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A REPORT ON A COLLECTION OF CHITONS (MOLLUSCA: POLYPLACOPHORA) DREDGED NEAR ISLA COCHE, NUEVA ESPARTA, VENEZUELA.

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ABSTRACT

A collection of Polyplacophora obtained during a study of the marine benthic communities in the vicinity of Isla Coche, Venezuela, yielded seven species: an undescribed species of *Lepidochitona*; *Ischnochiton striolatus* (Gray, 1828); *I. papillosus* (C.B. Adams, 1845), reported for the first time from Venezuela and the southern Caribbean; *Stenoplax boogii* (Haddon, 1886); *Chaetopleura apiculata* (Say, 1834); *Chaetopleura janeirensis* (Gray, 1828); and *Acanthochitona pygmaea* (Pilsbry, 1893), which is now confirmed as a member of the southern Caribbean fauna.

Palabras clave: Polyplacophora. Quitones. Taxonomía. Isla Coche. Venezuela.

RESUMEN

Una colección de Polyplacophora obtenida por dragado alrededor de la Isla de Coche, Venezuela, durante el estudio de las comunidades bentónicas de las canales de Margarita-Coche-Araya arroja como resultado siete especies: una especie de *Lepidochitona* que no ha sido descrita; *Ischnochiton striolatus* (Gray, 1828); *Ischnochiton papillosus* (C.B. Adams, 1845), reportada por primera vez para el sur del Caribe; *Stenoplax boogii* (Haddon, 1886); *Chaetopleura apiculata* (Say, 1834); *Chaetopleura janeirensis* (Gray, 1828) y *Acanthochitona pygmaea* (Pilsbry, 1893), que está ahora confirmada como un miembro de la fauna del sur del Caribe.

INTRODUCTION

The polyplacophoran fauna of the southern Caribbean Sea is poorly known (Lyons, 1988; Bullock and Franz, 1994). Localities from this region that have been investigated include the coast of Colombia (Götting, 1973), Isla de Margarita, Venezuela (Bullock and Franz, 1994), Trinidad (Baboolal *et al.*, 1981), and Barbados (Ferreira, 1985). Much of this effort has been on the shallow water fauna, and has not involved dredging. Previous reports on Caribbean chitons (Kaas, 1972; Bullock, 1985; Lyons, 1988) have indicated that the area from Honduras south to the northern South American coast and the Lesser Antilles differs in species composition from the northern Caribbean. Petuch (1982), in an examination of the distributional patterns of mollusks within the broad West Indian Faunal Province, observed the tendency for uniqueness within the southern Caribbean. Coining the term "paraprovincialism" for this phenomenon, Petuch recognized remnants of a Caloosahatchian fauna in the north and a Gatunian fauna in the south. Polyplacophoran species cited as examples supporting paraprovincialism in the Caribbean include: *Stenoplax floridana* (Pilsbry, 1893) and *S. bahamiensis* Kaas and Van Belle (1985) [Caloosahatchian] and *S. purpurascens* (C.B. Adams, 1845) [Gatunian] (Bullock, 1985); as well as *Acanthochitona hemphilli* (Pilsbry, 1893) and *A. pygmaea* (Pilsbry, 1893) [however, see below] of the Caloosahatchian fauna, and *A. rhodea* (Pilsbry, 1893) and *A. venezuelana* Lyons, 1988, respectively, of the Gatunian fauna (Lyons, 1988). A substantial test of the concept of paraprovincialism utilizing Caribbean chitons cannot be accomplished without a far greater knowledge of southern Caribbean chitons than is presently available.

While studying the chiton fauna of Isla de Margarita, an island in the southern Caribbean off the Venezuelan coast, the senior authors were asked by Dr. Joaquín Buitrago, Director, and Lic. Ramón J. Varela, Head of Marine Biology, Estación de Investigaciones Marinas de Margarita (EDIMAR), Fundación La Salle, to examine a collection of chitons dredged from the area around Isla Coche, an island that lies midway between Isla de Margarita and the Araya Peninsula of the Venezuelan mainland. The chitons were collected during 1982 and 1983 in an extensive project on the benthic communities of the Margarita-Coche-Araya

channels (Buitrago *et al.*, 1984). The opportunity to study these chitons was of great interest for two reasons. First, the paucity of chitons in malacological collections from the northern coast of South America instills value in any collection of chitons from the region. Secondly, few previous reports on chitons have included dredged material. Although the Isla Coche collection was obtained from shallow water (2.0-22.0 m), and it contained only seven species, the species encountered are of taxonomic interest and zoogeographic significance. The present report is a summary of our investigation of this collection.

MATERIALS AND METHODS

Chitons were collected at a number of stations made during the Margarita-Coche-Araya channels investigation, 1982-1983 (Table 1). Subsequent curatorial procedures by former personnel at EDIMAR have seriously hampered the scientific use of these chitons. After being sorted tentatively to species, the chitons were placed in glass vials in glass jars and stored in a formalin solution which in some cases resulted in extensive decalcification of the valves and girdle scales. Some of the glass vials were broken and the specimens and labels mixed. In some cases one or a few representative examples of each supposed species from each station were isolated and the remaining specimens maintained without station data. The station numbers of the latter specimens and those from broken vials are unknown and therefore these specimens are recorded in the present report only as "Isla Coche." Due to the state of preservation and the curling of many of the chitons, determination of specific sizes of individuals was not attempted; the typical size of each species is mentioned in the Remarks section under each species.

Specimens selected for detailed studies of the shell were prepared according to the methods reported by Bullock (1985). The animals were placed in a 2N KOH solution that was heated until the valves were easily removed. The valves, dorsal and ventral covering of the girdle, and radula were isolated and cleaned further in fresh KOH solution. After cleaning, these structures were placed in a series of distilled water rinses and then stored in 70% ethyl alcohol. The valves were best studied when air dried. Radulae were not utilized in the present study.

Shells prepared for study using scanning electron microscopy were mounted on aluminum stubs using double-stick tape, coated with carbon and 60% gold: 40% palladium in a Denton DV-502 evaporator, and studied using an ISM MSM-3 scanning electron microscope located in the Department of Zoology at the University of Rhode Island.

All specimens of the present study have been deposited in the malacological collection of the Estación de Investigaciones Marinas de Margarita.

Table 1

List of the Isla Coche stations that included examples of Polyplacophora.

Sta.	Date	Latitude	Longitude	Location	Depth	Bottom Type
53		10°51.1'N	63°57.6'W	N of Coche		
90	11/7/83	10°49.2'N	63°58.7'W	N of Coche	3.5 m	sand with <i>A. zebra</i>
119	20/7/82	10°48.3'N	63°56.9'W	N of Coche	4.5 m	sand with <i>A. zebra</i>
131	16/11/82	10°47.5'N	63°59.5'W	W of Coche	3.5 m	sand with sand dollars and sea stars
145	1/6/82	10°47.5'N	63°54.1'W	E of Coche		
153	11/02/83	10°47.9'N	63°53.0'W	E of Coche	13.0 m	sand with <i>A. zebra</i>
158	10/10/82	10°45.9'N	63°59.5'W	SW of Coche	2.0 m	sand with <i>Thalassia</i> beds
162	31/8/82	10°46.5'N	63°53.5'W	E of Coche	11.0 m	sand with <i>A. zebra</i>
173	8/10/82	10°45.9'N	63°52.3'W	E of Coche	12.0 m	sand with <i>A. zebra</i>
175	6/7/82	10°45.8'N	63°50.8'W	E of Coche	11.0 m	sand with <i>A. zebra</i>
181	25/1/83	10°45.2'N	63°53.4'W	E of Coche	4.5 m	sand with <i>A. zebra</i>
182	23/3/82	10°45.5'N	63°52.9'W	E of Coche	7.0 m	sand with <i>A. zebra</i>
193	22/11/82	10°45.1'N	63°52.0'W	E of Coche	9.0 m	sand with <i>A. zebra</i>
195	9/11/82	10°45.9'N	63°49.2'W	E of Coche	16.0 m	sand with <i>A. zebra</i>
204	11/1/82	10°44.5'N	63°52.8'W	E of Coche	5.0 m	sand with <i>A. zebra</i>
205	11/1/83	10°44.5'N	63°52.3'W	E of Coche	8.0 m	sand with <i>A. zebra</i>
206	17/2/83	10°44.6'N	63°51.8'W	E of Coche	9.0 m	sand with <i>A. zebra</i>
207	8/10/82	10°44.4'N	63°51.0'W	E of Coche	12.0 m	sand with <i>A. zebra</i>
208	3/8/82	10°44.5'N	63°49.9'W	E of Coche	11.0 m	sand with <i>A. zebra</i>
211	3/8/82	10°43.7'N	63°55.4'W	S of Coche	11.0 m	sand with <i>Thalassia</i> beds
217	14/9/82	10°44.0'N	63°52.2'W	SE of Coche	7.0 m	sand with <i>A. zebra</i>
218	14/04/83	10°44.1'N	63°52.7'W	SE of Coche	9.0 m	sand with <i>A. zebra</i>
223	17/8/82	10°43.3'N	63°53.8'W	S of Coche	4.0 m	sand with <i>Thalassia</i> beds
225	9/6/82	10°43.4'N	63°52.7'W	SE of Coche	4.0 m	sand with <i>Thalassia</i> beds
226	3/8/82	10°43.5'N	63°52.1'W	SE of Coche	8.0 m	sand with <i>Thalassia</i> and <i>A. zebra</i>
228	11/7/83	10°43.5'N	63°51.1'W	SE of Coche	9.0 m	sand with <i>A. zebra</i>
229	12/4/83	10°43.6'N	63°50.7'W	SE of Coche	12.0 m	sand with <i>A. zebra</i>
230	22/3/83	10°43.7'N	63°50.1'W	SE of Coche	13.0 m	sand with <i>A. zebra</i>
231	22/11/82	10°43.5'N	63°49.3'W	N of Morro	14.0 m	sand with <i>A. zebra</i>
241	17/8/82	10°42.9'N	63°52.7'W	SE of Coche	6.0 m	sand with <i>A. zebra</i>
242	3/8/82	10°43.0'N	63°52.1'W	SE of Coche	6.0 m	sand with <i>A. zebra</i>
243	3/8/82	10°43.0'N	63°51.7'W	SE of Coche	8.0 m	sand with <i>A. zebra</i>
245	8/6/82	10°43.2'N	63°50.6'W	SE of Coche	11.0 m	sand with <i>A. zebra</i>
250	22/6/82	10°42.3'N	63°52.6'W	SE of Coche	6.0 m	sand with <i>A. zebra</i>
251	17/8/82	10°42.4'N	63°51.5'W	SE of Coche	8.0 m	sand with <i>A. zebra</i>
252	17/8/82	10°42.4'N	63°51.5'W	SE of Coche	7.0 m	sand with <i>A. zebra</i>
253	3/8/82	10°42.5'N	63°51.0'W	SE of Coche	8.0 m	sand with <i>A. zebra</i>
255	7/9/82	10°42.7'N	63°49.9'W	W of Morro de Chacopata	10.0 m	sand with <i>A. zebra</i>
257	12/4/83	10°42.8'N	63°48.8'W	NW of Morro de Chacopata	13.0 m	sand with <i>A. zebra</i>
263	12/7/82	10°42.0'N	63°50.9'W	NW of Morro de Chacopata	10-12 m	sand with <i>A. zebra</i>
279	22/3/83	10°41.3'N	63°51.4'W	NW of Morro de Chacopata	8.0 m	sand with <i>A. zebra</i>

Table 1 (Cont.)

280	18/1/83	10°41.4'N	63°50.9'W	NW of Morro de Chacopata	5.0 m	sand with <i>A. zebra</i>
281	7/9/82	10°41.5'N	63°50.3'W	NW of Morro de Chacopata	2.5 m	sand with <i>A. zebra</i>
282	3/8/82	10°41.6'N	63°49.8'W	NW of Morro de Chacopata	4.0 m	sand with <i>A. zebra</i>
285	9/11/82	10°43.1'N	63°43.8'W	SE of Coche	16.0 m	sand with <i>A. zebra</i>
289	16/11/82	10°40.9'N	63°51.2'W	W of Morro de Chacopata	10.0 m	sand with <i>A. zebra</i>
291	9/6/83	10°41.0'N	63°50.8'W	W of Morro de Chacopata	4.0 m	sand with <i>Thalassia beds</i>
293	4/8/82	10°41.1'N	63°49.8'W	SW of Morro de Chacopata	2.0 m	sand with <i>Thalassia beds</i>
295	4/7/83	10°41.4'N	63°46.7'W	W of Morro de Chacopata	16.0 m	sand with <i>A. zebra</i>
315	8/6/83	10°38.9'N	63°53.5'W	N of Araya Peninsula	14.0 m	
330	2/11/82	10°37.7'N	63°54.5'W	N of Araya Peninsula	7.0 m	

SYSTEMATIC SECTION

Class Polyplacophora

Family Ischnochitonidae Dall, 1889

Subfamily Lepidochitoninae Iredale, 1914

Genus *Lepidochitona* Gray, 1821

Lepidochitona sp.

Figs. 1A, 5A

Remarks

Among the chitons we examined were many examples of a small species (length about 5 mm) of *Lepidochitona* with a granular tegmentum. Only two species of the genus are presently recognized from the Caribbean (Kaas and Van Belle, 1985), neither characterized by a granular tegmentum. One of these, *L. liozonis* (Dall and Simpson, 1901), has been taken from a number of localities on Isla de Margarita where a granular *Lepidochitona* also occurs (Bullock and Franz, 1993). It is likely that our Coche specimens belong to an undescribed species.

Distribution

Known only from southeastern Isla Coche to the Araya Peninsula (Figure 5A) and probably Isla de Margarita (Bullock and Franz, 1994).

Specimens examined

20 spec., Isla Coche.—2 spec., sta. 162.—1 spec., sta. 211.—1 spec., sta. 217.—3 spec., sta. 218.—1 spec., 223.—1 spec., sta. 229.—14 spec., sta. 241.—10 spec., sta. 243.—2 spec., sta. 282.—1 spec., sta. 289.—7 spec., sta. 291.

Subfamily Ischnochitoninae Gray, 1847 Genus *Ischnochiton* Gray, 1847

Ischnochiton striolatus (Gray, 1828) Figs. 1D, 5B

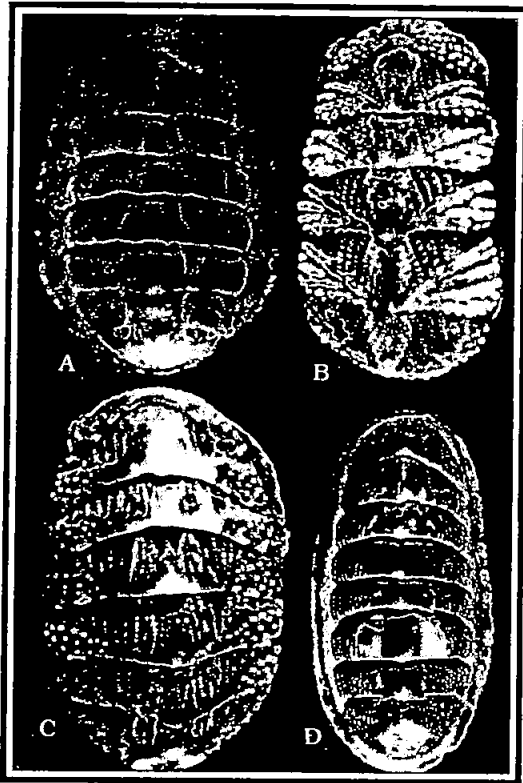


Figure 1

A. *Lepidochitona* sp. Isla Coche. Length, 5.0 mm.
B. *Chaetopleura janeirensis* (Gray). Sta. 204. Length, 11.0 mm (curled).
C. *Chaetopleura apiculata* (Say). Isla Coche. Length, 10.0 mm (curled).
D. *Ischnochiton striolatus* (Gray). Isla Coche. Length, 11.0 mm.

Chiton striolatus Gray, 1828: 6.

Ischnochiton striolatus (Gray).
Kaas, 1972: 77, figs. 151-166, pl. V, figs. 3, 4;
Kaas and Van Belle, 1990: 93, fig. 39 [synonymy];
Bullock and Franz, 1994, Fig. C, D.

Remarks

Ischnochiton striolatus was the most abundant and widespread chiton obtained during the Margarita-Coche-Araya channels study. This species is abundant throughout the West Indies. As discussed below (under *I. papillosus*), a group of similar chitons that includes *I. striolatus*, *I. papillosus* (C.B. Adams), *I. erythronotus* (C.B. Adams), *I. kaasi* Ferreira, and *I. nivea* Ferreira is not well known taxonomically. Among the individuals identified as *I. striolatus* in the present report one sees differing granulation of the central areas and lateral

triangle, as well as girdle scales with greatly different ribbing. It is possible that more than one species is represented among the samples identified here as *I. striolatus*.

Distribution

North Carolina south to the West Indies and Brazil (Kaas and Van Belle, 1990) (Fig. 5B).

Specimens examined

92 spec., Isla Coche.—1 spec., sta. 90.—4 spec., sta. 119.—1 spec., sta. 131.—1 spec., sta. 145.—5 spec., sta. 158.—21 spec., sta. 162.—1 spec., sta. 173.—2 spec., sta. 175.—8 spec., sta. 181.—5 spec., sta. 182.—6 spec., sta. 193.—8 spec., sta. 195.—6 spec., sta. 204.—6 spec., sta. 205.—2 spec., sta. 206.—1 spec., sta. 207.—10 spec., sta. 208.—3 spec., sta. 217.—10 spec., sta. 218.—2 spec., sta. 223.—5 spec., sta. 228.—23 spec., sta. 229.—1 spec., sta. 230.—6 spec., sta. 231.—13 spec., sta. 241.—6 spec., sta. 243.—17 spec., sta. 250.—1 spec., sta. 251.—1 spec., sta. 252.—1 spec., sta. 253.—4 spec., sta. 255.—2 spec., sta. 257.—7 spec., sta. 263.—3 spec., sta. 279.—1 spec., sta. 280.—13 spec., sta. 281.—8 spec., sta. 282.—2 spec., sta. 283.—14 spec., sta. 285.—3 spec., sta. 291.—5 spec., sta. 295.—6 spec., sta. 315.

Ischnochiton papillosus (C.B. Adams, 1845)

Figs. 2F, 3H

Chiton papillosus C.B. Adams, 1845: 9; Clench and Turner, 1950: 322, pl. 42, fig. 4 [lectotype figured].

Ischnochiton papillosus (C.B. Adams). Warmke and Abbott, 1961: 217, fig. 32a; Kaas, 1972: 87, figs. 175-178, pl. VI, fig. 5; Kaas and Van Belle, 1990: 96, fig. 40; Bullock and Franz, Fig. 4D.

Ischnochiton striolatus (Gray). Ferreira, 1978 [in part]: 82, figs. 3-4, table 1. Not *I. striolatus* (Gray).

Remarks

Ischnochiton papillosus is characterized by numerous tegmental pustules which on the central area are arranged in a quincunx pattern (Fig. 3H); in this chiton the area between each pustule is devoid of esthete pores. Also, the girdle scales have relatively few ribs. In contrast, the pustules of *I. striolatus* tend to be arranged in longitudinal, often chevron-shaped rows, esthete pores are evident between the pustules, and the girdle scales have more ribs than those of *I. papillosus*. *Ischnochiton erythronotus* has conspicuous longitudinal ribs on the central area and distally elongate girdle scales with few ribs.

The taxonomic status of *I. papillosus* and its close relatives is uncertain. This group, in our opinion, presents one of the most intriguing taxonomic problems among the Caribbean chitons. Ferreira (1978) studied C.B. Adams' type specimens from Jamaica, as well as examples from other localities, and he concluded that *I. papillosus* is conspecific with *I. striolatus* (Gray, 1828) and *I. erythronotus* (C.B. Adams, 1845). Kaas and Van Belle (1990), who did not accept this view, recorded *I. papillosus* from Texas and Florida south to Jamaica, the Virgin Islands and Guadeloupe; they made no mention of any records from the southern Caribbean Sea.

Ferreira (1987) described two new species from the Caribbean region that appear similar to the *I. papillosus-striolatus-erythronotus* species group. *Ischnochiton kaasi* Ferreira, known only from the Caribbean coast of Panama, has evenly rounded valves with pustules on the central area and lateral triangle which form rows that are often chevron-shaped on the lateral triangle. The girdle scales of *I. kaasi* characteristically have numerous ribs ("17-20 striations," *vide* Ferreira). *Ischnochiton niveus* Ferreira, 1987, reported from Garden Key and Bethal Shoals, Florida, is small, white, and has a shell covered with pustules arranged in an offset pattern. Lyons (1989) concluded that all records of *I. papillosus* and *I. striolatus* from Florida refer to *I. niveus*; he reported that *I. niveus* was the most abundant chiton in collections made during a long-term study off Hutchinson Island, Florida. Kaas and Van Belle (1990) noted a strong similarity between *I. niveus* and *I. papillosus*, but they did not synonymize the two species due to a few supposed differences. It is obvious that a great deal of study will be necessary in order to understand the taxonomy and to elucidate the evolutionary relationships of this group.

Our Isla Coche specimens must be considered to be *I. papillosus*. The specimens closely match the description of *I. papillosus* as presented by C.B. Adams (1845), Kaas (1972) and Kaas and Van Belle (1990). Our Venezuelan specimens of *I. papillosus* range from subcarinate to distinctly carinate. The consistent, fine, pustular sculpture of the shell, especially the lateral triangle, immediately distinguishes this species from the abundant *I. striolatus* with which it co-occurs off Isla Coche.

Distribution

Texas (Andrews, 1977; Treece, 1979) east to Florida (but see above) and the Greater Antilles (Kaas and Van Belle, 1990). The specimens noted below constitute a new record for Venezuela and a significant range extension to the southern Caribbean (Fig. 5C). Valves of this species have been taken from algal sediment at Isla de Margarita (Bullock and Franz, 1994).

Specimens examined

16 spec., Isla Coche.—1 spec., sta. 53.—1 spec., sta. 153.—1 spec., sta. 162.—

1 spec. sta. 195.—1 spec., sta. 204.—1 spec., sta. 218.—1 spec., sta. 243.—1 spec., sta. 279.—2 spec., sta. 282.—8 spec., sta. 289.—2 spec. sta. 315.

Genus *Stenoplax* (Carpenter MS) Dall, 1879

Stenoplax boogii (Haddon, 1886)

Figs. 2E, 5D.

Ischnochiton boogii Haddon, 1886: 15; Thiele, 1910: 80, pl. 7, figs. 66-68; Leloup, 1938: 10, figs. 2-4; Kaas, 1972: 74, figs. 137-150.

Ischnochiton pruinus (Gould). Dautzenberg, 1900: 220 [*vide* Leloup, 1938]. Not *I. pruinus* (Gould).

Ischnochiton bermudensis Dall and Bartsch, 1911: 287.

Stenoplax boogii (Haddon). Ferreira, 1985: 197, fig. 9.

Stenoplax (*Stenoplax*) *boogii* (Haddon). Kaas and Van Belle, 1987: 144, fig. 62.

Remarks

Stenoplax boogii has one of the broadest distributions of all New World chitons, yet most collections contain only a few specimens in any one lot. This species was well described by Kaas (1972) and Kaas and Van Belle (1987). It is readily recognized by its roundly arched valves, pastel pink coloration, and conspicuous, smooth, concentric ribs of the lateral triangle and terminal areas of the end valves. It attains a length of about 15 mm.

Distribution

Bermuda; St. Lucie Inlet, Florida south to Belize and the West Indies to Alagoas, Brazil, from 0-64 m; also known from the eastern Pacific (Ferreira, 1985; Kaas and Van Belle, 1987). Previously reported from Venezuelan waters at Los Testigos at a depth of 40 m by Dautzenberg (1900) [as *Ischnochiton pruinus* (Gould), *vide* Leloup, 1938]. The specimen reported herein confirms the Venezuelan presence of this widespread tropical New World species (Fig. 5D).

Specimens examined: 1 spec., sta. 255.

Subfamily Chaetopleurinae Plate, 1899

Genus *Chaetopleura* Shuttleworth, 1853

Chaetopleura apiculata (Say, 1834)

Figs. 1C, 5E

Chiton apiculatus Say, 1834: 231.

Chaetopleura apiculata (Say). Lyons, 1985: 39, figs. 15, 18-21, 29; Kaas and Van Belle, 1987: 43, fig. 19 [synonymy]; Bullock and Franz, 1994, Fig. 2E [occurrence on Isla de Margarita].

Remarks

The presence of *C. apiculata* in the Caribbean has usually been overlooked. It is moderately common at some Venezuelan localities. Kaas and Van Belle noted that they had observed two specimens from Isla Cubagua, and Bullock and Franz (1994) recorded numerous examples from Isla de Margarita. Few other specimens have been obtained from West Indian localities, leading to speculation about previous translocation of individuals from the eastern U.S. coast to some Caribbean sites (Bullock and Franz, 1994).

Distribution

Cape Cod, Massachusetts, south to Florida and the Gulf of Mexico; Cuba, Haiti, Guadeloupe, Venezuela (Kaas and Van Belle, 1987) (Fig. 5E).

Specimens examined

4 spec., Isla Coche.—1 spec., sta. 119.—1 spec., sta. 131.—1 spec., sta. 206.—1 spec., sta. 245.—2 spec., sta. 250.—1 spec., sta. 252.—11 spec., sta. 255.—3 spec., sta. 263.—19 spec., sta. 289.—3 spec., sta. 330.

Chaetopleura janeirensis (Gray, 1828)
Fig. 1B, 5D

Chiton janeirensis Gray, 1828: 6.

Calloplax janeirensis (Gray). Kaas, 1972: 60, figs. 117-123, pl. IV, figs. 1, 2.

Chaetopleura janeirensis (Gray). Lyons, 1985: 40, figs. 16, 17, 22-26, 30; Bullock and Franz, 1994, Fig. 3A [occurrence on Isla de Margarita].

Remarks

Only two specimens of this common shallow water species were obtained during the Margarita-Coche-Araya channels study. This species has long been known as *Calloplax janeirensis* (Gray), but Lyons (1985), who examined the shell, girdle elements, and radula of this and other species, concluded that it properly belongs in the genus *Chaetopleura*.

Distribution

Florida Keys and the West Indies south to Brazil (Kaas, 1972) (Fig. 5D).

Specimens examined

1 spec., sta. 182.—1 spec., sta. 204.

Family Acanthochitonidae Pilsbry, 1893

Genus *Acanthochitona* Gray, 1821

Acanthochitona pygmaea (Pilsbry, 1893)

Figs. 2G, 3I, 4J, K, 5F

Acanthochites pygmaeus Pilsbry, 1893: 23, pl. 13, figs. 58, 59.

Acanthochitona pygmaea (Pilsbry). Lyons, 1988: 94, figs. 66-72; Bullock and Franz, 1994, Fig. 6D [occurrence on Isla de Margarita].

Acanthochitona spiculosa (Reeve) of various authors; Not *Chiton spiculosus* Reeve, 1847 [see Lyons, 1988].

Remarks

The family Acanthochitonidae of the West Indies was monographed by Lyons (1988). Examination of this well-illustrated report is essential when attempting to identify members of this group. Although the Coche material included only a single species, other *Acanthochitona* species have been reported from Venezuela (Bullock and Franz, 1994), and still others are likely occur in this region (Lyons, pers. comm.). The species differ in the shapes of the valves, the morphology and arrangement of the pustules on each valve, and the spicules of the girdle. *Acanthochitona pygmaea* differs from other members of the genus occurring in the region by its strongly incised jugum (Figs. 3I, 4J).

Acanthochitona pygmaea was reported previously from Colombia (Leloup, 1941) and Los Testigos, Venezuela (Dautzenberg, 1900), but Lyons (1988), who observed no specimens collected south of Saba Bank, could not confirm any of the southern Caribbean records; he stated that these reports probably refer to *A. venezuelana* Lyons, 1988, presently known only from Isla de Margarita (Lyons, 1988; Bullock and Franz, 1994). However, a few specimens that are without doubt *A. pygmaea* have been found on nearby Isla de Margarita (Bullock and Franz, 1994) and the species is well represented in the present Isla Coche collection. These examples definitely establish the occurrence of *A. pygmaea* in the southern Caribbean.

The numerous examples of *A. pygmaea* taken during the Margarita-Coche-Araya channels study all came from the southern coast of Isla

Coche southeast to the Araya Peninsula (Fig. 5F).

Distribution

Bermuda; Florida and the Bahama Islands south to Yucatan, Mexico and Puerto Rico (Lyons, 1988); Venezuela (this report); possibly Brazil (Lyons, 1988).

Specimens examined

28 spec., Isla Coche.—5 spec., sta. 193.—1 spec., sta. 204.—1 spec., sta. 205.—3 spec., sta. 208.—1 spec., sta. 211.—3 spec., sta. 218.—2 spec., sta. 228.—1 spec., sta. 230.—3 spec., sta. 241.—2 spec., sta. 243.—1 spec., sta. 252.—3 spec., sta. 255.—1 spec., sta. 257.—1 spec., sta. 263.—1 spec., sta. 280.—1 spec., sta. 279.—4 spec., sta. 285.—34 spec., sta. 289.—13 spec., sta. 291.—1 spec., sta. 293.

DISCUSSION

The examples of Polyplacophora obtained by the extensive sampling program of the Margarita-Coche-Araya channels study provided a significant range



Figure 2

E. *Stenoplax boogii* (Haddon). Sta. 255. Length, 8.4 mm (curled). F. *Ischnochiton papillosus* (C. B. Adams). Isla Coche. Length, 5.8 mm. G. *Acanthochitona pygmaea* (Pilsbry). Isla Coche. Length, 8.5 mm.

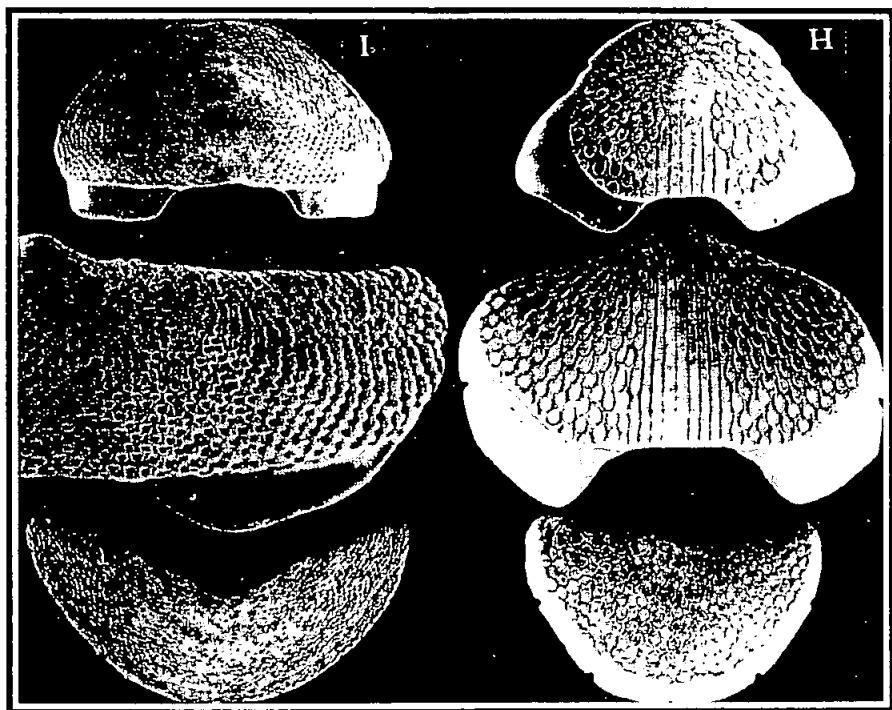


Figure 3

Scanning electron micrographs of the anterior, intermediate, and posterior valves of *Acanthochitona pygmaea* (Pilsbry) [H] and *Ischnochiton papillosus* (C.B. Adams) [I]. Width of each posterior valve approximately 2.5 mm; intermediate valve of *I. papillosus* enlarged.



Figure 4

J. Scanning electron micrographs of the tegmental surface microstructure of *Acanthochitona pygmaea*. Jugum. K. Lateral area. Magnification approximately 140x.

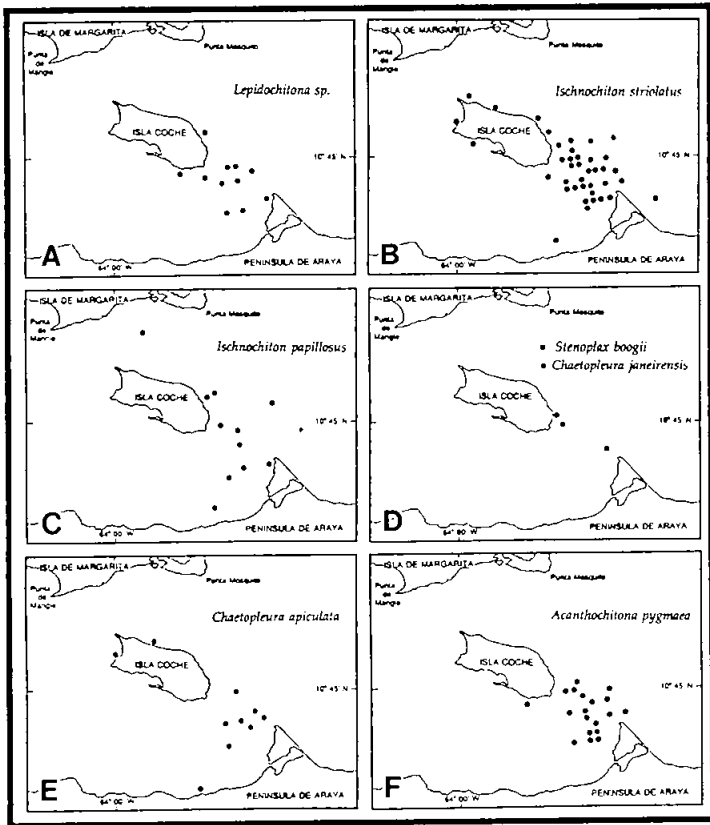


Figure 5

Distribution of the chitons collected during the Margarita-Coche-Araya channels study. A. *Lepidochitona* sp.; B. *Ischnochiton striolatus*; C. *Ischnochiton papillosus*; D. *Stenoplax boogii* (filled square), *Chaetopleura janneirensis* (filled circle); E. *Chaetopleura apiculata*; F. *Acanthochitona pygmaea*.

of extention for *Ischnochiton papillosus* (C.B. Adams) and confirmed the southern Caribbean distribution of *Acanthochitona pygmaea* (Pilsbry) [see Remarks under those species]. Of special interest was the relative paucity of species present. A preliminary study of the chitons of nearby Isla de Margarita, based on specimens collected over a seven-year period, resulted in 19 species (Bullock and Franz, 1994). Even more species are reported from southern Caribbean islands with clear, warm waters with extensive coral reef formations. The fewer species in the present report is likely due to the lack of shallow water surf-dwelling species, such as members of the genus *Chiton* and *Acanthopleura*, and the much more

homogeneous benthic environment that characterized the region sampled. Most of the stations yielding chitons had a bottom type of coarse sand with beds of the bivalve *Arca zebra*.

The study area extended from Isla de Margarita southeast past Isla Coche to the Araya Peninsula (Buitrago *et al.*, 1984). With the exception of some stations to the east of Isla Coche, most of the chitons collected came from a region that extended from the southeastern portion of Isla Coche to Chacopata on the Araya Peninsula. This region had a bottom type of *Arca zebra* beds on sand and gravel. The portion of the study area to the north and west of Isla Coche had bottom types of fine sand with coastal patches of *Thalassia testudinum* König, a habitat where only *Ischnochiton striolatus* was found. To the north of Isla Coche is an area of some coral formations where only *I. striolatus* was obtained. Further north is the deepest area sampled, the channel that separates the islands of Coche and Margarita. From this region *I. papillosus* was dredged at a depth of 22 m. The region southwest of Isla Coche and the northern coast of the Araya Peninsula west of Chacopata is characterized by sandy bottoms with a fauna rich in echinoderms; in this area *Chaetopleura apiculata*, *I. striolatus* and *I. papillosus* were obtained.

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