

# Chitons (Mollusca: Polyplacophora) procured by the CANCAP I-VII expeditions, 1976-86

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Key words: Polyplacophora; Madeira; Morocco; Selvagens Islands; Canary Islands; Mauretania; Cape Verde Islands; Azores; taxonomy; distribution.

The 327 specimens of chitons captured during six out of seven CANCAP Expeditions have been examined. They belong to 26 species, including two recently described ones: *Ischnochiton (Stenosemus) substriatus* Kaas & Van Belle, 1990 and *Ischnochiton (Ischnochiton nicklesi* Kaas & Van Belle, 1990. *Callistochiton pachylasmae* (Di Monterosato, 1878) has been found off the coast of Morocco.

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## Introduction

The species of chitons collected during the CANCAP I-VII expeditions are treated in systematic order. Their habitats are given in the CANCAP-code, explained by Van der Land (1987). The first number refers to the Expedition (1-7 for CANCAP I-VII); K-numbers refer to intertidal samples collected on shore; D-numbers refer to samples collected either by snorkeling, or by scuba diving). The number of specimens in a sample is added between brackets after the station number. See Kaas & Van Belle (1980) for complete references to the various nominal taxa.

Apart from the CANCAP material dealt with in this paper one more species of chiton from the Mauretania continental shelf, collected by B. Richer de Forges of the Muséum National d'Histoire Naturelle, Paris, has been taken into consideration; this concerns a single specimen of *Ischnochiton (Stenosemus) vanbellei* Kaas, 1985, the first one found outside the Mediterranean Sea.

## Systematic account

Class Polyplacophora Gray, 1821  
Ordo Neoloricata Bergenhayn, 1955  
Subordo Lepidopleurina Thiele, 1910  
Family Leptochitonidae Dall, 1889

### Lepidopleurus Risso, 1826

#### 1. *L. cajetanus* (Poli, 1791)

Material.— Canary Islands, S of Fuerteventura, 2-15 m. 2.D03(6); 4.D01(4); 4.D02(1); 4.D03(2); 4.D04(7); 4.K12(1).

**Leptochiton Gray, 1847****2. *L. scabridus* (Jeffreys, 1880)**

**Material.**— **Cape Verde Islands:** SW coast of São Nicolau, 6.K12(4).

First record of this species for the Cape Verde Islands.

**3. *L. algesirensis* (Capellini, 1859)**

**Material.**— **Selvagens Archipelago; Canary Islands:** S of Fuerteventura, Lanzarote, Gran Canaria. 2.035(1); 2.D02(2); 2.D05(1); 2.K07(14); 2.K10(7); 2.K19(10); 2.K22(2); 4.D01(7); 4.D03(3); 4.D04(1); 4.D07(1); 4.D08(1); 4.K01(1); 4.K02(2); 4.K06(6); 4.K09(9); 4.K12(1); 4.K13(2); 4.K28(4).

**4. *L. odhneri* (Bergenhayn, 1931)**

**Material.**— **Morocco,** S of Cape Yubi; **Canary Islands:** SE Fuerteventura, E Lanzarote, S of Palma, 50-580 m. 2.036(1); 2.044(5); 4.091(1); 4.110(1).

***L. spec.***

**Material.**— S of **Madeira:** 180-210 m, 1.108(1).

Too worn to indentify.

**Family Hanleyidae Bergenhayn, 1955*****Hanleya* Gray, 1857****5. *H. hanleyi* (Bean in Thorpe, 1844)**

**Material.**— S of **Madeira; Canary Islands:** S Fuerteventura, 45-196 m. 1.097(1); 2.035(1); 4.175(2).

**Subordo Ischnochitonina Bergenhayn, 1930****Family Ischnochitonidae Dall, 1889****Subfamily Callochitoninae Plate, 1901*****Callochiton* Gray, 1847****6. *C. septemvalvis euplaeae* (O.G. Costa, 1829)**

**Material.**— **Morocco:** W of Cape Yubi; **Canary Islands:** SE Lanzarote, SE Fuerteventura, 70-580 m. 2.049(1); 2.058(1); 4.071(5).

**Subfamily Lepidochitoninae Iredale, 1914**

**Lepidochitona Gray, 1821****7. *L. cinerea* (Linnaeus, 1767)**

Material.— **Morocco:** Casablanca, shore collecting. 1.K158(4).

The southernmost record hitherto known of this common European species.

**8. *L. canariensis* (Thiele, 1909)**

Material.— **SE Madeira; Canary Islands:** SW Hierro, SW Tenerife, intertidal to 25 m. 1.K14(1); 2.D08(1); 6.K01(1).

**9. *L. stroemfelti* (Bergenhayn, 1931)**

Material.— **Canary Islands:** Gran Canaria; W Fuerteventura, intertidal. 2.K05(9); 4.K09(4).

**10. *L. corrugata* (Reeve, 1848)**

Material.— **Selvagens Archipelago,** 0-6 m. 4.K25(2).

First record of this species off the West African coast.

**11. *L. caboverdensis* Kaas & Strack, 1986**

Material.— **Cape Verde Islands:** NE São Vicente, rocky beach. 6.K21(4).

A recently described species from Dakar and the Cape Verde Archipelago. The four specimens are paratypes (Kaas & Strack, 1986: 79).

**12. *L. rolani* Kaas & Strack, 1986**

Material.— **Cape Verde Islands:** SW Ilha Razo, rocky shore. 6.K13(2).

Recently described from the Cape Verde Archipelago. The two specimens are paratypes (Kaas & Strack, 1986: 83).

**13. *L. simrothi* Thiele, 1902**

Material.— **Azores:** S of São Miguel, 75 m. 5.008(1).

A common endemic species, found all over the archipelago of the Azores, mostly intertidal.

14. *L. piceola* (Shuttleworth, 1853)

Material.— **Azores:** Ilheus Formigas, 0-15 m. 5.D02(1).

The species was originally described from the Canary Islands, where it proves to be rather rare. This is the second record from the Azores.

Subfamily *Ischnochitoninae* Dall, 1889

Genus *Ischnochiton* Gray, 1847

Subgenus *Stenosemus* Von Middendorff, 1847

15. *I. (S.) exaratus* (G.O. Sars, 1878)

Material.— **Cape Verde Islands:** W São Tiago, 470 m. 6.020 (1 valve).

This is a cosmopolitan deep-water species, distributed from arctic to antarctic seas, mostly in the Atlantic Ocean, but also penetrating into the Pacific, along the coast of southern Chile. This is the first record from the Cape Verde Archipelago.

16. *I. (S.) vanbellei* Kaas, 1985

Material.— **Mauretania:** continental shelf NO N'Diago, 18°30'N 16°50'W, 240 m, 1 specimen, B. Richer de Forges, leg. 1981(MNHN), one specimen.

Although not collected during one of the CANCAP expeditions, it seems relevant to mention this specimen. It is the first record of the species outside the Mediterranean Sea.

17. *I. (S.) substriatus* Kaas & Van Belle, 1990

Material.— **Cape Verde Islands:** SW Santo Antão, 591-396 m. 6.119(2).

The two specimens are the holotype and a paratype of this species, described and illustrated by Kaas & Van Belle, 1990: 75, fig. 31, map 24).

Subgenus *Ischnochiton* Gray, 1847 s.s.

18. *I. (I.) cessaci* (De Rochebrune, 1881)

Material.— **Cape Verde Islands:** W Fogo, W São Vicente, 10-15 m; **Canary Islands:** SW Tenerife, tidal pools. 6.D04(2); 6.K01(1); 7.D15 (1).

A common species in the Cape Verde Archipelago and on the coast of Sénégal; also found on the Angola coast. The specimen collected near Tenerife is the first ever found in the Canary Islands.

19. *I. (I.) paessleri* Thiele, 1910

Material.— Cape Verde Islands: S São Tiago, W Fogo, c. 15 m. 6.D01(1); 6.D04(1).

The species is endemic to the Cape Verde Islands.

20. *I. (I.) nicklesi* Kaas & Van Belle, 1990

Material.— Cape Verde Islands: S São Tiago, W Fogo, SE Fogo, SW Santa Luzia, W Boa Vista, 0-15 m. 6.D01(1); 6.D04(1); 6.D05(1); 6.D07(2); 7.D06(1).

One of the specimens of sta. D.607, from the SW coast of Santa Luzia, is the holotype; it bears embryos in the pallial grooves. All other specimens are paratypes.

*I. (I.)* spec.

Material.— Several specimens from the Cape Verde Archipelago were immature or too worn to identify properly. 6.001(1); 6.048(1); 6.119(3); 6.D01(1).

**Connexochiton** Kaas, 197921. *C. platynomenus* Kaas, 1979

Material.— Canary Islands: SW Hierro, 480-540 m. 2.141(2).

This small deep-water species was originally described from the Bay of Biscay (Kaas, 1969: 25) from a depth of c. 1000 m. It has also been found on the Atlantic side of Gibraltar Straits (Kaas & Van Belle, 1987: 259). Dell'Angelo & Palazzi (1988: 115) erroneously described it as *Bathychiton biondii* from the Tyrrhenian Sea (Kaas & Van Belle, 1990: 54, fig. 22, map 30).

Subfamily **Callistoplacinae** Pilsbry, 1893**Callistochiton** Dall, 187922. *C. pachylasmae* (Di Monterosato, 1879)

Material.— Morocco, W of Cape Yubi, 500 m. 2.058(1).

"*Chiton pachylasmae*" was described by the marquis Di Monterosato (1879: 16) from Messina, Sicilia, after a MS-name of Seguenza. Sabelli (1971: 561), who had access to the collection of Di Monterosato in the Museo Zoologica di Roma, published a photograph of the type specimen from which it was clear that the name referred to a specimen of *Callistochiton*, a genus hitherto unknown in Europe, not even in a fossil state. That's why Ferreira (1979: 463) was in serious doubt about the locality of *C. pachylasmae* "in view of the fact that there seems to be no record of its

having been collected again in the Mediterranean or elsewhere." The finding of a second specimen off the coast of Morocco removes all doubt and confirms that *C. pachylasmae* is a valid species and that Di Monterosato's locality is reliable. Unfortunately our specimen got lost in an attempt to photograph it at the Nationaal Natuurhistorisch Museum. It fell apart while being exposed to the heat of lamps concentrating on the tiny animal, hardly 3 mm long. Only a few girdle scales and major lateral radula teeth could be saved. From the totally unclear photographs, together with Sabelli's unsatisfactory photo's of the holotype, a composition-drawing could be constructed, which will be published in volume 5 of the Monograph of Living Chitons (Kaas & Van Belle).

Family **Chitonidae** Rafinesque, 1815

Genus **Chiton** Linnaeus, 1758

Subgenus **Rhyssoplax** Thiele, 1893

23. **C. (R.) canariensis** d'Orbigny, 1839

Material.— **Canary Islands:** S, E and SE Lanzarote, W and S Fuerteventura, N, W and E Gran Canaria, W and SW La Palma, S Hierro, 0-25 m. 2.D02(2); 2.D03(2); 2.D05(3); 2.D09(2); 2.K07(1); 2.K12(1); 2.K19(6); 2.K22(3); 4.D01(4); 4.D03(5); 4.D11(2); 4.D12(3); 4.K01(1); 4.K07(1); 4.K12(1).

Commonly distributed throughout the Canary Islands and along the coast of Angola, not in the Cape Verde Islands.

Subordo **Acanthochitonina** Bergenhayn, 1930

Family **Acanthochitonidae** Pilsbry, 1893

**Acanthochitona** Gray, 1821

24. **A. fascicularis** (Linnaeus, 1767)

Material.— **Madeira Archipelago:** SE Madeira, Deserta Grande; **Selvagens Islands:** Selvagem Pequena, S. Grande; **Canary Islands:** S, SE and E Lanzarote, NW, N and E Gran Canaria, SW La Palma, S Hierro; **Azores:** N and SE Flores, SE Faial, N and S Pico, N São Jorge, S São Miguel, SW Santa Maria, 0-80 m. 1.D68(1); 1.K76(1); 2.D10(1); 2.K17(1); 2.K21(6); 4.070(1); 4.071(3); 4.091(1); 4.D01(9); 4.D02(1); 4.D03(4); 4.D07(2); 4.D08(1); 4.D11(1); 4.K01(2); 4.K02(1); 4.K06(1); 4.K10(2); 4.K12(3); 4.K13(2); 5.006(1); 5.117(1); 5.D01(2); 5.D04(3); 5.D05(2); 5.D07(2); 5.D11(1); 5.K06(1); 5.K07(1); 5.K10(3); 5.K17(1).

This well-known European species is distributed in the northeastern Atlantic Ocean from N Ireland (John Baxter, pers. comm.) to the Canary Islands, in the whole Mediterranean Sea and in the Azores (Kaas, 1985).

25. **A. crinita** (Pennant, 1777)

Material.— **Madeira;** **Canary Islands:** N, S and E Gran Canaria, W La Palma; **Cape Verde Archipelago:** SW Santa Luzia, NE São Vicente, São Tiago. 1.K08(2); 2.K02(3); 2.K08(5); 4.D12(1); 4.K02(1); 6.K15(1); 6.K21(1); 7.K10(2).

Distributed in the eastern Atlantic Ocean from Bodö, Norway, to Angola. Not on the African coast of the Mediterranean Sea, not in the Azores. Intertidal to shallow subtidal (Kaas, 1985).

## 26. *A. subrubicunda* Leloup, 1941

Material.— Cape Verde Islands: W São Tiago, 791-820 m. 6.026 (1 valve).

The species was described by Leloup (1941: 13) from Boa Vista, Cape Verde, Sénégal. At a later date (Leloup, 1968: 75) the author identified it with "*Acanthochiton gracilis* (Jeffreys, 1859)", which is a totally different species, now known as *Acanthochitona discrepans* (Brown, 1827). *A. rubicundus* has been recognized as a valid species (Kaas, 1985: 601).

### A. spec.

Material.— A few specimens of *Acanthochitona* were either too young, or too eroded to allow identification: 4.K03(1 juv.); 4.K22 (1 juv.); 6.D04(2); 6.D07(2); 6.K01(1).

## Discussion

Since Shuttleworth's enumeration of the chitons of the Canary Islands (1853) several authors have contributed to the knowledge of the chiton fauna in the southeastern part of the North Atlantic Ocean. Shuttleworth only recognized six species, viz. *Chiton (Lophurus) canariensis* [= *Chiton (Rhyssoplax) canariensis*]; *Chiton (Leptochiton) mediterraneus* [= *Ischnochiton rissoi* (Payraudeau, 1826)]; *Chiton (Leptochiton) cajetanus* [= *Lepidopleurus cajetanus*]; *Chiton (Acanthopleura) piceolus* [= *Lepidochitona piceola*]; *Phakellopleura (Acanthochites) discrepans* [= *Acanthochitona fascicularis*]; *Phakellopleura (Acanthochites) garnottii* [sic!] [= *Acanthochitona crinita*].

Bergenhayn (1931) listed the following 18 species from the Canary Islands: *Lepidopleurus granoliratus* [= *Leptochiton algesirensis*]; *Lepidopleurus cajetanus*; *Lepidopleurus scabridus* [= *Leptochiton scabridus*]; *Lepidopleurus odhneri* [= *Leptochiton odhneri*]; *Hanleya* sp. 1 and 2 [both: *Hanleya hanleyi*]; *Ischnochiton rissoi*; *Ischnochiton stroemfelti* [= *Lepidochitona stroemfelti*]; *Trachydermon (Craspedochilus) canariensis* [= *Lepidochitona canariensis*]; *Middendorffia piceola* [= *Lepidochitona piceola*]; *Callochiton doriae* [= *C. septemvalvis euplaeae*]; *Chiton canariensis* [= *Chiton (Rhyssoplax) canariensis*]; *Acanthochiton discrepans* [= *Acanthochitona fascicularis*]; *Acanthochiton heterochaetus* [= *Acanthochitona fascicularis*]; *Acanthochiton garnoti* [= *Acanthochitona crinita*]; *Acanthochiton joallesii* [= *Acanthochitona joallesii*]; *Acanthochiton adansonii* [= *Acanthochitona crinita*].

The record of *Ischnochiton rissoi* is merely based on Shuttleworth's list. The species, commonly distributed in the Mediterranean Sea from 0-10 m and attaining a length of c. 30 mm, has never again been found in the Canary Islands, nor anywhere outside the Mediterranean Sea, so it seems best to ignore this record.

Van Belle (1984a) summarized all records of chiton species from the Canary

Islands. He recognized 12 species, all of them also mentioned by Bergenhayn. *Acanthochitona joallesii* (De Rochebrune, 1881), however, is missing, although it is a valid species, found in the isle of Tenerife by Van Regteren Altena in 1947 and also enumerated by Bergenhayn. The "Tydeman" Cape Verde Islands Expedition 1982, CANCAP-VI, added a new species: one specimen of *Ischnochiton cessaci* (De Rochebrune, 1881), collected in a tidal pool on the SW coast of Tenerife, near Los Cristianos. The "Tydeman" Canary Islands Expedition 1977, CANCAP-II, brought two specimens of *Connexochiton platynomenus* Kaas, 1979, from SW of Hierro, off Punta de Orchilla, at a depth of 480-540 m. So the chiton fauna of the Canary Islands now amounts to 15 species.

In 1881, De Rochebrune attempted to describe the malacofauna of the Cape Verde Archipelago. He listed the following species of chitons: *Acanthochites Adansonii* [= *Acanthochitona crinita*]; *Acanthochites Bouvieri* [= *Acanthochitona crinita*]; *Acanthochites dakariensis* [nom. dub., fide Kaas, 1985]; *Acanthochites stercorarius* [nom. dub., fide Kaas, 1985]; *Leptochiton sererorum* [= *Ischnochiton sererorum*]; *Chaetopleura gigas* [= *Dinoplax gigas* (Gmelin, 1791), a South African species, never found N of the Cape of Good Hope]; *Acanthopleura brevispinosa* (Sowerby, 1840) [a species from E Africa and the western Indian Ocean, never found in the Cape Verde Islands]; *Tonicia chilensis* (Frembly, 1827) [a species of the Pacific coasts of Latin America, definitely not from Cape Verde]; *Lepidopleurus Cessaci* [= *Ischnochiton cessaci*]; *Gymnoplax siculus* [= *Chiton (Rhyssoplax) olivaceus* Spengler, 1797, restricted to the Mediterranean Sea and the southern Atlantic coast of Spain]; *Gymnoplax Cumingii* [= *Chiton cumingsii* Frembly, 1827, a common Chilean species]; *Gymnoplax Hamyi* [= *Chiton* spec., nom. dub., fide Kaas & Van Belle, 1980]; *Gymnoplax insularis* [probably *Chiton (Rhyssoplax) canariensis* d'Orbigny, 1839, although the appearance of this species in the Cape Verde Islands needs corroboration]; *Lophyrus senegalensis* [a species of *Chiton*, to be compared with *Chiton (Rhyssoplax) canariensis*]. Note that the figures of *G. hamyi* and *G. insularis* (De Rochebrune, 1881a: pl. 17) are transposed!].

The above enumeration makes clear why Iredale & Hull in their Monograph of the Australian Loricates (1927: 160) qualified De Rochebrune as "an erratic French malacologist, who worked at the Loricates in the Paris Museum and renamed Blainville's species. He mixed the specimens up, so that it is now difficult to trace the original examples described." Of the 14 species mentioned by De Rochebrune, only "*Lepidopleurus Cessaci*" and "*Leptochiton sererorum*" are now recognized as valid. The former is rather commonly distributed throughout the Cape Verde Islands and along the Sénégalese and Angolese coasts, the latter was described from the Banc d'Arguin, Mauretania, but is also known from the Isle of St. Vincent, Cape Verde Islands, as *Ischnochiton (Lepidozona) nebulosus* Carpenter in Pilsbry, 1893 (fide Kaas & Van Belle, 1990: 82). Two of his new "*Acanthochites*" species do not differ from the common European *Acanthochitona crinita* (Pennant, 1777), two others are too much worn to identify (nomina dubia, fide Kaas, 1985). His new "*Gymnoplax Hamyi*" and "*G. insularis*" are unidentifiable species of *Chiton* (?*Rhyssoplax*). All other names apply to wellknown species from various parts of the world; these records are based on either misidentifications, or wrongly labelled samples. The chiton fauna of Sénégal and the Cape Verde Islands now amounts to 12 species, viz. *Leptochiton scabridus* (Jeffreys, 1880); *Lepidochitona caboverdensis* Kaas & Strack, 1986; *Lepidochitona rolandi* Kaas & Strack, 1986; *Ischnochiton (Stenosemus) exaratus* (G.O. Sars, 1878); *Ischnochiton*



(*Stenosemus*) *substriatus* Kaas & Van Belle, 1990; *Ischnochiton* (*I.*) *cessaci* (De Rochebrune, 1881); *Ischnochiton* (*I.*) *sererorum* (De Rochebrune, 1881); *Ischnochiton* (*I.*) *paessleri* Thiele, 1910; *Ischnochiton* (*I.*) *goreensis* Thiele, 1910; *Ischnochiton* (*I.*) *nicklesi* Kaas & Van Belle, 1990; *Acanthochitona crinita* (Pennant, 1777); *Acanthochitona subrubicunda* Leloup, 1941.

The chiton fauna of the Azores has recently been drawn up by Van Belle (1984b). He enumerates eight species, viz. *Hanleya hanleyi* (Bean in Thorpe, 1844); *Lepidochitona piceola* (Shuttleworth, 1853); *Lepidochitona simrothi* (Thiele, 1910); *Ischnochiton* (*Stenosemus*) *exaratus* (G.O. Sars, 1878); *Placiphorella atlantica* (Verrill & Smith, 1882); *Acanthochitona fascicularis* (Linnaeus, 1767) and *Acanthochitona crinita* (Pennant, 1777). The "Tydeman" Azores Expedition 1981, CANCAP-V, only collected three species.

Up till now six species of chitons are known from the Madeira group (Van Belle, 1985): *Leptochiton cancellatus* (Jeffreys, 1839); *Leptochiton algesirensis* (Capellini, 1859); *Leptochiton odhneri* (Bergenhayn, 1931); *Callochiton septemvalvis euplaeae* (O.G. Costa, 1829); *Lepidochitona canariensis* (Thiele, 1909) and *Acanthochitona fascicularis* (Linnaeus, 1767). To these the "Onversaagd" Madeira-Morocco Expedition 1976, CANCAP-I added *Acanthochitona crinita* (Pennant, 1777) from Funchal.

Special attention deserve the findings of *Lepidochitona corrugata* (Reeve, 1848) from the Selvagens Islands (first record) and of *Ischnochiton* (*Stenosemus*) *vanbellei* Kaas, 1985 from Mauretania, the first record of this species outside the Mediterranean Sea.

### Abbreviations

IRSN = Institut Royal des Sciences Naturelles de Belgique, Bruxelles; MNHN = Muséum National d'Histoire Naturelle, Paris; RMNH = Nationaal Natuurhistorisch Museum, Leiden. VB = Private collection of R.A. Van Belle, Sint-Niklaas, Belgium.

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