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top left: *Jaton hemitripterus* (Lamarck, 1816) – top right: *Jaton flavidus* (Jousseaume, 1874) – bottom left: *Jaton decussatus* (Gmelin, 1791) – bottom right: *Jaton sinespina* Vermeij & Houart, 1996

- Back cover: *Jaton hemitripterus* (Lamarck, 1816) in situ. Bouthala, Western Sahara, Morocco.

Layout: Frank Nolf
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Contributions to the knowledge of the Triviidae. XXXVIII. A new species in the genus *Trivellona* Iredale, 1931 from Walters Shoal

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Keywords: MOLLUSCA, GASTROPODA, TRIVIIDAE, recent, new species, Walters Shoals.

Abstract: A new species of TRIVIIDAE from Walters Shoals is described in the genus *Trivellona* as *T. inopinata* n. sp. The new taxon is briefly compared with similar appearing species in the genus.

Introduction: The Walters Shoals is a huge isolated submerged seamount about 700 km south off Madagascar reaching 15 or 18 m below the surface (Collette & Parin, 1991; Galetti et al., 2018). It was discovered at the southern end of the Madagascar Ridge in 1962. Such seamounts '*are regarded as hotspots of marine biodiversity and are home to many endemic species*' (IUCN, 2017). The MNHN oceanographic cruise visited the Walters Shoals in 2017 as part of the project "Conservation and Sustainable Use of Underwater Mountain Ecosystems and Hydrothermal Sources in the South West Indian Ocean. Beyond Areas of National Juridiction" by the Global Program for the Marine and Polar Environment of the IUCN that was supported by the French Fund for the Global Environment (FFEM). The target of the project was the '*deepening of scientific knowledge, strengthening the governance and improving the integrated management beyond the areas under national juridiction*' (Dr. Philippe Bouchet, pers. comm.). Therefore, the biodiversity should be confirmed and Dr. Bouchet invited me to work on the OVULIDAE, PEDICULARIIDAE and TRIVIOIDEA. The first step is the description of a seemingly endemic Triviid taxon within the genus *Trivellona* Iredale, 1931 as *T. inopinata* n. sp.

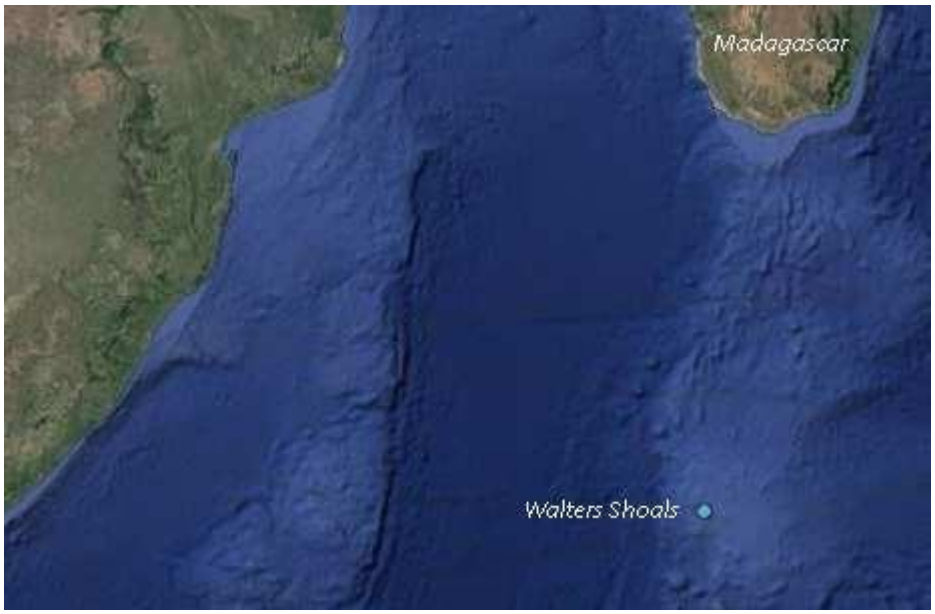

Fig. 1: Location of the Walters Shoals Seamount.

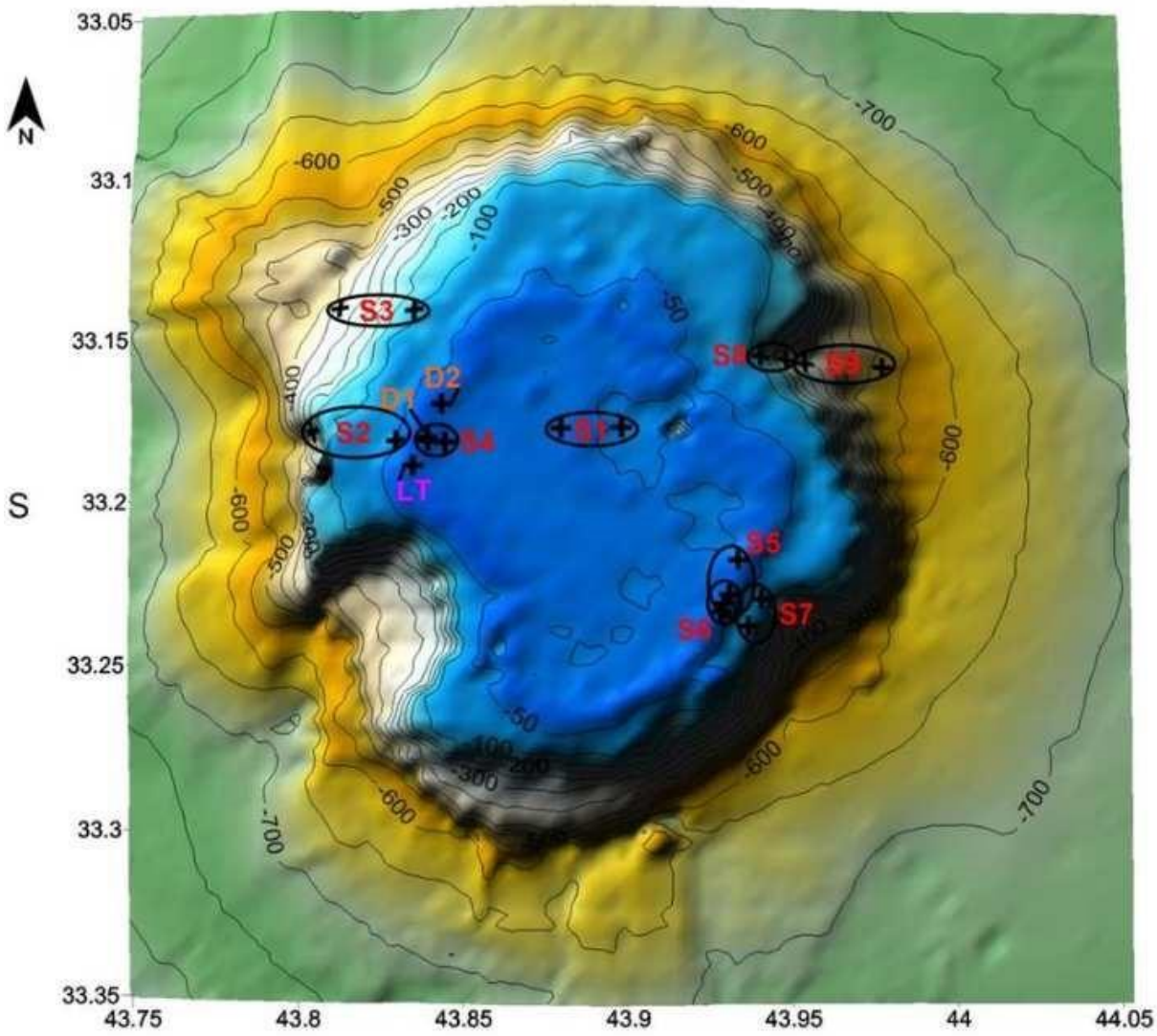

Fig. 2: Bathymetric map of the Walters Shoals Seamount (after Payne, 2015: text fig. 4).

Abbreviations:
MNHN: Muséum national d'Histoire naturelle, Paris, France.
L: length
W: width
H: height
CT: number of columellar teeth
LT: number of labral teeth
RR: number of dorsal ribs

Material and methods: See Fehse, 2015.

FAMILY: TRIVIIDAE Troschel, 1863
SUBFAMILY: Triviinae Troschel, 1863
GENUS: ***Trivellona*** Iredale, 1931

Type species: *Trivellona excelsa* Iredale, 1931, by original designation. Recent, New South Wales, Australia.

***Trivellona inopinata* n. sp.**
(Plate 1, Figs. 1a-e to 3a-c; Plate 2, Figs. 1a-d; 2a-d)

Type material: Holotype: Coll. MNHN, No. IM-2013-67253.

Paratype 1-4: Coll. MNHN

Table 1. *Trivellona inopinata* n. sp. Measurements (length, width and height in mm; CT, LT, RR).

specimen	length	width	height	LT	RR	CT
holotype	8.4	5.9	5.1	14	14	22
paratype 1	9.3	7.0	6.0	14	15	20
paratype 2	8.5	6.4	5.3	13	15	18
paratype 3	9.8	7.3	6.0	14	13	18
paratype 4	8.3	5.7	4.9	13	14	20

Type locality: MNHN loc. #DW4880, Campagne MD208 N.O. “Marion Dufresne”, Pentes (33° 09’ S – 43° 50’ E) Walters Shoals, S Madagascar; dredged at 199 to 261 m.

Distribution:
MNHN Campagne MD208 N.O. “Marion Dufresne”, Pentes:
DW4877, 33° 10’ S – 43° 49’ E, dredged at 217 to 256 m; **DW4881**, 33° 16’ S – 43° 50’ E, dredged at 377 to 382 m; **DW4885**, 33° 17’ S – 43° 55’ E, dredged at 272 to 380 m; **DW4887**, 33° 17’ S – 43° 57’ E, dredged at 599 to 640 m; **DW4894**, 33° 09’ S – 43° 50’ E, dredged at 199 to 261 m; **DW4896**, 33° 07’ S – 43° 51’ E, dredged at 325 to 357 m.

Description: Shell small for the genus, oblong-ovate, translucent. Terminals slightly produced with both tips indented. Dorsum evenly and roundly elevated, without sulcus. Ventral margin convex. Ventrum almost flattened with terminals almost straight. Aperture narrow, almost straight. Canals simple, indented and smooth. Columella slightly concave, inner margin straight. Longitudinal adaxial carinal ridge slightly ridged. Fossula indistinct, slightly concave. Fossular edge slightly protruded. Columellar edge not clearly delimited from fossula. Labrum narrow, widened at its mid-portion, rounded, declivous anteriorly and posteriorly. Outer labral margin curved, apertural shoulder ridged. Inner edge slightly curved. Dorsal ribbing – 20 on average (varies between 18 and 22 in number) – less numerous, regular, somewhat strong. Ribs continuous from the dorsal elevation, sides, margins, ventrum and labrum and terminating as sharp, coarse, slightly distant teeth on the labral edge – 14 on average (varies between 13 and 16 in number). Ribs continue on the columellar wall becoming finer and terminating as sharp, slightly thickened teeth on the columellar edge. They are thickened on the developed, roundly edged parietal lip and their number is 14 on average (varies between 13 and 15 in number). Parietal lip straight, somewhat edged and projected, posteriorly curved. Shell colour translucent with ribs and callosities uniformly white.

Variation: The shells are quite uniform in appearance.

L = 8 – 10, W = 69 – 75 % of length, H = 59 – 64 % of length, LT = 13 – 16, CT = 13 – 15, RR = 18 – 22.

External morphology and radula: Mantle lobes transparent covered with numerous white dots and irregularly shaped, translucent orange patches. Foot narrow, translucent and covered with numerous

white dots. Cephalic tentacles short, translucent covered with few white dots. Siphon short, transparent with white dots. No information is available on the radula.

Comparison: This is the second taxon of the genus *Trivellona* from the Southwestern Indian Ocean besides *Trivellona laurenti* Fehse, 2017b (shell variation L = 7-8, W = 76-82 % of length, H = 65-66 % of length, LT = 18-20, CT = 16-18, RR = 22) from S Faux-Cap, S Madagascar. The new species is seemingly endemic to Walters Shoals. *Trivellona inopinata* n. sp. differs from *T. laurenti* by the narrower shell (W = 69-75 % of length in *inopinata* vs. W = 76-82 % of length in *laurenti*) with lower dorsal profile (H = 59-64 % of length in *inopinata* vs. H = 65-66 % of length in *laurenti*), by the coarser, less numerous and close-set labral (LT = 13-16 in *inopinata* vs. LT = 18-20 in *laurenti*) and columellar (CT = 13-15 in *inopinata* vs. CT = 16-18 in *laurenti*) denticles, the differently shaped anal and siphonal canal and by the obscured spire. The new species is only superficially similar to the New Caledonian *Trivellona ovata* Fehse, 2017a concerning the shape of the shell ribs and apertural dentition. However, *T. ovata* is not only distinguished from *T. inopinata* by the great geographical distance but also by the more globose shell (W = 78-86 % of length in *ovata* vs. W = 69-75 % of length in *inopinata*; H = 67-73 % of length in *ovata* vs. H = 59-64 % of length in *inopinata*), the curved aperture, the convex ventrum and the less ridged apertural shoulder.

Etymology: From the Latin adjective, *inopinatus*, *-a*, meaning unexpected.

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Plate 1

a – left lateral view, b – dorsal view, c – right lateral view, d – ventral view

Trivellona inopinata n. sp.

1a-e. Holotype. Length: 8.4 mm. MNHN, loc. DW4880, Walters Shoals (33° 09' S – 43° 50' E). (MNHN, No. IM-2013-67253).

2a-d. *Trivellona inopinata* n. sp. Paratype 2, subadult. Length: 8.5 mm. MNHN, loc. DW4881, Walters Shoals (33° 16' S – 43° 50' E). (MNHN).

3a-d. *Trivellona inopinata* n. sp. Paratype 1. Length: 9.3 mm. MNHN, loc. DW4877, Walters Shoals (33° 10' S – 43° 49'). (MNHN).

Plate 2

a – left lateral view, b – dorsal view, c – right lateral view, d – ventral view

Trivellona inopinata n. sp.

1a-d. *Trivellona inopinata* n. sp. Paratype 3. Length: 9.8 mm. MNHN, loc. DW4887, Walters Shoals (33° 17' S – 43° 57' E). (MNHN).

2a-d. *Trivellona inopinata* n. sp. Paratype 4. Length: 8.3 mm. MNHN, loc. DW4896, Walters Shoals (33° 07' S – 43° 51' E). (MNHN).

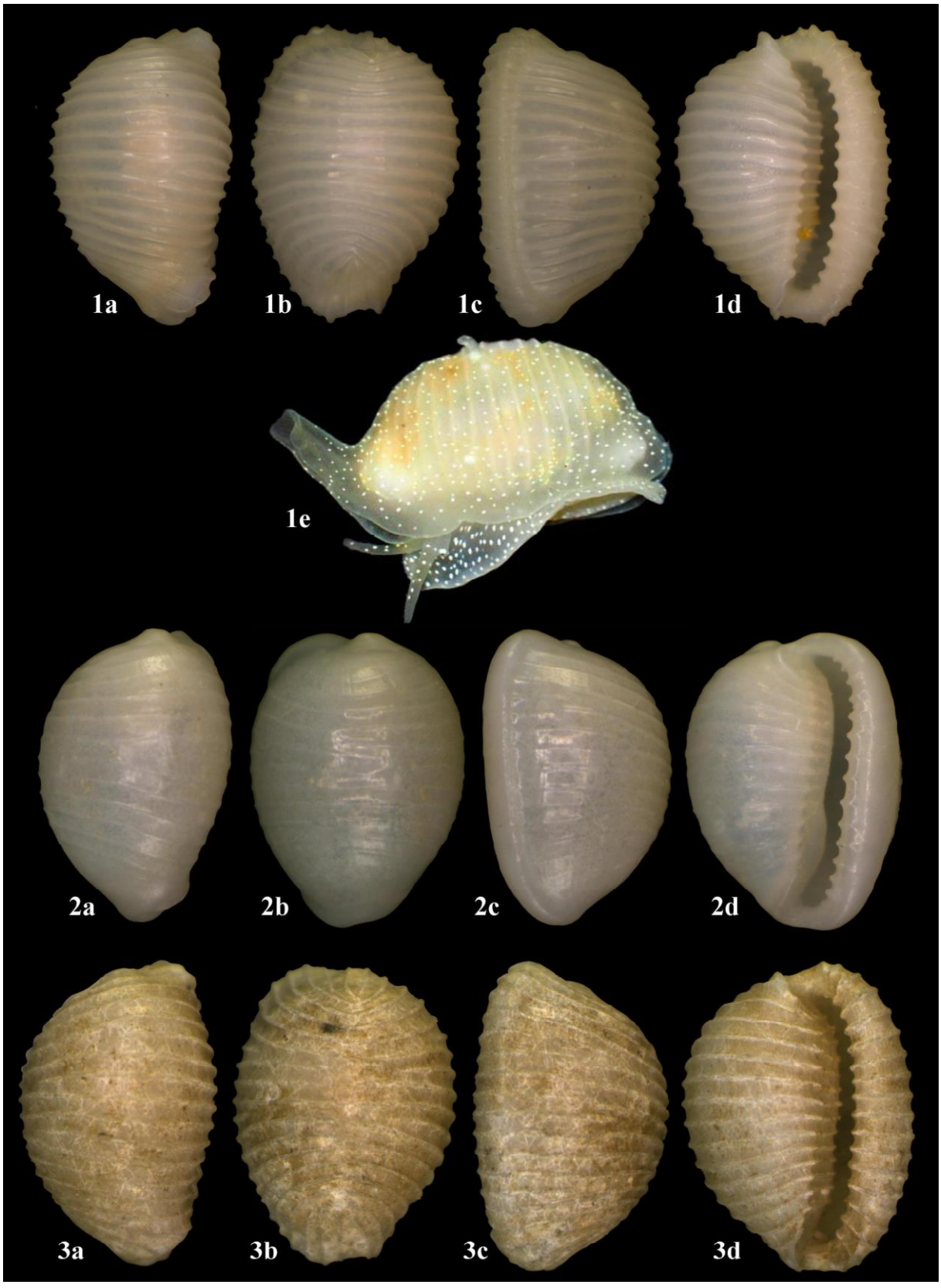

Plate 1

Plate 2

Contributions to the knowledge of the Eratoidae. XVIII. A new *Sulcerato* Finlay 1930 from the Australes

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Keywords: MOLLUSCA, GASTROPODA, ERATOIDAE, recent, new species, Australes.

Abstract: The RAPA 2002 expedition of the MNHN to the Australes results in the description of *Sulcerato rapa* n. sp. The new taxon is compared with similar species.

Introduction: The Triviid fauna of the Australes was already studied by Fehse (2015). Several new, strange appearing taxa were discovered and described. Now it is also possible to study the Eratoid material of the RAPA 2002 expedition of the MNHN. The specimens were collected at depths between 2 and 57 m and belong to only a minute, quite glossy *Sulcerato* never seen before from any other locality in the Indo-Pacific and Pacific. This taxon is hereby described as *Sulcerato rapa* n. sp. The holotype and several paratypes contain dried animals that allow a future DNA analysis.

Abbreviations:

MNHN: Muséum national d'Histoire naturelle, Paris, France.
LT: number of labral teeth
CT: number of columellar teeth

SUPERFAMILY: TRIVIOIDEA Troschel, 1863
FAMILY: ERATOIDAE Gill, 1871
SUBFAMILY: ERATOINAE Gill, 1871
GENUS: *Sulcerato* Finlay, 1930
Type species: *Erato* (*Eratopsis*) *illota* Tate, 1890, by original designation

***Sulcerato rapa* n. sp.**
(Plate 1, Figs 1a-c to 5a-c)

Type material: Holotype: MNHN IM-2000-33429. Length: 2.8 mm; width: 1.9 mm; height: 1.5 mm; LT 12; CT 15.

From MNHN sta. 8:
Paratype 1: MNHN IM-2000-35098. Length: 2.5 mm; width: 1.7 mm; height: 1.4 mm; LT 10; CT 12.
Paratype 2: MNHN IM-2000-35099. Length: 2.0 mm; width: 1.3 mm; height: 1.1 mm; LT —; CT — (subadult).

From MNHN sta. 22:
Paratype 3: MNHN IM-2000-35100. Length: 2.6 mm; width: 1.8 mm; height: 1.4 mm; LT 11; CT 13.

From MNHN sta. 28:
Paratype 4: MNHN IM-2000-35101. Length: 2.6 mm; width: 1.9 mm; height: 1.5 mm; LT 9; CT 11.
Paratype 5: MNHN IM-2000-35102. Length: 2.3 mm; width: 1.5 mm; height: 1.3 mm; LT 11; CT 13.

7 further paratypes from MNHN sta. 6; 62 from MNHN sta. 8; 10 from MNHN sta. 10; 1 from MNHN sta. 22; 3 from MNHN sta. 28; 1 from MNHN sta. 35; 7 from MNHN sta. 36; 2 from MNHN sta. 43; 2 from MNHN sta. 44; 3 from MNHN sta. 48.

Type locality: RAPA 2002 expedition: MNHN sta. 4: Rapa, Ile Rarapai, 27° 34.3' S – 144° 22.1' W, Australes; 18 m.

Distribution:
MNHN expedition RAPA 2002:

station	section	locality	coordinates		depth
6	Rapa	off Ahurei Bay	27°36.8' S	144°16.7' W	42 m
8	Rapa	SE of Tauna Island	27°36.5' S	144°17.7' W	52-57 m
10	Rapa	Point Komiré, Alt. 79 m	27°34.8' S	144°22.8' W	16-18 m
22	Rapa	off Cape Rukuaga	27°33.9' S	144°21.7' W	18-22 m
28	Rapa	Point Taekateke	27°38.4' S	144°20.6' W	30 m
35	Rapa	cave exit SE of Point Tematapu	27°34.8' S	144°19.0' W	2 m
36	Rapa	Point Kauira	27°33.5' S	144°20.8' W	27 m
43	Rapa	Bay of Haurei	27°36.8' S	144°18.3' W	45 m
44	Rapa	NW of Tauna Island	27°36.3' S	144°18.2' W	30 m
48	Rapa	off Point Rukuaga	27°34.1' S	144°22.1' W	36 m

Description: Shell length between 2 to 2.6 mm, pear-shaped, translucent. Spire blunt, of low profile, sparsely pustulated. Protoconch and subsequent whorls covered with thin callus. Suture indistinct. Junction with teleoconch obscured. Body whorl almost 95% of total length, roundly curved adapically, with the maximum diameter one third from the adapical suture, roundly tapered below and not constricted at the ventrum. Dorsum roundly elevated, less constricted towards anterior terminal collar. Dorsal sulcus absent. Shell surface covered with glossy, thin, translucent callus. Ventrum less callused, posteriorly sparsely pustulated, with straight anterior terminal. Aperture almost 80% of total shell length, almost straight and narrow. Posterior terminal tip absent, anterior blunt. Labrum inflected, slightly thickened, rounded, smooth, outer margin roundly callused, ridged at inner margin, with coarse, quite irregular, somewhat indistinct denticles. Denticles restricted to labral margin. Anal canal short, funnel-like widened. Siphonal canal deeply indented, tubular. Columella narrow, convex, rounded, without inner carinal ridge. Parietal lip less developed. Columellar denticles quite irregular. Ventral folds weakly developed, almost obscured, one to two in number. Fossula concave, obscured, not delimited from the columella. Terminal ridge bifid.
Shell glossy white. Anterior terminal tip, spire and posterior labral portion light olive.

Variation: The shells are almost uniform in appearance in spite of the shell inflation and the development of the dentition. Sometimes the denticles are fused and the columellar denticles are sometimes somewhat obscured.

External morphology and radula: No information is available.

Comparison: Especially the almost smooth, glossy shell surface assigns the new taxon to the genus

Sulcerato without doubt. *Sulcerato rehderi* (Raines, 2002) is the only similar species known from Easter Islands and the Galapagos Archipelago. The latter is seemingly identical with *Sulcerato galapagensis* (F.A. Schilder, 1933), which was described on the basis of a worn holotype.
Sulcerato rapa n. sp. is immediately distinguishable from *S. galapagensis* (including *S. rehderi*) by the pyriform shell outline with the almost obscured spire whereas the shell outline of *S. galapagensis* is slenderly ovate with a projecting spire. The new species also differs from the latter by the presence of ventral folds and a bifid terminal ridge. The labral denticles are only slightly developed in *S. rapa* and are restricted to the inner labral margin. The columellar denticles are coarser and more prominent in the new taxon.

Etymology: Named after type locality.

Acknowledgements: Many thanks to all organizers and supporters of the MNHN RAPA 2002 expedition that allowed the discovery of this interesting Eratoid species.

Bibliography:

Fehse, D., 2015. Contributions to the knowledge of Triviidae. XXIX-E. New Triviidae from the Australes. *VISAYA*, Supplement 5: 87-111, pls. 1-13, 10 unnumb. text figs., 1 tab.
Raines, B.K. (2002): Contributions to the Knowledge of Easter Island Mollusca. – *La Conchiglia*, 34 (304): 11-40, text figs. 1-47, tab. 1.

Text fig. 1: *Sulcerato rehderi* (Raines, 2002). Holotype. LACM, coll. No. 2940. Off Pta. Rosalia, E Anakena, Easter Island. Length: 3.1 mm. (photo: B.K. Raines).

Plate 1

a – dorsal view, b – lateral view, c – ventral view
Sulcerato rapa n. sp.
1a-c. Holotype. Length: 2.8 mm; width: 1.9 mm; height: 1.5 mm. MNHN IM-2000-33429.
2a-c. Paratype 2. Length: 2.0 mm; width: 1.3 mm; height: 1.1 mm. MNHN IM-2000-335099.
3a-c. Paratype 3. Length: 2.6 mm; width: 1.8 mm; height: 1.4 mm. MNHN IM-2000-335100.
4a-c. Paratype 4. Length: 2.6 mm; width: 1.9 mm; height: 1.5 mm. MNHN IM-2000-335101.
5a-c. Paratype 5. Length: 2.3 mm; width: 1.5 mm; height: 1.3 mm. MNHN IM-2000-335102.

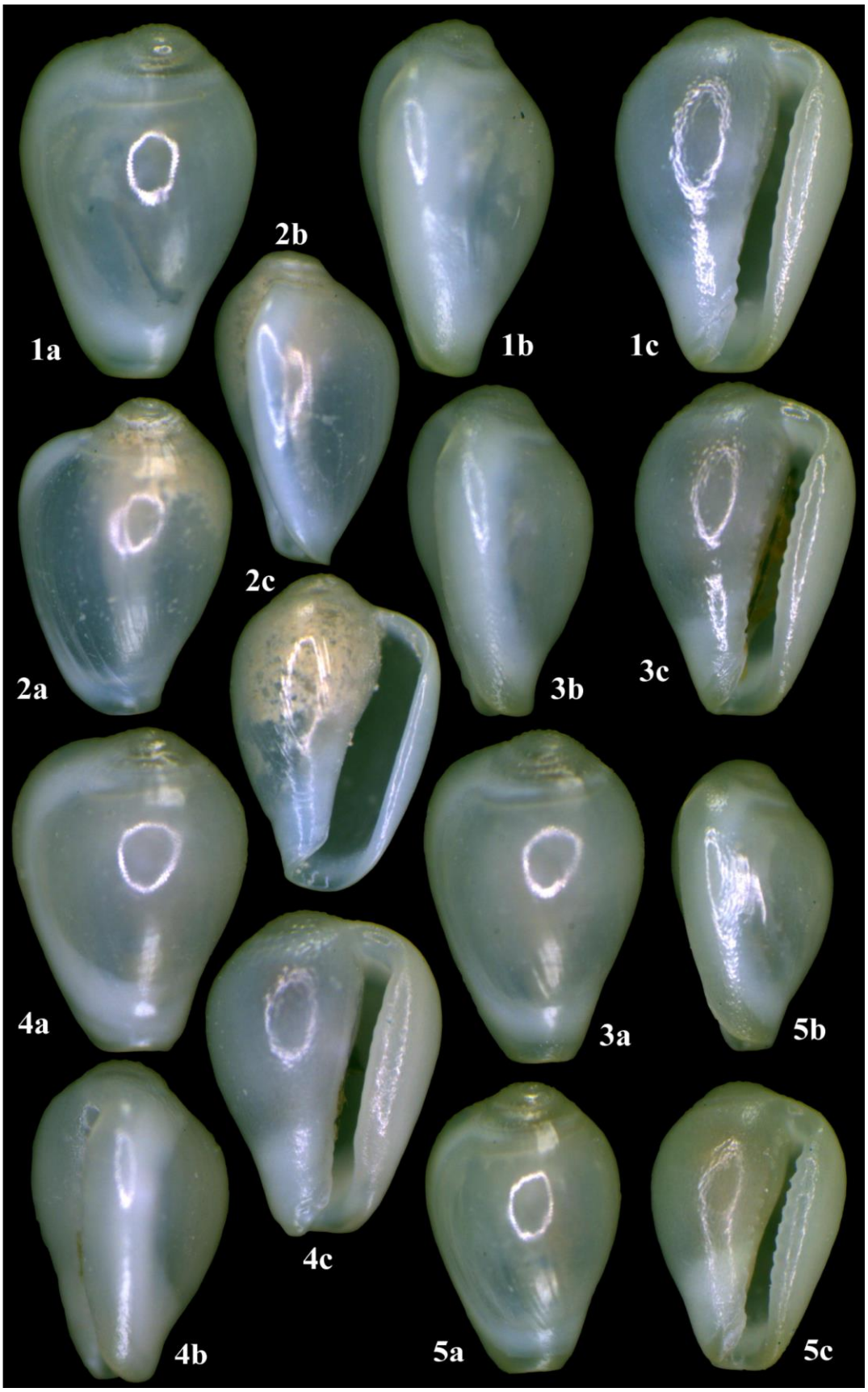

Plate 1

A comparative study of the *Jaton* species in East Atlantic waters

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Keywords: *Jaton,* MURICIDAE, Gastropoda, Mollusca, W Africa, junior synonyms.

Abstract: The description of a few doubtful new species in the past years has lead us to undertake a review of all the *Jaton* species living in the East Atlantic waters of West Africa. Four species are recognised as valid: *Jaton decussatus* (Gmelin, 1791), *Jaton hemitripterus* (Lamarck, 1816), *Jaton sinespina* Vermeij & Houart, 1996 and *Jaton flavidus* (Jousseaume, 1874). Only the latter shows a constant appearance and can easily be separated from the other *Jaton* species.
Jaton westsahariensis Franchi, 2007 and *Jaton rikae* Petuch & Berschauer, 2019 are treated as junior synonyms.
After studying dozens of specimens we have to ascertain that an important part of the material shows a transition between the extreme forms used in the original descriptions.

Abbreviations:
CFN: Private collection of Frank Nolf (Oostende, Belgium)
CJV: Private collection of Johan Verstraeten (Oostende, Belgium)
CSH: Private collection of Steve Hubrecht (Koksijde, Belgium)
MNHN: Muséum national d'Histoire naturelle, Paris, France

Introduction:

Genus *Jaton* Push, 1837 (Ocenebrinae, MURICIDAE)

Type taxon: *Murex decussatus* Gmelin, 1791 by original designation.

'*Shell oblong, subturreted, with five distinct whorls, deeply canaliculate above, with three or four transverse plications, the plicae (or costae) wide, smooth, rounded, separated by deep, slightly striated grooves; aperture oval, the labrum with three or four plications, the canal short, scarcely recurved*' (Pusch, 1837).
Species of the genus *Jaton* are restricted to the eastern Atlantic waters of West Africa.
They are characterised by the presence of three thick, spinose but usually rounded varices on the last two or three whorls, by having strongly shouldered whorls and by the presence of a broad sealed siphonal canal.
Intervarical sculpture consists of a prominent node, whose right side is adorned with two strong, rounder, divergent cords. The upper of these two cords forms the strong shoulder. These cords extend in the rim of the outer lip as tiny spines. In the type species, *Jaton decussatus* (Gmelin, 1791) the third cord extends across the varix to form a stronger labral tooth or spine (ceratus). Three or four much finer cords ornament the varices below the abapical termination if the intervarical node. Varices on adjacent whorls are connected across the suture by a strong continuous buttress. The apertural varix extends as a wing nearly reaching the recurved tip of the siphonal canal. The inner side of the outer lip is usually smooth. As such no other Ocinebrinae from the Eastern Atlantic and surrounding regions can be confused with members of the genus *Jaton*. Some members of the genera *Ceratostoma* Herrmanssen, 1846 and *Pteropurpura* Jousseuame, 1880 from other waters exhibit a vague resemblance but detailed evaluation easily eliminates this.

Jaton decussatus (Gmelin, 1791)
(Pl. I, Figs 1-6; Pl. II, Figs 7-12; Pl. III, Figs 13-18; Pl. IV, Figs 19-24; Pl. V, Figs 25-30; Pl. VI, Figs 31-36; Pl. VII, Figs 37-43)

Synonymised names:
Murex jatonus Lamarck, 1816 (synonym)
Murex lingua Dillwyn, 1817 (synonym)
Murex gibbosus Lamarck, 1822 (invalid: junior homonym of *Murex gibbosus* Born, 1778)

Murex linguavervecina Reeve, 1845 (synonym)
Ocenebra gibbosa (Lamarck, 1822)
Purpura jatou Adanson, Voyages au Sénégal.
Purpura jatou Jousseaume, 1880

Left - Fig.1 (121): *Murex lingua-vervecina* (= *Jaton decussatus*) from Reeve (1845)
Right - Fig.2 (3): *Murex gibbosus* from Kiener (1843)

Description: The original description by Gmelin (1791) is restricted to only two phrases in Latin, so we prefer to use a general description based upon the opinion of different authors (Kiener 1842-43, Reeve 1842, Houart 1997).
Shell somewhat pyriformly ovate, slightly obtuse and of moderate size. Spire somewhat contracted, short and sharp, consisting of four to five postnuclear whorls. Sutures entirely obscured and situated in a deep furrow. Body whorl large and fusoid. Aperture oval and rather variable as to size. Outer apertural lip erect and marginally serrate, in most instances with a moderately long **ceratus** (a kind of spine) anteriorly, which arises as an extension of the second cord from the bottom. Columellar lip entirely adherent, except at its anterior end, where it is slightly detached. Siphonal canal entirely closed and more or less slightly bent to the right.
Whorls three-varicose, each varix laminated and much broader at its base and thickest posteriorly, obtuse at its apex, where it is appressed to the preceding whorl almost at its shoulder margin; anteriorly the varices extend at least to the midpoint or even the endpoint of the siphonal canal. Varices bear a large number of small scales beneath. Interstices between varices obtusely ribbed with a single, massive rounded knob, filling almost the entire intervarical space. Spiral sculpture consists of seven weak major cords and numerous fine intercalary threads.
Colour white or mostly brown, often stained and variegated with chestnut-brown blotches or alternating irregular bands, varices white or light brown. The aperture is porcelaneous white to pale yellow. Shells measure from 20 to 45 mm in length.

Distribution: from southern Mauritania to southern Senegal at a depth of 1-2 m to 20-30 m.

Discussion: *J. decussatus* resembles *J. flavidus* in having a low spire, but it differs by lacking denticles on the inner side of the outer lip, by possessing a labral spine (labial tooth or ceratus) as an extension of the abapical cord, and by having much less spinose varices which are sometimes highly foliated and denticulated or more calloused and chalky in older shells.
See under *J. hemitripterus*, *J. sinespina* and the conclusion for more differences.

***Jaton hemitripterus* (Lamarck, 1816)**
(Pl. VIII, Figs 44-49; Pl. IX, Figs 50-55; Pl. X, Figs 56-61; Pl. XI, Figs 62-69; Pl. XII, Figs 70-74; Pl. XIII, Figs 75-80)

Synonymised names:
Murex hemitripterus
Lamarck, 1816 (basonym)
Jaton westsahariensis
Franchi, 2007
Jaton rikae
Petuch & Berschauer, 2019

Fig.3 (1223): *Murex hemitripterus* from Reeve (1845)

'*Shell triangularly pyriform gradually attenuated towards the base, thick, transversely obtusely ribbed, with a large tubercle between the varices; spire short, angularly turreted; whorls angularly depressed at the upper part, three-varicose, varices rather solid; obtusely ribbed; whitish, variegated with flesh-tinted brown; canal rather short*' (Reeve, 1845).

Fig.4: syntype of *J. hemitripterus* - MNHN – 27.7 mm

Left - Fig.5 (4): *Murex hemitripterus* from Kiener (1843)
Right - Fig.6 (60): *Murex hemitripterus* from Sowerby (1841)

Discussion: Kiener (1842) states that *J. hemitripterus* was described based upon a discoloured juvenile specimen of *J. decussatus*. Reeve (1842) on the contrary refutes the arguments of Kiener's (1842) and Sowerby's (1841) arguments and believes that there are two valid species. After accurate comparison we remarked that adult specimens of *J. hemitripterus* show the same characteristics as the juveniles but are different from adult *J. decussatus*. For a thorough comparison with the other *Jaton* species we refer to the conclusions.

***Jaton westsahariensis* Franchi, 2007**

Description: A **junior synonym** of ***J. hemitripterus*** was described on the basis of three specimens from Western Sahara (Morocco). The following is a shortened free translation of the Italian text.
Shell elongate with three varices per whorl, particularly angled at the shoulder of the last whorl. Low spire, teleoconch with five whorls and angled varices at the shoulder. Protoconch eroded, body whorl partially eroded, sutures deep.
Presence of one prominent intervarical nodosity and four or more major spiral ribs at the level of the last whorl, the first one contributes to form the robust shoulder and the third (or fourth) in the abapical direction extends to a prominent denticle on the outer lip of the aperture. The sculpture of the last whorl shows very thin and axial lamellae and 2-3 minor spiral ribs. The white opening is oval and white, with a denticulate aspect at the outer edge. The columellar lip is smooth and adherent. The siphonal canal is moderately long, about half the length of the shell, almost hermetically closed and curved. The colour is cream white, especially at the level of the varices and the spiral ribs which become brownish grey in the intervarical zones. Most often, the end of the siphonal canal is dark brown coloured. Horny operculum with a peripherical nucleus.

Fig.7: Holotype of *Jaton westsahariensis* Malacologia, 55:3-4

Fig.8: Paratype 1 of *Jaton westsahariensis* Malacologia, 55:3-4

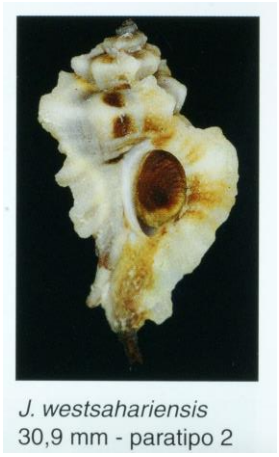

Fig.9: Paratype 2 of *Jaton westsahariensis* Malacologia, 55:3-4

Discussion: The description of *J. westsahariensis* matches the original description of *J. hemitripterus*, yet it is more complete by emphasising the most important characteristics.
Compared to *J. decussatus*, the varices are more angled at the shoulder giving the last whorl a triangular aspect. The varices in *J. decusssatus* are thickened and curved inwards in such a way they overlap the preceding whorls, giving the shell a more rounded outline and a club-shaped appearance. *J. hemitripterus* on the other hand is characterised by more prominent ribs and the tip of the siphonal canal is typically dark brown coloured. Franchi (2007) remarks that *J. westsahariensis* has a certain similarity with *Ocenebra erinaceus* (Linnaeus, 1758), confirming its presence in the subfamily Ocenebrinae.

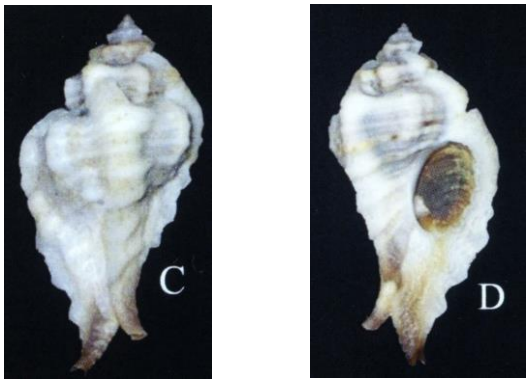

Fig.10-11: *Jaton hemitripterus* – Dakhla, Western Sahara from Petuch & Berschauer. The Festivus, 51: 228

Jaton rikae Petuch & Berschauer, 2019

This junior synonym of *J. hemitripterus* has recently been introduced on the basis of a dozen specimens collected off Gunjur, Gambia.

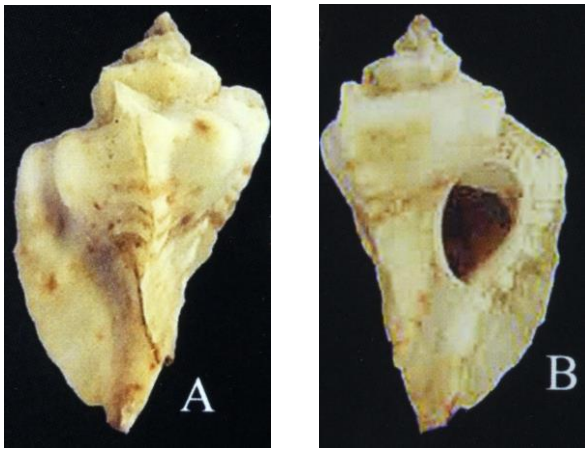

Fig.12-13: *Jaton rikae* – Gunjur, Gambia. Holotype. From Petuch & Berschauer. The Festivus, 51: 228

Description: The following is a shortened version of the original text, sporadically interrupted by personal comments:
'*Shell small for genus'* **of course it concerns juvenile specimens**, '*elongated and fusiform, with low stepped spire and protracted siphonal canal; body whorl roughly triangular in shape, grading directly into wing-like varix on margin of siphonal canal, shoulder sharply angled, with flattened subsutural area on body whorl and flattened, tabulate spire whorls; 3 thick and flattened varices per whorl', with edge of varix having slight undulations that correspond to 5 low, rounded longitudinal cords'*; '*cord around the shoulder being largest in size and having best development, forming prominent shoulder keel; body whorl and spire whorl surfaces smooth and waxy, with fine crenulations and frills present only on ventral side of each varix'* – **all these characteristics are typical of the juvenile stage and the growing conditions in an unusual habitat;** '*… single large rounded knob present between each pair of varices; shell color pale cream-white with 2 or 3 thin brown bands around middle of body whorl, crossing dorsal and ventral sides of each varix and intervarical knobs; scattered small brown dots and patches also present along shoulder cord, on posterior end of intervarical knobs, along the varical wing of the siphonal canal, and on the anterior tip'* – **this is an elaborate description of characteristics that are rarely visible, most specimens studied in different collections are missing these features as a result of the young stage of the type material and the poor circumstances of the living conditions in the cracks of a fishing boat;** '*… outer edge of lip with dentate peristome, being ornamented with 5 proportionally-large, low rounded teeth and numerous fine fimbriations.*' – **there is no mention of the prominent denticle, due to the very bad condition of the type material.**

Discussion: Petuch & Berschauer (2019) compared *Jaton rikae* with *Jaton hemitripterus*. They state that 'J. rikae *is a much smaller shell that averages only one-half the length of the Saharan coastal species*', evidently because it is only a juvenile form of *J. hemitripterus.* Other used differences to substantiate their arguments '*more colorful shell, three brown spiral bands, small brown patches scattered over the intervarical knobs and anterior tip*' are seldom present. Each critical reader of the text misses a comparison with the original text, figures and type material of *J. decussatus* and *J. hemitripterus.*
It was also incorrect to state that *J. rikae* '*… being found on muddy seafloors and mud-covered rocky platforms along the coast of*

Gambia …'. Actually, the specimens were collected on a single occasion from the cracks in a fishing boat parked on the beach.

Jaton sinespina Vermeij & Houart, 1996

(Pl. XIV, Figs 81-86; Pl. XV, Figs 87-92; Pl. XVI, Figs 93-96)

Synonymised name: *Jaton decussatus* var. *angolensis* Ryall, 1984 (unavailable name on the basis of IZCN Article 16)

Description: Shell heavy and shouldered, up to 50 mm in length. Spire high with 2 protoconch whorls and up to 6 relatively narrow, strongly shouldered teleoconch whorls. Sutures impressed. Steep subsutural ramp. Protoconch high, whorls relatively smooth and mostly eroded, weekly keeled.
Axial sculpture of first to third teleoconch whorls consisting of 7 or 8 low lamellae; from fourth to last teleoconch whorls there are 3 broad, thick varices, connected on preceding whorls by a broad, flat, large buttress. Last whorl with a thin, bladelike expansion abapically, extending to ¾ of siphonal canal. Intervarical axial sculpture of a single, broad, thick knob, connecting preceding varix on shoulder. Other axial sculpture of numerous, frilly, growth lamellae. Spiral sculpture of two strong broad cords – the uppermost of these two cords forms the strong shoulder - and six weaker threads of various strength, more obvious on outer edge of varices ending in the rim of the outer lip of the aperture as tiny spines, the second one being the stronger one.
Aperture large and ovate. Columellar lip smooth, rim adherent. Anal notch narrow, weak, almost indistinct. Outer lip serrate, smooth within. Siphonal canal moderately long, 2/5 of total shell length, broad, sealed.
Mostly completely white, or blotched with brown dots near varices and on shoulder, rarely completely brown.
Operculum dark brown, ovate with subterminal nucleus.

Discussion: *J. sinespina* differs from *J. decussatus*, *J. hemitripterus* and *J. flavidus* in sometimes having a larger aperture and much thicker varices which overlap the spire whorls in an extreme way as a kind of buttress. Its outline is slenderer and more elongate.
Vermeij and Houart state that the spire is higher compared with the other *Jaton* species. This characteristic is only occasionally present. Moreover, according to both authors, *J. sinespina* never possesses a labral spine compared to *J. decussatus* and *J. hemitripterus*. We have observed that the outer margin is still serrated like in the above mentioned species. Even the absence of denticles on the inner side of the outer lip, described by Vermeij & Houart, is not a constant feature. After all, there are very few differences between *J. sinespina* and *J. decussatus*. The results of the radula research are not convincing (Vermeij & Houart, 1996: figs 9-11). *J. sinespina* has a less spinose shell compared to *Jaton flavidus*.

Distribution: from Namibe towards south of Benguela, Angola. On infralittoral rocks at 0-10 m.

Jaton flavidus (Jousseaume, 1874)

(Pl. XVI, Figs 97-98; Pl. XVII, Figs 99-104)

Synonymised names:
Murex flavidus Jousseaume, 1874

Description: *J. flavidus* is characterized by the more compact appearance, the shouldered shell with strong spiral cords, a denticulate outer lip, squamose texture, and spinose varices. The shell of *J. flavidus* is uniformly brown, often with reddish-brown spots, up to 40 mm in length.
It resembles *J. decussatus* in having a low spire, but differs in most other aspects (see under *J. decussatus*). In contrast with the other members of the genus *Jaton* the inner side of the outer lip shows six weak denticles. The outer lip lacks the labial denticle.

Distribution: Restricted to off Dakar, Senegal at a depth of ca 10-50 m. It occupies deeper habitats than *J. decussatus*, which is a regular rock dweller in the infralittoral zone.

Conclusion: We accept the presence of four different species along the West African shores. Three of them occur in the area from Mauritania to southern Senegal: *J. decussatus* (Senegal, exceptionally from Mauritania in the north and Ivory Coast in the south), *J. hemitripterus* (from Western Sahara, sporadically from Senegal) and *J. flavidus* (Senegal). *J. sinespina* lives in southern Angola, which means a serious distributional gap of about four thousand kilometres of coastline. The lack of material in the area between Senegal and Angola can be explained by minor fishery activities in depths to ca 50 m and to the absence of local and visiting shell collectors linked to the political instability in several countries along the Gulf of Guinea. This is an observation true for numerous other West African molluscs. Another supposition is that probably no *Jaton* species live between Senegal and Angola and that the recent species of *Jaton* at both extremities of the distributional gap are

relics of Late Oligocene representatives. *J. sinespina* could possibly be regarded as a subspecies of *J. decussatus*.

After having studied about a hundred specimens we have to conclude that *J. decussatus*, *J. hemitripterus* and *J. sinespina* are very variable in structure and outline. However, differences described by the original authors are not always applicable and useful to separate the species and they only correspond to extreme forms. We have examined a number of specimens that could be considered as intergrades between *J. decussatus* and *J. sinespina* (for instance Pl. IV, figs 19-20; Pl. VI, figs 33-36; Pl.XVI, figs 95-96) and between *J. decussatus* and *J. hemitripterus* (Pl. V, figs 25-26 and Pl. VII, figs 37-41). A case could be made to consider these three species as extreme forms of a very variable species and hence consider only two valid species: *J. decussatus* and *J. flavidus*. However, we do not deem it correct to draw this far-reaching conclusion at this stage. It is clear that a final judgement can only be made after DNA barcoding and macro-evolutionary analyses.

The most difficult problem was to establish the difference between *J. decussatus* and *J. hemitripterus.* For about two centuries the latter was regarded as a synonym of *J. decussatus* and was assigned to juvenile specimens. Actually, the source of all problems can be found in the work of Adanson (1757) who described '*Le Jatou*' based - among others - upon very small specimens used by Gmelin (1791) to describe *Murex decussatus*. The collection of Adanson contained seven adult specimens, unfortunately not figured. On the other hand, Fischer-Piette (1942) recorded a tiny shell stuck on a piece of cardboard that had been used to draw '*Le Jatou*' (or: '*le Jaton*') in a rather fantasised way (fig. 3 in Adanson) by adding longer spines at the level of the shoulders.

Sowerby (1834-41) used figure 60 in his '*Conchological Illustrations'* (text figure 6) which is not Adanson's '*le Jaton*' of. It matches the figure of *J. hemitripterus* by Lamarck (1816) very well. This shell was illustrated (fig.4) by Kiener (1842-43) (text figure 5) as a juvenile specimen of *J. decussatus*. Deshayes & Milne Edwards in Lamarck (1843) state that the figure in Kiener does not match young individuals of *J. decussatus* which they studied.

The type locality of *J. hemitripterus* is unknown. Fortunately, several juvenile and adult specimens from Western Sahara (Morocco) have been made available for study in the last decade. In this area no typical *J. decussatus* could be found. *J. hemitripterus* is a typical species of Western Morocco and *J. decussatus* is rather restricted to Senegal, but they are sporadically found in the same area.

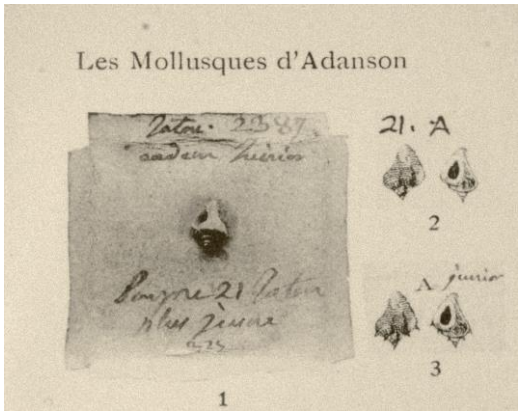

Fig.14: Le Jatou Adanson, 1757 from: Fischer-Piette, E., 1942. Les Mollusques d'Adanson. *Journal de Conchyliologie*, 85: 103-374, Pl. VII, figs 1,2 & 3

Ardovini & Cossignani (2004) mistakenly used a picture of *J. hemitripterus* to figure *Subpterynotus exquisitus* (G.B. Sowerby III, 1904). They probably mixed up the angular shape of some *Jaton* specimens with the extreme angular outline of *S. exquisitus*, and they neglected to look into the history of the two confusing species.

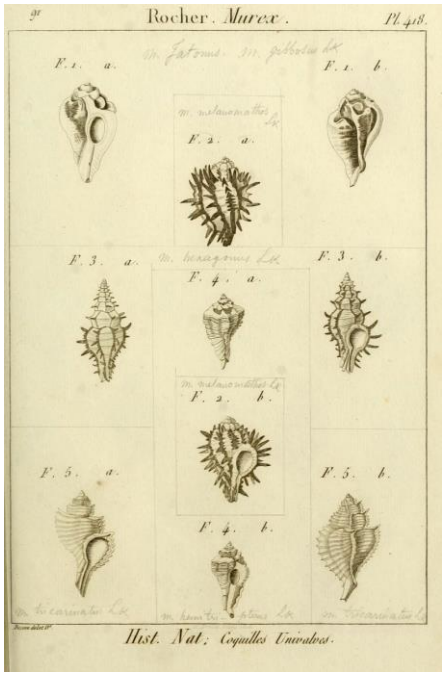

Fig.15: Plate 418 from Lamarck (1816). figs 1a-b: *Jaton decussatus* & figs 4a-b: *Jaton hemitripterus*

	J. decussatus	*J. hemitripterus*	*J. sinespina*	*J. flavidus*
outer margin serration	present	present	present	absent
ceratus	strong	less developed	**absent**	absent
spire	low	higher	higher	high
shape	oval, obtuse	**angular**	**elongate**	**squat**
shoulders	rounded	**rather sharp**	very rounded	well defined, sharp
whorls	white, blotched, brown, ribs less strongly developed	bluish grey, **strongly ribbed**	white, blotched, brown	brown
varices	thick and well developed, overlapping with preceding whorl sometimes to a high degree	less developed, only slightly overlapping	very thick, very overlapping	**spinose**
tip of siphonal canal	-	dark brown coloured	-	-

Table of the most important differences between the several *Jaton* species

Acknowledgements: For the loan of specimens and fruitful remarks we are grateful to Johan Verstraeten (Oostende, Belgium). We are also thankful to David Monsecour for the faithful help in correcting the English manuscript.

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Geographic distribution of *Jaton decussatus*

Jaton flavidus*, *Jaton hemitripterus* , *Jaton sinespina

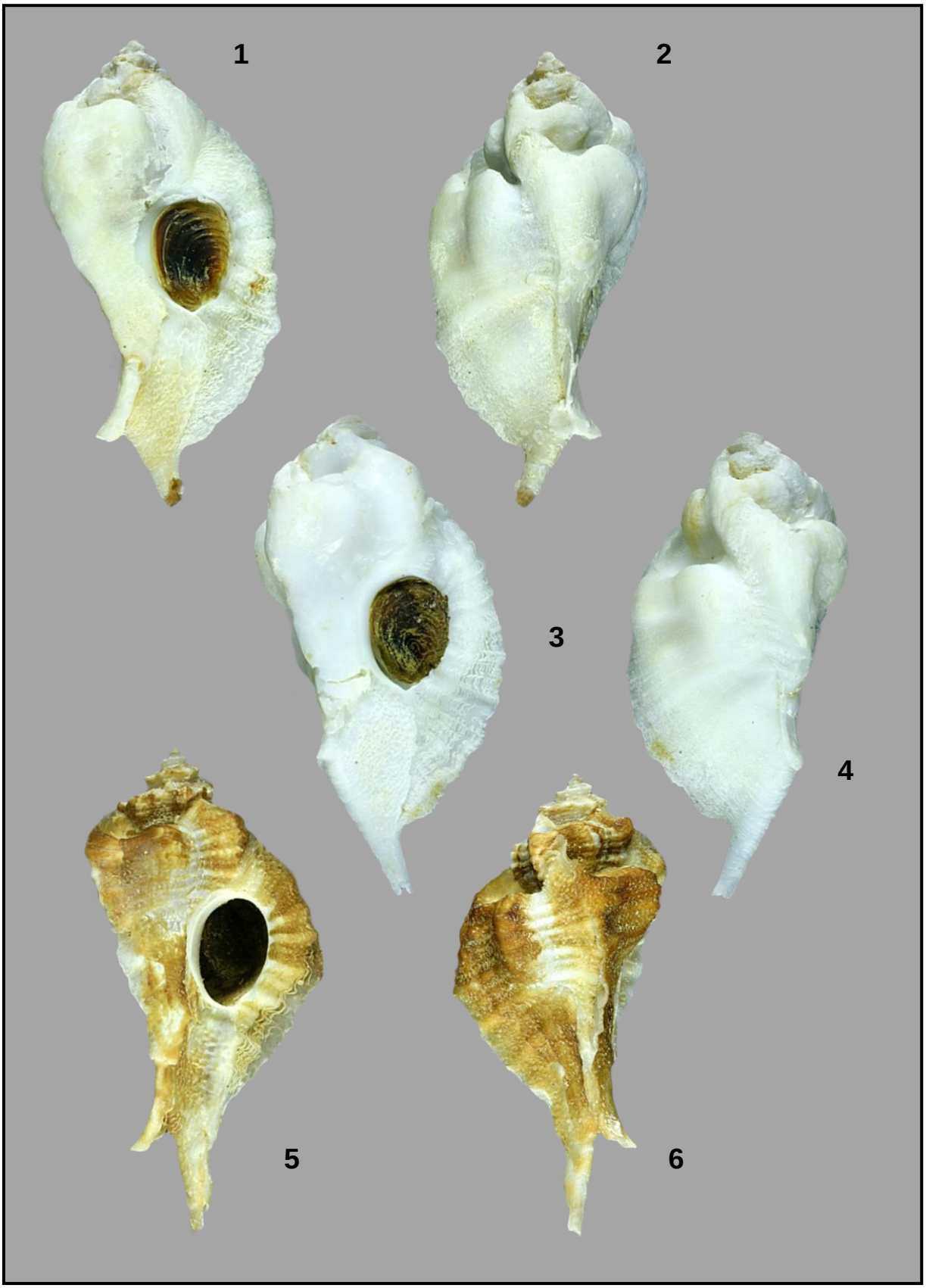

Plate I. Figs 1-6: *Jaton decussatus* (Gmelin, 1791). CJV; 1-4: Almadies, Senegal. On rocks. Dived at a depth of 20 m; 1-2: 44.66 mm; 3-4: 45.31 mm; 5-6: near Dakar, Senegal. Dived on a rocky bottom. 39.29 mm

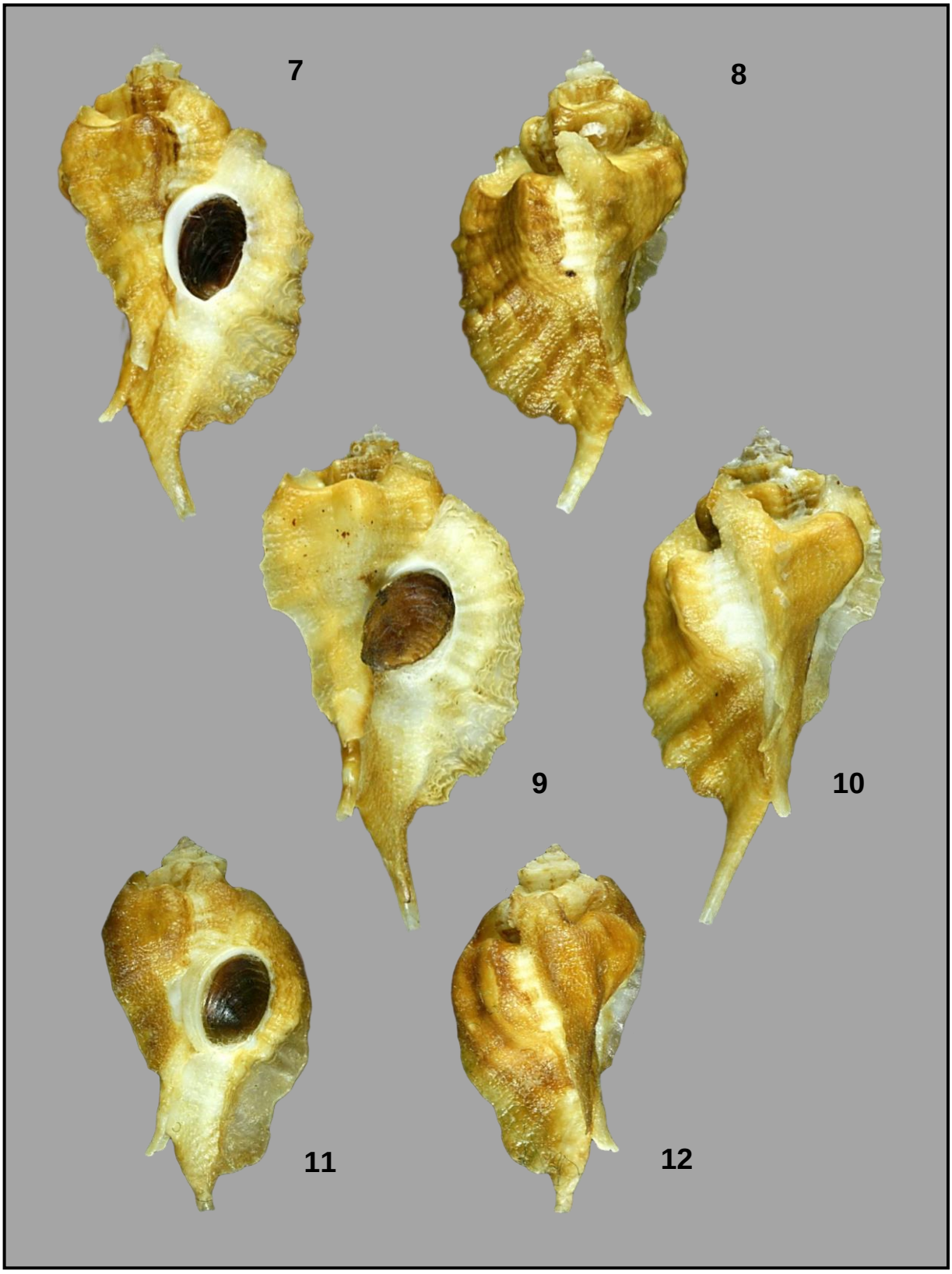

Plate II. Figs 7-12: *Jaton decussatus* (Gmelin, 1791); 7-10: Gorée Island, Senegal. On rocks. Trawled by fishermen at a depth of 10-15 m. 1986. CSH; 7-8: 40.65 mm; 9-10: 46.83 mm; 11-12: Ivory Coast. Trawled by fishermen. 1975. 30.94 mm. CFN.

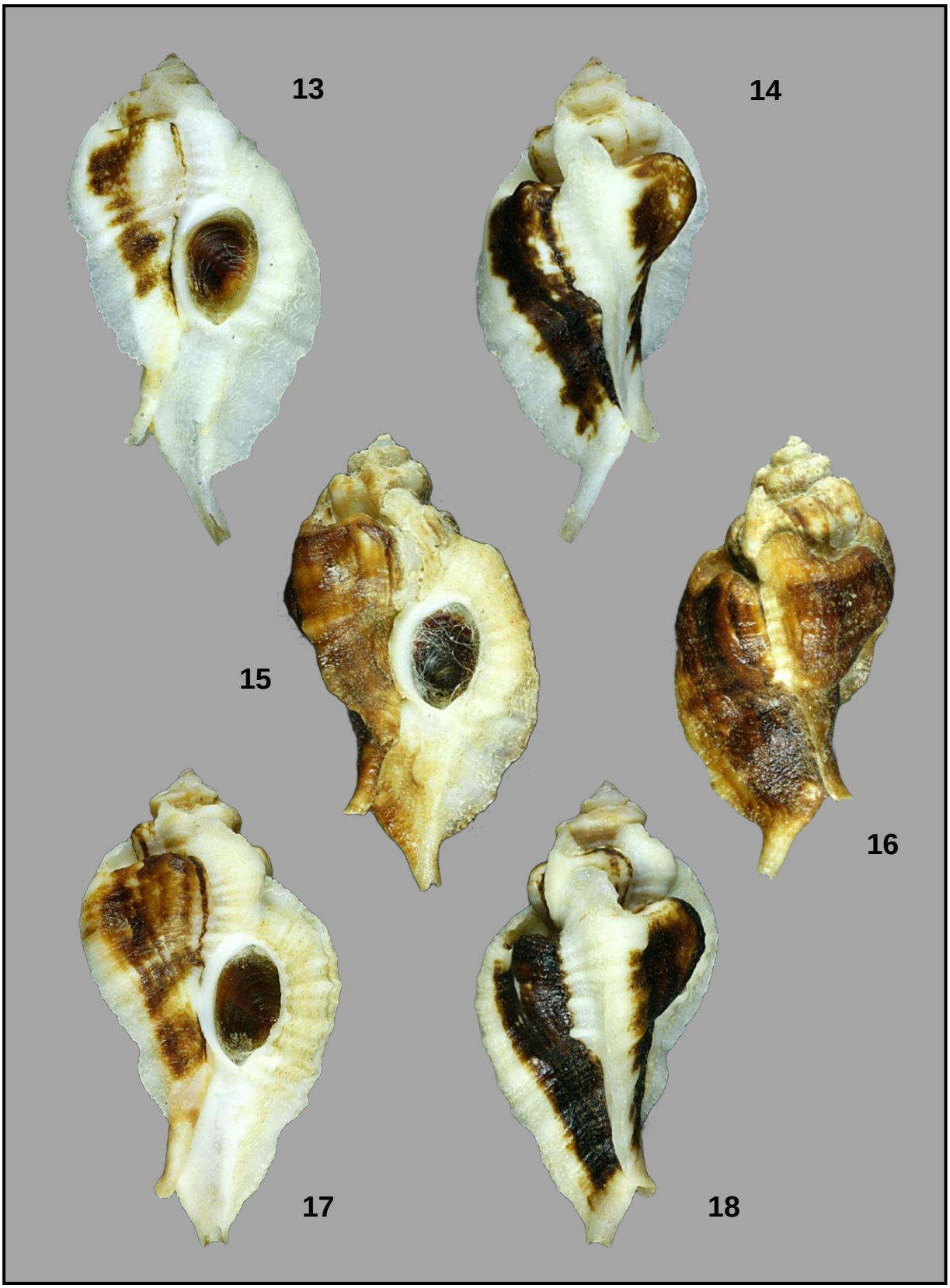

Plate III. Figs 13-18: *Jaton decussatus* (Gmelin, 1791). Anse Bernard, Dakar, Senegal. Snorkeled at a depth of 1.5 m. May 1976. CFN; 13-14: 37.26 mm; 15-16: 36.87 mm; 17-18: 43.83 mm.

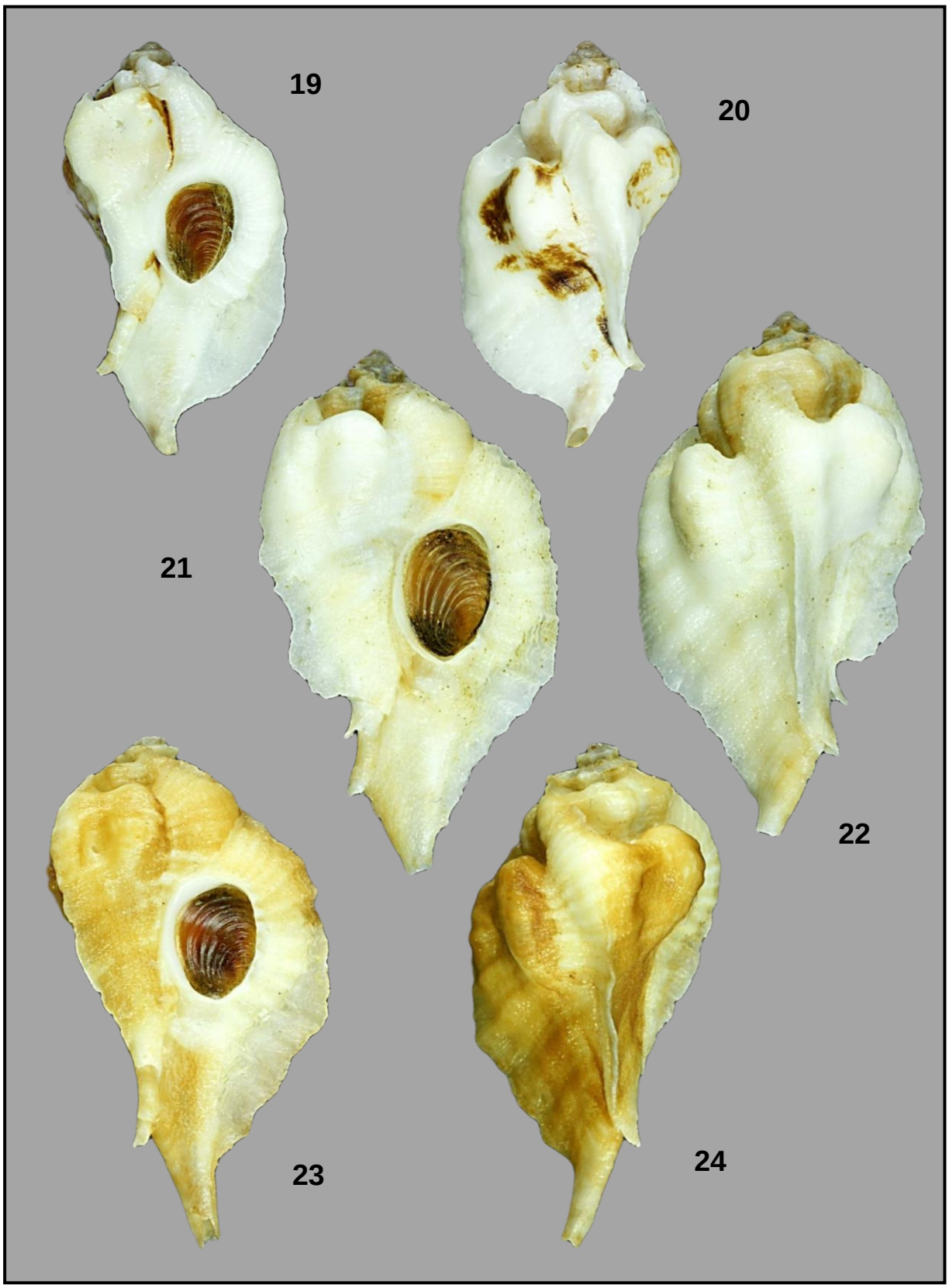

Plate IV. Figs 19-24: *Jaton decussatus* (Gmelin, 1791). CSH; 19-22: Gorée, Dakar, Senegal. Trawled by fishermen at a depth of 20m. 1981; 19-20: 39.69 mm; 21-22: 42.99 mm; 23-24: Gorée Island, Dakar, Senegal. Trawled by fishermen at a depth of 20-30 m. 1992. 41.17 mm.

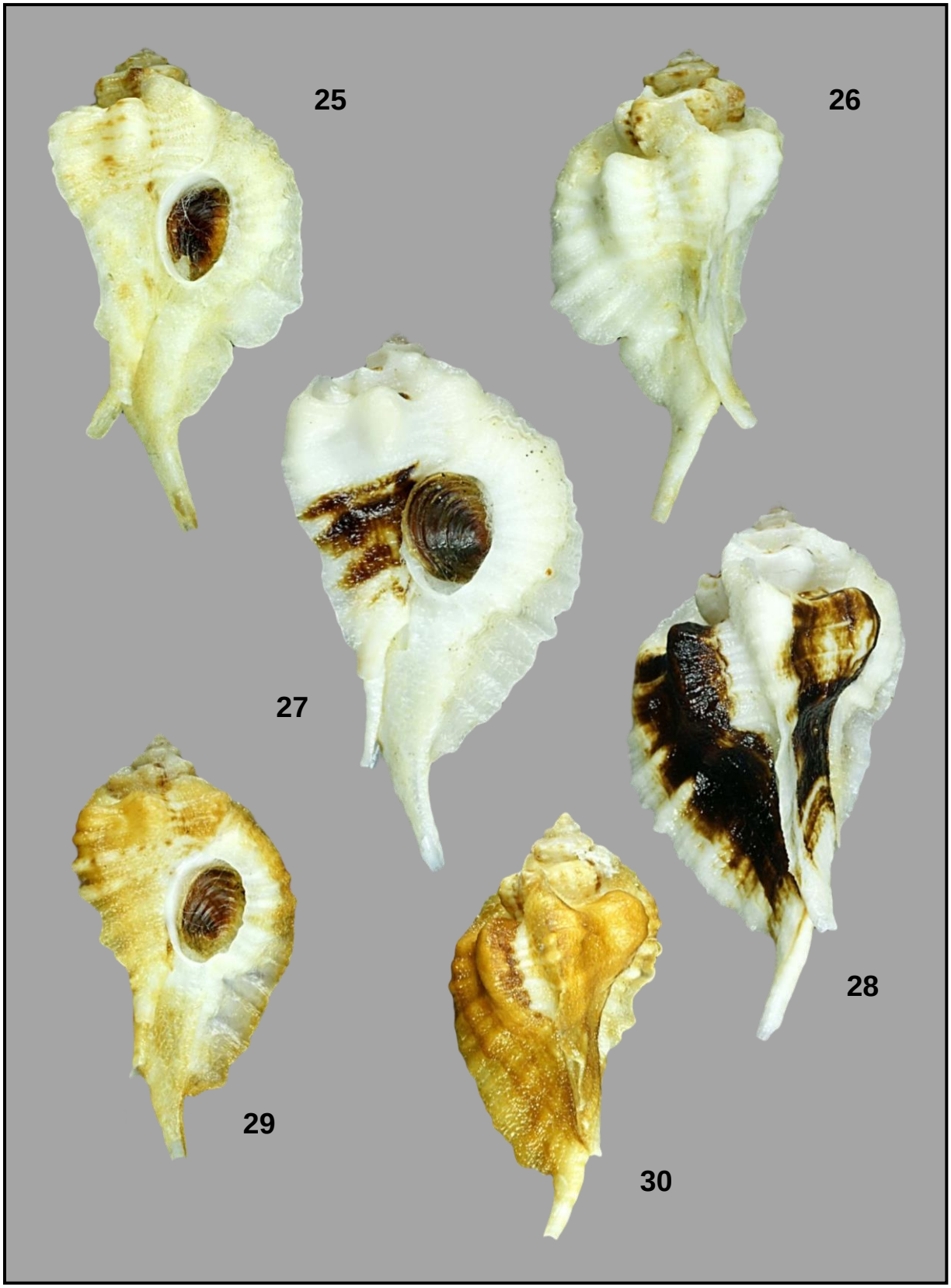

Plate V. Figs 25-30: *Jaton decussatus* (Gmelin, 1791). CJV; 1-4: Almadies, Senegal. On rocks. Dived at a depth of 20 m; 1-2: 44.66 mm; 3-4: 45.31 mm; 5-6: near Dakar, Senegal. Dived on a rocky bottom. 39.29 mm.

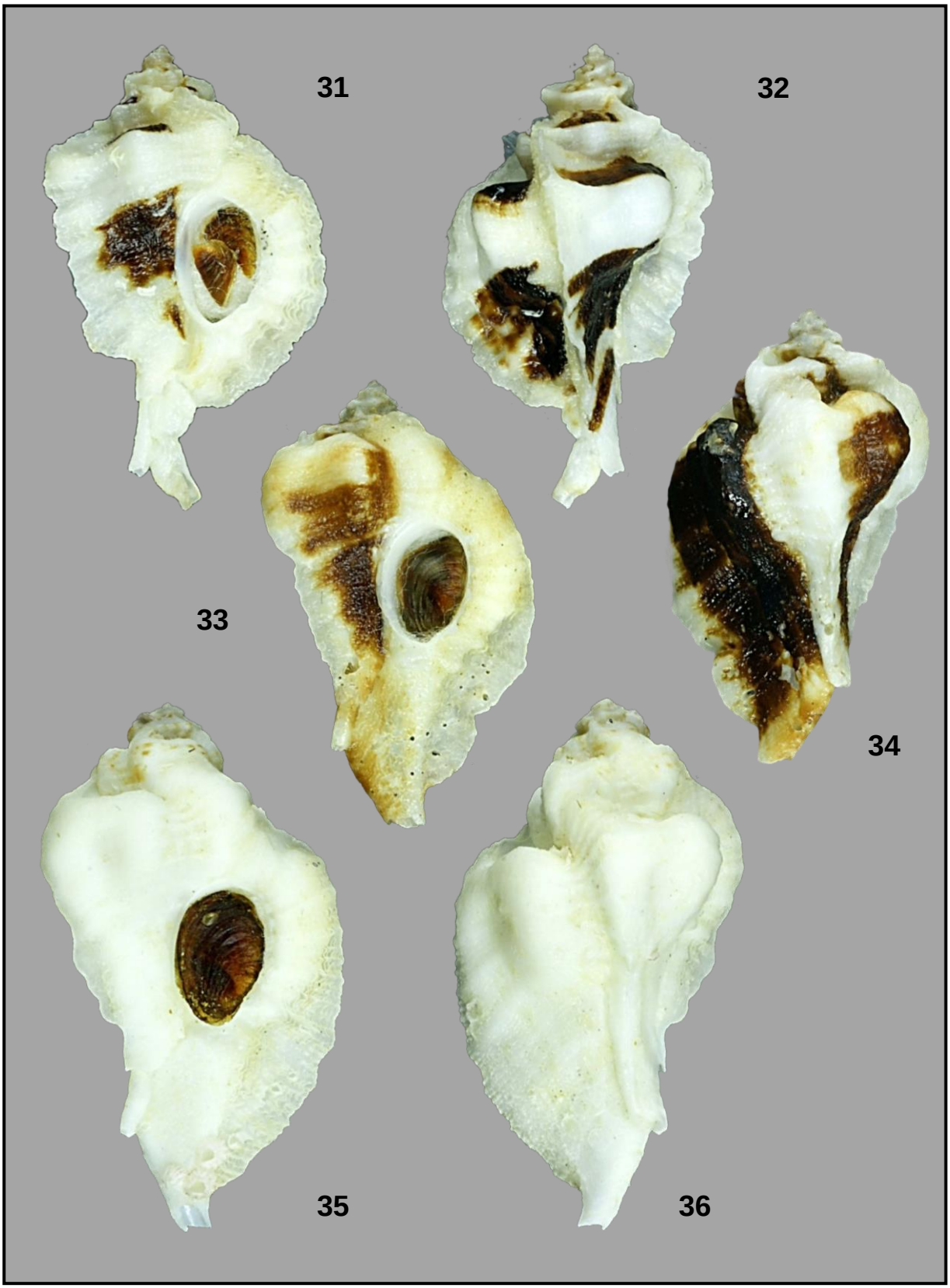

Plate VI. Figs 31-36: *Jaton decussatus* (Gmelin, 1791). CSH; 31-34: Gorée Island, off Dakar, Senegal. Trawled by fishermen at a depth of 15-20 m. 1984; 31-32: 32.79 mm; 33-34: 32.27 mm; 35-36: off Ile des Madeleines, Dakar, Senegal. In muddy area at low tide. 6 April 1998. 39.81 mm.

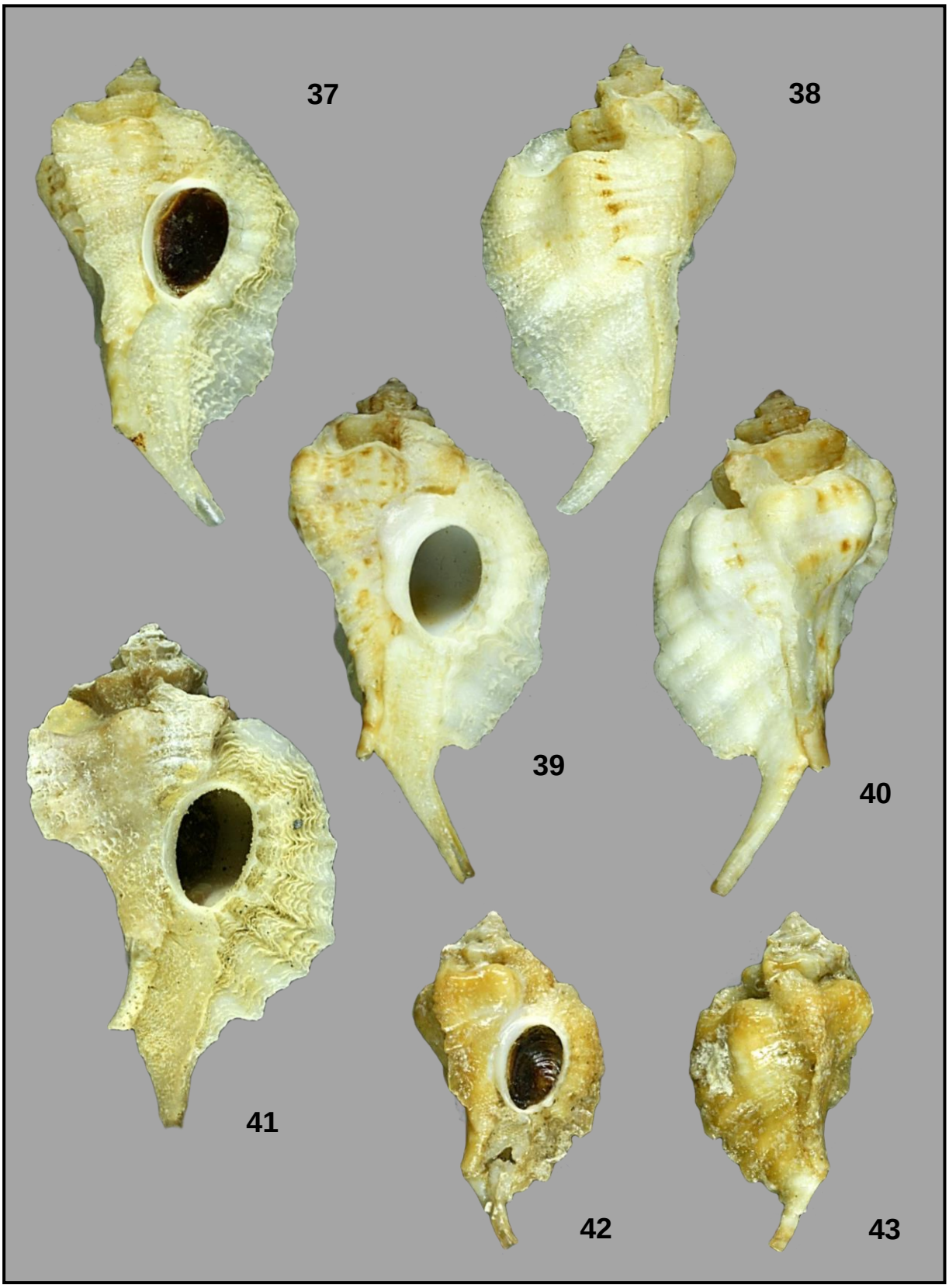

Plate VII. Figs 37-43: *Jaton decussatus* (Gmelin, 1791); 37-40: Ivory Coast. Trawled by fishermen. 1981. CFN; 37-38: 33.41 mm; 39-40: 38.88 mm; 41: near Dakar, Senegal. Dived on a rocky bottom. 39.29 mm. CJV; 42-43: Dakar, Senegal. On rock. Dived at a depth of 5 m. 24.41 mm. Juvenile specimen. CFN.

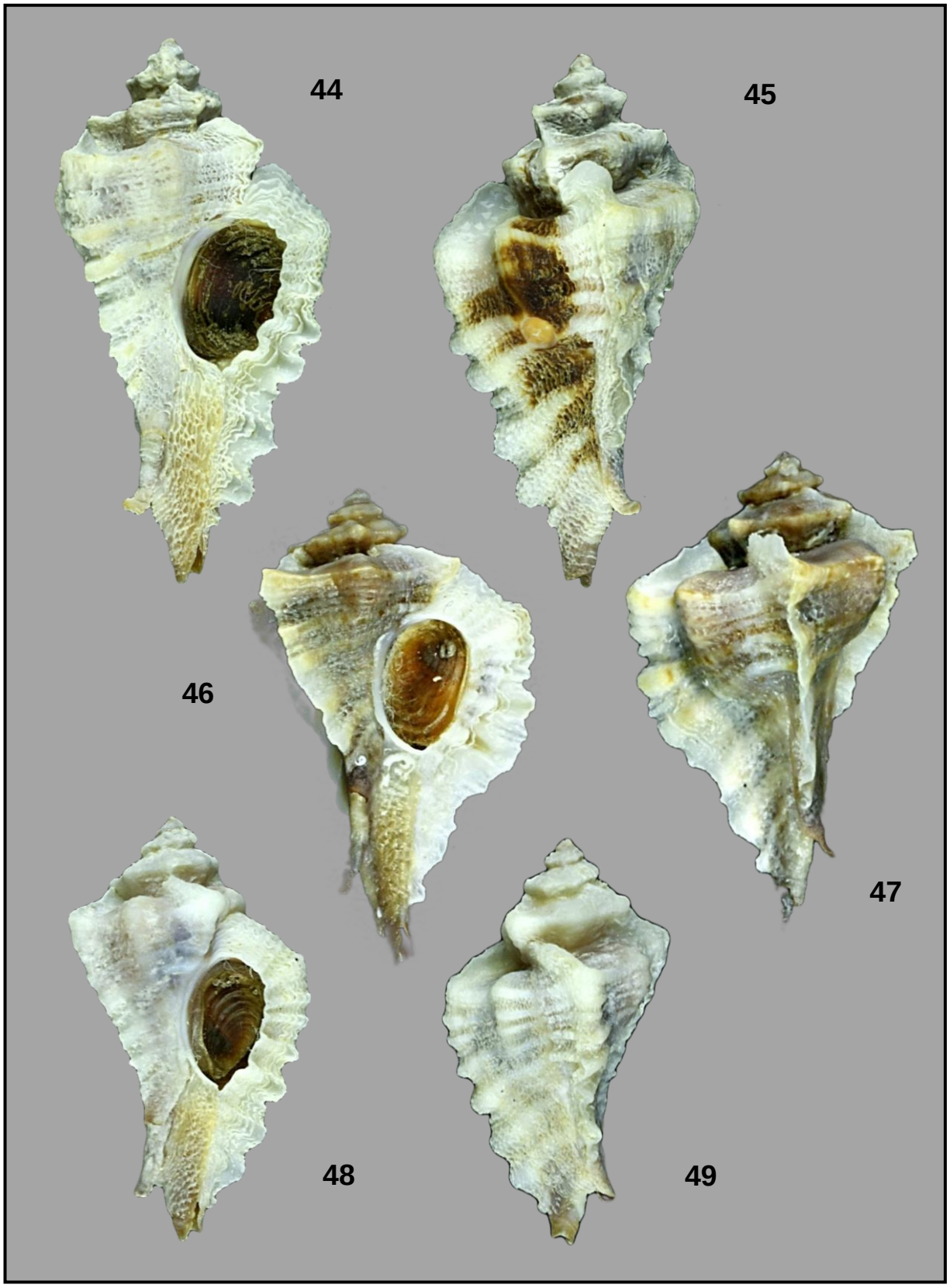

Plate VIII. Figs 44-49: *Jaton hemitripterus* (Lamarck, 1816). CJV; 44-45: Western Sahara, Morocco. 35.46 mm; 46-49: Bay of Dakhla, Western Sahara, Morocco. On rocks in small bays at low tide; 46-47: 29.30 mm; 48-49: 24.42 mm.

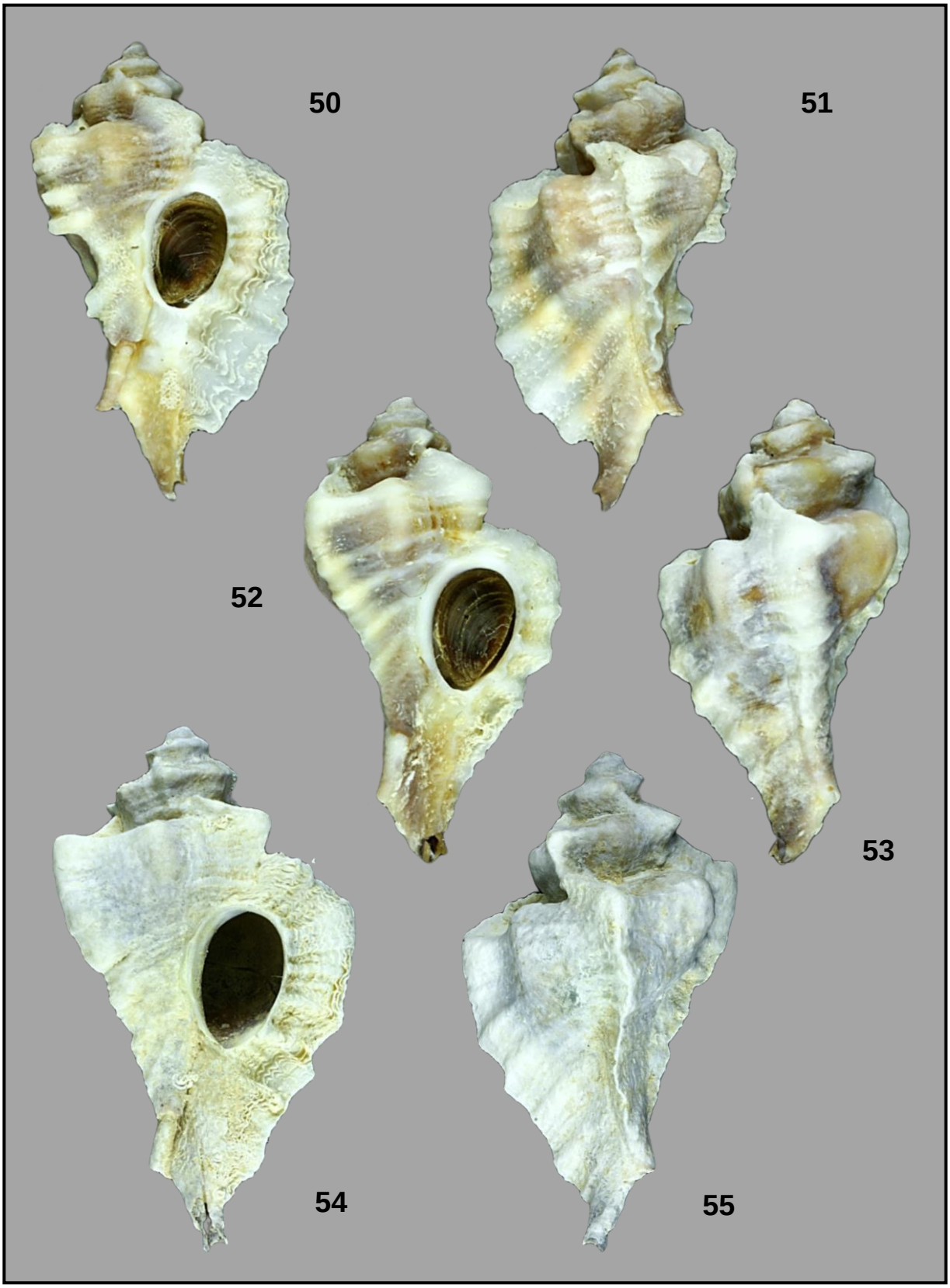

Plate IX. Figs 50-55: *Jaton hemitripterus* (Lamarck, 1816). Bay of Dakhla, Western Sahara, Morocco. On rocks in small bays at low tide. CJV; 50-51: 31.48 mm; 52-53: 32.77 mm; 54-55: 39.29 mm.

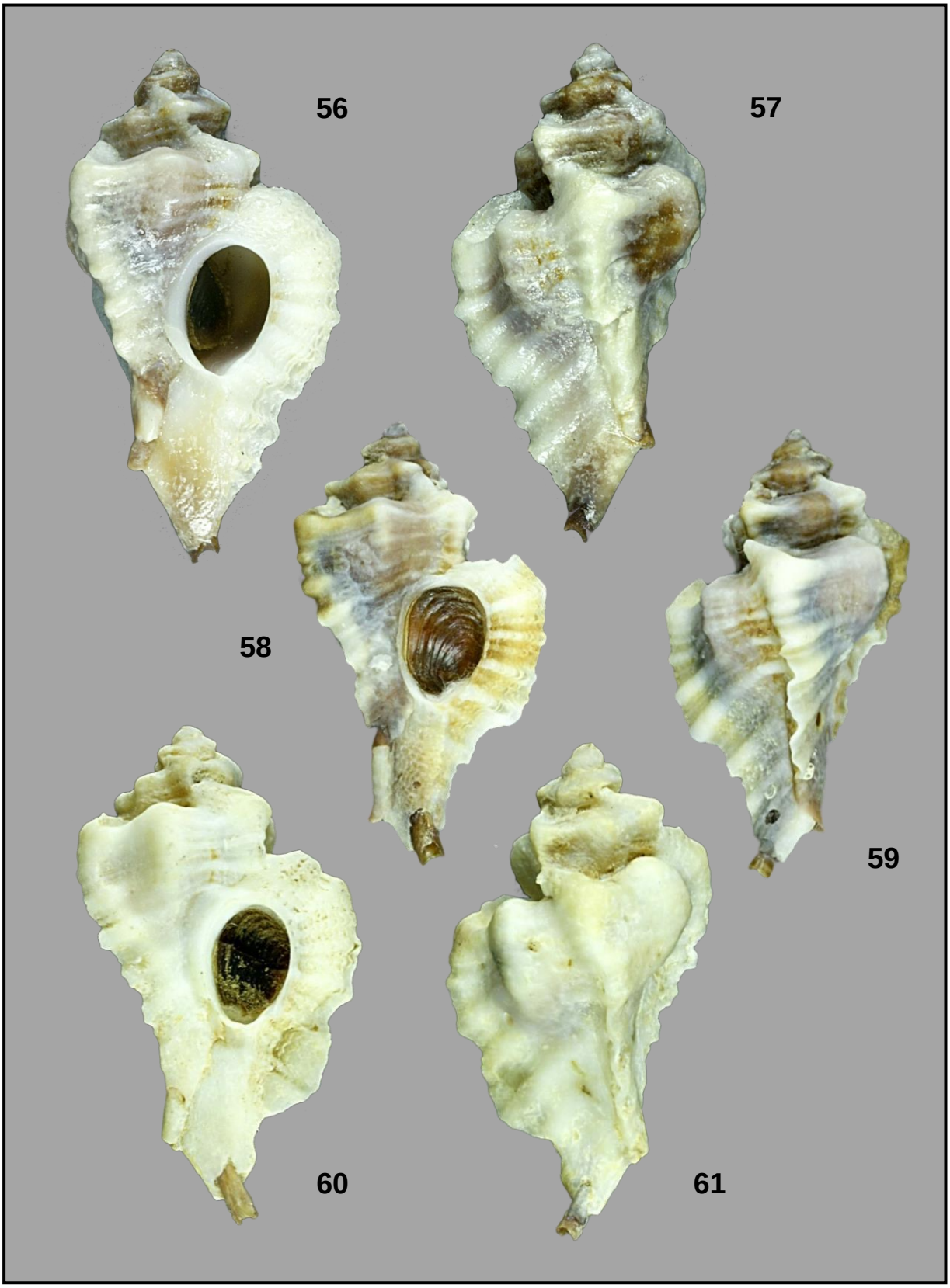

Plate X. Figs 56-61: *Jaton hemitripterus* (Lamarck, 1816); 56-57: Dakhla, Western Sahara, Morocco. Dived at a depth of 3 m. 2012. 37.30 mm. CFN; 58-59: Bouthala, Bay of Dakhla, Western Sahara, Morocco. On top of large rock at extreme low tide. 32.96 mm. CSH; 60-61: Dakhla, Western Sahara, Morocco. Under stone at extreme low tide. February 2011. 37.62 mm. CSH.

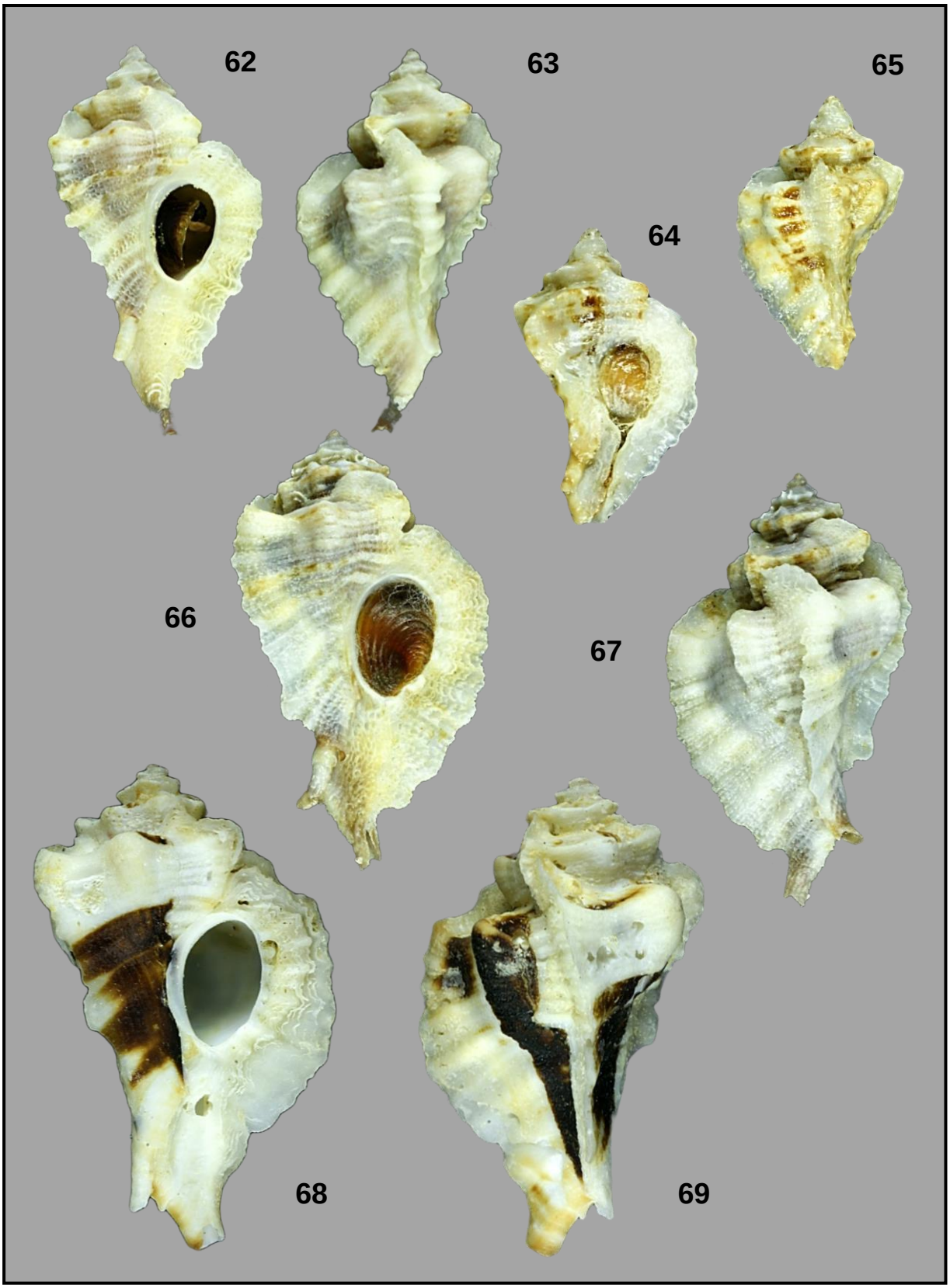

Plate XI. Figs 62-69: *Jaton hemitripterus* (Lamarck, 1816); 62-63: Dakhla, Western Sahara, Morocco. Trawled by shrimpers at a depth of 25-30 m. 2011. 32.93 mm. CSH; 64-65: Anse Bernard, Dakar, Senegal. Dived at a depth of 5 m. 19.05 mm. juvenile specimen. CFN; 66-67: Bayside of Dakhla Town, Western Sahara, Morocco. 23°41'58.1 N/ 15°55'40.8" W. On rock on mud flat. August 2015. 36.45 mm. CSH mm. CSH; 68-69: near Dakar, Senegal. Dived on a rocky bottom. 39.29 mm. CJV.

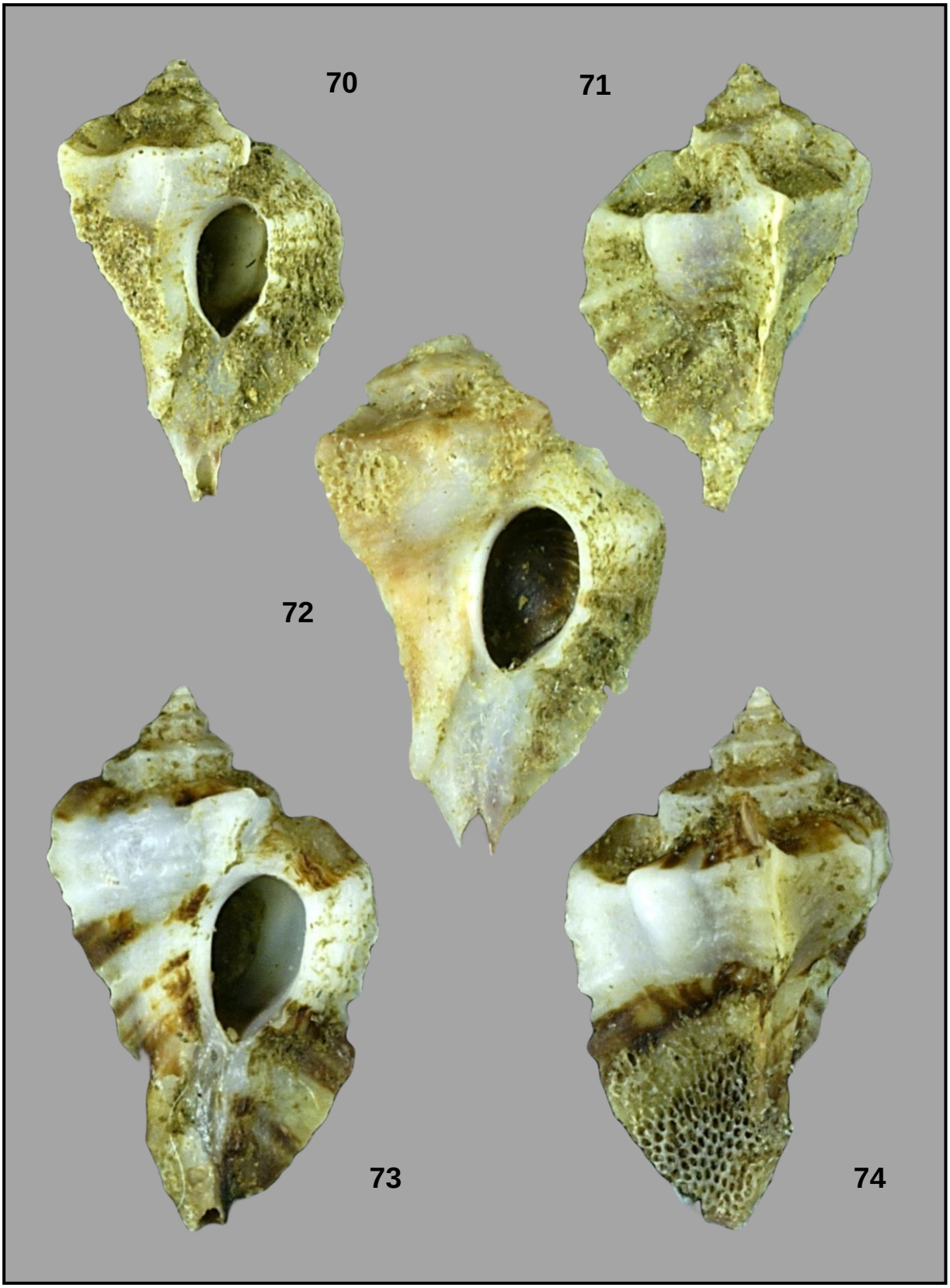

Plate XII. Figs 70-74: *Jaton rikae* Petuch & Berschauer, 2019 **[(= *J. hemitripterus* (Lamarck, 1816)]**. Gunjur, Gambia. Collected form the cracks in a fishing boat. February 2019. CJV; 70-71: 13.27 mm; 72: 14.27 mm; 73-74: 14.02 mm.

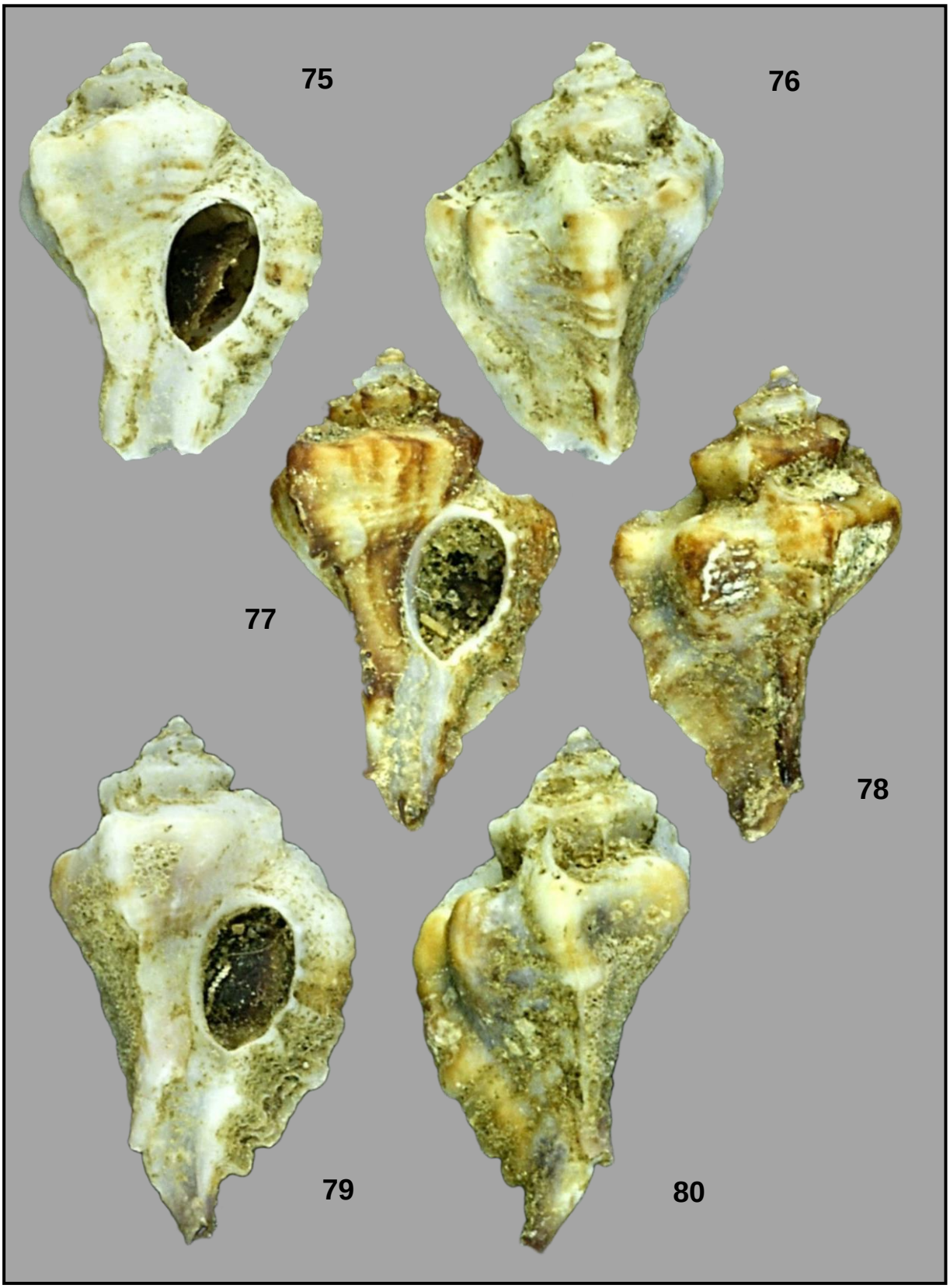

Plate XIII. Figs 75-80: *Jaton rikae* Petuch & Berschauer, 2019 **[(= *J. hemitripterus* (Lamarck, 1816)]**. Gunjur, Gambia. Collected form the cracks in a fishing boat. February 2019. CSH; 75-76: 15.70 mm; 77-78: 18.21 mm; 79-80: 20.31 mm.

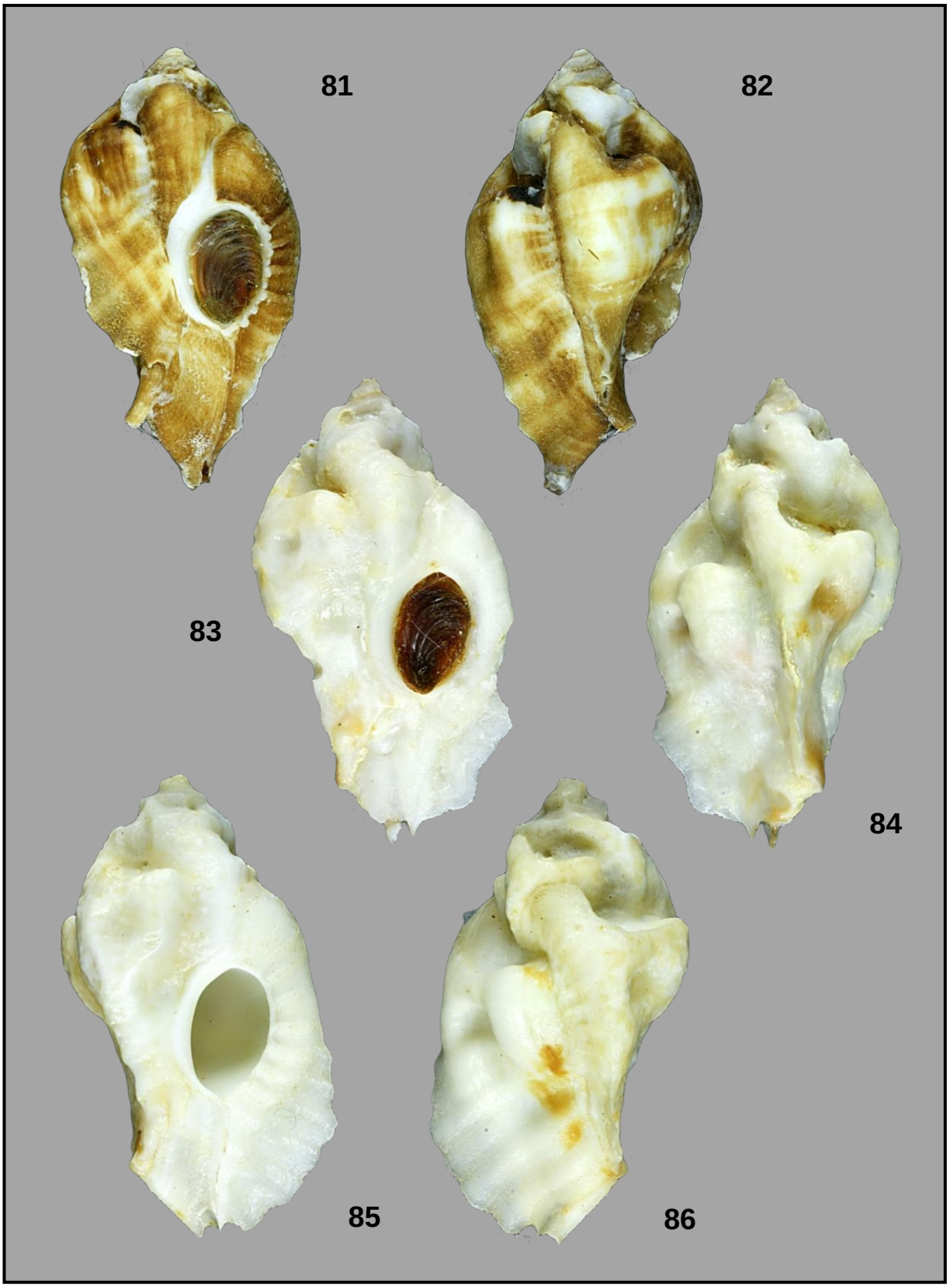

Plate XIV. Figs 81-86: *Jaton sinespina* Vermeij & Houart, 1996; 81-82: Ponta do Sombrero, Benguela Province, southern Angola. Dived at a depth of 8-10 m. 39.36 mm. CJV; 83-86: Farta Bay, Benguela Province, southern Angola. In rock crevices at low tide. 1974. FN; 83-84: 39.58 mm; 85-86: 39.00 mm.

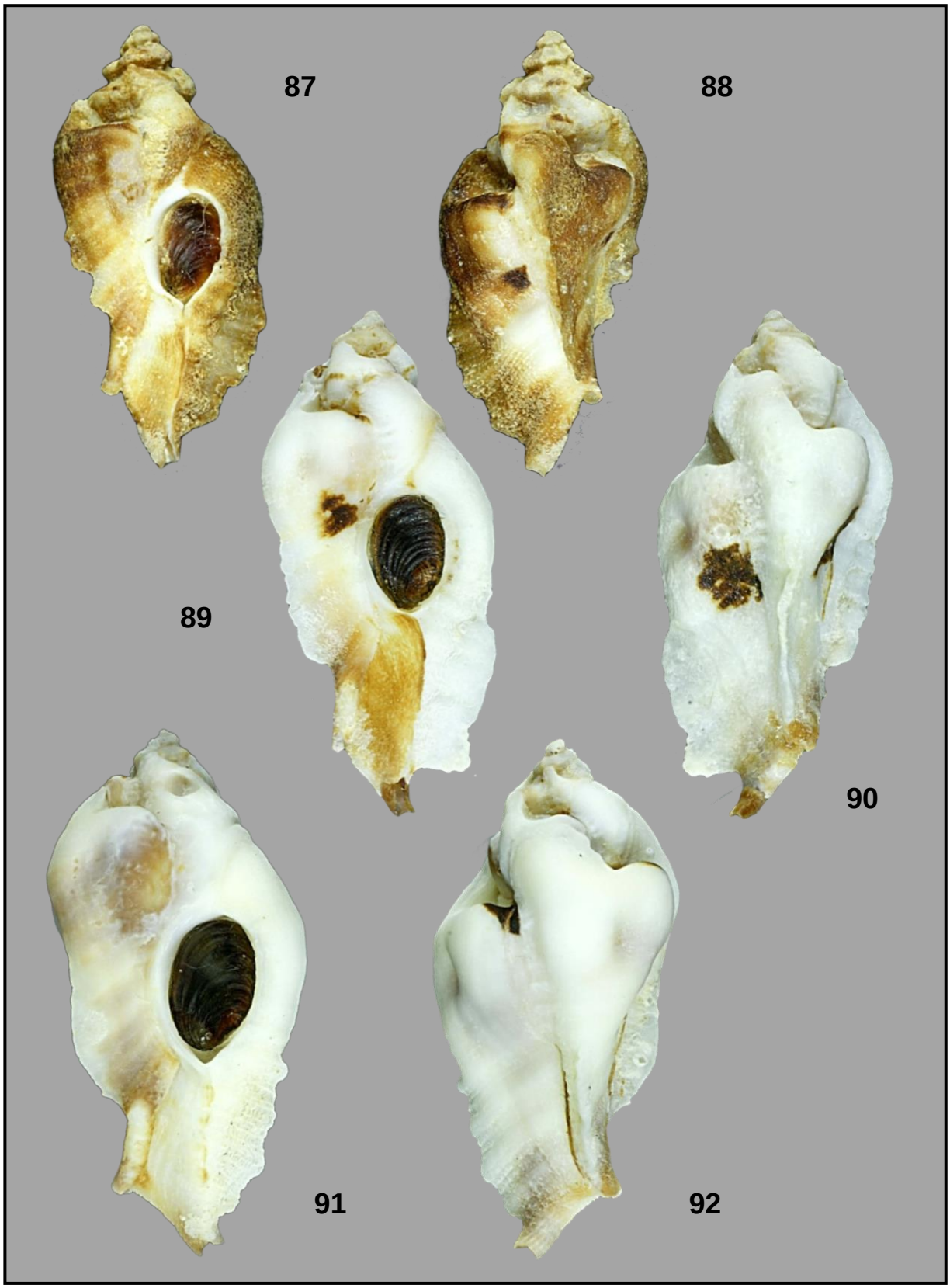

Plate XV. Figs 87-92: *Jaton sinespina* Vermeij & Houart, 1996; 87-88: Saco Mar, Namibe Povince, southern Angola. Dived at a depth of 4 m. August 1996. 31.28 mm. CFN; 89-90: Bay of Lucira, Angola. In crevices with coarse sand on rock platforms. February 2011. 39.11 mm. CFN; 91-92: Bay of Lucira, Angola. Dived at a depth of 4-6 m. Attached in crevices of rock platform with coarse sand. August 2009. 40.17 mm. CSH.

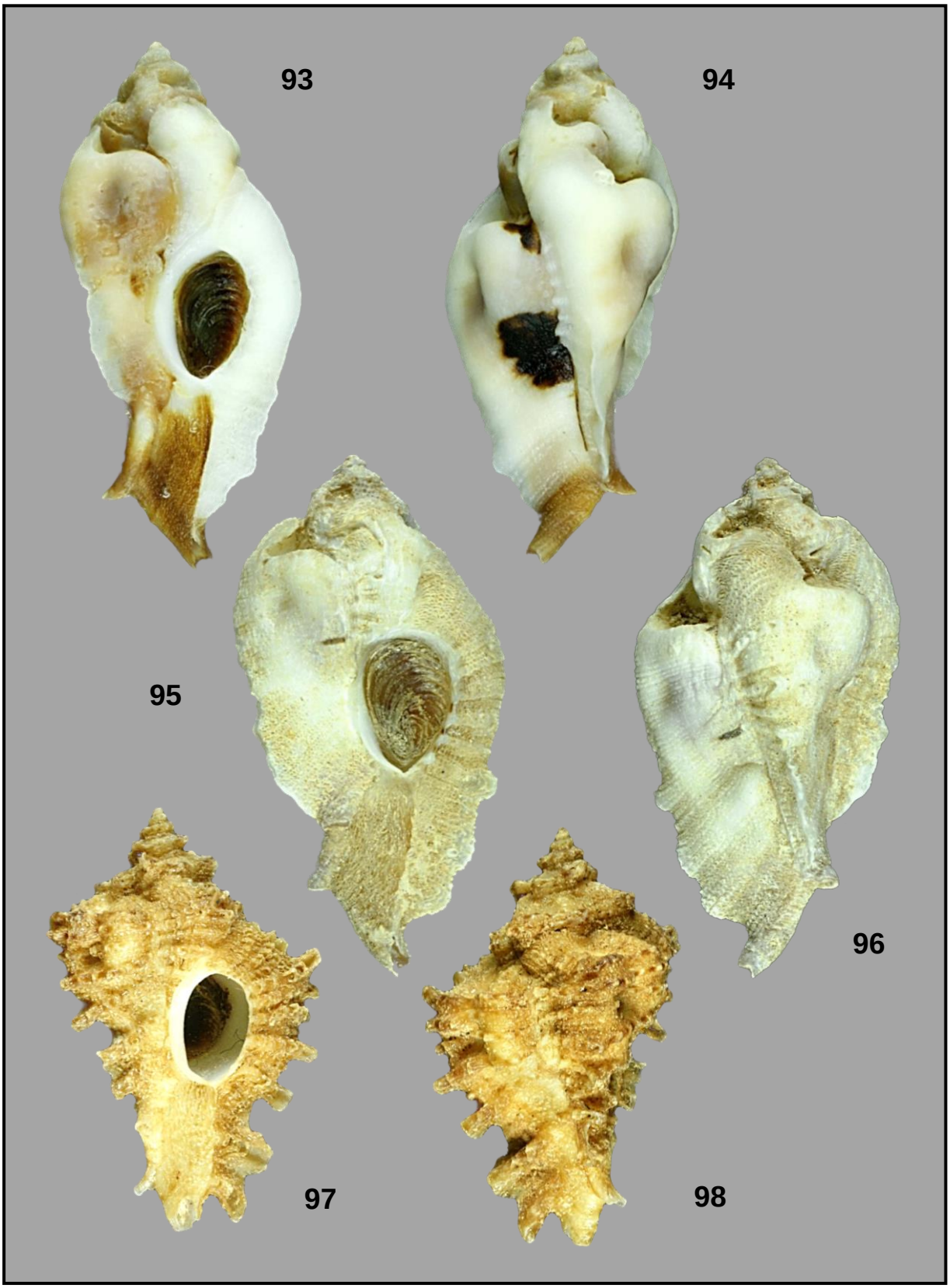

Plate XVI. Figs 93-96: ***Jaton sinespina* Vermeij & Houart, 1996**. CSH; Bay of Lucira, Namibe Povince, southern Angola. Dived at a depth of 3-6 m. August 2012; 93-94: 37.50 mm; 95-96: 37.70 mm.
Figs 97-98: ***Jaton flavidus* (Jousseaume, 1874)**. Bay of Gorée, Dakar, Senegal. Dredged by fishermen at a depth of 15 m. March 1978. 32.38 mm. CFN.

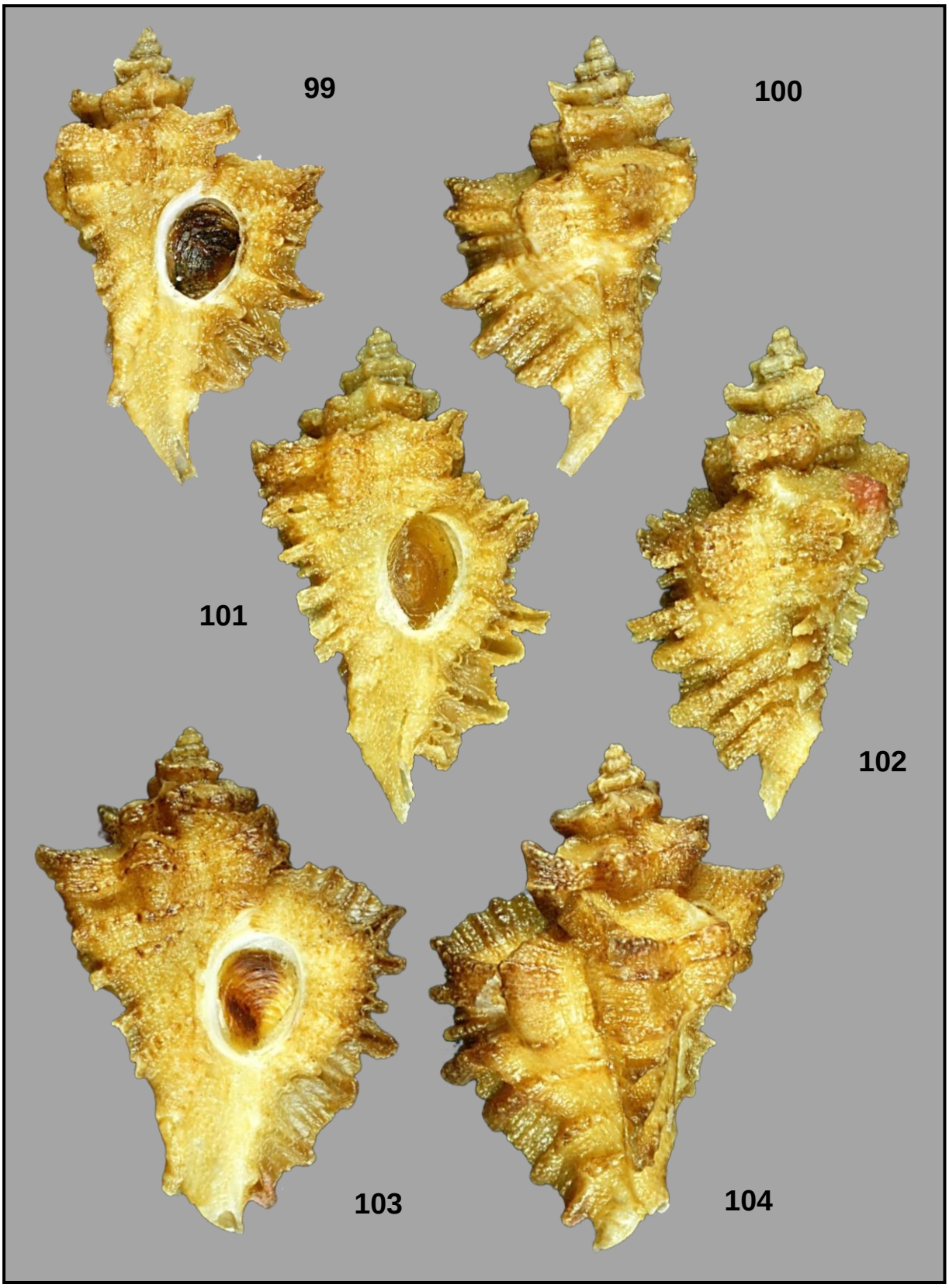

Plate XVII. Figs 99-104: *Jaton flavidus* (Jousseaume, 1874). CSH; 99-100: Cap de Naze, Popenguine, Senegal. Trawled by fishermen at a depth of 40-50 m. 1989. 33.12 mm; 101-104: off Gorée Island, Dakar, Senegal. Trawled at a depth of 20-30 m. 1991; 101-102: 34.55 mm; 103-104: 34.77 mm.

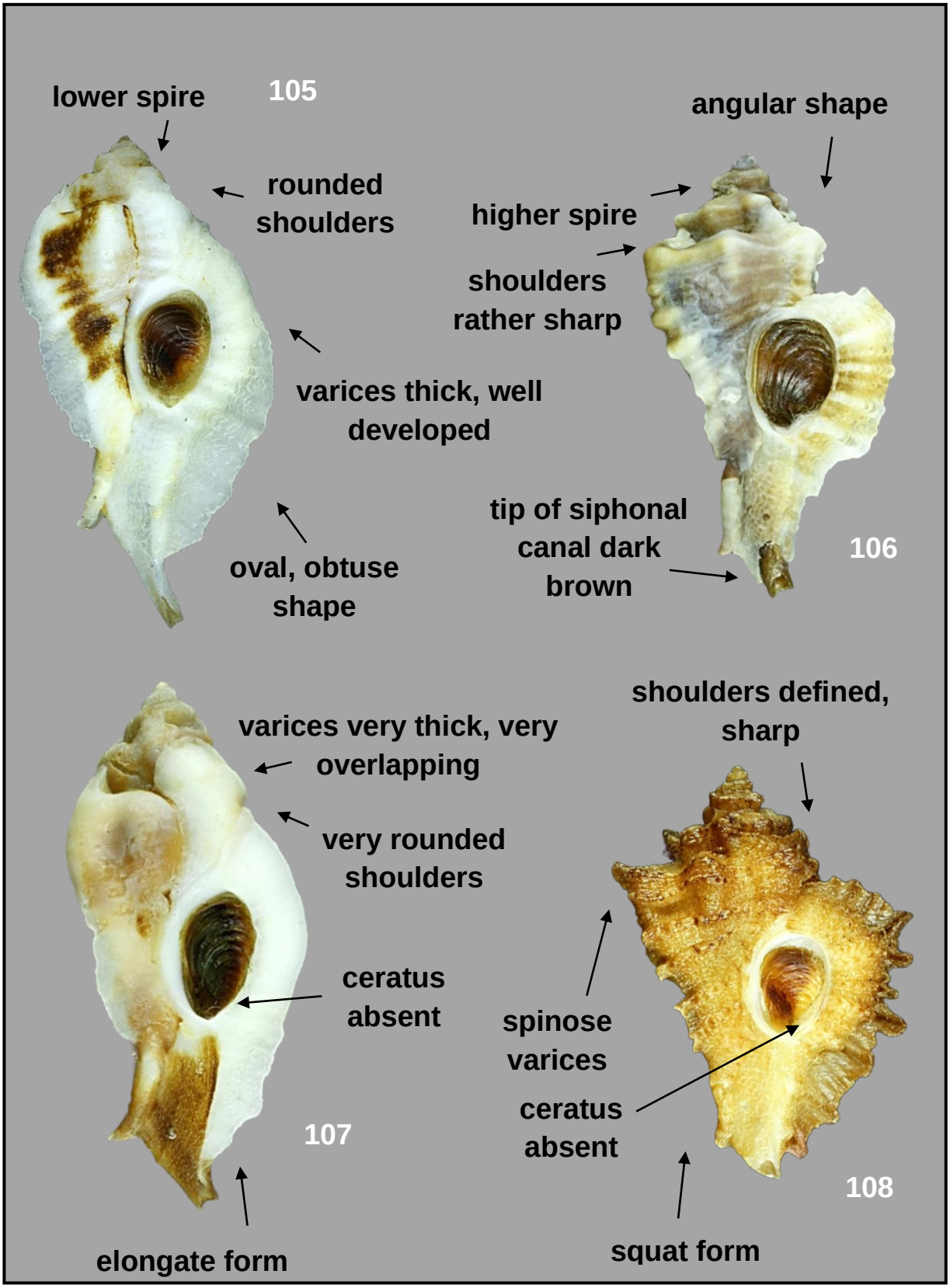

Plate XVIII. Fig. 105: *Jaton decussatus* (Gmelin, 1791); Fig. 106: *Jaton hemitripterus* (Lamarck, 1816); Fig. 107: *J. sinespina* Verweij & Houart, 1996; Fig. 108: *Jaton flavidus* (Jousseaume, 1874).

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Aartsen, J.J. van, 2002. Indo-Pacific migrants into the Mediterranean. 1. *Gibborissoa virgata* (Philippi, 1849). *La Conchiglia*, **34**(303): 56-58.

Alf, A. & Kreipl, K., 2004. A new *Bolma* from Madagascar (Mollusca, Gastropoda, Turbinidae). *Spixiana*, **27**(2): 183-184.

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Okutani, T., 2000. *Marine Mollusks in Japan*. Tokai University Press. Tokyo. 1173 pp.

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