral view. (B) Aboral disc. (C) Oral disc. *Ophiotreta valenciennesi rufescens* (D) Aboral disc. (E) Oral disc. *Ophiopristis hirsuta* (F) Aboral view. (G) Aboral disc. (H) Oral disc. *Ophiotrema gracilis*. (I) Oral disc.

Material examined: 1 INV EQU1210 (St.19, dd: 17 mm), 1 INV EQU2022 (St.73), 1 INV EQU2023 (St.73), 1 MZC 1670, 1 MZC 1671, 3 MZC 1686, 2 MZC 1756, 6 MZC 6326.

Previous records in Colombia: New record.

Distribution: Florida, Cuba, Jamaica and Lesser Antilles (Lyman 1875, Clark 1915, Lalana *et al.* 2004). In Colombia it was collected in front of TAY and ARCO.

Depth range: 147-830 m (Clark 1915).

Remarks: Clark (1915) considered *Ophiopristis* a synonym of *Ophiacantha*. However, according to Paterson (1985) they are clearly distinguishable and in different subfamilies.

***Ophiopristis sertata* (Lyman, 1869)
(Fig. 7 A, B, C)

References: Lyman (1869): 326.

Material examined: 1 INV EQU502 (St.28, dd: 4.5 mm al: 15 mm), 1 MZC 2000, 1 MZC 2001, 1 MZC 2003, 3 MZC 6390.

Previous records in Colombia: New record.

Distribution: Bahamas, Cuba and Lesser Antilles (Lyman 1869, Clark 1915, Lalana *et al.* 2004). In Colombia it was collected in front of ARCO.

Depth range: 293-567 m (Lyman 1869, Clark 1915).

***Ophiotrema gracilis* Koehler, 1914
(Fig. 7 I)

References: Koehler (1914): 112-114, pl. 12, figs. 1-2, Paterson (1985): 54.

Material examined: 1 INV EQU506 (St.34, without disc), 5 INV EQU507 (St.31, with no disc), 1 USNM 32310 (Holotype).

Previous records in Colombia: New record.

Distribution: Type locality Lesser Antilles (latitude 16°54' N; longitude 63°12' W) (Koehler 1914). In Colombia it was collected in front of ARCO and DAR. **Depth range:** 490-1236 m.

Remarks: This species was known only from the type locality at 1236 m (Koehler 1914).

***Ophiotreta valenciennesi rufescens*
Koehler, 1896
(Fig. 7 D, E)

References: Paterson (1985): 49-50, fig. 21.

Material examined: 1 INV EQU2005 (St.73, dd: 12 mm).

Previous records in Colombia: New record.

Distribution: It has been recorded from off Madeira south to Angola (Paterson 1985) and in the Gulf of México (Stöhr and Segonzac 2005). In Colombia it was collected in front of ARCO.

Depth range: 155-1440 m (Paterson, 1985).

Remarks: This record extends the previous depth range, 640-1440 m recorded by Paterson (1985). The specimen collected presents two large papillae, instead of only one, on the oral tentacular pore and the oral shields whose distal edge was strongly convex, which are considered by Koehler in 1896 in order to describe *Ophiancanta rufescens* (Koehler 1909). In addition, according to the description presented by Paterson (1985), the specimen collected belong to this subspecies, except by the number of arm spines that according with Paterson are 7-8 and the specimen collected showed six. The six spines are typical of *O. valenciennesi*, according with O'Hara and Stöhr (2006). Nevertheless, Paterson (1985) in the remarks did not mention this characteristic in order to distinguish it from *O. valenciennesi*. This author either does not mention the few small pointed spines on the distal margin of the basal dorsal arm plates registered by O'Hara and Stöhr (2006) for *O. valenciennesi*. This species was only collected in the station 73, one of the localities where a community of azooxanthellate coral has been described in the Colombian Caribbean Sea (Reyes *et al.* 2005).

Family Hemicuryalidae Verrill, 1899

*****Ophiochondrus convolutus*** Lyman, 1869
(Fig. 4 A, B)

References: Lyman (1869): 328-329.

Material examined: 2 INV EQU1090 (St.19, dd: 8 mm, al: 31 mm), 1 USNM E52006 (St. 19).

Previous records in Colombia: New record.

Distribution: Cuba and Lesser Antilles (Lyman 1869, Clark 1915). In Colombia it was collected in front of TAY.

Depth range: 165-720 m (Clark 1915).

Remarks: This species was only collected in the station 19, one of the localities where a community of azooxanthellate coral has been described in the Colombian Caribbean Sea (Reyes *et al.* 2005).

Family Ophiuridae Lyman, 1865

Amphiophiura metabula H.L. Clark, 1915
(Fig. 8 A, B)

References: Clark (1915): 311, 312, pl. 17: figs. 1-3, Paterson (1985): 133, 134, fig. 50.

Material examined: 1 INV EQU1139 (St.9), 1 INV EQU1140 (St.10), 1 INV EQU392 (St.25), 10 INV EQU394 (St. 25, dd: 7-12 mm), 8 INV EQU2096 (St.2), 2 INV EQU2097 (St.2), 6 INV EQU2098 (St.2), 2 INV EQU2099 (St.52), 18 INV EQU2100 (St.52).

Previous records in Colombia: Bayer *et al.* (1970).

Distribution: From South Carolina, Gulf of Mexico, Honduras, Cuba and the South American coasts, includes Colombia (Clark 1915, John and Clark 1954, Bayer *et al.* 1970, Paterson 1985, Lalana *et al.* 2004).

Depth range: 274-1800 m.

Remarks: This record extends the previous depth range of 315-1800 m, recorded by Clark (1941).

*****Amphiophiura oedignatha*** H.L. Clark, 1915
(Fig. 8 C, D)

References: Clark (1915): 312, 313, pl. 17: figs. 10-12.

Material examined: 1 INV EQU396 (St.31), 1 INV EQU397 (St.30), 4 INV EQU1928 (St.68), 10 INV EQU1929 (St. 68, dd: 5-10 mm, al: 4.5-18 mm).

Previous records in Colombia: New record.

Distribution: South and southwest of Bahamas, Cuba, St. Kits, Martinique (Clark 1915, 1941, Lalana *et al.* 2004). In Colombia it was found in MAG and ARCO.

Depth range: 284-850 m.

Remarks: This record extends the previous depth range of 374-850 m, recorded by Clark (1915).

*****Amphipholizone delicata*** H. L. Clark, 1915
(Fig. 9 A, B)

References: Clark (1915): 335, 336.

Material examined: 2 INV EQU595 (St. 35, dd: 2.3 mm, al: 11mm), 2 INV EQU596 (St.29), 1 INV EQU597 (St.29), 1 INV EQU1955 (St.61), 2 INV EQU1956 (St.75, dd: 2 mm).

Previous records in Colombia: New record.

Distribution: Barbados (Clark 1915). In Colombia it was found off PAL, TAY, MAG, ARCO and DAR. **Depth range:** 20-296 m.

Remarks: This record extends the previous depth range of 137-185 m, recorded by Clark (1915). This species was known only from the type locality.

*****Ophiambix devaneyi*** Paterson, 1985
(Fig. 13 F, G)

References: Paterson (1985): 115, 142-144, fig. 54, 57 a,b,c,d,e,f.

Material examined: 2 INV EQU1930 (St.33, dd: 4 mm).

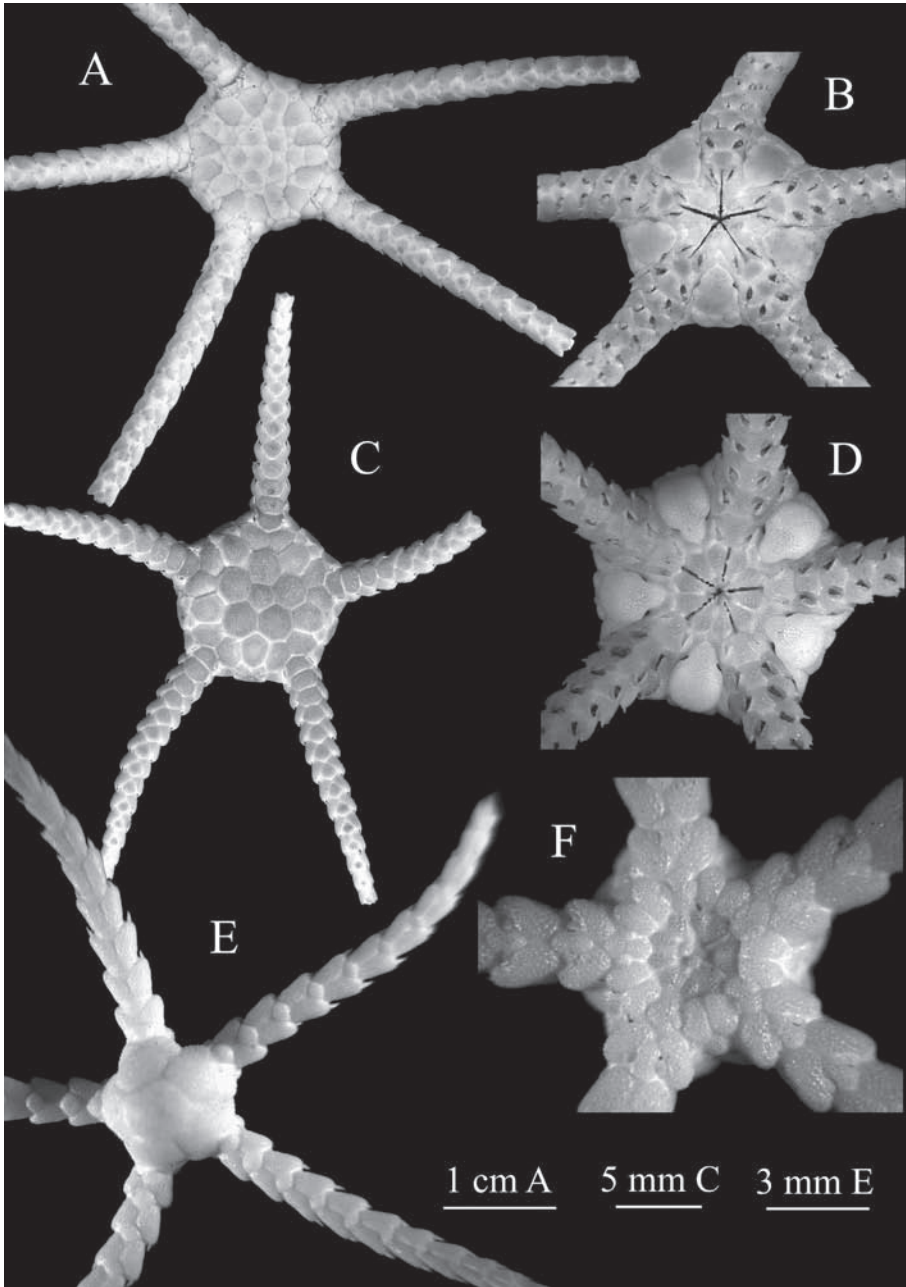


Fig. 8. *Amphiophiura metabula*. (A) Aboral view. (B) Oral disc. *Amphiophiura oedignatha*. (C) Aboral view. (D) Oral disc. *Ophiomastus secundus*. (E) Aboral view. (F) Oral disc.

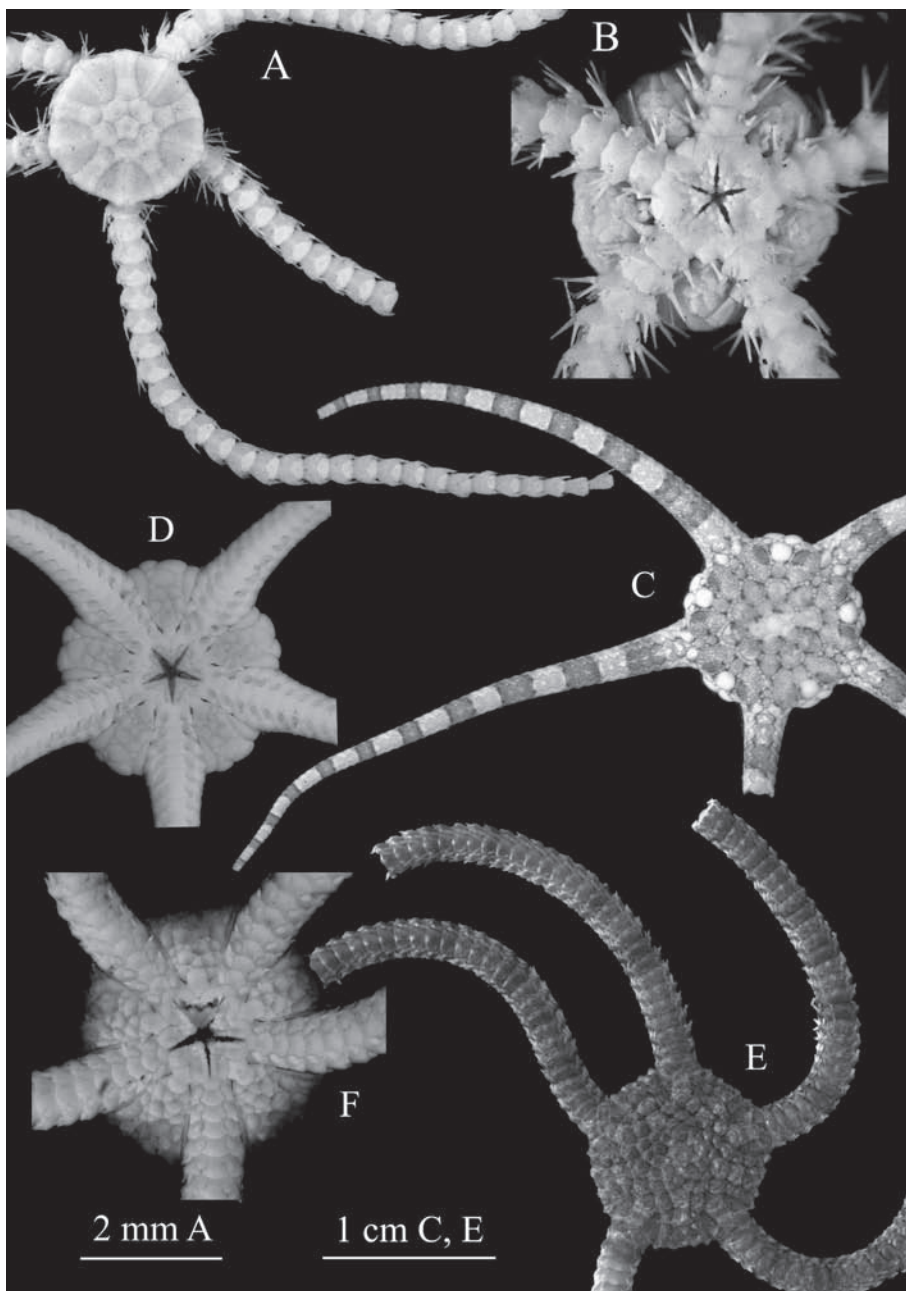


Fig. 9. *Amphipholizona delicata*. (A) Aboral view. (B) Oral disc. *Ophiolepis elegans*. (C) Aboral view. (D) Oral disc. *Ophiolepis impressa*. (E) Aboral view. (F) Oral disc.

Previous records in Colombia: New record.
Distribution: Dominica Island (Paterson 1985). In Colombia it was collected at ARCO.
Depth range: 146-494 m (Paterson 1985).
Remarks: This species was known only from the type locality.

Ophiernus adspersus adspersus Lyman, 1883
(Fig. 11 C, D)

References: Madsen (1977): 110-112, 114-116, fig. 3, Paterson (1985): 99, fig. 40.
Material examined: 1 USNM E52008 (St.3), 1 INV EQU1242 (St.13), 1 INV EQU1243 (St.13), 1 INV EQU1241 (St.17), 1 INV EQU452 (St.24), 1 INV EQU456 (St.34), 2 INV EQU462 (St. 28, dd: 15 mm al: 88 mm), 21 INV EQU1984 (St.68), 2 INV EQU1985 (St.32).
Previous records in Colombia: Bayer *et al.* (1970).
Distribution: Widely distributed: Northern Indian Ocean, Western Pacific and Eastern Atlantic to Cabo Verde Islands. In the western Atlantic it has been found off the coasts of Mexico, Colombia and the Antilles (Bayer *et al.* 1970, Madsen 1977, Laguarda-Figuera *et al.* 2005).
Depth range: 68 and 3650 m (Bayer *et al.* 1970, Paterson 1985).

Ophiolepis elegans Lütken, 1859
(Fig. 9 C, D)

References: Hendler (1988): 269-270, Hendler *et al.* (1995): 105-106, figs. 30C-4, 30D-14, 32-5, 38.
Material examined: 1 INV EQU2139 (St.46, dd: 13 mm, al: 40 mm), 4 INV EQU2140 (St.46).
Previous records in Colombia: Álvarez (1981), Gallo (1988).
Distribution: Bahamas, from North Carolina to Dry Tortugas and Gulf of Mexico coasts, Texas, Antilles and the Central and South American coasts from Mexico to French Guyana (Gallo 1988, Hendler *et al.* 1995, Lalana *et al.* 2004, Laguarda-Figuera *et al.* 2004, 2005).
Depth range: 1-92 m (Hendler *et al.* 1995).

Ophiolepis impressa Lütken, 1859
(Fig. 9 E, F)

References: Hendler (1988): 269-270, Hendler *et al.* (1995): 107-109, fig. 40.
Material examined: 1 INV EQU1958 (St.64, dd: 10 mm), 1 INV EQU1959 (St.64, dd: 8 mm, al: 34 mm).
Previous records in Colombia: Bayer *et al.* (1970), Gallo (1988), Alvarez (1981), Hendler *et al.* (1995).
Distribution: Bahamas, Florida Keys, Dry Tortugas, Texas, Antilles, Mexico, Belize, Panama, Colombia, Venezuela and Brazil (Bayer *et al.* 1970, Hendler *et al.* 1995, Laguarda-Figuera *et al.* 2004, 2005).
Depth range: Intertidal to 24 m (Hendler *et al.* 1995).

***Ophiomastus secundus* Lyman, 1878
(Fig. 8 E, F)

References: Lyman (1878): 218, pl. II: figs. 16-18.
Material examined: 2 USNM E52012 (St.13, dd: 2 mm, al: 3.5-5 mm). 1 INV EQU1117 (St.13)
Previous records in Colombia: New record.
Distribution: South Carolina, Gulf of Mexico, west of Cuba, Lesser Antilles (Lyman 1878, 1883, Clark 1915, Lalana *et al.* 2004). In Colombia it was found off TAY.
Depth range: 108-2035 m (Clark 1915).

Ophiomusium acuferum Lyman, 1875
(Fig. 10 A, B)

References: Lyman (1875): 7-8, fig. 1-5, pl. 1.
Material examined: 1 INV EQU1202, (St. 19, dd: 9 mm, al: 21 mm), 1 INV EQU1204 (St.19), 1 USNM E52002, (St.19), 2 INV EQU402 (St.30), 1 INV EQU403 (St.30), 1 INV EQU404 (St.29), 8 INV EQU405 (St.29), 2 INV EQU1965 (St.33), 19 INV EQU1960 (St.73), 20 INV EQU1962 (St.75).
Previous records in Colombia: Bayer *et al.* (1970), González *et al.* (2002).

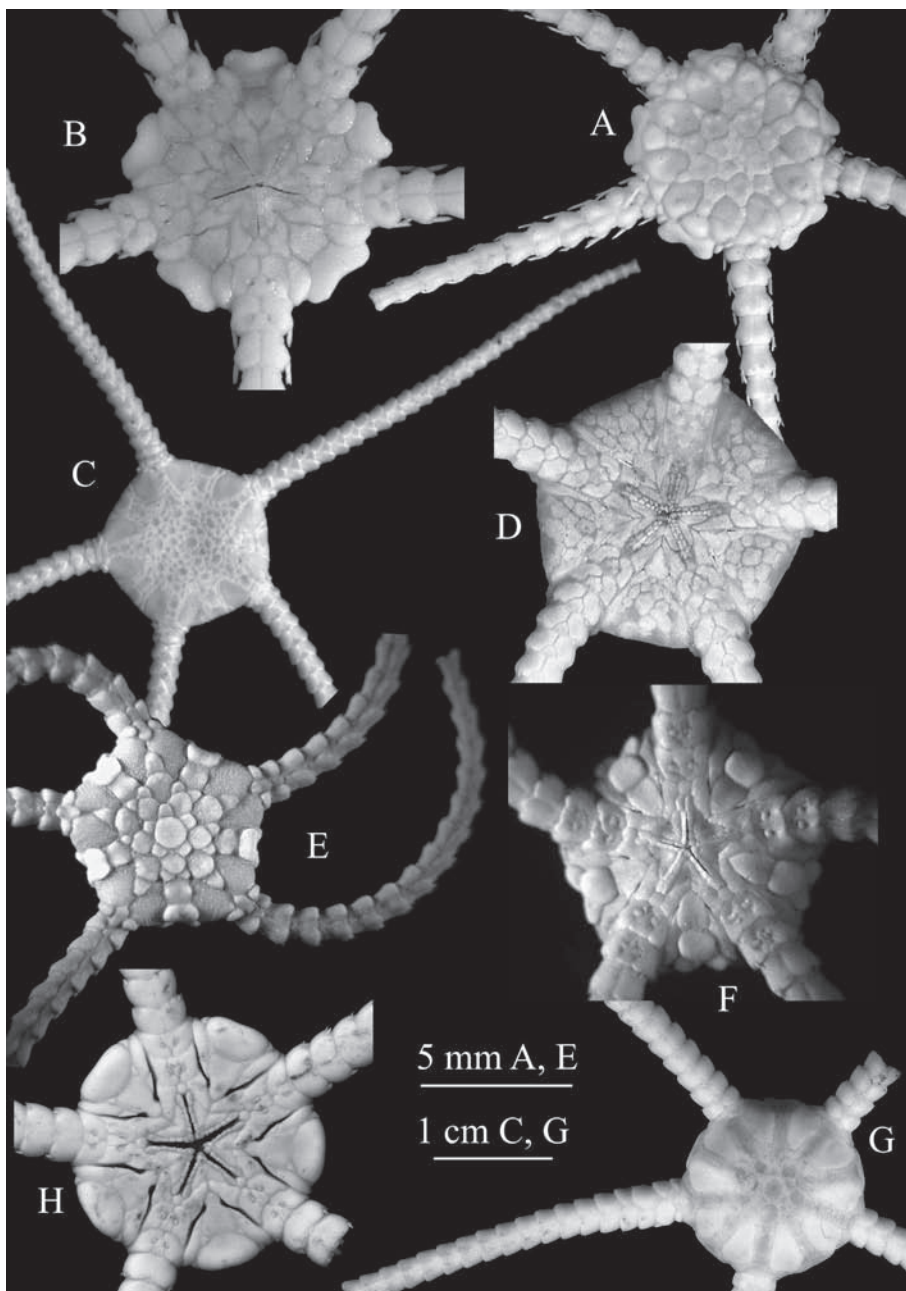


Fig. 10. *Ophiomusium acuferum*. (A) Aboral view. (B) Oral disc. *Ophiomusium eburneum*. (C) Aboral view. (D) Oral disc. *Ophiomusium testudo*. (E) Aboral view. (F) Oral disc. *Ophiomusium validum*. (G) Aboral view. (H) Oral disc.

Distribution: Florida, Antilles, Mexico, Colombia (Lyman 1883, Bayer *et al.* 1970, González *et al.* 2002, Lalana *et al.* 2004, Laguarda-Figueras *et al.* 2005).
Depth range: 48 - 540 m (Lyman 1883).

Ophiomusium eburneum Lyman, 1869
(Fig. 10 C, D)

References: Lyman (1869): 322-324, Lyman (1883): 244-245.

Material examined: 1 INV EQU1152 (St.1), 1 INV EQU1148 (St. 3, dd: 19 mm), 1 USNM E52001 (St.9), 1 INV EQU1151 (St.13), 1 INV EQU410 (St.27), 3 INV EQU420 (St.35), 2 INV EQU423 (St. 34, dd: 9-16 mm al: 33-51mm), 1 INV EQU426 (St.31), 1 INV EQU429 (St.28), 1 INV EQU1968 (St.68), 3 INV EQU1969 (St.71), 1 INV EQU1971 (St.33), 2 INV EQU1972 (St.75).

Previous records in Colombia: González *et al.* (2002)

Distribution: Florida, Gulf of Mexico and Caribbean Sea including Colombia (Koehler 1914, González *et al.* 2002, Lalana *et al.* 2004). In Colombia it was collected in all marine regions.

Depth range: 35 and 720 m.

Remarks: This record extends the previous depth range of 133-720 m, recorded by Koehler (1914) and González *et al.* (2002).

***Ophiomusium testudo* Lyman, 1875
(Fig. 10 E, F)

References: Lyman (1875): 8, 9, pl. I: figs. 6-8.

Material examined: 1 INV EQU1176 (St.19), 3 INV EQU1974 (St. 73, dd: 4.5-8 mm, al: 13-27 mm).

Previous records in Colombia: New record.

Distribution: Cuba and Lesser Antilles (Lyman 1875, Clark 1915, 1941, Lalana *et al.* 2004). In Colombia it was collected at TAY and ARCO.

Depth range: 124-914 m (Clark 1915).

Remarks: This species was only collected in the stations 19 and 73, two of the localities where a community of azooxanthellate coral

has been described in the Colombian Caribbean Sea (Reyes *et al.* 2005).

Ophiomusium validum Ljungman, 1872
(Fig. 10 G, H)

References: Lyman (1882): 92, 93, pl. I: figs. 1-3, XXXIX, figs. 11-13.

Material examined: 1 INV EQU1205 (St.14), 1 INV EQU435 (St.39), 6 INV EQU436 (St.37), 14 INV EQU438 (St. 37, dd: 8-18mm), 10 INV EQU448 (St.29), 26 INV EQU1975 (St.67), 17 INV EQU1977 (St.33).

Previous records in Colombia: Bayer *et al.* (1970).

Distribution: Gulf of Mexico, Cuba, Jamaica, Puerto Rico, Lesser Antilles and Caribbean Sea including Colombia (Lyman 1883, Koehler 1914, Clark 1915, John and Clark 1954, Bayer *et al.* 1970, Lalana *et al.* 2004).

Depth range: 108-2732 m (Koehler 1914).

***Ophiostriatus atlanticus* (Mortensen, 1933)
(Fig. 11 E, F, G)

References: Clark (1936): 5-7, pl. 3: figs: 7-9, Madsen (1983): 65, fig 14 e-f.

Material examined: 1 INV EQU1219 (St.8), 1 USNM E52010 (St.8, dd: 4.8 mm), 1 INV EQU1220 (St.11), 1 INV EQU465 (St.37, dd: 4.6 mm al: 19 mm), 4 INV EQU466 (St.29), 8 INV EQU468 (St.29), USNM 5198 (Holotype), USNM E20042.

Previous records in Colombia: New record.

Distribution: Virgins Islands (Clark 1936). In Colombia it was collected in front of PAL, ARCO and DAR.

Depth range: 296-396 m.

Remarks: This species was known only from the type locality at 396 m depth (Clark 1936). The oral shields of most specimens examined are naked and granules cover the disc plates.

***Ophiothyreus goesi* Ljungman, 1872
(Fig. 11 A, B)

References: Agassiz (1888): 113-115, fig. 400, Koehler (1904): 59-61, figs. 5-7, Clark (1915): 335.

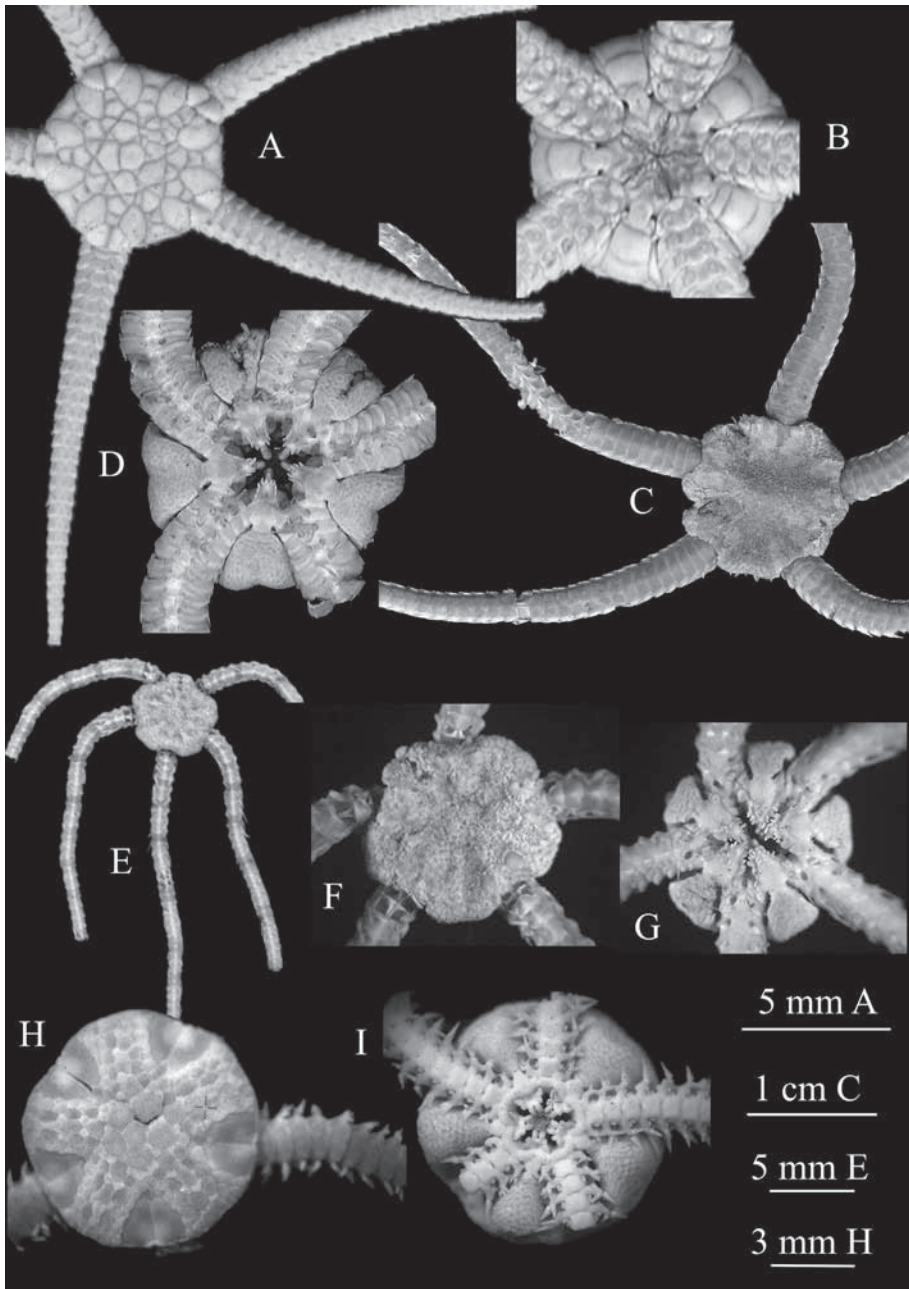


Fig. 11. *Ophiothyreus goesi*. (A) Aboral view. (B) Oral disc. *Ophiernus adpersus adpersus*. (C) Aboral view. (D) Oral disc. *Ophiostriatus atlanticus*. (E) Aboral view. (F) Aboral disc. (G) Oral disc. *Amphiodia atra*. (H) Aboral disc. (I) Oral disc.

Material examined: 10 INV EQU2154 (St.57), 1 INV EQU2155 (St.57), 6 INV EQU1980 (St. 73, dd: 2.5-6 mm, al: 7-13 mm), 101 INV EQU1981 (St.73), 47 INV EQU1982 (St.73).

Previous records in Colombia: New record.

Distribution: Antilles (Clark 1915). In Colombia it was collected off TAY and ARCO.

Depth range: 144-540 m (Clark 1915).

**Ophiura acervata* (Lyman, 1869)
(Fig. 12 A, B, C)

References: Lyman (1869): 316-319, Zoppi De Roa (1967): 295-296, fig. 25, Tommasi (1970): 78, 79.

Material examined: 2 INV EQU1222 (St.19), 1 USNM E52003 (St.19), 1 INV EQU378 (St.39), 6 INV EQU380 (St.35), 6 INV EQU382 (St.33), 2 INV EQU1933 (St.62), 35 INV EQU1940 (St. 65, dd: 4-8.5 mm), 5 INV EQU1943 (St.72), 2 INV EQU1949 (Est.74).

Previous records in Colombia: New record.

Distribution: Georgia, Florida, Yucatan, Cuba, Lesser Antilles, Panama, Venezuela and Brazil (Lyman 1883, Clark 1915, 1941, Zoppi De Roa 1967, Bayer *et al.* 1970, Tommasi 1970, Lalana *et al.* 2004). In Colombia it was collected in all marine regions.

Depth range: 20-630 m.

Remarks: This record extends the previous depth range of 40-630 m recorded by Lyman (1882) and Zoppi De Roa (1967).

***Ophiura falcifera* (Lyman, 1869)
(Fig. 12 G, H, I)

References: Lyman (1869): 319, 320, Lyman (1883): 242, pl. I: figs. 37-39.

Material examined: 4 INV EQU1191 (St.13), 1 INV EQU387 (St.26), 4 INV EQU388 (St.25), 5 INV EQU389 (St.34), 1 INV EQU390 (St.34), 2 INV EQU391 (St.32), 1 INV EQU1953 (St.68), 6 INV EQU1954 (St. 68, dd: 5-6.5 mm).

Previous records in Colombia: New record.

Distribution: Gulf of Mexico, Cuba and Lesser Antilles (Lyman 1883, Clark 1915, Lalana *et al.* 2004). In Colombia it was collected in all marine regions.

Depth range: 73-1037 m.

Remarks: This record extends the previous depth range of 360-1037 m recorded by Lyman (1883).

***Ophiura tenera* (Lyman, 1883)
(Fig. 12 D, E, F)

References: Lyman (1883): 239, 240, pl. IV: figs. 31-33.

Material examined: 2 INV EQU1180 (St. 1, dd: 4-6 mm), 1 USNM E52011 (St.1), 1 INV EQU1181 (St.10), 4 INV EQU373 (St.20), 1 INV EQU00374 (St.26), 3 INV EQU375 (St.26), 4 INV EQU2130 (St.11).

Previous records in Colombia: New record.

Distribution: St. Vincent (Clark 1915). In Colombia it was collected in GUA, PAL, TAY and MAG. **Depth range:** 158-500 m.

Remarks: This record extends the depth range 158-223 m, recorded by Clark (1915). This species was previously known from the type locality only.

Family Amphiridae Ljungman, 1867

***Amphilimna mirabilis* (H.L. Clark, 1941)
(Fig. 13 D, E)

References: Clark (1941): 84-85, pl. 8, Thomas (1975): 135, 137.

Material examined: 1 INV EQU500 (St.35, dd: 9 mm), 1 INV EQU501 (St.33).

Previous records in Colombia: New record.

Distribution: North and South coast of Cuba (Clark 1941, Thomas 1975, Lalana *et al.* 2004). In Colombia it was collected off ARCO and DAR.

Depth range: 286-430 m.

Remarks: This record extends the previous depth range of 315-430 m, recorded by Clark (1941) and Thomas (1975).

Amphilimna olivacea (Lyman, 1869)
(Fig. 13 A, B, C)

References: Thomas (1967): 123-127, fig. 1-6, Tommasi (1970): 32-33, fig. 30-31, Thomas (1975): 130-131.

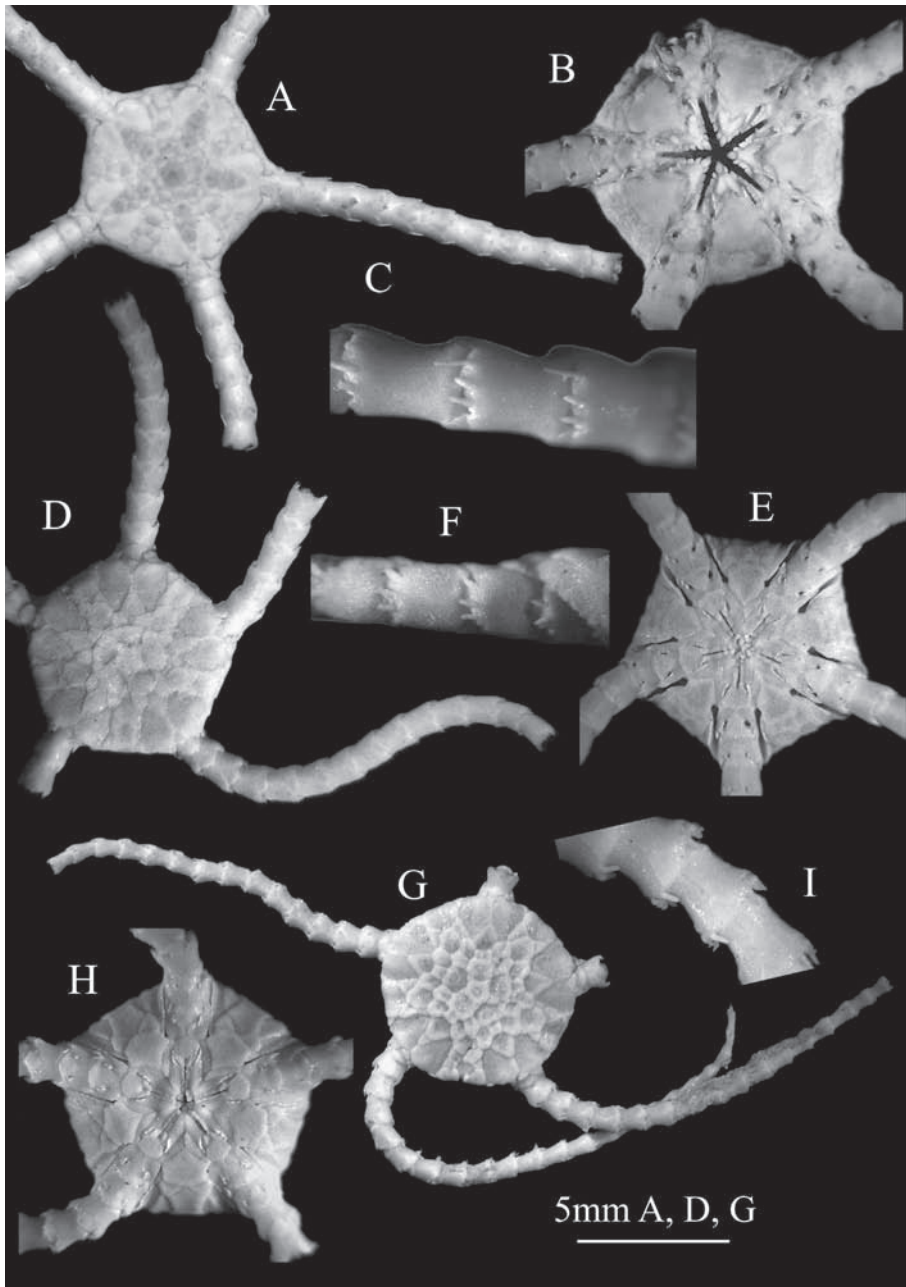


Fig. 12. *Ophiura acervata*. (A) Aboral view. (B) Oral disc. (C) Arm laterally, note the spines. *Ophiura tenera*. (D) Aboral view. (E) Oral disc. (F) Arm laterally, note the spines. *Ophiura falcifera*. (G) Aboral view. (H) Oral disc. (I) Arm aborally, note the spines hook-shaped.

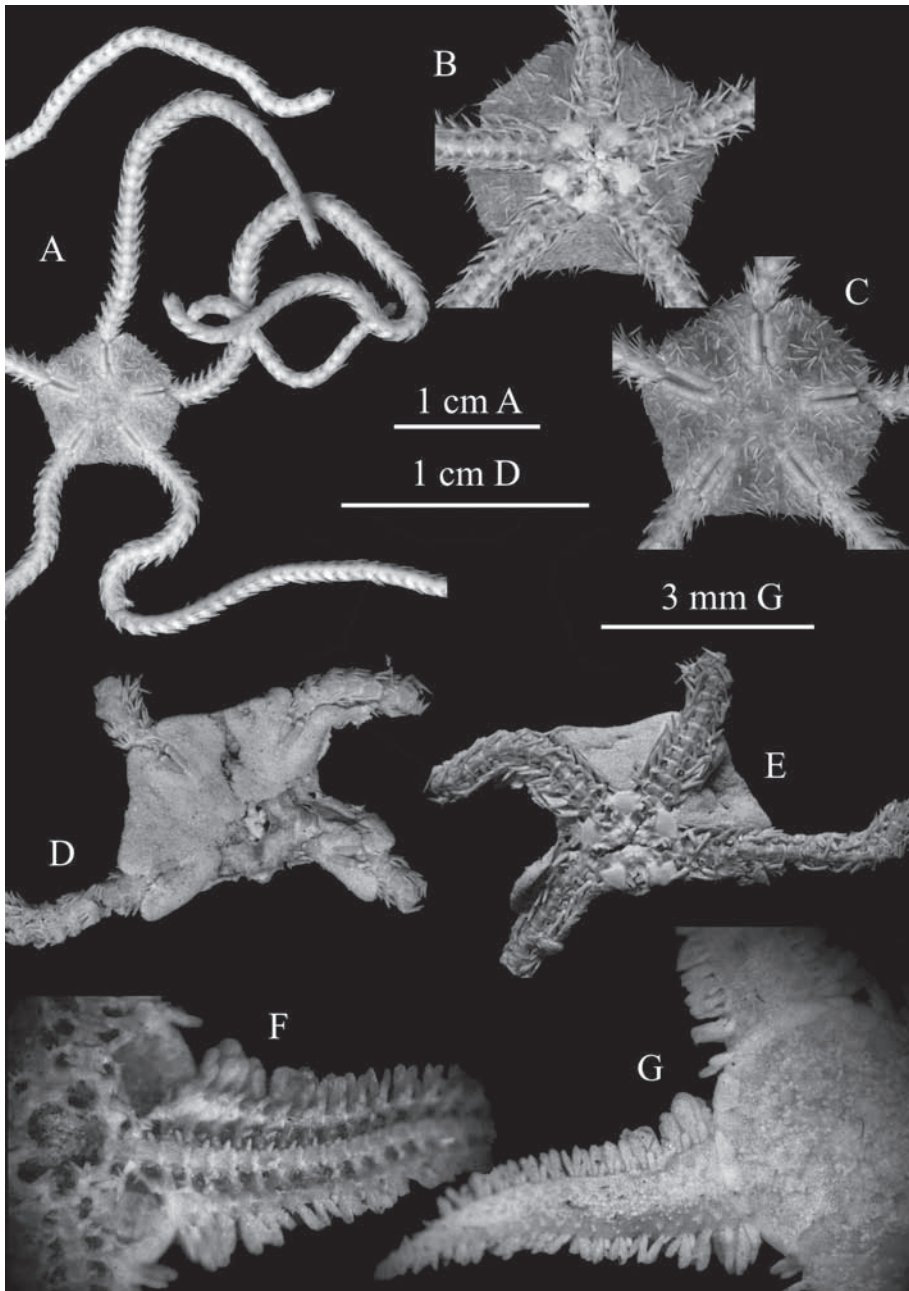


Fig. 13. *Amphilimna olivacea*. (A) Aboral view. (B) Oral disc. (C) Aboral disc. *Amphilimna mirabilis* (D) Aboral disc. (E) Oral disc. *Ophiambix devaneyi* (F) Oral disc and arm. (G) Aboral disc and arm.

Material examined: 2 INV EQU495 (St.22), 2 INV EQU496 (St.23), 1 INV EQU498 (St.24), 4 INV EQU2009 (St.62), 5 INV EQU2011 (St.65, dd: 9.5-12 mm), 1 INV EQU2012 (St.71), 1 INV EQU2013 (St.72).

Previous records in Colombia: Bayer *et al.* (1970), González *et al.* (2002).

Distribution: Eastern Atlantic from Liberia to Angola and Western Atlantic from Massachusetts including Florida coasts, Cuba, Mexico, Colombia, Brazil and Uruguay (Thomas 1967, Bayer *et al.* 1970, Tommasi 1970, González *et al.* 2002, Laguarda-Figueras *et al.* 2005).

Depth range: 60 - 406 m.

Remarks: This record extends the previous depth range of 60-350 m, recorded by Thomas (1965).

Amphiodia atra (Stimpson, 1852)
(Fig. 11 H, I)

References: Thomas (1964): 161-162, figs. 2, 3, Zoopi De Roa (1967): 287, fig. 17, Tommasi (1970): 38-39, figs. 37-38.

Material examined: 2 INV EQU2228 (St.40, Sin disco), 2 INV EQU2229 (St.40, dd: 6 mm, al: 55 mm), 2 INV EQU128 (St.61), 1 INV EQU157 (St.74, dd: 4.5), 1 INV EQU158 (St.74).

Previous records in Colombia: González *et al.* (2002).

Distribution: Widely distributed from Virginia to Gulf of Mexico, Antilles and across the South American coast to Brazil, including Panama, Colombia and Venezuela (Thomas 1964, Zoppi De Roa 1967, Bayer *et al.* 1970, Tommasi 1970).

Depth range: 1-38 m (Tommasi 1970).

**Amphiodia planispina* (Martens, 1867)

References: Hendler *et al.* (1995): 152-153, figs. 71, 100 A, B, C.

Material examined: 1 INV EQU2245 (St.46).

Previous records in Colombia: New record.

Distribution: Florida, Dry Tortugas, Cuba, Panama, Brazil and Argentina (Hendler *et al.*

1995). In Colombia it was collected in front of GUA.

Depth range: 1-49 m (Hendler *et al.* 1995).

***Amphioplus tumidus* (Lyman, 1878)
(Fig. 14 A, B, C)

References: Lyman (1878): 225, pl. 2, figs. 28-30, Verrill (1899a): 25.

Material examined: 1 USNM E52005 (St.6), 1 INV EQU1121 (St.9), 1 INV EQU1119 (St.17), 4 INV EQU585 (St.27), 1 INV EQU588 (St.26, dd: 8mm, al: 77mm), 1 INV EQU589 (St.50), 3 INV EQU593 (St.29), 8 INV EQU2040 (St.67), 1 INV EQU2042 (St.73), 4 INV EQU2043 (St.75), 1 MZC 1476 (Holotype), 2 MZC 1540 (Paratype).

Previous records in Colombia: New record.

Distribution: Gulf of Mexico and Lesser Antilles (Clark 1915). In Colombia it was collected from all marine regions.

Depth range: 70-578 m.

Remarks: This record extends the known depth range, 169-578 m, by Clark (1915).

Amphiura otteri Ljungman, 1872
(Fig. 14 F, G)

References: Paterson (1985): 81, 86, fig. 33.

Material examined: 2 INV EQU576 (St. 25, dd: 4-7.5 mm).

Previous records in Colombia: New record.

Distribution: Eastern Atlantic from south of Iceland and Rockall Trough to Cabo Verde Island; Western Atlantic in the Labrador basin and Antilles, Cuba (Paterson 1985, Lalana *et al.* 2004). In Colombia it was collected in front of GUA and MAG.

Depth range: 198-3200 m (Paterson 1985).

**Amphiura rathbuni* Koehler, 1914
(Fig. 14 D, E)

References: Koehler (1914): 50-52, pl. 18: figs. 5, 7, Zoppi De Roa (1967): 284-286.

Material examined: 1 INV EQU1103 (St.15), 1 INV EQU559 (St.21), 1 INV EQU574 (St. 29), 1 INV EQU2050 (St.66), 26 INV EQU2051

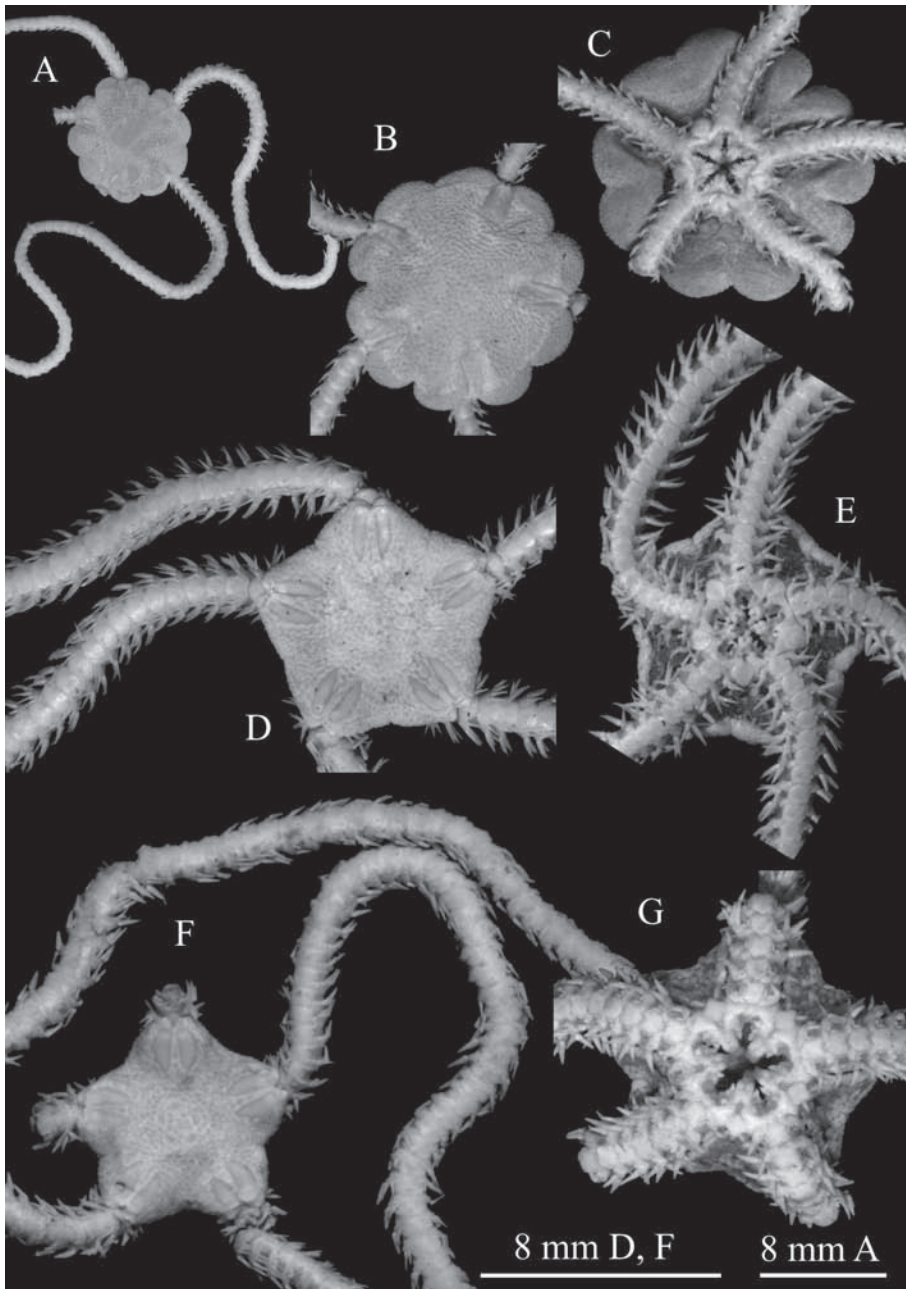


Fig. 14. *Amphioplus tumidus*. (A) Aboral view. (B) Aboral disc. (C) Oral disc. *Amphiura rathbuni*. (D) Aboral view. (E) Oral disc. *Amphiura otteri*. (F) Aboral view. (G) Oral disc.

(St.67), 2 INV EQU2053 (St.67, dd: 8-9 mm).

Previous records in Colombia: New record.

Distribution: Puerto Rico and northeast of Margarita Island, Venezuela (Koehler 1914, Clark 1915, Zoppi De Roa 1967). In Colombia it was collected in all marine regions.

Depth range: 29-502 m.

Remarks: This record extends the previous depth range, 29-200 m, recorded by Koehler (1914) and Zoppi De Roa (1967). This is the third record known of this species, since the original description by Koehler (1914), and the record from Venezuela by Zoppi De Roa (1967).

**Ophiophragmus riisei* (Lütken, 1859)
(Fig. 15 A, B, C)

References: Hendler *et al.* (1995): 175-176, Figs. 90, 106C, D, E.

Material examined: 1 INV EQU2056 (St.73, dd: 7 mm), 1 INV EQU2057 (St.74, dd: 10 mm, al: 40 mm).

Previous records in Colombia: New record.

Distribution: Gulf of Mexico, Florida (Hat Key and Miami), Antilles and Brazil. It was collected possibly in Panama and Puerto Rico (Thomas 1962, Tommasi 1970, Hendler *et al.* 1995). In Colombia it was collected at ARCO and MOR.

Depth range: 1-311 m (Tommasi 1970).

Remarks: Some specimens with regenerating discs have a rim of spines (Figure 18 C). Adult specimens with their original disc do not have a rim of spines (Figure 18 A).

Ophiostigma isocanthum (Say, 1825)

References: Hendler *et al.* (1995): 178-179, figs. 93, 104C, D.

Material examined: 1 INV EQU2060 (St.64, dd: 4 mm), 13 INV EQU2248 (St. 45, dd: 4-5 mm, al: 24 mm), 2 INV EQU2249 (St. 46), 2 INV EQU2250 (St. 46, dd: 2 mm, al: 10-13 mm), 1 INV EQU2251 (St. 47), 23 INV EQU2252 (St. 48), 18 INV EQU2253 (St. 48), 1 INV EQU2254 (St. 51).

Previous records in Colombia: Álvarez (1981), Hendler *et al.* (1995).

Distribution: Bermuda, Bahamas, North Carolina to Florida, Florida Keys, Dry Tortugas, shallow reef of Texas, Antilles, Mexico, Costa Rica, Panama, Colombia, Venezuela and Brazil (Hendler *et al.* 1995, Laguarda-Figueras *et al.* 2004).

Depth range: 1-223 (Hendler *et al.* 1995).

Family Ophiotrichidae Ljungman, 1867
Ophiotrix (*Ophiotrix*) *angulata* (Say, 1825)
(Fig. 15 D, E)

References: Hendler *et al.* (1995):180-182, figs. 30D-11, 95.

Material examined: 2 INV EQU2255 (St. 41, dd: 10-13 mm, al: 45 mm), 2 INV EQU2273 (St. 45), 5 INV EQU02259 (St. 45), 1 INV EQU2260 (St. 47, dd: 6 mm, al: 20 mm), 1 INV EQU2261 (St. 47), 2 INV EQU2263 (St. 48), 1 INV EQU2266 (St. 49), 1 INV EQU2267 (St. 49), 1 INV EQU2269 (St. 51), 4 INV EQU2271 (St. 55, dd: 6-8 mm, al: 20-32 mm).

Previous records in Colombia: Bayer *et al.* (1970), Álvarez (1981), Gallo (1988).

Distribution: Bermuda, Bahamas, North Carolina to Dry Tortugas, Florida coasts in the Gulf of Mexico, Texas coasts, Antilles and Central and South America coasts to Uruguay including Mexico, Panama, Colombia, Venezuela and Brazil (Zoppi De Roa 1967, Bayer *et al.* 1970, Tommasi 1970, Hendler *et al.* 1995, Lalana *et al.* 2004, Laguarda-Figueras *et al.* 2005).

Depth range: 1-540 m (Hendler *et al.* 1995).

Remarks: Tommasi (1970) named 21 varieties based on colouration, which have not been accepted by subsequent taxonomists.

Ophiotrix (*Acanthophiotrix*) *suensonii*
Lütken, 1856
(Fig. 15 F, G, H)

References: Gallo (1988): 387, 388, fig. 3, c, d, Hendler *et al.* (1995): 187, 188, figs. 30D-10, 32-7, 99.

Material examined: 3 INV EQU1096 (St.19). 1 INV EQU1097 (St.19, dd: 4 mm, al: 38 mm), 6 INV EQU2065 (St.73, dd: 9-15 mm), 1 INV EQU2064 (St.74).

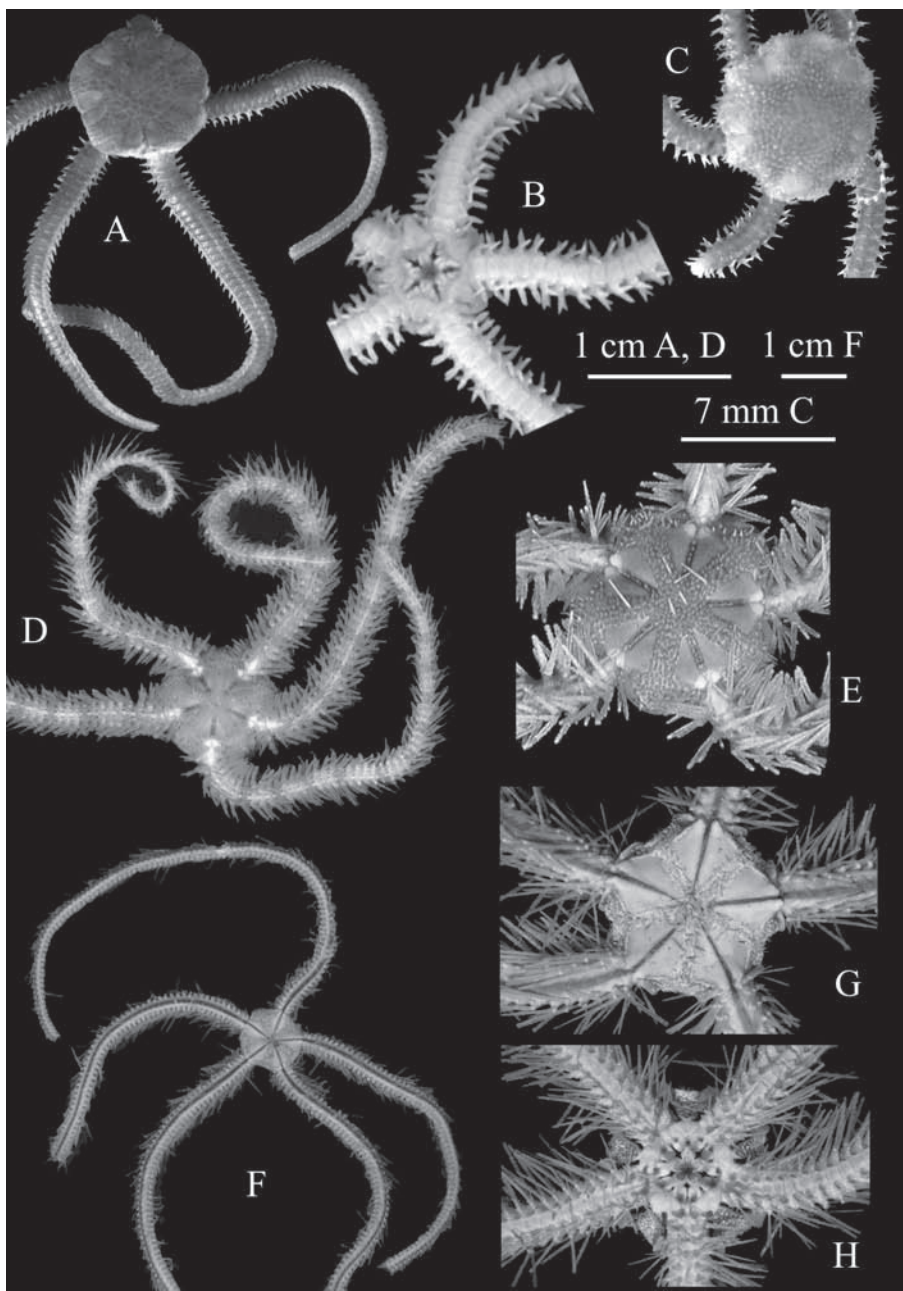


Fig. 15. *Ophiophragmus riisei*. (A) Aboral view. (B) Oral disc. (C) Aboral disc. *Ophiothrix (Ophiothrix) angulata*. (D) Aboral view. (E) Aboral disc. *Ophiothrix (Acanthophiothrix) suensonii*. (F) Aboral view. (G) Aboral disc. (H) Oral disc.

Previous records in Colombia: Bayer *et al.* (1970), Caycedo (1979), Álvarez (1981), Quiñones (1981), Gallo (1988).

Distribution: Widely distributed. Florida Keys, Gulf of Mexico, Bermuda, Antilles, Mexico, Central and South America coasts (Venezuela and Colombia) to Brazil (Zoppi De Roa 1967, Tommasi 1970, Bayer *et al.* 1970, Hendler *et al.* 1995, Lalana *et al.* 2004, Laguarda-Figueras *et al.* 2004, 2005).

Depth range: 0-479 m (Tommasi 1970, Hendler *et al.* 1995).

Family Ophiactidae Matsumoto, 1915

Histampica duplicata (Lyman, 1875)

(Fig. 16 B, C, D)

References: Lyman (1875): 19, pl. V, fig. 78, Paterson (1985): 80, 77: fig. 32.

Material examined: 2 INV EQU01229 (St. 19), 1 INV EQU1225 (St. 3), 2 INV EQU1228 (St. 4, dd: 3-5 mm), 2 INV EQU1226 (St. 7), 4 INV EQU1227 (St. 10), 1 INV EQU1232 (St. 11, dd: 2 mm, al: 8 mm), 1 INV EQU1230 (St. 12, dd: 4 mm, al: 14 mm), 3 INV EQU542 (St. 27), 1 INV EQU547 (St. 34, dd: 5 mm al: 26 mm), 1 INV EQU549 (St. 34, dd: 6 mm al: 35 mm), 2 INV EQU556 (St. 28), 1 USNM 15431 (dd: 5 mm, al: 23 mm), 1 USNM 12467 (dd: 3 mm).

Previous records in Colombia: New record.

Distribution: Eastern Pacific of Colombia and Ecuador; Eastern Atlantic from Bay of Biscay to North Africa; Western Atlantic, Antilles (Lyman 1875, Lyman 1882, Paterson 1985). In Colombia it was collected in all marine regions.

Depth range: 125-2870 m (Paterson 1985).

Ophiactis savignyi

(Müller and Troschel, 1842)

(Fig. 16 A)

References: Hendler *et al.* (1995): 148-151, figs. 32-4, 70.

Material examined: 3 INV EQU2221 (St. 45, dd: 2-4 mm, al: 5-13mm), 5 INV EQU2222 (St. 48, dd: 3 mm, al: 10-12 mm), 1 INV EQU2223

(St. 48, dd: 3 mm, al: 14 mm), 1 INV EQU2226 (St. 54), 1 INV EQU2227 (St. 55), 1 INV EQU2033 (St.64, dd: 2.5 mm, al: 12 mm), 6 INV EQU2034 (St.64).

Previous records in Colombia: Alvarez (1981), Gallo (1988).

Distribution: Temperate waters from Indo-Pacific, Eastern Pacific and Western and Eastern Atlantic. In Western Atlantic it has been recorded in South Carolina, Bermuda, Gulf of Mexico, Caribbean Sea and Brazil (Hendler *et al.* 1995, Laguarda-Figueras *et al.* 2004, 2005).

Depth range: Commonly in shallow waters but it has been recorded up to 518 m (Hendler *et al.* 1995).

Family Ophionereididae Ljungman, 1867

Ophionereis dolabrififormis John and A.M.

Clark, 1954

(Fig. 17 A)

References: Clark (1953): 68-71, John and Clark (1954): 155-158, Text-figs. 9-11.

Material examined: 1 INV EQU1989 (St.72, dd: 6 mm). 1 INV EQU2168 (St. 45), 2 INV EQU2169 (St. 45), 1 INV EQU2170 (St. 46), 3 INV EQU2171 (St. 48, 6-8 mm, al: 18-30 mm), 1 INV EQU2172 (St. 48), 1 INV EQU2173 (St. 48).

Previous records in Colombia: Bayer *et al.* (1970), Thomas (1973).

Distribution: The mouth of the Orinoco River, Venezuela and Colombia (John and A. M. Clark 1954, Bayer *et al.* 1970, Thomas 1973).

Depth range: 22-93 m.

Family Ophiocomidae Ljungman, 1867

Ophiopsila hartmeyeri Koehler, 1913

(Fig. 16 E)

References: Hendler *et al.* (1995): 120, fig. 48.

Material examined: 1 INV EQU2160 (St.41, dd: 8 mm, al: 60-65 mm), 1 INV EQU2161 (St. 42), 1 INV EQU2162 (St.45, dd: 6mm, al: 20-35 mm), 2 INV EQU2163 (St.45), 1 INV EQU2164 (St.48 dd: 3 mm, al: 11-13 mm),

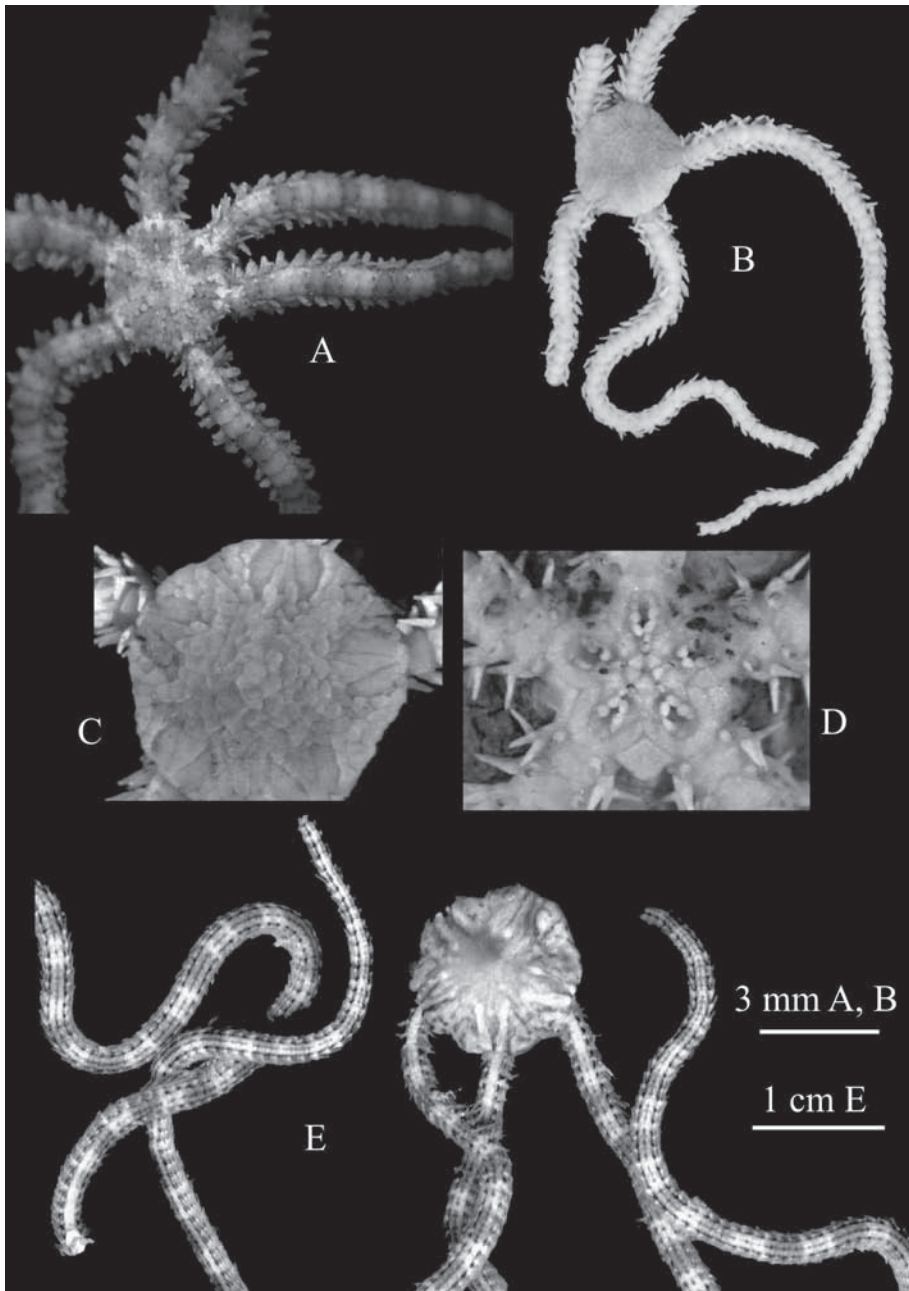


Fig. 16. *Ophiactis savignyi*. (A) Aboral view. *Histampica duplicata*. (B) Aboral view. (C) Aboral disc. (D) Oral disc. *Ophiopsila hartmeyeri*. (E) Aboral view.

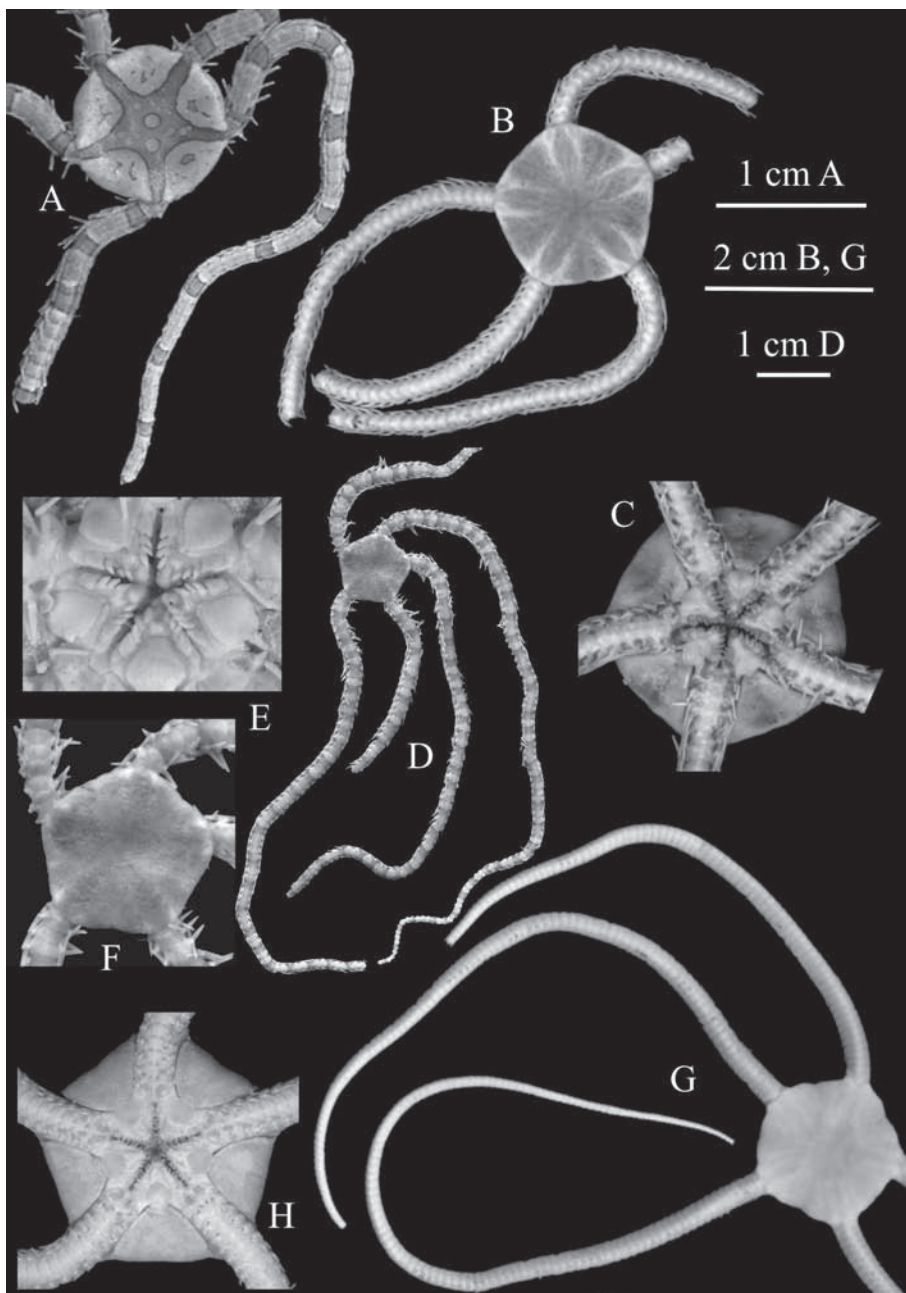


Fig. 17. *Ophionereis dolabriformis*. (A) Aboral view. *Ophiochiton ternispinus*. (B) Aboral view. (C) Oral disc. *Ophioplax ljungmani*. (D) Aboral view. (E) Oral disc. (F) Aboral disc detail. *Bathypectinura heros*. (G) Aboral view. (H) Oral disc.

1 INV EQU2165 (St.48), 1 INV EQU2166 (St.55).

Previous records in Colombia: Bayer *et al.* (1970).

Distribution: Florida, Florida Keys, St. Thomas, Montserrat, Barbados, Cozumel (Mexican Caribbean), Venezuela, Colombia and Brazil (Bayer *et al.* 1970, Hendler *et al.* 1995, Laguarda-Figueras *et al.* 2004, 2005).

Depth range: 12-161 m (Hendler *et al.* 1995).

*****Ophiopsila fulva* Lyman, 1878**

References: Lyman (1878): 227, pl. 2, figs. 25-27.

Material examined: 1 specimen INVEQU2167 (St. 42).

Previous records in Colombia: New record.

Distribution: Cuba (Lyman 1878). In Colombia it was collected in front of GUA.

Depth range: 29-315 m.

Remarks: This species was known only from the type locality at 315 m depth (Lyman 1878).

Family Ophiochitonidae Matsumoto, 1915

Ophiochiton ternispinus Lyman, 1883
(Fig. 17 B, C)

References: Lyman (1883): 255, 256, pl. V: figs. 67-69, Bartsch (1983): 15, 16, figs. 2, 3, Paterson (1985): 96-98, fig. 39.

Material examined: 1 INV EQU470 (St.31), 1 INV EQU471 (St.31, dd: 21 mm), 1 INV EQU1990 (St.32).

Previous records in Colombia: Bayer *et al.* (1970).

Distribution: North Atlantic Ocean, southwest of Ireland, Davis Strait, United States Atlantic coast, Gulf of Mexico, Mexican Caribbean, Antilles and Colombia (Koehler 1914, Clark 1915, 1941, Bayer *et al.* 1970, Bartsch 1983, Laguarda-Figueras *et al.* 2005).

Depth range: 377-2200 m (Bayer *et al.* 1970, Bartsch 1983).

*****Ophioplax ljungmani* Lyman, 1875**
(Fig. 17 D, E, F)

References: Lyman (1875): 22, 23.

Material examined: 2 INV EQU1206 (St.19), 1 INV EQU1207 (St.19), 4 INV EQU1991 (St.73, dd: 4.5-8 mm), 1 INV EQU1993 (St.74).

Previous records in Colombia: New record.

Distribution: Gulf of Mexico, Jamaica and Lesser Antilles (Lyman 1875, Clark 1915). In Colombia it was collected in front of TAY and ARCO.

Depth range: 22-471 m.

Remarks: This record extends the previous depth range of 158-471 m, recorded by Clark (1915).

Family Ophiodermatidae Ljungman, 1867

**Bathypsectinura heros* (Lyman, 1879)
(Fig. 17 G, H)

References: Lyman (1882): 16, pl. XXIII: figs. 7-9, Madsen (1973): 133-142, figs. 1, 2, Paterson (1985): 95, 96, fig. 38.

Material examined: 2 INV EQU1126 (St.7), 1 USNM E52023 (St.7), 1 INV EQU1125 (St.13), 1 INV EQU1124 (St.16), 2 INV EQU473 (St.22, dd: 37-38 mm al: 208mm), 2 INV EQU475 (St.20), 2 INV EQU480 (St.24), 3 INV EQU482 (St.25), 2 INV EQU1994 (St.68), 1 INV EQU1995 (St.68).

Previous records in Colombia: New record.

Distribution: Distributed in most oceans, except Arctic and South Oceans. In the Eastern Atlantic it has been collected in the Bay of Biscay, Azores, Gulf of Guinea and Cabo Verde Islands; in the Western Atlantic off North Carolina, Mexican Caribbean and Cuba (Madsen 1973, Paterson 1985, Laguarda-Figueras *et al.* 2005). In Colombia in front of GUA, PAL, TAY, MAG.

Depth range: 276-2050 m.

Remarks: *B. heros* has been recorded between 1920-2050 m in the Eastern Atlantic, and

450-494 m in the Pacific and Indian Ocean (Madsen 1973, Paterson 1985). The collected specimens extend this depth range. The juveniles differ from the adults, especially in the shape of the dorsal arm plates and in the granules that they have developed in simple series towards the edges of disc plates. Two specimens (dd: 33-38 mm) present a pair of orifices denominated extra-pores, on the proximal part of the ventral plate on the second and third vertebrae, which can appear in the family Ophiodermatidae (Madsen 1973).

Ophioderma appressa (Say, 1825)
(Fig. 18 A, B)

References: Hendler *et al.* (1995): 129-131, fig. 56.

Material examined: 1 INV EQU1996 (St.73, dd: 29 mm, al: 120-130 mm).

Previous records in Colombia: Bayer *et al.* (1970), Caycedo (1979), Gallo (1988), Alvarez (1981), Hendler *et al.* (1995).

Distribution: Bermuda, Bahamas, South Carolina, Florida, Florida Keys, Dry Tortugas, shallow reef of Texas, Antilles, Providencia Island (Colombia), Mexico, Panama, Colombia, Venezuela and Brazil (Caycedo 1979, Hendler *et al.* 1995, Laguarda-Figueras *et al.* 2004, 2005).

Depth range: Intertidal to 160 m.

Remarks: This record extends the previously known depth range of intertidal to 50 m, recorded by Hendler *et al.* (1995).

Ophioderma rubicunda Lütken, 1856
(Fig. 18 C, D)

References: Hendler *et al.* (1995): 139-140, fig. 63.

Material examined: 1 INV EQU2178 (St.48, dd: 9 mm, al: 40-45 mm).

Previous records in Colombia: Bayer *et al.* (1970), Álvarez (1981), Gallo (1988), Hendler *et al.* (1995).

Distribution: Bahamas, Florida Keys, Dry Tortugas, shallow reef of Texas, Antilles, Mexico, Panama, Colombia and Venezuela

(Gallo 1988, Hendler *et al.* 1995, Laguarda-Figueras *et al.* 2004, 2005).

Depth range: 1-71 m.

Remarks: This record extends the previous depth range of 1-31 m, recorded by Hendler *et al.* (1995).

***Ophiopaepale goesiana* Ljungman, 1872
(Fig. 18 E, F)

References: Nielsen (1932): 338-339, Turner (1984): 927-937, figs. 1-3.

Material examined: 29 INV EQU2179 (St.43), 1 INV EQU2180 (St.43), 41 INV EQU2181 (St.43), 1 INV EQU2182 (St.57), 1 INV EQU2183 (St. 57), 4 INV EQU1997 (St.73, dd: 9-12.5 mm), 1 INV EQU1998 (St.73).

Previous records in Colombia: New record.

Distribution: East of Gulf of Mexico and across the Antilles (Turner 1984, Lalana *et al.* 2004). In Colombia it was collected in front of GUA, TAY and ARCO.

Depth range: 101-436 m (Turner 1984).

Remarks: The diameter of disc (11.1 mm) recorded by Turner (1984) is exceeded by the specimens here collected (5.5 to 12.5 mm).

DISCUSSION

Brittle stars are the most diverse and abundant class within the phylum Echinodermata. In some locations they comprise between 27-56% of the macrofauna (Hendler *et al.* 1995). Approximately 2100 species have been described (World Ophiuroidea database, <http://www.marinespecies.org/ophiuroidea/index.php>). Even though the ecological important of this group is significant, they are poorly known from Colombia. Only 35 species were recorded by 2002 (Thomas 1962, Bayer *et al.* 1970, Thomas 1973, Caycedo 1979, Alvarez 1981, Schoppe 1996, González *et al.* 2002). This study has doubled the number of species known from the Colombian Caribbean with 39 new records. Thirty-one species are reported for the first time from the continental area of the Caribbean Sea and one species is new to the Atlantic Ocean. The lack of taxonomic studies

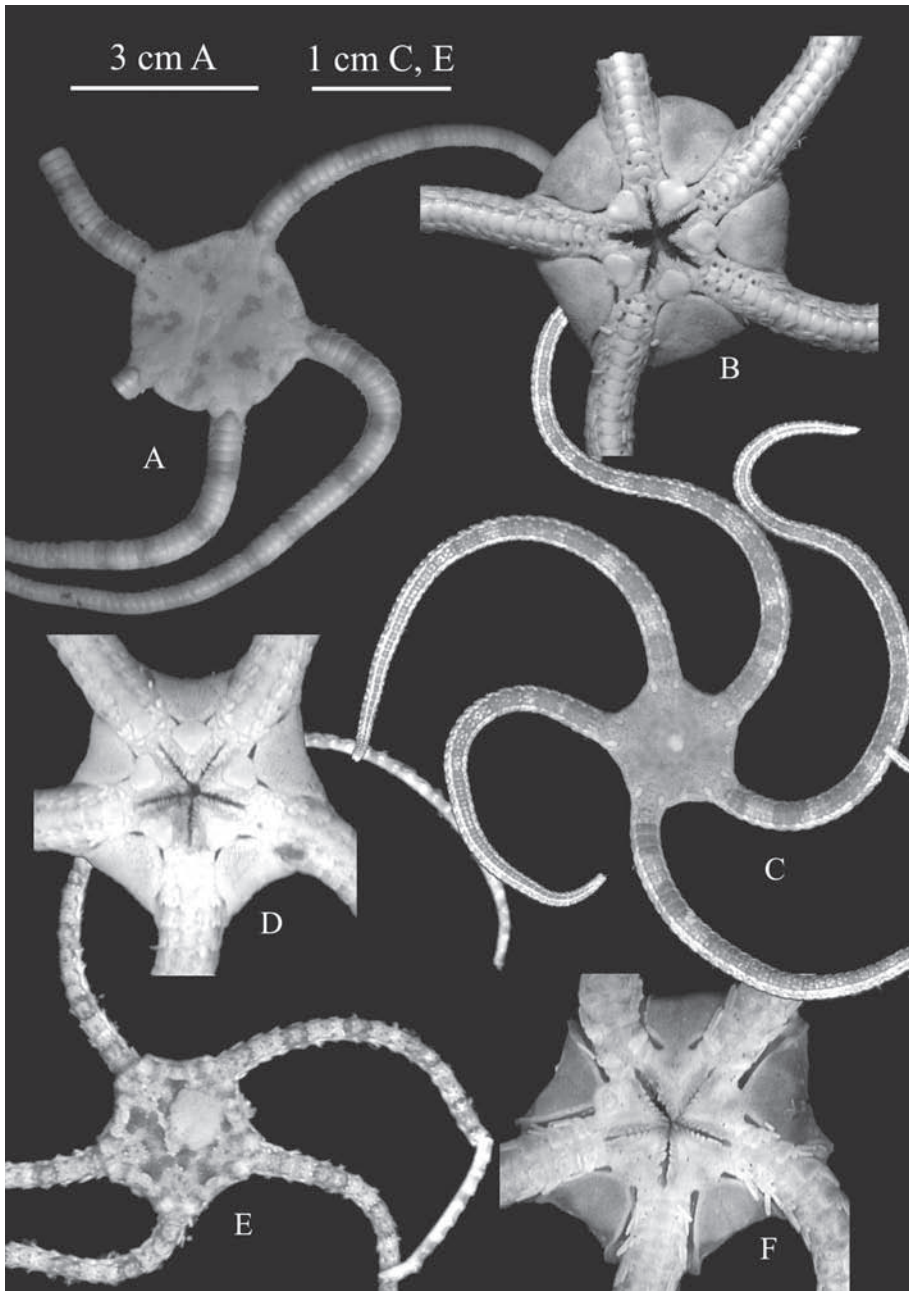


Fig. 18. *Ophioderma apressum*. (A) Aboral view. (B) Oral disc. *Ophioderma rubicundum*. (C) Aboral view. (D) Oral disc. *Ophiopaepale goesiana*. (E) Aboral view. (F) Oral disc.

from the continental area of the Caribbean Sea (Tommasi 1970, 1971, 1972, Zoppi De Roa 1967, Bayer *et al.* 1970) contrasts with the number from the Caribbean Islands (Lyman 1869, 1875, 1878, 1879, 1882, 1883, Verrill 1899a, b, Clark 1941). The new records in this paper are an important extension of the distribution for many species. For example *Ophiura tenera*, *Amphipholizona delicata* and *Amphilimna mirabilis* were previously known from one or two localities in the Antilles. Eight of the species collected in this work were recorded by Paterson (1985) from deep-water in the North Atlantic Ocean. Of these, *Ophiocamax fasciculata* stands out because of its wide distribution and high abundance in the Colombian Caribbean Sea.

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RESUMEN

Se presenta un listado anotado de los ofiuros (Echinodermata: Ophiuroidea) encontrados entre 20 y 520 m de profundidad en la plataforma continental y el talud superior del Caribe colombiano. Los ejemplares se recolectaron durante las campañas INVEMAR-MACROFAUNA

(1998-2001) utilizando redes de arrastre. Se identificaron un total de 58 especies, pertenecientes a 41 géneros, 13 familias y 2 órdenes. 35 especies son primeros registros para el Caribe colombiano; entre estas 28 son también primeros registros para la parte continental del Mar Caribe. Se presentan para cada especie, figuras generales y detalles.

Palabras clave: Echinodermata, Ophiuroidea, primeros registros, Colombia, Mar Caribe.

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