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Pictoconus, new genus from South Africa and *Profundiconinae*, new subfamily
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Darioconus rosiae (Gastropoda: Conidae) a new species of the *Darioconus pennaceus* complex
from South-West Madagascar
E. MONNIER, J.-L. BATIFOIX & L. LIMPALAËR

The cones (Gastropoda) from Madagascar «Deep South»: composition, endemism and new taxa
E. MONNIER, M.J. TENORIO, P. BOUCHET & N. PUILLANDRE



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Pictoconus, new genus from South Africa and *Profundiconinae*, new subfamily (Gastropoda: Conidae)

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Key Words : Taxonomy, new genus, new subfamily, Conidae (Gastropoda, Caenogastropoda).

Abstract: In the course of the preparation of a forthcoming Iconography of living *Conidae* the necessity to introduce two new supraspecific group names appeared. They are named and described in this paper. *Pictoconus* is a genus name for a distinct monophyletic group of *Conidae* living along the South African coast. *Profundiconinae* is proposed as a subfamily for another distinct monophyletic group of species.

Pictoconus new genus

Type species

Conus pictus Reeve, 1843.

Diagnosis

Shells: (descriptive terms are taken from Röckel, Korn & Kohn, 1995)

The range of size varies from small to medium sized with exceptional specimens reaching 70 mm. (moderately large).

The protoconch is paucispiral, smooth, rounded with less than two whorls. Its colour varies from translucent white to pale cream or yellow.

The shape of the shells varies from conical to conoid-cylindrical.

The spire is low or moderately high with stepped whorls in most species. No nodules are present in the early postnuclear whorls. Its outline varies from straight to concave or convex. The sutural ramp is concave or flat, sculptured with spiral striae or only shows faint growth lines. The shoulder may be carinate (sometimes keeled), angulate or subangulate. It is not sculptured.

The body whorl is of silky to glossy texture. Its outline is straight or convex. The only sculpture is made of spiral cords on the anterior third of the shell.

The pattern varies strongly both within and between species. There are two or three brown spiral bands that are more or less solid. They are separated by ground colour zones overlaid with spiral lines of squarish spots or small chevrons.

The aperture is white or uniformly stained with pale yellow, pink or violet.

The operculum is small.

The periostracum is thin, yellowish and translucent with many spiral rows of short hair.

Radula: the teeth of *P. infrenatus*, *P. pictus* and *P. visagenus* are described in details by Tenorio, Monteiro and Terry (2008). They are of a vermivorous type, relatively large compared to

shell size ratio (shell length / tooth length: 26 to 50), with one large barb and a blade that may be absent, the anterior part is shorter than half the total tooth length, the serration is narrow with one or two rows of denticles, the waist is weak.

Animal: We could only see a few pictures of living animals (Brian Hayes, pers. comm.) showing a mottled siphon on its upper side. The foot is whitish and is also mottled on its upper side.

Biogeography: the genus is restricted to waters off the South African coasts from Cape Saint Francis (Eastern Cape Province) to off Durban (KwaZulu Natal), in the South Western Indian Ocean.

Ecology: the diet is most probably vermivorous if we consider both genetic affinities and radular morphology. The species live in rather deep waters from 10 down to 350 meters. The deepest species is *P. visagenus* which is also the one living in the more tropical waters. The literature does not contain information about the biota, food preferences or reproduction of the members of the genus.

Name derivation

The new genus name is made of the combination of “picto” from the type species *P. pictus* (Reeve, 1843) and “Conus” as it belongs to the family *Conidae* Fleming, 1822. The name is masculine.

Remarks

The Genus *Pictoconus*, gen. nov. is here proposed to group together four South African species:

Pictoconus pictus (Reeve, 1843)

Pictoconus infrenatus (Reeve, 1848)

Pictoconus visagenus (Kilburn, 1974)

Pictoconus transkeiensis (Korn, 1998)

Molecular phylogenies (Puillandre & al. 2014) show that two species (*P. infrenatus* and *P. pictus*) belonging to this group are genetically related with each other but distinct from other Conid clades. The authors place the two species in *Sciteconus* da Motta, 1991. Tucker & Tenorio (2009, 2013) also placed *P. infrenatus* and *P. pictus* in *Sciteconus* while *P. visagenus* is classified within *Plicaustraconus* Moolenbeek, 2008.

Puillandre & al. (2014) have sampled the DNA of a specimen of “*Conus*” *mozambicus* Hwass in Bruguière, 1792 a South African species also classified by Tucker & Tenorio in *Sciteconus*. This species is conchologically and geographically closest to

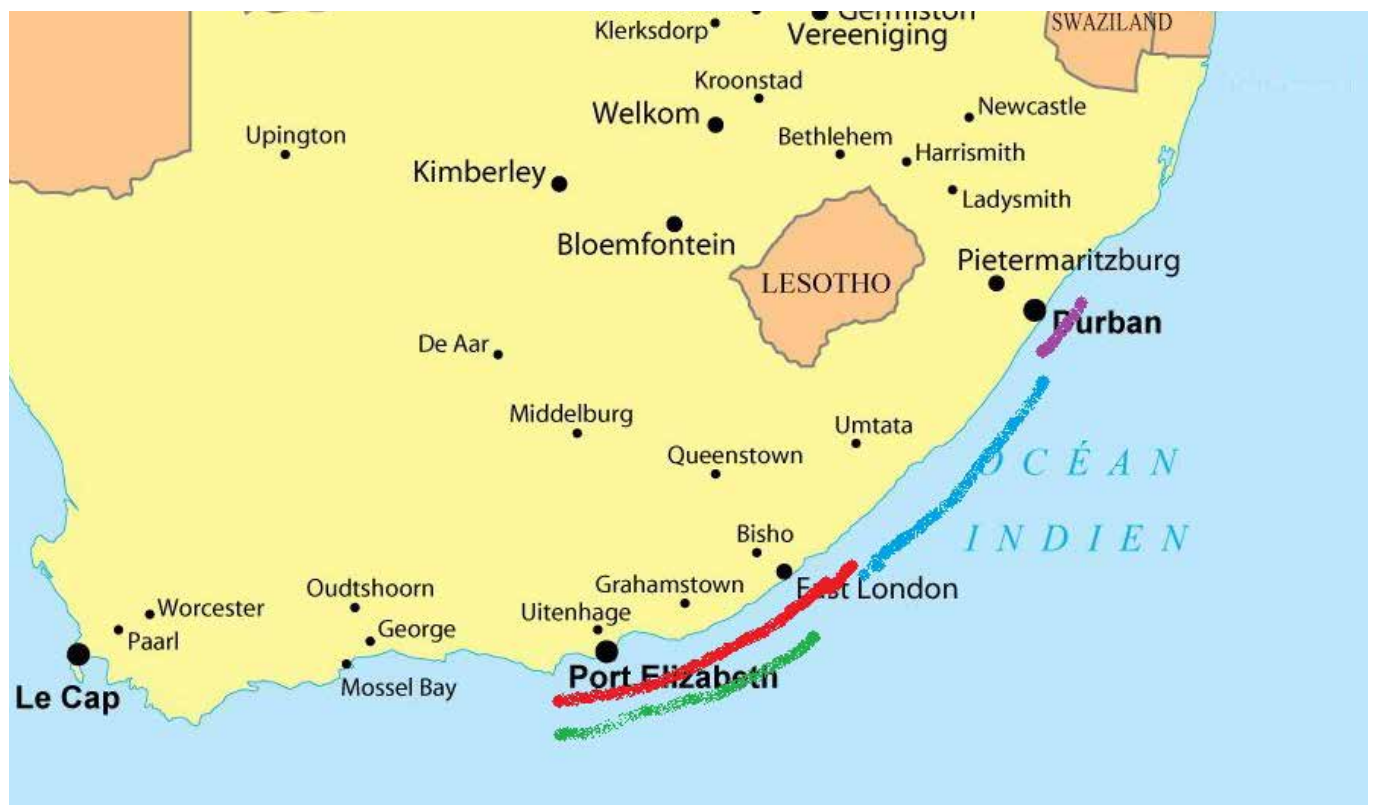
"Conus" algoensis Sowerby, 1834 type species of *Sciteconus*. The new genus differs from members of *Sciteconus* sensu Tucker & Tenorio in being restricted to Indian Ocean waters while species of *Sciteconus* are also present much farther North West in Atlantic waters up to Southern Namibia. Some members of *Sciteconus* live in much shallower waters (*C. mozambicus* and *C. algoensis* e.g.). Shells of species placed in *Sciteconus* generally have a less angulate shoulder with spiral cords (with the exception of *C. gradatulus* Reeve, 1848). In *Sciteconus* species the periostracum is smooth.

Finally *C. mozambicus* is not genetically related with the two species of *Pictoconus* gen. nov. that have been sampled. Moreover *"Conus" tinianus* another South African endemic placed by Tucker & Tenorio in the genus *Ketyconus* da Motta, 1991 is a member of the same genetic clade than *C. mozambicus*. This clade also contains *Floraconus anemone* (Lamarck, 1810) from Australia and other species from various parts of the Tropical Indo-Pacific. We therefore place *Ketyconus* da Motta, 1991 and *Sciteconus* da Motta, 1991 in synonymy with *Floraconus* Iredale, 1930. As the clade containing *P. pictus* and *P. infrenatus* remains without valid generic name, we decided to introduce a new name for it.

Plicaustraconus is in our opinion endemic to Australian waters. It is characterized by the presence of a conspicuous columellar plait in the aperture. This character is not present in *P. visagenus*. Other convergent conchological characters like the

almost flat spire and spiral striae on the sutural ramp are not significant at generic level.

Endemism and biogeography: the short protoconch presenting less than two whorls is most probably indicative of the absence of a veliger stage for the larvae, thus restricting the possibility of geographic range extensions. In this context it is interesting to observe that three of the four species are mostly allopatric but with adjacent ranges. The genus lives in the southernmost end of the Indian Ocean at the edge of the Tropical Indo-Pacific realm. The temperature of waters is tropical off Natal but gets progressively temperate with dominant currents flowing southwards. This region is an important hotspot of biodiversity housing several endemic radiations of Gastropods in families like: *Cypraeidae* (*Cypraeovula*), *Marginellidae* (*Marginella*), *Fascioliidae* (*Africolaria*), Conidae (*Nataliconus* an endemic offshoot of the molluscivorous Conid clade) etc. All these groups have species with limited geographic ranges and short protoconches indicating a direct development. In colder waters, this mode of development provides competitive advantages for adaptation to the local environmental conditions.



Geographic range of *Pictoconus* species

- *P. pictus*
- *P. infrenatus*
- *P. transkeiensis*
- *P. visagenus*

Profundiconinae* new subfamily*Type genus**

Profundiconus Kuroda, 1956. At present this genus is the only one known to belong to the subfamily which is therefore monogeneric.

Name derivation

The name is derived from *Profundiconus* Kuroda, 1956 the type genus of the subfamily.

Shell characters

The shells vary in size from very small to large (10 – 110 mm.). The shell is thin, of varying shape (from conical to broadly ventricosely conical and narrowly conoid-cylindrical). Many species have a convex outline of the last whorl but others are rather straight. The spire is most often moderately high with rounded shoulders that may be tuberculate in some species. The nodules on the early teleoconch whorls most often become obsolete on the later ones. The anal notch is shallow. Large operculum with serrated outer edge.

Animal

Taki (1937) described in a detailed way the anatomy of *Profundiconus tuberculosus* (Tomlin 1937), a small Japanese species. Most of this work was republished by Röckel in 1994. Tenorio & Castelin, 2016 also commented this work.

Radular characters

Tenorio studied the radular teeth of many species of *Profundiconus*. The anterior part of the tooth is shorter than the posterior one and devoid of serrations. There is a serrated external cusp and a fringe of projections just below the waist that are unknown in other Conidae. There is a shaft fold. The base of the tooth has a large basal spur.

Biogeography

All species live in the Tropical Indo-Pacific except one found in the Tropical Eastern Pacific (*P. emersoni* Hanna, 1963).

Ecology

All known species live in deep water (50 to 1180 m.).

Diet

The animals are probably vermivorous if the radular structure is

considered. However the only citation in literature about a prey of a *Profundiconus* (Marshall, 1981) states that a cephalopod beak was found in the digestive tract of a *P. smirnoides* fished off North of New Zealand.

Taxonomy

Puillandre & al. (2014) evidenced the existence of four deep clades within the monophyletic family Conidae. Two more were more recently discovered (Puillandre & Tenorio, 2017). The most basal clade contains species of *Profundiconus*. The others are *Californiconus*, *Pygmaeonus* and *Pseudolilliconus*, then several genera grouped around *Conasprella* Thiele, 1929 and, finally the remaining species of *Conus* Linnaeus, 1758. In 2015 and 2017 these clades were given a generic level.

This apparently contradicted the classification of Tucker & Tenorio (2009 and 2013) that was founded on three families and four subfamilies. In this classification, *Profundiconus* is a genus of the family *Conilithidae* like many others. In fact, the phylogenetic classification of Puillandre & al. is remarkably coherent with Tucker & Tenorio's system based on radular, conchological and feeding characters and mostly differ in the nomenclatural ranks (generic vs. familial) given to the various identified clades.

Conilithes antdiluvianus Bruguière, 1792 is a fossil European species that lived in the Mediterranean Sea during the Pliocene. It is the type species of *Conilithes*. Its shell is remarkably convergent with that of *Profundiconus teramachii* (Kuroda, 1956). However the fossil species placed in *Conilithes* Swainson, 1840 by Tucker & Tenorio (2009, 2013) all lived in European and American Seas and show strong conchological convergences with recent species of *Conasprella* Thiele, 1929, *Dalliconus* Tucker & Tenorio, 2009 or *Fusiconus* da Motta, 1991. Other species of *Profundiconus* are only remotely resemblant to *Conilithes* species. In any case, it is impossible to confirm if *Conilithes* is genetically linked with *Profundiconus* by a more recent common ancestry than with other genera because all its species are extinct. However if we retain the conchological proximity and paleobiogeography, it is likely that *Conilithes* is apparented to the genetic clade named *Conasprella* by Puillandre & al., 2015. This situation leaves without a subfamily name the deep phylogenetic clade of *Profundiconus*. For these reasons, we decided to give a name to this clade at subfamily level. Tenorio & Castelin (2016) published a molecular

Puillandre & al. (2014, 2015, 2017)	Tucker & Tenorio (2009, 2013)	Monnier, Limpalaër, Robin & Roux in press, 2018
Genera	Families and Subfamilies	Subfamilies
<i>Profundiconus</i>	<i>Conilithidae</i> - <i>Conilithinae</i>	<i>Profundiconinae</i> n. subfamily
<i>Pygmaeonus</i>	<i>Conilithidae</i> - <i>Conilithinae</i>	<i>Californiconinae</i>
<i>Lilliconus</i>	<i>Conilithidae</i> - <i>Conilithinae</i>	
<i>Californiconus</i>	<i>Conilithidae</i> - <i>Californiconinae</i>	
<i>Conasprella</i>	<i>Conilithidae</i> - <i>Conilithinae</i>	<i>Conilithinae</i>
<i>Conus</i> (with many subgenera)	<i>Conidae</i> - <i>Coninae</i>	<i>Coninae</i>
	<i>Conidae</i> - <i>Puncticulinae</i>	
	<i>Conorbidae</i>	

phylogeny for twelve species of this group. We refer the reader to this paper for more information on the Genus *Profundiconus*.

Comments

This genus has long been poorly documented because of the scarcity of specimens linked with their deep water habitat. The number of described species has strongly increased from seven before 1980 (mostly from Japanese waters) to twenty five nowadays. Deep dredging campaigns performed in the Tropical Western Pacific by MNHN have allowed the discovery of many new species. Manuel J. Tenorio, alone or with other authors, has extensively studied this genus and described many of these new species. Yet, some are still in need of a name and others are still waiting for their discovery in regions that are still unexplored.

The genus is the most common of the family below 200 m. in the Tropical Indo Pacific.

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- 1 *Pictoconus pictus* 40.8 mm Cape Saint Francis, South Africa 35 m
 2 *Pictoconus pictus* live animal Photo Brian Hayes
 3 *Pictoconus transkeiensis* 50.1 mm Coffee Bay, Transkei, South Africa 80 m
 4 *Pictoconus infrenatus* 38.9 mm Fish River, Port Alfred, South Africa 25-35 m
 5 *Pictoconus visagenus* 22.7 mm Port Shepstone, Natal, South Africa



- 1 *P. cakobaui* 18.9 mm Somosomo Strait, Vanua Levu, Fiji 426-487 m, Holotype MNHN IM-2000-21030
- 2 *P. kanakinus* 17.1 mm New Caledonia
- 3 *P. tuberculosus* 16.2 mm Japan, SMNS ZI 0091264 Coll. BdM
- 4 *P. limpalaeri* 34.9 mm Balut Island, Philippines 100-150 m, Paratype 1
- 5 *P. profundorum* 70.3 mm Japan, SMNS ZI 67253 Coll. DR
- 6 *P. smirnoides* 60.5 mm New Caledonia Coll. LL
- 7 *P. teramachii* 82.9 mm Wakayama, Japan 200 m

Darioconus rosiae (Gastropoda: Conidae) a new species of the *Darioconus pennaceus* complex from South-West Madagascar

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ABSTRACT

The new species *Darioconus rosiae* sp. nov. is described from material obtained during the last ten years from local fishermen in the area surrounding Ambatomilo, North of Toliara, South-West of Madagascar.

This species has been collected alive from 3 m deep on the extern slope of the reef. The new species is compared to *Darioconus behelokensis* (Lauer, 1989), *D. corbieri* (Blöcher, 1994), *D. vezoi* (Korn, Niederhöfer & Blöcher, 2000) and *D. praelatus* (Hwass in Bruguière, 1792).

INTRODUCTION

In Madagascar, the *Darioconus pennaceus* complex is presently known by various populations described as *Conus pennaceus behelokensis* Lauer, 1989 (type locality: Beheloka, 60 Km South Toliara ≡ Tuléar, South-West Madagascar); *Conus pennaceus corbieri* Blöcher, 1994 (type locality: Salary, 100 Km North Toliara); *Conus pennaceus tsara* Korn, Niederhöfer & Blöcher, 2000 (type locality: Toalagnaro ≡ Fort-Dauphin, South-Est Magagascars and *Conus pennaceus vezoi* Korn, Niederhöfer & Blöcher, 2000 (type locality: Maromitiliky, 85 Km South Toliara).

We consider here that all these populations represent distinct species.

Currently, the taxon *Darioconus behelokensis* is used for specimens living along an expanse of 200 km in a straight line between Beheloka (in the South of the Great Lagoon of Toliara) and Beangolo (in the North).

However the geographical distribution of what is usually called *D. behelokensis* is interrupted for about 100 km. between Anakao (North of Beheloka) and Manombo (South of Tsiandamba). The mouth of the mighty river Onilahy (South of Toliara) and two other rivers (North of Toliara) form natural breaks in the Great Lagoon and consequently no specimens of the *Darioconus pennaceus* complex are found in this area. *D. behelokensis* is in fact restricted in the type locality (Beheloka) in the extreme South of the area. We describe here *Darioconus rosiae* n. sp. that lives between Tsiandamba and Beangolo in the North of the Great Lagoon. The description of the new species is based on morphological and pattern characters.

INTRODUCTION

A Madagascar, le complexe *Darioconus pennaceus* est aujourd'hui composé de plusieurs populations connues comme *Conus pennaceus behelokensis* Lauer, 1989 (localité type : Beheloka, 60 Km Sud Toliara ≡ Tuléar, Sud-Ouest Madagascar) ; *Conus pennaceus corbieri* Blöcher, 1994 (localité type : Salary, 100 Km Nord Toliara; *Conus pennaceus*

tsara Korn, Niederhöfer & Blöcher, 2000 (localité type : Toalagnaro ≡ Fort-Dauphin, Sud-Est Magagascars et *Conus pennaceus vezoi* Korn, Niederhöfer & Blöcher, 2000 (localité type: Maromitiliky, 85 Km Sud Toliara). Nous considérons ici toutes ces espèces comme distinctes. Le taxon *Darioconus behelokensis* est généralement employé pour des spécimens vivant à environ 200 Km en ligne droite entre Beheloka (au Sud du Grand Lagon de Toliara) et Beangolo (au Nord), Cependant la distribution géographique de ce qui est habituellement appelé *D. behelokensis* est discontinue et interrompue sur environ 100 km entre Anakao (Nord de Beheloka) et Manombo (Sud de Tsiandamba). Les embouchures du puissant fleuve Onilahy (Sud de Toliara) et de deux autres cours d'eau forment une rupture dans le Grand Lagon et par conséquent aucun *D. pennaceus* n'est trouvé dans cette zone. *D. behelokensis* est en réalité restreint à la localité type (Beheloka) dans l'extrême Sud de cette zone. Nous décrivons ici *Darioconus rosiae* n. sp. qui vit entre Tsiandamba et Beangolo au Nord du Grand Lagon. Cette nouvelle espèce est décrite à partir de caractéristiques morphologiques.

MATERIAL AND METHODS

Taxonomy follows Tucker & Tenorio (2009) with the updates and modifications introduced in Tucker & Tenorio (2013). Sampling was done directly by Rosia Raharisoa and the second author in the fishermen villages distributed all along the Great Lagoon of Toliara.

We describe shell morphology using the terminology established in Röckel et al. (1995).

Adult shells were measured with digital calipers, with measurements rounded to 0.1 millimeter.

We use R (a Language and Environment for Statistical Computing, R Core Team, R Foundation for Statistical Computing, Vienna, Austria, 2016, <https://www.R-project.org/>) to produce graphs.

Maps were made with Google map.

Museums and private collections

MNHN: Muséum National d'Histoire Naturelle, Paris, France.

MHNG: Muséum d'Histoire Naturelle, Genève, Switzerland.

SMNS: Collection da Motta and collection Röckel in the collection of the Staatliches Museum für Naturkunde, Stuttgart, Germany.

EM: Eric Monnier reference collection, Paris, France.

JLB: Jean-Louis Batifoix reference collection, Brunoy, France.

Shell morphometry	
S_L maximum shell length	AH aperture height
MD maximum diameter	RD relative diameter (= MD/AH)
SH spire height	RSH relative spire height (= SH/ S_L)
HMD height of maximum diameter	PMD relative position of the maximum diameter (= HMD/AH)
W shell weight	RW relative shell weight (= W/ S_L)

RESULTS

SYSTEMATICS

Family CONIDAE Fleming, 1822
Genus *Darioconus* Iredale, 1930

Darioconus rosiae sp. nov.

(Plate 1, Figs. 1–11; Plate 2, Figs. 1-11, Plate 3, Figs. 1-10)

Type material: Holotype and 25 paratypes. The holotype is deposited in the Muséum National d’Histoire Naturelle, Paris, France, under the number MNHN-IM-2000-33712
See Table 1 for details.

Material examined: Several hundreds of specimens of the five species of the Malagasy *D. pennaceus* complex have been examined and 82 such specimens (including 26 of the new species) have been measured and studied.

Type locality: Ambatomilo, 120 km in the North of Toliara, South-West Madagascar.

Distribution and habitat: The species has been collected at a

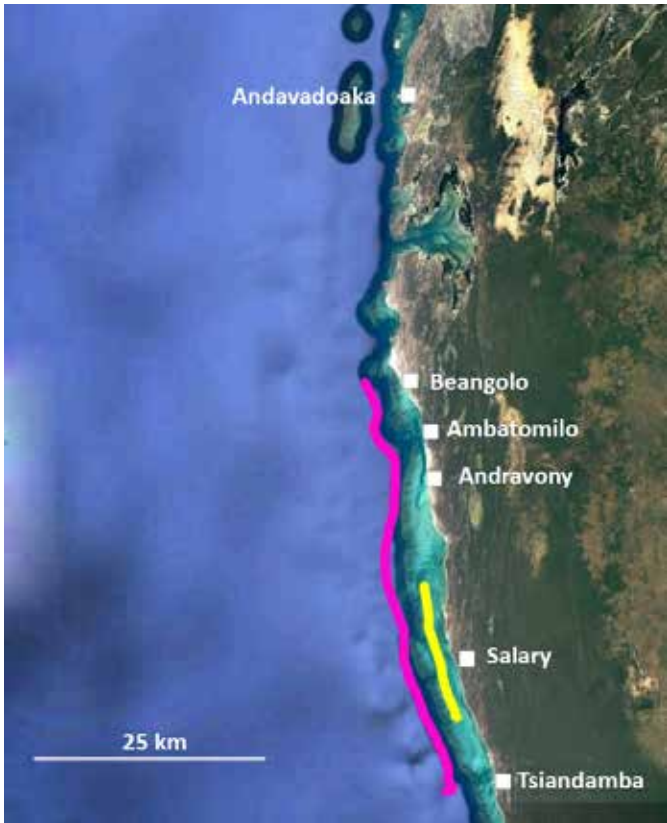


Figure 2: Distribution map for *D. rosiae* n. sp. ● and *D. corbieri* ● in the North of the Great Lagoon of Toliara.

distance of about 40 kilometers (in a straight line) from Bean-golo in the North of the area, Ambatomilo, Andravony, Salary to Tsiandamba in the South of the area, at depths ranging from 3 to 20 m out of the coral reef of the lagoon.

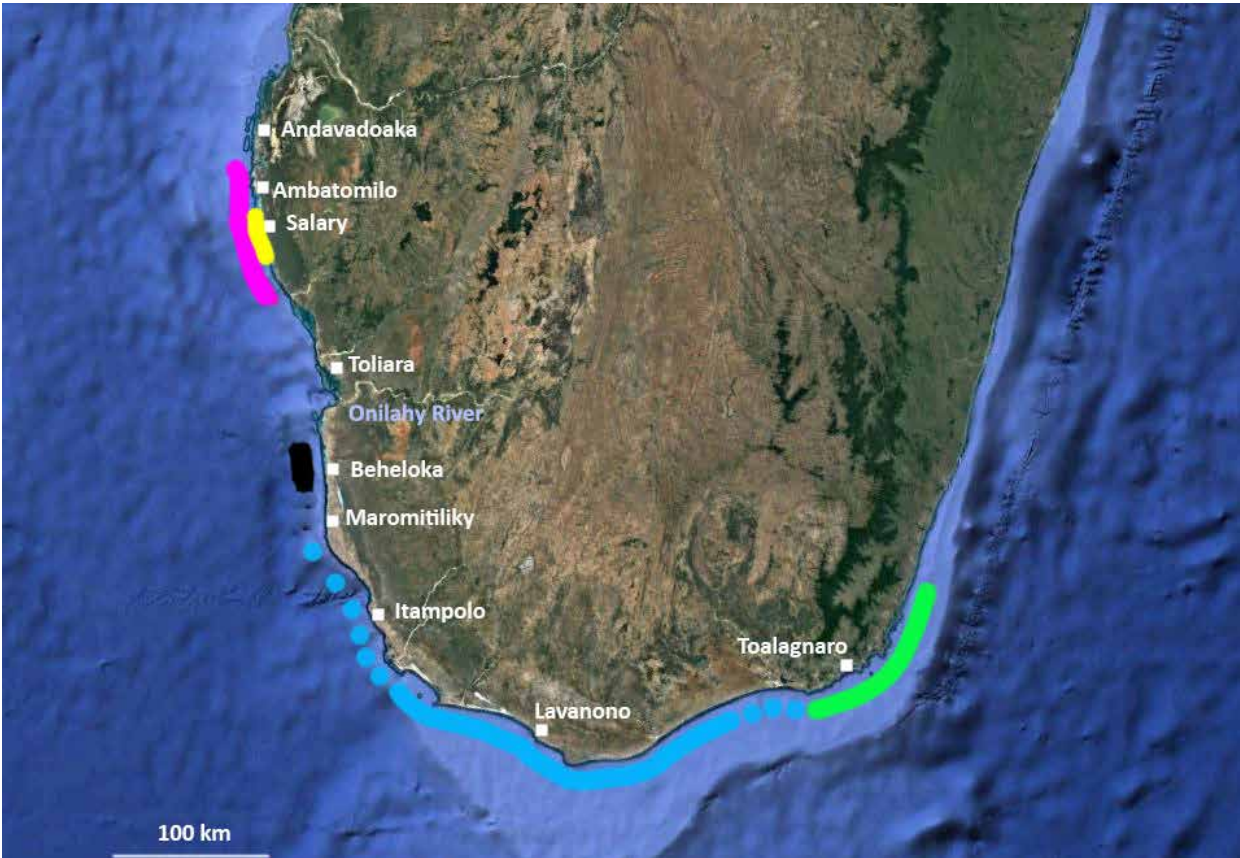


Figure 1: Distribution map for *Darioconus pennaceus* Malagasy complex: *D. rosiae* n. sp. ● ; *D. corbieri* ● ; *D. behelokensis* ● ; *D. vezoi* ● and *D. praelatus* ● .

Type	Institution	Dimensions - Weight $S_L \times MD \times W(\text{mm} \times \text{mm} \times \text{g})$	Locality
Holotype	MNHN IM-2000-33712	58.3 x 28.4 x 21.1	Ambatomilo, South-West Madagascar
Paratype 1	EM coll.	58.2 x 30.8 x 24.7	Salary, South-West Madagascar
Paratype 2	EM coll.	50.8 x 26.8 x 17.1	Beangolo, South-West Madagascar
Paratype 3	EM coll.	70.7 x 35.2 x 40.1	South-West Madagascar
Paratype 4	EM coll.	70.7 x 36.3 x 40.6	South-West Madagascar
Paratype 5	EM coll.	62.4 x 30.9 x 26.4	South-West Madagascar
Paratype 6	EM coll.	58.9 x 29.7 x 19.9	Ambatomilo, South-West Madagascar
Paratype 7	EM coll.	58.6 x 30.2 x 20.9	South-West Madagascar
Paratype 8	EM coll.	51.0 x 26.9 x 16.8	South-West Madagascar
Paratype 9	EM coll.	54.7 x 29.7 x 27.3	South-West Madagascar
Paratype 10	EM coll.	59.0 x 30.3 x 24.9	Ambatomilo, South-West Madagascar
Paratype 11	JLB coll.	46.5 x 23.3 x 11.0	Beangolo, South-West Madagascar
Paratype 12	JLB coll.	49.5 x 26.2 x 14.9	South-West Madagascar
Paratype 13	JLB coll.	55.7 x 28.3 x 18.8	South-West Madagascar
Paratype 14	JLB coll.	46.7 x 24.1 x 10.1	South-West Madagascar
Paratype 15	JLB coll.	61.5 x 30.1 x 23.4	Ambatomilo, South-West Madagascar
Paratype 16	JLB coll.	66.4 x 35.1 x 37.0	South-West Madagascar
Paratype 17	JLB coll.	64.7 x 33.3 x 32.6	South-West Madagascar
Paratype 18	JLB coll.	52.6 x 29.3 x 22.0	South-West Madagascar
Paratype 19	JLB coll.	56.3 x 31.4 x 28.3	Andravony, South-West Madagascar
Paratype 20	JLB coll.	57.0 x 30.9 x 28.6	South-West Madagascar
Paratype 21	JLB coll.	56.8 x 28.9 x 23.3	South-West Madagascar
Paratype 22	EM coll.	52.1 x 27.2 x 15.4	South-West Madagascar
Paratype 23	JLB coll.	50.3 x 27.8 x 17.5	South-West Madagascar
Paratype 24	JLB coll.	55.2 x 28.7 x 17.7	South-West Madagascar
Paratype 25	EM coll.	63.7 x 32.5 x 28.7	South-West Madagascar

Table 1: Types of *Darioconus rosiae* n. sp.

Etymology: The new species is named after Rosia Raharisoa, native from Toliara, who helped the second author to visit the fishermen villages of the Great Lagoon of Toliara between Andavadoaka (in the North) and Beheloka (in the South of the area) and to select the studied material during several years.

Description of the shell:

**Figure 3: Beangolo, fishermen village, in the North of the Great Lagoon of Toliara**

Morphometric parameters: S_L = 46–71 mm (mean S_L = 57.2 mm); RD = 0.56–0.63 (mean RD = 0.60); PMD = 0.82–0.89 (mean PMD = 0.85); RSH = 0.10–0.17 (mean RSH = 0.13); RW = 0.22–0.57 (mean RW = 0.40).

Description: Shell medium-sized to moderately large, ventricosely conical to conical in profile. The shell has a shiny texture. It is moderately solid to solid in weight.

The apex is pink. The protoconch is most probably paucispiral. The adult shell has more than 11 whorls. The spire is of low to moderate height, from straight to slightly concave in profile. The spire whorls are juxtaposed and the suture is narrow and well-marked. The teleoconch sutural ramps are flat to slightly concave with numerous weak radial threads and very weak spiral striae. The shoulder is subangulate to almost rounded and smooth.

The last whorl is convex. The adapical half of the last whorl is smooth while low narrow spiral threads progressively on the abapical half. The columellar fold is strong and ivory coloured. Siphonal lip outline is subrounded. The aperture is wider at base than near shoulder, white, pale bluish grey to pink coloured often according to the external colour of the shell. The outer lip is clearly convex and the profile of the origin of the lip is receding.

The pattern and the colour of the new species are extremely variable. The ground colour of the last whorl is white mostly irregularly shaded by a greyish blue or pink hue. This is overlaid with mustard, bright orange, orange to reddish brown or chestnut to very dark brown. There are 30 to 45 irregular dotted or solid spiral lines on the spiral threads that are more or less obsolete in the adapical part of the last whorl. They are darker than the overlying colour of the shell. The last whorl is covered by variably sized ground colour tents. The spiral lines are also irregularly interrupted by smaller tents. All the tents are outlined with dark brown on the edge towards the outer lip. The triangular tents sometimes coalesce spirally or axially to form great irregular blotches.

The pattern and colour of the spire is in accordance with that of the last whorl.



Figure 4: Fresh specimens of *Darioconus rosiae* n. sp. in Ambatomilo, type locality of the new species.

Living animal and radula:

Morphology of the soft parts, radula and DNA of the new species are not yet known. Periostracum is translucent and yellowish.

COMPARISON

Korn, Niederhöfer & Blöcher in 2000 have studied the different populations of the Malagasy *Darioconus pennaceus* complex (as subspecies of *D. pennaceus*) and gave their measurements. Our new species was recognized by these authors as a quite distinct undescribed population from Ambatomilo in relation to *D. behelokensis*, *D. corbieri*, *D. vezoi*, *D. tsara* and *D. pennaceus* (from Mozambique).

Darioconus rosiae, new species must be compared with the four other endemic species of the *Darioconus* complex living in Madagascar. Two of these species are found in the warm waters in the region of the Great Lagoon of Toliara in the West South of the Island: *D. corbieri* (Blöcher, 1994) around Salary in the Northern part of the lagoon and *D. behelokensis* (Lauer, 1989) in Beheloka in the South of the Lagoon. Two other species are living in the Deep South of Madagascar in rather cooler waters without coral reefs and lagoon: *D. vezoi* (Korn, Niederhöfer & Blöcher, 2000) in the extreme South of the Island and *D. praelatus* (Hwass in Bruguière, 1792) in the South East.

-A- The species of the *Darioconus pennaceus* complex from Madagascar waters.

-1- *Darioconus corbieri* (Blöcher, 1994)

Holotype in SMNS. Type locality: Salary, 100Km North of Toliara, South-West Madagascar.

This species is only found in a restricted area around Salary in

the North of the Great Lagoon of Toliara and has a much smaller geographical repartition than *D. rosiae* n. sp.

D. corbieri and *D. rosiae* n. sp. have different habitats: the former inside the lagoon and the new species outside the lagoon on the outer reef.

The ground colour of *D. corbieri* is always pink, the pattern is constantly reddish brick brown and the tents are not strongly edged with darker brown. The spiral lines are very irregular and quite often absent or obsolete. *D. corbieri* is finally very constant in colour and cannot be confused with other similar species.

-2- *Darioconus behelokensis* (Lauer, 1989)

Holotype in MNHN. Type locality: Beheloka, South of Toliara, South-West Madagascar.

This species too seems to have a very restricted distribution area around Beheloka, 40 Km South of Onilahy river mouth and 60 Km South of Toliara.

The ground colour is whitish mostly covered with various amounts of greyish blue and mauve to pale violet shades. The pattern varies very little from orange to chestnut brown with many very fine darker spiral dotted lines regularly spaced on the last whorl. The tents are edged with dark brown.

The "colour concept" of *Darioconus behelokensis* forma *pseudoracemosus* Bozzetti, 2012 is a mixture of *D. behelokensis* with a quite uniform russet caramel-coloured shell with blue tents pattern and of *D. vezoi* of the same colour without tents. Two specimens of *D. pennaceus* f. *pseudoracemosus* were studied



Figure 5: specimens of *Darioconus behelokensis* in Beheloka, type locality of the species.

for the description of the form: the first specimen found in Toliara (erroneous, corrected by us as Beheloka) is a *D. behelokensis* and the second specimen found in Cap Sainte Marie is a *Darioconus vezoi*.

-3- *Darioconus vezoi* (Korn, Niederhöfer & Blöcher, 2000)

Holotype in SMNS. Type locality Maromitiliky, S. W., Madagascar. This type locality needs confirmation with further material. From our present knowledge no specimens of this species are found in this area but only 200 km. further South. This species has a broad conical last whorl and is easily recognized by its chocolate brown pattern and duller texture. A colour form with white tents was called *D. pennaceus pseudoecho* Bozzetti, 2013. Specimens of this species are found primarily around Lavanono in the extreme South of Madagascar.

-4- *Darioconus praelatus* (Hwass in Bruguière, 1792)

Lectotype in MHNG (designated by Kohn in 1968). Type locality: East Indies.

The senior author could examine in Geneva the lectotype of *Conus praelatus* Hwass in Bruguière, 1792 (MHNG 52688, see

Plate 7, n°3) and compare the actual shell with the original figure of *Conus praelatus*, (fig.4, Pl. 345 in Encyclopédie Méthodique. Histoire Naturelle des Vers.) reproduced here in fig. 6. A comparison with the shells from the vicinity of Toalagnaro shows that these shells are fully matching in pattern, weight and texture with the lectotype and the original figure. On the other hand it does not match with the shells from North Mozambique which are instead closer to with "the true" *D. pennaceus* (Born 1778)). We therefore conclude that *D. tsara* Korn, Niederhöfer & Blöcher, 2000 is a junior synonym of *D. praelatus* (Hwass in Bruguière, 1792).

The species lives in South East Madagascar around Toalagnaro and Sainte Luce where granitic rocks form platforms with tide-pools. The shell is thinner and lighter than the similar Malagasy species and its surface has a unique gloss. The pattern is orange-brown over a greyish or bluish background.



Figure 6: *Conus praelatus*, fig.4, Pl. 345. Encyclopédie Méthodique, Histoire Naturelle des Vers.

-B- Graphical morphometric comparison of the five species of Malagasy *D. pennaceus* complex

We produce graphs: $PMD = f(RD)$ (relative Position of the Maximum Diameter versus Relative Diameter) for comparison of shell morphometry of the five species of the *D. pennaceus* complex (including the new species).

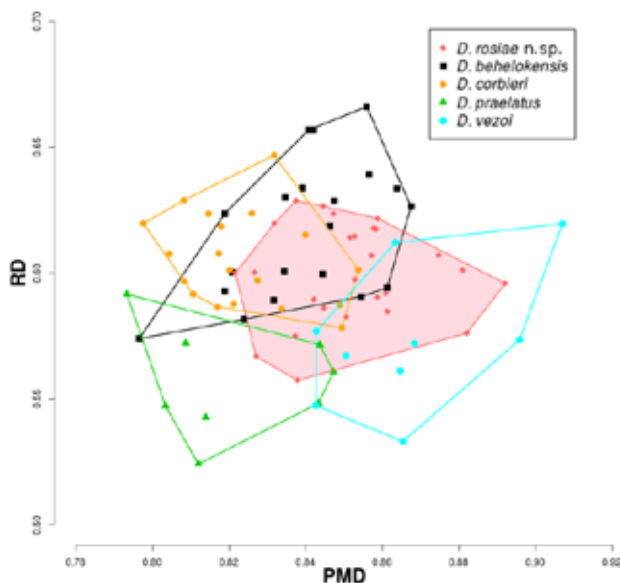


Figure 7: Graph of $PMD = f(RD)$ for the five species; *Darioconus rosiae* n. sp. is figured in pink color.

Figure 7 shows that the plotting area of each species represented on the graph: $PMD = f(RD)$ is significantly different from each other relative species. Moreover *D. rosiae* n. sp. has a central position in this graph, this new species sharing common morphological points with every other relative species.

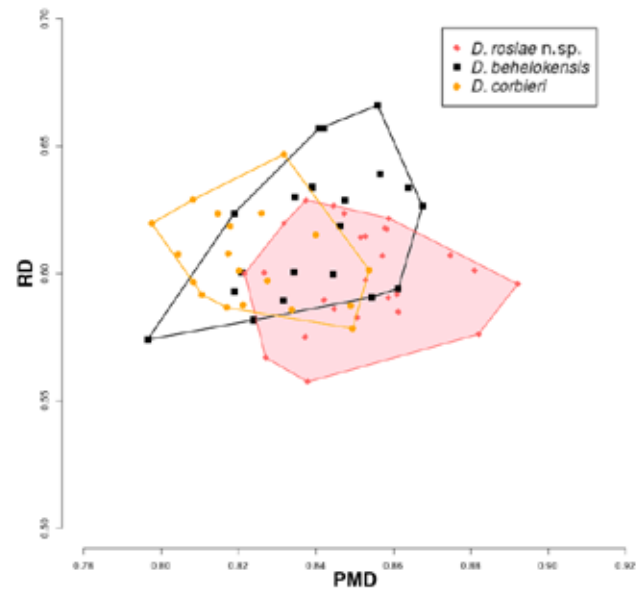


Figure 8: Graph of $PMD = f(RD)$ for the three species from the great lagoon of Toliara in the South West of Madagascar. *Darioconus rosiae* n. sp. is figured in pink color.

Despite the relative average dispersion of the dots for each of the three species from the South West Madagascar in figure 8, it must be noted that no more than 50% of the area delimited by the dots of the new species are shared with *D. behelokensis* and even less with *D. corbieri*.

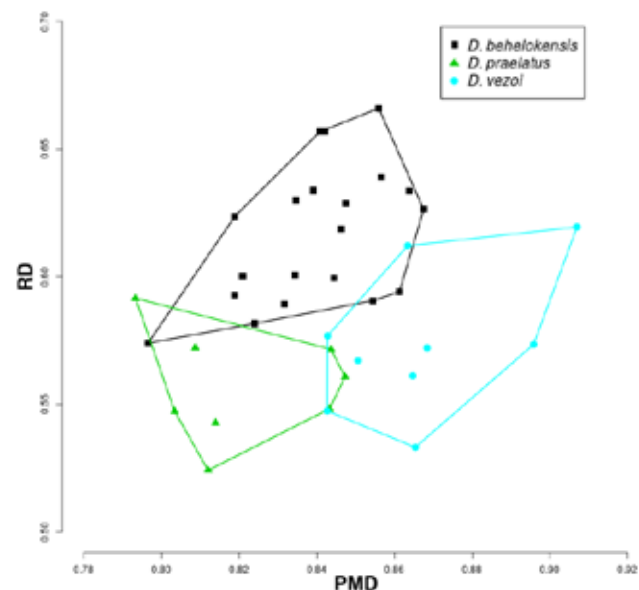


Figure 9: Graph of $PMD = f(RD)$ for the three southernmost species from Madagascar.

Figure 9 shows that the plotting areas of the three southernmost species are almost distinct from each other bringing out great differences in morphology between them.

-C- Comparisons of *D. rosiae* n. sp. with the Malagasy *Darioconus pennaceus* complex species

The morphometric and weight parameters of the five *D. pennaceus* complex species from Madagascar are summarized in Table 2 (vide infra).

Last whorl shape of the five species of *Darioconus* are conical to ventricosely conical and scarcely conoid cylindrical according to the tabular key given by Röckel, Korn & Kohn in the RKK.

of the new species it was impossible to observe a complete protoconch. *D. rosiae* n. sp. is most probably paucispiral as its sister specie: *D. behelokensis*.

D. rosiae has a geographic range significantly larger than *D. behelokensis*. Moreover it is found much farther North of the Great Lagoon of Toliara.

D. rosiae has a larger average size and a more conical shape than *D. behelokensis*. Spiral lines are less numerous, sometimes missing, and less regularly spaced than in *D. behelokensis*.

Species		SL	RD	PMD	RSH	RW (g/mm)
<i>D. rosiae</i> n. sp. 26 specimens	our values	46.5 - 70.7	0.56 - 0.63	0.82 - 0.89	0.10 - 0.17	0.22 - 0.57
	medium value	57.2	0.60	0.85	0.13	0.40
	Korn-Niederhöfer-Blöcher*	50 - 58	0.59 - 0.64	0.70 - 0.81	0.10 - 0.15	0.26 - 0.44
<i>D. behelokensis</i> 20 specimens	our values	42.4 - 64.4	0.57 - 0.67	0.80 - 0.87	0.11 - 0.16	0.21 - 0.52
	medium value	55.5	0.62	0.84	0.13	0.34
	Korn-Niederhöfer-Blöcher	40 - 62	0.56 - 0.62	0.75 - 0.84	0.08 - 0.15	0.20 - 0.38
<i>D. corbieri</i> 19 specimens	our values	47.3 - 64.8	0.58 - 0.65	0.80 - 0.85	0.08 - 0.14	0.27 - 0.67
	medium value	55.0	0.61	0.82	0.11	0.42
<i>D. vezoi</i> 9 specimens	our values	52.9 - 66.7	0.53 - 0.62	0.84 - 0.91	0.09 - 0.15	0.23 - 0.51
	medium value	59.4	0.57	0.87	0.11	0.36
	Korn-Niederhöfer-Blöcher	27 - 54	0.50 - 0.63	0.76 - 0.87	0.07 - 0.15	0.09 - 0.41
<i>D. praelatus</i> (= <i>tsara</i>) 8 specimens	our values	46.4 - 66.6	0.52 - 0.59	0.79 - 0.85	0.12 - 0.16	0.17 - 0.32
	medium value	55.1	0.56	0.82	0.14	0.23
	Korn-Niederhöfer-Blöcher	30 - 55	0.54 - 0.65	0.70 - 0.81	0.11 - 0.15	0.09 - 0.24
<i>D. pennaceus</i> complex (Madagascar)	Röckel, Korn & Kohn (RKK)	45 - 61	0.56 - 0.62	0.75 - 0.84	0.08 - 0.15	0.22 - 0.37

Table 2: Morphometric and weight parameters including SL, RD, PMD, RSH and RW for the *Darioconus pennaceus* complex in Madagascar

*Values given in 2000 by Korn, Niederhöfer & Blöcher for the population from Ambatomilo (undescribed at that time and described here as *D. rosiae* n. sp.).

- *D. rosiae* n. sp. is conical to ventricosely conical
- *D. behelokensis* is more ventricosely conical than conical
- *D. corbieri* is ventricosely conical
- *D. vezoi* is mostly conical, few specimens are ventricosely conical
- *D. praelatus* is mostly ventricosely conical, scarcely conoid cylindrical

We can classify the five species of Malagasy *Darioconus* in the following order from the most conical (left) to the less conical (right):

D. vezoi* > *D. rosiae* n. sp. > *D. behelokensis* > *D. corbieri* > *D. praelatus

According to Table 2 and the shell characters defined in RKK, *D. praelatus* is moderately solid with an average relative weight of 0.23 g/mm. All the other relative species are solid, especially *D. corbieri* (average RW = 0.42) and *D. rosiae* n. sp. (average RW = 0.40).

Due to the erosion of the spire on all the examined specimen

Homogeneity in the very constant chestnut orange to warm brown colours of the pattern of *D. behelokensis* contrasts sharply with the very great variability with that of *D. rosiae* n. sp. The background of the new species varies from white to bluish grey or pink but is never bluish purple as in *D. behelokensis*. As in *D. behelokensis*, the tents of *D. rosiae* are edged with dark brown and can widely vary in size although they are often more triangular.

REMARKS

Various forms of *D. rosiae* n. sp. have been named in literature but do not have a valid status according to the ICZN rules:

- form *melbae* from Beangolo has a bluish to grey background and a chestnut to dark brown pattern. This form is sometimes attributed to Lauer with the date of 1989 but in fact it was never described. It appears for the first time in literature in Robin (2008) with the authorship of Lauer that refers in fact to *D. pennaceus* f. *behelokensis*.
- *D. pennaceus pennaceus* f. *confusa* Bozzetti, 2010 is a pale fuzzy form of the new species.

- *D. pennaceus* f. *mimeticus* Bozzetti, 2017 whose last whorl is entirely covered by very small tents.
- *D. pennaceus melbae* f. *nigra* Bozzetti 2017 with very dark pattern.
- *D. pennaceus melbae* f. *azurea* for greyish blue background specimens of *D. rosiae* n.sp.

The warm South Equatorial Current is constantly directed Southward in the South East coast of Madagascar, from East to West in the extreme South of the Island and Northward in the South West coast (Mozambique Channel). In 2000, Korn, Niederhöfer and Blöcher suggested that this surface current is probably playing an important role in producing genetic isolation between the populations of the *Darioconus pennaceus* complex in Madagascar.

D. behelokensis, *D. praelatus* and *D. vezoi* have a large bulbous and very paucispiral protoconch (unpublished personal observations), and the two other Malagasy species, *D. corbieri* and *D. rosiae*, n. sp. also most probably have a paucispiral protoconch. Four of the members of the complex in Madagascar have an allopatric distribution along the Southern coast: *D. praelatus* (South East), *D. vezoi* (Extreme South), *D. behelokensis* (South West, in the South of the Great Lagoon) and *D. rosiae* n. sp. (South West in the North of the Great Lagoon). The very restricted area where *D. corbieri* lives (around Salary) is included in the larger geographical distribution of *D. rosiae* n. sp. However the latter lives outside the barrier reef while *D. corbieri* is found inside the lagoon in shallow water. We can conclude that there is an allopatric speciation between the different Malagasy species of *D. pennaceus* complex.

DNA analysis should confirm in the future that these isolated populations from the South of Madagascar are genetically distinct from each other. It is also probably the case for many of the populations of *Darioconus pennaceus* complex in the Tropical Indo-Pacific region.

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Annex 1 : Measurements and calculations

<i>D. rosiae</i>												
Types	Institution	SL	MD	AH	HMD	RD	PMD	RSH	W	RW	Locality	
Holotype	MNHN	58.28	28.4	50.95	42.69	0.557	0.838	0.126	21.1	0.362	Ambatomilo	
P. 1	EM coll.	58.16	30.76	50.05	42.68	0.615	0.853	0.139	24.7	0.425	Salary	f. mimeticus
P. 2	EM coll.	50.82	26.77	43.59	37.12	0.614	0.852	0.142	17.1	0.336	Beangolo	
P. 3	EM coll.	70.66	35.23	62.15	51.4	0.567	0.827	0.120	40.1	0.568	-	
P. 4	EM coll.	70.73	36.34	62.01	52.38	0.586	0.845	0.123	40.6	0.574	-	
P. 5	EM coll.	62.36	30.85	52.13	44.88	0.592	0.861	0.164	26.4	0.423	-	
P. 6	EM coll.	58.86	29.72	50.42	42.46	0.589	0.842	0.143	19.9	0.338	Ambatomilo	
P. 7	EM coll.	58.6	30.16	49.7	42.6	0.607	0.857	0.152	20.9	0.357	-	
P. 8	EM coll.	51.04	26.93	43.46	36.15	0.620	0.832	0.149	16.8	0.329	-	
P. 9	EM coll.	54.74	29.67	48.05	41.24	0.617	0.858	0.122	27.3	0.499	-	
P. 10	EM coll.	59.04	30.33	49.96	43.7	0.607	0.875	0.154	24.9	0.422	Ambatomilo	
P. 11	JLB coll.	46.45	23.27	40.47	33.88	0.575	0.837	0.129	11.0	0.237	Beangolo	
P. 12	JLB coll.	49.54	26.23	43.72	35.92	0.600	0.822	0.117	14.9	0.301	-	f. "melbae"
P. 13	JLB coll.	55.67	28.26	48.51	41.26	0.583	0.851	0.129	18.8	0.338	-	periostracum
P. 14	JLB coll.	46.69	24.05	40.74	34.98	0.590	0.859	0.127	10.1	0.216	-	f. confusa
P. 15	JLB coll.	61.45	30.12	52.28	46.11	0.576	0.882	0.149	23.4	0.381	Ambatomilo	f. "melbae"
P. 16	JLB coll.	66.42	35.05	58.83	52.48	0.596	0.892	0.114	37.0	0.557	-	f. "melbae"
P. 17	JLB coll.	64.72	33.32	53.44	45.28	0.624	0.847	0.174	32.6	0.504	-	
P. 18	JLB coll.	52.61	29.28	47.1	40.45	0.622	0.859	0.105	22.0	0.418	-	
P. 19	JLB coll.	56.29	31.4	50.12	42.33	0.626	0.845	0.110	28.3	0.503	Andravony	f. "melbae"
P. 20	JLB coll.	56.97	30.87	49.97	42.86	0.618	0.858	0.123	28.6	0.502	-	
P. 21	JLB coll.	56.76	28.88	49.38	42.53	0.585	0.861	0.130	23.3	0.411	-	
P. 22	EM coll.	52.12	27.15	45.23	37.39	0.600	0.827	0.132	15.4	0.295	-	
P. 23	JLB coll.	50.3	27.8	44.22	37.03	0.629	0.837	0.121	17.5	0.348	-	
P. 24	JLB coll.	55.16	28.73	48.09	41.01	0.597	0.853	0.128	17.7	0.321	-	
P. 25	EM coll.	63.7	32.51	54.08	47.64	0.601	0.881	0.151	28.7	0.451	-	
average		57.236	29.695	49.563	42.248	0.600	0.852	0.134	23.427	0.401		
<i>D. behelokensis</i>												
N°	Institution	SL	MD	AH	HMD	RD	PMD	RSH	W	RW	Locality	
1	EM	59.39	30.27	52.04	42.88	0.582	0.824	0.124	25.4	0.428	Beheloka	
2	EM	48.42	26.35	41.91	35.51	0.629	0.847	0.134	16.8	0.347	Beheloka	
3	EM	49.94	27.78	41.71	35.7	0.666	0.856	0.165	16.1	0.322	Beheloka	
4	EM	49.56	27.24	43.23	36.08	0.630	0.835	0.128	14.1	0.285	Beheloka	
5	EM	52.7	27.65	46.93	39.03	0.589	0.832	0.109	16.9	0.321	Beheloka	
6	EM	53.97	29.13	47.08	39.84	0.619	0.846	0.128	19.2	0.356	Beheloka	
7	EM	64.37	32.24	56.17	44.74	0.574	0.797	0.127	24.6	0.382	Beheloka	
8	EM	46.71	24.09	40.14	32.95	0.600	0.821	0.141	9.8	0.210	Beheloka	Paratype 2
9	EM	48.3	27	41.1	34.61	0.657	0.842	0.149	15.7	0.325	Beheloka	
10	EM	53.02	28.75	46.1	37.75	0.624	0.819	0.131	15.4	0.29	Beheloka	
11	EM	53.76	27.4	46.12	39.72	0.594	0.861	0.142	15.6	0.29	Beheloka	
12	EM	57.5	30.91	49.35	42.81	0.626	0.867	0.142	23.4	0.407	Beheloka	
13	EM	42.4	23.17	36.57	31.59	0.634	0.864	0.138	9.7	0.229	Beheloka	
14	EM	59.87	30.29	50.51	42.65	0.600	0.844	0.156	25	0.418	Beheloka	
15	EM	54.75	27.95	47.32	40.43	0.591	0.854	0.136	20.2	0.369	Beheloka	
16	EM	60.02	33.36	52.21	44.72	0.639	0.857	0.130	31	0.516	Beheloka	
17	EM	54.21	29.9	47.18	39.59	0.634	0.839	0.130	24.1	0.445	Beheloka	
18	EM	52.66	27.23	45.33	37.82	0.601	0.834	0.139	16.6	0.315	Beheloka	
19	EM	48.94	27.35	41.64	35.01	0.657	0.841	0.149	14.4	0.294	Beheloka	
20	EM	49.98	26.46	44.64	36.55	0.593	0.819	0.107	13.1	0.262	Beheloka	
average		53.024	28.226	45.864	38.499	0.617	0.840	0.135	18.355	0.341		

<i>D. corbieri</i>											
N°	Institution	SL	MD	AH	HMD	RD	PMD	RSH	W	RW	Locality
1	EM	61.77	34.86	53.9	44.83	0.647	0.832	0.127	41.6	0.673	Salary
2	EM	61.82	33.08	53.48	43.74	0.619	0.818	0.135	30.9	0.500	Salary
3	EM	59.22	32.9	52.76	42.98	0.624	0.815	0.109	32.5	0.549	Salary
4	EM	57.02	31.62	51.03	40.7	0.620	0.798	0.105	26.3	0.461	Salary
5	EM	56.92	30.1	50.41	41.71	0.597	0.827	0.114	20.6	0.362	Tsiadamba
6	EM	53.47	30.04	49.42	40.39	0.608	0.817	0.076	23.2	0.434	Salary
7	EM	57.31	30.29	50.37	43	0.601	0.854	0.121	22.9	0.400	Salary
8	EM	51.32	27.14	46.19	37.93	0.588	0.821	0.100	17.2	0.335	Salary
9	EM	54.37	28.44	47.67	38.53	0.597	0.808	0.123	20.2	0.372	Salary
10	EM	59.48	33.71	53.6	43.32	0.629	0.808	0.099	35.4	0.595	Salary
11	EM	57.22	31.15	51.27	41.24	0.608	0.804	0.104	27.2	0.475	Salary
12	EM	55.51	29.75	48.36	40.62	0.615	0.840	0.129	20.2	0.364	Salary
13	EM	52.4	27.14	46.27	37.8	0.587	0.817	0.117	15.6	0.298	Salary
14	EM	50.64	26.9	44.75	36.7	0.601	0.820	0.116	13.9	0.274	Salary
15	EM	48.95	25.53	43.59	36.34	0.586	0.834	0.109	14.3	0.292	Salary
16	EM	49.6	24.95	42.48	36.06	0.587	0.849	0.144	13.4	0.270	Salary
17	EM	47.34	24.83	41.97	34.02	0.592	0.811	0.113	13.4	0.283	Salary
18	EM	55.51	28.5	49.28	41.86	0.578	0.849	0.112	19.7	0.355	Salary
19	EM	64.77	36.05	57.8	47.74	0.624	0.826	0.108	39.3	0.607	Salary
average		55.507	29.841	49.189	40.501	0.606	0.824	0.114	23.568	0.416	
<i>D. vezoi</i>											
N°	Institution	SL	MD	AH	HMD	RD	PMD	RSH	W	RW	Locality
1	EM	60.6	33.23	53.64	48.65	0.620	0.907	0.115	30.6	0.505	Lavanono
2	EM	58.1	30.26	52.46	44.21	0.577	0.843	0.097	18.3	0.315	Lavanono
3	EM	52.86	26.4	48.23	40.64	0.547	0.843	0.088	13.8	0.261	Lavanono
4	EM	53.28	25.02	46.93	40.61	0.533	0.865	0.119	12.1	0.227	Lavanono
5	EM	56.15	28.46	50.18	42.68	0.567	0.851	0.106	19.2	0.342	Lavanono
6	EM	62.63	33.65	54.97	47.46	0.612	0.863	0.122	26.9	0.430	Lavanono
7	EM	66.69	33.43	59.57	51.51	0.561	0.865	0.107	29.8	0.447	Lavanono
8	EM	64.91	31.47	54.88	49.16	0.573	0.896	0.155	25.6	0.394	Lavanono
9	EM	59.8	30.42	53.17	46.17	0.572	0.868	0.111	21.7	0.363	Lavanono
average		59.447	30.26	52.67	45.677	0.574	0.867	0.113	22	0.365	
<i>D. praelatus</i>											
N°	Institution	SL	MD	AH	HMD	RD	PMD	RSH	W	RW	Locality
1	EM	52.46	25.69	44.9	36.31	0.572	0.809	0.144	10.9	0.208	Toalagnaro
2	EM	56.09	25.68	46.84	39.5	0.548	0.843	0.165	11.4	0.203	Toalagnaro
3	EM	48.62	23.65	41.38	34.91	0.572	0.844	0.149	9.6	0.197	Toalagnaro
4	EM	58.39	27.97	49.88	42.26	0.561	0.847	0.146	16.6	0.284	Toalagnaro
5	EM	66.61	32.06	58.59	47.07	0.547	0.803	0.120	21.3	0.320	Toalagnaro
6	EM	54.86	24.78	47.28	38.39	0.524	0.812	0.138	9.5	0.173	Toalagnaro
7	EM	46.42	23.84	40.3	31.97	0.592	0.793	0.132	9.8	0.211	Toalagnaro
8	EM	56.97	26.82	49.43	40.23	0.543	0.814	0.132	14.5	0.255	Toalagnaro
average		55.053	26.311	47.325	38.83	0.557	0.821	0.141	12.95	0.231	



Plate 1 1 *D. rosiae* 63.7 mm S.W. Madagascar
Paratype 25
2 *D. rosiae* 58.3 mm Ambatomilo, Madagascar
Holotype MNHN IM-2000-33712
3 *D. rosiae* 59.0 mm Ambatomilo, Madagascar
Paratype 10
4 *D. rosiae* 50.0 mm Salary, Madagascar

5 *D. rosiae* 53.9 mm Salary, Madagascar
6 *D. rosiae* 50.7 mm Salary, Madagascar
7 *D. rosiae* 53.2 mm Salary, Madagascar
8 *D. rosiae* 55.6 mm Salary, Madagascar
9 *D. rosiae* 59.1 mm Salary, Madagascar
10 *D. rosiae* 51.0 mm Salary, Madagascar
11 *D. rosiae* f. *melbae* 46.0 mm Salary, Madagascar



Plate 2

- | | |
|--|--|
| 1 <i>D. rosiae</i> f. <i>melbae</i> 48.5 mm Salary, Madagascar | 7 <i>D. rosiae</i> 49.5 mm Ambatomilo, Madagascar |
| 2 <i>D. rosiae</i> f. <i>melbae</i> 51.6 mm Salary, Madagascar | Coll. JLB Paratype 12 |
| 3 <i>D. rosiae</i> 54.7 mm Salary, Madagascar | 8 <i>D. rosiae</i> 50.8 mm Ambatomilo, Madagascar |
| Paratype 9 | Paratype 2 |
| 4 <i>D. rosiae</i> 42.3 mm Ambatomilo, Madagascar | 9 <i>D. rosiae</i> 58.9 mm Ambatomilo, Madagascar |
| 5 <i>D. rosiae</i> f. <i>melbae</i> 46.5 mm Beangolo, | Paratype 6 |
| Madagascar Paratype 11 Coll. JLB | 10 <i>D. rosiae</i> f. <i>mimeticus</i> 58.2 mm Salary, Madagascar |
| 6 <i>D. rosiae</i> f. <i>melbae</i> 48.7 mm Ambatomilo, | Paratype 1 |
| Madagascar | 11 <i>D. rosiae</i> f. <i>mimeticus</i> 62.5 mm Angsavony, |
| | Madagascar |



- Plate 3**
- | | |
|---|--|
| 1 <i>D. rosiae</i> 51.3 mm Angsavony, Madagascar Coll. JLB | 6 <i>D. rosiae</i> 58.6 mm Madagascar Paratype 7 |
| 2 <i>D. rosiae</i> 70.7 mm Salary, Madagascar Paratype 3 | 7 <i>D. rosiae</i> 54.4 mm Ambatomilo, Madagascar |
| 3 <i>D. rosiae</i> f. <i>confusa</i> 51.0 mm Salary, Madagascar Paratype 8 | 8 <i>D. rosiae</i> f. <i>melbae</i> 62.4 mm Beangolo, Madagascar Paratype 5 |
| 4 <i>D. rosiae</i> 65.0 mm Salary, Madagascar | 9 <i>D. rosiae</i> f. <i>melbae</i> 47.2 mm Salary, Madagascar |
| 5 <i>D. rosiae</i> f. <i>melbae</i> 44.9 mm Madagascar | 10 <i>D. rosiae</i> 70.7 mm Salary, Madagascar Paratype 4 |



- Plate 4**
- | | |
|--|--|
| 1 <i>D. behelokensis</i> f. <i>pseudoracemosus</i> 48.4 mm Beheloka, Madagascar | 5 <i>D. behelokensis</i> 64.4 mm Beheloka, Madagascar |
| 2 <i>D. behelokensis</i> 20.4 mm juvenile Beheloka, Madagascar | 6 <i>D. behelokensis</i> 42.4 mm Beheloka, Madagascar |
| 3 <i>D. behelokensis</i> 46.7 mm Beheloka, Madagascar Paratype 2 | 7 <i>D. behelokensis</i> 54.0 mm Beheloka, Madagascar |
| 4 <i>D. behelokensis</i> 48.3 mm Beheloka, Madagascar, Holotype MNHN IM-2000-2581 | 8 <i>D. behelokensis</i> 53.8 mm Beheloka, Madagascar ex Coll. Lauer |
| | 9 <i>D. behelokensis</i> f. <i>pseudoracemosus</i> 57.5 mm Beheloka, Madagascar |



Plate 5 1 *D. corbieri* 53.2 mm Salary, Madagascar
 2 *D. corbieri* 49.0 mm Salary, Madagascar
 3 *D. corbieri* 55.5 mm Salary, Madagascar

4 *D. corbieri* 56.8 mm Tsiandamba, Madagascar
 5 *D. corbieri* 55.2 mm Salary, Madagascar
 6 *D. corbieri* 56.9 mm Tsiandamba, Madagascar
 7 *D. corbieri* 59.2 mm Salary, Madagascar



Plate 6 1 *D. vezoi* 39.8 mm Lavanono, Madagascar 5-7 m 4 *D. vezoi* 53.2 mm Lavanono, Madagascar 5-7 m
 2 *D. vezoi* f. *pseudoecho* 52.8 mm Lavanono, Madagascar 5-7 m 5 *D. vezoi* 9.0 mm juvenile Madagascar MNHN
 3 *D. vezoi* 54.8 mm Lavanono, Madagascar 5-7 m 6 *D. vezoi* 66.6 mm Lavanono, Madagascar 0-1 m



Plate 7 1 *D. praelatus* 46.0 mm Fort Dauphin, Madagascar 5 *D. praelatus* 58.4 mm Fort Dauphin, Madagascar
 2 *D. praelatus* 66.6 mm Fort Dauphin, Madagascar 6 *D. praelatus* 52.5 mm Fort Dauphin,
 3 *D. praelatus* 47.3 mm, Lectotype MHNG 52688 Madagascar 3-7 m
 4 *D. praelatus* 8.9 mm juvenile Fort Dauphin, Madagascar, MNHN 7 *D. praelatus* 56.1 mm Fort Dauphin, Madagascar

The cones (Gastropoda) from Madagascar “Deep South”: composition, endemism and new taxa

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ABSTRACT

The cone fauna of southernmost Madagascar is reviewed based on the material collected during the *Atimo Vatae* expedition. The expedition involved sampling from the intertidal to near-shore by diving to ca 40 m, and offshore by dredging and trawling to 700 m. A total of 75 cone species was sampled. Strikingly, many tropical species are represented in the study area by single specimens whereas these are often quite common elsewhere in the tropical SW Indian Ocean, and it is hypothesized that these represent vagrants of occasionally settling larvae, rather than reproductive, self-recruiting populations. With these limitations, the resident cone fauna of Madagascar “Deep South” probably consists of 58 species, of which 10 (17%) are regional endemics, thus confirming the existence of a distinct marine ecoregion, termed “Toliaran Sub-Province” by Lorenz, which matches the distribution of seasonal upwelling fronts in South Madagascar.

New taxonomic decisions in this regional monograph: *Conasprella* (*Fusiconus*) *lemuriana* sp. nov., *Conus* (*Phasmoco-**nus*) *galeyi* sp. nov., *Conus* (*Textilia*) *cymbioides* sp. nov., *Conus* (*Turriconus*) *aequiquadratus* sp. nov. *Conus biancae* Bozzetti, 2010 and *Cylinder priscai* Bozzetti, 2012, are synonymized with *Conus archiepiscopus* Hwass in Bruguière, 1792, and the latter is treated as a valid species from the Indian Ocean, molecularly distinct species from the Pacific Ocean *Conus textile* Linnaeus, 1758. *Conus fuscatus* Born, 1778, is treated as a valid, molecularly distinct species in the *Conus imperialis* complex. *Darioconus fort-dauphinensis* Bozzetti, 2015 and *D. miniturrus* Bozzetti, 2017, are synonymized with *Conus praelatus* Hwass in Bruguière, 1792; *Darioconus pennaceus pseudoecho* Bozzetti, 2013, is synonymized with *C. vezoi* Korn, Niederhöfer & Blöcher, 2000; *Conus olgiatti* Bozzetti, 2007, *C. anosyensis* Bozzetti, 2008, and *Rolaniconus gilberti* Bozzetti, 2012, with *C. balteatus* G.B. Sowerby I, 1833; *Conus nimbosus nanoclarus* Bozzetti, 2017, with *C. nimbosus* Hwass in Bruguière, 1792; *Pionoconus atimovatae* Bozzetti, 2012, with *Conus simonis* Bozzetti, 2010; *Conus pennasilicorum* Bozzetti, 2017, with *C. alconnelli* da Motta, 1986; *Conus sazanka* Shikama, 1970, with *C. martensi* E.A. Smith, 1884; *Rolaniconus buniatus* Bozzetti, 2013, with *Conus varius* Linnaeus, 1758; and *Conus multibandatus* Bozzetti, 2017, with *C. coronatus* Gmelin, 1791.

RÉSUMÉ

La faune de cônes présente dans le «Grand Sud» malgache est monographiée sur la base du matériel échantillonné par

l’expédition *Atimo Vatae*. L’expédition s’est déployée sur plusieurs fronts : récoltes à la côte et en plongée jusqu’à 40 mètres environ ; dragages et chalutages au large jusqu’à 700 m. Au total, 75 espèces de cônes ont été échantillonnées. De nombreuses espèces souvent communes dans l’Océan Indien tropical ne sont représentées dans la zone d’étude que par des spécimens uniques, et nous faisons l’hypothèse que ces occurrences résultent de recrutements occasionnels de larves planctoniques, et ne sont pas l’expression de populations permanentes résidentes. Avec ces réserves, le peuplement résident de cônes du «Grand Sud» de Madagascar comprend 58 espèces, dont 10 (17%) sont des endémiques régionaux, ce qui indique qu’il s’agit d’une écorégion bien distincte, appelée «Sous-Province Tuliarienne» par Lorenz, dont les contours se superposent à la carte des upwellings saisonniers.

Décisions taxonomiques nouvelles : *Conasprella* (*Fusiconus*) *lemuriana* sp. nov., *Conus* (*Phasmoco-**nus*) *galeyi* sp. nov., *Conus* (*Textilia*) *cymbioides* sp. nov., *Conus* (*Turriconus*) *aequiquadratus* sp. nov. *Conus biancae* Bozzetti, 2010 et *Cylinder priscai* Bozzetti, 2012, sont mis en synonymie de *Conus archiepiscopus* Hwass in Bruguière, 1792, traité ici comme une espèce valide propre à l’Océan Indien et moléculairement distincte de *Conus textile* Linnaeus, 1758 de l’Océan Pacifique. *Conus fuscatus* Born, 1778, est traité comme une espèce valide, moléculairement distincte au sein du complexe de *Conus imperialis*. *Darioconus fort-dauphinensis* Bozzetti, 2015 et *D. miniturrus* Bozzetti, 2017, sont mis en synonymie de *Conus praelatus* Hwass in Bruguière, 1792; *Darioconus pennaceus pseudoecho* Bozzetti, 2013, est mis en synonymie de *C. vezoi* Korn, Niederhöfer & Blöcher, 2000; *Conus olgiatti* Bozzetti, 2007, *C. anosyensis* Bozzetti, 2008, et *Rolaniconus gilberti* Bozzetti, 2012, le sont de *C. balteatus* G.B. Sowerby I, 1833; *Conus nimbosus nanoclarus* Bozzetti, 2017, l’est de *C. nimbosus* Hwass in Bruguière, 1792; *Pionoconus atimovatae* Bozzetti, 2012, de *Conus simonis* Bozzetti, 2010; *Conus pennasilicorum* Bozzetti, 2017, de *C. alconnelli* da Motta, 1986; *Conus sazanka* Shikama, 1970, de *C. martensi* E.A. Smith, 1884; *Rolaniconus buniatus* Bozzetti, 2013, de *Conus varius* Linnaeus, 1758; et *Conus multibandatus* Bozzetti, 2017, de *C. coronatus* Gmelin, 1791.

INTRODUCTION

The “Deep South” [*Atimo Vatae* in Malagasy language] area of Madagascar, which encompasses the coasts of the Anosy and Androy regions, is a remarkable marine region of fierce promontories and open bays (Figs 1-2).



Fig. 1. Landscapes of the “Deep South” of Madagascar:
A) View from Cape Sainte Marie looking west towards Lavanono;
B) Aerial view of Pointe Evatra near Fort-Dauphin. Photos by Philippe Maestrati and Xavier Desmier, MNHN/PNI/*La Planète Revisitée*.

Corals may occasionally be present in sheltered coves, but they do not form reefs; instead extensive algal belts characterize the intertidal and subtidal zones, setting it apart from the rest of the adjacent Indo-Pacific province. The lack of infrastructures has arguably made the “Deep South” the least visited and least known coastline in Madagascar. The marine hydroclimate is characterized by a coastal upwelling (Fig. 3) with cold surface water and high concentrations of chlorophyll-*a*, with winter sea surface temperatures as low as 21.5°C, vs 24–25°C or more elsewhere around Madagascar (Lutjeharms & Machu, 2000; Ramanantsoa et al. 2018).

From the late 1990’s, new species of molluscs started to be discovered on the coastline of the regions Anosy and Androy, first serendipitously as a by-product of the local lobster fishery (e.g. Bouchet, 1999), and later specifically attracting shell collectors and molluscan taxonomists. These scattered findings and the unique oceanographic background together suggested that the region had a potential for more discoveries, and this was what motivated a large-scale exploring expedition, itself called *ATIMO VATAE*, that sampled the benthos of the region in April–June 2010. The expedition targeted more than molluscs, focussing also on crustaceans, echinoderms, algae and fishes, and generating many new species descriptions (e.g., Monniot

2012, Houart & Héros 2013, Cecalupo & Perugia 2014, Le Gall et al. 2015, Macpherson & Robainas-Barcia 2015, Mah 2017).

The present work reviews the cone fauna of the Madagascar “Deep South” region based on the material gathered during the expedition, including four species new to science described herein. Beside new species and new records, the expedition also generated fresh material of poorly known species, such as *Conus (Malagasyconus) lozeti* Richard, 1980. Whenever live-taken material was available, a molecular phylogenetic study has been carried out, elucidating relationships to alleged conspecific individuals from other localities in the Indian and Pacific oceans. The composition of the fauna is then compared to that of adjacent areas in the Southwestern Indian Ocean, namely the rest of Madagascar, South Africa and the Mascarene Islands, and it is concluded that ten cone species are endemic to the Atimo Vatae region,

MATERIAL AND METHODS

The *ATIMO VATAE* expedition was carried between April 27 and June 18, 2010. It involved 69 participants from 15 countries, and surveyed the coastline and offshore in an area extending roughly from Manantenina in the north-east to Androka, in the south-west, with both shore-based and ship-based sampling (Fig. 2): **(1–2)** Two legs, each involving 20 to 30 persons for a duration of 3 weeks, were based successively in Fort-Dauphin and Lavanono, sampled intertidally, by diving, and by light (hand) dredging within 1–2 hours of the base; **(3–4)** Two legs, each involving 8–10 divers for a duration of 20 days, took place aboard IRD’s research vessel *Antéa*, and sampled by diving; **(5)** One leg involving 8 persons during 2 weeks on board F/V *Nosy-Bé 11*, a chartered shrimp trawler, sampled by dredging and trawling the continental shelf and upper slope, to ca 700 meters deep. For station lists and lists of participants, see <https://expeditions.mnhn.fr/campaign/atimovatae>. In addition to material collected by the scientists, specimens – especially of seashells – were occasionally purchased from local fishermen. All specimens are deposited in MNHN.

Supraspecific taxonomy follows essentially Puillandre et al. (2015), with updates by Monnier & Tenorio (2016) and Puillandre & Tenorio (2017). The systematic account follows the alphabetical order within each genus (subgenus). Distribution maps were generated using GeoMapApp (<http://www.geomapapp.org>) using the general bathymetric map of the oceans as default basemap.

We describe shell morphology using the terminology established in Röckel et al. (1995). We also used the procedure described in Röckel et al. (1995) for counting the number of protoconch whorls. For morphometric comparisons, adult shells were measured with digital calipers, with measurements rounded to 0.1 millimeter. For comparison of shell morphology, analysis was performed using analysis of co-variance (ANCOVA) for the corresponding shell trait, using species hypotheses as factor and shell length (L) or aperture height (AH) as co-variate. Mean values L were compared statistically (*t*- and *F*-tests). Statistical tests were carried out using STATGRAPHICS CENTURION XVII or PAST3 (Hammer et al., 2001), once all the measurement sets passed the normality tests.

For radular morphology we used the terminology of Tucker & Tenorio (2009) and the abbreviations in Kohn et al. (1999). Specimens of shells containing the dried animal inside were digested in concentrated aqueous potassium hydroxide for

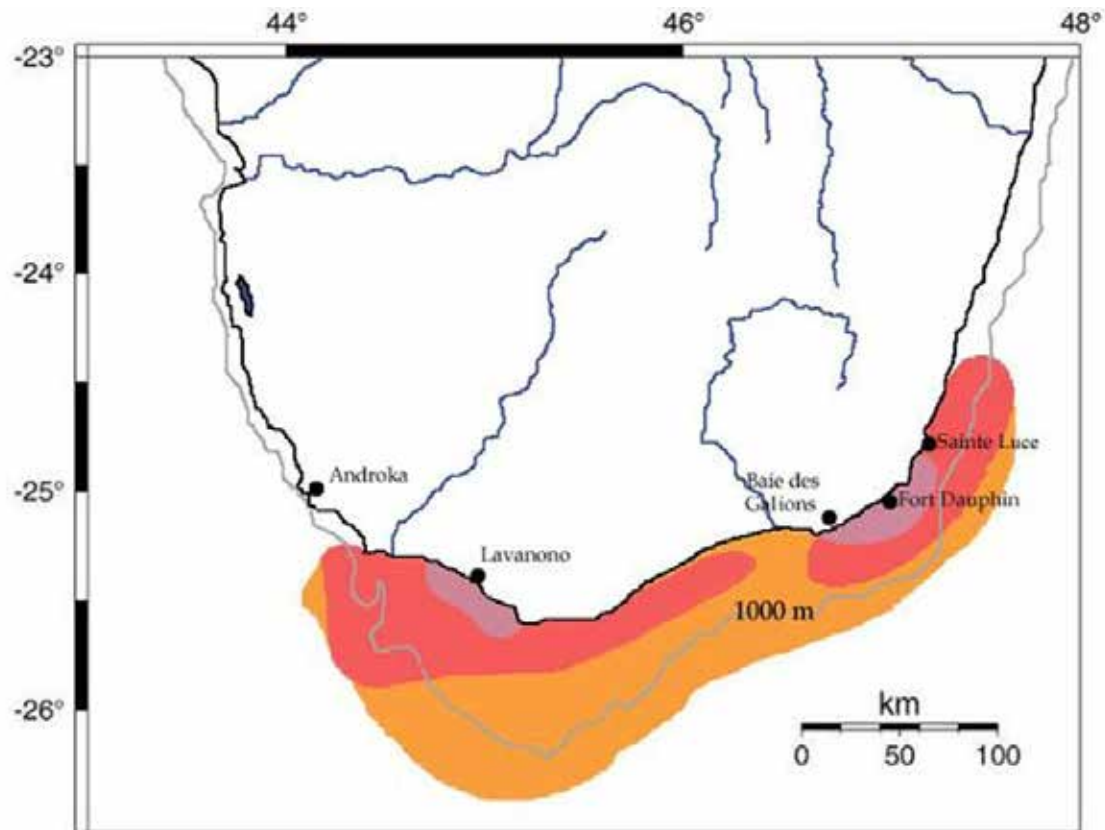


Fig. 2. The area covered by the ATIMO VATAE expedition, near Fort-Dauphin and Lavanono (legs 1-2, purple), offshore on board R/V *Antea* (legs 3-4, red) and F/V *Nosy Bé 11* (leg 5, orange).

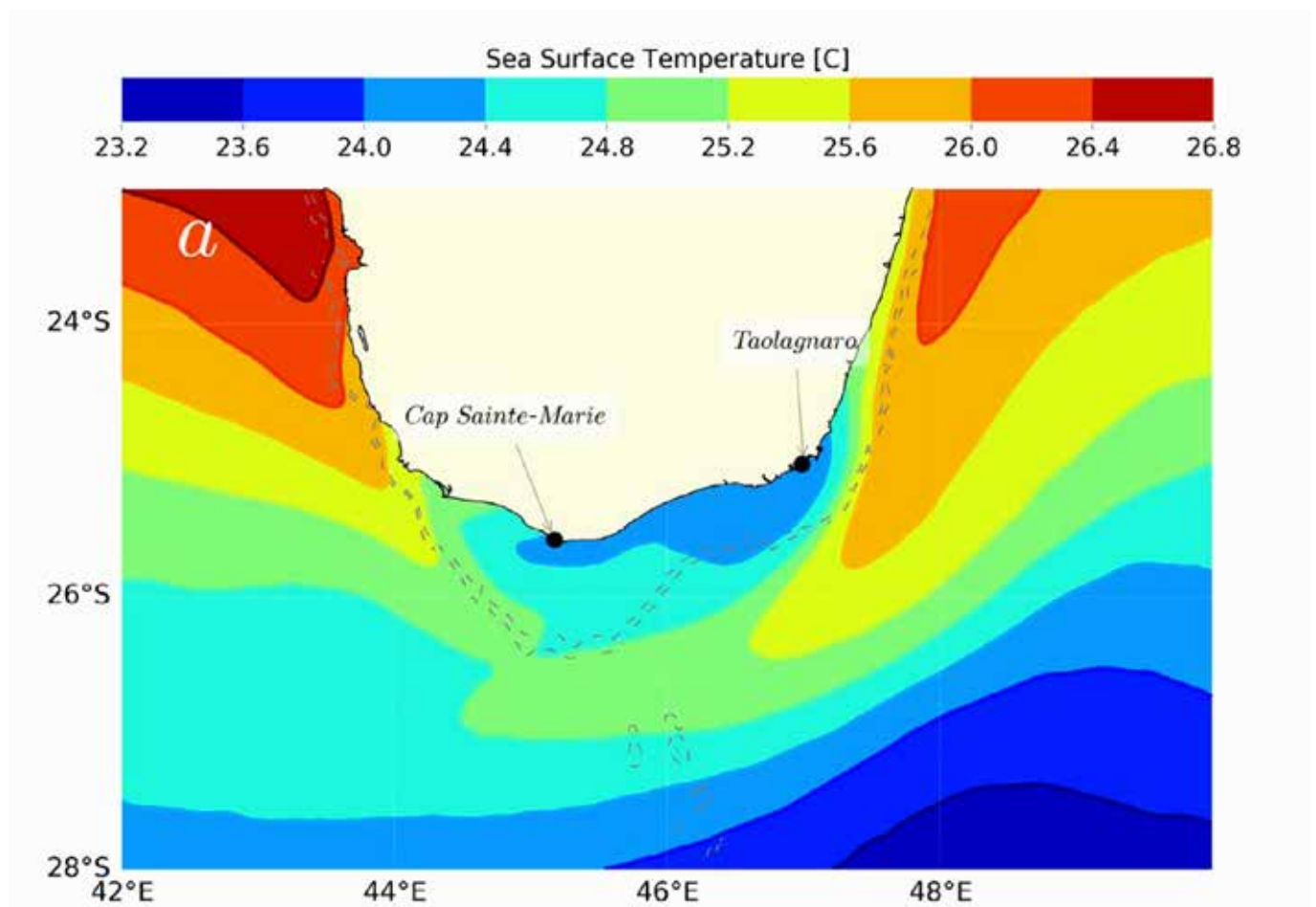


Fig. 3. Mean Sea Surface Temperature (SST) for 2003–2015 which reflects the strong signature of inshore cold water, marker of coastal upwelling, south of Madagascar. Grey dotted lines are isobaths at 500 m and 1000 m (Reprinted from Ramanantsoa et al. 2018, with permission from Elsevier).

24 h. The resulting mixture was then placed in a Petri dish and examined with a dissecting microscope. The entire radula was removed with fine tweezers and rinsed with distilled water, then mounted on a slide using Aquatex (Merck) mounting medium, and examined under a compound microscope. Photographs were obtained with a CCD camera attached to the microscope. SEM studies of protoconch were carried out at MNHN with the support of Sylvain Pont.

In addition to the ATIMO VATAE material, and for comparative purpose, cone snails of closely related taxa and collected during several expeditions organized by the MNHN (EBISCO, INHACA 2011, KAVIENG, NANHAI 2014, PAKAIHI I TE MOANA, PANGLAO 2004 and 2005, PAPUA NIUGINI, SALOMON 2, SANTO 2006, TUAA PAHE 2013 – more info at expeditions.mnhn.fr) were added to the molecular analyses. Additional *cox-1* sequences were downloaded from GenBank (see Appendix 1). All specimens were preserved in the field specifically for molecular analyses, by removing the tissue from the shell (either using magnesium chloride or a micro-wave oven, see Galindo et al. 2014) and preserving it in 95° alcohol. DNA was extracted using the Epmotion 5075 robot (Eppendorf), following the manufacturers’ recommendations. A fragment of the cytochrome oxidase subunit I (*cox-1*) was amplified using universal primers LCO1490/HCO2198 (Folmer et al., 1994). PCR reactions were performed in 25 µl, containing 3 ng of DNA, 1X reaction buffer, 2.5 mM MgCl₂, 0.26 mM dNTP, 0.3 mM of each primer, 5% DMSO, and 1.5 units of Qbiogene Q-Bio Taq. Amplification consisted of an initial denaturation step at 94°C for 4 min, followed by 35 cycles of denaturation at 94°C for 30 s, annealing at 50°C for 30s, followed by extension at 72°C for 1 min. The final extension was at 72°C for 5 min. PCR products were purified and sequenced by the Eurofins sequencing facility. Sequences were deposited in BOLD (Barcode of Life Datasystem) and GenBank (see Appendix 1, updated version available at <http://hdl.handle.net/10498/19934>).

The phylogenetic tree was reconstructed using MrBayes (Huelsenbeck et al., 2001), as implemented by the Cipres Science Gateway (MrBayes 3.2.2 on XSEDE; <http://www.phylo.org/portal2>). The three codon positions of the *cox-1* gene were treated as independent partitions, and the substitution model was set to be the GTR+I+G; the parameters of the substitution model were evaluated independently for each partition during the analyses. Each of the two runs consisted of 8 Markov chains and 10,000,000 generations, with 5 swaps at each generation, a sampling frequency of one tree each 1,000 generations and a chain temperature set at 0.02. Convergence of each analysis was evaluated using TRACER 1.4.1 (Rambaut & Drummond et al., 2014) to check that all effective sample size values exceeded 200. Consensus trees were calculated after omitting the first 25% trees as burn-in. Following Uribe et al. (2016), the *Profundiconus* clade was used to root the tree.

Museums and other repositories

MNHN: Muséum National d’Histoire Naturelle, Paris, France.
ANSP : Academy of Natural Sciences, Philadelphia, U.S.A.
DMNH : Delaware Museum of Natural History, Wilmington, Delaware, U.S.A.
LMD : Löbbecke Museum und Aquazoo, Düsseldorf, Germany.
LSL : Linnean Collection, Linnean Society, London, England.
MHNG : Muséum d’Histoire Naturelle, Genève, Switzerland.
MHNLR : Muséum d’Histoire Naturelle, La Rochelle, France.

NBC-ZMA : Naturalis Biodiversity Center - Zoological Museum of the University of Amsterdam, Netherlands.

NHMUK : Natural History Museum, London, England.

NHMW : Naturhistorisches Museum, Wien (Vienna), Austria.

NMSA : Kwazulu-Natal Museum, Pietermaritzburg, South Africa

NMW : National Museum of Wales, Cardiff, Wales.

SMNS : Staatliche Museum für Naturkunde , Stuttgart, Germany.

UUMZ: Zoologische Institute, University of Uppsala, Sweden.

ZMMU : Zoological Museum, Michigan University, Ann Arbor, Michigan, USA.

EM: Eric Monnier reference collection, Paris, France.

GH: collection Guy Hoarau [to be accessioned by the Muséum d’Histoire Naturelle de Saint Denis], La Réunion.

GR: collection Georges Richard, La Rochelle, France.

MJT: Manuel J. Tenorio reference collection, Jerez, Spain.

dd: dead collected specimen(s)

lv: live collected specimen (s)

spm: specimen(s) doubtful if alive or dead collected

stn: station

<i>Shell morphometry</i>	
L maximum shell length	AH aperture height
MD maximum diameter	RD relative diameter (= MD/AH)
SH spire height	RSH relative spire height (= SH/L)
HMD height of maximum diameter	PMD relative position of the maximum diameter (= HMD/AH)

<i>Radular morphometry</i>	
L/T _L shell length/radular tooth length	
T _L /AP _L radular tooth size/anterior portion length	
100B _L /AP _L 100 x blade length/anterior portion length	

RESULTS

Fauna composition

Dautzenberg (1929) catalogued the shelled molluscs of Madagascar, including 51 species of cones; some are cited from “Madagascar” without further precision, and when a locality is mentioned all are from the tropical coasts of the island (e.g., Tuléar, Amborovy, Ankify, Nosy Bé, Diego-Suarez, Ambodifotatra, Tamatave). Three years later, he published a follow-up list (Dautzenberg 1932) with 3 further species then added to the Madagascar cone fauna, and records of just four species from Madagascar “Deep South” (Cap Sainte-Marie, Faux-Cap, Fort-Dauphin): *Conus coronatus*, *C. ebraeus*, *C. pertusus*, *C. textile*. With the exception of the description of *Conus lozeti* in 1980, our knowledge on the cones of Madagascar “Deep South” remained very scanty, in fact until commercial fishing using lobster traps in the 1990s opened the region and generated seashells as a by-product, including new cones (Korn et al. 2000, Lorenz 2004, Bozzetti 2004 and many subsequent papers).

The ATIMO VATAE expedition sampled a total of 74 cone species considered valid by the authors. At least one more species not sampled during the expedition (*Conus (Cylindropseudocedonulli)*) but known from the area must be added to this number, making a total of 75. Of these, 62 are also present in other areas of Madagascar, and most often widespread in the Indian Ocean or even the Pacific Ocean. Conversely, there are 29 species of cones inhabiting the warmer waters of Madagascar which have not been found in the Atimo Vatae region. Combining the numbers, the cone snail fauna of Madagascar as a whole is composed of 104 species (representing over 11% of the total known species in the world). Of these 14 are likely endemic species, including the recently described *Kioconus sakalava* Monnier & Tenorio, 2017, and *Fusiconus levenensis* Monnier & Tenorio, 2017 and two of the new species described in the present work. With as many as 10 local endemics, or 13.3 % of the local fauna, most endemics are concentrated in the colder waters of the Deep South region, and there are only a further 4 cone species endemic to Madagascar but absent in Atimo Vatae.

Appendix 2 summarizes the abundance and bathymetric distribution of all the cones collected during Atimo Vatae. A number of occurrences correspond most likely to “pseudopopulations”. It is remarkable that most of the species treated as endemic are represented by a substantial number of specimens (7 to 57 spms), whereas by contrast many of the species that are usually common in the tropical Indo-Pacific are represented by just 1 or a few spms in the Atimo Vatae collection. We believe that these represent pseudopopulations that are recruiting locally from larvae derived from more tropical populations in Madagascar (or in Natal). We have tentatively marked 15 such species as being “vagrant” / pseudopopulations in South Madagascar. But there may be others (e.g., *tessulatus*, *frigidus*,...) that could also rank as “vagrant”. If we accept these tropical species as vagrants, then the level of endemism in the Atimo Vatae region jumps to 17%. The composition of the cone fauna thus speaks in favor of the recognition of a Toliaran subprovince or province (Lorenz 2004, 2017), in contrast to Spalding et al. (2007) who divided Madagascar into “Southeast Madagascar” and “Western and Northern Madagascar” ecoregions with a frontier right in the middle of the Atimo Vatae region.

The cone fauna of the Atimo Vatae region can be compared with

that of two other adjacent (sub)tropical regions, namely the Indian Ocean coast of South Africa, and the Mascarene Islands. Both areas are known for harboring a number of endemic species of cones along with many other Indo-Pacific species having wider ranges (Fig. 4).

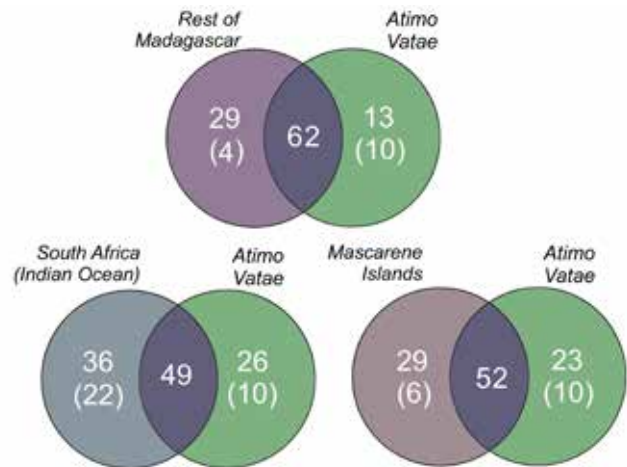


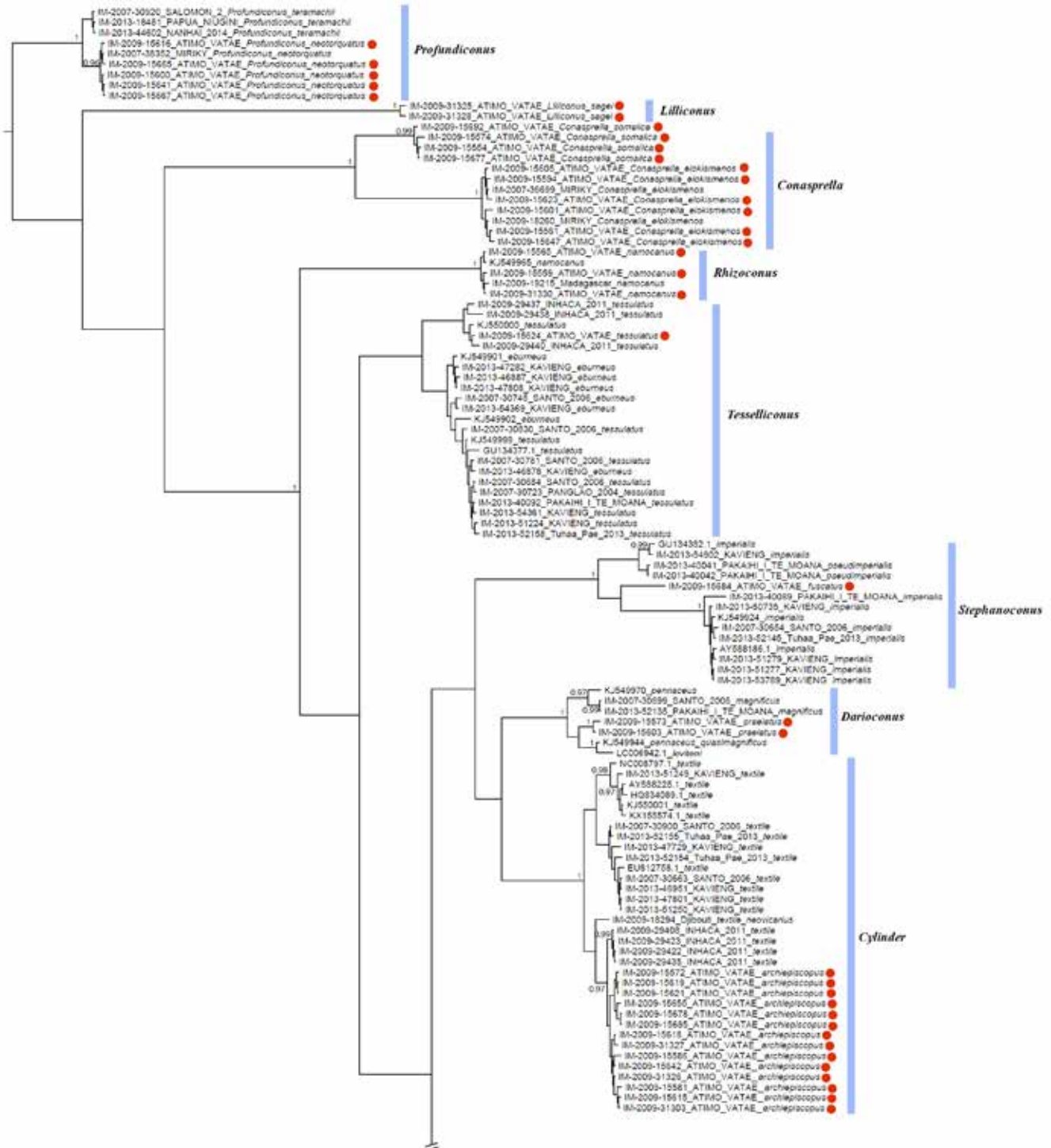
Fig. 4. Diagrammatic representation of the cone fauna composition of the Atimo Vatae region in comparison with that of the rest of Madagascar (above), South Africa (Indian Ocean coast) (bottom left) and the Mascarene Islands (Reunion and Mauritius) (bottom right). In the circles appear the numbers of species from each region, from which the number of endemic species is indicated in parenthesis. In the intersection area appears the number of shared cone species (i.e. present in both regions).

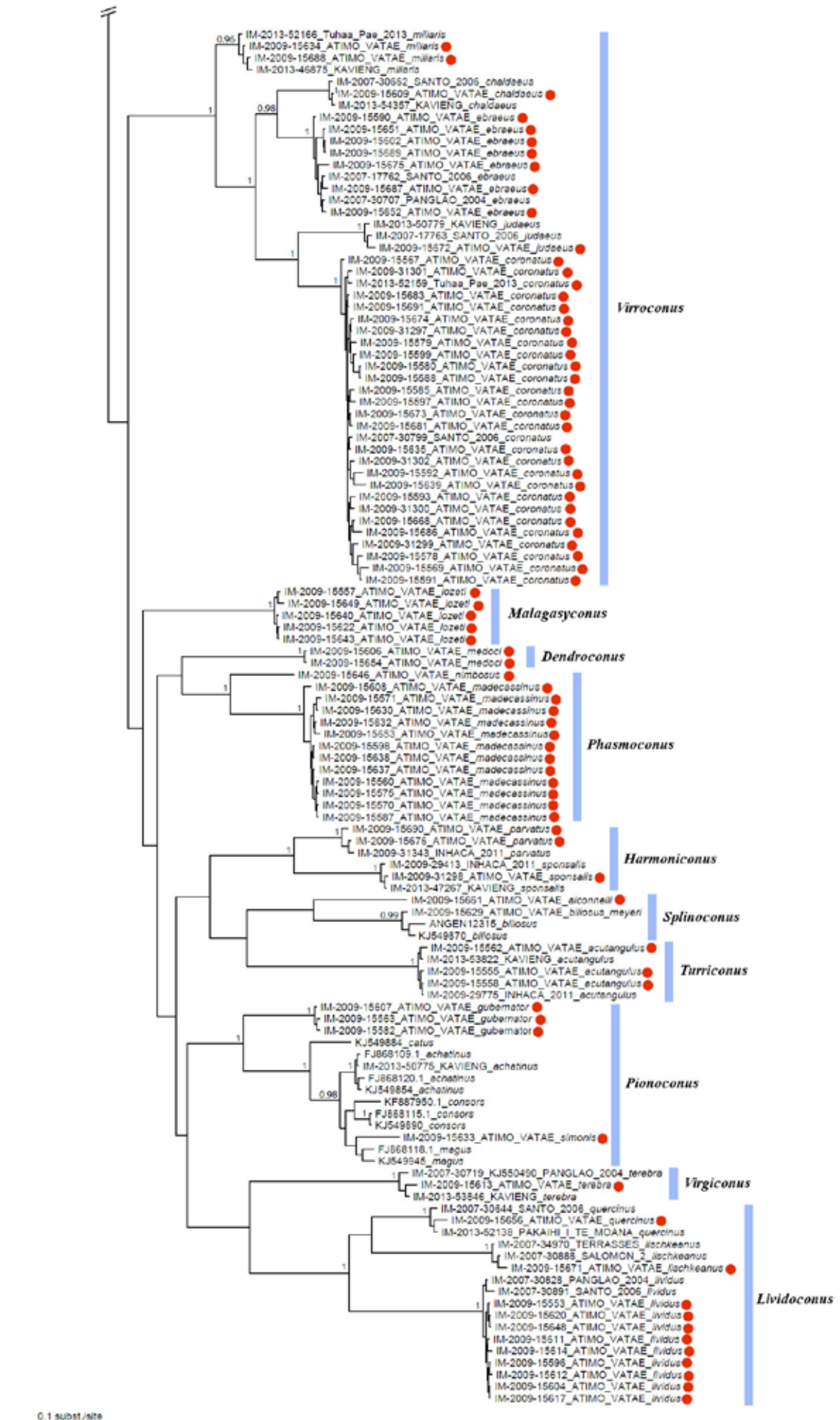
For South Africa, our starting point has been the species listed in Tenorio & Monteiro (2008) with the additions by Monnier & Limpalaër (2012), Fenzan (2012) and Veldsman (2010, 2016a, 2016b). The Indian Ocean coast of South Africa is home to a total of 85 cone species, many of them typically Indo-Pacific due to the environment provided by the warm Agulhas current, and in sharp contrast with the cold Agulhas current running along the Atlantic coast. Of those 85 species, 22 are endemic to South Africa (5 of them, very recently described, are provisionally considered valid), and 63 are widespread Indo-Pacific taxa. Of these 63 widespread cone species, 49 are also found in the Deep South of Madagascar. The ratio of endemic cone species in the Indian Ocean coast of South Africa is in the range of 21% to 26%, which can be compared with the 13% endemism (17% if pseudopopulations are discounted) in the Atimo Vatae region. However, we must consider that the Indian Ocean coast of South Africa has an extension of more than 1800 km, whereas the extension of the Deep South of Madagascar is less than 500 km. A similar comparison can be established with the cone fauna of the Mascarene Islands (Reunion Island, Mauritius Island and its shoals and offshore reefs) according to the cone inventory by Le Court de Billot & Touitou (2016). Of the 81 species of cone snails reported, only 6 are considered Mascarene endemics, accounting for a level of endemism of about 7%. Of the non-endemic, 52 species are also present in the Deep South of Madagascar.

We can therefore summarize that the cone fauna of the Atimo Vatae region is composed of a relatively large number of endemic species which constitute about 13% to 17% of the total. The remaining cone species found in this area are also present in the rest of Madagascar, as well as in other parts of the South Western Indian Ocean.

Fig. 5.

Bayesian phylogenetic tree based on the mitochondrial *cox-1* gene. Posterior probabilities values are indicated for each node (when PP $\geq 0.95\%$). *Cox-1* sequences from MNH specimens are labelled using the MNHN voucher identification number, the expedition name and the species name. *Cox-1* sequences downloaded from GenBank are labelled with the GenBank accession number and the species name. Genus or subgenus names are indicated for each clade. Specimens from the ATIMO VATAE expedition are marked with a red dot.





Phylogenetic analysis

One of the objectives of the ATIMO VATAE expedition was the characterization of the marine fauna and flora by a DNA barcoding approach. In the case of cone snails, tissue samples of about 150 live collected specimens corresponding to 36 different species were obtained, and identified based on shell characters. Each morphospecies corresponded to an independent lineage in the phylogenetic tree, separated by long branches from the other species (Fig. 5). When several specimens were available, the morphospecies corresponded to a clade, generally well supported (posterior probabilities > 95). When samples from other localities were available, they clustered with the conspecific specimens from Atimo Vatae, with short branches. In some cases, the phylogenetic analyses revealed that the Madagascar samples, or even the Atimo Vatae samples, corresponded to a separate species from the rest of the Indo-Pacific; they are discussed below in the remarks sections of the "Systematic account".

SYSTEMATIC ACCOUNT

Subclass CAENOGASTROPODA Cox, 1960

Order NEOGASTROPODA Thiele, 1929

Superfamily CONOIDEA Fleming, 1822

Family CONIDAE Fleming, 1822

Genus *Profundiconus* Kuroda, 1956*Profundiconus neotorquatus* (da Motta, 1985)

Plate 1, Figs. 1-3

Conus torquatus Martens, 1901: 15; 1904: 75, pl. 1 fig. 1. Junior homonym of *Conus torquatus* Röding, 1798; *Conus neotorquatus* da Motta, 1985 is a replacement name.

Type material: Not examined.

Type locality: East Africa. *Valdivia* Expedition stn 263, off Somalia, 823 m; stn 246, off Tanzania, 818 m; stn 253, 254, 256, off Mozambique, 638-1134 m (Martens 1904).

Material examined: ATIMO VATAE, Trawler "Nosy Be 11": Lavanono area: stn CP3597, 25°43'S, 44°24'E, 729-732 m, 3 dd. – East Faux-Cap: stns CP3566 / DW3565, 25°36'-37'S, 46°21'E, 618-624 m, 2 dd. – South Pointe Barrow: stn CP3595, 25°35'S, 44°15'E, 821-910 m, 2 lv, 3 dd.

Remarks: According to the phylogenetic analysis, the sequenced specimens from Madagascar diverge significantly from those identified as *Profundiconus teramachii* and should be treated as a distinct species rather than as a form of the latter (Tenorio & Castelin 2016), despite the only slight morphological differences in their shells and radulae. *Profundiconus neotorquatus* is relatively abundant in deep water in the southern Indian Ocean, and is one of the most common *Profundiconus* species.

Genus *Conasprella* Thiele, 1929Subgenus *Conasprella* Thiele, 1929*Conasprella* (*Conasprella*) *articulata* (G. B. Sowerby II, 1873)

Plate 1, Fig. 4

Type locality: Holotype whereabouts unknown.**Type material:** Mauritius.

Material examined: ATIMO VATAE, Trawler "Nosy Be 11": North Sainte Luce: stn DW3531, 24°37.6'S, 47°31.1'E, 54-56 m, 1 dd. – South-East Faux-Cap: stn CP3623, 25°41.4'S, 45°59.2'E, 74-80 m, 1 dd. – SW Cap Sainte Marie: stn DW3607, 25°45.7'S, 44°52.0'E, 40-41 m, 1 dd. – Fort-Dauphin: Rocher de la Baleine: stn TA51, 25°00.2'S, 47°06.2'E, 14-26 m, 1 dd.

Subgenus *Endemoconus* Iredale, 1931*Conasprella* (*Endemoconus*) *somalica* (Bozzetti, 2013)

Plate 1, Figs. 8-11

Type material: Holotype in MNHN IM-2000-25778.**Type locality:** Ras Hafun, North-Eastern Somalia, 150-250 m.

Material examined: ATIMO VATAE, Trawler "Nosy Be 11": Between Lokaro and Ste Luce: stn DW3516, 24°52'S, 47°29'E, 160-161 m, 4 lv, 7 dd. – Fort-Dauphin area: stn CP3543, 25°28'S, 46°59'E, 148-155 m, 1 lv, 3 dd. – stn CP3573, 25°13.5'S, 47°13.8'E, 87-88 m, 1 dd. – South Pointe Barrow: stn CP3586, 25°33'S, 44°18'E, 155-156 m, 1 dd. – South-West Pointe Barrow: stn DW3588, 25°03'S, 44°00'E, 113-135 m, 1 dd. – South-East Pointe Barrow: stn CP3584, 25°28'S, 44°25'E, 203-210 m, 5 dd. – Lavanono area: stn DW3599, 25°45'S, 44°29'E, 122-123 m, 1 dd. – Toliara, South West Madagascar (Crosnier coll.), 23°36.3'S, 43°32.5'E, 250 m, 2 dd.

Distribution and habitat: Among the specimens of *C. somalica* from the MNHN (mostly collected between 110 and 250 m), 24 are coming from the South of Madagascar (ATIMO VATAE), 8 from northwestern Madagascar (7 from the MIRIKY cruise and one from Collection Pierrot). Some specimens have also been collected in Toliara [Tuléar] and North of La Réunion in 87 to 340 m deep. Although only very recently described from Somalia, this species has a large geographic range covering much of the western Indian Ocean in rather deep water.

Re-description: Shell small to moderately small (22 to 33 mm), conical, with a moderate to high scalariform spire, sigmoid in profile. Protoconch multispiral with at least 2.5 or 3 whorls (apex of protoconch broken in all specimens collected). Teleoconch sutural ramp concave with radial threads, lacking spiral striae or grooves. Early 3-4 postnuclear whorls tuberculate. Shoulder sharply angulate. Left side of the last whorl sigmoid (convex adapically and concave basally), giving to the shell a slightly pyriform elongated appearance. Anal notch U-shaped. Aperture rather broad and uniform in width, with a sigmoid inner lip. Pattern of last whorl consisting of pure white and brown alternate spiral rows of dashes, except on the brown blotches forming three spiral broad bands on an ivory-grey colored background. Shoulder ornated with a row of regularly alternate dark brown and white dots. Basal area with about seven close spiral grooves and rounded ribs brown colored with white radial streaks. Periostracum thin and translucent.

Living animal and radula: Five specimens have been collected alive during the ATIMO VATAE expedition, and their DNA (cox-1 gene fragment) analyzed. The specimens are nested in the *Conasprella* clade (Fig. 5). The radula has not yet been examined.

Remarks: *Conasprella somalica* had previously been confused with *Conasprella wakayamaensis* (Kuroda, 1956) and *C. eugrammata* (Bartsch & Rehder, 1943).

Subgenus *Fusiconus* da Motta, 1991*Conasprella* (*Fusiconus*) *elokismenos* (Kilburn, 1975)

Plate 1, Figs. 5-7

Conus orbignyi aratus Kilburn, 1973: 575, figs 15-16. Junior homonym of *Conus aratus* Gabb, 1873; *Conus orbignyi elokismenos* Kilburn, 1975 is a replacement name.

Type material: Holotype in NMSA A3.

Type locality: off Tongaat-Umhlanga Rocks, Natal, South Africa, 150-170 fms [275-310 m].

Material examined: ATIMO VATAE, Trawler "Nosy Be 11": South-East Pointe Barrow: stn CP3584, 25°28'S, 44°25'E, 203-210 m, 2

lv, 18 spm, 67 dd. – South Pointe Barrow: stn CP3583, 25°31'S, 44°16'E, 296-302 m, 3 lv, 7 dd. – South-West Pointe Barrow: stn CP3590, 25°03'S, 43°59'E, 300-309 m, 1 lv, 1 spm., 1 dd. – Lavanono area: stn DW3599, 25°45'S, 44°29'E, 122-123 m, 1 dd. – Between Lokaro and Sainte Luce: stn DW3515, 24°53'S, 47°28'E, 184-203 m, 1 dd. – Fort-Dauphin area: stn DW3540, 25°26'S, 47°05'E, 189-217 m, 1 dd.

Remarks: Puillandre et al. (2011) have studied the genetic divergence and geographical variation in the deep-water *Conasprella orbignyi* complex, providing support to consider *elokismenos* as a full species rather than a geographical subspecies of *C. orbignyi*. This is one of the most common species from deep water in Madagascar “Deep South”. It is widely distributed in the SW Indian Ocean, including the Mozambique Channel and South Africa.

Conasprella (Fusiconus) lemuriana sp. nov.

Plate 2, Figs. 1-6

Type material: Holotype MNHN IM-2000-33731 and five paratypes (Table 1).

TABLE 1

Type	Repository	Dimensions (mm)	Locality
Holotype	MNHN IM-2000-33731	37.5 x 13.4	South Pointe Barrow, ATIMO VATAE CP3586, 25°33'S, 44°18'E, 155-156 m.
Paratype 1	MNHN IM-2000-33732	32.2 x 12.7	South-East Faux-Cap, ATIMO VATAE CP3623, 25°41.4'S, 45°59.2'E, 74-80 m.
Paratype 2	MNHN IM-2000-33733	37.3 x 14.0	Off Baie Narendry, MIRIKY DW3238, 14°29' S, 47°27' E, 48-139 m.
Paratype 3	MNHN IM-2000-33734	18.4 x 7.0	Off Baie Narendry, MIRIKY DW3238, 14°29' S, 47°27' E, 48-139 m.
Paratype 4	MNHN IM-2000-33735	13.7 x 5.0	Off Baie Narendry, MIRIKY DW3237, 14°31' S, 47°25' E, 50-107 m.
Paratype 5	EM coll.	26.8 x 10.4	Mauritius, Rivière Noire, 120-180 m

Type locality: South Madagascar, South of Pointe Barrow, 25°33'S, 44°18'E, 155-156 m.

Material examined: ATIMO VATAE, Trawler “Nosy Be 11”: South-East Faux-Cap: stn CP3623, 25°41.4'S, 45°59.2'E, 74-80 m, 1 dd (paratype 1). – South Pointe Barrow: stn CP3586, 25°33'S, 44°18'E, 155-156 m, 1 dd (holotype).

Additional material from other sources: Expedition MIRIKY: NW Madagascar, off Baie Narendry, stn DW3238, 14°29' S, 47°27' E, 48-139 m, 2 dd (paratypes 2 and 3); stn DW3237, 14°31' S, 47°25' E, 50-107 m, 1 dd (paratype 4).

La Réunion, “Marion Dufresne” cruise MD32 (1982): off l'Hermitage les Bains: stn DC 56, 21°05'S, 55°12'E, 170-225 m, 6 dd – Off Ste Suzanne: stn DC 128, 20°51' S, 55° 36' E, 280-340 m, 3 dd.

Mauritius: Rivière Noire: about 20°23' S, 57°18' E, 120 m, July 2010, 1 dd (coll. EM ex Francis Hennequin, paratype 5).

Distribution and habitat: The range of *C. lemuriana* sp. nov. includes the South and North-West of Madagascar at depths between 48 and 156 m, in localities more than 1500 km apart from each other, as well as Réunion and Mauritius.

Etymology: Named after the imaginary continent Lemuria

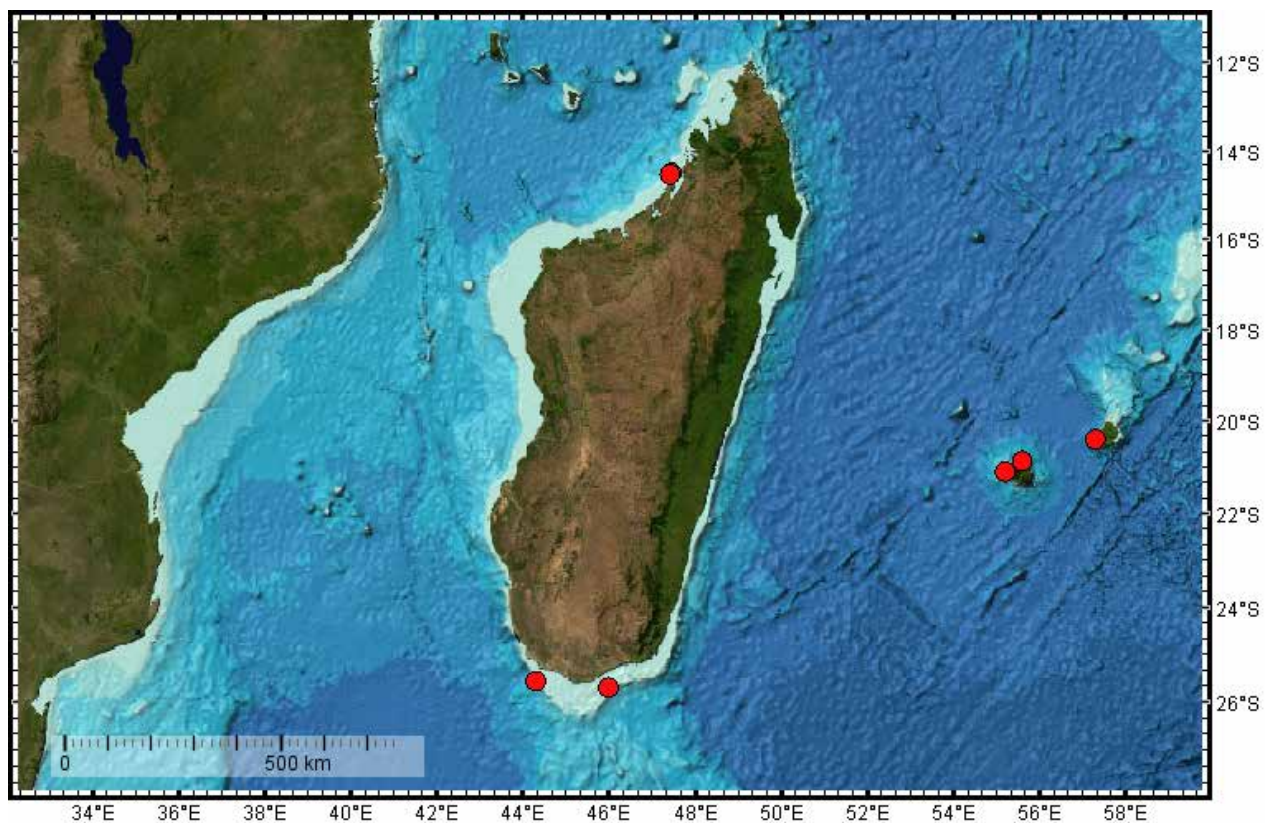


Fig. 6. Distribution map for *Conasprella (Fusiconus) lemuriana* sp. nov.

consisting of the Mascarenes and Madagascar.

Description of the shell: Morphometric parameters: L = 26–38 mm; mean L = 32.7 mm; RD = 0.46–0.52; RSH = 0.18–0.26; PMD = 0.93–0.96.

Shell moderately small to medium-sized, conical to narrowly conical in shape with a concave, scalariform and rather high spire. The protoconch is small (about 0.7 mm maximum diameter) and paucispiral of about 2 whorls (Fig. 7). Teleoconch sutural ramp concave with radial threads and about five spiral striae and grooves. Five early postnuclear whorls tuberculate. Shoulder broadly carinate. Left side of the last whorl sigmoid (convex adapically and concave basally), giving to the shell a slightly pyriform-elongated aspect. Aperture narrow and uniform in width. Last whorl weakly sculptured with about 23 to 25 axially striate grooves and flat ribbons, absent or obsolete near the shoulder. Colour pattern of the last whorl consisting of interrupted pure white spiral rows of bars alternating with brown dots on the ribbons. Brown blotches arranged in three spiral bands on an ivory colored background.



Fig. 7. Protoconch and early postnuclear teleoconch whorls of *Conasprella (Fusiconus) lemuriana* sp. nov. from La Réunion (L = 7.5 mm). Scale bar: 1 mm.



Fig. 8. Protoconch and early postnuclear teleoconch whorls of the holotype of *Conus (Leptoconus) saecularis* Melvill, 1898. Scale bar: 1 mm. Photo credit: Harry Taylor, NHMUK Photographic Unit.

Living animal and radula: The specimens available were all dead taken, so the animal, DNA and radula are unavailable.

Remarks: *C. (F.) lemuriana* sp. nov. seems restricted to the South West Indian Ocean. It can be compared to *Conasprella*

(*Fusiconus*) *saecularis* (Melvill, 1898) (Pl. 2, fig. 7), *Conasprella (Fusiconus) comatosa* (Pilsbry, 1904) (Pl. 2, fig. 9), and to *Conasprella (Fusiconus) fijiensis* (Molenbeek, Röckel & Bouchet, 2008) (Pl. 2, fig. 8). The protoconch of both *C. saecularis* (Fig. 8) and *C. comatosa* is multispiral, whereas it is paucispiral in *C. lemuriana* sp. nov.. The profile of the spire in *C. saecularis* is more deeply concave than in *C. lemuriana* sp. nov., and its shoulder is even more sharply angulated than in the latter. The last whorl of *C. saecularis* has more pronounced spiral grooves, and is differently patterned with numerous irregular spiral rows of brown dots and dashes. *C. comatosa* has a larger and more colourful shell, almost biconical with straight sides, and the last whorl is more densely sculptured with numerous spiral grooves. *C. fijiensis*, a species most likely endemic to Fiji, is the most similar in shell features. It is much smaller (L = 15 to 20 mm) than *C. lemuriana* sp. nov., but its shell is almost identical in shape. The protoconch is paucispiral in both but the shell pattern of axial streaks and blotches in *C. fijiensis* is different from that of *C. lemuriana* sp. nov. Tucker & Tenorio (2009) would have assigned the present new species to *Bathyconus*.

Conasprella (Fusiconus) longurionis (Kiener, 1845)

Plate 3, Fig. 1

Type material: Holotype repository unknown.

Type locality: not stated.

Material examined: ATIMO VATAE, Trawler "Nosy Be 11"; South of Pointe Barrow: stn CP3586, 25°33'S, 44°18'E, 155–156 m, 1 dd.

Remarks: A single, dead specimen was collected during the ATIMO VATAE expedition. The species is fairly common in the Mozambique Channel, especially in northern Mozambique in relatively shallow water. It has a multispiral protoconch indicating planktotrophic larval development and its occurrence in southernmost Madagascar might represent a pseudopopulation of occasionally settling larvae rather than a reproductive, self-recruiting population.

Genus *Lilliconus* Raybaudi, 1994

Lilliconus sagei (Korn & G. Raybaudi Massilia, 1993)

Plate 3, Figs. 2–6

Type material: Holotype in SMNS.

Type locality: off northern Somalia, Gulf of Aden.

Material examined: ATIMO VATAE: Cap Ranavalona: stn TM02, 25°04.43'S, 46°57.7'E, intertidal, 1 dd. – Fausse Baie des Galions: stn TP21, 25°03.3'S, 46°59.1'E, 23–25 m, 1 dd. – Andramara: stn BM10, 25°28.8'S, 44°58.3'E, intertidal, 5 dd. – Fort-Dauphin, in front of Baie Monseigneur: stn TB05, 25°02.2'S, 47°00.4'E, 23 m, 1 dd. – South Baie de Lokaro: stn TS09, 24°57.0'S, 47°06.4'E, 5–6 m, 1 dd. – Nosy Manitsa: stn TA15, 25°12.6'S, 44°12.5'E, 12–18 m, 1 lv; stn TA20, 25°13.1'S, 44°14.0'E, intertidal, 1 dd. – Pointe Evatra: stn TB01, 24°59.8'S, 47°05.7'E, 22 m, 1 lv. – Ambatobe, near Soamanitse: stn BM02, 25°27.4'S, 44°57.4'E, intertidal, 1 dd. – Ambatobe, Bavarama: stn BM06, 25°27.9'S, 44°57.6'E, intertidal, 1 dd. – Lavanono, Rocher de l'Albatros: stn BS12, 25°28.6'S, 44°56.8'E, 12 m, 2 dd; stn BS01, 25°28.2'S, 44°56.4'E, 12–14 m, 1 dd; stn BS09, 25°28.8'S, 44°56.8'E, 11–13 m, 3 spms; stn BS15, 25°28.6'S, 44°57.0'E, 11–12 m, 5 dd. – Cap Sainte Marie: stn BS16, 25°34.9'S, 45°07.6'E, 15 m, 1 dd. – SW Cap Sainte Marie, Trawler "Nosy Be 11": stn DW3605, 24°54.5'S, 44°51.0'E, 56–57 m, 2 dd; stn DW3606, 25°48.4'S, 44°51.1'E, 44–46 m, 4 dd; stn DW3607, 25°45.7'S, 44°52.0'E, 40–41 m, 1 spm. – Lavanono area, stn BP23, 25°26.4–8'S, 44°56.1–3'E, 6–9

m, 1 spm; stn BP10, 25°25.5-8'S, 44°54.4-6'E, 23-25 m, 1 dd; stn BP33, 25°25.80-8'S, 44°55.7-8'E, 11-13 m, 3 spms; stn BP34, 25°25.8'S, 44°55.4'E, 14-15 m, 2 dd; stn BP42, 25°22.8-23.7'S, 44°51.1'E, 18-21 m, 1 dd; stn BP29, 25°25.0-1'S, 44°52.0'E, 22-24 m, 1 dd; plage de Lavanono, stn BM01, 25°25.2'S, 44°56.3'E, intertidal, 1 dd; Lavanono, débarcadère, stn BM08, 25°25.6'S, 44°56.2'E, intertidal, 1 dd; stn BS03, 25°26.4'S, 44°56.1'E, 14-18 m, 1 lv; purchased from local fishermen, 1 dd.

Remarks: Specimens from Atimo Vatae identified as *L. sagei* have been sequenced, and their radula examined (Puillandre & Tenorio, 2017) (Fig. 9). The radula is essentially identical to that of individuals of *L. sagei* from the type locality (Somalia), but there are no sequences of animals from near the type locality to compare with those from Madagascar. Shell morphology of Somalia and Madagascar specimens is similar, and within the expected range of variation of *L. sagei*. However, the shell has a large, paucispiral protoconch (Fig. 10), suggesting a non-planktotrophic mode of development, and hence a limited dispersal ability. Hence, we cannot unequivocally reject the hypothesis that the *Lilliconus* species found in southern Madagascar might in fact correspond to a species distinct from *L. sagei*. Future molecular studies are needed to test this hypothesis, or alternatively confirm that *L. sagei* has a continuous distribution along the coast of East Africa, reaching southern Madagascar. *L. sagei* is common as a beached shell, and can be found in large quantities among shell-grit in areas around Lavanono.

Type locality: "East Indies".

Synonyms: *Conus biancae* Bozzetti, 2010, **syn. nov.** [type locality: Sandraviny, SE Madagascar; holotype MNHN IM-2000-22881]; *Cylinder priscai* Bozzetti, 2012, **syn. nov.** [type locality: Ste Luce, SE Madagascar; holotype MNHN IM-2000-25774].

The following nominal taxa have until now been treated as synonyms of *Conus textile*. We now regard them as synonyms of *C. archiepiscopus*: *Conus panniculus* Lamarck, 1810 [type locality: "Mer des Grandes Indes"; type material lost]; *Conus pyramidalis* Lamarck, 1810 [type locality: East Indies]; *Conus communis* Swainson, 1840 [objective synonym of *C. archiepiscopus*, typified by the same lectotype as *C. archiepiscopus*]; *Conus textile* var. *euetrios* G. B. Sowerby III, 1882 [type locality: not stated]; *Conus eumitus* Tomlin, 1926 [Natal, South Africa]; *C. textile* var. *ponderosa* Dautzenberg, 1932 [type locality: Ste Marie, Madagascar; invalid: junior homonym of *Conus quercinus* var. *ponderosus* G. B. Sowerby II, 1858]; *Conus sirventi* Fenaux, 1943 [Type locality: Madagascar]; *Conus suzannae* van Rossum, 1990 [type locality: Malindi, Kenya]. The nominal taxa *Conus verriculum* Reeve, 1843 [Type locality: "Ceylan"], *Conus concatenatus* Kiener, 1845 (1850) [Type locality not stated], and *Conus cholmondeleyi* Melvill, 1900 [Type locality unknown] may also correspond to *C. archiepiscopus*.

Material examined: ATIMO VATAE: Sainte Luce, W Ilot Babet: stn TA63, 24°46.2'S, 47°12.4'E, 1-10 m, 1 lv. – Sainte Luce, Sud Ilot Souillac: stn TA37, 24°45.8'S, 47°12.4'E, 4-7 m, 1 lv. – Sainte



Fig. 9. Photomicrograph of the radular tooth of *L. sagei* from Lavanono, South Madagascar (specimen MNHN IM-2009-31328, L = 6.4 mm). Scale bar 0.1 mm.



Fig. 10. SEM micrograph of the protoconch and early postnuclear teleoconch whorls of *L. sagei* from Rocher de l'Albatros (L = 4.3 mm).

Genus *Conus* Linnaeus, 1758

Subgenus *Cylinder* Montfort, 1810

Conus (*Cylinder*) *archiepiscopus* Hwass in Bruguière, 1792, **revalidated**

Plate 3, Figs. 8-14

Type material: Lectotype designated by Kohn (1968) in MHNG 1106/40.

Luce, W Ilot Babet: stn TA63, 24°46.2'S, 47°12.4'E, 1-10 m, 1 lv. – Baie de Fort-Dauphin: stn TS03, 25°00.8'S, 47°00.9'E, 24 m, 3 dd. – Fort-Dauphin area, imprecise locality: stn s/n, 1 dd. – Baie des Galions: stn TM21, 25°08.9'S, 46°45.4'E, intertidal, 1 dd; stn TA58, 25°09.5'S, 46°45.5'E, 1-10 m, 1 lv, 1 dd. – Fausse Baie des Galions: stn TA52, 25°02.4'S, 46°59.6'E, 8-14 m, 3 dd. – Ilot de Lokaro: stn TM05, 24°56.5'S, 47°07.1'E, intertidal, 1 lv, 3 dd. – crique au NE phare d'Evatra: stn TM08, 24°58.7'S, 47°05.9'E, intertidal, 1 lv. – South Baie de Lokaro: stn TS09, 24°57.0'S, 47°06.4'E, 5-6 m, 1 lv, 1 dd. – Pointe Evatra: stn TR05, 24°58.1'S, 47°06.1'E, 3-8 m, 4 dd; stn TA50, 24°59.5'S, 47°06.0'E, 10 m, 3 lv. – Anjatanimena: stn TR13, 25°08.1'S, 46°47.7'E, 16-20 m, 1 lv. – West Pointe Evatra: stn TR16, 24°59.5'S, 47°05.6'E, 15-17 m, 1 dd. – Pointe Evatra, Anse Itapera: stn TA46, 24°59.2'S, 47°05.6'E, 2-12 m, 1 dd. – Ilot Choumare: stn TA41, 24°50.2'S, 47°10.7'E, 12-24 m, 2 dd. – stn TA43, 24°50.5'S, 47°10.4'E, 10 m, 1 dd. – Plage Monseigneur: stn TM01, 25°02.1'S, 46°59.9'E, intertidal, 1 lv, 2 dd. – Cap Ranavalona: stn TR14, 25°04.5'S, 46°57.7'E, 2-4 m, 1 dd. – Cap Ranavalona, Bevava: stn TV13, 25°04.4'S, 46°57.1'E, 4-5 m, 1 lv, 1 dd. – Sainte Luce: stn TM19, 24°47.1'S, 47°11.9'E, intertidal, 1 dd. – Plage Libanona: stn TS11, 25°02.3'S, 46°59.7'E, intertidal, 1 dd. – Pointe d'Ambero: stn TM16, 25°06.7'S, 46°49.9'E, intertidal, 1 dd. – Sud de la Baie de Lokaro: stn TV11, 24°57.0'S, 47°06.4'E, 5-6 m, 1 lv. – West du Cap Ansirabe: stn TV14, 25°02.5'S, 46°59.7'E, 4-5 m, 1 dd.

– off Phare Flacourt: stn TR07, 25°01.3'S, 47°00.2'E, 12–16 m, 1 dd; stns TB02–TB03, 25°01.3'S, 47°00.5'E, 18 m, 1 dd. Plage de Lavanono: stn BM01, 25°25.2'S, 44°56.3'E, intertidal, 10 dd. – Ambatobe, Bavarama: stn BM06, 25°27.9'S, 44°57.6'E, intertidal, 2 lv. – Débarcadère de Lavanono intertidal: stn BM08, 25°25.6'S, 44°56.2'E, 3 lv. – Lavanono area: stn TA10, 25°28.3'S, 44°55.6'E, 23 m, 1 dd. – Nosy Manitsa: stn TA20, 25°23.1'S, 44°14.0'E, intertidal, 1 lv. – Lavanono area: stn BV06, 25°26.9'S, 44°55.9'E, 14–18 m, 1 lv. – Lavanono area dredging: stn BP23, 25°26.4–8'S, 44°56.1–3'E, 6–9 m, 1 dd. – Lavanono area: stn BP34, 25°25.8'S, 44°55.4'E, 14–15 m, 1 dd. – off Lavanono: stn BV15, 25°25.6'S, 44°55.9'E, 9 m, 2 lv. – Western area Lavanono: stn BP42, 25°22.8–23.7'S, 44°51.1'E, 18–21 m, 1 dd. – Lavanono area, purchased from local fishermen, 47 dd. – secteur Ouest de Lavanono: stn BP41, 25°22.9–23.2'S, 44°51.0–51.6'E, 19–21 m, 1 lv. – NW Rocher de l'Albatros: stn BS01, 25°28.2'S, 44°56.4'E, 12–14 m, 1 lv. – secteur de Lavanono: stn BS03, 25°26.4'S, 44°56.1'E, 14–18 m, 1 lv. – NW Rocher de l'Albatros: stn BV01, 25°28.2'S, 44°56.4'E, 12–14 m, 1 lv. – secteur de Lavanono: stn BV04, 25°26.4'S, 44°56.1'E, 14–18 m, 1 lv. – secteur de Lavanono: stn BV06, 25°26.9'S, 44°55.9'E, 14–18 m, 1 lv. – Cap Malainpioka area, purchase from local fishermen, 4 dd. – Cap Malainpioka: stn BM15, 25°20.6'S, 44°48.3'E, intertidal, 1 dd. – N W Cap Sainte Marie: stn BM17, intertidal, 1 lv. – Andramara: stn BM10, 25°28.8'S, 44°58.3'E, intertidal, 1 dd. – Ambatobe, near Soamanitse: stn BM02, 25°27.4'S, 44°57.4'E, intertidal, 1 dd. – South of Ambatomainty: stn BM05, 25°26.7'S, 44°56.7'E, intertidal, 2 dd. – Rocher de l'Albatros: stn BS12, 25°28.6'S, 44°56.8'E, 12 m, 2 dd; stn BV10, 25°28.7'S, 44°56.8'E, 10–13 m, 1 dd; stn BV14, 25°28.8'S, 44°55.9'E, 20 m, 1 lv. – N W Rocher de l'Albatros: stn BS01, 25°28.2'S, 44°56.4'E, 12–14 m, 1 dd.

Remarks: The cones reported as *Conus textile* from Madagascar (e.g., Dautzenberg 1929, 1932) and the western Indian Ocean are extremely variable in shape and pattern. The paucispiral protoconch of 2–2.5 whorls (Fig. 11) in some forms of the Western Indian Ocean is consistent with a limited dispersal ability, accounting for the observed variability in these shells. Larval shell consists of 3–3.5 whorls in Pacific Ocean populations (Röckel et al., 1995).

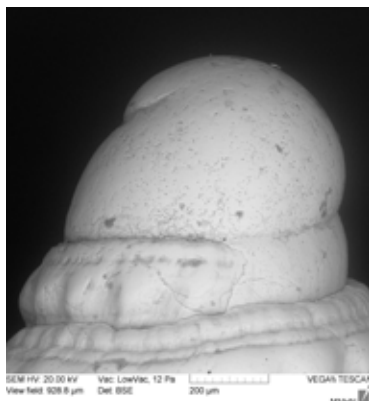


Fig. 11. SEM micrograph of the protoconch and early post-nuclear teleoconch whorls of *C. (C.) archiepiscopus* from Lavanono (L = 4.8 mm).

In our phylogeny (Fig. 5), the sequenced specimens from Atimo Vatae cluster together with specimens from southern Mozambique (Inhaca). One specimen of *Conus textile neovicarius* da Motta, 1982 is sister to the clade containing specimens from Madagascar and Mozambique. All this clade composed of specimens from the Indian Ocean and the Red Sea appear

separated from specimens from locations throughout the Pacific Ocean, and the corresponding node has a strong support. Thus, the distinctive morphological features and the molecular data are consistent with the hypothesis that the members of the *C. textile* group originating from the SW Indian Ocean correspond actually to a distinct species. Many names have been established for specimens originating from the Western Indian Ocean. The oldest is *archiepiscopus* Hwass in Bruguière, 1792, and hence we consider that this is the name to be used for individuals from this area which includes Madagascar "Deep South". The names *Conus biancae* and *Cylinder prisca* refer to, respectively, albinistic and pale coloured individuals. Molecular data are also consistent with the hypothesis that *C. neovicarius* represents most likely a valid species from the Red Sea rather than a mere subspecies.

Conus (Cylinder) pseudocedonulli Blainville, 1818
Plate 3, Fig. 7

Type material: not traced.

Type locality: not stated.

Synonyms: *Conus blainvillii* Vignard, 1829 [type locality: China sea (erroneous) corrected by Coomans et al. (1982) to Conducia Bay, Mozambique; specimen illustrated by Vignard selected as lectotype by Coomans et al. 1982, whereabouts unknown]; *Conus hereditarius* da Motta, 1987 [type locality: Raya Island, Phuket, Thailand; holotype in MHNG].

Material examined: Lavanono, Coll. Batifoix from local fishermen, 2 spm. Not collected during the Atimo Vatae expedition.

Remarks: *Conus pseudocedonulli* has been treated as a subspecies (e.g., Coomans et al. 1982, as *blainvillii*; Röckel et al. 1995) or as a synonym (Tucker & Tenorio 2013) of *Conus ammiralis* Linnaeus, 1758. The two have disjunct distributions, the former living in the Indian Ocean (W. Thailand, Réunion, Madagascar, Zanzibar, Seychelles, Mozambique), the latter in the tropical West Pacific. The two are readily separable morphologically, *pseudocedonulli* being distinguished by a coronated and channeled spire and an average smaller size. Although our view is not backed by molecular data, we tentatively treat *C. pseudocedonulli* as a valid species. Its occurrence in southernmost Madagascar might represent a pseudopopulation of occasionally settling larvae rather than a reproductive, self-recruiting population.

Subgenus *Darioconus* Iredale, 1930
Conus (Darioconus) praelatus Hwass in Bruguière, 1792
Plate 4, Figs. 1–8

Type material: Lectotype designated by Kohn (1968) in MNHG 1107/37.

Type locality: «Mer [des] Grandes Indes».

Synonyms: *Conus pennaceus tsara*, Korn, Niederhöfer & Blöcher, 2000 [type locality: Taolagnaro (= Fort-Dauphin); holotype SMNS ZI 30424]; *Darioconus fort-dauphinensis* Bozzetti, 2015, **syn. nov.** [type locality: Taolagnaro (= Fort-Dauphin); holotype MNHN IM-2000-31697]; *Darioconus miniturrus* Bozzetti, 2017, **syn. nov.** [Taolagnaro (= Fort-Dauphin); holotype MNHN].

Material examined: ATIMO VATAE: Sainte Luce, NW Ilot Souillac: stn TA40, 24°46.7'S, 47°12.2'E, 4–5 m, 1 dd; stn TA36, 24°45.2'S, 47°12.0'E, 4–6 m, 2 lv, 2 dd. – Fort-Dauphin area, doubtful data, 1 dd.

Remarks: The members of the *C. pennaceus* group from the Indian Ocean require a thorough revision supported by molecular data. Preliminary studies carried out by Pereira et. al. (2010) on

material from Mozambique suggested the separation of northern (*pennaceus*) and southern populations (*lohri*). Resolution and support at the nodes was however rather poor, and no specimens from Madagascar were included. In the present work we are tentatively treating *C. praelatus* and *C. vezoi* as full, separate and South Madagascar endemic species, different from *C. pennaceus* (considered to correspond to North Mozambique populations). However, their taxonomic status as separate species, or as forms of a single polymorphic species, requires validation by molecular data. Comparison of the lectotype of *Conus praelatus* Hwass in Bruguière, 1792 in MHNG (Pl. 4, fig. 2) with the holotype of *C. pennaceus tsara* Korn, Niederhöfer & Blöcher, 2000 (Pl. 4, fig. 2) suggests that the latter is a junior synonym (Monnier et al. 2018). Other recently described taxa such as *D. fortdauphinensis* Bozzetti, 2015 and *D. miniturrus* Bozzetti, 2017 are within range of morphological variability of *C. praelatus*, and represent forms of the latter. *C. praelatus* is a shallow-water species and would have been accessible to sailors and militaries from the late 18th century stopping over in Fort-Dauphin en route to/from Réunion.

Conus (Darioconus) vezoi Korn, Niederhöfer & Blöcher, 2000
Plate 4, Figs. 9-10

Type material: Holotype of *Conus pennaceus vezoi* in SMNS ZI 30438.

Type locality: Maromitiliky, South of Beheloka, South West Madagascar [doubtful, see below].

Synonym: *Darioconus pennaceus pseudoecho* Bozzetti, 2013, **syn. nov.** [type locality: Lavanono, south Madagascar; holotype MNHN IM-2000-25776].

Material examined: ATIMO VATAE: Plage de Lavanono: stn BM01, 25°25.2'S, 44°56.3'E, intertidal, 4 dd; stn BM08, 25°25.6'S, 44°56.2'E, intertidal, 2 dd. – South-West Cap Andavaka, Trawler "Nosy Be 11": stn CP3549, 25°16.9'S, 46°31.3'E, 53-54 m, 1 dd. – Rocher de l'Albatros: stn BS12, 25°28.6'S, 44°56.8'E, 12 m, 1 dd. – Lavanono area, purchased from local fishermen, 27 dd. – Fort-Dauphin, Plage de Libanona: stn TB07, 25°02.5'S, 46°59.7'E, 4-5 m, 1 dd.

Remarks: As other members of the *pennaceus* group, *C. vezoi* has a paucispiral protoconch suggesting limited dispersal abilities (Fig. 12). Very few specimens of *C. vezoi* were collected during the ATIMO VATAE expedition, despite the fact that this is a rather common intertidal species, which can be seen crawling in tidal pools (Fig. 13). It is possible that the species occurrence is seasonal, and only common when individuals gather for reproduction at certain times of the year. The nominal taxon

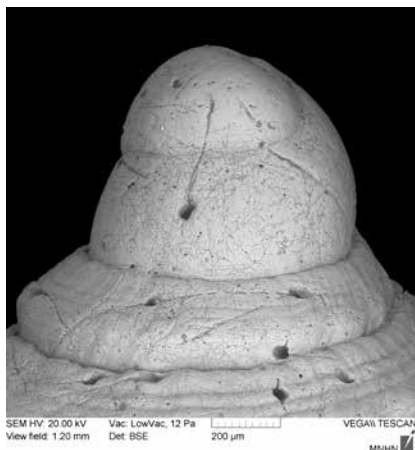


Fig. 12. SEM micrograph of the protoconch and early postnuclear teleoconch whorls of *C. (D.) vezoi* from Lavanono (L = 9 mm).

pseudoecho most likely represents a patterned individual of *C. vezoi* rather than a geographical subspecies. The type locality of *Conus vezoi* is somewhat doubtful, as it has not recently been collected between Beheloka and Itampolo and seems endemic to the stretch of coast extending between Lavanono and Fort-Dauphin.



Fig. 13. Live specimen of *C. (D.) vezoi* crawling during low tide at Lavanono in April 2014. Photo: E. Monnier.

Subgenus *Dendroconus* Swainson, 1840
Conus (Dendroconus) betulinus Linnaeus, 1758
Plate 5, Fig. 1

Type material: Lectotype selected by Kohn (1963) in LSL.

Type locality: Java, Indonesia, designated by Coomans et al. (1981).

Synonym: *Conus betulinus rufoluteus* Bozzetti & Ferrario, 2005 [type locality: Toliara (= Tuléar), SW Madagascar; holotype MNHN IM-2000-5392].

Material examined: ATIMO VATAE: Pointe Barrow: stn TA31, 25°12.2'S, 44°19.3'E, 4 m, 1 dd. – Lavanono area, purchased from local fishermen, 1 dd.

Remarks: We regard *Conus betulinus rufoluteus* Bozzetti & Ferrario, 2005 as a color form - rather than a subspecies - of *C. betulinus*. *C. betulinus* has a multispiral protoconch indicating planktotrophic larval development; its scarcity of in the study area suggests that its occurrence in southernmost Madagascar might represent a pseudopopulation of occasionally settling larvae rather than a reproductive, self-recruiting population.

Conus (Dendroconus) figulinus Linnaeus, 1758
Plate 5, Fig. 2

Type material: Lectotype selected by Kohn (1963) in LSL.

Type locality: Not stated.

Material examined: ATIMO VATAE: Baie des Galions: stn TA59, 25°09.1'S, 46°45.4'E, 1 dd. – Lavanono area, purchased from local fishermen, 1 dd. – Lavanono area: stn BP16, 25°26.4'S, 44°54.8-55.0'E, 23-25 m, 1 dd. – Plage de Lavanono: stn BM01, 25°25.2'S, 44°56.3'E, intertidal, 4 dd. – Cap Malainpioka area, purchased from local fishermen, 6 dd. – East of Cap Malainpioka: stn BM07, 25°21.5'S, 44°50.0'E, intertidal, 3 dd.

Remarks: No live specimens of *Conus figulinus* were found during the expedition, although this is a very common shallow water species, widely distributed throughout the Indo-Pacific. *C. figulinus* has a multispiral protoconch indicating planktotrophic larval development; its scarcity of in the study area suggests

that its occurrence in southernmost Madagascar might represent a pseudopopulation of occasionally settling larvae rather than a reproductive, self-recruiting population.

Conus (Dendroconus) medoci Lorenz, 2004

Plate 5, Figs. 3-7

Type material: Holotype in MNHN IM-2000-9376.

Type locality: Lavanono, South Madagascar.

Material examined: ATIMO VATAE, Trawler "Nosy Be 11": South of Faux-Cap, stn CP3579, 25°54.5'S, 45°33.2'E, 65-66 m, 1 dd; stn CP3580, 25°58.6'S, 45°34.9'E, 88-90 m, 1 dd. – South Cap Andavaka: stn CP3547, 25°18.0'S, 46°40.3'E, 69-70 m, 1 dd. – SW Cap Sainte Marie: stn DW3601, 25°59.0'S, 44°43.3'E, 97-98 m, 1 lv; stn DW3608, 25°39.4'S, 44°53.0'E, 37-38 m, 1 lv. – Fort-Dauphin area: stn CP3511, 25°15.0'S, 47°14.5'E, 97-98 m, 3 dd. – NW Rocher de l'Albatros: stn BV01, 25°28.2'S, 44°56.4'E, 12-14 m, 1 dd. – Cap Sainte Marie: stn TA26, 25°33.9'S, 45°06.9'E, 18-20 m, 1 dd. – Lavanono area, purchased from fishermen, 3 dd.

Remarks: *Conus medoci* can attain more than 80 mm in shell length. During the expedition, it has been collected between Fort Dauphin and Lavanono at depths from 12 to 98 m; other specimens have apparently been collected North of Sandravivany (roughly 24°03' S, 47° 30' E), a small village 120 km NE of Fort Dauphin. Its paucispiral protoconch (Fig. 14) is consistent with the hypothesis that this species is endemic to Madagascar "Deep South".



Fig. 14. SEM micrograph of the protoconch and early postnuclear teleoconch whorls of *C. (D.) medoci* from Sud de Faux Cap (L = 29.1 mm).

DNA analysis (Puillandre et al. 2014) as well as radular and shell morphology are consistent with the placement of this species in *Dendroconus*. The radular tooth (Fig. 15) is of the vermivorous type, rather broad and medium-sized ($L/T_L = 39$). The anterior section is slightly longer than the posterior section of the tooth ($T_L/AP_L = 1.9$). The rounded blade covers two thirds of the anterior portion ($100B_L/AP_L = 67\%$). 15 to 17 denticles in the serration arranged in two rows ending in a pointed terminating cusp. Base broad, with a small spur.

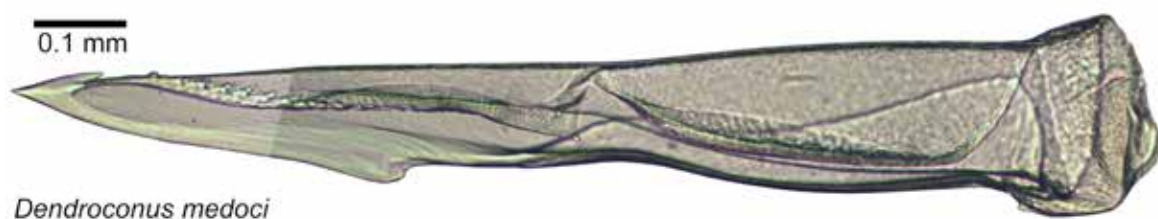


Fig. 15. Photomicrograph of the radular tooth of *C. (D.) medoci* from SW Cap Sainte Marie (specimen MNHN IM-2009-15606, L = 47.7 mm). Scale bar 0.1 mm.

Subgenus *Elisaconus* Tucker & Tenorio, 2013

Conus (Elisaconus) litteratus Linnaeus, 1758

Plate 6, Fig. 1

Type material: Lectotype designated by Kohn (1963) in LSL.

Type locality: "Asiatic Ocean".

Material examined: ATIMO VATAE: Pointe Barrow: stn TA31, 25°12.2'S, 44°19.3'E, 4 m, 1 dd. – South Faux-Cap, Trawler "Nosy Be 11": stn CP3579, 25°54.5'S, 45°33.2'E, 65-66 m, 1 dd.

Remarks: Only a couple of dead specimens were found during the expedition, although this is a common shallow water species, widely distributed throughout the Indo-Pacific, and also present in South Africa, the Mascarenes and the rest of Madagascar. The scarcity of *C. litteratus* in the study area suggests that its occurrence in southernmost Madagascar might represent a pseudopopulation of occasionally settling larvae rather than a reproductive, self-recruiting population.

Subgenus *Floraconus* Iredale, 1930

Conus (Floraconus) balteatus G. B. Sowerby I, 1833

Plate 6, Figs 2-5

Type material: Figure in G. B. Sowerby II, pl. 37, fig. 58 designated as lectotype by Kohn (1992).

Type locality: The Mascarenes, Indian Ocean, designated by Coomans et al. (1982).

Synonyms: *Conus olgiatii* Bozzetti, 2007, **syn. nov.** [type locality: Toliara (= Tuléar); holotype MNHN-IM-2000-9901]; *Conus anosyensis* Bozzetti, 2008, **syn. nov.** [type locality: Antsotso, SE Madagascar, in 60-100 m; holotype MNHN IM-2000-20864]; *Rolaniconus gilberti* Bozzetti, 2012, **syn. nov.** [type locality: Toliara (= Tuléar), SW Madagascar, in 3-5 m; holotype MNHN IM-2000-25077].

Material examined: ATIMO VATAE; Cap Sainte Marie: stn TA27, 25°33.2'S, 45°06.6'E, 16-18 m, 1 dd. – Banc Tozer: stn TA21, 25°12.6'S, 44°08.6'E, 13-27 m, 1 dd.

Remarks: Only a couple of dead specimens of an otherwise typical Indian Ocean species were collected in the expedition. Several nominal species have been established for specimens originating from the study, that are consistent with the spectrum of variability of *C. balteatus*. Thus, *Conus olgiatii* from Tuléar, SW Madagascar, and *Conus anosyensis* from SE Madagascar are respectively considered yellow to white and purple-blue color forms *C. balteatus*, while *Rolaniconus gilberti*, also described from Tuléar, most likely represents a white form of *balteatus* with the last whorl heavily sculptured with spiral cords and cordlets.

Subgenus *Fraterconus* Tucker & Tenorio, 2013

Conus (Fraterconus) distans Hwass in Bruguière, 1792

Plate 6, Fig. 6

Type material: Lectotype selected by Kohn (1968) in MHNG 1106/67.

Type locality: "The Pacific Ocean", narrowed (Coomans et al.,

1985) to the Moluccas, Indonesia.

Material examined: ATIMO VATAE: Banc Tozer: stn TA21, 25°12.6'S, 44°08.6'E, 13-27 m, 2 spm. – Ilot Choumare: stn TA43, 25°50.5'S, 47°10.4'E, 10 m, 1 lv. – Between Lokaro and Sainte Luce, Trawler "Nosy Be 11": stn DW3516, 24°52'S, 47°29'E, 160-161 m, 1 lv.

Subgenus *Gastridium* Modeer, 1793
Conus (Gastridium) geographus Linnaeus, 1758

Plate 6, Fig. 7

Type material: Lectotype selected by Kohn (1963) in LSL.

Type locality: "Indies".

Material examined: ATIMO VATAE: Port de Fort-Dauphin: stn TV19, 25°01.5'S, 47°00.0'E, 4-5 m, 1 dd. – Lavanono area, purchased from local fishermen, 1 dd. – Lavanono débarcadère: 25°25.6'S, 44°56.2'E, intertidal, 1 dd.

Conus (Gastridium) obscurus G. B. Sowerby I, 1833
Plate 6, Fig. 8

Type material: Lectotype representative (Kohn) figure in Sowerby I (1833): pl. 29, fig. 26.

Type locality: "Coast of Arabia".

Material examined: Lavanono area, purchased from local fishermen, 1 dd.

Remarks: Species widely distributed throughout the Indo-Pacific. The scarcity of *C. obscurus* in the study area suggests that its occurrence in southernmost Madagascar might represent a pseudopopulation of occasionally settling larvae rather than a reproductive, self-recruiting population.

Conus (Gastridium) tulipa Linnaeus, 1758

Type material: Lectotype selected by Kohn (1963) in LSL.

Type locality: not known.

Material examined: ATIMO VATAE: South-East of Faux-Cap, Trawler "Nosy Be 11": stn CP3622, 25°43.0'S, 45°59.4'E, 84-88 m, 1 dd.

Remarks: A single, dead specimen of this species was collected during the ATIMO VATAE expedition. This species is fairly common in Mozambique and northern Madagascar in relatively shallow water. The scarcity of *C. tulipa* in the study area suggests that its occurrence in southernmost Madagascar might represent a pseudopopulation of occasionally settling larvae rather than a reproductive, self-recruiting population.

Subgenus *Harmoniconus* da Motta, 1991
Conus (Harmoniconus) parvatus Walls, 1979
Plate 7, Fig. 2

Type material: Holotype in DMNH 122118.

Type locality: Natal, South Africa.

Material examined: ATIMO VATAE: Nosy Manitsa: stn TA20, 25°13.1'S, 44°14.0'E, intertidal, 1 dd. – Ambatomainty: stn BM03, 25°26.3'S, 44°56.5'E, intertidal, 3 lv.

Conus (Harmoniconus) nanus G. B. Sowerby I, 1833
Plate 7, Fig. 1

Type material: Lectotype selected by Kohn (1992) in NHMUK 1978170.

Type locality: "Lord Hood's Island" [South Marutea Island, Tuamotu].

Material examined: ATIMO VATAE: Pointe Evatra: stn TA49, 24°59.5'S, 47°06.0'E, 19 m, 1 dd. – Nosy Manitsa: stn TA20, 25°13.1'S, 44°14.0'E, intertidal, 1 dd. – Baie des Galions: stn TV16, 25°09.5'S, 46°44.9'E, 9-10 m, 1 spm; stn TA05/08/59,

25°08.8'S, 46°45.0'E, intertidal, 1 lv. – Cap Ranavalona, Beva: stn TV13, 25°04.4'S, 46°57.1'E, 4-5 m, 1 dd. – Fort-Dauphin, Plage Libanona: stn TM18, 25°02.3'S, 46°59.7'E, intertidal, 1 dd. – Rocher de l'Albatros: stn BS15, 25°28.6'S, 44°57.0'E, 11-12 m, 1 dd. – Ambatobe, Bavarama: stn BM06, 25°27.9'S, 44°57.6'E, intertidal, 1 lv.

Conus (Harmoniconus) sponsalis Hwass in Bruguière, 1792
Plate 7, Fig. 3

Type material: Specimen illustrated by Bruguière (1798: pl. 322, fig. 1) selected as lectotype by Kohn (1968); whereabouts unknown.

Type locality: "Iles Saint-George" [said by Hwass to be in the Pacific Ocean; modern name not known].

Material examined: ATIMO VATAE: Rocher de l'Albatros, BV10, 25°24'42"S, 44°54'20"E, 10-13 m, 1 lv. – Ambatobe, near Soamanitse, stn BM02, 25°27.4'S, 44°57.4'E, intertidal, 1 lv. – Secteur de Lavanono: stn BS03, 25°26.4'S, 44°56.1'E, 14-18 m, 1 lv. – Pointe Flacourt: stn TB13, 25°01.5'S, 47°00.0'E, 2-4 m, 1 lv. – Cap Ranavalona: stn TM03, 25°04.5'S, 46°57.8'E, intertidal, 1 lv.

Subgenus *Hermes* Montfort, 1810
Conus (Hermes) nussatella Linnaeus, 1758
Plate 7, Fig. 5

Type material: Lectotype selected by Kohn (1963) in LSL.

Type locality: "*Nussatello Insulam Asiae*" probably Tello Island, Sumatra, according to Kohn.

Material examined: ATIMO VATAE: Banc Tozer: stn TA22, 25°12.7'S, 44°08.5'E, 20-22 m, 1 dd. – Nosy Manitsa: stn TA20, 25°13.1'S, 44°14.0'E, intertidal, 1 dd. – Lavanono area, purchased from local fishermen, 1 dd.

Subgenus *Leporiconus* Iredale, 1930
Conus (Leporiconus) tenuistriatus G. B. Sowerby II, 1858
Plate 7, Fig. 4

Type material: Three syntypes in NHMUK.

Type locality: Philippines (Cuming).

Material examined: ATIMO VATAE: Pointe Evatra: stn TA50, 24°59.5'S, 47°06.0'E, 10 m, 1 dd.

Remarks: A single dead specimens was found during the expedition. This species is also present in the Mascarenes. The scarcity of *C. tenuistriatus* in the study area suggests that its occurrence in southernmost Madagascar might represent a pseudopopulation of occasionally settling larvae rather than a reproductive, self-recruiting population.

Subgenus *Lividoconus* Wils, 1970
Conus (Lividoconus) lischkeanus Weinkauff, 1875
Plate 7, Fig. 7

Type material: Holotype in LMD.

Type locality: "Insel Kiusiu" [Kyushu Island, Japan].

Material examined: ATIMO VATAE, Trawler "Nosy Be 11": Sainte Luce area: stn DW3533, 24°42'S, 47°32'E, 187-209 m, 1 dd. – North of Sainte Luce: stn DW3532, 24°39.4'S, 47°31.7'E, 86-87 m, 1 lv, 1 dd. – South of Faux Cap: stn CP3578, 25°50.1'S, 45°27.5'E, 59-61 m, 1 dd.

Remarks: The specimens from Madagascar "Deep South" are consistent with the morphological concept of *C. lischkeanus subroseus* (Röckel & Korn, 1992), which appears to be too geographically widespread to be considered a subspecies. In the tree in Fig. 5 the specimen from ATIMO VATAE appears closely

related to specimens from the Solomon Islands and New Caledonia. Hence, we consider it representative of *C. lischkeanus* and not ascribed to any particular subspecies.

Conus (Lividoconus) lividus Hwass in Bruguière, 1792
Plate 7, Figs 6, 8

Type material: Lectotype selected by Kohn (1968) in MHNG 1107/5.

Type locality: Antilles (in error).

Material examined: ATIMO VATAE: Sainte Luce: stn TM19, 24°47.1'S, 47°11.9'E, intertidal, 6 lv. – Platier Flacourt: stn TM23, 25°01.7'S, 47°00.1'E, intertidal, 1 lv. – off Phare Flacourt: stn TR07, 25°01.3'S, 47°00.2'E, 12-16 m, 1 dd. – Ilot de Lokaro: stn TM05, 24°56.5'S, 47°07.1'E, intertidal, 1 lv. – devant Baie Monseigneur: stn TB04, 25°02.1'S, 47°00.1'E, 11-12 m, 1 lv. – Baie de Lokaro: stn TS10, 24°56.8'S, 47°06.6'E, 7 m, 1 lv. – Sud de la Baie de Lokaro: stn TV11, 24°57.0'S, 47°06.4'E, 5-6 m, 1 lv. – Port de Fort-Dauphin: stn TV21, 25°01.6'S, 47°00.0'E, 2-4 m, 1 lv, 1 dd. – Port de Fort-Dauphin: stn TV19, 25°01.5'S, 47°00.0'E, 4-5 m, 1 lv. – Port de Fort-Dauphin: stn TV22, 25°01.5'S, 47°00.0'E, 4-5 m, 1 lv. – Baie des Galions: stn TA03, 25°09.2'S, 46°45.4'E, 3-8 m, 1 lv. – stn TA04, 25°09.6'S, 46°44.6'E, 7-8 m, 1 lv. – Cap Sainte Marie: stn TA27, 25°33.4'S, 45°06.9'E, 16-18 m, 1 lv. – East Baie des Galions: stn TA60, 25°09.4'S, 46°45.3'E, 6-13 m, 1 lv, 2 dd. – Baie des Galions: stn TV17, 25°09.2'S, 46°45.4'E, 5-6 m, 1 lv. – Pointe Evatra: stn TR05, 24°58.1'S, 47°06.1'E, 3-8 m, 7 lv. – West Pointe Evatra: stn TR16, 24°59.5'S, 47°05.6'E, 15-17 m, 1 lv, 1 dd. – Sud Pointe Evatra: stn TR18, 24°59.9'S, 47°06.0'E, 18-20 m, 1 lv. – Pointe Evatra: stn TB01, 24°59.8'S, 47°05.7'E, 22 m, 1 dd. – Pointe Evatra, Anse Itapera: stn TA46, 24°59.2'S, 47°05.6'E, 2-12 m, 3 lv. – East of Cap Antsirabe: stn TS04, 25°02.3'S, 47°00.3'E, 22-24 m, 5 dd. – Faux-Cap: stn BM12, 25°34.3'S, 45°31.7'E, intertidal, 1 lv, 1 dd. – Lavanono area, purchased from local fishermen, 1 dd.

Remarks: The sequenced specimens from Atimo Vatae do not differ significantly from conspecific individuals from other Indo-Pacific localities.

Conus (Lividoconus) muriculatus G. B. Sowerby I, 1833
Plate 7, Fig. 9

Type material: Lectotype selected by Kohn (1992) in NHMUK.

Type locality: Masbate, Philippines (Sowerby, 1841).

Material examined: ATIMO VATAE: Cap Sainte Marie: stn TA27, 25°33.2'S, 45°06.6'E, 16-18 m, 1 dd.

Conus (Lividoconus) quercinus Lightfoot, 1786
Plate 7, Fig. 11

Type material: Specimen illustrated by Martini (1773: pl.59, fig.657) selected as lectotype by Kohn (1964).

Type locality: None stated.

Material examined: ATIMO VATAE: Ehoala harbour: stn TP25, 25°03.5'S, 46°57.8'E, 7-9 m, 1 spm – South-East Faux-Cap, Trawler "Nosy Be 11": stn CP3622, 25°43.0'S, 45°59.4'E, 84-88 m, 1 lv.

Remarks: The sequenced specimens from Atimo Vatae do not differ significantly from conspecific individuals from other localities such as Vanuatu or the Marquesas.

Conus (Lividoconus) sanguinolentus Quoy & Gaimard, 1834
Plate 7, Fig. 10

Type material: Specimen illustrated by Quoy & Gaimard (pl. 53, fig.18) selected as lectotype by Kohn (1992); present whereabouts unknown.

Type locality: "Le Havre Carteret" [now Kavieng, New Ireland], Papua New Guinea.

Material examined: ATIMO VATAE: Nosy Manitsa: stn TA20, 25°13.1'S, 44°14.0'E, intertidal, 1 lv. – Ilot Choumare: stn TA41, 24°50.2'S, 47°10.7'E, 12-24 m, 1 lv. – stn TA43, 24°50.5'S, 47°10.4'E, 10 m, 1 lv. – Pointe Evatra: stn TA48, 25°00.0'S, 47°06.0'E, 4-19 m, 2 lv. – stn TA49, 24°59.5'S, 47°06.0'E, 19 m, 2 lv. – Pointe Evatra, Anse Itapera: stn TA46, 24°59.2'S, 47°05.6'E, 2-12 m, 2 lv. – stn TA47, 24°59.1'S, 47°05.4'E, 23 m, 1 lv.

Subgenus *Malagasyconus* Monnier & Tenorio, 2015

In the molecular phylogeny of Puillandre et al. (2014), *Conus lozeti* and *C. melvilli* stand apart on long branches, and they were somewhat arbitrarily classified in *Conus (Quasisonus)* by Puillandre et al. (2015). *Malagasyconus* was established at the rank of genus, and it is here ranked as subgenus to be consistent with the rest of the classification.

Conus (Malagasyconus) bonfigliolii (Bozzetti, 2010)
Plate 15, Figs 10-11

Type material: Holotype in MNHN IM-2000-23783.

Type locality: Lavanono, South Madagascar, 30-50 m.

Material examined: ATIMO VATAE stn BS04, 25°26.9'S, 44°55.9'E, 14-18 m, 1 dd. – Sainte Luce, Trawler "Nosy Be 11", stn DW3534, 24°43'S, 47°32'E, 296-307 m, 2 dd. – Lavanono area, purchased from local fishermen, 3 dd.

Remarks: Few specimens of this small, endemic species were found. Its morphological features, including the presence of a tooth-like columellar plait, and its geographical range are very similar to those of *Conus (Malagasyconus) lozeti*. In fact, the possibility that this species might be a mere form of *C. lozeti* can not be ruled out. Plate 5, fig. 9 shows the shell of a juvenile *C. lozeti* which has been positively identified by cox-1 gene fragment sequencing, for comparison with the holotype of *C. bonfigliolii*.

Conus (Malagasyconus) lozeti Richard, 1980
Plate 15, Figs 1-9

Type material: Holotype in MNHN IM-2000-2543.

Type locality: off Fort-Dauphin, SE. Madagascar.

Material examined: ATIMO VATAE, Trawler "Nosy Be 11": Fort-Dauphin area: stn CP3511, 25°15.0'S, 47°14.5'E, 97-98 m, 6 dd; stn CP3545, 25°29'S, 46°42'E, 108-110 m, 1 dd; stn CP3543, 25°28'S, 46°59'E, 148-155 m, 2 lv, 2 dd; stn CP3573, 25°13.5'S, 47°13.8'E, 87-88 m, 1 dd. – South of Faux-Cap: stn CP3579, 25°54.5'S, 45°33.2'E, 65-66 m, 1 dd; stn CP3580, 25°58.6'S, 45°34.9'E, 88-90 m, 1 lv, 2 dd. – SW of Cap Sainte Marie: stn DW3600, 25°59'S, 44°42'E, 143 m, 1 dd; stn DW3601, 25°59.0'S, 44°43.3'E, 97-98 m, 3 dd. – Manantenina area: stn CP3521, 24°24'S, 47°32'E, 117-118 m, 2 dd. – South-East of Faux-Cap: stn CP3623, 25°41.4'S, 45°59.2'E, 74-80 m, 1 dd. – Lavanono area: stn DW3599, 25°45'S, 44°29'E, 122-123 m, 1 lv, 4 dd. – East of Faux-Cap: stn CP3559, 25°33.7'S, 46°08.6'E, 78-80 m, 2 dd. – stn CP3560, 25°37'S, 46°10'E, 102-106 m, 1 lv, 2 dd. – North of Sainte Luce: stn DW3532, 24°39.4'S, 47°31.7'E, 86-87 m, 1 dd. – Sainte Luce area: stn DW3533, 24°42'S, 47°32'E, 187-209 m, 2 dd. – between Lokaro and Ste Luce: stn DW3516, 24°52'S, 47°29'E, 160-161 m, 1 dd.

Distribution and habitat: Thirty-seven specimens were collected during the ATIMO VATAE expedition between Sainte Luce and Lavanono, dead ones at depths between 65 and 209 meters while the five living ones were collected between 88



Fig. 16. SEM micrograph of the protoconch of *Malagasyconus lozeti* from East of Faux-Cap (L = 32.3 mm).



Fig. 17. Radular tooth of *Conus (Malagasyconus) lozeti* MNHN IM-2009-15622 (L = 44.5 mm). Scale bar 0.1 mm.

and 155 meters. The paucispiral protoconch in this species is consistent with the fact that it is a regional endemic.

Redescription of the shell: L = 40–70 mm; RD = 0.57–0.62; RSH = 0.16–0.22; PMD = 0.93–0.98.

Shell medium to moderately large, conical in profile with a porcellaneous surface and a low to moderate spire. Protoconch (Fig. 16) large, flattened, mammillate and paucispiral (1.5 whorls). Spire straight to concave in profile, rather scalariform, with weak arcuate radial threads on the flat sutural ramp. Nodules absent. Outline of the last whorl straight. Shoulder subangulate to angulate. Aperture narrow and nearly uniform in width. Strong tooth-like fold (dentiform plait) nearly perpendicular to the columella in the anterior part of the aperture. Pattern of the last whorl consisting of brown spiral lines forming minute tent markings on an ivory white background. Periostracum thin and transparent.

Living animal and radula: The collection of fresh, alive specimens of *C. (M.) lozeti* has allowed to carry out DNA and radular analyses of this species. In a Bayesian tree based on a concatenation of the cox-1, 16S and 12S gene fragments, *C. lozeti* appears sister to *C. melvilli* G. B. Sowerby III, 1879, but without strong posterior probability support (i.e., less than

0.95) (Puillandre et al. 2014). Shell morphology had suggested the placement of *lozeti* in *Plicaustraconus* (Tucker & Tenorio 2013; Puillandre et al. 2015), but the unique morphological features of shell and radula led to the erection of the genus *Malagasyconus* Monnier & Tenorio, 2015.

Operculum moderate to large (ca. one-fourth of the aperture length) and elongated. Radular tooth (Fig. 17) of medium-large relative size ($L/T_L = 40$). Anterior section of the radular tooth is longer than the posterior section of the tooth ($T_L/AP_L = 1.7$); the blade and barb are short; the weak blade covers less than one-third of the anterior section ($100B_L/AP_L = 28\%$); 40 to 45 coarse serrations arranged in multiple rows ending into an internal terminating cusp; base relatively broad, with a basal spur present.

Remarks: This elusive species was previously known only from its holotype from off Fort Dauphin and had been assimilated by some authors (Röckel et al. 1995; Filmer, 2001) with *Conus (Leptoconus) amadis* Gmelin, 1791 from southern India. Other

authors have considered this species as valid (Tucker & Tenorio, 2009). *C. (M.) lozeti* differs strongly from *C. (L.) amadis* in shell and radula morphologies, as well as in DNA sequence.

Subgenus *Phasmoconus* Mörch, 1852

Conus (Phasmoconus) galeyi sp. nov.

Plate 8, Figs 1-4

Type material: Holotype MNHN IM-2000-33736 and 3 paratypes (Table 2).

Type locality: Fort-Dauphin, South Madagascar, 25°29'S, 46°42'E, 108–110 m.

Material examined: ATIMO VATAE, Trawler “Nosy Be 11”: Sainte Luce area: stn DW3533, 24°42'S, 47°32'E, 187–209 m, 2 dd. – Fort-Dauphin area: stn CP3545, 25°29'S, 46°42'E, 108–110 m, 1 dd; stn CP3572, 25°11.7'S, 47°12.5'E, 75–77 m, 1 dd. – South- East Faux-Cap: stn CP3620, 25°47'S, 46°02'E, 133–178 m, 3 dd. – Between Lokaro and Sainte Luce: stn DW3516, 24°52'S, 47°29'E, 160–161 m, 1 dd. – South of Cap Sainte Marie: stn CP3611, 26°08'S, 45°04'E, 106–111 m, 1 dd; stn CP3614, 26°14'S, 45°09'E, 250–300 m, 4 dd. – Port d' Ehoala: stn TP25, 25°03.5'S, 46°57.8'E, 7–9 m, 2 dd.

Distribution and habitat: *Conus galeyi* has been collected between Sainte Luce and Cap Sainte Marie, in the extreme

TABLE 2

Type	MNHN catalogue number	Dimensions (mm)	Locality
Holotype	IM-2000-33736	20.8 x 11.5	Fort-Dauphin, CP3545, 25°29'S, 46°42'E, 108–110 m.
Paratype 1	IM-2000-33737	32.4 x 17.3	South- East Faux-Cap, CP3620, 25°47'S, 46°02'E, 133–178 m.
Paratype 2	IM-2000-33738	29.5 x 17.5	South- East Faux-Cap, CP3620, 25°47'S, 46°02'E, 133–178 m.
Paratype 3	IM-2000-33739	29.3 x 16.4	South- East Faux-Cap, CP3620, 25°47'S, 46°02'E, 133–178 m.

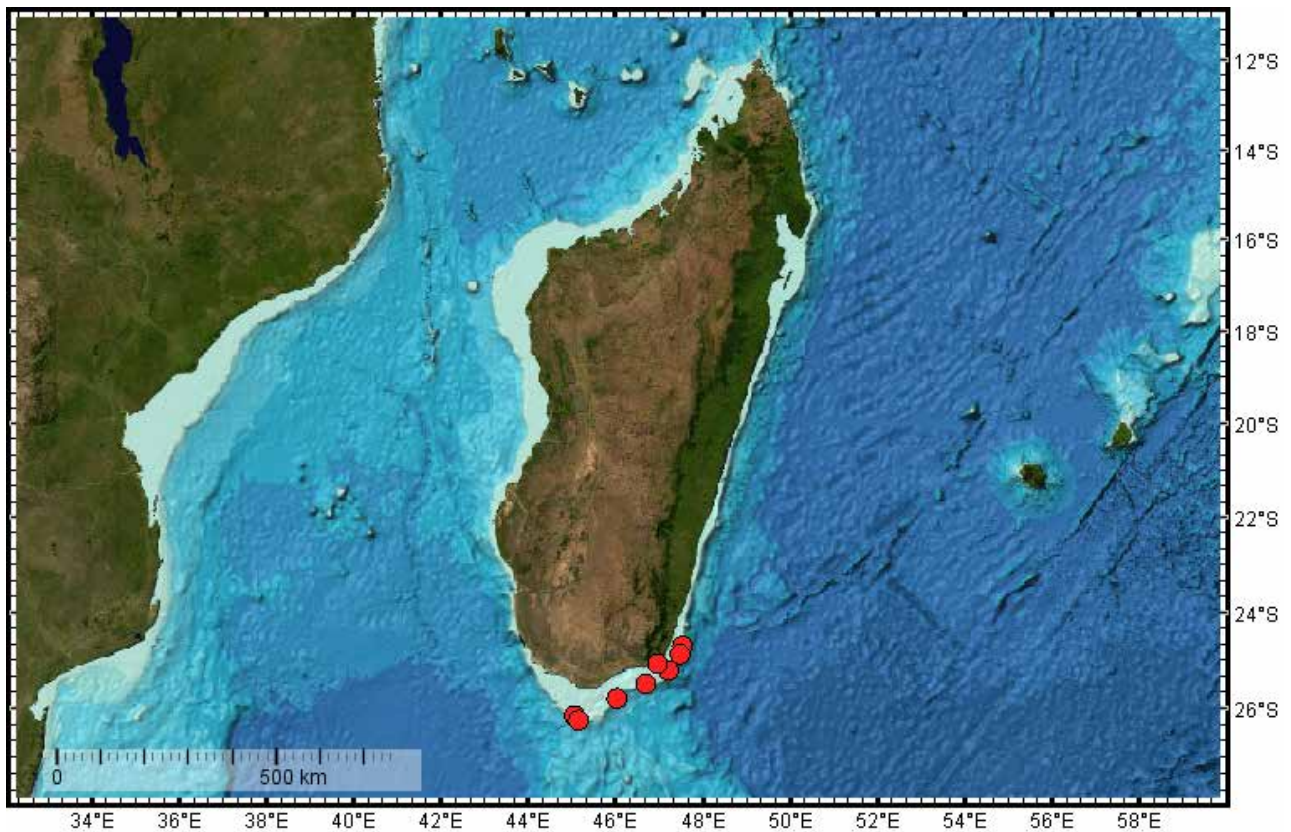


Figure 18. Distribution map for *Conus (Phasmoconus) galeyi* sp. nov.

South of Madagascar, i.e. a shore length of about 250 km, mostly at depths from 75 to 210 m.

Etymology: This new species is named after Bertrand-Pierre Gale, Director General of MNHN at the time of the ATIMO VATAE expedition, in recognition for his support to biodiversity exploration.

Description: Morphometric parameters: L = 20.8–32.4 mm, mean = 24.9 mm; RD = 0.61–0.64; RSH = 0.08–0.12; PMD = 0.90–0.93.

Shell small to moderately small, conical-pyriform in profile. The protoconch is large (about 1.4 mm maximum diameter), very bulbous and paucispiral (1.5 to 2 whorls) (Fig. 19). Spire low and straight (slightly convex in paratype 1). Teleoconch sutural ramp with about five spiral grooves and intervening ribs in the five or six first early postnuclear whorls. Shoulder broadly carinate. Outline of the last whorl is sigmoid (convex adapically, and

concave basally), with about six very weak spiral grooves and ribs in the basal area. Aperture of essentially uniform width, bright pink colored inside. The ground color of the last whorl is orange, patterned with white irregularly shaped blotches arranged in spiral bands. Spiral white band at the height of the lower third of the last whorl present in larger specimens. Additionally, the pattern may be overlaid with orange-brown dots forming up to six interrupted lines around the upper third of the last whorl, like in case of paratype 3.

Living animal and radula: All specimens were dead taken, so the animal, DNA and radula are unavailable.

Remarks: *C. (P.) galeyi* sp. nov. is most likely endemic to South Madagascar, as suggested by its large, bulbous, paucispiral protoconch. This species can be compared to *Conus (Phasmoconus) madecassinus* (Bozzetti, 2012). The morphometry and texture of the shells are similar. There are statistically significant differences between the mean lengths of the shells of the two species: 24.9 mm for *galeyi*, and 39.6 mm for *madecassinus* ($t = -4.569$, $p = 3.69 \times 10^{-4}$). The shells of *C. galeyi* sp. nov. are usually wider-bodied than those of *C. madecassinus*, although these differences in MD are just on the verge of statistical significance (ANCOVA on MD using species hypothesis as factor: with L as co-variate: $F = 4.41$, $p = 0.052$; with AH as co-variate: $F = 4.74$, $p = 0.045$). There are no significant differences in spire height. Therefore, *C. galeyi* sp. nov. has a smaller shell with a general shape more triangular than in the larger *C. madecassinus*, with the sides of the last whorl more straight and less convex than in the latter. The pattern of the two species is similar, but differs strikingly in color: orange in *C. galeyi* sp. nov., but light brown in *C. madecassinus*.

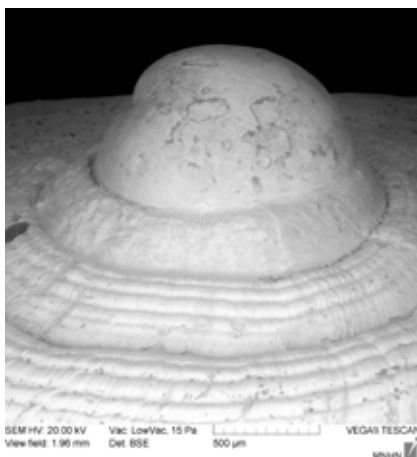


Fig. 19. SEM micrograph of the protoconch and early post-nuclear teleoconch whorls of the holotype of *Conus (Phasmoconus) galeyi* sp. nov. (MNHN IM-2000-33736, Fort Dauphin, L = 20.8 mm).

Conus (Phasmoconus) madecassinus (Bozzetti, 2012)

Plate 8, Figs 6–9

Asprella madecassina Bozzetti, 2012: 5, figs.

Type material: Holotype MNHN IM-2000-25076.

Type locality: Lavanono, southern Madagascar, in 30–50 m.

Material examined: ATIMO VATAE, Trawler "Nosy Be 11": Fort-Dauphin area: stn CP3572, 25°11.7'S, 47°12.5'E, 75–77 m, 1 dd; stn CP3573, 25°13.5'S, 47°13.8'E, 87–88 m, 1 dd; stn CP3545, 25°29'S, 46°42'E, 108–110 m, 4 dd. – Between Lokaro and Ste Luce: stn DW3519, 24°51.9'S, 47°28.0'E, 80–83 m, 1 dd; stn DW3516, 24°52'S, 47°29'E, 160–161 m, 1 dd. – SW Cap Sainte Marie: stn CP3603, 25°57.1'S, 44°47.6'E, 62–63 m, 1 dd. – South of Cap Sainte Marie: stn DW3610, 26°08'S, 45°04'E, 106–111 m, 1 dd; stn CP3611, 26°08'S, 45°04'E, 106–111 m, 7 dd; stn CP3614, 26°14'S, 45°09'E, 250–300 m, 1 lv. – South-East of Faux-Cap: stn CP3619, 25°45'S, 46°00'E, 106–116 m, 3 dd; stn CP3622, 25°43.0'S, 45°59.4'E, 84–88 m, 1 dd; stn CP3623, 25°41.4'S, 45°59.2'E, 74–80 m, 14 dd. – East Faux-Cap: – stn CP3558, 25°33.0'S, 46°09.2'E, 77–78 m, 1 dd; stn CP3559, 25°33.7'S, 46°08.6'E, 78–80 m, 1 dd; stn CP3560, 25°37'S, 46°10'E, 102–106 m, 10 lv, 7 dd. – stn CP3561, 25°38'S, 46°13'E, 128–133 m, 1 dd. – South of Faux-Cap: stn DW3550, 26°03.2'S, 45°32.1'E, 98 m, 1 lv, 2 dd; stn CP3580, 25°58.6'S, 45°34.9'E, 88–90 m, 3 dd. – South-West of Cap Andavaka: stn CP3549, 25°16.9'S, 46°31.3'E, 53–54 m, 1 lv.

Remarks: Although recently described, *C. (P.) madecassinus* has turned out to be one of the most common species sampled by the ATIMO VATAE expedition. A dozen of specimens have been sequenced, suggesting the placement of the species in *Conus (Phasmoconus)*. The large, paucispiral protoconch (Fig. 20) indicates that this species is most likely endemic to South Madagascar.

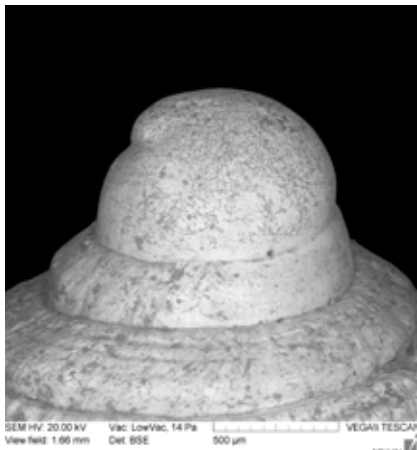


Fig. 20. SEM micrograph of the protoconch and early postnuclear teleoconch whorls of the holotype of *Asprella madecassinus* (MNHN-IM-2000-25076, Lavanono, southern Madagascar, L = 32.6 mm).

Conus (Phasmoconus) nimbosus Hwass in Bruguière, 1792
Plate 9, Fig. 1

Type material: Lectotype selected by Kohn (1968) in MHNG 1107/24/1.

Type locality: "East Indies".

Synonym: *Conus nimbosus nanoclarus* Bozzetti, 2017, **syn. nov.** [type locality: Tolagnaro; holotype: MNHN-IM-2000-28452].

Material examined: Plage de Lavanono: stn BM01, 25°25.2'S, 44°56.3'E, intertidal, 1 dd. – Débarcadère de Lavanono: stn BM08, 25°25.6'S, 44°56.2'E, intertidal, 1 dd. – Rocher de l'Albatros: stn BV02, 25°29.0'S, 44°57.0'E, 8 m, 1 dd. – secteur de Lavanono: stn BP01, 25°26.6–26.9'S, 44°54.9–55.1'E, 22–23 m, 1 lv. – secteur Ouest de Lavanono: stn BP42, 25°22.8–23.7'S, 44°51.1'E, 18–21 m, 1 lv. – Lavanono area, purchased from local fishermen, 12 dd. – Fausse Baie des Galions: stn TP21,

25°03.3'S, 46°59.1'E, 23–25 m, 1 dd. – Banc Tozer: stn TA19, 25°13.6'S, 44°10.3'E, 14–22 m, 1 dd.

Remarks: The recently described subspecies *nanoclarus* corresponds to a light-colored specimen of *nimbosus*. Hence, due to its overlapping range of distribution with that of the nominate species, it is a plain form of *nimbosus* and not a subspecies. Subgenus *Pionoconus* Mörch, 1852

Conus (Pionoconus) simonis Bozzetti, 2010

Plate 9, Figs 2–5

Type material: Holotype in MNHN.

Type locality: Tolagnaro [Fort-Dauphin], southeastern Madagascar.

Synonym: *Pionoconus atimovatae* Bozzetti, 2012, **syn. nov.** [type locality: Lavanono, South Madagascar; holotype MNHN IM-2000-25775].

Material examined: ATIMO VATAE: Cap Sainte Marie: stn BS14, 25°36.0'S, 45°08.7'E, 16 m, 1 lv. – Lavanono area, purchased from local fishermen, 1 dd. Other material: Djamandjary, Nosy Bé, North-West Madagascar, 2 spms (Coll. EM).

Remarks: Filmer (2011) treated *Conus simonis* as a synonym (form) of *C. boeticus* Reeve, 1844. The 22.8 mm holotype (Pl. 9, fig. 3) is a dead collected subadult specimen with the last whorl of a vivid orange colour. The two specimens from Nosy Bé are slightly more mature (L = 31.5 and 44 mm respectively) and of the same color, albeit faded. The specimen purchased from fishermen in Lavanono is very large and gerontic (L = 74.4 mm); it is similar to *C. achatinus*, and even very much alike the holotype of that species. The growth series of these four specimens suggests that *simonis* is a member of the *C. achatinus* species complex. DNA analysis (cox-1 gene fragment) confirms that *simonis* is a member of the *Pionoconus* clade (Fig. 5), and that it probably represents a valid species, distinct from *C. achatinus* from other localities like Papua New Guinea or the Philippines. We regard *Pionoconus atimovatae* as a juvenile specimen of *C. simonis*. *Conus simonis* is a Madagascar endemic, but is not restricted to South Madagascar.

Conus (Pionoconus) catus Hwass in Bruguière, 1792

Plate 9, Fig. 6

Type locality: Lectotype selected by Kohn (1968) in MHNG 1106/53.

Type material: «Ile de France» [Mauritius].

Material examined: ATIMO VATAE: Lavanono area, purchased from local fishermen, 2 dd.

Conus (Pionoconus) gubernator Hwass in Bruguière, 1792

Plate 9, Fig. 7

Type material: Lectotype selected by Kohn (1968) in MHNG 1106/86.

Type locality: Indian Ocean.

Material examined: ATIMO VATAE: West Pointe Evatra: stn TR16, 24°59.5'S, 47°05.6'E, 15–17 m, 1 dd. – SW Cap Sainte Marie, Trawler "Nosy Be 11": stn DW3608, 25°39.4'S, 44°53.0'E, 37–38 m, 2 lv, 1 dd. – Cap Sainte Marie: stn TA27, 25°33.4'S, 45°06.9'E, 16–18 m, 1 lv. – Lavanono area, purchased from local fishermen, 3 dd.

Conus (Pionoconus) striatus Linnaeus, 1758

Plate 9, Figs 8–9

Type material: Lectotype selected by Kohn (1992) in LSL.

Type locality: Ambon, Indonesia.

Material examined: ATIMO VATAE: Baie des Galions: stn TV16, 25°09.5'S, 46°44.9'E, 9-10 m, 1 lv. – Lavanono area, purchased from local fishermen, 1 dd.

Remarks: A single specimen of this otherwise common Indo-Pacific species was collected during the ATIMO VATAE expedition. The scarcity of *C. striatus* in the study area suggests that its occurrence in southernmost Madagascar might represent a pseudopopulation of occasionally settling larvae rather than a reproductive, self-recruiting population.

Subgenus *Puncticulis* Swainson, 1840

Conus (Puncticulis) arenatus Hwass in Bruguière, 1792
Plate 9, Fig. 10

Type material: Lectotype selected by Kohn (1968) in MHNG 1106/41.

Type locality: Philippines.

Material examined: ATIMO VATAE: Pointe Evatra: stn TR05, 24°58.1'S, 47°06.1'E, 3-8 m, 1 dd. – South of Cap Sainte Marie, Trawler "Nosy Be 11": stn CP3611, 26°08'S, 45°04'E, 106-111 m, 1 dd.

Remarks: The populations of *C. arenatus* from the Indian Ocean are sometimes attributed to the subspecies *bizona* Coomans, Moolenbeek & Wils, 1981, based on morphological differences with shells from the Western Pacific. The differences in pattern with the subspecies *aequipunctatus* Dautzenberg, 1937 from the Red Sea and the Gulf of Aden are not constant enough to grant their separation (Röckel et al., 1995). Molecular studies are needed in order to disentangle this complex.

Conus (Puncticulis) zeylanicus Gmelin, 1791
Plate 9, Fig. 11

Type material: Specimen illustrated by Gualtieri (1742: pl. 25, fig. I) selected as lectotype by Kohn (1964); present whereabouts unknown.

Type locality: None stated.

Material examined: ATIMO VATAE: Baie de Fort-Dauphin: stn TR03, 25°00.8'S, 47°00.9'E, 21 m, 1 dd. – Baie des Galions: stn TV17, 25°09.2'S, 46°45.4'E, 5-6 m, 1 dd. – Rocher de l'Albatros: stn BV11, 25°28.8'S, 44°56.8'E, 11-13 m, 1 dd.

Subgenus *Rhizoconus* Mörch, 1852
Conus (Rhizoconus) capitaneus Linnaeus, 1758
Plate 10, Fig. 1

Type material: Lectotype selected by Kohn (1963) in LSL.

Type locality: "Asia", restricted by Coomans et al. (1983) to Flores, Indonesia.

Material examined: ATIMO VATAE: Plage de Lavanono: stn BM01, 25°25.2'S, 44°56.3'E, intertidal, 1 dd. – Lavanono area, purchased from local fishermen, 2 dd.

Remarks: The scarcity of *C. capitaneus* in the study area suggests that its occurrence in southernmost Madagascar might represent a pseudopopulation of occasionally settling larvae rather than a reproductive, self-recruiting population.

Conus (Rhizoconus) miles Linnaeus, 1758

Type material: lectotype selected by Kohn (1963) in LSL.

Type locality: India.

Material examined: ATIMO VATAE: Fausse Baie des Galions: stn TA52, 25°02.4'S, 46°59.6'E, 8-14 m, 2 dd. – Pointe Evatra: stn TA49, 24°59.5'S, 47°06.0'E, 19 m, 1 dd. – off Phare Flacourt: stn TR07, 25°01.3'S, 47°00.2'E, 12-16 m, 1 dd. – Lavanono area, purchased from local fishermen, 1 dd.

Conus (Rhizoconus) namocanus Hwass in Bruguière, 1792
Plate 10, Fig. 2

Type material: Holotype in MHNG 1107/23.

Type locality: "Namoca I.", Pacific Ocean [perhaps Namuka Island in Fiji or Vanuatu, but this would be in error].

Material examined: ATIMO VATAE: West Pointe Evatra: stn TR16, 24°59.5'S, 47°05.6'E, 15-17 m, 1 dd. – Ilot Choumare: stn TA41, 24°50.2'S, 47°10.7'E, 12-24 m, 1 dd. – Between Lokaro and Ste Luce, Trawler "Nosy Be 11": stn DW3519, 24°51.9'S, 47°28.0'E, 80-83 m, 1 lv. – North of Sainte Luce, Trawler "Nosy Be 11": stn DW3530, 24°35.9'S, 47°32.1'E, 80-86 m, 1 lv; stn DW3531, 24°37.6'S, 47°31.1'E, 54-56 m, 1 lv.

Remarks: A species typical from the Western Indian Ocean.

Conus (Rhizoconus) pertusus Hwass in Bruguière, 1792
Plate 10, Figs 3-4

Type material: Lectotype selected by Kohn (1968) in MHNG 1107/34.

Type locality: East Indies.

Material examined: ATIMO VATAE, Trawler "Nosy Be 11": Manantenina area: stn CP3521, 24°24'S, 47°32'E, 117-118 m, 1 dd. – North of Sainte Luce: stn DW3531, 24°37.6'S, 47°31.1'E, 54-56 m, 1 lv.

Remarks: Species already listed by Dautzenberg (1932) as from Madagascar "Deep South". *C. pertusus* is a rare species anywhere in Madagascar and its scarcity in the study area is compatible, in our opinion, with it representing a permanent, reproductive, self-recruiting population.

Conus (Rhizoconus) rattus Hwass in Bruguière, 1792
Plate 10, Fig. 5

Type material: Specimen illustrated by Bruguière (1798: pl. 338, fig. 7) selected as lectotype by Kohn (1968); present whereabouts unknown.

Type locality: "America" (erroneous).

Material examined: ATIMO VATAE: Ilot Choumare: stn TA45, 25°50.7'S, 47°12.6'E, 29 m, 1 dd. – Lavanono area, purchased from local fishermen, 3 dd.

Remarks: The scarcity of *C. rattus* in the study area suggests that its occurrence in southernmost Madagascar might represent a pseudopopulation of occasionally settling larvae rather than a reproductive, self-recruiting population.

Conus (Rhizoconus) vexillum Gmelin, 1791

Type material: Specimen illustrated by Rumphius (1705, pl. 31, fig. 5) selected as lectotype by Kohn (1966); present whereabouts unknown.

Type locality: Ambon, Indonesia (based on Rumphius).

Material examined: ATIMO VATAE: Plage de Lavanono: stn BM01, 25°25.2'S, 44°56.3'E, intertidal, 1 dd. – Pointe Evatra, Anse Itapera: stn TA46, 24°59.2'S, 47°05.6'E, 2-12 m, 1 dd. – Baie des Galions: stn TV17, 25°09.2'S, 46°45.4'E, 5-6 m, 1 dd. Subgenus *Splinoconus* da Motta, 1991

Conus (Splinoconus) alconnelli da Motta, 1986
Plate 10, Fig. 6

Type material: Holotype in MHNG.

Type locality: Richards Bay, 200 km North of Durban to Park Rynie South, South Africa.

Synonym: *Conus pennasilicorum* Bozzetti, 2017, **syn. nov.** [type locality: northern Transkei, South Africa; holotype MNHN-IM-2000-28451].

Material examined: ATIMO VATAE, Trawler "Nosy Be 11": South West of Pointe Barrow, DW3588, 25°03' S, 44°00' E, 113-135 m, 1 lv.

Remarks: This is a new record for this species which had previously been confused with *C. martensi* E. A. Smith, 1884, but was reinstated by Tenorio & Monteiro (2008) as a distinct, valid species. The live specimen obtained during the expedition ATIMO VATAE is typical, and similar to the ones taken in South Africa (Natal coast) in deep water. *C. alconnelli* is rare throughout its range and its scarcity in southernmost Madagascar is compatible, in our opinion, with it representing a permanent, reproductive, self-recruiting population.

Conus (Splinoconus) martensi E. A. Smith, 1884

Plate 10, Fig. 7

Type material: Holotype in NHMUK.

Type locality: Providence Reef [a dependency of Seychelles north of Madagascar, 09°23' S, 51°03' E], in 24 fms [44 m].

Synonym: *Conus (Rhizoconus) sazanka* Shikama, 1970, **syn. nov.** [type locality: SW Kochi Prefecture, Japan].

Material examined: ATIMO VATAE, Trawler "Nosy Be 11": Between Lokaro and Sainte Luce: stn DW3516, 24°52'S, 47°29'E, 160-161 m, 1 dd. – Manantenina area: stn DW3522, 24°23'S, 47°32'E, 154-168 m, 3 dd. – Sainte Luce area: stn DW3533, 24°42'S, 47°32'E, 187-209 m, 4 dd. – South-West of Cap Andavaka: stn CP3549, 25°16.9'S, 46°31.3'E, 53-54 m, 1 dd. – South-East of Faux-Cap: stn CP3624, 25°38.1'S, 45°57.0'E, 63 m, 1 dd.

Remarks: The holotype of *C. martensi* in NHMUK is a dead and worn shell, and it has long remained a ghost species but a close examination shows that it is conspecific with material identified as *sazanka*. After the description of *C. alconnelli* da Motta, 1986, the two were subsequently confused. The species is fairly common in the Western Pacific Ocean, and also in South Africa, La Réunion and Madagascar. DNA analysis shows that specimens from the SW Indian Ocean (Mozambique Channel) and the Western Pacific (New Caledonia) correspond to the same species (Puillandre, unpublished results).

Conus (Splinoconus) biliosus (Röding, 1798)

Plate 10, Fig. 9

Type material: Specimen illustrated by Chemnitz (1788: pl. 139, fig. 1294) selected as lectotype by Kohn (1975).

Type locality: No locality in Röding. Gulf of Mannar designated by Coomans, Moolenbeek & Wils (1982).

Material examined: ATIMO VATAE: Plage de Lavanono: stn BM01, 25°25.2'S, 44°56.3'E, intertidal, 8 dd. – Lavanono débarcadère: stn BM08, 25°25.6'S, 44°56.2'E, intertidal, 2 lv, 2 dd. – Lavanono area, purchased from local fishermen, 1 dd. – South of Ambatomainty: stn BM05, 25°26.7'S, 44°56.7'E, intertidal, 1 dd, 1 lv. – Port de Fort-Dauphin: stn TV19, 25°01.5'S, 47°00.0'E, 4-5 m, 1 dd. – Baie des Galions: stn TM21, 25°08.9'S, 46°45.4'E, intertidal, 2 dd. – Cap Malainpioka area, purchased from local fishermen: 1 dd. – Nosy Manitsa: stn TA20, 25°13.1'S, 44°14.0'E, intertidal, 2 dd.

Remarks: Based on morphological characters, specimens of *Conus biliosus* from the SW Indian Ocean are classically attributed to the subspecies *meyeri* Walls, 1979 [type locality: Genezzano, Natal, South Africa; holotype in DMNH]. However, molecular differences with specimens from the Pacific Ocean (i.e., South Taiwan) are small (Fig. 5), so this separation based upon shell traits might not be justified.

Subgenus *Stephanoconus* Mörch, 1852

Conus (Stephanoconus) fuscatus Born, 1778 **stat. nov.**

Plate 10, Fig. 8

Type material: Lectotype selected by Kohn (1963) in NHMW.

Type locality: Two localities are associated with the references cited by Born: Mauritius (based on Martini (1773) and "Guinea" (based on Regenfuss 1758)

Material examined: ATIMO VATAE: Banc Tozer cave: stn TA22, 25°12.7'S, 44°08.5'E, 20-22 m, 1 dd. – Rocher de l'Albatros: stn BV18, 25°28.6'S, 44°57.0'E, 11-12 m, 1 dd. – North Sainte Luce, Trawler "Nosy Be 11": stn DW3532, 24°39.4'S, 47°31.7'E, 86-87 m, 1 lv.

Remarks: On the tree in Fig. 5 there are two lineages within the *Conus (Stephanoconus) imperialis* complex of species, and the sequenced individual from ATIMO VATAE identified as *C. (S.) fuscatus* would represent a third one. On the tree, specimens within the *C. (S.) imperialis* complex from the Indian Ocean are represented by just this individual, but the branch length as well as the support at the corresponding node is consistent with the hypothesis that *C. fuscatus* represents a valid species, separate from *C. imperialis*. More sequences of individuals of this group from Indian Ocean localities are needed in order to further confirm this hypothesis, and also to test whether typical *C. imperialis* is present in the Indian Ocean or not.

Subgenus *Strategoconus* da Motta, 1991

Conus (Strategoconus) augur Lightfoot, 1786

Plate 10, Fig. 10

Type material: Specimen illustrated by Knorr (1772, pl. 13, fig. 6) selected as lectotype by Kohn (1964).

Type locality: No locality in Lightfoot. Sri Lanka designated by Coomans et al. (1981).

Material examined: ATIMO VATAE: West of Pointe Evatra: stn TR16, 24°59.5'S, 47°05.6'E, 15-17 m, 1 dd. – Nosy Manitsa: stn TA20, 25°13.1'S, 44°14.0'E, intertidal, 1 dd. – Pointe Barrow, lagoon: stn TA32, 25°18.0'S, 44°18.1'E, 18-22 m, 1 dd. – Banc Tozer: stn TA19, 25°13.6'S, 44°10.3'E, 14-22 m, 1 spm.

Conus (Strategoconus) litoglyphus Hwass in Bruguière, 1792

Plate 10, Fig. 11

Type material: Lectotype selected by Kohn (1968) in MHNG 1107/1.

Type locality: East Indies.

Material examined: ATIMO VATAE, Trawler "Nosy Be 11": South of Faux-Cap: stn CP3579, 25°54.5'S, 45°33.2'E, 65-66 m, 1 dd.

Remarks: The scarcity of *C. litoglyphus* in the study area suggests that its occurrence in southernmost Madagascar might represent a pseudopopulation of occasionally settling larvae rather than a permanent, reproductive, self-recruiting population.

Conus (Strategoconus) maldivus Hwass in Bruguière, 1792

Plate 11, Fig. 1

Type material: Lectotype selected by Kohn (1968) in MHNG 1107/91.

Type locality: Maldives Islands.

Material examined: ATIMO VATAE: Sainte Luce, South of Ilot Souillac: stn TA37, 24°45.8'S, 47°12.4'E, 4-7 m, 1 dd. – South-East of Faux-Cap, Trawler "Nosy Be 11": stn CP3623, 25°41.4'S, 45°59.2'E, 74-80 m, 1 dd.

Conus (Strategoconus) varius Linnaeus, 1758

Plate 11, Fig. 2

Type material: Lectotype selected by Kohn (1963) in LSL.**Type locality:** Not stated.**Synonym:** *Rolaniconus buniatus* Bozzetti, 2013, **syn. nov.** [type locality: Lavanono, South Madagascar; holotype MNHN IM-2000-25777].**Material examined:** ATIMO VATAE: Pointe Evatra: stn TA49, 24°59.5'S, 47°06.0'E, 19 m, 1 dd. – Banc Tozer cave: stn TA22, 25°12.7'S, 44°08.5'E, 20–22 m, 1 dd.**Remarks:** The morphological features of the shell of *Rolaniconus buniatus* are consistent with those of a juvenile specimen of *C. (S.) varius*, and is therefore considered a synonym of the latter. Filmer (2011) considered *buniatus* a synonym of *Conus lecourtorum* Lorenz, 2012. However, the latter seems to be a different, valid species restricted to the Mascarenes (Saint Brandon).*Conus (Strategoconus) striatellus* Link, 1807

Plate 11, Fig. 3

Type material: Specimen illustrated by Chemnitz (1788, pl.138, fig. 1285) selected as lectotype by Kohn (1981).**Type locality:** Not stated.**Material examined:** Plage de Lavanono: stn BM01, 25°25.2'S, 44°56.3'E, intertidal, 1 dd. – Lavanono area, purchased from local fishermen, 4 dd. – Banc Tozer cave: stn TA22, 25°12.7'S, 44°08.5'E, 20–22 m, 1 dd. – Pointe Evatra: stn TA49, 24°59.5'S, 47°06.0'E, 19 m, 1 dd. – Sainte Luce, W. of Ilot Babet: stn TA63, 24°46.2'S, 47°12.4'E, 1–10 m, 1 lv.Subgenus *Tesselliconus* da Motta, 1991*Conus (Tesselliconus) tessulatus* Born, 1778

Plate 11, Figs 4–5

Type material: Specimen illustrated by Martini (1773, pl. 59, fig. 653) selected as lectotype by Kohn (1964).**Type locality:** "African Ocean" (Martini).**Material examined:** ATIMO VATAE: Sainte Luce, Sud Ilot Souillac: stn TA37, 24°45.8'S, 47°12.4'E, 4–7 m, 1 lv. – Lavanono area, purchased from local fishermen, 2 dd. – Toliara, Thomassin stn 617, 1 dd; stn 119, 1 dd.**Remarks:** Sequenced specimens identified as *C. tessulatus* from Indian Ocean localities such as Madagascar (including the Atimo Vatae specimen), Mozambique and Oman (Masirah; voucher UF:292546) appear grouped into a well-supported clade separated from individuals of *C. tessulatus* from Western and Central Pacific Ocean localities. The latter are mixed with specimens of *Conus eburneus* Röding, 1798 (Fig. 5). The status of *C. tessulatus* specimens from the Western and Central Pacific Ocean and their relative phylogenetic position with respect to *C. eburneus* requires additional studies which are beyond the scope of the present work. Given that the type locality for *C. tessulatus* is "African Ocean", the specimens from the Indian Ocean (including Madagascar "Deep South") represent the "true" *tessulatus*. More detailed studies on this matter might eventually show that *tessulatus*-like specimens from the Western and Central Pacific Ocean might correspond to a different taxon (species or subspecies), but this hypothesis requires confirmation, and such studies are beyond the scope of the present workSubgenus *Textilia* Swainson, 1840*Conus (Textilia) bullatus* Linnaeus, 1758

Plate 11, Fig. 7

Type material: Neotype designated by Kohn (1963) at UUMZ.**Type locality:** No locality in Linnaeus. Amboina, Moluccas, Indonesia designated by Coomans et al., (1981).**Material examined:** ATIMO VATAE, Trawler "Nosy Be 11": Manantenina area: stn CP3521, 24°24'S, 47°32'E, 117–118 m, 1 dd.**Remarks:** Only one specimen was found. This species is also present in other parts of Madagascar and in the Mascarenes. Shells of *C. bullatus* from Indian Ocean localities (Thailand, Sri Lanka, La Réunion Island, Madagascar, Mauritius) are consistent with the original concept of *C. (T.) bullatus* forma *pongo*. The name *pongo* as proposed by Shikama & Oishi (in Shikama 1977) was unavailable (described as a form after 1960), but made available by Coomans et al. (1983) who used it at the rank of subspecies.*Conus (Textilia) chiapponorum* Lorenz, 2004

Plate 11, Fig. 6

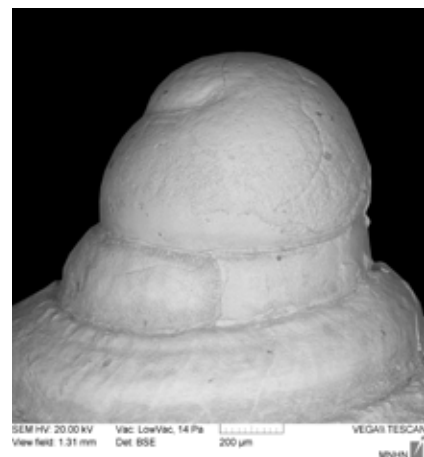
Type material: Holotype in MNHN IM-2000-9375.**Type locality:** Between Fort Dauphin and Lavanono, southern Madagascar.**Synonym:** *Textilia lucasi* Bozzetti, 2010, **syn. nov.** [type locality: Lavanono, South Madagascar, 30–50 m; holotype MNHN IM-2000-23784]; *Textilia lucasi* f. *albina* Bozzetti, 2011 (unavailable infrasubspecific name).**Material examined:** ATIMO VATAE: Plage de Lavanono: stn BM01, 25°25.2'S, 44°56.3'E, 0–1 m, 2 dd. – Rocher de l'Albatros: stn BV19, 25°28.6'S, 44°57.0'E, 11–12 m, 1 dd. – Lavanono area, purchased from local fishermen, 2 dd. – Cap Malainpioka area, purchased from local fishermen, 3 dd. – stn CP3607, 25°45.7'S, 44°52.0'E, 40–41 m, 1 dd. – Fort-Dauphin area, Trawler "Nosy Be 11": stn CP3539, 25°25'S, 47°03'E, 106–114 m, 2 dd. – Cap Sainte Marie, Trawler "Nosy Be 11": stn CP3577, 25°46.3'S, 45°22.9'E, 52 m, 1 dd.

Fig. 21. SEM micrograph of the protoconch and early post-nuclear teleoconch whorls of *C. (P.) chiapponorum* (EM coll., Lavanono, southern Madagascar, L = 21.2 mm).

Remarks: *Conus chiapponorum* is most likely endemic to Madagascar "Deep South", as suggested by its bulbous paucispiral protoconch (Fig. 21). No live specimen was found during the expedition.

Conus (Textilia) cymbioides sp. nov.

Plate 12, Figs. 1-9

Type material: Holotype MNHN IM-2000-33740 and 7 paratypes (Table 3).**TABLE 3**

Type	MNHN Catalogue number	Dimensions (mm)	Locality
Holotype	IM-2000-33740	23.3 x 9.3	Sud de Faux-Cap, DW3557, 26°08'S, 45°39'E, 282-333 m.
Paratype 1	IM-2000-33741	24.2 x 9.6	secteur de Sainte Luce, DW3534, 24°43'S, 47°32'E, 296-307 m.
Paratype 2	IM-2000-33742	22.0 x 8.6	Sud-Est Faux-Cap, CP3622, 25°43.0'S, 45°59.4'E, 84-88 m.
Paratype 3	IM-2000-33743	24.9 x 9.9	Sud-Est Pointe Barrow, CP3584, 25°28'S, 44°25'E, 203-210 m.
Paratype 4	IM-2000-33744	25.6 x 10.7	Sud Cap Sainte Marie, CP3614, 26°13'S, 45°08'E, 250-300 m.
Paratype 5	IM-2000-33745	26.7 x 10.4	Sud Cap Sainte Marie, CP3615, 26°14'S, 45°09'E, 284-286 m.
Paratype 6	IM-2000-33746	23.8 x 9.1	Sud-Est Faux-Cap, CP3620, 25°47'S, 46°02'E, 133-178 m.
Paratype 7	IM-2000-33747	23.6 x 9.0	secteur Fort-Dauphin, CP3511, 25°15.0'S - 47°14.5'E, 97-98 m.

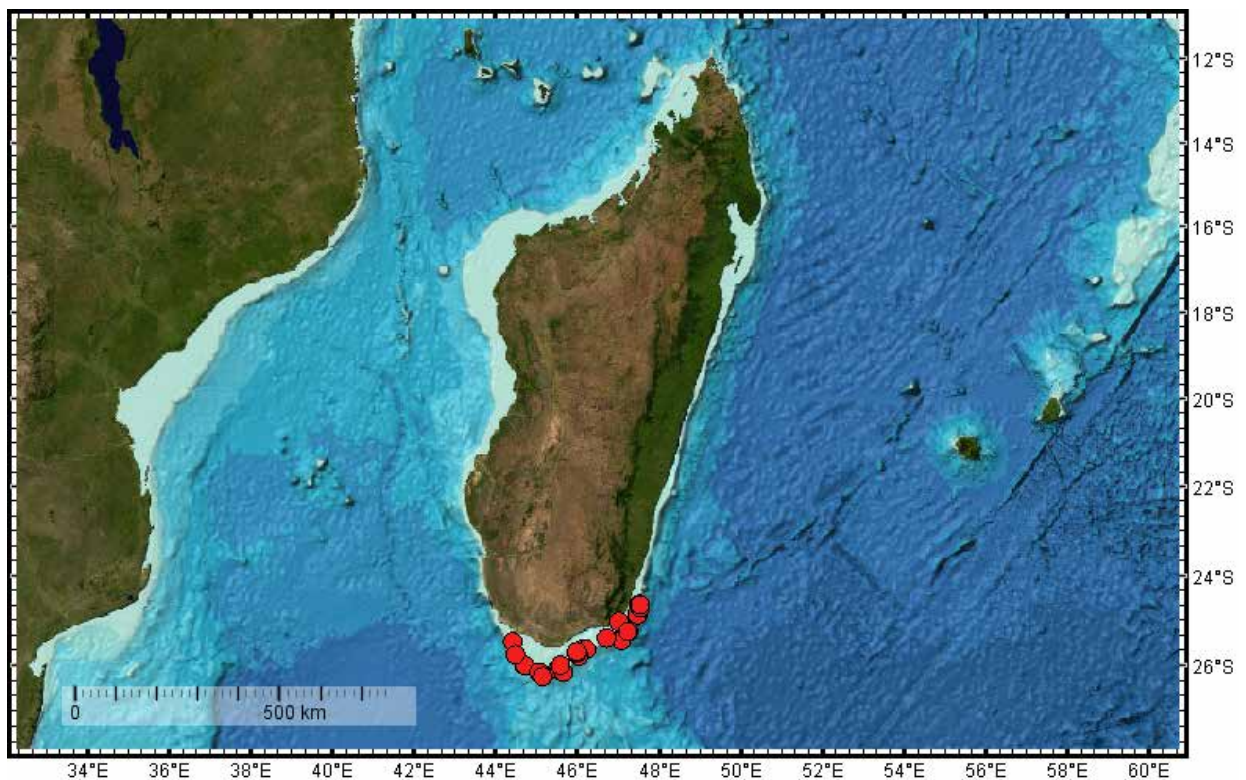
Type locality: South of Faux-Cap, South Madagascar, 26°08'S, 45°39'E, 282-333 m.

Material examined: ATIMO VATAE, Trawler "Nosy Be 11": Between Lokaro and Ste Luce: stn DW3518, 24°50.7'S, 47°28.7'E, 99-101 m, 1 dd; stn DW3519, 24°51.9'S, 47°28.0'E, 80-83 m, 1 dd. – Sainte Luce area: stn DW3533, 24°42'S, 47°32'E, 187-209 m, 1 dd; stn DW3534, 24°43'S, 47°32'E, 296-307 m, 4 dd. – North of Sainte Luce: stn DW3531, 24°37.6'S, 47°31.1'E, 54-56 m, 1 dd; stn DW3532, 24°39.4'S, 47°31.7'E, 86-87 m, 1 dd. – Fort-Dauphin area: stn CP3511, 25°15.0'S, 47°14.5'E, 97-98 m, 2 dd; stn CP3539, 25°25'S, 47°03'E, 106-114 m, 1 dd; stn DW3540, 25°26'S, 47°05'E, 189-217 m, 1 dd; stn CP3546, 25°22.7'S, 46°42.5'E, 84-85 m, 3 dd; stn CP3573, 25°13.5'S, 47°13.8'E, 87-88 m, 2 dd. – SW of Cap Sainte Marie: stn DW3600, 25°59'S, 44°42'E, 143 m, 1 dd; stn DW3601, 25°59.0'S, 44°43.3'E, 97-98 m, 1 dd. – South of Cap Sainte Marie: stn DW3610, 26°08'S,

45°04'E, 106-111 m, 2 dd; stn CP3611, 26°08'S, 45°04'E, 106-111 m, 2 dd; stn CP3614, 26°14'S, 45°09'E, 250-300 m, 1 dd; stn CP3615, 26°14'S, 45°09'E, 284-286 m, 7 dd. – South-East Pointe Barrow: stn CP3584, 25°28'S, 44°25'E, 203-210 m, 1 dd. – East of Faux-Cap: stn CP3560, 25°37'S, 46°10'E, 102-106 m, 6 dd;

stn CP3561, 25°38'S, 46°13'E, 128-133 m, 1 dd. – South-East of Faux-Cap: stn CP3620, 25°47'S, 46°02'E, 133-178 m, 2 dd; stn CP3622, 25°43.0'S, 45°59.4'E, 84-88 m, 2 dd; stn CP3623, 25°41.4'S, 45°59.2'E, 74-80 m, 4 dd. – South of Faux-Cap: stn DW3550, 26°03.2'S, 45°32.1'E, 98 m, 2 dd; stn DW3551, 26°06'S, 45°34'E, 111-115 m, 1 dd; stn DW3553, 26°08'S, 45°39'E, 280-333 m, 1 dd; stn DW3557, 26°08'S, 45°39'E, 282-333 m, 1 dd; stn CP3580, 25°58.6'S, 45°34.9'E, 88-90 m, 2 dd. – Lavanono area: stn DW3599, 25°45'S, 44°29'E, 122-123 m, 1 dd. – Baie de Fort-Dauphin: stn TP02, 25°01.1-5'S, 47°01.4'E, 25-30 m, 1 dd.

Distribution and habitat: *C. cymbioides* sp. nov. is present in all the areas prospected during the ATIMO VATAE expedition, from Sainte Luce in the north-east to Lavanono in the south-west, at depths from 25 to 307 m. All specimens were taken dead and the true bathymetric range of the species is not known, but ap-

Figure 22. Distribution map of *Conus (Textilia) cymbioides* sp. nov.

pears to be mostly below 100 m.

Etymology: From its elongated shape and wide aperture, this new species superficially recalls the volute genus *Cymbium* Röding, 1798, the name of which means in Latin "ship-like vase".

Description of the shell: Morphometric parameters: L = 22–27 mm; mean L = 24.2 mm; RD = 0.41–0.45; RSH = 0.07–0.10; PMD = 0.87–0.93.

Shell small to moderately small, with a characteristic narrowly conical outline. Broad protoconch (maximum diameter 1.2 to 1.5 mm), paucispiral of 1.5 to 2 whorls, smooth and bulbous, white to pink-colored (Fig. 23). Spire very low, with a concave profile. Teleoconch sutural ramp with about four spiral grooves and intervening ribs, with deep and narrow sutures between each whorl. Shoulder angulate. Shell very light in weight and fragile, elongated with a large salmon pink- to orange-colored aperture, wider at base than near the shoulder. Surface of the last whorl variably sculptured, smooth in some specimens or with numerous (more than 50) very fine spiral ribbons, a feature quite rare (if not unique) in cones. Background of the last whorl is pale cream colored, the pattern is composed of irregular and diffuse brown blotches, forming 2 or 3 spiral bands in some cases.

Living animal and radula: All specimens were dead taken, so the animal, DNA and radula are unavailable.

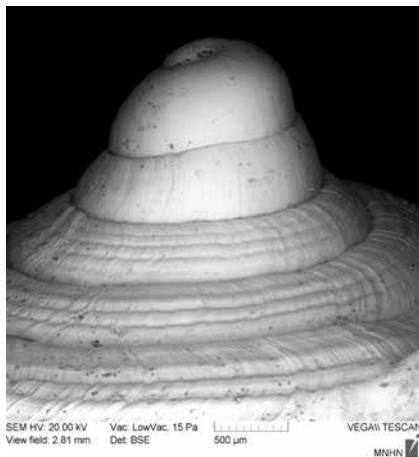


Fig. 23. SEM micrograph of the protoconch and early post-nuclear teleoconch whorls of the holotype of *Conus (Textilia) cymbioides* sp. nov. (MNHN IM-2000-33740, Sud de Faux-Cap, L = 23.3 mm).

Remarks: This new species represents one of the most exciting cone discoveries of the Atimo Vatae expedition. Pending the finding of live material, the wide aperture as well as the thin and light shell has led us to include this species tentatively in the subgenus *Textilia*. The specimens appear to be adult despite of the low (average 7) numbers of whorls: some specimens show gerontic characters such as a thickening of the basal part of the columella. The shell of *C. cymbioides* sp. nov. is so unusually shaped that there are almost no species to compare it with. The most similar species seems to be the sympatric *Conus (Textilia) solangeae* Bozzetti, 2010. The shells of both are similar in size, but differ in shape. The shell of *C. cymbioides* sp. nov. is narrower-bodied than that of *C. solangeae* (RD = 0.41–0.45 for *cymbioides*, versus 0.49–0.59 for *solangeae*) and the differences are statistically significant (ANCOVA on MD using species hypothesis as factor, with L as co-variate: $F = 131.2$, $p = 9.67 \times 10^{-11}$). The spire in *C. cymbioides* sp. nov. is usually lower than in *C. solangeae*. The differences are slight, but still significant

(ANCOVA on SH using species hypothesis as factor, with L as co-variate: $F = 4.61$, $p = 0.04$). The aperture in *C. solangeae* is narrower than in *C. cymbioides* sp. nov., and the shoulder is rounded to subangulate in the former, but angulate in the new species. Despite the fact that all specimens of *C. cymbioides* sp. nov. examined were dead collected and possibly faded, it seems evident that the shells of individuals of the new species are less brightly coloured than those of *C. solangeae*.

Conus (Textilia) dusaveli (H. Adams, 1872)

Plate 11, Fig. 11

Type material: Holotype in NMW.

Type locality: Mauritius.

Material examined: ATIMO VATAE, Trawler "Nosy Be 11": North of Sainte Luce: stn DW3530, 24°35.9'S, 47°32.1'E, 80–86 m, 1 dd; stn DW3531, 24°37.6'S, 47°31.1'E, 54–56 m, 1 dd (fragmentary).

Remarks: Only a couple of shell fragments were found, but they allow for unequivocal identification of this species. The present finding represents the spectacular re-discovery of this mythical species in the Western Indian Ocean. The holotype of *Conus dusaveli* was collected from the stomach of a fish in Mauritius. This type locality had been considered "dubious" by Walls (1979), Röckel et al. (1995), Filmer (2001), and other authors due to the fact that no other specimens had since been found in Indian Ocean (except India; G. Poppe, personal communication to the first author) and in Andaman sea, off Ranong, Thailand where three specimens were recently trawled (Livernette, P., personal communication to the first author). In the last decades, *C. dusaveli* has been regularly collected in the Western Pacific (Philippines, Ryukyu Islands, East China Sea, New Caledonia, Solomon Islands), and has also been sampled by MNHN expeditions in the Society Islands and Tuamotu (Rabiller & Richard 2014). Madagascar seems to be the westernmost locality of this species which has one of the largest geographical ranges among the Conidae.

Conus (Textilia) solangeae Bozzetti, 2004

Plate 11, Fig. 8

Type material: Holotype MNHN IM-2000-5395.

Type locality: Lavanono, southern Madagascar, in lobster pots to 60 m.

Material examined: ATIMO VATAE: Sainte Luce area, Trawler "Nosy Be 11": stn DW3534, 24°43'S, 47°32'E, 296–307 m, 1 dd. – North of Sainte Luce, Trawler "Nosy Be 11": stn DW3531, 24°37.6'S, 47°31.1'E, 54–56 m, 1 dd. – Fort-Dauphin area, Trawler "Nosy Be 11": stn DW3508, 25°15'S, 47°06.1'E, 77–78 m, 2 dd; stn DW3510, 25°14.6'S, 47°09.1'E, 79–80 m, 1 dd; stn CP3572, 25°11.7'S, 47°12.5'E, 75–77 m, 3 dd. – South East of Faux-Cap, Trawler "Nosy Be 11": stn CP3622, 25°43.0'S, 45°59.4'E, 84–88 m, 5 dd; stn CP3623, 25°41.4'S, 45°59.2'E, 74–80 m, 8 dd. – Lavanono area, purchased from local fishermen, 25 dd. – stn TA10, 25°28.3'S, 44°55.6'E, 23 m, 2 dd. – stn BV04, 25°26.4'S, 44°56.1'E, 14–18 m, 1 dd. – East of Cap Malainpioka: stn BM07, 25°21.5'S, 44°50.0'E, 0–1 m, 1 dd. – Cap Malainpioka area, purchased from local fishermen, 2 dd. – West of Cap Sainte Marie, Trawler "Nosy Be 11": stn DW3609, 25°34.3'S, 44°55.2'E, 32 m, 2 dd. – SW of Cap Sainte Marie, Trawler "Nosy Be 11": stn DW3608, 25°39.4'S, 44°53.0'E, 37–38 m, 2 dd; stn DW3605, 24°54.5'S, 44°51.0'E, 56–57 m, 1 dd.

Remarks: This seems to be a relatively common species in Madagascar "Deep South" in moderately deep water. However,

C. solangeae has never been found alive, preventing the realization of molecular and radular studies which might eventually clarify its taxonomic position. The smooth, shiny shell suggests a placement in *Textilia*. Its paucispiral protoconch (Fig. 24) suggests that the species is most likely endemic to southern Madagascar.

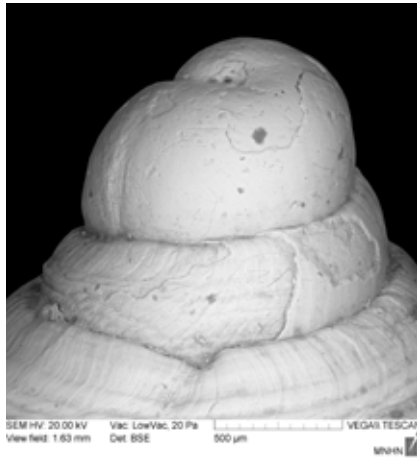


Fig. 24. SEM micrograph of the protoconch and early postnuclear teleoconch whorls of *Conus (Textilia) solangeae* (Lavanono, L = 28.4 mm).).

Subgenus *Turriconus* Shikama & Habe, 1968
Conus (Turriconus) acutangulus Lamarck, 1810
 Plate 11, Figs. 9-10

Type material: Neotype designated by Kohn (1981) in MNHN IM-2000-2589.

Type locality: “Mers des Grandes Indes”, Indian Ocean, neotype from “China Seas”.

Material examined: ATIMO VATAE, Trawler “Nosy Be 11”: Fort-Dauphin area: stn DW3537, 25°22.3'S, 47°02.6'E, 88-89 m, 2 lv; stn CP3568, 25°04.7'S, 47°03.4'E, 64-65 m, 1 spm, 1 lv. – South-East of Faux-Cap: stn CP3623, 25°41.4'S, 45°59.2'E, 74-80 m, 1 dd.

Conus (Turriconus) aequiquadratus sp. nov.
 Plate 13, Figs. 1-8

Type material: Holotype MNHN IM-2000-33748 and 8 paratypes (Table 4).

TABLE 4

Type	Repository	Dimensions (mm)	Locality
Holotype	MNHN IM-2000-33748	44.2 x 16.8	Sainte Luce, ATIMO VATAE DW3533, 24°42'S, 47°32'E, 187-209 m.
Paratype 1	MNHN IM-2000-33749	35.4 x 13.6	West of Nosy-Bé, MIRIKY DW3234, 13°27' S, 47°55' E, 187-247 m.
Paratype 2	MNHN IM-2000-33750	37.0 x 13.3	West of Cap Saint-André, MIRIKY DW3196, 12°08' S, 48°56' E, 238-249 m.
Paratype 3	GR coll.	29.0 x 11.1	La Réunion
Paratype 4	MHNLR	23.3 x 9.1	La Réunion
Paratype 5	EM coll.	30.7 x 11.6	Mauritius
Paratype 6	GH coll.	46.4 x 18.1	La Réunion
Paratype 7	GH coll.	34.5 x 13.3	La Réunion
Paratype 8	EM coll. (ex GH coll.)	22.2 x 8.5	La Réunion,

Type locality: Sainte Luce, South East Madagascar, 24°42'S, 47°32'E, 187-209 m.

Material examined: ATIMO VATAE, Trawler “Nosy Be 11”: Sainte Luce area: stn DW3533, 24°42'S, 47°32'E, 187-209 m, 1 dd (holotype).

MIRIKY: West of Nosy-Bé, stn DW3234, 13°27' S, 47°55' E, 187-247 m, 1 dd (paratype 1). – West of Cap Saint-André, stn DW3196, 12°08' S, 48°56' E, 238-249 m, 1 dd (paratype 2).

Flic-en-Flac, Mauritius: about 20°16' S, 57°20' E, 250-300 m, 1 dd, Francis Hennequin, July 2010 (paratype 5).

La Réunion: Marion-Dufresne cruise MD32 (1982): off l'Hermitage les Bains: stn DC 56, 21°05'S, 55°12' E, 170-225 m, 1 dd. – about 21°04' S, 55°11' E, 120 m, 3 dd; about 100 m, 2 lv (paratype 4 MHNLR).

Distribution: This deep water species occurs in Madagascar and the Mascarenes in 100-300 m.

Etymology: Named after the special pattern of spiral rows of square blotches equally spaced on the last whorl.

Description of the shell: Morphometric parameters: L = 22–64 mm; mean L = 36.7 mm; RD = 0.54–0.62; RSH = 0.31–0.39; PMD = 0.83–0.98.

Shell medium-sized to moderately large, biconical with a very high spire of straight or slightly concave profile. Although the apex of the protoconch is broken in the material examined, it appears to be clearly multispiral with more than 2.5 whorls (Fig. 26). Teleoconch sutural ramp slightly concave with radial threads and about 5 to 6 spiral striae and rather broad grooves. 14 whorls present in adult specimens. Early postnuclear whorls slightly tuberculate. Shoulder angulate. Aperture rather narrow and uniform in width. The last whorl of subadult shells sculptured with about 20 flat broad ribbons. These ribbons fade and become obsolete in adult specimens, which exhibit a smoother surface. Ground color white. Pattern of the last whorl with about 20 to 22 spiral rows of very close square brown dots regularly spaced on the white background. These square dots are also aligned axially (the first spiral row on the last whorl of the holotype has 40 dots). Two bands on the last whorl have a slightly higher density of spiral dots giving a darker appearance. The spire is patterned with regularly spaced spots on the shoulder of each whorl and with irregular flames arranged axially.

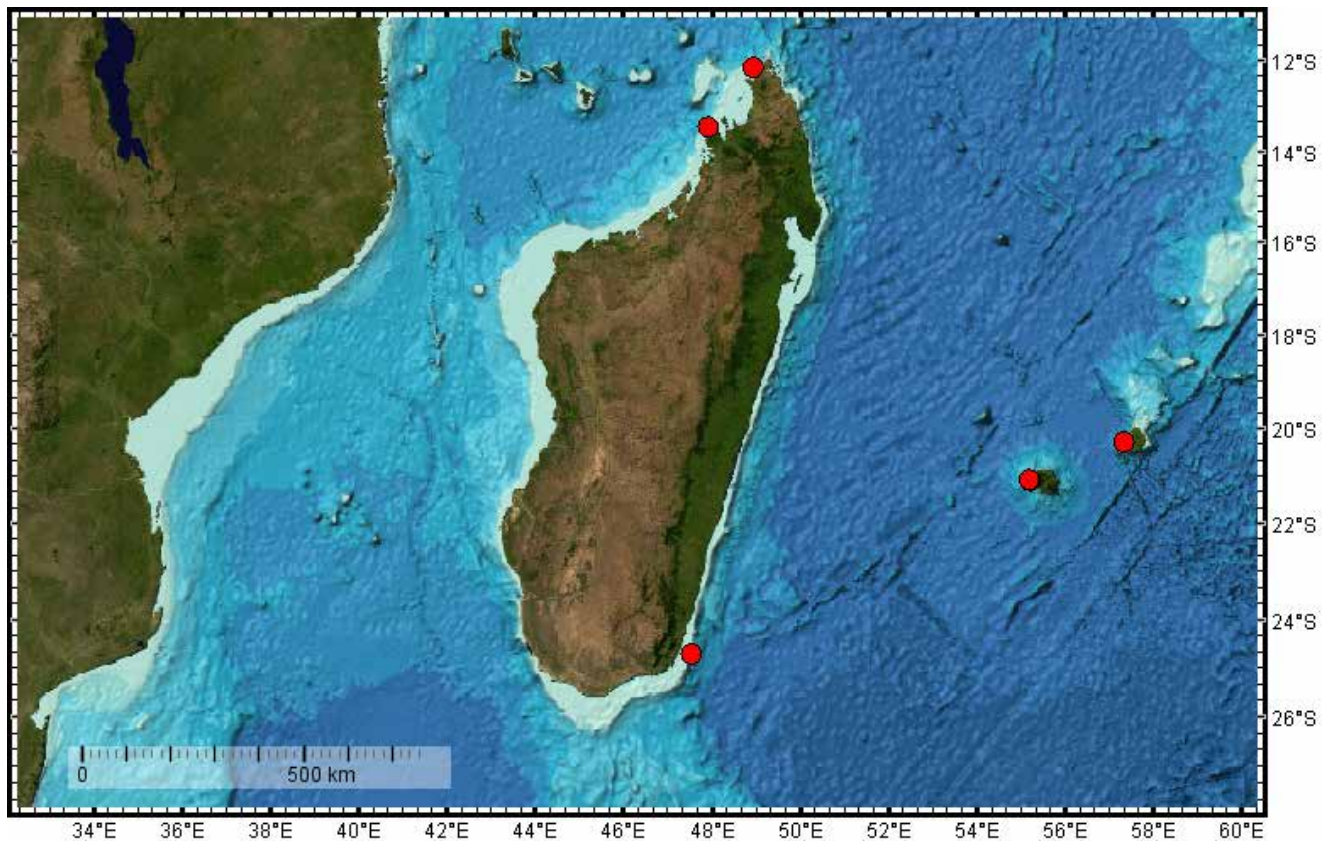


Figure 25. Distribution map for *Conus (Turriconus) aequiquadratus* sp. nov.



Fig. 26. Protoconch and early postnuclear teleoconch whorls of *Conus (Turriconus) aequiquadratus* from La Réunion (L = 9.3 mm). Scale bar: 1 mm.

Living animal and radula: Most specimens were dead taken and the live-taken specimens from Réunion were not preserved in ethanol, so the animal, DNA and radula are unavailable.

Remarks: This new species pertains to the *Conus (Turriconus) praecellens* (A. Adams, 1855) (Pl. 13, fig. 9) species complex. Based on specimens from the Philippines, Biggs et al. (2010) studied this complex and splitted *C. (T.) praecellens* in several species which, apart from the nominal taxon, include *Conus* cf. *praecellens* A. Adams, 1855 "Aliguay form" (Philippines), *Conus (Turriconus) andrenezei* Olivera & Biggs, 2010, *Conus (Turriconus) miniexcelsus* Olivera & Biggs, 2010, and *Conus (Turriconus) rizali* Olivera & Biggs, 2010. *Conus (Turriconus) beatrix* Tenorio, Poppe & Tagaro, 2007 is another member of this species complex. *C. (T.) aequiquadratus* sp. nov. can be compared to *Conus praecellens* s.s. The latter has a much broader and less elongated shape, a paucispiral protoconch (versus multispiral in the new species), and a different, less regular

pattern. *C. miniexcelsus* exhibits a shell pattern similar to that of *C. aequiquadratus* sp. nov., but with the addition of 2 brown spiral bands on the last whorl. Its shell is smaller-sized (L = 25 to 35 mm), slightly broader and less elongated. Protoconchs are multispiral in both species.

One remarkably large specimen (64 mm) from Madagascar corresponding clearly to the new species is figured in Röckel et al. (1995, pl. 54, fig. 12, as *Conus praecellens*) (Fig. 27). It was said to be in MNHN, but cannot currently be traced.



Figure 27. Specimen of *C. (T.) aequiquadratus* sp. nov. figured in Röckel et al. (1995) as *Conus praecellens*.

Subgenus *Virgiconus* Cotton, 1945
Conus (Virgiconus) berdulinus Veillard, 1972
 Plate 14, Fig. 2

Type material: Holotype in MNHN IM-2000-2580.

Type locality: near the port of Pointe des Galets, off the coast of La Réunion.

Material examined: ATIMO VATAE, Trawler "Nosy Be 11": Sainte Luce area: stn DW3533, 24°42'S, 47°32'E, 187-209 m, 1 dd. – SW of Cap Sainte Marie: stn DW3601, 25°59.0'S, 44°43.3'E, 97-98 m, 1 dd (fragmentary).

Remarks: Several incomplete fragments of this species were collected during the ATIMO VATAE expedition. *C. berdulinus* also occurs on the Natal coast of South Africa and in the Mascarenes; its presence in southern Madagascar was therefore not unexpected.

Conus (Virgiconus) flavidus Lamarck, 1810**Type material:** Holotype in MHNG.**Type locality:** "Guinée".**Material examined:** ATIMO VATAE: Nosy Manitsa: stn TA20, 25°13.1'S, 44°14.0'E, intertidal, 1 dd.**Remarks:** This is a very common shallow water species across the entire Indo-Pacific, also present on the Natal coast of South Africa. However, only one single dead specimen was obtained during the expedition. The scarcity of *C. flavidus* in the study area suggests that its occurrence in southernmost Madagascar might represent a pseudopopulation of occasionally settling larvae rather than a reproductive, self-recruiting population.*Conus (Virgiconus) frigidus* Reeve, 1848

Plate 14, Fig. 4

Type material: Holotype in NHMUK.**Type locality:** not stated.**Material examined:** ATIMO VATAE: Sainte Luce: stn TM19, 24°47.1'S, 47°11.9'E, intertidal, 1 lv. – Secteur de Lavanono, purchased from local fishermen, 4 dd.*Conus (Virgiconus) moreleti* Crosse, 1858

Plate 14, Fig. 1

Conus elongatus Reeve, 1843: Conchologia Iconica, 1, *Conus*, pl. 27, sp. 157. Junior homonym of *Conus elongatus* Holten, 1802; *Conus elongatus* Dillwyn, 1817; *Conus elongatus* Schlotheim, 1820; *Conus elongatus* Borson, 1820; *Conus moreleti* Crosse, 1858 is a replacement name.**Type material:** Holotype whereabouts unknown. Lectotype representative figure in Reeve (1843)**Type locality:** not stated.**Material examined:** ATIMO VATAE: Nosy Manitsa: stn TA20, 25°13.1'S, 44°14.0'E, intertidal, 1 dd. – Récif de l'Etoile: stn TA24, 25°23.4'S, 44°14.0'E, 15-17 m, 1 dd. – Ambatobe, Bavarama: stn BM04, 25°26.7'S, 44°05.7'E, intertidal, 1 lv.*Conus (Virgiconus) terebra* Born, 1778

Plate 14, Fig. 3

Type material: Lectotype selected by Kohn (1992) in NHMW 14165.**Type locality:** None stated. Cernohorsky (1964) designated the Fiji Islands.**Material examined:** ATIMO VATAE: Fausse Baie des Galions: stn TA52, 25°02.4'S, 46°59.6'E, 8-14 m, 3 dd. – Baie des Galions: stn TV17, 25°09.2'S, 46°45.4'E, 5-6 m, 1 dd. – East Baie des Galions: stn TA60, 25°09.4'S, 46°45.3'E, 6-13 m, 1 lv. – Ilot Choumare: stn TA54, 24°51.9'S, 47°09.12'E, 15-25 m, 1 dd. – Cap Sainte Marie: stn TA27, 25°33.2'S, 45°06.6'E, 16-18 m, 2 lv. – Pointe Evatra: stn TA49, 24°59.5'S, 47°06.0'E, 19 m, 1 dd. – Pointe Evatra: stn TA50, 24°59.5'S, 47°06.0'E, 10 m, 1 lv. – Nosy Manitsa: stn TA20, 25°13.1'S, 44°14.0'E, intertidal, 1 dd. – Ilot de Lokaro: stn TM05, 24°56.5'S, 47°07.1'E, intertidal, 1 dd. – Banc Tozer: stn TA21, 25°12.6'S, 44°08.6'E, 13-27 m, 1 lv. – Sainte Luce, W Ilot Babet: stn TA63, 24°46.2'S, 47°12.4'E, 1-10 m, 1 dd. – Port de Fort-Dauphin: stn TV22, 25°01.5'S, 47°00.0'E, 4-5 m, 1 lv. – Lavanono area, purchased from local fishermen, 1 dd.*Conus (Virgiconus) virgo* Linnaeus, 1758

Plate 14, Fig. 5

Type material: Specimen illustrated by Rumphius (1705, pl. 31, fig. E) selected as lectotype by Kohn (1963); whereabouts unknown.**Type locality:** Not stated.**Material examined:** ATIMO VATAE: Ilot Choumare: stn TA54, 24°51.9'S, 47°09.12'E, 15-25 m, 1 dd. – Nosy Manitsa: stn TA15, 25°12.6'S, 44°12.5'E, 12-18 m, 1 dd. – South of Faux-Cap, Trawler "Nosy Be 11": stn CP3579, 25°54.5'S, 45°33.2'E, 65-66 m, 1 lv.Subgenus *Virroconus* Iredale, 1930*Conus (Virroconus) chaldaeus* (Röding, 1798)

Plate 14, Fig. 6

Type material: Specimen illustrated by Knorr (1768, pl. 4, fig. 2) selected as lectotype by Kohn (1975); whereabouts unknown.**Type locality:** None stated. The Moluccas, Indonesia designated by Coomans et al. (1983).**Material examined:** ATIMO VATAE: Ambatobe, near Soamanitse: stn BM02, 25°27.4'S, 44°57.4'E, intertidal, 1 lv. – Ambatobe, Bavarama: stn BM06, 25°27.9'S, 44°57.6'E, intertidal, 1 lv. – Lavanono area, purchased from local fishermen, 1 dd.**Remarks:** One sequenced specimen does not differ significantly from conspecific individuals from other localities.*Conus (Virroconus) coronatus* Gmelin, 1791

Plate 14, Fig. 10

Type material: Neotype designated by Kohn (1966) in NHMUK.**Type locality:** None originally stated. Neotype from Australia.**Synonym:** *Conus multibandatus* Bozzetti, 2017, **syn. nov.** [type locality: Toliara, South-West Madagascar; type material: IM-2000-28449].**Material examined:** ATIMO VATAE: Sainte Luce, W Ilot Babet: stn TA63, 24°46.2'S, 47°12.4'E, 1-10 m, 1 lv. – Cap Ranavalona: stn TM03, 25°04.5'S, 46°57.8'E, intertidal, 1 lv, 4 dd. – Sainte Luce: stn TM19, 24°47.1'S, 47°11.9'E, intertidal, 3 lv. – Cap d'Ansirabe: stn TM14, 25°02.6'S, 46°59.8'E, intertidal, 1 lv. – "Lac" Mananivo: stn TM13, 24°55.4'S, 47°06.7'E, intertidal, 5 lv. – Baie des Galions: stn TM21, 25°08.9'S, 46°45.4'E, intertidal, 2 lv. – Platier Flacourt: stn TM23, 25°01.7'S, 47°00.1'E, intertidal, 2 lv. – Pointe Flacourt: stn TB13, 25°01.5'S, 47°00.0'E, 2-4 m, 2 lv, 3 dd. – Phare Flacourt: stn TV22, 25°01.5'S, 47°00.0'E, 2-4 m, 1 lv. – Pointe d'Ambero: stn TM16, 25°06.7'S, 46°49.9'E, intertidal, 2 lv, 1 dd. – Nosy Manitsa: stn TA20, 25°13.1'S, 44°14.0'E, intertidal, 1 dd. – Nosy Manitsa: stn TA15, 25°12.6'S, 44°12.5'E, 12-18 m, 1 lv. – Port de Fort-Dauphin: stn TV19, 25°01.5'S, 47°00.0'E, 4-5 m, 3 dd; stn TV21, 25°01.6'S, 47°00.0'E, 2-4 m, 1 lv. – Plage Monseigneur: stn TM01, 25°02.1-2'S, 46°59.9'E, intertidal, 6 lv, 3 dd. – Baie des Galions: stn TA59, 25°09.1'S, 46°45.4'E, intertidal, 1 dd. – West Baie des Galions: stn TA62, 25°09.5'S, 46°44.5'E, 1-10 m, 1 dd. – Pointe Evatra: stn TR05, 24°58.1'S, 47°06.1'E, 3-8 m, 3 lv, 2 dd. – Crique N.E. Phare d'Evatra: stn TM08, 24°58.7'S, 47°05.9'E, intertidal, 7 lv, 2 dd. – Cap Ranavalona: stn TM02, 25°04.3'S, 46°57.7'E, intertidal, 1 lv. – Cap Ranavalona, Tebava: stn TB06, 25°04.4'S, 46°57.1'E, 4-5 m, 1 dd. – Sud Baie de Lokaro: stn TR20, 24°57.0'S, 47°06.5'E, 0-10 m, 1 lv. – Cap Ranavalona, Bevava: stn TS11, 25°04.4'S, 46°57.1'E, 4-5 m, 1 dd. – Ilot de Lokaro: stn TM05, 24°56.5'S, 47°07.1'E, intertidal, 6 lv. – Baie de Lokaro: stn TS10, 24°56.8'S, 47°06.6'E, 7 m, 20 lv, 7 dd. – Pasput, Ampasipotsty: stn BM11, 25°31.0'S, 45°04.0'E, intertidal, 1 lv. – Faux Cap: stn BM12, 25°34.3'S, 45°31.7'E, intertidal, 9 lv, 10 dd; stn BV09, 25°34.2'S, 45°31.9'E, 1-10 m, 1 lv, 6 dd. – Ambatomainty: stn BM03, 25°26.3'S, 44°56.5'E, intertidal, 2 lv. – Rocher de l'Albatros: stn BS11, 25°28.6'S, 44°56.8'E, 8-11 m, 1 dd. – Plage de Lavanono: stn BM01, 25°25.2'S, 44°56.3'E, intertidal, 1 lv. – Lavanono

débarcadère: stn BM08, 25°25.6'S, 44°56.2'E, intertidal, 2 lv, 2 dd. – South of Ambatomainty: stn BM05, 25°26.7'S, 44°56.7'E, intertidal, 2 lv. – Ambatobe, Bavarama: stn BM06, 25°27.9'S, 44°57.6'E, intertidal, 1 lv, 5 dd. – East of Cap Malainpioka: stn BM07, 25°21.5'S, 44°50.0'E, intertidal, 1 lv. – Andramara: stn BM10, 25°28.8'S, 44°58.3'E, intertidal, 1 lv, 1 dd. – East of Cap Malainpioka: stn BM07, 25°21.5'S, 44°50.0'E, intertidal, 1 lv. – Lavanono area, purchased from local fishermen, 3 dd. – Cap Malainpioka area, purchased from local fishermen, 7 dd.

Remarks: A very common species, already recorded from Madagascar "Deep South" by Dautzenberg (1932). A total of 28 specimens were sequenced. These do not differ significantly from conspecific individuals from other localities.

Conus (Virroconus) ebraeus Linnaeus, 1758

Plate 14, Figs. 7-8

Type material: Lectotype selected by Kohn (1963) in LSL.

Type locality: India.

Material examined: ATIMO VATAE: Cap d'Ansirabe: stn TM14, 25°02.6'S, 46°59.8'E, intertidal, 2 spm. – Cap Ranavalona: stn TM02, 25°04.3'S, 46°57.7'E, intertidal, 1 lv. – Cap Ranavalona: stn TM03, 25°04.5'S, 46°57.7'E, intertidal, 1 lv. – Fort-Dauphin, Plage Monseigneur: stn TM01, 25°02.1'S, 46°59.9'E, intertidal, 1 spm. – Pointe d'Ambero: stn TM16, 25°06.7'S, 46°49.9'E, intertidal, 1 lv, 3 spm. – Sainte Luce: stn TM19, 24°47.1'S, 47°11.9'E, intertidal, 1 lv. – Nosy Manitsa: stn TA20, 25°13.1'S, 44°14.0'E, intertidal, 3 spm. – "Lac" Mananivo: stn TM13, 24°55.4'S, 47°06.7'E, intertidal, 2 spm. – Pointe Evatra: stn TR05, 24°58.1'S, 47°06.1'E, 3-8 m, 1 lv, 2 spm., 2 dd. – Plage de Lavanono: stn BM01, 25°25.2'S, 44°56.3'E, intertidal, 2 dd. – Ambatobe, near Soamanitse: stn BM02, 25°27.4'S, 44°57.4'E, intertidal, 3 lv – Faux Cap: stn BM12, 25°34.3'S, 45°31.7'E, intertidal, 6 spm. – Saririaka: stn BM09, 25°29.0'S, 44°59.6'E, intertidal, 3 lv, 4 spm., 5 dd. – Andramara: stn BM10, 25°28.8'S, 44°58.3'E, intertidal, 11 lv. – South of Ambatomainty: stn BM05, 25°26.7'S, 44°56.7'E, intertidal, 3 lv, 1 spm. – Ambatobe, Bavarama: stn BM06, 25°27.9'S, 44°57.6'E, intertidal, 3 spm. – Ambatomainty: stn BM03, 25°26.3'S, 44°56.5'E, intertidal, 1 lv.

Remarks: A very common species, already listed from Madagascar "Deep South" by Dautzenberg (1932). A total of 7 specimens were sequenced, and they do not differ significantly from conspecific individuals from other localities.

Conus (Virroconus) judaeus Bergh, 1896

Plate 14, Fig. 9

Type material: Neotype designated by Tucker & Tenorio (2013) in ZMMU.

Type locality: Philippines.

Material examined: ATIMO VATAE: Ambatobe, near Soamanitse, stn BM02, 25°27.4'S, 44°57.4'E, intertidal, 1 lv.

Remarks: A cryptic species which lives in sympatry with *C. judaeus*. The shell morphologies of *judaeus* and *ebraeus* are essentially identical, and do not allow unequivocal separation. However, the two species have different radular morphology and are molecularly distinct (Tucker & Tenorio 2013; Duda et al. 2009). The specimen from Madagascar "Deep South" (Pl. 14, fig. 9) was unambiguously identified as *C. judaeus* by its DNA sequence (cox-1 gene fragment), confirming the presence of this species syntopically (same station) with *C. (V.) ebraeus*. This finding confirms the range extension of *C. judaeus* to southern Madagascar. *C. judaeus* has a wide confirmed range, which includes the Indian Ocean (Madagascar, Seychelles) and the western Pacific Ocean (Okinawa, Philippines, Guam).

Conus (Virroconus) miliaris Hwass in Bruguière, 1792

Plate 14, Fig. 11

Type material: lectotype selected by Kohn (1968) in MHNG 1105/9.

Type locality: China.

Material examined: ATIMO VATAE: West Baie des Galions: stn TA62, 25°09.5'S, 46°44.5'E, 1-10 m, 1 dd. – NW Cap Sainte Marie: stn BM17, intertidal, 1 dd. – Faux-Cap: stn BM12, 25°34.3'S, 45°31.7'E, intertidal, 1 lv. – Débarcadère de Lavanono: stn BM08, 25°25.6'S, 44°56.2'E, intertidal, 2 lv. – Lavanono area, purchased from local fishermen, 4 dd. –

Remarks: A common species. The two specimens sequenced from Atimo Vatae do not differ significantly from conspecific individuals from other localities.

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Plate 1: **1.** *Profundiconus neotorquatus*, MNHN IM-2009-15665, Sud Pointe Barrow, 821-910 m, 45.6 mm; **2.** *Profundiconus neotorquatus*, MNHN IM-2009-15600, Sud Pointe Barrow, 821-910 m, 42.6 mm; **3.** *Profundiconus neotorquatus*, MNHN IM-2009-15616, Sud Pointe Barrow, 821-910 m, 74.4 mm; **4a-b:** *Conasprella (Conasprella) articulata* MNHN uncataloged, 25°40.9'S-25°41.4'S, 45°58.1'E-45°59.2'E, 74-80 m, 18.6 mm; **5.** *Conasprella (Fusiconus) elokismenos*, MNHN-IM-2009-15623, Sud-Est Pointe Barrow, 203-210 m, 49.5 mm; **6.** *Conasprella (Fusiconus) elokismenos*, MNHN-IM-2009-15561, Sud Pointe Barrow, 296-302 m, 38.3 mm; **7.** *Conasprella (Fusiconus) elokismenos*, MNHN-IM-2009-15601, Sud-Ouest Pointe Barrow, 300-309 m, 47.5 mm; **8.** *Conasprella (Endemoconus) somalica*, MNHN-IM-2009-15556, between Lokaro & Ste Luce, 161-161 m, 23.9 mm; **9.** *Conasprella (Endemoconus) somalica*, MNHN-IM-2009-15692, between Lokaro & Ste Luce, 161-161 m, 28.8 mm; **10a-b.** Holotype of *Yeddoconus somalicus*, MNHN-IM-2000-25778, Ras Hafun, North-Eastern Somalia, 150-250 m, 23.6 mm; **11.** *Conasprella (Endemoconus) somalica*, MNHN-IM-2009-15574, between Lokaro & Ste Luce, 161-161 m, 24.3 mm.



Plate 2: *Conasprella (Fusiconus) lemuriana* sp. nov. : **1a-b.** Holotype, MNHN IM-2000-33731, South Pointe Barrow, ATIMO VATAE stn CP3586, 25°33'S, 44°18'E, 155-156 m, 37.5 mm; **2.** Paratype 4, MNHN IM-2000-33735, Off Baie Narendry, MIRIKY stn DW3237, 14°31' S, 47°25' E, 50-107 m, 13.7 mm; **3a-b.** Paratype 1, MNHN IM-2000-33732, South-East Faux-Cap, ATIMO VATAE stn CP3623, 25°41.4'S, 45°59.2'E, 74-80 m, 32.2 mm; **4a-b.** Paratype 2, MNHN IM-2000-33733, Off Baie Narendry, MIRIKY stn DW3238, 14°29' S, 47°27' E, 48-139 m, 37.3 mm; **5.** Paratype 3, MNHN-IM-2000-33734, Off Baie Narendry, MIRIKY stn DW3238, 14°29' S, 47°27' E, 48-139 m, 18.4 mm; **6a-b.** Paratype 5, EM coll., Riviere Noire, Mauritius, 120 m, 26.6 mm; **7.** Holotype of *Conus (Leptoconus) saecularis*, NHMUK 1898.7.5.86, Malcolm Inlet, Mekran coast, Persian Gulf, 24 fathoms, 36 mm; **8.** Holotype of *Conus fijiensis*, MNHN-IM-2000-21034, SE Viti Levu, Fiji, 80-120 m, 17.8 mm; **9.** *Conasprella (Fusiconus) comatosa*, INHS 45043, Aliguay Island, northern Mindanao, Philippines, 50-150 m, 46.2 mm



Plate 3: 1a-b. *Conasprella (Fusiconus) longurionis*, MNHN uncataloged, stn CP3586, 25°33'S, 44°18'E, 155-156 m, 33.9 mm; *Lilliconus sagei*: 2. EM coll., Lavanono, 7 mm; 3. MJT coll., Lavanono, 8 mm; 4. Holotype of *Conus sagei*, SMNS. Gulf of Aden, off northern Somalia, 8.7 mm; 5. MNHN IM-2009-31328, secteur de Lavanono, 14-18 m, 6.4 mm; 6. MNHN IM-2009-31325, Pointe Evatra, intertidal, 5 mm; 7. *Conus (Cylinder) pseudocedonulli*, ex-coll. Jean-Louis Batifoix, Lavanono, 66 mm; *Conus (Cylinder) archiepiscopus*: 8. MNHN 2009-15619, Sainte Luce, Sud Ilot Souillac, 4-7 m, 54.5 mm. 9. MNHN uncataloged, TA52, 25°2.4'S, 46°59.6'E, 8-14 m, 69.1 mm; 10. MNHN 2009-15621, Sud Baie de Lokaro, 5-6 m, 50.1 mm. 11. MNHN 2009-15615, Nosy Manitsa, 0-1 m, 51.2 mm. 12. MNHN 2009-31303, juvenile specimen, secteur de Lavanono, 14-18 m, 8.6 mm. 13. MNHN 2009-15655, Sainte Luce, W Ilot Babet, 1-10 m, 63.9 mm. 14. MNHN 2009-15650, Lavanono, 0-1 m, 39.6 mm.



Plate 4: *Conus (Darioconus) praelatus*: **1a-b**. MNHN uncataloged, stn TA40, 24°46.7'S, 47°12.2'E, 4-5 m, 50.8 mm; **2**. Lectotype of *Conus praelatus*, MHNG 52688, "Mer Grandes Indes ", 47.3 mm; **3**. MNHN IM- 2009-15657, Sainte Luce, SW Ilot Souillac, 4-6 m, 61.1 mm; **4**. MNHN IM- 2009-15660, Sainte Luce, SW Ilot Souillac, 4-6 m, 63.6 mm; **5a-b**. Holotype of *Conus pennaceus tsara*, SMNS ZI 30424, Fort Dauphin, Madagascar, 52.7 mm; **6**. MNHN IM-2009-15573, Sainte Luce, SW Ilot Souillac, 4-6 m, 27 mm; **7a-b**. Holotype of *Darioconus fort-dauphinensis*, MNHN IM-2000-31697, Tolagnaro, South-Eastern Madagascar, 47.8 mm; **8**. EM coll., Fort-Dauphin, 58.4 mm. **9a-b**. *Conus (Darioconus) vezoi*, MNHN uncataloged, Lavanono, from local fishermen, 64.7 mm. **10**. Holotype of *Conus pennaceus vezoi*, SMNS ZI 30438, Maromitiliky, Madagascar, 50.1 mm.



Plate 5: **1a-b.** *Conus (Dendroconus) betulinus*, MNHN uncataloged, Lavanono, from local fishermen, 79.4 mm; **2a-b.** *Conus (Dendroconus) figulinus*, MNHN uncataloged, TA59, 25°9.1'S, 46°45.4'E, intertidal, 52.1 mm; *Conus (Dendroconus) medoci*: **3.** Holotype of *Conus medoci*, MNHN IM-2000-9376, near Lavanono, 53.7 mm; **4a-b.** MNHN IM-2009-15606, SW Cap Sainte Marie, 37-38 m, 47.7 mm; **5a-b.** MNHN IM-2009-15654, SW Cap Sainte Marie, 97-98 m, 71.5 mm; **6.** MJT coll., Lavanono, 55.9 mm; **7a-b.** EM coll., Lavanono, intertidal, 84.3 mm.



Plate 6: **1a-b.** *Conus (Elisaconus) litteratus*, MNHN uncataloged, TA31, 25°12.2'S, 44°19.3'E, 4 m, 87.1 mm; **2a-b.** *Conus (Floraconus) balteatus*, MNHN uncataloged, TA27, 25°33.4'S, 45°6.9'E, 16-18 m, 24.7 mm; **3.** Holotype of *Conus anosyensis*, MNHN IM-2000-20864, Antsotso, 60-100m, 30.9 mm; **4.** Holotype of *Conus olgiatti*, MNHN IM-2000-9901, Toliara, southwestern Madagascar, 31 mm; **5.** Holotype of *Conus gilberti*, MNHN IM-2000-25077, Toliara, southwestern Madagascar, 3-5 m, 30.5 mm; **6a-b.** *Conus (Fraterconus) distans*, TA21, 25°12.6'S, 44°8.6'E, 13-27 m, 81.1 mm; **7.** *Conus (Gastridium) geographus*, MNHN uncataloged, Lavanono, from local fishermen, 93.3 mm; **8.** *Conus (Gastridium) obscurus*, MNHN uncataloged, Lavanono, from local fishermen, 35.7 mm.



Plate 7: 1a-b. *Conus (Harmoniconus) nanus*, MNHN uncataloged, stn BM06, 25°27.9'S, 44°57.6'E, intertidal, 18.4 mm; 2. *Conus (Harmoniconus) parvatus*, MNHN uncataloged, TA20, 25°23.1'S, 44°14'E, intertidal, 15.9 mm; 3. *Conus (Harmoniconus) sponsalis*, MNHN IM-2009-15631, Ambatobe, near Soamanitse, 0-1 m, 13.3 mm; 4. *Conus (Leporiconus) tenuistriatus*, MNHN uncataloged, stn TA50, 24°59.5'S, 47°6'E, 10 m, 44.9 mm; 5a-b. *Conus (Hermes) nussatellus*, MNHN uncataloged, Lavanono, from local fishermen, 45.3 mm; 6. *Conus (Lividoconus) lividus*, MNHN uncataloged, Lavanono, from local fishermen, 57.3 mm; 7. *Conus (Lividoconus) lischkeanus*, MNHN uncataloged, DW3533, 24°42'S, 47°32'E, 187-209 m, 30.5 mm; 8. *Conus (Lividoconus) lividus*, MNHN IM-2009-15666, Saint Luce, 0-1 m, 37.8 mm. 9a-b. *Conus (Lividoconus) muriculatus*, MNHN uncataloged, stn TA27, 25°33.4'S, 45°6.9'E, 16-18 m, 23.2 mm; 10a-b. *Conus (Lividoconus) sanguinolentus*, MNHN uncataloged, stn TA49, 24°59.5'S, 47°6'E, 19 m, 35.2 mm; 11. *Conus (Lividoconus) quercinus*, MNHN IM-2009-15656, Sud-Est Faux-Cap. 84-88 m, 71.0 mm.



Plate 8: *Conus (Phasmoconus) galeyi* sp. nov.: **1a-b.** Holotype, MNHN IM-2000-33736, Fort-Dauphin, stn CP3545, 25°29'S, 46°42'E, 108-110 m, 20.8 mm; **2.** Paratype 2, MNHN IM-2000-33738, South- East Faux-Cap, stn CP3620, 25°47'S, 46°02'E, 133-178 m, 29.5 mm; **3a-b.** Paratype 1, MNHN IM-2000-33737, South- East Faux-Cap, stn CP3620, 25°47'S, 46°02'E, 133-178 m, 32.4 mm; **4:** Paratype 3, MNHN IM-2000-33739, South- East Faux-Cap, stn CP3620, 25°47'S, 46°02'E, 133-178 m, 29.3 mm; **5.** MNHN uncataloged, stn CP3611, 26°8'S, 45°4'E, 106-111 m, 16.5 mm; **6.** MNHN uncataloged, DW3516, 24°53'S-24°52'S, 47°28'E-47°29'E, 160-161 m, 21.2 mm; *Conus (Phasmoconus) madecassinus*: **7a-b.** Holotype of *Asprella madecassina*, MNHN-IM-2000-25076, Lavanono, southern Madagascar 30-50 m, 32.6 mm; **8.** MNHN IM-2009-15632, SW Cap Andavaka, 53-54 m, 27.5 mm; **9.** MNHN uncataloged, stn DW3550, 26°3.8'S- 26°3.2'S, 45°31.4' E-45°32.1'E, 45.4 mm; **10.** MNHN uncataloged, stn CP3614, 26°13'S, 45°7'E, 250-300 m, 54.2 mm.



Plate 9: 1. *Conus (Phasmoconus) nimbosus*, MNHN uncataloged, Lavanono, from local fishermen, 38.7 mm; 2. *Conus (Pionoconus) simonis*, MNHN uncataloged, Lavanono, from local fishermen, 74.4 mm; 3. Holotype of *Conus simonis*, MNHN IM-2000-22878, Tolagnaro, southeastern Madagascar, 22.8 mm; 4. *Conus (Pionoconus) simonis*, MNHN 2009-15633, Cap Sainte Marie, 16 m, 19.9 mm; 5. Holotype of *Pionoconus atimovatae*, MNHN 2000-25775, Lavanono, South Madagascar, 21.4 mm; 6a-b. *Conus (Pionoconus) catus*, MNHN uncataloged, Lavanono, from local fishermen, 35.1 mm; 7. *Conus (Pionoconus) gubernator*, MNHN uncataloged, Lavanono, from local fishermen, 81 mm; 8. *Conus (Pionoconus) striatus*, MNHN IM 2009-15658, Baie des Galions, 9-10 m, 87.7 mm; 9. *Conus (Pionoconus) striatus*, Lavanono, from local fishermen, 79.4 mm; 10a-b. *Conus (Puncticulis) arenatus*, MNHN uncataloged, stn TR05, 24°58.1'S, 47°6.1'E, 3-8 m, 57.0 mm; 11. *Conus (Puncticulis) zeylanicus*, MNHN uncataloged, stn TV17, 25°9.2'S, 46°45.4'E, 5-6 m, 56.9 mm.



Plate 10: 1. *Conus (Rhizoconus) capitaneus*, MNHN uncataloged, Lavanono, from local fishermen, 61.5 mm; 2. *Conus (Rhizoconus) namocanus*, MNHN uncataloged, stn TR16, 24°59.5'S, 47°5.6'E, 15-17 m, 104.7 mm; 3. *Conus (Rhizoconus) pertusus*, MNHN IM-2009-15636, N Saint Luce, 54-56 m, 24.9 mm; 4. *Conus (Rhizoconus) pertusus*, MNHN uncataloged, stn CP3521, 24°24'S, 47°32'E, 117-118 m, 43.2 mm; 5. *Conus (Rhizoconus) rattus*, MNHN uncataloged, Lavanono, from local fishermen, 30.4 mm; 6. *Conus (Splinoconus) alconnelli*, MNHN IM-2000-15661, SW Pointe Barrow, 113-135 m, 81.0 mm; 7. *Conus (Splinoconus) martensi*, MNHN uncataloged, stn CP3624, 25°37.6'S-25°38.1'S, 45°56.3'E-45°57'E, 63 m, 27.4 mm; 8a-b. *Conus (Stephanoconus) fuscatus*, MNHN uncataloged, stn TA22, 25°12.7'S, 44°8.5'E, 20-22 m, 31.1 mm; 9. *Conus (Splinoconus) meyeri*, MNHN uncataloged, stn BM05, 25°26.7'S, 44°56.7'E, intertidal, 36.3 mm; 10. *Conus (Strategoconus) augur*, MNHN uncataloged, stn TA32, 25°18'S, 44°18.1'E, 18-22 m, 59.4 mm; 11. *Conus (Strategoconus) litoglyphus*, MNHN uncataloged, stn CP3579, 25°54.2'S-25°54.5'S, 45°31.1'E-45°33.2'E, 65-66 m, 49.2 mm.



Plate 11: 1. *Conus (Strategoconus) maldivus*, MNHN uncataloged, stn CP3623, 25°40.9'S- 25°41.4'S, 45°58.1'E-45°59.2'E, 74-80 m, 68.6 mm; 2. *Conus (Strategoconus) varius*, MNHN uncataloged, stn TA49, 24°59.5'S, 47°6'E, 19 m, 56.8 mm; 3. *Conus (Strategoconus) striatellus*, MNHN uncataloged, Lavanono, from local fishermen, 56.2 mm; 4. *Conus (Tesselliconus) tessulatus*, MNHN uncataloged, Lavanono, from local fishermen, 25.4 mm; 5. *Conus (Tesselliconus) tessulatus*, MNHN IM-2009-15624, Sainte Luce, Sud Ilot Souillac, 4-7 m, 48.6 mm; 6a-b. Holotype of *Conus chiapponorum*, MNHN IM-2000-9375, between Fort Dauphin and Lavanono, 41.4 mm; 7. *Conus (Textilia) bullatus*, MNHN uncataloged, secteur de Manantenina, stn CP3521, 24°24'S, 47°32'E, 117-118 m, 61 mm; 8a-b. Holotype of *Conus solangeae*, MNHN IM-2000-5395, Lavanono, southern Madagascar, 25.7 mm; 9. *Conus (Turriconus) acutangulus*, MNHN IM-2009-15558, secteur de Fort-Dauphin, 88-89 m, 21.1 mm; 10. *Conus (Turriconus) acutangulus*, MNHN IM-2009-15562, secteur de Fort-Dauphin, 88-89 m, 20.1 mm; 11. *Conus (Textilia) dusaveli*, MNHN uncataloged, N Saint Luce, DW3531, 24°37.6'S, 47°31.1'E, 54-56 m, 53.1 mm.



Plate 12: *Conus (Textilia) cymbioides* sp. nov. : **1a-b.** Holotype, MNHN IM-2000-33740, Sud de Faux-Cap, stn DW3557, 26°08'S, 45°39'E, 282-333 m, 23.3 mm; **2.** Paratype 1, MNHN IM-2000-33741, secteur de Sainte Luce, stn DW3534, 24°43'S, 47°32'E, 296-307 m, 24.2 mm; **3a-b.** Paratype 3, MNHN IM-2000-33743, Sud-Est Pointe Barrow, stn CP3584, 25°28'S, 44°25'E, 203-210 m, 24.9 mm; **4a-b:** Paratype 6, MNHN IM-2000-33746, Sud-Est Faux-Cap, stn CP3620, 25°47'S, 46°02'E, 133-178 m, 23.8 mm; **5.** Paratype 2, MNHN-IM-2000-33742, Sud-Est Faux-Cap, stn CP3622, 25°43.0'S, 45°59.4'E, 84-88 m, 22.0 mm; **6.** Paratype 4, MNHN-IM-2000-33744, Sud Cap Sainte Marie, stn CP3614, 26°13'S, 45°08'E, 250-300 m, 25.6 mm; **7.** Paratype 5, MNHN-IM-2000-33745, Sud Cap Sainte Marie, stn CP3615, 26°14'S, 45°09'E, 284-286 m, 26.7 mm; **8a-b.** Paratype 7, MNHN-IM-2000-33747, secteur Fort-Dauphin, stn CP3511, 25°15.0'S - 47°14.5'E, 97-98 m, 23.6 mm; **9.** MNHN uncataloged, Sud de Faux-Cap, stn DW3550, 26°03.2' S, 45°32.1'E, 98 m, 21.4 mm.

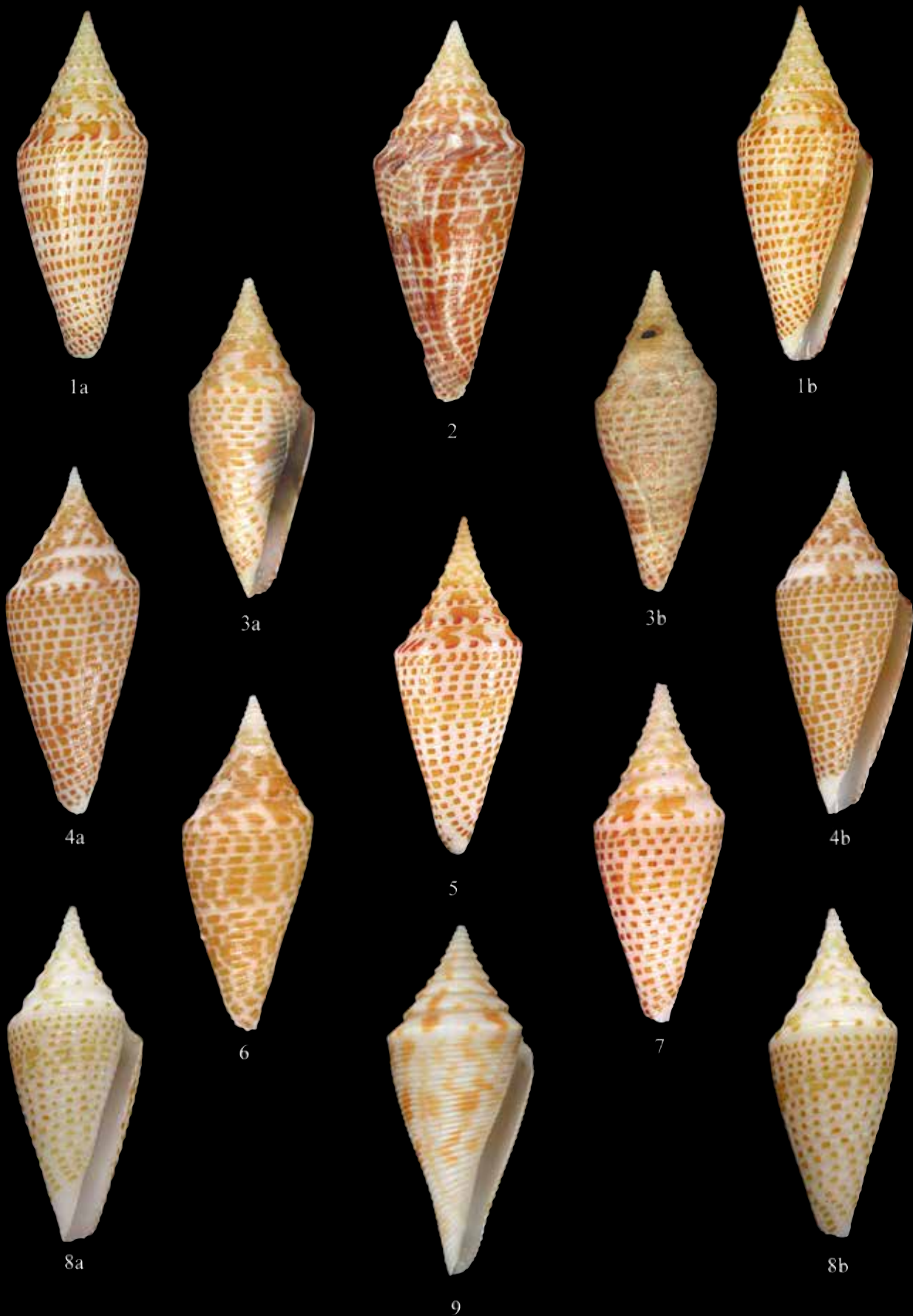


Plate 13: *Conus (Turriconus) aequiquadratus* sp. nov. : **1a-b.** Holotype, MNHN IM-2000-33748, Sainte Luce, ATIMO VATAE stn DW3533, 24°42'S, 47°32'E, 187-209 m, 44.2 mm; **2.** Paratype 6, CH coll., La Réunion, 46.4 mm; **3a-b.** Paratype 1, MNHN IM-2000-33749, West of Nosy-Bé, MIRIKY stn DW3234, 13°27' S, 47°55' E, 187-247 m, 35.4 mm; **4a-b:** Paratype 7, CH coll., La Réunion, 34.5 mm; **5.** Paratype 5, EM coll., Mauritius, 30.7 mm; **6.** Paratype 8, EM coll., La Réunion, 22.2 mm; **7.** Paratype 3, GR coll., La Réunion, 29.0 mm; **8a-b.** Paratype 4, MHNLR, La Réunion, 23.3 mm; **9.** Holotype of *Conus praececellens*, NHMUK, China Seas, 35 mm.



Plate 14: 1. *Conus (Virgiconus) moreleti*, MNHN uncataloged, stn TA20, 25°23.1'S, 44°14' E, intertidal, 43.8 mm; 2. *Conus (Virgiconus) berdulinus*, MNHN uncataloged, stn DW3533, 24°43'S, 47°32'E, 187-201 m; 3. *Conus (Virgiconus) terebra*, MNHN IM-2009-15613, Port de Fort Dauphin, 2-4 m, 45.7 mm; 4a-b: *Conus (Virgiconus) frigidus*, MNHN uncataloged, stn TM19, 24°47.1'S, 47°11.9'E, intertidal, 33.3 mm; 5. *Conus (Virgiconus) virgo*, MNHN uncataloged, stn TA15, 25°12.6'S, 44°12.5'E, 12-18 m, 97 mm; 6. *Conus (Virroconus) chaldaeus*, MNHN uncataloged, Lavanono, from local fishermen, 32.1 mm; 7. *Conus (Virroconus) ebraeus*, MNHN uncataloged, stn BM10, 25°28.8'S, 44°58.3'E, intertidal, 35.5 mm; 8. *Conus (Virroconus) ebraeus*, MNHN IM 2009-15687, Ambatobe, near Soamanitse, intertidal, 23.0 mm; 9. *Conus (Virroconus) judaeus*, MNHN IM-2009-15672, Ambatobe, near Soamanitse, intertidal, 28.7 mm. 10a-b. *Conus (Virroconus) coronatus*, MNHN uncataloged, stn TM03, 25°4.5'S, 46°57.8'E, intertidal, 25.8 mm; 11a-b. *Conus (Virroconus) miliaris*, MNHN uncataloged, Lavanono, from local fishermen, 30.2 mm.



Plate 15: *Conus* (*Malagasyconus*) *lozeti*: **1a-b.** Holotype of *Conus lozeti*, MNHN IM-2000-2543, Fort Dauphin, 56 mm; **2.** MNHN uncataloged, southern Madagascar, 38.1 mm; **3.** MNHN uncataloged, southern Madagascar, 49 mm; **4.** MNHN uncataloged, southern Madagascar, 48 mm; **5.** MNHN uncataloged, southern Madagascar, 23.9 mm; **6.** MNHN uncataloged, southern Madagascar, 69.4 mm; **7.** MNHN uncataloged, southern Madagascar, 70.5 mm; **8.** MNHN IM-2009-15643, secteur de Lavanono, 122-123 m, 43.4 mm; **9.** MNHN IM-2009-15557, Est de Faux-Cap, 102-106 m, 20.2 mm; **10.** Holotype of *Endemoconus bonfigliolii*, MNHN IM-2000-23783, Lavanono, southern Madagascar, 30-50 m, 23.6 mm. **11.** *Conus* (*Malagasyconus*) *bonfigliolii*, EM coll., Lavanono, from local fishermen, 19.2 mm.

Appendix 1. List of the specimens and sequences included in the molecular analysis.

MNHN Number	BOLD ID	Genus	species	Expedition / Country	Coordinates; depth	GenBank Accession number
IM-2007-17762	CONO1989-17	<i>Conus</i>	<i>ebraeus</i>	SANTO 2006 / Vanuatu	15°34,9'S, 167°02,4'E; 0-1m.	pending
IM-2007-17763	CONO1990-17	<i>Conus</i>	<i>judaeus</i>	SANTO 2006 / Vanuatu	15°34,9'S, 167°02,4'E; 0-1m.	pending
IM-2007-30644	CONO998-10	<i>Conus</i>	<i>quercinus</i>	SANTO 2006 / Vanuatu	15°31,3'S, 167°10,4'E; 3-18m.	KJ550433
IM-2007-30654	CONO1005-10	<i>Conus</i>	<i>imperialis</i>	SANTO 2006 / Vanuatu	15°26,6'S, 167°15,2'E; 0-1m.	KJ550308
IM-2007-30662	CONO1009-10	<i>Conus</i>	<i>chaldaeus</i>	SANTO 2006 / Vanuatu	15°28,9'S, 167°15,5'E; 0-1m.	KJ550167
IM-2007-30663	CONO1426-14	<i>Conus</i>	<i>textile</i>	SANTO 2006 / Vanuatu	15°34,5'S, 167°12,3'E	KJ550496
IM-2007-30684	CONO1013-10	<i>Conus</i>	<i>tessulatus</i>	SANTO 2006 / Vanuatu	15°38,1'S, 167°05,9'E; 0-1m.	KJ550492
IM-2007-30699	CONO1447-14	<i>Conus</i>	<i>magnificus</i>	SANTO 2006 / Vanuatu	15°22,4'S, 167°13'E; 45m.	KJ550235
IM-2007-30707	CONO1467-14	<i>Conus</i>	<i>ebraeus</i>	PANGLAO 2004 / Philippines	09°37,5'N, 123°46,8'E; 0-2m.	KJ550206
IM-2007-30719	CONO1377-14	<i>Conus</i>	<i>terebra</i>	PANGLAO 2004 / Philippines	09°30,9'N, 123°40,8'E; 2-30m.	KJ550490
IM-2007-30723	CONO1466-14	<i>Conus</i>	<i>tessulatus</i>	PANGLAO 2004 / Philippines	09°35,2'N, 123°50,5'E; 4m.	KJ550493
IM-2007-30745	CONO1390-14	<i>Conus</i>	<i>eburneus</i>	SANTO 2006 / Vanuatu	15°31,4'S, 167°09,8'E; 2-7m.	KJ550217
IM-2007-30781	CONO1035-10	<i>Conus</i>	<i>tessulatus</i>	SANTO 2006 / Vanuatu	15°32,6'S, 167°16,9'E; 3-37m.	KJ550494
IM-2007-30799	CONO1047-10	<i>Conus</i>	<i>coronatus</i>	SANTO 2006 / Vanuatu	15°27,5'S, 167°15,4'E; 0-1m.	KJ550182
IM-2007-30828	CONO1053-10	<i>Conus</i>	<i>lividus</i>	PANGLAO 2004 / Philippines	09°30,9'N, 123°40,8'E; 2-30m.	KJ550339
IM-2007-30830	CONO1054-10	<i>Conus</i>	<i>tessulatus</i>	SANTO 2006 / Vanuatu	15°31,1'S, 167°15,8'E; 5-20m.	KJ550495
IM-2007-30888	CONO1074-10	<i>Conus</i>	<i>lischkeanus</i>	SALOMON 2 / Solomons	06°51'S, 156°24'E; 182-277m.	KJ550237
IM-2007-30891	CONO1076-10	<i>Conus</i>	<i>lividus</i>	SANTO 2006 / Vanuatu	15°34,9'S, 167°02,4'E; 0-1m.	KJ550340
IM-2007-30900	CONO1078-10	<i>Conus</i>	<i>textile</i>	SANTO 2006 / Vanuatu	15°25,1'S, 167°14,2'E; 5-40m.	KJ550497
IM-2007-30920	CONO1453-14	<i>Profundiconus</i>	<i>teramachii</i>	SALOMON 2 / Solomons	08°17'S, 160°00'E; 487-541m.	KJ550477
IM-2007-34970	CONO1594-14	<i>Conus</i>	<i>lischkeanus</i>	TERRASSES / New Caledonia	23°01'S, 168°18'E; 150-180m.	KJ550332
IM-2007-36699	CONO1727-14	<i>Conasprella</i>	<i>elokismenos</i>	MIRIKY / Madagascar (North)	14°29'S, 47°26'E; 332-379m.	KJ550219
IM-2007-38352	CONO1991-17	<i>Profundiconus</i>	<i>neotorquatus</i>	MIRIKY / Madagascar (North)	15°22'S, 46°00'E; 493-662m.	pending
IM-2009-15553	CONO1994-17	<i>Conus</i>	<i>lividus</i>	ATIMO VATAE / Madagascar (South)	24°58.1'S, 47°06.1'E; 3-8m.	pending
IM-2009-15554	CONO1997-17	<i>Conasprella</i>	<i>somalica</i>	ATIMO VATAE / Madagascar (South)	25°28'S, 46°59'E; 148-155m.	pending
IM-2009-15555	CONO1995-17	<i>Conus</i>	<i>acutangulus</i>	ATIMO VATAE / Madagascar (South)	25°04.7'S, 47°03.4'E; 64-65m.	pending
IM-2009-15557	CONO1996-17	<i>Conus</i>	<i>lozeti</i>	ATIMO VATAE / Madagascar (South)	25°37'S, 46°10'E; 102-106m.	pending
IM-2009-15558	CONO1613-14	<i>Conus</i>	<i>acutangulus</i>	ATIMO VATAE / Madagascar (South)	25°22.3'S, 47°02.6'E; 88-89m.	KJ550104
IM-2009-15559	CONO1610-14	<i>Conus</i>	<i>namocanus</i>	ATIMO VATAE / Madagascar (South)	24°35.9'S, 47°32.1'E; 80-86m.	KJ550442
IM-2009-15560	CONO1628-14	<i>Conus</i>	<i>madecassinus</i>	ATIMO VATAE / Madagascar (South)	25°37'S, 46°10'E; 102-106m.	KJ550244
IM-2009-15561	CONO1632-14	<i>Conasprella</i>	<i>elokismenos</i>	ATIMO VATAE / Madagascar (South)	25°31'S, 44°16'E; 296-302m.	KJ550222
IM-2009-15562	CONO1998-17	<i>Conus</i>	<i>acutangulus</i>	ATIMO VATAE / Madagascar (South)	25°22.3'S, 47°02.6'E; 88-89m.	pending
IM-2009-15563	CONO1645-14	<i>Conus</i>	<i>gubernator</i>	ATIMO VATAE / Madagascar (South)	25°39.4'S, 44°53.0'E; 37-38m.	KJ550279
IM-2009-15565	CONO1609-14	<i>Conus</i>	<i>namocanus</i>	ATIMO VATAE / Madagascar (South)	24°51.9'S, 47°28.0'E; 80-83m.	KJ550443
IM-2009-15567	CONO1666-14	<i>Conus</i>	<i>coronatus</i>	ATIMO VATAE / Madagascar (South)	24°58.1'S, 47°06.1'E; 3-8m.	KJ550183
IM-2009-15569	CONO1681-14	<i>Conus</i>	<i>coronatus</i>	ATIMO VATAE / Madagascar (South)	25°26.3'S, 44°56.5'E; 0-1m.	KJ550184
IM-2009-15570	CONO1620-14	<i>Conus</i>	<i>madecassinus</i>	ATIMO VATAE / Madagascar (South)	25°37'S, 46°10'E; 102-106m.	KJ550245
IM-2009-15571	CONO1621-14	<i>Conus</i>	<i>madecassinus</i>	ATIMO VATAE / Madagascar (South)	25°37'S, 46°10'E; 102-106m.	KJ550246
IM-2009-15572	CONO1605-14	<i>Conus</i>	<i>archiepiscopus</i>	ATIMO VATAE / Madagascar (South)	25°26.4'S, 44°56.1'E; 14-18m.	KJ550498
IM-2009-15573	CONO1534-14	<i>Conus</i>	<i>praelatus</i>	ATIMO VATAE / Madagascar (South)	24°45.2'S, 47°12.0'E; 4-6m.	KJ550409
IM-2009-15574	CONO1606-14	<i>Conasprella</i>	<i>somalica</i>	ATIMO VATAE / Madagascar (South)	24°52'S, 47°29'E; 160-161m.	KJ550270
IM-2009-15575	CONO1625-14	<i>Conus</i>	<i>madecassinus</i>	ATIMO VATAE / Madagascar (South)	25°37'S, 46°10'E; 102-106m.	KJ550247

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IM-2009-15578	CONO1648-14	<i>Conus</i>	<i>coronatus</i>	ATIMO VATAE / Madagascar (South)	25°02.1-02.2'S, 46°59.9-47°00'E; 0-1m.	KJ550185
IM-2009-15579	CONO1663-14	<i>Conus</i>	<i>coronatus</i>	ATIMO VATAE / Madagascar (South)	24°58.1'S, 47°06.1'E; 3-8m.	KJ550186
IM-2009-15580	CONO1656-14	<i>Conus</i>	<i>coronatus</i>	ATIMO VATAE / Madagascar (South)	25°06.7'S, 46°49.9'E; 0-1m.	KJ550187
IM-2009-15581	CONO1688-14	<i>Conus</i>	<i>archiepiscopus</i>	ATIMO VATAE / Madagascar (South)	25°27.9'S, 44°57.6'E; 0-1m.	KJ550499
IM-2009-15582	CONO1646-14	<i>Conus</i>	<i>gubernator</i>	ATIMO VATAE / Madagascar (South)	25°39.4'S, 44°53.0'E; 37-38m.	KJ550280
IM-2009-15585	CONO1671-14	<i>Conus</i>	<i>coronatus</i>	ATIMO VATAE / Madagascar (South)	25°01.5'S, 47°00.0'E; 2-4m.	KJ550188
IM-2009-15586	CONO1601-14	<i>Conus</i>	<i>archiepiscopus</i>	ATIMO VATAE / Madagascar (South)	25°22.9-23.2'S, 44°51.0-51.6'E; 19-21m.	KJ550500
IM-2009-15587	CONO1623-14	<i>Conus</i>	<i>madecassinus</i>	ATIMO VATAE / Madagascar (South)	25°37'S, 46°10'E; 102-106m.	KJ550248
IM-2009-15588	CONO1992-17	<i>Conus</i>	<i>coronatus</i>	ATIMO VATAE / Madagascar (South)	25°08.9'S, 46°45.4'E; 0-1m.	pending
IM-2009-15590	CONO1665-14	<i>Conus</i>	<i>ebraeus</i>	ATIMO VATAE / Madagascar (South)	24°58.1'S, 47°06.1'E; 3-8m.	KJ550207
IM-2009-15591	CONO1649-14	<i>Conus</i>	<i>coronatus</i>	ATIMO VATAE / Madagascar (South)	25°02.1-02.2'S, 46°59.9-47°00'E; 0-1m.	KJ550189
IM-2009-15592	CONO1651-14	<i>Conus</i>	<i>coronatus</i>	ATIMO VATAE / Madagascar (South)	25°02.1-02.2'S, 46°59.9-47°00'E; 0-1m.	KJ550190
IM-2009-15593	CONO1654-14	<i>Conus</i>	<i>coronatus</i>	ATIMO VATAE / Madagascar (South)	24°56.5'S, 47°07.1'E; 0-1m.	KJ550191
IM-2009-15594	CONO1633-14	<i>Conasprella</i>	<i>elokismenos</i>	ATIMO VATAE / Madagascar (South)	25°28'S, 44°25'E; 203-210m.	KJ550223
IM-2009-15596	CONO1664-14	<i>Conus</i>	<i>lividus</i>	ATIMO VATAE / Madagascar (South)	24°58.1'S, 47°06.1'E; 3-8m.	KJ550341
IM-2009-15597	CONO1689-14	<i>Conus</i>	<i>coronatus</i>	ATIMO VATAE / Madagascar (South)	25°21.5'S, 44°50.0'E; 0-1m.	KJ550192
IM-2009-15598	CONO1619-14	<i>Conus</i>	<i>madecassinus</i>	ATIMO VATAE / Madagascar (South)	25°37'S, 46°10'E; 102-106m.	KJ550249
IM-2009-15599	CONO1655-14	<i>Conus</i>	<i>coronatus</i>	ATIMO VATAE / Madagascar (South)	24°58.7'S, 47°05.9'E; 0-1m.	KJ550193
IM-2009-15600	CONO1637-14	<i>Profundiconus</i>	<i>neotorquatus</i>	ATIMO VATAE / Madagascar (South)	25°35'S, 44°15'E; 821-910m.	KJ550479
IM-2009-15601	CONO1636-14	<i>Conasprella</i>	<i>elokismenos</i>	ATIMO VATAE / Madagascar (South)	25°03'S, 43°59'E; 300-309m.	KJ550224
IM-2009-15602	CONO1680-14	<i>Conus</i>	<i>ebraeus</i>	ATIMO VATAE / Madagascar (South)	25°26.3'S, 44°56.5'E; 0-1m.	KJ550208
IM-2009-15603	CONO1622-14	<i>Conus</i>	<i>vezoi</i>	ATIMO VATAE / Madagascar (South)	25°37'S, 46°10'E; 102-106m.	KJ550410
IM-2009-15604	CONO1667-14	<i>Conus</i>	<i>lividus</i>	ATIMO VATAE / Madagascar (South)	24°59.5'S, 47°05.6'E; 15-17m.	KJ550342
IM-2009-15605	CONO1631-14	<i>Conasprella</i>	<i>elokismenos</i>	ATIMO VATAE / Madagascar (South)	25°31'S, 44°16'E; 296-302m.	KJ550225
IM-2009-15606	CONO1644-14	<i>Conus</i>	<i>medoci</i>	ATIMO VATAE / Madagascar (South)	25°39.4'S, 44°53.0'E; 37-38m.	KJ550370
IM-2009-15607	CONO1533-14	<i>Conus</i>	<i>gubernator</i>	ATIMO VATAE / Madagascar (South)	25°33.4'S, 45°06.9'E; 16-18m.	KJ550281
IM-2009-15608	CONO1647-14	<i>Conus</i>	<i>madecassinus</i>	ATIMO VATAE / Madagascar (South)	26°13'S, 45°08'E; 250-300m.	KJ550250
IM-2009-15609	CONO1675-14	<i>Conus</i>	<i>chaldaeus</i>	ATIMO VATAE / Madagascar (South)	25°27.4'S, 44°57.4'E; 0-1m.	KJ550170
IM-2009-15611	CONO1536-14	<i>Conus</i>	<i>lividus</i>	ATIMO VATAE / Madagascar (South)		KJ550343
IM-2009-15612	CONO1673-14	<i>Conus</i>	<i>lividus</i>	ATIMO VATAE / Madagascar (South)	25°09.2'S, 46°45.4'E; 5-6m.	KJ550344
IM-2009-15613	CONO1674-14	<i>Conus</i>	<i>terebra</i>	ATIMO VATAE / Madagascar (South)	25°01.5'S, 47°00.0'E; 2-4m.	KJ550491
IM-2009-15614	CONO1668-14	<i>Conus</i>	<i>lividus</i>	ATIMO VATAE / Madagascar (South)	24°59.9'S, 47°06.0'E; 18-20m.	KJ550345
IM-2009-15615	CONO1532-14	<i>Conus</i>	<i>archiepiscopus</i>	ATIMO VATAE / Madagascar (South)	25°23.1'S, 44°14.0'E; 0-1m.	KJ550501
IM-2009-15616	CONO1639-14	<i>Profundiconus</i>	<i>neotorquatus</i>	ATIMO VATAE / Madagascar (South)	25°35'S, 44°15'E; 821-910m.	KJ550480
IM-2009-15617	CONO1531-14	<i>Conus</i>	<i>lividus</i>	ATIMO VATAE / Madagascar (South)	25°09.2'S, 46°45.4'E; 3-8m.	KJ550346
IM-2009-15618	CONO1537-14	<i>Conus</i>	<i>archiepiscopus</i>	ATIMO VATAE / Madagascar (South)		KJ550502
IM-2009-15619	CONO1535-14	<i>Conus</i>	<i>archiepiscopus</i>	ATIMO VATAE / Madagascar (South)	24°45.8'S, 47°12.4'E; 4-7m.	KJ550503
IM-2009-15620	CONO1653-14	<i>Conus</i>	<i>lividus</i>	ATIMO VATAE / Madagascar (South)	24°56.5'S, 47°07.1'E; 0-1m.	KJ550347
IM-2009-15621	CONO1670-14	<i>Conus</i>	<i>archiepiscopus</i>	ATIMO VATAE / Madagascar (South)	24°57.0'S, 47°06.4'E; 5-6m.	KJ550504
IM-2009-15622	CONO1615-14	<i>Conus</i>	<i>lozeti</i>	ATIMO VATAE / Madagascar (South)	25°28'S, 46°59'E; 148-155m.	KJ550357
IM-2009-15623	CONO1634-14	<i>Conasprella</i>	<i>elokismenos</i>	ATIMO VATAE / Madagascar (South)	25°28'S, 44°25'E; 203-210m.	KJ550226
IM-2009-15624	CONO1993-17	<i>Conus</i>	<i>tessulatus</i>	ATIMO VATAE / Madagascar (South)	24°45.8'S, 47°12.4'E; 4-7m.	pending
IM-2009-15629	CONO1685-14	<i>Conus</i>	<i>bilius</i>	ATIMO VATAE / Madagascar (South)	25°26.7'S, 44°56.7'E; 0-1m.	KJ550138
IM-2009-15630	CONO1626-14	<i>Conus</i>	<i>madecassinus</i>	ATIMO VATAE / Madagascar (South)	25°37'S, 46°10'E; 102-106m.	KJ550251
IM-2009-15632	CONO1617-14	<i>Conus</i>	<i>madecassinus</i>	ATIMO VATAE / Madagascar (South)	25°16.9'S, 46°31.3'E; 53-54m.	KJ550252

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IM-2009-15633	CONO1604-14	<i>Conus</i>	<i>simonis</i>	ATIMO VATAE / Madagascar (South)	25°36.0'S, 45°08.7'E; 16m.	KJ550445
IM-2009-15634	CONO1691-14	<i>Conus</i>	<i>miliaris</i>	ATIMO VATAE / Madagascar (South)	25°25.6'S, 44°56.2'E; 0-1m.	KJ550380
IM-2009-15635	CONO1657-14	<i>Conus</i>	<i>coronatus</i>	ATIMO VATAE / Madagascar (South)	24°47.1'S, 47°11.9'E; 0-1m.	KJ550194
IM-2009-15637	CONO1627-14	<i>Conus</i>	<i>madecassinus</i>	ATIMO VATAE / Madagascar (South)	25°37'S, 46°10'E; 102-106m.	KJ550253
IM-2009-15638	CONO1624-14	<i>Conus</i>	<i>madecassinus</i>	ATIMO VATAE / Madagascar (South)	25°37'S, 46°10'E; 102-106m.	KJ550254
IM-2009-15639	CONO1686-14	<i>Conus</i>	<i>coronatus</i>	ATIMO VATAE / Madagascar (South)	25°26.7'S, 44°56.7'E; 0-1m.	KJ550195
IM-2009-15640	CONO1614-14	<i>Conus</i>	<i>lozeti</i>	ATIMO VATAE / Madagascar (South)	25°28'S, 46°59'E; 148-155m.	KJ550358
IM-2009-15641	CONO1640-14	<i>Profundiconus</i>	<i>neotorquatus</i>	ATIMO VATAE / Madagascar (South)	25°35'S, 44°15'E; 821-910m.	KJ550481
IM-2009-15642	CONO1692-14	<i>Conus</i>	<i>archiepiscopus</i>	ATIMO VATAE / Madagascar (South)	25°25.6'S, 44°56.2'E; 0-1m.	KJ550505
IM-2009-15643	CONO1642-14	<i>Conus</i>	<i>lozeti</i>	ATIMO VATAE / Madagascar (South)	25°45'S, 44°29'E; 122-123m.	KJ550359
IM-2009-15646	CONO1602-14	<i>Conus</i>	<i>nimbosus</i>	ATIMO VATAE / Madagascar (South)	25°22.8-23.7'S, 44°51.1'E; 18-21m.	KJ550391
IM-2009-15647	CONO1630-14	<i>Conasprella</i>	<i>elokismenos</i>	ATIMO VATAE / Madagascar (South)	25°31'S, 44°16'E; 296-302m.	KJ550227
IM-2009-15648	CONO1672-14	<i>Conus</i>	<i>lividus</i>	ATIMO VATAE / Madagascar (South)	24°57.0'S, 47°06.4'E; 5-6m.	KJ550348
IM-2009-15649	CONO1629-14	<i>Conus</i>	<i>lozeti</i>	ATIMO VATAE / Madagascar (South)	25°58.6'S, 45°35.0'E; 88-90m.	KJ550360
IM-2009-15651	CONO1677-14	<i>Conus</i>	<i>ebraeus</i>	ATIMO VATAE / Madagascar (South)	25°27.4'S, 44°57.4'E; 0-1m.	KJ550209
IM-2009-15652	CONO1676-14	<i>Conus</i>	<i>ebraeus</i>	ATIMO VATAE / Madagascar (South)	25°27.4'S, 44°57.4'E; 0-1m.	KJ550210
IM-2009-15653	CONO1618-14	<i>Conus</i>	<i>madecassinus</i>	ATIMO VATAE / Madagascar (South)	26°03.2'S, 45°32.1'E; 98m.	KJ550255
IM-2009-15654	CONO1643-14	<i>Conus</i>	<i>medoci</i>	ATIMO VATAE / Madagascar (South)	25°59.0'S, 44°43.3'E; 97-98m.	KJ550371
IM-2009-15655	CONO1538-14	<i>Conus</i>	<i>archiepiscopus</i>	ATIMO VATAE / Madagascar (South)	24°46.2'S, 47°12.4'E; 1-10m.	KJ550506
IM-2009-15656	CONO1999-17	<i>Conus</i>	<i>quercinus</i>	ATIMO VATAE / Madagascar (South)	25°43.0'S, 45°59.4'E; 84-88m.	pending
IM-2009-15661	CONO1635-14	<i>Conus</i>	<i>alconnelli</i>	ATIMO VATAE / Madagascar (South)	25°03'S, 44°00'E; 113-135m.	pending
IM-2009-15665	CONO1638-14	<i>Profundiconus</i>	<i>neotorquatus</i>	ATIMO VATAE / Madagascar (South)	25°35'S, 44°15'E; 821-910m.	KJ550482
IM-2009-15667	CONO1641-14	<i>Profundiconus</i>	<i>neotorquatus</i>	ATIMO VATAE / Madagascar (South)	25°43'S, 44°24'E; 729-732m.	KJ550483
IM-2009-15668	CONO1659-14	<i>Conus</i>	<i>coronatus</i>	ATIMO VATAE / Madagascar (South)	24°47.1'S, 47°11.9'E; 0-1m.	KJ550196
IM-2009-15671	CONO1612-14	<i>Conus</i>	<i>lischkeanus</i>	ATIMO VATAE / Madagascar (South)	24°39.4'S, 47°31.7'E; 86-87m.	KJ550454
IM-2009-15672	CONO1679-14	<i>Conus</i>	<i>judaeus</i>	ATIMO VATAE / Madagascar (South)	25°27.4'S, 44°57.4'E; 0-1m.	KJ550211
IM-2009-15673	CONO1650-14	<i>Conus</i>	<i>coronatus</i>	ATIMO VATAE / Madagascar (South)	25°02.1-02.2'S, 46°59.9-47°00'E; 0-1m.	KJ550197
IM-2009-15674	CONO1658-14	<i>Conus</i>	<i>coronatus</i>	ATIMO VATAE / Madagascar (South)	24°47.1'S, 47°11.9'E; 0-1m.	KJ550198
IM-2009-15675	CONO1652-14	<i>Conus</i>	<i>ebraeus</i>	ATIMO VATAE / Madagascar (South)	25°04.3'S, 46°57.8'E; 0-1m.	KJ550212
IM-2009-15676	CONO1684-14	<i>Conus</i>	<i>parvatus</i>	ATIMO VATAE / Madagascar (South)	25°26.3'S, 44°56.5'E; 0-1m.	KJ550407
IM-2009-15677	CONO1608-14	<i>Conasprella</i>	<i>somalica</i>	ATIMO VATAE / Madagascar (South)	24°52'S, 47°29'E; 160-161m.	KJ550271
IM-2009-15678	CONO1603-14	<i>Conus</i>	<i>archiepiscopus</i>	ATIMO VATAE / Madagascar (South)	25°28.2'S, 44°56.4'E; 12-14m.	KJ550507
IM-2009-15681	CONO1693-14	<i>Conus</i>	<i>coronatus</i>	ATIMO VATAE / Madagascar (South)	25°31.0'S, 45°04.0'E; 0-1m.	KJ550199
IM-2009-15683	CONO1661-14	<i>Conus</i>	<i>coronatus</i>	ATIMO VATAE / Madagascar (South)	25°08.9'S, 46°45.4'E; 0-1m.	KJ550200
IM-2009-15684	CONO1611-14	<i>Conus</i>	<i>fuscatus</i>	ATIMO VATAE / Madagascar (South)	24°39.4'S, 47°31.7'E; 86-87m.	KJ550309
IM-2009-15685	CONO1687-14	<i>Conus</i>	<i>archiepiscopus</i>	ATIMO VATAE / Madagascar (South)	25°27.9'S, 44°57.6'E; 0-1m.	KJ550508
IM-2009-15686	CONO1682-14	<i>Conus</i>	<i>coronatus</i>	ATIMO VATAE / Madagascar (South)	25°26.3'S, 44°56.5'E; 0-1m.	KJ550201
IM-2009-15687	CONO1678-14	<i>Conus</i>	<i>ebraeus</i>	ATIMO VATAE / Madagascar (South)	25°27.4'S, 44°57.4'E; 0-1m.	KJ550213
IM-2009-15688	CONO1690-14	<i>Conus</i>	<i>miliaris</i>	ATIMO VATAE / Madagascar (South)	25°25.6'S, 44°56.2'E; 0-1m.	KJ550381
IM-2009-15689	CONO1660-14	<i>Conus</i>	<i>ebraeus</i>	ATIMO VATAE / Madagascar (South)	24°47.1'S, 47°11.9'E; 0-1m.	KJ550214
IM-2009-15690	CONO1683-14	<i>Conus</i>	<i>parvatus</i>	ATIMO VATAE / Madagascar (South)	25°26.3'S, 44°56.5'E; 0-1m.	KJ550408
IM-2009-15691	CONO1669-14	<i>Conus</i>	<i>coronatus</i>	ATIMO VATAE / Madagascar (South)	24°57.0'S, 47°06.5'E; 0-10m.	KJ550202
IM-2009-15692	CONO1607-14	<i>Conasprella</i>	<i>somalica</i>	ATIMO VATAE / Madagascar (South)	24°52'S, 47°29'E; 160-161m.	KJ550272
IM-2009-18260	CONO1529-14	<i>Conasprella</i>	<i>elokismenos</i>	MIRIKY / Madagascar (North)	15°35'S, 45°45'E; 179-193m.	KJ550229
IM-2009-18294	CONO1702-14	<i>Conus</i>	<i>textile neovi-carius</i>	Djibouti	11°37'N; 43°09'E; 0-2m.	KJ550509

IM-2009-19215	CONO1712-14	<i>Conus</i>	<i>namocanus</i>	Madagascar (North)	13°22'S; 48°11'E; 0-1m.	KJ550390
IM-2009-29408	CONO2000-17	<i>Conus</i>	<i>textile</i>	INHACA 2011 / Mozambique	26°03.7'S, 32°54.8'E; 0-1m.	pending
IM-2009-29413	CONO2001-17	<i>Conus</i>	<i>sponsalis</i>	INHACA 2011 / Mozambique	25°58.6'S, 32°54.1'E; 15m.	pending
IM-2009-29422	CONO2002-17	<i>Conus</i>	<i>textile</i>	INHACA 2011 / Mozambique	26°00.0'S, 32°54.4'E; 4m.	pending
IM-2009-29423	CONO2003-17	<i>Conus</i>	<i>textile</i>	INHACA 2011 / Mozambique	26°03.7'S, 32°54.8'E; 0-1m.	pending
IM-2009-29435	CONO2004-17	<i>Conus</i>	<i>textile</i>	INHACA 2011 / Mozambique	26°03.7'S, 32°54.8'E; 0-1m.	pending
IM-2009-29437	CONO2005-17	<i>Conus</i>	<i>tessulatus</i>	INHACA 2011 / Mozambique	26°03.9'S, 32°57.3'E; 0-1m.	pending
IM-2009-29438	CONO2006-17	<i>Conus</i>	<i>tessulatus</i>	INHACA 2011 / Mozambique	26°03.9'S, 32°57.3'E; 0-1m.	pending
IM-2009-29440	CONO2007-17	<i>Conus</i>	<i>tessulatus</i>	INHACA 2011 / Mozambique	26°03.9'S, 32°57.3'E; 0-1m.	pending
IM-2009-29775	CONO2054-17	<i>Conus</i>	<i>acutangulus</i>	INHACA 2011 / Mozambique	26°07.0'S, 32°58.7'E; 34-36m.	pending
IM-2009-31297	CONO2010-17	<i>Conus</i>	<i>coronatus</i>	ATIMO VATAE / Madagascar (South)	24°56.8'S, 47°06.6'E; 7m.	pending
IM-2009-31298	CONO2011-17	<i>Conus</i>	<i>sponsalis</i>	ATIMO VATAE / Madagascar (South)	25°28.7-24.7'S, 44°56.8-54.3'E; 10-13m.	pending
IM-2009-31299	CONO2055-17	<i>Conus</i>	<i>coronatus</i>	ATIMO VATAE / Madagascar (South)	24°56.8'S, 47°06.6'E; 7m.	pending
IM-2009-31300	CONO2012-17	<i>Conus</i>	<i>coronatus</i>	ATIMO VATAE / Madagascar (South)	24°56.8'S, 47°06.6'E; 7m.	pending
IM-2009-31301	CONO2013-17	<i>Conus</i>	<i>coronatus</i>	ATIMO VATAE / Madagascar (South)	24°56.8'S, 47°06.6'E; 7m.	pending
IM-2009-31302	CONO2014-17	<i>Conus</i>	<i>coronatus</i>	ATIMO VATAE / Madagascar (South)	25°06.7'S, 46°49.9'E; 0-1m.	pending
IM-2009-31303	CONO2015-17	<i>Conus</i>	<i>archiepiscopus</i>	ATIMO VATAE / Madagascar (South)	25°26.4'S, 44°56.1'E; 14-18m.	pending
IM-2009-31325	CONO1979-17	<i>Lilliconus</i>	<i>sagei</i>	ATIMO VATAE / Madagascar (South)	24°59.8'S, 47°05.7'E; 22m.	KY570905
IM-2009-31326	CONO2016-17	<i>Conus</i>	<i>archiepiscopus</i>	ATIMO VATAE / Madagascar (South)	24°58.7'S, 47°05.9'E; 0-1m.	pending
IM-2009-31327	CONO2017-17	<i>Conus</i>	<i>archiepiscopus</i>	ATIMO VATAE / Madagascar (South)	25°02.1-02.2'S, 46°59.9-47°00'E; 0-1m.	pending
IM-2009-31328	CONO1980-17	<i>Lilliconus</i>	<i>sagei</i>	ATIMO VATAE / Madagascar (South)	25°26.4'S, 44°56.1'E; 14-18m.	KY570904
IM-2009-31330	CONO2018-17	<i>Conus</i>	<i>namocanus</i>	ATIMO VATAE / Madagascar (South)	24°37.6'S, 47°31.1'E; 54-56m.	pending
IM-2009-31343	CONO2019-17	<i>Conus</i>	<i>parvatus</i>	INHACA 2011 / Mozambique	25°59.7'S, 32°54.5'E; 2-5m.	pending
IM-2013-18481	CONO1809-15	<i>Profundiconus</i>	<i>teramachii</i>	PAPUA NIUGINI / Papua New Guinea	04°29'S, 145°31'E; 500-510m.	KT874755
IM-2013-40041	CONO2020-17	<i>Conus</i>	<i>pseudimperialis</i>	PAKAIHI I TE MOANA / French Polynesia	10°28,31'S, 138°40,68'W; 0-28m.	pending
IM-2013-40042	CONO2021-17	<i>Conus</i>	<i>pseudimperialis</i>	PAKAIHI I TE MOANA / French Polynesia	08°56,01'S, 140°01,7'W; 60-76m.	pending
IM-2013-40089	CONO2008-17	<i>Conus</i>	<i>imperialis</i>	PAKAIHI I TE MOANA / French Polynesia	09°23,714'S, 140°07,759'W; 5-22m.	pending
IM-2013-40092	CONO2009-17	<i>Conus</i>	<i>tessulatus</i>	PAKAIHI I TE MOANA / French Polynesia	09°59,98'S, 139°07,83'W; 27-35m.	pending
IM-2013-44602	CONO1812-15	<i>Profundiconus</i>	<i>teramachii</i>	NanHai 2014 / Taiwan	20°01'N, 115°02'E; 700-723m.	KT874753
IM-2013-46875	CONO2030-17	<i>Conus</i>	<i>miliaris</i>	KAVIENG 2014 / Papua New Guinea	02°35,2'S, 150°46,2'E; 6m.	pending
IM-2013-46878	CONO2031-17	<i>Conus</i>	<i>eburneus</i>	KAVIENG 2014 / Papua New Guinea	02°36,3'S, 150°46,2'E; 3-12m.	pending
IM-2013-46887	CONO2032-17	<i>Conus</i>	<i>eburneus</i>	KAVIENG 2014 / Papua New Guinea	02°36,3'S, 150°46,2'E; 3-12m.	pending
IM-2013-46951	CONO2053-17	<i>Conus</i>	<i>textile</i>	KAVIENG 2014 / Papua New Guinea	02°34,1'S, 150°46,6'E; 5-23m.	pending
IM-2013-47267	CONO2033-17	<i>Conus</i>	<i>sponsalis</i>	KAVIENG 2014 / Papua New Guinea	02°33,9'S, 150°46,7'E; 8-10m.	pending
IM-2013-47282	CONO2034-17	<i>Conus</i>	<i>eburneus</i>	KAVIENG 2014 / Papua New Guinea	02°36,3'S, 150°46,3'E	pending
IM-2013-47729	CONO2037-17	<i>Conus</i>	<i>textile</i>	KAVIENG 2014 / Papua New Guinea	02°35,1'S, 150°47,3'E; 10m.	pending
IM-2013-47801	CONO2042-17	<i>Conus</i>	<i>textile</i>	KAVIENG 2014 / Papua New Guinea	02°41,2'S, 150°41,4'E; 3-12m.	pending
IM-2013-47808	CONO2043-17	<i>Conus</i>	<i>eburneus</i>	KAVIENG 2014 / Papua New Guinea	02°35,5'S, 150°47,2'E; 6m.	pending
IM-2013-50735	CONO2044-17	<i>Conus</i>	<i>imperialis</i>	KAVIENG 2014 / Papua New Guinea	02°34,6'S, 150°46,3'E; 10-22m.	pending
IM-2013-50775	CONO2045-17	<i>Conus</i>	<i>achatinus</i>	KAVIENG 2014 / Papua New Guinea	02°40,8'S, 150°42,7'E; 4-7m.	pending
IM-2013-50779	CONO2046-17	<i>Conus</i>	<i>judaeus</i>	KAVIENG 2014 / Papua New Guinea	02°37,3'S, 150°40,4'E; 0-1m.	pending
IM-2013-51224	CONO2048-17	<i>Conus</i>	<i>tessulatus</i>	KAVIENG 2014 / Papua New Guinea	02°45,2'S, 150°43,4'E; 13-17m.	pending
IM-2013-51249	CONO2049-17	<i>Conus</i>	<i>textile</i>	KAVIENG 2014 / Papua New Guinea	02°42,3'S, 150°39,1'E; 7-10m.	pending
IM-2013-51250	CONO2050-17	<i>Conus</i>	<i>textile</i>	KAVIENG 2014 / Papua New Guinea	02°42,3'S, 150°39,1'E; 7-10m.	pending
IM-2013-51277	CONO2051-17	<i>Conus</i>	<i>imperialis</i>	KAVIENG 2014 / Papua New Guinea	02°41,7'S, 150°38,4'E; 3-19m.	pending

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IM-2013-51279	CONO2052-17	<i>Conus</i>	<i>imperialis</i>	KAVIENG 2014 / Papua New Guinea	02°41,7'S, 150°38,4'E; 3-19m.	pending
IM-2013-52135	CONO2022-17	<i>Conus</i>	<i>magnificus</i>	PAKAIHI I TE MOANA / French Polynesia	10°27,5'S, 138°40,3'W; 30m.	pending
IM-2013-52138	CONO2023-17	<i>Conus</i>	<i>quercinus</i>	PAKAIHI I TE MOANA / French Polynesia	08°56,4'S, 139°33,3'W; 20m.	pending
IM-2013-52145	CONO2024-17	<i>Conus</i>	<i>imperialis</i>	Tuhaa Pae 2013 / Marquesas Islands	22°38'S, 152°48,2'W; 15m.	pending
IM-2013-52154	CONO2025-17	<i>Conus</i>	<i>textile</i>	Tuhaa Pae 2013 / Marquesas Islands	27°34,1'S, 144°21,1'W; 8m.	pending
IM-2013-52155	CONO2026-17	<i>Conus</i>	<i>textile</i>	Tuhaa Pae 2013 / Marquesas Islands	23°50,7'S, 147°41,2'W; 6m.	pending
IM-2013-52158	CONO2027-17	<i>Conus</i>	<i>tessulatus</i>	Tuhaa Pae 2013 / Marquesas Islands	21°48,2'S, 154°43,2'W; 26m.	pending
IM-2013-52159	CONO2028-17	<i>Conus</i>	<i>coronatus</i>	Tuhaa Pae 2013 / Marquesas Islands	22°38'S, 152°48,2'W; 15m.	pending
IM-2013-52166	CONO2029-17	<i>Conus</i>	<i>miliaris</i>	Tuhaa Pae 2013 / Marquesas Islands	23°50,7'S, 147°41,2'W; 6m.	pending
IM-2013-53789	CONO2035-17	<i>Conus</i>	<i>imperialis</i>	KAVIENG 2014 / Papua New Guinea	02°39,4'S, 150°43,5'E; 2-16m.	pending
IM-2013-53822	CONO2036-17	<i>Conus</i>	<i>acutangulus</i>	KAVIENG 2014 / Papua New Guinea	02°37,2'S, 150°31,7'E; 20-22m.	pending
IM-2013-53846	CONO2038-17	<i>Conus</i>	<i>terebra</i>	KAVIENG 2014 / Papua New Guinea	02°36,9'S, 150°44,4'E; 9m.	pending
IM-2013-54357	CONO2039-17	<i>Conus</i>	<i>chaldaeus</i>	KAVIENG 2014 / Papua New Guinea	02°36,8'S, 150°40,5'E; 0-1m.	pending
IM-2013-54361	CONO2040-17	<i>Conus</i>	<i>tessulatus</i>	KAVIENG 2014 / Papua New Guinea	02°39,5'S, 150°26,9'E; 5-18m.	pending
IM-2013-54369	CONO2041-17	<i>Conus</i>	<i>eburneus</i>	KAVIENG 2014 / Papua New Guinea	02°41,3'S, 150°45,7'E; 0-1m.	pending
IM-2013-54902	CONO2047-17	<i>Conus</i>	<i>imperialis</i>	KAVIENG 2014 / Papua New Guinea	02°38,4'S, 150°38,4'E; 5-24m.	pending
		<i>Conus</i>	<i>imperialis</i>			AY588186.1
		<i>Conus</i>	<i>textile</i>			AY588225.1
		<i>Conus</i>	<i>textile</i>			EU812758.1
		<i>Conus</i>	<i>achatinus</i>			FJ868109.1
		<i>Conus</i>	<i>consors</i>			FJ868115.1
		<i>Conus</i>	<i>magus</i>			FJ868118.1
		<i>Conus</i>	<i>achatinus</i>			FJ868120.1
		<i>Conus</i>	<i>tessulatus</i>			GU134377.1
		<i>Conus</i>	<i>imperialis</i>			GU134382.1
		<i>Conus</i>	<i>textile</i>			HQ834089.1
		<i>Conus</i>	<i>consors</i>			KF887950.1
		<i>Conus</i>	<i>achatinus</i>			KJ549854
		<i>Conus</i>	<i>bilosus</i>			KJ549870
		<i>Conus</i>	<i>catus</i>			KJ549884
		<i>Conus</i>	<i>consors</i>			KJ549890
		<i>Conus</i>	<i>eburneus</i>			KJ549901
		<i>Conus</i>	<i>eburneus</i>			KJ549902
		<i>Conus</i>	<i>imperialis</i>			KJ549924
		<i>Conus</i>	<i>pennaceus quasi-magnificus</i>			KJ549944
		<i>Conus</i>	<i>magus</i>			KJ549945
		<i>Conus</i>	<i>namocanus</i>			KJ549965
		<i>Conus</i>	<i>pennaceus</i>			KJ549970
		<i>Conus</i>	<i>tessulatus</i>			KJ549999
		<i>Conus</i>	<i>tessulatus</i>			KJ550000
		<i>Conus</i>	<i>textile</i>			KJ550001
		<i>Conus</i>	<i>textile</i>			KX155574.1
		<i>Conus</i>	<i>leviteni</i>	Hawaii		LC006942.1
		<i>Conus</i>	<i>textile</i>			NC008797.1
	ANGEN12315	<i>Conus</i>	<i>bilosus</i>	Gujarat, Veraval, India	22°54,6'N', 70°21'E; 1m	

Appendix 2. List of cone species sampled during the ATIMO VATAE expedition to South Madagascar. Extralimital records and number of specimens collected purchased from local fishermen (marked with +) not included. Segments of the bathymetric distribution based on empty shells only in parentheses. Species enumerated in the order they are treated in the Systematic Section.

GENUS	SPECIES	No. collecting events	No. specimens	Depth (m)	Hypothesized Status
<i>Profundiconus</i>					
	<i>neotorquatus</i>	4	10	(624)-821	
<i>Conasprella</i>					
	<i>articulata</i>	4	4	(26-74)	
	<i>somalica</i>	7	24	(88)-155-160-(203)	
	<i>elokismenos</i>	6	101	(123)-210-300	
	<i>lemuriana</i>	2	2	(80-155)	
	<i>longurionis</i>	1	1	(155-156)	pseudopopulation?
<i>Lilliconus</i>					
	<i>sagei</i>	26	44	(0)-22-(56)	
<i>Conus</i>					
	<i>archiepisopus</i>	52	86	0-16-(24)	
	<i>pseudocodonulli</i>	+	+	+	pseudopopulation?
	<i>praelatus</i>	2	6	4-6	endemic
	<i>vezoi</i>	5	9	(0-53)	endemic
	<i>betulinus</i>	1	1	4	pseudopopulation ?
	<i>figulinus</i>	4	9	(0-23)	pseudopopulation ?
	<i>medoci</i>	8	10	(14)-38-97	endemic
	<i>litteratus</i>	2	2	(4-65)	pseudopopulation ?
	<i>balteatus</i>	2	2	(16-18)	
	<i>distans</i>	3	4	10-160	
	<i>geographus</i>	2	2	(0-4)	
	<i>obscurus</i>	+	+	+	pseudopopulation ?
	<i>tulipa</i>	1	1	(84-88)	pseudopopulation ?
	<i>parvatus</i>	2	4	0	
	<i>nanus</i>	8	8	0-(11)	
	<i>sponsalis</i>	5	5	0-14	
	<i>nussatella</i>	2	2	(0-20)	
	<i>tenuistriatus</i>	1	1	(10)	pseudopopulation?
	<i>lischkeanus</i>	3	4	(61)-86-(187)	
	<i>lividus</i>	22	44	0-18-(22)	
	<i>muriculatus</i>	1	1	(16-18)	
	<i>quercinus</i>	2	2	(9)-84-88	
	<i>sanguinolentus</i>	7	10	0-23	
	<i>galeyi</i>	8	15	(77-250)	endemic
	<i>bonfiglioli</i>	2	3	(18-296)	endemic
	<i>lozeti</i>	16	37	(66)-90-148	endemic
	<i>madecassinus</i>	19	63	54-250	endemic
	<i>nimbosus</i>	7	7	(0)-21-22	
	<i>simonis</i>	1	1	16	
	<i>catus</i>	+	+	+	pseudopopulation?
	<i>gubernator</i>	3	5	18-37	
	<i>striatus</i>	1	1	9-10	pseudopopulation?
	<i>arenatus</i>	2	2	(8-106)	
	<i>zeylanicus</i>	3	3	(6-21)	
	<i>capitaneus</i>	1	1	(0)	pseudopopulation?
	<i>miles</i>	3	4	(14-19)	
	<i>namocanus</i>	5		(17)-56-80	
	<i>pertusus</i>	2	2	54-56-(117)	
	<i>rattus</i>	1	1	(29)	pseudopopulation?
	<i>vexillum</i>	3	3	(0-5)	
	<i>alconnelli</i>	1	1	113-135	
	<i>martensi</i>	5	10	(54-187)	
	<i>bilius</i>	7	20	0-(4)	
	<i>fuscatus</i>	3	3	(12)-86-87	
	<i>augur</i>	4	4	(0-18)	
	<i>litoglyphus</i>	1	1	(65-66)	pseudopopulation?
	<i>maldivus</i>	2	2	(7-74)	
	<i>varius</i>	2	2	(19-20)	
	<i>striatellus</i>	4	4	1-10-(20)	
	<i>tessulatus</i>	1	1	4-7	
	<i>bullatus</i>	1	1	(117-118)	
	<i>chiapponorum</i>	5	7	(12-106)	endemic
	<i>cymbioides</i>	30	57	(25-307)	endemic
	<i>dusaveli</i>	2	2	(56-80)	
	<i>solangeae</i>	13	30	(18-296)	endemic
	<i>acutangulus</i>	3	5	65-88	
	<i>aequiquadratus</i>	1	1	(187-209)	
	<i>berdulinus</i>	2	2	(98-187)	
	<i>flavidus</i>	1	1	(0)	pseudopopulation?
	<i>frigidus</i>	1	1	0	
	<i>moreleti</i>	3	3	0-(15)	
	<i>terebra</i>	12	15	(0)-5-16-(19)	
	<i>virgo</i>	3	3	(18)-65-66	
	<i>chaldaeus</i>	2	2	0	
	<i>coronatus</i>	37	142	0-12	
	<i>ebraeus</i>	17	60	0-3	
	<i>judaus</i>	1	1	0	
	<i>miliaris</i>	4	5	0-(1)	



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