

A systematic review of “*Asthenotoma spiralis* (Smith, 1872)” in West Africa, with description of two new species (Mollusca, Gastropoda, Conoidea)

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ABSTRACT

The West African marine species generally known as *Asthenotoma spiralis* (Smith, 1872) is revised, and transferred to the genus *Tomopleura* Casey, 1904. This specific name is shown to be preoccupied and a replacement name *Tomopleura spiralissima* n. nom. is provided. Two further species *Tomopleura fuscocincta* n. sp. and *T. tricineta* n. sp., hitherto confused with *T. spiralis*, are described with a type locality in Angola. All three species have larval shells indicating a planktotrophic development and therefore good ability for dispersal, and all three are broadly sympatric across the entire West African region from Senegal to Angola. They are nevertheless differentiated in microhabitat and normally do not occur together in the same samples.

KEY WORDS

Mollusca,
Gastropoda,
Conoidea,
Turridae,
West Africa,
protoconch,
new species.

RÉSUMÉ

Révision systématique d’« Asthenotoma spiralis (Smith, 1872) » en Afrique occidentale, avec description de deux espèces nouvelles (Mollusca, Gastropoda, Conoidea).

L’espèce ouest-africaine généralement connue sous le nom *Asthenotoma spiralis* (Smith, 1872) est révisée, et transférée dans le genre *Tomopleura* Casey, 1904. Un nom de remplacement *Tomopleura spiralissima* n. nom. est introduit pour ce nom spécifique préoccupé. Deux autres espèces, *Tomopleura fuscocincta* n. sp. et *T. tricineta* n. sp., confondues jusqu’à présent avec *T. spiralis*, sont décrites avec une localité type en Angola. Les trois espèces possèdent une coquille larvaire indiquant un développement planctotrophe et par conséquent une bonne capacité de dispersion, et toutes trois sont globalement sympatriques dans l’ensemble de la région Ouest Africaine entre le Sénégal et l’Angola. Elles sont néanmoins différenciées quant à leur microhabitat et ne se trouvent pas normalement ensemble dans le même prélèvement.

MOTS CLÉS

Mollusca,
Gastropoda,
Conoidea,
Turridae,
Afrique occidentale,
protoconque,
espèces nouvelles.

INTRODUCTION

The gastropod superfamily Conoidea (including the genera colloquially known as “turrids”) is a prominent and species-rich taxon in worldwide seas, but particularly so in West Africa. Many species have been described however on the basis of few specimens and their variability could not be adequately assessed. Extensive material has been obtained during the last decades of the 20th century, and has given new insights on this malacofauna.

This paper is devoted to review a rather well known species, originally described as *Pleurotoma spiralis* by Smith (1872). The recently collected material contains a good representation of this species and also reveals the occurrence of two additional species, morphologically similar but ecologically distinct, and hitherto confused with it. Therefore, published references to this taxon could be ascertained only when backed by a figure or by voucher material which could be examined. In addition, we propose a replacement name for *Pleurotoma spiralis*, preoccupied.

The generic placement of the species is reexamined, in context with the general systematic framework for the Conoidea in the major review of Taylor *et al.* (1993), superseding those of Powell (1966) and McLean (1971).

MATERIAL AND METHODS

Collections considered in this study are mainly housed in the Muséum national d’Histoire naturelle, Paris (MNHN) and in small part, in Museo de Historia Natural, Santiago de Compostela (MHNS). All the material without any indication is from MNHN.

From North to South, the main sources are:

- Mauritania: dredgings by RV *Ndiago* conducted by B. Richer de Forges on the continental shelf, 1981;
- Senegal: collections by I. Marche-Marchad in the years 1950-1955, collections by M. Pin in the years 1980-1987, and a dredging campaign on the continental shelf of Casamance by RV *Louis Sauger*, conducted by R. von Cosel in March 1988;
- Ivory Coast: some dredgings on the continental shelf by I. Marche-Marchad in the 1950s and by R. Le Loeuff in the 1960s;

- Ghana: material collected by P. Ryall and E. Rolán in dredgings from a small boat (MHNS);
- Cameroon: shore collecting and shallow dredging with commercial trawlers by R. von Cosel, December 1985;
- Gabon: material from environmental surveys around drilling sites presented by C. Chevallier, 1980-1989, also some shore collections made by P. Bernard in the same period and by R. von Cosel, November 1985;
- Congo: shore collecting by R. von Cosel, November-December 1985;
- Angola: shore collecting and shallow dredging from a small boat by F. Fernandes and S. Gofas, 1981-1987 and by F. Fernandes and E. Rolán, 1989 (MHNS).

There are therefore major gaps in the sources of material, in parts of the Gulf of Guinea other than Ivory Coast and Ghana, where the scanty sources of material are scattered dredgings of RV *Calypso* in the 1960s. The islands in the Gulf of Guinea have been extensively collected by the authors, but did not yield any specimens relevant to this study.

Most specimens were dried for collection storage. Whenever possible, drawings showing the external characters of the living animals were prepared from specimens collected in Angola by SG.

Specimens selected for SEM examination of the protoconch were cleaned in a 10% solution of sodium lauryl sulphate, a detergent, sonicated for a few seconds, then dried and mounted on a stub for coating with gold and examination. The radula of one specimen was extracted and also examined under the SEM.

ABBREVIATIONS

j	juvenile shell;
sh	empty shell;
spm	specimen with soft parts.

SYSTEMATICS

Family CONIDAE Fleming, 1822

Genus *Tomopleura* Casey, 1904

TYPE SPECIES. — *Pleurotoma nivea* Philippi, 1851, by original designation.

REMARKS

"*Pleurotoma*" *spiralis* has been consistently attributed to the genus *Asthenotoma* Harris & Burrows, 1891, in the literature on West African mollusca (e.g., Knudsen 1952, 1956; Collignon 1960; Bassindale 1961; Bernard 1984; Gofas *et al.* 1985; Rolán & Ryall 1999; Ardovini & Cossignani 2004). Gofas (1990) and Gatto (1997) figured *Asthenotoma meneghinii* (Mayer, 1868), a fossil from the European Miocene which is the type species of *Asthenotoma*. This species has an evenly biconical shell with the last whorl occupying about two-thirds of the total height, has a distinct axial sculpture forming nodes on the spire and last whorl, and has a simple outer lip with a poorly defined labial notch. The lower part of the columella is quite prominent and borders a large, broadly open siphonal canal. The Recent West African species "*Pleurotoma*" *lamothei* Dautzenberg, 1910 has a quite similar shell architecture although the last whorl is not quite so high, and is possibly a Recent representative of *Asthenotoma*. Its radula indicates that it belongs to the toxoglossate Conidae but it has a well-developed operculum, which is lacking in "*Asthenotoma*" *spiralis*. This feature and also the general shell architecture are quite different from the species considered hereafter, which have a high spire and relatively low body whorl, completely lack any element of axial macrosculpture, and have a well-defined labial notch. We consider these sufficient reasons to dismiss the current classification as *Asthenotoma*.

The attribution to *Tomopleura* as suggested herein is supported by shell characters and would extend the distribution of the latter genus to the Atlantic. The type species (Fig. 1) is Indo-Pacific but matches the West African species in important details such as the position of the posterior notch, the non-thickened configuration of the outer lip abapically from the notch and the lack of axial folds on the shell. The protoconchs of *T. nivea* as well as those of the West African species are comparable in being of a multispiral type, and share a smoothish, non-reticulate surface.

Admittedly there are also some differences, in particular, the posterior notch of the outer lip is not so deeply marked in *Tomopleura nivea* as in the West African species, but we consider that the



FIG. 1. — *Tomopleura nivea* (Philippi, 1851), type species of *Tomopleura* Casey, 1904, neotype (Kilburn 1986), also lectotype of *Drillia makimonos* Jousseaume, 1883, from Japan (height 27 mm, MNHN).

alternative course of erecting a new genus for the three species treated herein is not appropriate in a paper concerned with the species-level systematics on a local scale, particularly in such a complex family as the Conidae.

Tomopleura spiralis n. nom.
(Figs 2-6; 10A; 11A)

Pleurotoma spiralis Smith, 1872: 731, pl. 75 fig. 8 [non *Pleurotoma spiralis* M. de Serres, 1829: 261].

Pleurotoma spiralis – Dautzenberg 1912: 11 (the material examined from Mission Gruvel).

Asthenotoma spiralis – Knudsen 1956: 100, pl. 4 fig. 8. — Bernard 1984: 103, 106, pl. 51 fig. 211. — Ardovini & Cossignani 2004: 220, unnumbered figure of a specimen



FIG. 2. — *Pleurotoma spiralis* Smith, 1872, single syntype from Ouidah, Benin (height 9.5 mm, BMNH).

from Gabon (but not the specimens from Mauritania and Senegal on pages 219 and 220).

TYPE MATERIAL. — One syntype (Natural History Museum, London, BMNH 1871-1.24.35) (Fig. 2).

TYPE LOCALITY. — Whidah, Dahomey (current names are Ouidah, Benin).

ETYMOLOGY. — The name is construed as a superlative of the preoccupied name *spiralis*.

MATERIAL EXAMINED. — **Senegal.** No further details, 1 sh (13.5 × 4.2 mm, old collection MNHN). — Off Cap Skirring, 12°25'N, 17°17'W, fine sand and rocks 25 m, 27.III.1988, leg. R. von Cosel, 1 sh (14.0 × 4.0 mm).

Guinea. Îles de Los, 5 sh (8.3 × 2.6 to 11.4 × 3 mm).

Ivory Coast. Abidjan area, 15 m, leg. Le Loeuff, 1 sh (11.3 × 3.6 mm). — Abidjan area, leg. Marche-Marchad, 1 sh (14.2 × 4.3 mm).

Ghana. Miamia, 04°50.1'N, 02°13'W, 10-20 m, 40 sh (8.3 × 2.8 to 13.1 × 4.4 mm, MHNS). — Miamia, 15-25 m, 3 spm, 5 j (6.8 × 1.9 to 11.4 × 3.9 mm,

MHNS). — Princess Town, 04°47.0'N, 02°07.5'W, 10-15 m, 25 sh (8.2 × 2.8 to 13.3 × 3.6 mm, MHNS). — Mudrachmi Bay, 04°48.3'N, 02°10.3'W, 20 m, 3 spm (7.9 × 2.5 to 15.1 × 4.0 mm, MHNS); all specimens from Ghana collected by Peter Ryall.

Benin. The type specimen.

Nigeria. Off Niger delta, *Calypso* stn 24, 04°03'N, 06°12'E, 32 m, 1 sh (11.0 × 3.2 mm).

Cameroon. Victoria (currently Limbe), 03°56'N, 09°06'E, 1-3 m, 1 sh (8.5 × 2.9 mm).

Gabon. Cap Esterias, low tide, 2 sh (12.2 × 4.3, 14.2 × 4.3 mm). — Port Gentil, "Anguille" oilfield, 00°47.4'S, 08°43.6'E, 25 m, leg. C. Chevallier, 22 sh (6.8 × 2.2 to 16.4 × 5.0 mm).

Congo. Pointe Noire, beach facing ORSTOM, 3-4 m, leg. R. von Cosel, 4 sh (13.3 × 3.7 to 24.7 × 7.3 mm). — *Idem*, 5-7 m, 3 spm (16.2 × 4.6 to 22.6 × 6.5 mm), 2 sh (18.6 × 5.8, 21.4 × 6.8 mm). — Pointe Noire, leg. Office Pointe Noire, 3 spm (8.8 × 2.8 to 10.3 × 3.3 mm), 6 sh (up to 7.8 × 2.6 mm). — Conkouati, 04°10'S, 11°15'E, 19 m, XII.1985, leg. R. von Cosel, 1 spm (12.5 × 3.8 mm). — Songolo, 04°45'S, 11°50'E, 4 spm (13.1 × 4.2 to 17.0 × 4.9 mm), 7 sh (12.3 × 3.6 to 18.7 × 6.5 mm).

Angola. Between Shark Point and Ponta do Padrão, mouth of the River Zaire, 25 m, 4.V.1910, leg. Gruvel, 3 spm (5.8 × 2.2 to 10.2 × 3.2 mm), 9 sh (4.8 × 1.8 to 13.1 × 4.0 mm). — Barra do Dande, 08°28.0'S, 13°23.0'E, dredging 0-2 m on muddy sand, 2 sh (17.0 × 5.9, 19.3 × 6.4 mm). — Cacuaco, 08°45.0'S, 13°21.0'E, dredging 10-12 m on silty mud, 2 spm (10.5 × 3.4, 18.2 × 5.5 mm), 1 sh (14.3 × 4.9 mm). — *Idem*, 5-10 m, 9 spm (11.2 × 3.5 to 22.0 × 7.1 mm, MHNS). — Farol das Lagostas, 08°45'S, 13°18'E, 1 sh (13.1 × 4.3 mm, MHNS).

DESCRIPTION

Shell slender, fusiform with a high conical spire. Protoconch (Fig. 10A) of *c.* 4 smooth, moderately convex whorls, with diameter of nucleus 210 µm and maximum diameter 530 µm; transition to teleoconch with a few, broadly spaced, narrow riblets which start nearly axial in their adapical part, then are markedly curved to follow the contour of the "sinusigera" aperture of the larval shell. Teleoconch of 6-9 whorls, with a strong spiral sculpture. Sculpture on spire whorls starting with one subsutural keel and another stronger keel on the abapical part of the first whorl, separated by a concave depression; sculpture continued on later spire whorls with the stronger keel shifting towards the median part of the whorls, and a third keel on the abapical edge, partly concealed by the subsequent whorl. Body whorl with several additional acute cords abapically

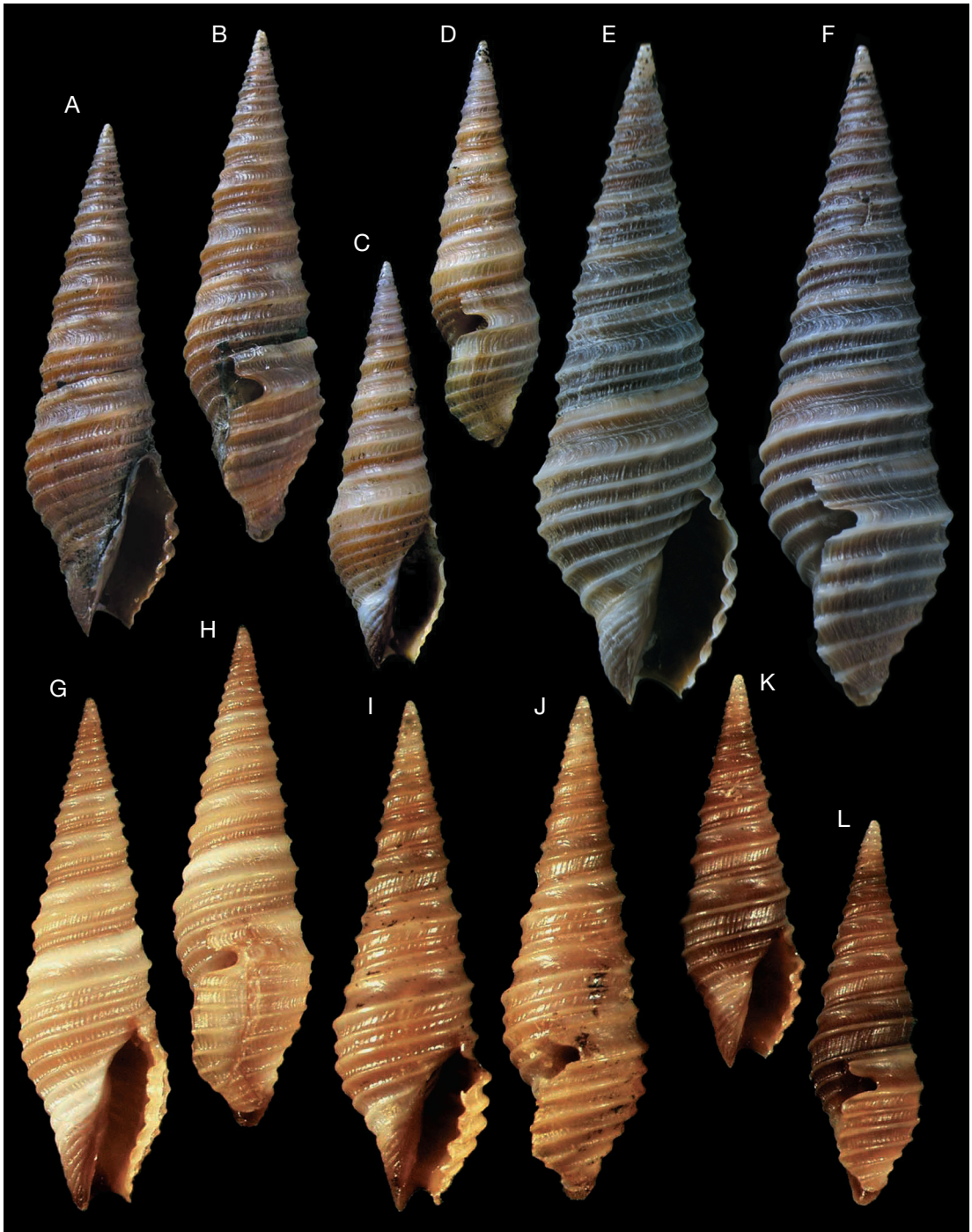


FIG. 3. — *Tomopleura spiralissima* n. nom.: **A, B**, specimen from off Songolo, Congo (height 15.8 mm, MNHN), from a lot of 11 spm with sh up to 18.7 mm in size; **C, D**, specimen from Conkouati, Congo (height 12.3 mm, MNHN) resembling the type; **E, F**, large specimen from Pointe Noire, Congo (height 20.7 mm, MNHN); **G-L**, colour variations from Miamia, Ghana (height 14.2 mm, 14.5 mm and 11.2 mm, MHNS).

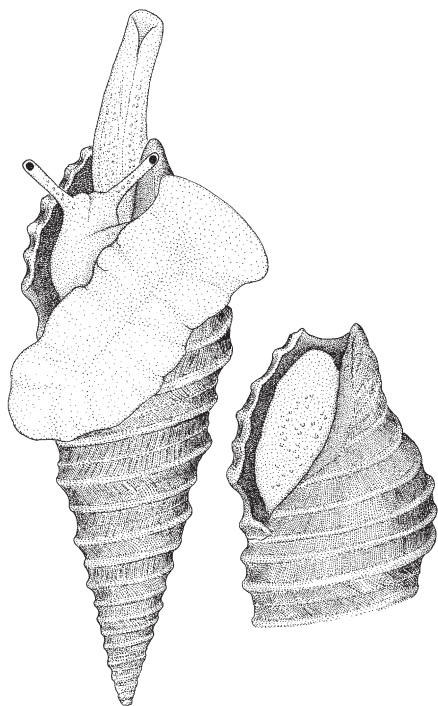


FIG. 4. — *Tomopleura spiralissima* n. nom. (the large form) living animal from off Cacuaco (height of shell 18 mm).

to the main keel, decreasing in size towards the abapical end. Furrows between spirals concave, crossed by tenuous axial raised threads running parallel to the growth lines.

Aperture devoid of parietal callus on the columellar side. Siphonal canal short and broadly open; adapical end of the aperture narrowing to a small notch reaching the suture. Outer lip simple, with a marked U-shaped notch situated adapically to the termination of the major keel, at a short distance from the suture, then with a convex profile as seen from one side. Colour of shell dark brown, either uniform or with paler spiral keel and cords; columella dark brown, darker than surrounding areas of last whorl and aperture.

Living animal (Fig. 4): foot broad and relatively short, truncated anteriorly, making a very blunt angle posteriorly, rather flat, devoid of operculum and forming a plug on the aperture when the animal is retracted. Head broad, with cephalic tentacles

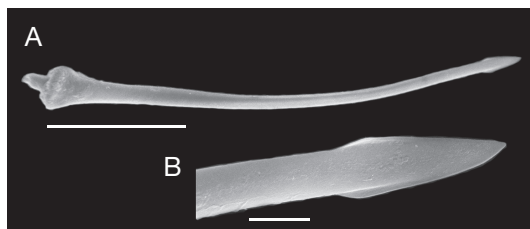


FIG. 5. — *Tomopleura spiralissima* n. nom.: **A**, single tooth of the radula of a specimen from Cacuaco, Angola (size of shell 10.4 mm); **B**, detail of distal end. Scale bars: A, 100 μ m; B, 10 μ m.

situated on each side of the mouth, with eyes situated at their tip; mouth quite large, appearing as a vertical slit when proboscis is retracted. Siphon quite large, tapering. Colour whitish with minute opaque white flecks on the siphon, on the head and to a lesser extent on the upper part of foot.

Radula toxoglossate, tooth slender with lancet-shaped distal end and a thickened rim surrounding its base (Fig. 5).

HABITAT

On soft bottoms of muddy sand or mud, usually in murky waters at 1-20 m depth.

REMARKS

Smith's name for this species is a primary homonym of an older name used for a Miocene species of Europe, for which reason a replacement name is here proposed.

The type specimen of "*Pleurotoma*" *spiralis* is a rather small shell (9.5 mm) but some specimens collected in Congo and Angola reach nearly three times this size. We once considered the possibility that these larger specimens (Fig. 3E, F) could belong to a distinct species, supported by the observation that larger specimens tend to have spiral cords and keels paler than the general background whereas smaller forms and the holotype are uniformly brown in colour; moreover both forms were collected sympatrically at Cacuaco, Angola, and observed alive with more diffuse, coalescent whitish flecks on the large form. Nevertheless, pooling all specimens in this study (Fig. 6) shows that the distribution of sizes is not bimodal and examination of the rather large lot from off Songolo, Congo, with an array

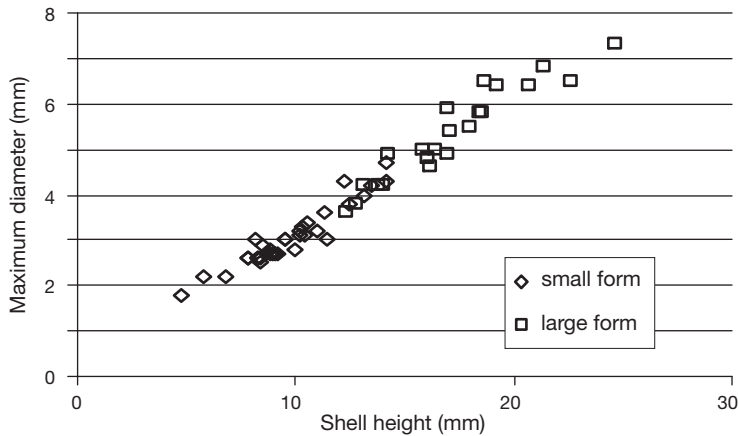


FIG. 6. — Plot of height/breadth measurements for all examined specimens and shells of *Tomopleura spiralis* n. nom.

of intermediate sizes and colours, has driven us to doubt about arguments for two species.

The protoconch of this species is clearly distinct from those of the two following species, being more pointed (diameter of nucleus 210 μm instead of 250 μm), slightly larger and lacking a suprasutural thread.

There is some resemblance between this species and *Tomopleura fultoni* (Sowerby, 1888), a species found along the East Coast of South Africa. The latter is larger, has less conspicuous axial threads, and has only one spiral keel apparent on spire whorls; moreover the spiral keels are whitish and contrast over the dark brown background.

Tomopleura fuscocincta n. sp.

(Figs 7; 8; 10B; 11B)

Asthenotoma spiralis – Ardovini & Cossignani 2004: 219, 220 (unnumbered figure of specimens from Mauritania, but not specimens from Senegal and Gabon on page 220) [non *A. spiralis* (Smith, 1872)].

TYPE MATERIAL. — Holotype (spm, 11.3 \times 3.6 mm, MNHN 21408) (Fig. 7A, B); 10 paratypes from the type locality (5 MNHN 21409, 5 MHNS).

TYPE LOCALITY. — Off Ilha de Luanda, Angola (08°44'S, 13°12'E, 40-60 m) on bottom of bioclastic sand with rocks.

ETYMOLOGY. — The name alludes to the darker hue of the cords, contrasting with the other species.

MATERIAL EXAMINED. — **Mauritania.** RV *N'Diogo* stn 118, 18°35.94'N, 16°30.48'W, 96 m, 1 sh (10.0 \times 3.7 mm). — RV *N'Diogo* stn 153, 18°18'N, 16°28'W, 90 m, 1 sh (9.9 \times 3.4 mm). — RV *N'Diogo* stn 246, 17°54'N, 16°26'W, 108 m, 1 sh (12.5 \times 4.2 mm). — RV *Meteor* stn 60-77, 17°17'N, 16°30'W, 85 m, 2 sh (15.3 \times 4.6, 15.7 \times 5.0 mm).

Senegal. Dakar area stn 58.2.4B, 12°56'N, 17°26'W, 43 m, leg. Marche-Marchad, 1 sh (15.0 \times 4.5 mm). — Baie de Rufisque, 10-20 m, leg. Pin, 1987, 1 spm (15.3 \times 4.7 mm).

Ghana. *Calypso* stn 25, 04°36'N, 01°31'W, 50 m, 6 sh (8.1 \times 3.1 to 12.4 \times 3.7 mm). — Off Adjua, 40 m, 2 spm (9.4 \times 2.9, 10.0 \times 3.1 mm, MHNS ex collection Peter Ryall).

Gabon. Port Gentil, "N'Kondo" oilfield, leg. Chevallier, 1 sh (8.1 \times 2.9 mm). — Port Gentil, "Anguille" oilfield, leg. Chevallier, 1 sh (11.0 \times 3.2 mm).

Angola. Off Ilha de Luanda, 08°44'S, 13°12'E, 40-60 m, 14 spm (5.0 \times 2.0 to 14.0 \times 4.1 mm) and 22 sh (5.5 \times 2.2 to 14.2 \times 4.3 mm) [includes types]. — *Idem*, 1 spm (11.7 \times 3.9 mm, MHNS), 22 sh (8.0 \times 2.7 to 14.9 \times 4.8 mm, MHNS), 6 j. — Luanda, 2 sh, 2 j (MHNS). — Luanda, 35-40 m, 1 spm (MHNS). — Luanda, Matuco, 20 m, 10 sh (9.0 \times 2.9 to 14.8 \times 4.9 mm, MHNS), 1 j. — Off Ilha de Luanda, 100 m, 4 sh (9.2 \times 3.0 mm, MHNS), 15 j. — Off Ilha de Luanda, 120 m, 4 sh (8.0 \times 3.0 to 10.8 \times 3.4 mm). — *Idem*, 1 sh (MHNS). — Corimba, 08°51.4'S, 13°10.0'E, 20 m, 1 j (MHNS). — Off Mussulo, 08°51'S, 13°00'E, 90 m, 10 sh (1.7 \times 0.8 to 11.4 \times 3.7 mm). — Off Mussulo, Macôco, 50-70 m, 1 spm (12.3 \times 3.7 mm) and 4 sh (4.7 \times 1.9 to 10.5 \times 3.5 mm). — Cape Palmeirinhas, 60-80 m, 5 sh (8.0 \times 2.8 to 9.8 \times 3.3 mm). — *Idem*, 20 m, 1 sh (6.5 \times 2.3 mm, MHNS), 6 j.

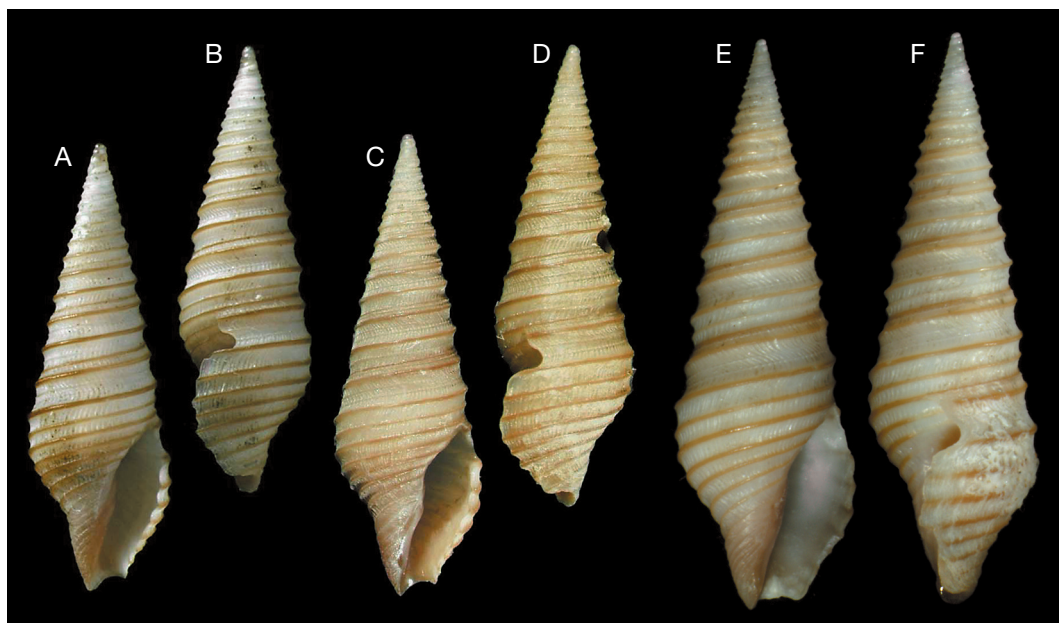


FIG. 7. — *Tomopleura fuscocincta* n. sp.: **A, B**, holotype (spm, height 11.3 mm), off Ilha de Luanda, Angola, 40–60 m (MNHN); **C, D**, paratype (sh, height 11.5 mm), same locality (MHNS); **E, F**, specimen from off Dakar, Senegal (height 15.3 mm, MNHN).

DESCRIPTION

Shell slender, fusiform with a high conical spire. Protoconch (Fig. 10B) of *c.* 3 smooth, convex whorls, the last one with abapically a narrow keel coincident with the suture, with diameter of nucleus 250 μ m and maximum diameter 480 μ m; transition to teleoconch with a few narrow riblets which start nearly axial in their adapical part, then are markedly curved to follow the contour of the “sinusigera” aperture of the larval shell. Teleoconch of 7–9 whorls, with a strong spiral sculpture. Sculpture on spire whorls starting with one subsutural keel and another prominent keel on the abapical part of the first whorl, separated by a flat area where a smaller intermediate spiral cord is present; sculpture continued on later spire whorls with the stronger keel shifting towards the median part of the whorls, and a third cord being revealed on the abapical edge of the whorl, partly concealed by the subsequent whorl; the adapical intermediate cord becoming more tenuous and eventually reduced to one or several spiral threads; on later whorls with one or two additional threads abapically to the main keel. Body whorl with several

additional acute cords abapically to the main keel, decreasing in size towards the abapical end. Furrows between spirals concave, crossed by well-defined axial riblets running parallel to the growth lines.

Aperture devoid of parietal callus on the columellar side. Siphonal canal short and broadly open; adapical end of the aperture narrowing to a small notch reaching the suture. Outer lip simple, with a marked U-shaped notch situated adapically to the termination of the major keel, at a short distance from the suture, then with a convex profile as seen from one side. Colour of shell whitish or creamish with darker, brownish to purplish cords; abapical end of shell also darker.

Living animal (Fig. 8) as in *T. spiralissima* but with uniform, very pale buff colour of the head-foot, without flecks; siphon whitish with very few yellow flecks.

HABITAT

On the continental shelf (usually 50–100 m) on current-swept bottoms with bioclastic rubble and rocky outcrops.

REMARKS

This species is broadly sympatric with *T. spiralis-sima* but occurs deeper, on a quite different kind of bottoms, and avoids the muddy sites where the latter is usually found. The columella is not dark brown. Contrary to the other species which tend to be uniform in colour or have paler cords, this species has distinctly darker spirals on a pale background, particularly conspicuous on fresh specimens. Colour however tends to fade after some years even if shells are preserved from sunlight. The protoconch is also distinct, having one whorl less and a distinct suprasutural cord; on the teleoconch the axial riblets between keels are much more conspicuous and widely spaced, and the additional cords on spire whorls are usually not developed in *T. spiralis-sima*.

Tomopleura tricincta n. sp.
(Figs 9; 10C; 11C)

Asthenotoma spiralis – Ardovini & Cossignani 2004: 220 (unnumbered figure of a specimen from Gorée, Senegal, but not the specimens from Mauritania and Gabon on pages 219 and 220) [non *A. spiralis* (Smith, 1872)].

TYPE MATERIAL. — Holotype (spm, 13.7 × 4.2 mm, MNHN 21410) (Fig. 9A, B) and 8 paratypes (sh, 8.7 × 2.9, 12.2 × 3.9, 14.2 × 4.6, 18.7 × 5.5 mm) from the type locality (4 MNHN 21411, 4 MHNS).

TYPE LOCALITY. — Cape Palmeirinhas, Angola (09°00'S, 12°59'E, 10-30 m) on sandy bottom.

ETYMOLOGY. — The name alludes to the three evenly developed cords which are seen on the first teleoconch whorls and diagnose the species.

MATERIAL EXAMINED. — **Mauritania.** RV *N'Diogo* stn 188, 17°18'N, 16°13'W, 14 m, 1 spm (9.6 × 3.2 mm). — RV *N'Diogo* stn 231, 17°42'N, 16°07'W, 17 m, 1 spm (9.8 × 3.3 mm).

Senegal. Bay of Rufisque, leg. M. Pin, 3 sh (15.2 × 4.2 to 20.9 × 5.6 mm). — Casamance, RV *Louis Sauger*, 12°47.2'N, 17°12.4'W, 24 m on fine sand, 1 spm (14.1 × 4.7 mm). — Dakar Bay, 30 m (10.8 × 3.8 mm, MHNS).

Ivory Coast. Abidjan area, leg. Marche-Marchad, 1 sh (6.3 × 4.7 mm) and 1 spm (13.0 × 3.9 mm).

Gabon. Port Gentil, "Anguille" oilfield, 00°47.4'S, 08°43.6'E, 25 m, leg. C. Chevallier, 4 sh (10.8 × 3.5 to 14.0 × 3.8 mm).

Angola. Off Luanda, 40-50 m, 5 sh (9.1 × 3.2 to 11.4 ×

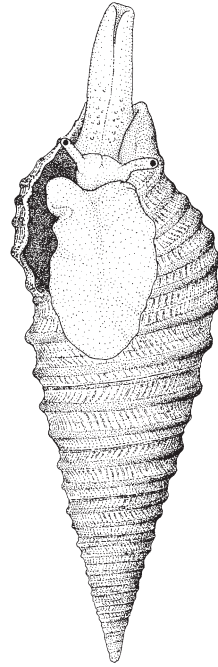


FIG. 8. — Living holotype of *Tomopleura fuscocincta* n. sp. from off Ilha de Luanda, Angola, 40-60 m (height of shell 11.3 mm).

3.5 mm, MHNS). — Cape Palmeirinhas, 10-30 m, 1 spm (13.7 × 4.2 mm) and 4 sh (8.7 × 2.9, 12.2 × 3.9 mm), 14.2 × 4.6, 18.7 × 5.5 mm) [includes MNHN types]. — *Idem*, 20 m, 1 spm, 3 s, 2 j (7.9 × 2.8 to 13.1 × 4.1 mm) [includes MHNS types].

DESCRIPTION

Shell slender, fusiform with a high conical spire. Protoconch (Fig. 10C) of *c.* 3 ½ smooth, very slightly convex whorls; with abapically a narrow keel coincident with the suture, with diameter of nucleus 250 µm and maximum diameter 530 µm; transition to teleoconch with a few narrow riblets which start nearly axial in their adapical part, then are markedly curved to follow the contour of the "sinusigera" aperture of the larval shell. Teleoconch of 7-10 whorls, with a strong spiral sculpture. Sculpture on spire whorls starting with three subequal keels, one subsutural, one median and one overhanging the suture on the abapical part of the whorl, separated by concave furrows; sculpture continued with the keels remaining subequal on several spire whorls, and at some stage supplemented with a fourth keel on the

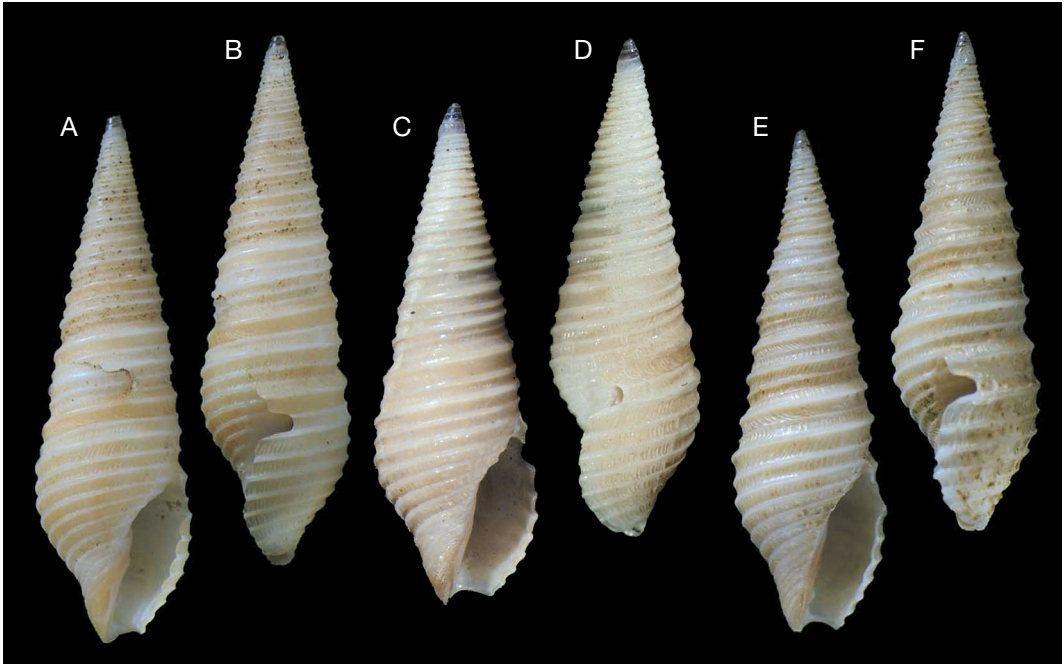


FIG. 9. — *Tomopleura tricincta* n. sp.: **A, B**, holotype (spm, height 13.7 mm), Cape Palmeirinhas, Angola, 10-30 m (MNHN); **C, D**, paratype (sh, height 11.6 mm), same locality (MHNS); **E, F**, specimen from Abidjan area, Ivory Coast (height 13.0 mm, MNHN).

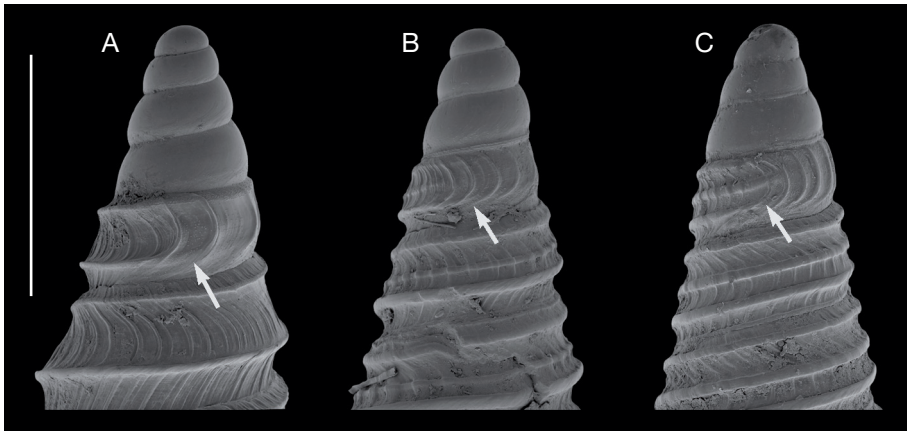


FIG. 10. — Compared top whorls of the three West African species of *Tomopleura* Casey, 1904 (MNHN): **A**, *T. spiralissima*, specimen from Pointe Noire, Congo; **B**, *T. fuscocincta* n. sp., specimen from off Ilha de Luanda, Angola, 40-60 m, paratype; **C**, *T. tricincta* n. sp., specimen from off Cape Palmeirinhas, Angola, 10-30 m, paratype. Arrows point to the protoconch/teleoconch transition. Scale bar: 1 mm.

abapical edge, partly concealed by the subsequent whorl. Later spire whorls with the median keel becoming slightly more prominent. Body whorl

with several additional acute cords abapically to the main keel, decreasing in size towards the abapical end. Furrows between spirals concave, crossed by

well-defined axial riblets running parallel to the growth lines.

Aperture devoid of parietal callus on the columellar side. Siphonal canal short and broadly open; adapical end of the aperture narrowing to a small notch reaching the suture. Outer lip simple, with a marked U-shaped notch situated adapically to the termination of the second keel, at a short distance from the suture, then with a convex profile as seen from one side. Colour of protoconch dark purplish on first whorls, later whitish; teleoconch of a pale ivory colour, slightly darker near abapical end.

Living animal like *T. spiralissima*, with the same colour pattern.

HABITAT

On shallow bottoms (10-30 m) of clean bioclastic sands, often near rocky outcrops.

REMARKS

This species is readily recognised by the configuration of three subequal spirals on early teleoconch whorls (Fig. 10C), whereas the other two species have one keel becoming clearly more prominent on that part of the shell. The protoconch is distinctive, being stouter (apparent portion 800 µm high instead of 930 µm in *T. spiralissima*, for a same maximum diameter of 530 µm) with less convex whorls than the other two species, and being conspicuously tinged with a dark purplish hue on its apical half. The teleoconch is whitish. This species is found on rather shallow bottoms of clean bioclastic sands, normally not together with the other two.

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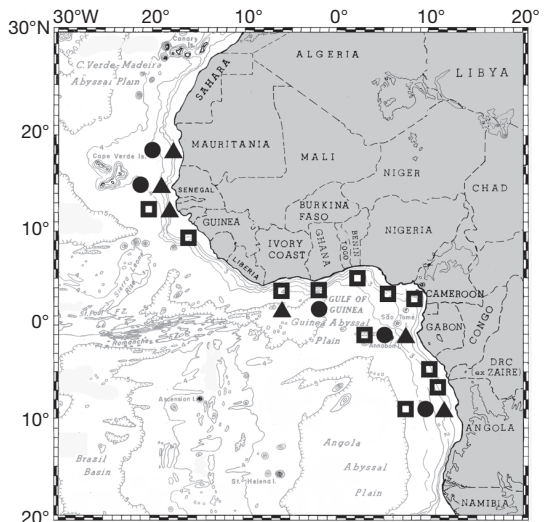


FIG. 11. — Diagrammatic plot of the distributions of the three West African species of *Tomopleura* Casey, 1904: *T. spiralissima* n. nom. (●); *T. fuscocincta* n. sp. (■); *T. tricincta* n. sp. (▲). None of the three species were found in the southern half of Angola despite extensive sampling in the appropriate habitats.

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