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Four new *Euthria* (Gastropoda: Buccinidae) from the Cape Verde Archipelago.

Koen FRAUSSEN (1) & Emilio ROLAN (2)

(1) Leuvensestraat 25, B-3200 Aarschot, Belgium, koen.fraussen@skynet.be

(2) Cánovas del Castillo, 22-5^oF, 36202 Vigo, España, emiliorolan@inicia.es

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Abstract: Four species, collected in the Cape Verde Islands, are described as new and assigned to the genus *Euthria* M. E. Gray, 1830: *E. bernardi* sp. nov., *E. insalubris* sp. nov., *E. abrotona* sp. nov. and *E. cecilea* sp. nov. The new species are compared with other taxa from the Mediterranean Sea and the Cape Verde Archipelago. We discuss the infraspecific variability of the genus and especially *E. bernardi* and *E. cecilea*.

Introduction: *Euthria cornea* (Linnaeus, 1758), the type species of the genus, had for a long time been the only known species in the Atlantic. Nearly a century and a half later Dautzenberg & Fischer (1906) described the first additional Atlantic species, in the eighties followed by Cosel (1982), Cosel & Burnay (1983) and Rolán (1985) and in the beginning of this year (2003) by Rolán, Monteiro & Fraussen. These 10 additional species are all endemic to the Cape Verde Archipelago. In the present paper we enlarge this fauna from 10 to 14 known species.

The descriptions are based on material collected by local divers or fishermen and obtained by private collectors:

Pierre Bernard (France), who collected material in the Cape Verde Archipelago between 1992 and 1998.

Guido T. Poppe (Belgium), who obtained material from divers at São Vicente.

Abbreviations:

MNCN	Museo Nacional de Ciencias Naturales, Madrid, Spain.
MNHN	Muséum national d'Histoire naturelle, Paris, France
CER	collection Emilio Rolán, Spain.
GP	collection Guido T. Poppe, Belgium.
KF	collection Koen Fraussen, Belgium.

Genus *Euthria* M. E. Gray, 1850

Type species by original designation: "*Fusus lignarius* Chiaje" (this is *Fusus lignarius* Lamarck, 1816, a junior synonym of *Murex corneus* Linnaeus, 1758) from the Mediterranean, Recent.

For a discussion of the use of *Euthria* as a genus we refer to Shuto (1978), Beets (1986), Fraussen (1999: 73) and Fraussen & Hadorn (1999: 120-121).

For a detailed comparison with radulae of related genera we refer to Rolán, Monteiro & Fraussen (2003).

Euthria bernardi sp. nov.

(Figs.1-8)

Type Material: Holotype (65.0 mm) (Figs. 1-2) in MNHN. Paratypes 1-4, 6, 8-9 in MNHN, paratype 5 in KF nr.4150, paratype 7 in ER.

Type Locality: Cape Verde Archipelago. The type material was obtained from fishermen, without exact information.

Range: Only known from the Cape Verde Archipelago.

Description: Shell 65 mm high, (paratypes from 45.9 up to 65.1 mm high), thick and heavy, solid. Shape fusiform, slender, with rather short siphonal canal. Ground colour white to pale yellow. Pattern dense, reddish brown, small, angular dots, arranged in spirals, with 2 paler, broad spiral bands. Paratypes highly variable, red brown to dark brown, varying from a dense pattern of small, angular dots, arranged in spirals (figs. 3-4), corresponding with spiral cords; to a pattern with large, irregular blotches, arranged in axials, with 2 broad, pale spiral bands, occasionally showing some spirals with these small, angular dots inside the large blotches (figs. 7-8). Other specimens

show a wide array of intermediates (figs. 1-2, 5-6). Subsutural band ornamented with rather rectangular, mostly evenly sized, alternating dark brown and white blotches. Tip of siphonal canal dark brown to purplish.

Protoconch rather bulbous, with 2 1/4 to 2 1/2 convex, slightly inflated whorls, smooth, whitish.

Teloconch with about 8 whorls, abapically convex, subsutural concavity broad, strong.

First teloconch whorl with 3 weak spiral cords, interspaces slightly narrower. Second whorl with 5 cords, interspaces becoming narrower. Third whorl with 6-7 flat, spiral cords, abapically broad, gradually becoming narrower adapically, subsutural cord exceptionally broad. Penultimate whorl smooth or with 8 or 9 spiral cords, body whorl smooth or with 18-25 broad, flat, spiral cords, of equal size except for broad subsutural cord, occasionally corresponding with pattern, interspaces a fine groove.

First teloconch whorls with 9 or 10 strong axial ribs. Interspaces of equal size, deep. Second whorl with 11 axial ribs. From third whorl on, ribs smoother and broad, or absent. Body whorl rather smooth, with thick rib marking aperture. All whorls covered with fine growth lines, adapically prosocline or occasionally signoid.

Aperture ovate. Outer lip thick, with 10-14 internal lirae. Edge sharp, smooth. Columella smooth with weak abapical fold, callus thin. Siphonal canal short, broad, open, tip darker coloured. Aperture together with siphonal canal slightly shorter than 1/2 of total shell length.

Periostracum, radula and operculum unknown.

Comparison: *Euthria bernardi* sp. nov. is characterized by the large size, the heavy shell with high spire and strong subsutural concavity, the dark siphonal canal, and by the penultimate and body whorl which are usually covered by many spiral cords and dotted spiral lines.

Paratype 3 (figs. 3-4) is atypical in shape by the broader and blunt base. Regarding the strong growthmarks and breaks in the former whorls we consider this a traumatic variation.

For differences with *E. cecilea* sp. nov. we refer to the comparison under that species.

Etymology: *Euthria bernardi* sp. nov. is named after the late Pierre Bernard, for his contributions to the knowledge of West African molluscs. A long time resident of Gabon between 1972 and 1989, Pierre Bernard was a professor of statistics and economics at the University of Libreville. His interest for the local molluscan fauna culminated in the book *Seashells of Gabon / Coquillages du Gabon*. During his subse-

quent stay in the Cape Verde Islands until 1992, he pursued his interests with conchology and acquired the new *Euthria* species reported on in this paper. Pierre Bernard passed away in 2001 while he was employed in Mauritania. His wife Idalina Bernard donated his mollusc collection to MNHN.

***Euthria insalubris* sp. nov.**
(Figs. 9-10)

Type Material: Holotype in MNHN.

Type Locality: Cape Verde Archipelago. The type material was obtained from fishermen, without exact information.

Range: Only known from the Cape Verde Archipelago, and most probably endemic to a part of the archipelago.

Description: Shell 30.9 mm in height, thick, solid. Shape fusiform, slender, with rather short siphonal canal. Colour white.

Protoconch 1.3 mm in diameter, consisting of 1 3/4 whorls.

7 teleoconch whorls. Subsutural slope as broad as half a whorl, weakly concave.

First teleoconch whorl with 4 fine, primary spiral cords, interspaces narrow. Second and third whorl with 4 or 5 primary spiral cords, the narrow interspaces filled up with a fine, secondary spiral cord, resulting in 9 flat spirals alternatingly broad and narrow. Fourth whorl with 4 flat, broad, weak primary spiral cords, 1-3 secondary spirals between two adjacent primary cords. Fifth whorl with 3 primary spiral cords, the sub-sutural one much broader. Body whorl smooth.

First teleoconch whorl with 9 broad, axial ribs. Interspaces of equal size, deep. Second whorl with 10, third whorl with 12 broad axial ribs. Ribs becoming weak and flat from fourth whorl on. Body whorl rather smooth. All whorls covered with fine, prosocline growth lines, occasionally signoid.

Aperture ovate. Outer lip thick, with 8 internal lirae. Edge sharp, smooth, dark reddish brown. Columella smooth with 1 weak adapical fold. Callus rather thick, dark reddish brown on connection with outer lip and on siphonal canal. Siphonal canal short, broad, open. Aperture together with siphonal canal shorter than 1/2 of total shell length.

Operculum corneous, semi ovate with terminal nucleus, thick, dark brown.
Periostracum and radula unknown.

Comparison: *Euthria insalubris* sp. nov. is characterized, and differs from the other species described in this paper, by the protoconch with lower number of whorls.

E. calypso Cosel & Burnay, 1983 (figs. 13-14) is similar in shape, but differs by the higher number of protoconch whorls, by a slightly lower number of teleoconch whorls in combination with a larger size, by the weaker subsutural concavity especially on the upper whorls, by the presence of spiral cords on the upper whorls, by the presence of a pattern with dots, by the colour of the aperture which is white with some brown spots in the outer lip and by the siphonal canal which is not straight. For differences with *E. abrotona* sp. nov. we refer to the comparison under that species.

Etymology: Derived from the Latin *insalubris* (adjective) meaning "unhealthy". The white colour gives the shell "a pale face".

***Euthria abrotona* sp. nov.**
(Figs. 11-12)

Type Material: Holotype in MNHN.

Type Locality: Cape Verde Archipelago. The type material was obtained from fishermen, without exact information.

Range: Only known from the Cape Verde Archipelago.

Description: Shell 40.1 mm in height, thick, solid. Shape fusiform, slender, with rather short siphonal canal. Colour dark lemon yellow.

Protoconch of holotype badly eroded, large, rather inflated, 1.7 mm in diameter, consisting of 2 1/4 whorls.

6 1/2 teleoconch whorls. Suture adpressed to preceding whorl; subsutural slope as broad as half a whorl.

Surface covered with numerous fine spiral cords. Second whorl with about 20 such

spirals, occasionally alternatingly fine and slightly broader. Penultimate whorl with more than 50 spirals, body whorl with more than 100 spirals.

First and second teleoconch whorl both with 9 broad, low axial ribs. Becoming lower in number and weaker on further whorls. Penultimate whorl with only some hardly visible ribs. Body whorl smooth. All whorls covered with numerous fine growth lines, adapically widely curved towards aperture.

Aperture ovate. Outer lip white, thick, with 9 internal knobs, edge sharp. Columella smooth, callus thin, white to yellowish, edge dark yellow. Siphonal canal rather short, broad, open, curved to dorsum. Aperture together with siphonal canal longer than 1/2 of total shell length.

Periostracum, radula and operculum unknown.

Comparison: *Euthria abrotona* sp. nov. is characterized, and differs from all other Recent *Euthria* species, by the fine spiral sculpture consisting of numerous fine spiral cords, and by the numerous fine growth lines which are curved adapically.

E. insalubris sp. nov. is similar in shape, but differs by the lower number of protoconch whorls, by a slightly higher number of teleoconch whorls in combination with a smaller size, by the straighter growth lines, by the presence of alternatingly strong and finer spiral cords on the second to third whorl and by the smooth latter whorls (instead of covered with numerous fine spirals).

E. calypso Cosel & Burnay, 1983 (figs. 13-14) is similar in shape, but differs by the weaker subsutural concavity especially on the upper whorls, by the presence of spiral cords on the upper whorls only (the latter whorls are smooth), by the presence of pattern, by the colour of the aperture which is white with some brown spots in the outer lip, by the thinner lip, by the siphonal canal which is not straight.

Etymology: *Euthria abrotona* sp. nov. is derived from *abrotonum* (Latin, neuter), which is *Southernwood* or *The Lemon Plant*. This plant, not yellow in colour itself, produces yellow fruit. The single shell we have for study is strikingly yellow, but maybe the species produces other colours too. We hereby relativate the importance of the yellow colour, as, we cannot ensure the species is characterized by a yellow colour, until other specimens are found.

Euthria cecilea sp. nov.
(Figs. 19-30)

Type Material: Holotype (33.0 mm) (Figs. 19-20) in MNHN. Paratypes 1-11 in GP, KF nr.4151 and ER.

Type Locality: Cape Verde Archipelago. São Vicente. By divers 20-80 m deep.

Range: Only known from the type locality.

Description: Shell medium, 33 mm high (paratypes up to 39.5 mm high), thick, solid. Shape fusiform, slender, with rather short siphonal canal. Ground colour white, apex pale pink. Pattern dark brown, with many irregular dots, crossed by fine, white spiral bands. Paratypes varying from many irregular dots (fig. 25-26); to a pattern with broad spiral bands and/or broad axial flecks (fig. 23-24, 27-30); crossed by 0-8 white, narrow, spiral lines. Subsutural band consisting of rather rectangular, mostly evenly sized, alternating dark brown and white blotches, which are larger in the forms with large flecks. Tip of siphonal canal pale pink.

Protoconch rather bulbous, with $1\frac{3}{4}$ to $2\frac{1}{2}$ convex, rather inflated, occasionally slightly carinated whorls, smooth, pink. Transition to teleoconch marked by a weak axial rib.

Teleoconch with 6 - $6\frac{1}{4}$ whorls, spire rather conical, with weak subsutural concavity.

First teleoconch whorl with 3 or 4 rather strong spiral cords, eroded in most specimens, interspaces narrow, towards second whorl with an additional fine, secondary spiral cord between two adjacent primary cords. Second whorl smooth, occasionally with 7-14 cords. Third whorl smooth. Paratype 6 with 18, paratype 7 with 27 spiral cords on third whorl. First teleoconch whorls with 10 broad, axial ribs. Interspaces of equal size, deep. Second whorl with 11-13 broad axial ribs. From third whorl on, ribs smoother and broad, or absent. Body whorl rather smooth, with thick rib marking aperture. All whorls covered with fine, mostly sigmoid, prosocline growth lines.

Aperture ovate. Outer lip thick, with 9-11 (occasionally 15) internal lirae. Edge sharp, smooth. Columella smooth with 1 weak abapical fold or denticle, callus thin. Siphonal canal short, broad, open. Aperture together with siphonal canal shorter than $\frac{1}{2}$ of total shell length.

Operculum corneous, semi ovate with terminal nucleus, thick, dark brown.

Periostracum and radula unknown.

Comparison: *Euthria cecilea* sp. nov. is characterized by the pattern with dark brown colour together with a pink protoconch, by an occasionally pale pink siphonal canal and the smooth shell without spiral cords on the penultimate and body whorl.

E. calypso Cosel & Burnay, 1983 (figs. 13-14) differs by the higher spire and more slender shell, the smaller aperture which is white with some brown spots in the outer lip, the narrow siphonal canal, the weaker subsutural concavity, the paler colour and by the pattern with fewer spiral bands and a narrower subsutural band.

E. marianae Rolan, Monteiro & Fraussen, 2003 differs by the broader shape with slightly shorter siphonal canal, a higher number of spiral cords on the first whorl, and by the paler pattern.

E. cornea (Linnaeus, 1758), or at least some of the forms with dark brown pattern, can look similar to *E. cecilea* sp. nov. especially to the form with large flecks, but differs by the smaller protoconch (0.8-1.0 mm) with a lower number of whorls (1 1/4) instead of 1 3/4 to 2 1/2), the axial ribs which are abapically strong but adapically weak, on the upper whorls, and by the operculum with a more pointed nucleus.

E. bernardi sp. nov. differs by the larger size, the slender shape with higher spire, the stronger subsutural concavity, the presence of spiral cords on the penultimate and body whorls (while *E. cecilea* sp. nov. is usually smooth from the third whorl on) but the lower number of spiral cords on the second whorl, the growth lines which are mostly curved, (while in *E. cecilea* sp. nov. the lines are mostly signoid), the pattern with smaller dots and more colour bands, and the dark coloured siphonal canal.

Etymology: *Euthria cecilea* sp. nov. is named after Cecile Hoskens (Belgium). Together with Guido Poppe she collected the typematerial in the Cape Verde Archipelago early this year.

General remarks on the genus: Although *Euthria* species are rather uniform in shape within a same single species (especially the presence, or absence, of a narrow or broad concave subsutural slope is a stable characteristic), colour, pattern and size can occasionally be variable.

E. boavistensis Cosel, 1982 (figs. 15-18), from the Cape Verde Archipelago, and *E. cumulata* Fraussen & Hadorn, 2003 from New Caledonia, are variable in spire angle. Species which are known to show considerable variation in colour pattern are: *E. poppei* Fraussen, 1999 from East Africa (uniform white, yellow or lightbrown, occasionally with fine brownish spiral bands), *E. solifer* Fraussen & Hadorn, 2003 from

New Caledonia (from snow-white to dark yellow, often with narrow, dark yellow to orange spiral bands), and *E. cornea* (Linnaeus, 1758) from the Mediterranean (from snow-white to dark brown, over all intergrades of greyish, yellow, orange, pink, pale brown, even greenish, uniform or with dots or axial strikes). To this list we can now add *E. cecilea* sp. nov. and especially *E. bernardi* sp. nov. We here illustrate this variation by a series of each (figs. 1-8, 19-30). The extremities (a densely dotted form and a flecked form) could be described as separate species if no intermediates are available for comparison. The variability in the pattern of *E. cecilea* sp. nov. (showing more or less or no white lines in combination with darker blotches, these blotches ranging from small dots to axial strikes) is also found in *E. aracanense* Angas, 1873 and *E. javanica* Fraussen & Dekker, 2002, both from the Indian Ocean.

Species with rather moderately to high variation in adult size are *E. walleri* (Ladd, 1976) from the Philippines (from 39 to 60 mm), *E. philpoppei* Fraussen, 2002 from New Caledonia (from 22 to 30 mm), *E. scepta* Fraussen & Hadorn, 2003 from New Caledonia (from 17 to 33 mm), and *E. cornea* (Linnaeus, 1758). To this list we can now add: *E. bernardi* sp. nov. varying from 45.9 to 65 mm.

The Cape Verde Archipelago is famous for its Conidae radiation. We may assume for sure that the genus *Euthria* will not reach a similar high number of species or forms. But, as the study of this genus and this archipelago are both still going on, we can imagine that more, still undiscovered, species are waiting to be presented to science.

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Summarizing translation into Dutch/ Samenvattende Nederlandse vertaling

Dit artikel introduceert vier nieuwe Kaapverdische soorten in het genus *Euthria* (BUCCINIDAE): *E. bernardi* sp. nov., *E. insalubris* sp. nov., *E. abrotona* sp. nov. en *E. ceciliae* sp. nov.

E. bernardi sp. nov. (tot 65mm) is een zware schelp met een hoge top. De kleur is wit tot lichtgeel met een druk patron van roodbruine vlekken in spiraalbanden en twee blekere spiraalbanden. Het uiteinde van het korte siphonaal kanaal is donkerbruin tot purper. De witte protoconch is gezwollen en bestaat uit 2 1/4 tot 2 1/2 convexe omgangen. De teleoconch bestaat uit 8 omgangen die met spiraalkoorden bezet zijn. Het aantal hiervan neemt toe per omgang (3 op de bovenste omgang tot 18-25 op de laatste omgang). Op de eerste twee omgangen van de teleoconch is een axiale sculptuur zichtbaar die op de latere omgangen afvlakt en verdwijnt op de laatste omgang. Lip met 10-14 groeven; columella glad met een zwakke abapicale plooi.

E. insalubris sp. nov. (tot 31mm) is wit. De protoconch bestaat slechts uit 1 3/4 omgang, terwijl de teleoconch uit 7 omgangen bestaat. De bovenste omgang van de teleoconch draagt 4 spiraalkoorden, de tweede tot de vierde 4-5 waartussen secundaire spiraalkoorden voorkomen, de vijfde omgang heeft slechts 3 primaire spiraalkoorden en de laatste omgang is glad. De axiale sculptuur bestaat uit 9 ribben op de eerste omgang van de teleoconch. Dit aantal neemt toe tot en met de derde omgang, maar verdere omgangen zijn gladder. Lip met 8 groeven; columella met een adapicale plooi. Callus dik, roodbruin nabij de buitenlip en het korte siphonaal kanaal.

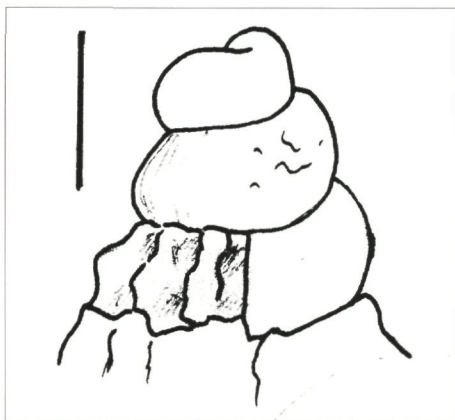
E. abrotona sp. nov. (tot 40mm) is donker citroengeel. De protoconch bestaat uit 2 1/4 gezwollen omgang, terwijl de teleoconch uit 6 1/2 omgangen bestaat. Alle omgangen dragen veel spiraalkoorden (van 20 op de eerste omgang tot meer dan 100 op de laatste). De bovenste omgang van de teleoconch draagt 9 axiale ribben, verdere omgangen zijn gladder. Lip met 9 knobbelachtige uitsteeksels. Columella glad. Het dunne callus is wit tot geel met een donkergele rand. Het siphonaal kanaal is naar de rugzijde van de schelp toe gebogen.

E. ceciliae sp. nov. (tot 40mm) is wit met een roze top en punt van het siphonaal kanaal. Het patroon bestaat uit vele onregelmatige donkerbruine vlekken en fijne witte spiraalbanden. De gezwollen protoconch omvat 1 3/4 tot 2 1/2 gladde omgangen. De overgang naar de teleoconch wordt gemarkeerd door een zwakke axiale rib. De teleoconch zelf bestaat uit 6 tot 6 1/4 omgangen. Axiale ribben komen voor op de eerste twee omgangen van de teleoconch, daarna worden ze gladder en de laatste omgang is vrij glad met een dikke ribbel aan de mondopening. Lip met 9-15 groeven. Columella glad met een zwakke adapicale plooi of uitsteeksel.

A. *Euthria cecilea* sp. nov.,
protoconch of paratype 9.
Scale bar: 1 mm.



B. *Euthria bernardi* sp. nov.,
protoconch of paratype 1.
Scale bar: 1 mm.



C. *Euthria insalubris* sp. nov.,
protoconch of holotype. Scale
bar: 1 mm.



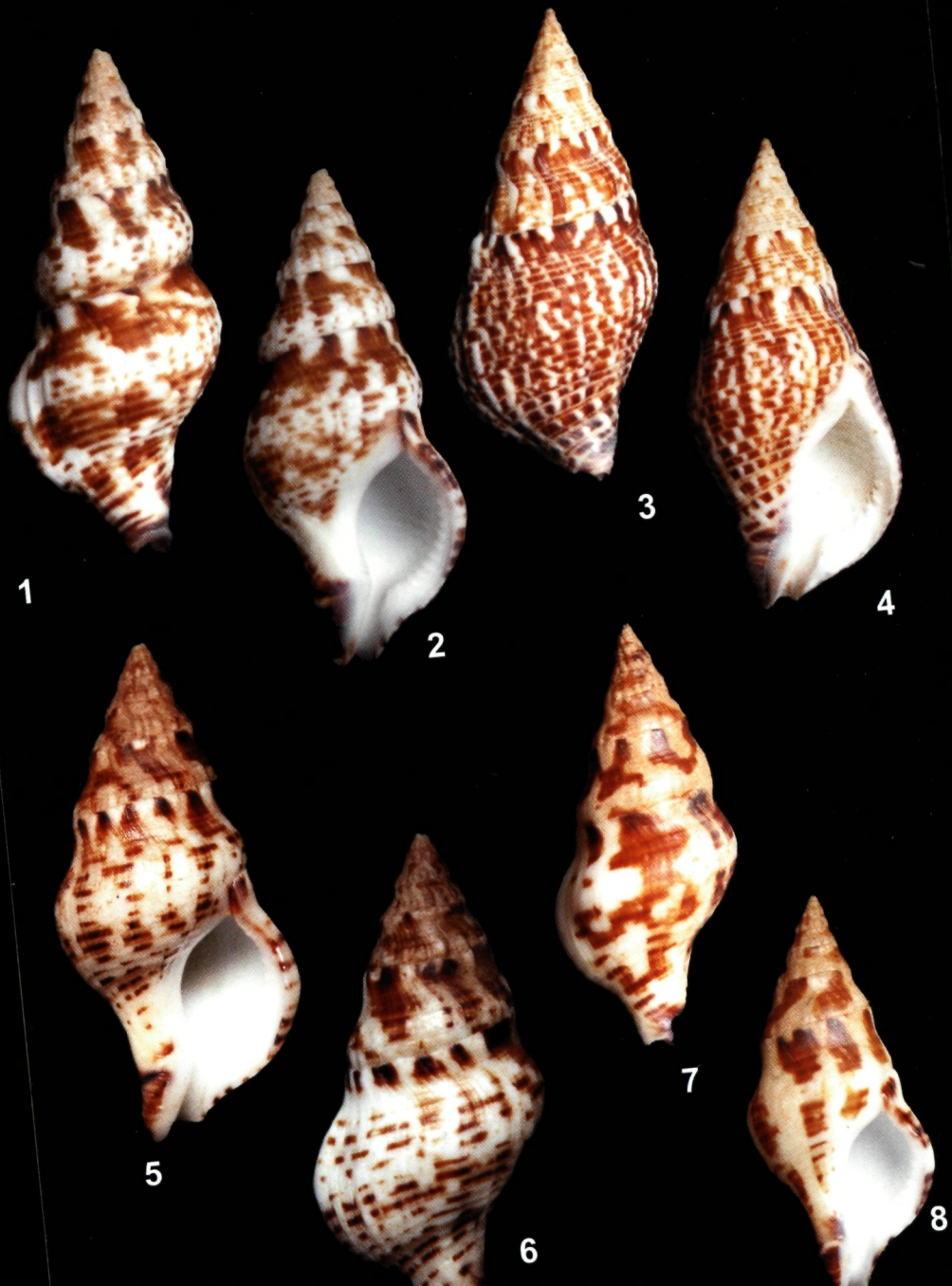
1-8. *Euthria bernardi* sp. nov., Cape Verde Islands.

1-2: holotype, 65.0 mm.

3-4: paratype 3, 61.2 mm.

5-6: paratype 6, 49.3 mm.

7-8: paratype 4, 45.9 mm.





- 9-10.** *Euthria insalubris* sp. nov., Cape Verde Islands, holotype, 30.9 mm.
11-12. *Euthria abrotona* sp. nov., Cape Verde Islands, holotype, 40.1 mm.
13-14. *Euthria calypso* Cosel & Burnay, 1983, Cape Verde Islands, off Maio Island, holotype, 44.6 mm.
15-18. *Euthria boavistensis* Cosel, 1982, São Vicente.
15-16: 26.0 mm.
17-18: slender form, 31.2 mm.

19-30. *Euthria cecilea* sp. nov., Cape Verde Islands, São Vicente.

- 19-20: holotype, 33.0 mm.
- 21-22: paratype 2, 39.5 mm.
- 23: paratype 3, 34.0 mm.
- 24: paratype 4, 36.0 mm.
- 25-26: paratype 1, 36.6 mm.
- 27: paratype 5, 33.4 mm.
- 28: paratype 6, 37.4 mm.
- 29: paratype 7, 35.9 mm.
- 30: paratype 8, 37.0 mm.



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