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The extensive Indo-Pacific deep-water radiation of *Vermeijius* Kantor, Fedosov, Snyder & Bouchet, 2018 (Buccinoidea: Fasciolaridae), revealed by molecular data, with descriptions of new species

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Abstract. An integrative taxonomy approach of the Indo-Pacific deep-water genus *Vermeijius* Kantor, Fedosov, M.A. Snyder & Bouchet, 2018 (Neogastropoda: Buccinoidea: Fasciolaridae) revealed a significant radiation, with molecular (*cox1* barcode fragment) and morphological data supporting species delimitation and the status of the genus. A total of 40 species is recognized, of which 27 are described as new, namely *V. abditus* sp. nov., *V. admirabilis* sp. nov., *V. albulus* sp. nov., *V. antea* sp. nov., *V. atimovatae* sp. nov., *V. bellatulus* sp. nov., *V. brevicostatus* sp. nov., *V. celatus* sp. nov., *V. chinoi* sp. nov., *V. comorensis* sp. nov., *V. corbariae* sp. nov., *V. costuliferus* sp. nov., *V. cracens* sp. nov., *V. fijiensis* sp. nov., *V. geminatus* sp. nov., *V. macdonaldensis* sp. nov., *V. mainbaza* sp. nov., *V. malampaensis* sp. nov., *V. miriky* sp. nov., *V. papuaensis* sp. nov., *V. pauxillus* sp. nov., *V. putillus* sp. nov., *V. sayaensis* sp. nov., *V. snyderi* sp. nov., *V. spectabilis* sp. nov., *V. tarasoc* sp. nov., and *V. tashiensis* sp. nov. Five new combinations are established: *Vermeijius aikenii* (Lussi, 2014), *V. alcyoneum* (Hadorn & Fraussen, 2006), *V. brinkae* (Lussi, 1996), *V. inglorius* (Hadorn & Fraussen, 2006), and *V. thielei* (Schepman, 1911). The radula is variable interspecifically and not genus specific, and is similar to those of other genera, e.g., *Granulifusus* Kuroda & T. Habe, 1954 and *Amiantofusus* Fraussen, Kantor & Hadorn, 2007. The genus is confined, with few exceptions, to the upper bathyal zone, occurring at depths between 80 and 1200 m, with most records from 300–800 m. The highest species richness (10 species) was recorded in Madagascar and the Mozambique Channel, followed by New Caledonia (8 species), Papua New Guinea and the Solomon Islands (6 species). This pattern likely reflects more intensive sampling of the upper bathyal zone in these regions compared to other parts of the Indo-Pacific.

Keywords. Gastropoda, Neogastropoda, Fasciolaridae, *Vermeijius*, integrative taxonomy, *cox1*, new species, radular morphology.

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Introduction

The genus *Vermeijius* Kantor, Fedosov, Snyder & Bouchet, 2018 (Fascioliariidae J.E. Gray, 1853) represents a diverse group of deep-water gastropods distributed throughout the Indo-Pacific region. Established on molecular and morphological grounds (Kantor *et al.* 2018), the genus initially included only six species. Species of *Vermeijius* primarily inhabit the upper bathyal zone, occurring at depths of approximately 80–1200 m, most commonly between 300 and 800 m, and show centers of diversity in the western Indian Ocean (notably Madagascar and the Mozambique Channel) and the western Pacific (e.g., New Caledonia, Papua New Guinea, and the Solomon Islands).

Prior to the establishment of the genus, species currently attributed to *Vermeijius* had been placed in several other fascioliariid genera, particularly *Fusinus* Rafinesque, 1815, *Pseudolatirus* Bellardi, 1884, *Fusolatirus* Kuroda & Habe, 1971, and *Latirus* Montfort, 1810, reflecting their previously uncertain phylogenetic affinities and the extent of morphological convergence within the group.

Little is known about the biology of *Vermeijius* species; like other neogastropods, they are presumed to be predatory, and their radula shows considerable interspecific variability without clear genus-specific features.

This study applies an integrative taxonomy approach, based on DNA sequences, morphological data, geographic and bathymetric distributions, and ecological data, to nearly 1300 specimens, among which 94 *Vermeijius* sequences were included, most obtained during major deep-sea expeditions led by the Muséum national d'Histoire naturelle (MNHN) as part of the Tropical Deep-Sea Benthos and La Planète Revisitée programs. Particular emphasis was placed on verifying the diagnostic value of morphological traits in light of molecular-based species partitions.

For each delimited species, including 27 new species, diagnoses, type localities, and distributions are revised (Supp. file 2). These results substantially improve our systematic knowledge of Indo-Pacific Fascioliariidae and provide a framework for future taxonomic and biodiversity studies in deep-water gastropods.

Material and methods

Sampling

As part of the MNHN ongoing systematic DNA barcoding of the neogastropod collection, a large number of Fascioliariidae specimens has been sequenced for the barcode fragment of the *cox1* gene. The resulting phylogenetic tree (not shown) revealed a clade including all the species currently recognised as belonging to the genus *Vermeijius* (following Kantor *et al.* 2018 and Hadorn & Fraussen 2024), plus a number of unidentified species. All these specimens included in the *Vermeijius* clade were thus included in the present analysis. They were collected during MNHN expeditions, as part of the Tropical Deep-Sea Benthos and La Planète Revisitée expeditions programs (Supp. file 1; expeditions.mnhn.fr; see also the Acknowledgement section for more details). Specimens were either anaesthetised with isotonic magnesium chloride solution or processed using a microwave oven (Galindo *et al.* 2014), and subsequently tissue-clipped, with the tissue preserved in 95% alcohol. All data of the sequenced specimens were uploaded to BOLD, and the corresponding sequences were also uploaded to GenBank (Supp. file 1).

Additionally, non-sequenced specimens were identified as belonging to *Vermeijius*, based on morphological examination, and included in this study. In total, nearly 1300 specimens were examined and assigned to species, originating from various MNHN expeditions conducted since 1972 (see Acknowledgements section). Additional material from various museums (AMS, ANSP, NMNS, NSMT, OSA, QM, and ZMB), private collections (KF, MC), as well as specimens obtained as by-catch from commercial fisheries or collected by shell collectors and stored in the NMBE (Hadorn Coll.), was examined.

Unless otherwise indicated, material from the MNHN expeditions is deposited in the collections of the MNHN. Bathymetric ranges are provided for each species, considering all the material and live-collected specimens (when applicable), and are reported as inner values of the shallowest and deepest stations as explained in Bouchet *et al.* (2008).

Base map data were obtained from Natural Earth (public domain). Maps were generated using QGIS ver. 3.40.15-Bratislava ((QGIS Development Team 2026). Geographical and bathymetric distribution maps are based exclusively on the examined material. For bathymetric visualization, reported depth ranges were averaged to obtain a single representative depth value per lot. These values were subsequently rounded down to the nearest 50 m interval for display. The total number of specimens was calculated by summing the specimens per lot. Lots lacking depth information were excluded from bathymetric analyses.

DNA sequencing

DNA was extracted using an epMotion 5075 robot (Eppendorf), following the manufacturer's recommendations. The barcode fragment (658 bp) of the mitochondrial *cox1* gene was amplified using the universal primers LCO1490/HCO2198 (Folmer *et al.* 1994). Polymerase chain reactions (PCRs) were performed using a previously established protocol (Puillandre *et al.* 2017). The PCR products were purified and sequenced by the Eurofins sequencing facility. In some cases, when PCR with the Folmer primers failed, the barcode fragment was amplified in two separate PCR reactions, using internal primers, followed by a library preparation with a double-indexing and sequenced on a Illumina Miseq 2×300 V3 platform at the ICM (Institut du Cerveau et de la Moëlle épinière, Paris, France), as detailed in Puillandre *et al.* (2025).

Species delimitation

In the absence of indels, the *cox1* sequences were aligned manually. The web version (<https://bioinfo.mnhn.fr/abi/public/asap/>) of the ASAP method (Assemble Species by Automatic Partitioning, Puillandre *et al.* 2021), with default parameters, was used to define primary species hypotheses (PSHs). ASAP screens all the genetic distances calculated among all pairs of sequences, from the lowest to the highest, and merges sequences into 'groups' that are successively further merged until all sequences form a single group. At each merging step, the partition is evaluated and given a score. At the end of the analyses, the 10 partitions with the lowest scores are provided (the lower the ASAP-score, the better the partition).

Genetic p-distances among PSHs were calculated using MEGA 7 (Tamura *et al.* 2013).

A phylogenetic tree (Fig. 1) was reconstructed to check whether the PSHs proposed by ASAP corresponded to clades or not, and to test the monophyly of the genus *Vermeijius*. The phylogenetic tree was reconstructed using the *cox1* alignment of *Vermeijius* sequences, plus one sequence of *Busycon carica* (Gmelin, 1791) (Busyconidae) used as a distant outgroup to root the tree, and representatives of the Fascioliariidae genera diversity, including representatives of *Chryseofusus* Hadorn & Fraussen, 2003, identified as a potential sister-genus to *Vermeijius* in Kantor *et al.* (2018) (Supp. file 1). A Bayesian Approach (BA) was performed using MrBayes ver. 3.2. (Ronquist *et al.* 2012), with two parallel analyses

consisting each of 4 Markov chains for 10 000 000 generations with 2 swaps at each generation, a sampling frequency of one tree each 5000 generations, a chain temperature of 0.02 and the parameters of the substitution model estimated during the analysis. A substitution model with six substitution categories, a gamma-distributed rate variation across sites approximated in four discrete categories and a proportion of invariable sites was used for each codon position independently. Convergence of each analysis was evaluated using Tracer ver. 1.4.1 (Rambaut & Drummond 2014) by checking that ESS values all exceeded 200, and a consensus tree was reconstructed after removing trees from the burn-in phase (first 25% of the trees).

The robustness of the PSHs proposed by ASAP was also evaluated by checking whether they were conchologically and anatomically diagnosable, and whether they were geographically and/or bathymetrically isolated. We also inferred the dispersal abilities of the species by determining the protoconch type, a paucispiral protoconch indicating limited dispersal abilities and a multispiral protoconch indicating higher dispersal abilities. We thus converted the PSHs into secondary species hypotheses (SSHs), following the methodology described in Puillandre *et al.* (2012).

We attempted to identify a DNA-based diagnose for all proposed SSHs, by running MOLD (Fedosov *et al.* 2022) with default parameters on the *Vermeijius cox1* alignment.

Morphological studies

In addition to the normal convex or carinated whorls, the genus *Vermeijius* contains numerous species with a special whorl shape, which can be described as a ‘symmetrical trapezoid with chamfered edges’. Essentially, it is a symmetrical trapezoid where the corners of the parallel sides are rounded or bevelled.

Shells were categorised as: small (shell length [SL] <20 mm), medium-sized (20–40 mm), large (>40–60 mm), and very large (SL >60 mm).

The number of whorls of the protoconch was counted according to Bouchet & Kantor (2004). Radulae from both preserved specimens and dried specimens with bodies were prepared by standard methods (Kantor & Puillandre 2012) and examined by scanning electron microscopy (TeScan TS5130MM) at the Institute of Ecology and Evolution of the Russian Academy of Sciences (IEE RAS).

Abbreviations

AL	=	aperture length
ASAP	=	Assemble Species by Automatic Partitioning
CC	=	(chalut à crevettes) shrimp trawl
CH	=	(chalut) trawl
CP	=	(chalut à perche) beam trawl
dd	=	empty shell(s)
DW	=	(drague Warén) Warén dredge
juv.	=	juvenile
lv	=	live-collected specimen(s)
PSH	=	primary species hypothesis
ShW	=	shell width
SL	=	shell length
spm	=	specimen (dd and/or lv)
SSH	=	secondary species hypothesis
stn	=	station

Repositories

AMS	=	Australian Museum, Sydney, New South Wales, Australia
ANSP	=	Academy of Natural Sciences of Drexel University, Philadelphia, USA
KF	=	Koen Fraussen collection, Belgium
MC	=	Mitsuo Chino collection, Japan
ML	=	Markus Lussi collection, South Africa
MNHN	=	Muséum national d'Histoire naturelle, Paris, France
MZB	=	Museum Zoologicum Bogoriense, Cibinong, Indonesia
NMBE	=	Naturhistorisches Museum, Bern, Switzerland
NMNS	=	National Museum of Natural Science, Taichung, Taiwan
NMSA	=	Natal Museum, Pietermaritzburg, South Africa
NRM	=	Swedish Museum of Natural History, Stockholm, Sweden
NSMT	=	National Museum of Nature and Science, Tokyo, Japan
OSA	=	Osaka Museum of Natural History, Osaka, Japan
QM	=	Queensland Museum, Brisbane, Queensland, Australia
RA	=	Roy Aiken collection, South Africa
RBINS	=	Royal Belgian Institute of Natural Sciences, Brussels, Belgium
RH	=	Roland Hadorn collection, Switzerland (in NMBE)
UMUT	=	University Museum, University of Tokyo, Tokyo, Japan
ZMA	=	Zoologisch Museum Amsterdam (Naturalis Biodiversity Center), Amsterdam, The Netherlands
ZMB	=	Museum für Naturkunde, Berlin, Germany
ZSI	=	Zoological Survey of India, Kolkata, India

Results

Species delimitation

All the species considered here are grouped together into a supported clade (Posterior Probabilities – PP=1), sister to *Chryseofusus*. They are all attributed to the genus *Vermeijius*.

The ASAP analysis resulted in several partitions with various numbers of PSHs (Fig. 1). For clarity, we will not discuss the partitions with unrealistic numbers of species, in total contradiction with the morphological variability, and we will only discuss the most and less inclusive partitions among the realistic ones, ranging from 8 to 16 PSHs. All the PSHs correspond to clades in the phylogenetic tree (except PSH 12 – see below), with high statistical support (PP > 0.97), except for PSH 7 (PP=0.79) and PSH10 (PP=0.52).

In all the partitions, the PSHs 1, 4, 5, and 8 are recovered. They are all morphologically diagnosable (see Taxonomy section below). The PSHs 4 and 5, sister groups in the phylogenetic tree, are referable to *V. virginiae* (Hadorn & Fraussen, 2002) and *V. pallidus* (Kuroda & Habe, 1961), respectively. Both are found in a very similar depth range, but *V. virginiae* is restricted to the Indian Ocean, and *V. pallidus* to the Western Pacific. Both have multispiral protoconchs, suggesting large dispersal abilities. These two allopatric PSHs maintain a genetic differentiation despite high dispersal abilities, a pattern that tends to support the presence of two separate species. We thus turned these two PSHs into two SSHs. Furthermore, because they correspond to already described species, we preserve nomenclatural stability. The PSHs 1 and 8, not closely related phylogenetically, are more localized geographically (Solomon Islands and New Caledonia, respectively), in agreement with their non planktotrophic development as indicated by the paucispiral protoconchs. We confirm them as two SSHs. No names were available, and they are described as two new species, *V. admirabilis* sp. nov. and *V. bellatulus* sp. nov.

The PSHs 2 and 3 are recovered as a single PSH in the more inclusive partition, but separated into two PSHs in the less inclusive partition. They are sister lineages in the phylogenetic tree, and both have been collected in the Philippines, at overlapping depth ranges, although their known distribution ranges are not strictly overlapping. However, because they are morphologically diagnosable and separated by relatively high genetic p-distances (3.5–3.6%), we turned these two PSHs into two SSHs, for which no name was available, and they are thus described as two new species, *V. snyderi* sp. nov. and *V. celatus* sp. nov.

Similar to the PSHs 2 and 3, the PSHs 6 and 7 are either recovered as a single PSH or as two distinct PSHs, and are sister groups in the phylogenetic tree. PSH 6 is restricted to French Polynesia, and PSH 7 is found in Papua New Guinea, Solomon Islands, Vanuatu and New Caledonia. They are thus allopatric, in agreement with their non planktotrophic development. In addition, they are morphologically clearly different and with relatively high genetic p-distances (2.5–3.1%). We thus convert them into two distinct SSHs. No name was available, and both are described as new species: *V. tarasoc* sp. nov. and *V. spectabilis* sp. nov., respectively.

The remaining PSHs, from PSHs 9 to 16, are grouped into a single PSH in the most inclusive partition. However, this is in clear disagreement with the morphological characters and geographic distributions, and we will thus refer to the less inclusive partition to convert the PSHs into SSHs.

PSH 9 includes only one specimen, with an incomplete shell, and following a conservative approach, we decided to consider it as conspecific with the specimens of the PSH 10, collected in the same area, and sister to PSH 9 in the phylogenetic tree. We thus convert the PSHs 9 and 10 into a single SSH, for which the name *V. alcyoneum* (Hadorn & Fraussen, 2006) is available.

The PSH 11 includes a single specimen from New Caledonia, clearly isolated in the phylogenetic tree, and morphologically distinguishable from the other species. We thus converted it into an SSH, which is described as new: *V. abditus* sp. nov.

The PSH 12 is not recovered as monophyletic, but is split into two clades, the second one being more closely related to the PSH 13. All of these three clades (the PSH 13, and the two clades within the PSH 12) include specimens with paucispiral protoconchs, and their distributions are allopatric (Papua New Guinea for PSH 13, and Taiwan vs Indian Ocean for the two clades within PSH 12, respectively). These three clades are morphologically distinct and separated by relatively high genetic distances (1.8–3.8%). We thus decided to turn these two PSHs into three SSHs, for which names are available for two of them: the two SSHs within the PSH 12 are referred to as *V. retiarius* (von Martens, 1901) and *V. inglorius* (Hadorn & Fraussen, 2006). The PSH 13 is described as a new species: *V. albulus* sp. nov.

The PSHs 14, 15 and 16 are grouped together into a single clade, within which the PSHs 15 and 16, each including several specimens, are reciprocally monophyletic. Again, all these specimens have a paucispiral protoconch, and the three PSHs have an allopatric distribution. In this case, an allopatric distribution could suggest both the presence of three different species or of a single species with three structured populations. However, the three groups are separated by relatively high genetic distances (1.8–2.9%) and are morphologically different, and we thus decided to convert them into three SSHs, two described as new species (*V. cracens* sp. nov. for PSH 14 and *V. atimovatae* sp. nov. for PSH 15), and one for which a name is available (*V. insperatus* Hadorn & Fraussen, 2024 for PSH 16).

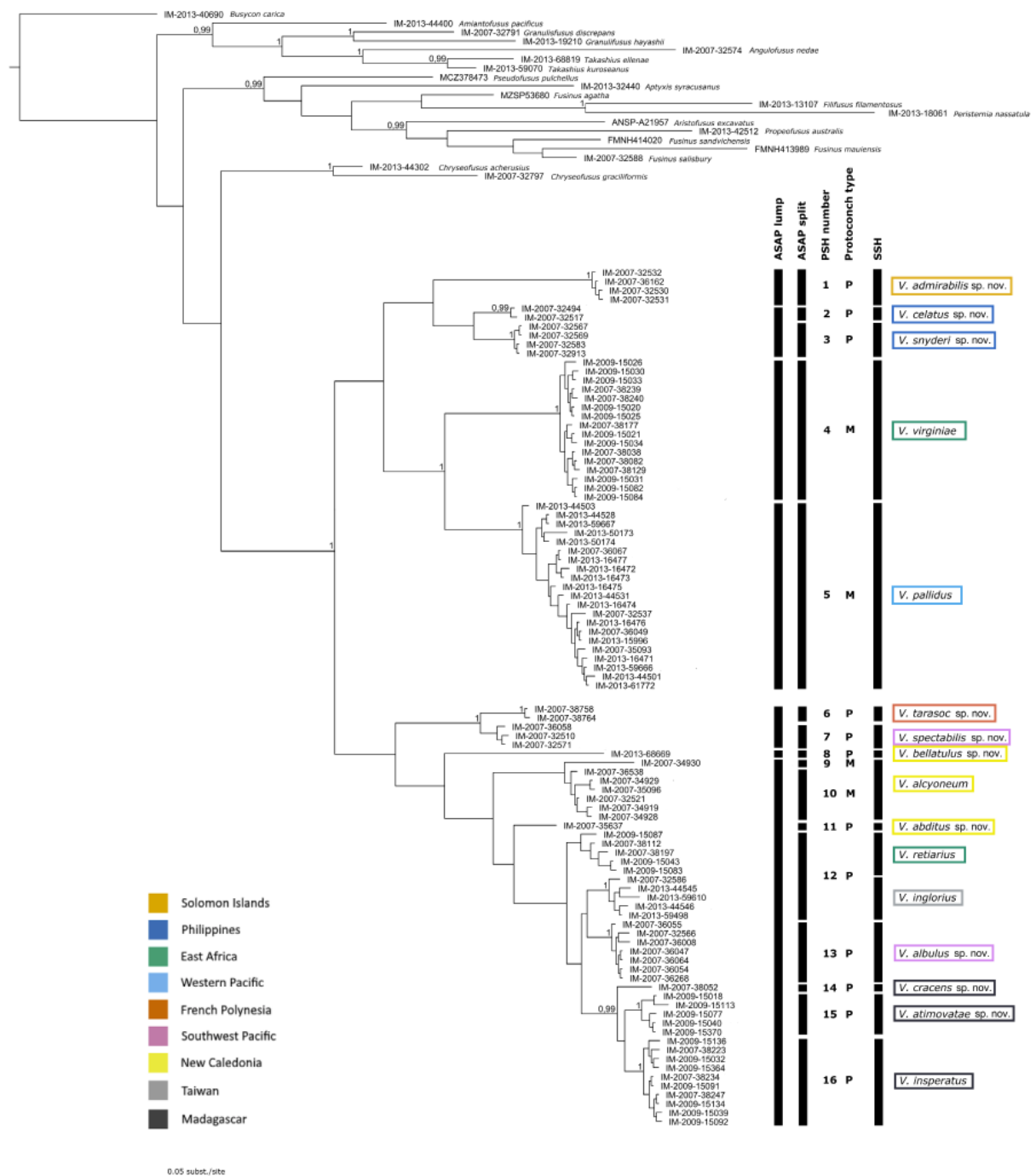


Fig. 1. Bayesian phylogenetic tree obtained with the *cox1* dataset. Posterior probabilities (when >0.98) are shown for each PSH and deeper nodes. PSHs (corresponding to the most and less inclusive ASAP partitions) and SSHs are figured as black boxes in front of the tree; PSH number, Protoconch type (M = multispiral; P = paucispiral) and final species names are also provided.

Taxonomy

Class Gastropoda Cuvier, 1795
Subclass Caenogastropoda Cox, 1960
Order Neogastropoda Wenz, 1938
Superfamily Buccinoidea Rafinesque, 1815
Family Fasciolariidae Gray, 1853
Subfamily Fusininae Wrigley, 1927

Genus *Vermeijius* Kantor, Fedosov, M.A. Snyder & Bouchet, 2018

Type species

Pseudolatirus pallidus Kuroda & Habe in Habe, 1961 – accepted as *Vermeijius pallidus* (Kuroda & Habe in Habe, 1961) (type by original designation).

Diagnosis

Refer to Kantor *et al.* (2018: 45). Based on new findings, including molecular data, the diagnosis has been supplemented and expanded:

Shell small to medium-sized, adult size from 5.5 mm (*V. putillus* sp. nov.) to 76.5 mm (*V. admirabilis* sp. nov.), fusiform, strong but usually light, usually off-white but with some species having vivid reddish-brown spiral banding, with evenly convex to inflated, sometimes trapezoid teleoconch whorls, constricted shell base and short to moderately long, straight or weakly sinuous siphonal canal. Protoconch paucispiral or multispiral (1.75–3.5 whorls). Axial sculpture consisting of distinct ribs, often nearly coaxial, separated by broader (1–2 times as wide as the ribs) interspaces. Spiral sculpture consisting of distinct cords, unequal in size, covering the entire shell surface, major cords nodulose at intersections with axial ribs. Clearly visible axial growth lines intersecting with spiral sculpture create a delicate, net-like appearance. Aperture broad, oval, relatively small, with smooth columella (sometimes with a weak elongate ridge similar to a columellar plica). Usually with constriction at base of siphonal canal, often bearing calloused teeth on labral and/or parietal side. Parietal tooth present in most species. Umbilicus absent. Operculum spanning entire aperture, with terminal nucleus. Radula variable interspecifically, but rather stable intraspecifically. Lateral teeth with 4–8 closely spaced, slightly curved major cusps varying in size, and much smaller but distinct, innermost cusp. Outer anterior corner is attenuated and forms long distinct ‘handle’ directed anteriorly. This ‘handle’ is often overlaid by a subsequent tooth and sometimes cannot be seen in dorsal view of the radula (see, e.g., Fig. 79C–D). The outer profile of lateral teeth can be nearly straight to distinctly concave at transition to ‘handle’ and forms either an obtuse angle (Fig. 79A) or a more or less distinct small additional cusp (Fig. 80F, H). Central tooth small, variable in shape, from rectangular to trapezoid, short to long, with three cusps. Narrow but distinct transverse folds of membrane situated serially between rows of lateral teeth and which can fuse with the central teeth.

Differential diagnosis

Vermeijius differs from *Granulifusus* Kuroda & T. Habe, 1954 and *Takashius* Kantor, Fedosov, Snyder & Bouchet, 2022 [= syn. *Okutanius*] in its usually uniformly coloured light shell with smooth or nearly smooth columella, more abruptly constricted shell base, producing a relatively narrow canal. *Trophonofusus muricatoides* (Yokoyama, 1920), the type species of *Trophonofusus* Kuroda & Habe, 1971, was originally described from Pliocene deposits of the Miura Peninsula, west of Tokyo, Japan (Fig. 78). This species resembles some members of *Vermeijius* in shell morphology. Among the MNHN material from Taiwan, two specimens with a shell structure somewhat similar to that of *T. muricatoides* were found and are herein described as *Vermeijius tashiensis* sp. nov., unfortunately non-sequenced.

Vermeijius was clearly defined both molecularly and morphologically by Kantor *et al.* (2018), whereas this cannot be said for *Trophonofusus*. In *Trophonofusus*, the suture is deeper, giving the impression of more convex whorls, and the whorl translation rate (vertical shift) is higher, resulting in a distinctly different shell profile. *T. muricatoides* is known from a single specimen, making it impossible to assess intraspecific variability.

There is no justification for synonymising *Vermeijius* with *Trophonofusus*, which at best only superficially resembles the species described herein. Furthermore, no additional evidence is currently available that would support or refute such a synonymy. The species most similar to *Trophonofusus* is *V. tashiensis* sp. nov., a very similar form but it has not been sequenced. It remains possible that *tashiensis* could ultimately prove molecularly distinct from *Vermeijius*, in which case *Trophonofusus* could accommodate that clade. Nevertheless, retaining *Vermeijius* is, in the authors' opinion, the more logical choice for maintaining nomenclatural stability. Numerous cases of superficial shell similarity are well known.

Amiantofusus Fraussen, Kantor & Hadorn, 2007 was recovered as monophyletic in the analysis of Couto *et al.* (2016). It is morphologically similar to *Vermeijius*, but can be distinguished by its multispiral protoconch (in contrast to many species of *Vermeijius*), the distinctly short, axially bent siphonal canal, the often very weak and inconspicuous secondary and tertiary spiral sculpture, and the presence of a strong, broad varix behind the outer lip (present only in adult specimens). All known species are smaller than 45 mm in shell length (SL).

Chryseofusus Hadorn & Fraussen, 2003 is recovered as the sister taxon to *Vermeijius* in molecular phylogenetic analyses (Kantor *et al.* 2018). The radula of *Vermeijius* is also similar to that of *Chryseofusus* (Couto *et al.* 2016: fig. 38), sharing similarly shaped lateral teeth and a trapezoidal, relatively broad and short central tooth. Morphologically, however, *Chryseofusus* differs from *Vermeijius* by its generally much larger adult size and its usually thin, lightweight shell. The whorls are slightly convex, with a concave shoulder slope on the later whorls, sometimes weakly keeled, and the suture is indistinct. Strong axial ribs are present on the upper whorls, whereas axial sculpture on later whorls is typically weak or absent. The spiral sculpture is indistinct, close-set and regular, consisting of weak primary cords and intercalated fine threads, crossed by strong, closely spaced, curved axial growth lines, producing a characteristic linen-like surface texture. The protoconch is paucispiral. The columella is always completely smooth, and no teeth are present at the base of the siphonal canal on either the labral or parietal side.

Genus composition – included species

Already assigned to *Vermeijius* by Kantor *et al.* (2018: 45) and Hadorn & Fraussen (2024: 110–111, pl. 3 figs 1–7):

- *Vermeijius pallidus* (Kuroda & Habe, 1961) [Western Pacific]
- *Vermeijius virginiae* (Hadorn & Fraussen, 2002) [Mozambique Channel]
- *Vermeijius guidonis* (Delsaerdt, 1995) [Somalia to southwestern India]
- *Vermeijius retiarius* (von Martens, 1901) [East Africa to Sri Lanka]
- *Vermeijius insperatus* Hadorn & Fraussen, 2024 [western Madagascar]
- *Vermeijius palmarium* (Hadorn & Fraussen, 2006) [Queensland, Australia]
- *Vermeijius wallacei* (Hadorn & Fraussen, 2006) [Indonesia]

In addition to those previously assigned to the genus, we include the following sequenced species in *Vermeijius*:

- *Vermeijius alcyoneum* (Hadorn & Fraussen, 2006) comb. nov. [New Caledonia]
- *Vermeijius inglorius* (Hadorn & Fraussen, 2006) comb. nov. [Taiwan]
- *Vermeijius albulus* sp. nov. [Papua New Guinea and Solomon Islands]

- *Vermeijius abditus* sp. nov. [New Caledonia]
- *Vermeijius admirabilis* sp. nov. [Solomon Islands]
- *Vermeijius spectabilis* sp. nov. [Papua New Guinea to New Caledonia]
- *Vermeijius tarasoc* sp. nov. [French Polynesia]
- *Vermeijius bellatulus* sp. nov. [New Caledonia]
- *Vermeijius snyderi* sp. nov. [Philippines]
- *Vermeijius celatus* sp. nov. [Philippines]
- *Vermeijius cracens* sp. nov. [northwestern Madagascar]
- *Vermeijius atimovatae* sp. nov. [southeastern Madagascar]

Additionally, due to conchological similarities to sequenced species, we include the following, known only from unsequenced material or/and empty shells in *Vermeijius*:

- *Vermeijius brinkae* (Lussi, 1996) comb. nov. [southern Mozambique to South Africa]
- *Vermeijius aikeni* (Lussi, 2014) comb. nov. [South Africa]
- *Vermeijius thielei* (Schepman, 1911) comb. nov. [Indonesia]
- *Vermeijius papuaensis* sp. nov. [Papua New Guinea]
- *Vermeijius costuliferus* sp. nov. [Vanuatu]
- *Vermeijius tashiensis* sp. nov. [northwestern Taiwan]
- *Vermeijius geminatus* sp. nov. [Coral Sea, New Caledonia, Vanuatu, Tonga]
- *Vermeijius sayaensis* sp. nov. [Saya de Malha Bank to Madagascar]
- *Vermeijius pauxillus* sp. nov. [Papua New Guinea]
- *Vermeijius brevicostatus* sp. nov. [New Caledonia]
- *Vermeijius putillus* sp. nov. [Norfolk Ridge, New Caledonia]
- *Vermeijius miriky* sp. nov. [northwestern Madagascar]
- *Vermeijius* sp. [northwestern Madagascar]
- *Vermeijius mainbaza* sp. nov. [Mozambique]
- *Vermeijius comorensis* sp. nov. [Comoro Islands]
- *Vermeijius corbariae* sp. nov. [Glorieuses]
- *Vermeijius antea* sp. nov. [Glorieuses]
- *Vermeijius malampaensis* sp. nov. [Vanuatu to Papua New Guinea]
- *Vermeijius fijiensis* sp. nov. [Fiji]
- *Vermeijius chinoi* sp. nov. [Japan]
- *Vermeijius macdonaldensis* sp. nov. [Austral Islands]

***Vermeijius pallidus* (Kuroda & Habe, 1961)**

Figs 2A–G, 3, 79A, 82A, 85A

Pseudolatirus pallidus Kuroda & Habe in Habe, 1961: 66, pl. 33 fig. 9.

Latirus pallidus – Mallard & Robin 2005: pl. 47.

Pseudolatirus pallidus – Callomon & Snyder 2009: 167, fig. 20. — Mallard & Robin 2017: 154, figs 1, 4–5 [partim, not figs 2–3 = *Vermeijius snyderi*].

Vermeijius pallidus – Kantor *et al.* 2018: 45, figs 11a–e, 12a–b. — Callomon & Snyder 2019: 89, fig. 192. — Robin 2021: 282, 3rd row middle.

non *Fusinus pallidus* (Kuroda & Habe) – Kaicher 1978: card no 1778 [= *Vermeijius snyderi*].

non “*Fusinus*” *pallidus* (Kuroda & Habe, 1961) – Snyder & Callomon 2008: 84, pl. 337 fig. 1 [= *Vermeijius snyderi*].

non *Vermeijius pallidus* (Kuroda & Habe, 1961) – Sary & Pramod Kiran 2023: 76, fig. 2 [= *Vermeijius guidonis*].

Diagnosis

Shell large to very large for genus (up to 64 mm SL), solid, fusiform; base strongly constricted; siphonal canal long, nearly straight, slightly inclined to left. Protoconch obtusely conical (Figs 2G, 85A), of 3.25 whorls; whorls evenly convex, brown, smooth; last half-whorl with seven distinct, arcuate axial ribs; protoconch/teleoconch discontinuity distinct, marked by appearance of teleoconch spiral sculpture. Protoconch diameter ~1.2 mm; exposed height 1.1 mm. Teleoconch with strongly convex whorls. Aperture wide, oval; columellar plicae weak, corresponding to primary spiral cords overlaid by callus, ranging from nearly absent to 4–5 on lower half of columella. Spiral sculpture of unevenly arranged cords, alternating in strength, strongly nodulose at intersections with axial ribs. Axial ribs broadly spaced, narrow, not aligned along spire, 10–12 on last whorl. Axial growth lines usually thickened, forming reticulate structure at intersections with spiral cords. Background colour pale flesh to nearly white. Operculum elongate, leaf-shaped, nearly spanning entire aperture; nucleus terminal, often abraded.

DNA diagnosis

DNA diagnosis (based on 21 *cox1* sequences): ‘C’ in the site 49, ‘C’ in the site 163, ‘T’ in the site 283.

Material examined

Holotype or paratype

JAPAN • Kochi Prefecture, off Cape Ashizuri; specimen figured by Habe (1961: pl. 33 fig. 9). Callomon & Snyder (2009: 11, fig. 20a–b) discussed and illustrated a specimen labelled as type stored in NSMT (Mo 40378) and concluded that it does not match the size of the holotype (52.2 vs 56.8 mm for the latter according to the original description); that specimen may be a figured paratype (Figs 2A–B, 82A).

Sequenced material

NEW CALEDONIA • 1 lv; N New Caledonia, Grand Passage; 18°59′ S, 163°08′ E; depth 580–647 m; CONCALIS, stn CP2962; MNHN-IM-2007-35093.

PAPUA NEW GUINEA • 1 lv; Madang, E Malamal Passage; 5°07′ S, 145°50′ E; depth 527–539 m; PAPUA NIUGINI, stn CP3964; MNHN-IM-2013-15996 • 1 lv; W Rempi area; 5°00′ S, 145°50′ E; depth 505–521 m; PAPUA NIUGINI, stn CP3961; MNHN-IM-2013-16471 • 1 lv; same data as for preceding; MNHN-IM-2013-16472 • 1 lv; same data as for preceding; MNHN-IM-2013-16473 • 1 lv; same data as for preceding; MNHN-IM-2013-16474 • 1 lv; same data as for preceding; MNHN-IM-2013-16475 (Fig. 2C–D) • 1 lv; same data as for preceding; MNHN-IM-2013-16476 • 1 lv; same data as for preceding; MNHN-IM-2013-16477.

SOLOMON ISLANDS • 1 lv; W San Cristobal; 10°26′ S, 161°22′ E; depth 381–422 m; SALOMONBOA 3, stn CP2837; MNHN-IM-2007-36049 • 1 lv; same data as for preceding; MNHN-IM-2007-36067 • 1 lv; N Tetepare Island; 8°40′ S, 157°32′ E; depth 384–418 m; SALOMON 2, stn CP2290; MNHN-IM-2007-32537.

TAIWAN • 1 lv; continental slope; 20°02′ N, 114°09′ E; depth 333–421 m; NanHai 2014, stn CP4117; MNHN-IM-2013-44501 • 1 lv; same data as for preceding; MNHN-IM-2013-44503 • 1 lv; same data as for preceding; MNHN-IM-2013-44528 • 1 lv; same data as for preceding; MNHN-IM-2013-44531 • 1 lv; 19°53′ N, 114°25′ E; depth 524–536 m; ZhongSha 2015, stn CP4137; MNHN-IM-2013-61772 • 1 lv; Pratas Island; 20°42′ N, 116°08′ E; depth 420–444 m; DongSha 2014, stn CP4128; MNHN-IM-2013-50173 • 1 lv; same data as for preceding; MNHN-IM-2013-50174 • 1 lv; N Macclesfield Bank; 16°15′ N, 114°34′ E; depth 321–326 m; ZhongSha 2015, stn CP4154; MNHN-IM-2013-59666 • 1 lv; same data as for preceding; MNHN-IM-2013-59667 (Figs 2E–G, 85A).

Other material

AUSTRALIA • 1 lv; Western Australia, 300 km W of Port Hedland; depth 450–500 m; from commercial trawlers; NMBE MOLL-0584202.

FIJI • 1 lv; Bligh Water; 16°58' S, 177°58' E; depth 797–799 m; MUSORSTOM 10, stn CC1336; MNHN-IM-2023-1128.

NEW CALEDONIA • 1 lv; N New Caledonia, Grand Passage; 18°58' S, 163°10' E; depth 558–566 m; BATHUS 4, stn CP911; MNHN-IM-2023-1145 • 1 dd; SE New Caledonia, off Passe de Yaté; 22°02' S, 167°09' E; depth 523–560 m; EXBODI, stn CP3831; MNHN-IM-2023-1129 • 2 dd; off Toupeti; 21°44' S, 166°38' E; depth 387–688 m; EXBODI, stn CP3811; MNHN-IM-2023-1140 • 1 dd; Passe de Kouakoué-Canyon; 21°53' S, 166°50' E; depth 211–440 m; EXBODI, stn CP3821; MNHN-IM-2023-1139.

PAPUA NEW GUINEA • 1 lv; East Sepik, W of Kairiru Island; 3°18' S, 143°27' E; depth 495–510 m; PAPUA NIUGINI, stn CP4050; MNHN-IM-2023-1150 • 1 dd juv.; Astrolabe Bay, Madang; 5°22' S, 145°48' E; depth 372–384 m; BIOPAPUA, stn CP3710; MNHN-IM-2023-1131 • 2 lv, 3 dd; E Malamal Passage; 5°07' S, 145°50' E; depth 527–539 m; PAPUA NIUGINI, stn CP3964; MNHN-IM-2023-1154 • 3 lv; N of Bagabag Island; 4°44' S, 146°11' E; depth 540–580 m; PAPUA NIUGINI, stn CP3979; MNHN-IM-2023-1141 • 5 lv; 4°44' S, 146°12' E; depth 480–490 m; PAPUA NIUGINI, stn DW3977; MNHN-IM-2023-1153 • 12 lv, 6 dd; 4°59' S, 145°50' E; depth 400–466 m; BIOPAPUA, stn CP3707; MNHN-IM-2023-1135 • 32 lv; 4°58' S, 145°50' E; depth 502–529 m; BIOPAPUA, stn CP3708; MNHN-IM-2023-1155 • 3 dd; W Rempi area; 4°59' S, 145°51' E; depth 598–614 m; PAPUA NIUGINI, stn CP3962; MNHN-IM-2023-1142 • 1 lv; SE Manus Island; 2°11' S, 147°18' E; depth 499–517 m; BIOPAPUA, stn CP3691; MNHN-IM-2023-1132 • 2 lv; Huon Gulf, S Lae, Morobe; 7°27' S, 147°31' E; depth 462–495 m; BIOPAPUA, stn CP3636; MNHN-IM-2023-1156 • 1 dd; Vititaz Strait; 6°03' S, 147°36' E; depth 410 m; BIOPAPUA, stn DW3719; MNHN-IM-2023-1136 • 1 dd; Huon Gulf, W Tami Island; 6°45' S, 147°49' E; depth 460–485 m; BIOPAPUA, stn CP3646; MNHN-IM-2023-1127 • 1 lv; New Britain, Dampier Strait, E of Umboi Island; 5°36' S, 148°13' E; depth 500–640 m; PAPUA NIUGINI, stn CP4012; MNHN-IM-2013-19937 • 1 dd; northern Province, off Mambare Bay; 7°52' S, 148°01' E; depth 498–501 m; BIOPAPUA, stn CP3728; MNHN-IM-2023-1138 • 1 lv; NE Sissano, Sandaun; 2°55' S, 142°11' E; depth 485–490 m; PAPUA NIUGINI, stn CP4057; MNHN-IM-2023-1146 • 20 lv; same data as for preceding; MNHN-IM-2023-1158 • 1 lv, 5 dd; 2°55' S, 142°11' E; depth 535–540 m; PAPUA NIUGINI, stn CP4058; MNHN-IM-2023-1148 • 19 lv; same data as for preceding; MNHN-IM-2023-1157 • 1 lv; SE of Tuam Island; 6°03' S, 148°08' E; depth 440–475 m; PAPUA NIUGINI, stn CP4006; MNHN-IM-2023-1147 • 1 dd; 6°04' S, 148°12' E; depth 550–575 m, PAPUA NIUGINI, stn CP4009; MNHN-IM-2023-1144.

SOLOMON ISLANDS • 1 dd juv.; Vella Gulf, Kolombangara Island; 8°04' S, 156°56' E; depth 399–427 m; SALOMON 2, stn CP2260; MNHN-IM-2023-1130 • 1 dd; E of Rendova Island; 8°41' S, 157°24' E; depth 248–253 m; SALOMON 2, stn CP2286; MNHN-IM-2023-1133 • 1 lv; W San Jorge Island, Santa Isabel Island; 8°24' S, 159°27' E; depth 362–432 m; SALOMON 2, stn CP2193; MNHN-IM-2007-32564.

TAIWAN • 1 dd; off Suao, NE Taiwan; 24°31' N, 122°06' E; depth 397–399 m; TAIWAN 2004, stn CP269; MNHN-IM-2023-1149 • 1 lv; 24°33' N, 122°02' E; depth 340–407 m; TAIWAN 2004, stn CP270; MNHN-IM-2023-1151 • 1 lv; continental slope; 20°02' N, 114°09' E; depth 333–421 m; NanHai 2014, stn CP4117; MNHN-IM-2013-44495 • 1 lv; same data as for preceding; MNHN-IM-2013-44506 • 1 lv; same data as for preceding; MNHN-IM-2023-1134 • 2 dd; same data as for preceding; MNHN-IM-2023-1137 • 4 lv, 2 dd; 19°53' N, 114°25' E; depth 524–536 m; ZhongSha 2015, stn CP4137; MNHN-IM-2023-1264 • 1 dd; N Macclesfield Bank; 16°14' N, 114°30' E; depth 318 m;

ZhongSha 2015, stn CP4153; MNHN-IM-2023-1266 • 1 lv, 1 dd; same data as for preceding; MNHN-IM-2023-1268 • 1 lv; 16°14' N, 114°31' E; depth 321–326 m; ZhongSha 2015, stn CP4154; MNHN-IM-2013-59334 • 2 lv; same data as for preceding; MNHN-IM-2023-1267 • 1 lv; NE Macclesfield Bank; 16°11' N, 115°00' E; depth 507–526 m; ZhongSha 2015, stn CP4155; MNHN-IM-2023-1265 • 1 lv; Pratas Island, 20°41' N, 116°48' E; depth 500–600 m; NMBE MOLL-0576874.



Fig. 2. A–G. *Vermeijius pallidus* (Kuroda & Habe, 1961). A–B. Figured paratype, NSMT-Mo 40378, Japan, Kochi Prefecture, off Cape Ashizuri, SL 52.2 mm (from Callomon & Snyder 2009). C–D. MNHN-IM-2013-16475, Papua New Guinea, Madang Province, PAPUA NIUGINI, stn CP3961, depth 505–521 m, SL 50.7 mm (sequenced). E–G. MNHN-IM-2013-59667, South China Sea, N Macclesfield Bank, ZhongSha 2015, stn CP4154, depth 321–326 m, SL 35.6 mm (sequenced). – H–L. *Vermeijius virginiae* (Hadorn & Fraussen, 2002). H–I. Holotype, MNHN-IM-2000-9626, SW Madagascar, Campagne Crevettière 1986, stn CH79, depth 525 m, SL 59.0 mm. J–L. MNHN-IM-2009-15025, SW Madagascar, ATIMO VATAE, stn CP3585, depth 549–576 m, SL 54.0 mm (sequenced). All shells at the same scale, except protoconchs.

VANUATU • 1 dd; W of Malo; 15°43' S, 167°04' E; depth 514–609 m; BOA 0, stn CP2329; MNHN-IM-2023-1152 • 1 dd; W of Malo; 15°43' S, 167°04' E; depth 309–402 m; BOA 1, stn CP2414; MNHN-IM-2023-1143.

Description

Measurements (holotype): SL 56.8 mm, ShW 18.7 mm.

Refer to Kantor *et al.* (2018).

Distribution

From Japan to the South China Sea and southwards to New Caledonia and Fiji, and northwest Australia (Fig. 3). Live-collected specimens recorded at depths of 326–580 m while empty or crabbed shells were found at depths between 253 and 598 m. One specimen (MNHN-IM-2023-1128) was recorded from Fiji at depths of 797–799 m. Although *V. pallidus* exhibits the widest distribution within the genus, no confirmed records exist from the Philippines.

Remarks

Selected as the type species of *Vermeijius* by Kantor *et al.* (2018: 45).

Specimens previously reported from the Philippines all represent *V. snyderi* sp. nov., for example: Snyder & Callomon (2008: 84, pl. 337 fig. 1) as “*Fusinus*” *pallidus*; Springsteen & Leobrera (1986: 178–180, pl. 48 fig. 11) as *Pseudolathyrus* sp.; Couto *et al.* (2016: fig. 6) as *Pseudolathyrus* aff. *pallidus*. Diagnostic differences are detailed under *V. snyderi*.

Vermeijius pallidus is somewhat similar to *V. virginiae*; distinguishing characters are given in the remarks for the latter species.

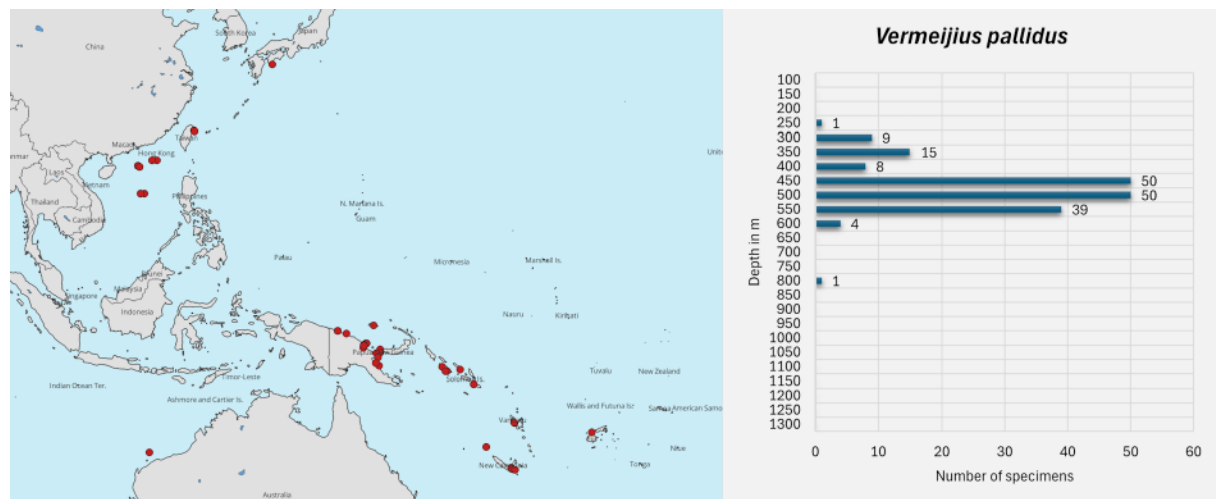


Fig. 3. Geographical and bathymetrical distribution of *Vermeijius pallidus* (Kuroda & Habe, 1961). Each column represents the number of specimens (lv or dd).

***Vermeijius virginiae* (Hadorn & Fraussen, 2002)**

Figs 2H–L, 4, 79B, 82B, 85B

Fusinus virginiae Hadorn & Fraussen, 2002: 70, 72, figs 15–19, 23.

Fusinus virginiae – Mallard & Robin 2005: pl. 33; 2017: 104. — Marais & Kilburn 2010: 124.

Vermeijius virginiae – Kantor *et al.* 2018: 49–50, figs 11f–j, 12c–d. — Robin 2021: 282, 4th row left.

Diagnosis

Shell large to very large for genus (up to 63 mm SL), strong, fusiform, with strongly constricted base and long, nearly straight siphonal canal, slightly inclined to left. Protoconch (Figs 2L, 85B) conical, of 2.25 moderately convex, smooth, greyish, semitransparent whorls, with elevated first whorl and 2–5 indistinct axial ribs at transition to teleoconch. Protoconch/teleoconch discontinuity distinct, marked by onset of teleoconch spiral sculpture. Protoconch diameter ~0.9–1.0 mm, exposed height 0.8 mm. Teleoconch with regularly strongly convex whorls. Aperture broad, oval; columella smooth or with 1–2 weak, inconspicuous plicae, corresponding to underlying spiral sculpture of preceding whorl. Spiral sculpture of unevenly spaced cords, alternating in strength, slightly nodulose at intersections with axial ribs. Axial growth lines usually thickened, forming reticulate structure at intersections with spiral cords. Axial ribs not aligned along spire, 9–11 on last whorl. Background colour pale flesh to nearly white. Operculum elongate, leaf-shaped, spanning nearly entire aperture; nucleus terminal.

DNA diagnosis

DNA diagnosis (based on 16 *cox1* sequences): ‘G’ in the site 4, ‘G’ in the site 25, ‘C’ in the site 235.

Material examined

Holotype

MADAGASCAR • 1v; Mozambique Channel, SW of Madagascar; 22°09′ S, 43°04′ E; depth 525 m; Campagne Crevetière 1986, stn CH79; MNHN-IM-2000-9626 (Figs 2H–I, 82B).

Sequenced material

MADAGASCAR • 1 lv; W Madagascar, off Narendry Bay; 14°30′ S, 47°27′ E; depth 274–325 m; MIRIKY, stn CP3241; MNHN-IM-2007-38239 • 1 lv; off Mahajamba Bay; 14°50′ S, 46°57′ E; depth 340–446 m; MIRIKY, stn CP3248; MNHN-IM-2007-38082 • 1 lv; same data as for preceding; MNHN-IM-2007-38177 • 1 lv; same data as for preceding; MNHN-IM-2007-38240 • 1 lv; W of Cap d’Ambre; 12°07′ S, 48°58′ E; depth 362–431 m; MIRIKY, stn DW3197; MNHN-IM-2007-38038 • 1 lv; same data as for preceding; MNHN-IM-2007-38129 • 1 lv; SW Madagascar, S of Pointe Barrow; 25°32′ S, 44°16′ E; depth 549–576 m; ATIMO VATAE, stn CP3585; MNHN-IM-2009-15020 • 1 lv; same data as for preceding; MNHN-IM-2009-15025 (Figs 2J–L, 85B) • 1 lv; same data as for preceding; MNHN-IM-2009-15026 • 1 lv; same data as for preceding; MNHN-IM-2009-15030 • 1 lv; same data as for preceding; MNHN-IM-2009-15031 • 1 lv; same data as for preceding; MNHN-IM-2009-15033 • 1 lv; same data as for preceding; MNHN-IM-2009-15034 • 1 lv; same data as for preceding; MNHN-IM-2009-15082 • 1 lv; SW of Pointe Barrow; 25°03′ S, 43°58′ E; depth 400–402 m; ATIMO VATAE, stn CP3591; MNHN-IM-2009-15021 • 1 lv; same data as for preceding; MNHN-IM-2009-15084.

Other material

COMORO ARCHIPELAGO • 1 dd; SE of Mayotte; 12°56′ S, 45°15′ E; depth 474–505 m; BIOMAGLO, stn DW4865; MNHN-IM-2023-1263.

MADAGASCAR • 68 lv, 11 dd; W Madagascar, off Majunga; 15°22′ S, 46°00′ E; depth 493–750 m; MIRIKY, stn CP3250; MNHN-IM-2023-1256 • 1 lv; between Majunga and Cap Saint-André; 15°34′ S,

45°44' E; depth 287–450 m; MIRIKY, stn CP3263; MNHN-IM-2023-1260 • 2 lv; 15°33' S, 45°44' E; depth 325–560 m; MIRIKY, stn CP3264; MNHN-IM-2023-1228 • 6 lv; 15°34' S, 45°43' E; depth 293–396 m; MIRIKY, stn CP3266; MNHN-IM-2023-1259 • 8 lv; 15°32' S, 45°43' E; depth 350–580 m; MIRIKY, stn CP3267; MNHN-IM-2023-1258 • 5 lv; between Nosy Be and Cap Saint-André, MIRIKY (defective labeling); MNHN-IM-2023-1254 • 5 lv; same data as for preceding; MNHN-IM-2023-1255 • 1 dd; W of Nosy Be; 13°27' S, 47°55' E; depth 187–247 m; MIRIKY, stn DW3234; MNHN-IM-2023-1262 • 1 dd juv.; between Nosy Be and Banc du Leven; 12°38' S, 48°14' E; depth 420–436 m; MIRIKY, stn CP3183; MNHN-IM-2023-1230 • 1 dd; off Narendry Bay; 14°30' S, 47°27' E; depth 251–257 m; MIRIKY, stn CP3240; MNHN-IM-2023-1236 • 4 lv; 14°29' S, 47°26' E; depth 332–379 m; MIRIKY, stn CP3289; MNHN-IM-2023-1238 • 13 lv, 1 dd; 14°29' S, 47°26' E; depth 409–425 m; MIRIKY, stn CP3290; MNHN-IM-2023-1239 • 6 lv; 14°27' S, 47°25' E; depth 347–448 m; MIRIKY, stn CP3291; MNHN-IM-2023-1240 • 2 lv; 14°30' S, 47°26' E; depth 268–408 m; MIRIKY, stn CP3293; MNHN-IM-2023-1231 • 1 lv; same data as for preceding; MNHN-IM-2023-1235 • 5 lv, 1 dd; 14°29' S, 47°27' E; depth 263–331 m; MIRIKY, stn CP3294; MNHN-IM-2023-1233 • 2 lv juv., 1 dd juv.; off Mahajamba Bay; 14°50' S, 47°00' E; depth 349–442 m; MIRIKY, stn CP3247; MNHN-IM-2023-1237 • 3 lv, 3 dd; 14°50' S, 46°57' E; depth 340–446 m; MIRIKY, stn CP3248; MNHN-IM-2023-1257 • 1 dd; 14°52' S, 46°56' E; depth 228–257 m; MIRIKY, stn CP3283; MNHN-IM-2023-1226 • 1 lv; 14°47' S, 46°58' E; depth 512–680 m; MIRIKY, stn CP3285; MNHN-IM-2023-1261 • 1 lv; off Majunga; 15°22' S, 46°00' E; depth 493–750 m; MIRIKY, stn CP3250; MNHN-IM-2007-38241 • 2 lv; 15°25' S, 45°57' E; depth 609–620 m; MIRIKY, stn CP3251; MNHN-IM-2023-1234 • 1 lv, 1 dd; SW Madagascar; 22°22' S, 43°03' E; depth 530 m; Campagne Crevetière 1986, stn CH76; MNHN-IM-2023-1232 • 1 dd; 22°19' S, 43°01' E; depth 735–765 m; N/O “Vauban”, stn CH108; MNHN-IM-2023-1227 • 12 lv, 4 dd; S of Pointe Barrow; 25°32' S, 44°16' E; depth 549–576 m; ATIMO VATAE, stn CP3585; MNHN-IM-2023-1229 • 9 lv; NW Madagascar, off Majunga; depth 300–400 m; from commercial trawlers; NMBE MOLL-0588919 • 1 dd; W Madagascar, off Morondava; depth 600–800 m; from commercial trawlers; NMBE MOLL-0576879.

Description

Measurements (holotype): SL 59.0 mm, ShW 19.8 mm.

Refer to Hadorn & Fraussen (2002) and Kantor *et al.* (2018).

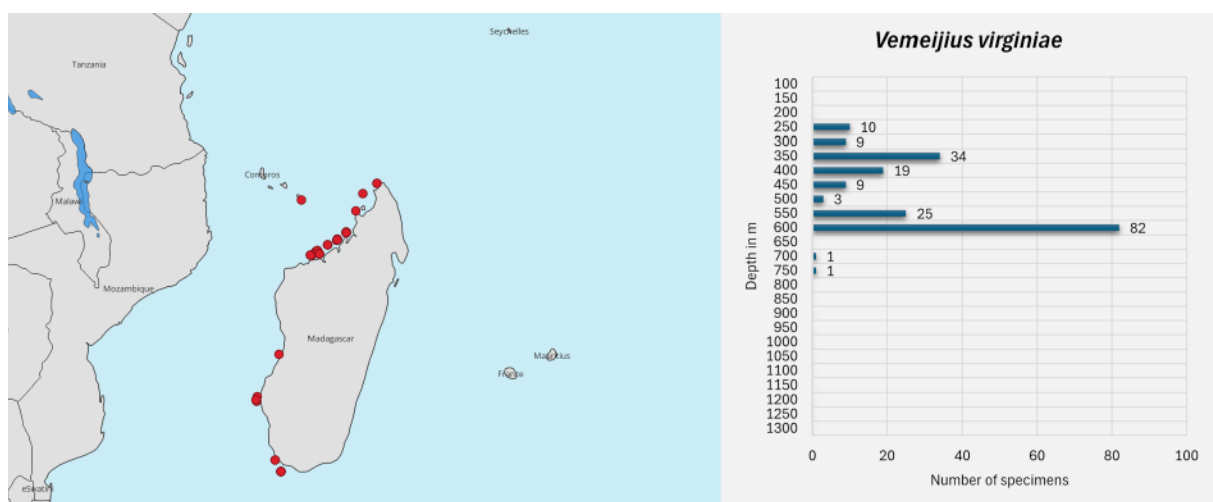


Fig. 4. Geographical and bathymetrical distribution of *Vermeijius virginiae* (Hadorn & Fraussen, 2002). Each column represents the number of specimens (lv or dd).

Distribution

Mozambique Channel: from northwest to southwest Madagascar and Comoro Archipelago (Fig. 4). Live-collected specimens at depths of 325–609 m, empty or crabbed shells at depths of 247–760 m. Also recorded from central Natal, South Africa (Marais & Kilburn 2010: 124), and from a single commercial trawler record from Somalia (potentially *V. guidonis*—confirmation needed).

Remarks

Assigned to *Vermeijius* by Kantor *et al.* (2018: 45), this species is conchologically similar to *V. pallidus* and phylogenetically its sister species. It differs in having fewer protoconch whorls and thinner spiral cords, which form less pronounced beads at intersections with axial ribs.

Vermeijius guidonis (Delsaerdt, 1995) (Somalia to southwestern India) differs by its slightly smaller adult size, fewer whorls, broader spire angle, conspicuously lightweight and translucent shell, widely spaced and more prominent primary spiral cords, and finer intercalated spiral threads.

Voucher specimen MNHN-IM-2007-38241 (identified as “Gen. sp.”) was used by Kantor *et al.* (2018: 10) as an outgroup. Comparative analysis has confirmed that it is a typical *V. virginiae*. However, the associated molecular data appear to be contaminated and unreliable for phylogenetic conclusions.

Vermeijius guidonis (Delsaerdt, 1995)

Figs 5–6, 82C

Fusinus (*Simplicifusus*) *guidonis* Delsaerdt, 1995: 117–119, figs 3rd row on p. 118, right fig. on p. 119.

Fusinus guidonis – Mallard & Robin 2005: pl. 22; 2017: 51, figs 1–3. — Robin 2021: 274, 2nd row right.

Vermeijius guidonis – Kantor *et al.* 2018: 45.

Vermeijius pallidus – Sary & Pramod Kiran 2023: 76, fig. 2.

Diagnosis

Shell large for genus (up to 55 mm SL), lightweight, translucent, pure white, fusiform, with strongly convex whorls; axial sculpture of widely spaced, strong axial ribs crossed by major and minor spiral cords; suture strongly undulating due to pronounced axial ribs. Aperture roundly ovate, internally lirate; columella smooth. Siphonal canal straight, about same length as aperture, with numerous spiral threads.

Material examined

Holotype

SOMALIA • dd; off Mogadishu; RBINS 469.

Paratype

SOMALIA • 1 dd; S Somalia, off Mogadishu; MNHN-IM-2023-1082 (Figs 5A–B, 82C).

Sequenced material

None sequenced.

Other material

SOMALIA • 1 dd; NE coast, off Ras Hafun; depth 150–250 m; NMBE MOLL-0576250 • 1 dd; NE coast, off Ras Hafun; NMBE MOLL-0587898 (Fig. 5C–E).

Description

Measurements (holotype): SL 49.9 mm, ShW 20.5 mm.

Refer to Delsaerdt (1995).

Distribution

From southwestern India to Somalia (Fig. 6), occurring at depths of 150–300 m.

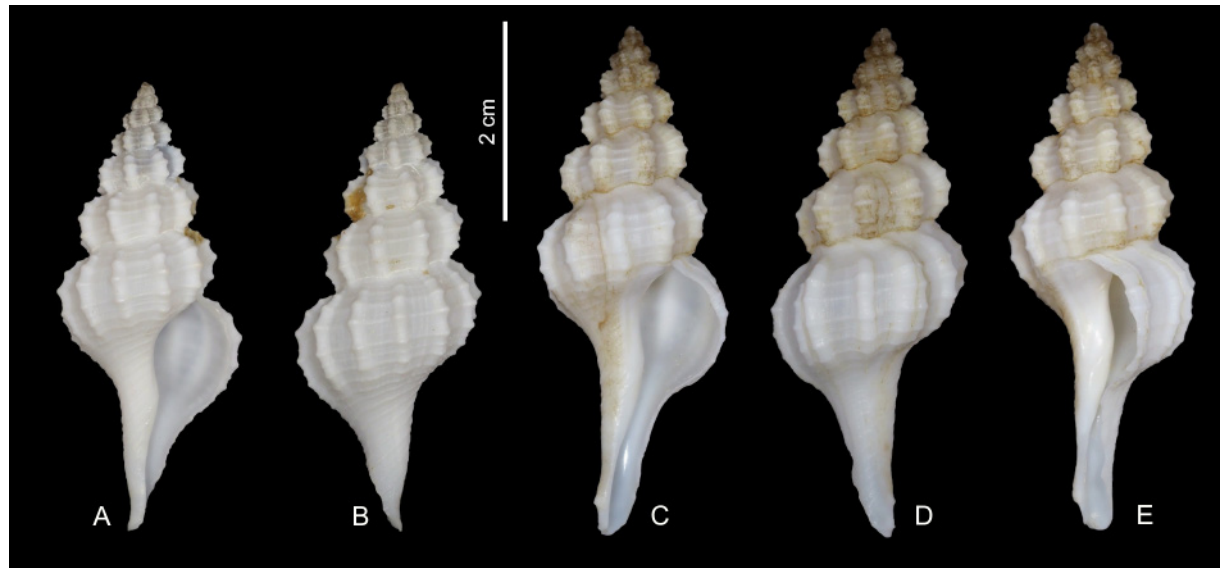


Fig. 5. *Vermeijius guidonis* (Delsaerdt, 1995). **A–B.** Paratype, MNHN-IM-2023-1082, south Somalia, offshore Mogadishu, SL 45.6 mm. **C–E.** NMBE MOLL-0587898, Somalia, off Ras Hafun, SL 50.8 mm. All shells at the same scale.

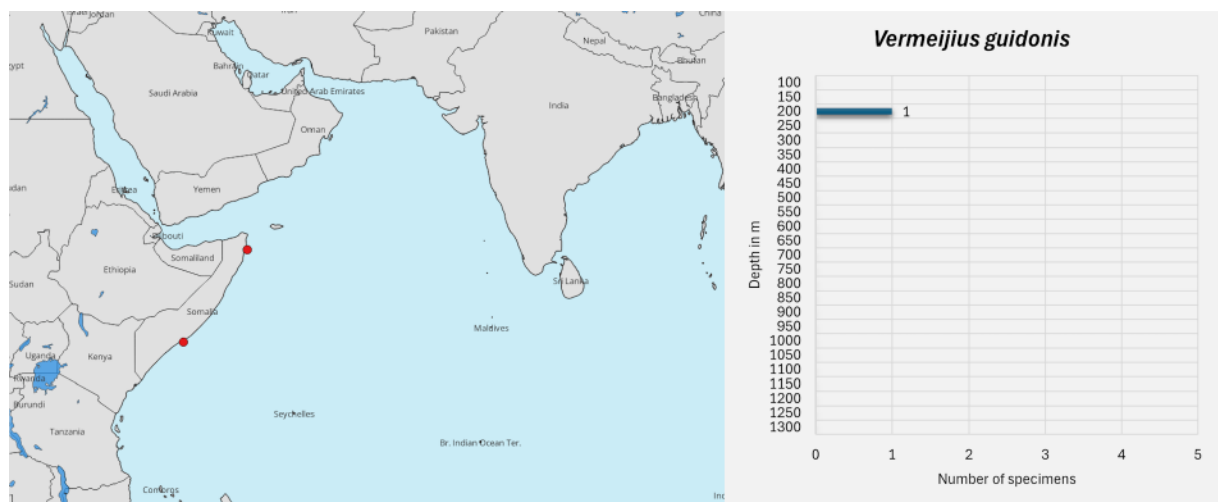


Fig. 6. Geographical and bathymetrical distribution of *Vermeijius guidonis* (Delsaerdt, 1995). Each column represents the number of specimens (lv or dd).

Remarks

Assigned to *Vermeijius* by Kantor *et al.* (2018: 45). Little is known about the East African population of *V. guidonis*, and both protoconch and soft anatomy remain undescribed. Sary & Pramod Kiran (2023: 76, fig. 2) reported a single specimen collected by shrimp trawlers off the southwestern coast of India, misidentified as *Vermeijius pallidus*. This represents a remarkable range extension to the east coast of the Arabian Sea.

Vermeijius guidonis is conchologically similar to *V. pallidus* and *V. virginiae*, but differs by having a lighter and thinner shell, more swollen whorls, more widely spaced axial ribs, weaker and narrower axial ribs, and fewer spiral cords.

Vermeijius retiarius (von Martens, 1901)

Figs 7A–M, 8, 79C–D, 82D, 85C

Fusus? retiarius von Martens, 1901: 22.

Fusus incertus E.A. Smith, 1906: 167. **Syn nov.**

Fusus? retiarius – von Martens 1904: 104–105, pl. 2 fig. 4.

Fusinus retiarius – Hadorn & Fraussen 2002: 64, 66, 68, figs 3–8, 21. — Mallard & Robin 2005: pl. 29 [partim]; 2017: 81.

Vermeijius retiarius – Kantor *et al.* 2018: 50–51, fig. 11k. — Hadorn & Fraussen 2024: 111, pl. 3 figs 8–14.

non *Fusus? retiarius* von Martens 1901 – Robin 2021: 282, 3rd row right [= *Vermeijius insperatus*].

Diagnosis

Shell large for genus (up to 57 mm SL), strong, broadly fusiform, gradually constricting to medium-long, sinuous, coaxial siphonal canal. Protoconch (Figs 7K, 85C) dome-shaped, paucispiral, of 1.5 convex, smooth, greyish, semitransparent whorls, with 3 weak arcuate axial ribs at transition to teleoconch. Protoconch/teleoconch discontinuity distinct, marked by appearance of teleoconch spiral sculpture. Protoconch diameter 1.0 mm, exposed height 0.7 mm. Teleoconch with strongly convex whorls. Aperture broad, oval; columella smooth. Spiral sculpture of moderately strong cords, beaded at intersections with axial ribs, and much thinner, although distinct, secondary cords covering interspaces between primary cords; 4–5 primary spiral cords on spire whorls, including penultimate. Axial ribs not aligned along spire, 11–12 per whorl. Background colour pale flesh to nearly white. Operculum elongate, leaf-shaped, spanning nearly entire aperture; nucleus terminal. Radula (Fig. 79C–D) studied in two specimens (MNHN-IM-2007-38112, MNHN-IM-2023-1247), similar in both specimens, long, comprising about 175–190 transverse rows of teeth, of which about 15 rows nascent. Radula narrow, distance between outer edges of lateral teeth about 210–240 µm (1.30–1.48% of AL without canal). Lateral teeth broad, with slightly arcuate anterior margin and strongly attenuated outer anterior corner, producing long ‘handle’. Left lateral teeth with six almost equal, recurved, closely spaced major cusps and one smaller inner cusp; right teeth with 4–5 major cusps. Outermost cusp in MNHN-IM-2007-38112 (Fig. 79C) apparently teratological, incompletely subdivided, with serrated inner edge. Outermost cusp on lateral side nearly straight at transition into ‘handle’, with small obtuse knob. Central tooth subrectangular, with three short, sharp cusps, central cusp slightly longer; basal plate with attenuated corners on posterior margin, producing impression of additional lateral obtuse cusps. Distinct transverse folds of membrane situated serially between rows of lateral teeth, fusing with anterior margin of central teeth.

DNA diagnosis

DNA diagnosis (based on 5 *cox1* sequences): ‘G’ in the site 328, ‘C’ in the site 347, ‘A’ in the site 424, ‘A’ in the site 619.

Material examined

Lectotype of *Fusus? retarius*

SOMALIA • dd; S Somalia, northern Brawa (near Mogadishu); 1°49' N, 45°29' E; depth 1134 m; *Valdivia*, stn 256; ZMB 61012 (Figs 7A–B, 82D).

Paralectotype of *Fusus? retarius*

SOMALIA • 1 lv subadult, SL 41.2 mm, ShW 17.6 mm; same data as for lectotype; ZMB 61013 (Fig. 7C–D).

Holotype of *Fusus incertus*

SRI LANKA • dd, SL 51.0 mm, ShW 22.0 mm; Gulf of Mannar, off west “Ceylon”; 7°04' N, 79°32' E; depth 1079 m; Investigator, stn 317; ZSI M 1450/1 (Fig. 7L–M).

Sequenced material

MADAGASCAR • 1 lv; W Madagascar, off Majunga; 15°25' S, 45°57' E; depth 609–620 m; MIRIKY, stn CP3251; MNHN-IM-2007-38197 • 1 lv; W Madagascar, off Majunga; 15°22' S, 45°58' E; depth 650–850 m; MIRIKY, stn CP3252; MNHN-IM-2007-38112 (Figs 7G–H, 79C) • 1 lv; SW Madagascar, Lavanono sector; 25°43' S, 44°24' E; depth 729–732 m; ATIMO VATAE, stn CP3597; MNHN-IM-2009-15043 (Figs 7I–K, 85C) • 1 lv; S of Pointe Barrow; 25°35' S, 44°15' E; depth 821–910 m; ATIMO VATAE, stn CP3595; MNHN-IM-2009-15083 (Fig. 7E–F) • 1 lv; same data as for preceding; MNHN-IM-2009-15087.

Other material

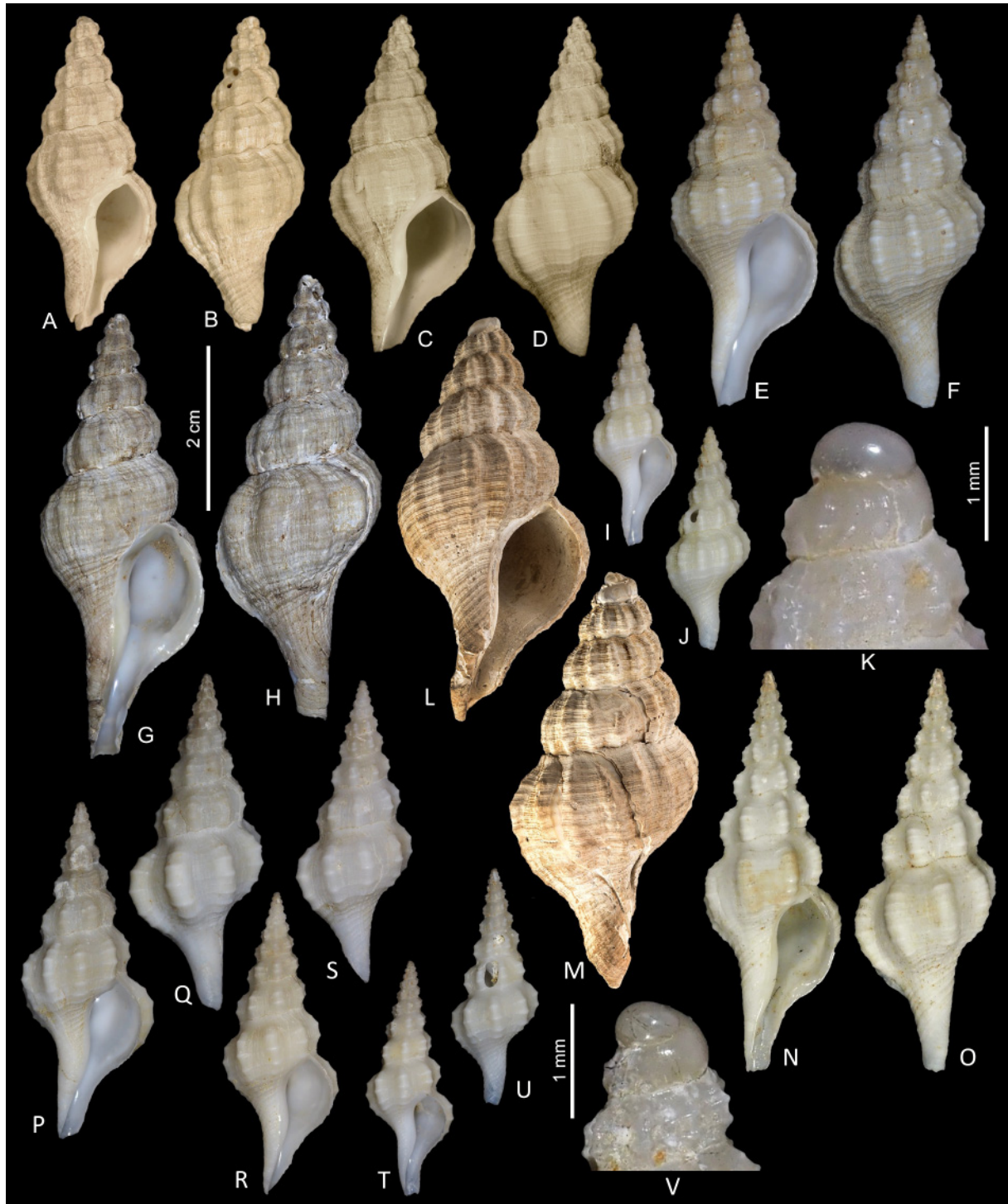
COMORO ARCHIPELAGO • 1 lv; SE of Mayotte; 12°58' S, 45°15' E; depth 810 m; BIOMAGLO, stn DW4867; MNHN-IM-2013-69750 • 1 lv; same data as for preceding; MNHN-IM-2013-69752.

GLORIEUSES • 1 dd; Banc du Geyser; 12°17' S, 46°28' E; depth 836–842 m; BIOMAGLO, stn DW4792; MNHN-IM-2023-1269.

MADAGASCAR • 2 lv; W Madagascar, between Majunga and Cap Saint-André; 15°24' S, 45°56' E; depth 750–780 m; MIRIKY, stn CP3278; MNHN-IM-2023-1173 • 1 lv; same data as for preceding; MNHN-IM-2023-1247 (Fig. 79D) • 1 dd; between Nosy Be and Banc du Leven; 12°51' S, 48°08' E; depth 558–592 m; MIRIKY, stn CP3180; MNHN-IM-2023-1175 • 1 dd juv.; between Nosy Be and Banc du Leven; 12°19' S, 48°12' E; depth 703–704 m; MIRIKY, stn CP3194; MNHN-

Fig. 7 (next page). **A–M.** *Vermeijius retarius* (von Martens, 1901). **A–B.** Lectotype, ZMB 61012, S Somalia, northern Brawa (near Mogadishu), *Valdivia* stn 256, depth 1134 m, SL 38.5 mm. **C–D.** Paralectotype, ZMB 61013, same data as for lectotype, SL 41.2 mm. **E–F.** MNHN-IM-2009-15083, SW Madagascar, S of Pointe Barrow, ATIMO VATAE, stn CP3595, depth 821–910 m, SL 47.9 mm (sequenced). **G–H.** MNHN-IM-2007-38112, W Madagascar, off Majunga, MIRIKY, stn CP3252, depth 650–850 m, SL 53.9 mm (sequenced). **I–K.** MNHN-IM-2009-15043, SW Madagascar, Lavanono sector, ATIMO VATAE, stn CP3597, depth 729–732 m, SL 27.4 mm (sequenced). **L–M.** Holotype of *Fusus incertus* E.A. Smith, 1906, ZSI M 1450/1, W Sri Lanka, Gulf of Mannar, Investigator, stn 317, depth 1079 m, SL 51.0 mm (data/images courtesy of the Digitization Unit, ZSI). – **N–V.** *Vermeijius insperatus* Hadorn & Fraussen, 2024. **N–O.** Holotype, NMBE MOLL-0576873, W Madagascar, off Morondava, depth 600 m, SL 49.2 mm. **P–Q.** MNHN-IM-2007-38234, W Madagascar, off Mahajamba Bay, MIRIKY, stn CP3249, depth 620–637 m, SL 41.5 mm (sequenced). **R–S.** MNHN-IM-2009-15092, SW Madagascar, Lavanono sector, ATIMO VATAE, stn CP3597, depth 729–732 m, SL 37.0 mm (sequenced). **T–V.** MNHN-IM-2009-15136, SW Madagascar, Lavanono sector, ATIMO VATAE, stn CP3597, depth 729–732 m, SL 28.65 mm (sequenced). All shells at the same scale, except protoconchs.

IM-2023-1176 • 4 lv, 1 dd; 15°25' S, 45°55' E; depth 943–950 m; MIRIKY, stn CP3253; MNHN-IM-2023-1172 • 1 dd; SW Madagascar, S of Pointe Barrow; 25°35' S, 44°15' E; depth 821–910 m; ATIMO VATAE, stn CP3595; MNHN-IM-2023-1174 • 1 lv, 6 dd; same data as for preceding; MNHN-IM-2023-1177 • 1 lv; NW of Nosy Ve Island; 23°36' S, 43°31' E; depth 445–455 m; MADAGASCAR, stn CH61; MNHN-IM-2024-20074 • 1 dd; W Madagascar, off Majunga; 15°22' S, 45°58' E; depth 850–900 m; MIRIKY, stn CP3252; MNHN-IM-2023-1270 • 2 dd; W Madagascar, off Majunga; depth 500–800 m; by commercial trawlers; NMBE MOLL-0576876 • 1 dd; W Madagascar, off Morondava; depth



600 m; NMBE MOLL-0576877 • 3 dd; off Morondava; depth 600–800 m; NMBE MOLL-0576878 • 1 lv; off Morondava; depth 600 m; NMBE MOLL-0576875.

Description

Measurements (lectotype): SL 38.5 mm, SW 15.7 mm.

Refer to Hadorn & Fraussen (2002, 2024), and Kantor *et al.* (2018).

Distribution

East Africa, from Somalia to southern Madagascar (Fig. 8). The record from western Sri Lanka (holotype of *Fusus incertus*) represents a considerable extension of the known range. A similar pattern has been observed in *Vermeijius guidonis*, which was previously known only from Somalia until Sary & Pramod Kiran (2023: 76) reported a specimen from the southwestern coast of India. Live-collected specimens at depths of 455–1134 m; empty or crabbed shells at depths of 592–1134 m.

Remarks

Assigned to *Vermeijius* by Kantor *et al.* (2018: 45).

Fusus incertus E.A. Smith, 1906 was described from western Sri Lanka and has remained poorly known to date; it is currently treated as a taxon inquirendum in WoRMS. *Fusus incertus* is a junior primary homonym of *Fusus incertus* Deshayes, 1834 (Eocene, Paris Basin), and is here regarded as a new junior synonym of *Vermeijius retarius* (von Martens, 1901).

Diagnostic differences from *V. insperatus* are listed under that species.

Vermeijius albulus sp. nov. (Papua New Guinea and Solomon Islands) represents a western Pacific analogue to *V. retarius*, distinguished by fewer but notably stronger, rounded primary spiral cords that form distinct, white, rounded nodes at their intersections with the axial ribs.

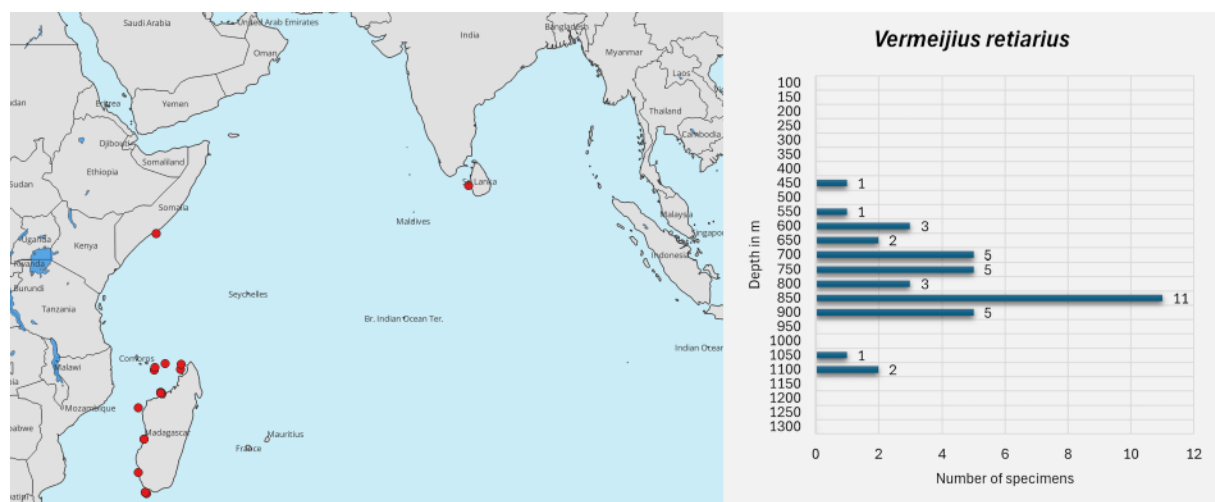


Fig. 8. Geographical and bathymetrical distribution of *Vermeijius retarius* (von Martens, 1901). Each column represents the number of specimens (lv or dd).

Vermeijius insperatus Hadorn & Fraussen, 2024
Figs 7N–V, 9, 79E–F, 82E, 85D

Vermeijius insperatus Hadorn & Fraussen, 2024: 110–111, pl. 3 figs 1–7.

Fusinus retiarius – Hadorn & Fraussen 2002: figs 7–8 [partim]. — Mallard & Robin 2005: pl. 29 [partim].

Vermeijius retiarius – Robin 2021: 282, 3rd row right [partim].

Diagnosis

Shell large for genus (up to 50 mm SL), strong, solid, uniformly white or cream-coloured, with proportionally long, slender spire and short last whorl. About 10 convex teleoconch whorls; suture wavy, slightly incised. Protoconch (Figs 7V, 85D) paucispiral, of ~1.5 convex, smooth whorls. Axial sculpture of 7–8 ribs on upper teleoconch whorls, extending from just below adapical to abapical suture, adapically weaker and narrower, abapically broader and stronger; interspaces deeply impressed, about as wide as ribs. Last whorl, sometimes also penultimate whorl, with 8–9 prominent axial ribs of uniform size, with regularly spaced interspaces, gradually withdrawing from adapical suture. Spiral sculpture of 4 primary cords on early teleoconch, two central cords stronger; uppermost cord weak and inconspicuous, lowermost partly covered by abapical suture; primary cords of similar strength on later whorls, prominent over ribs, weak in interspaces; from third or fourth teleoconch whorl onwards, fine spiral threads present, multiplying by intercalation; numerous intercalated fine spiral threads of varying strength between primary cords on later whorls; axial growth lines fine, close-set, inconspicuous. Aperture small, ovate, smooth within; outer lip simple, smooth, glossy, not crenulated; parietal callus smooth, usually without columellar folds, rarely with single inconspicuous fold; adapically with rather strong, flat, calloused tooth. Siphonal canal short, about as long as aperture, open, slightly bent, tapering towards tip; outer side with major spiral cords and intercalated minor threads, weakening distally. Radula (Fig. 79E–F), examined in two specimens (MNHN-IM-2009-15092, MNHN-IM-2023-1249), rather similar in both specimens, long, comprising up to 175 transverse rows of teeth, of which about 15 rows nascent. Radula narrow, distance between outer edges of lateral teeth about 110 and 95 µm (1% and 0.95% of AL without canal). Lateral teeth broad, slightly arcuate, with strongly attenuated outer anterior corner, producing long ‘handle’. Lateral teeth with 5–6 recurved, closely spaced major cusps, outermost largest, and one smaller inner cusp. Tooth outline distinctly concave, lacking knob or cusp at transition of outer cusp side into ‘handle’. Central tooth subrectangular, with three short, sharp cusps, central cusp slightly longer. Distinct transverse folds of membrane situated serially between rows of lateral teeth and fusing with lateral margins of central teeth.

DNA diagnosis

DNA diagnosis (based on 10 *cox1* sequences): ‘G’ in the site 208, ‘C’ in the site 271, ‘C’ in the site 548.

Material examined

Holotype

MADAGASCAR • dd; Mozambique Channel, W Madagascar, off Morondava; depth 600 m; by commercial trawlers; NMBE MOLL-0576873 (Figs 7N–O, 82E).

Paratypes

MADAGASCAR • 1 dd, SL 48.0 mm, ShW 18.0 mm; W Madagascar, off Majunga; depth 500–800 m; from commercial trawlers; MNHN-IM-2012-25399 • 2 dd, SL 48.3 mm, ShW 19.0 mm / SL 45.1 mm, ShW 17.1 mm; same data as for preceding; NMBE MOLL-0576872 • 1 dd, SL 46.8 mm, ShW 18.0 mm; W Madagascar, off Morondava; depth 600 m; from commercial trawlers; NMBE MOLL-0578839.

Sequenced material

MADAGASCAR • 1 lv; W Madagascar, off Mahajamba Bay; 14°48' S, 47°00' E; depth 620–637 m; MIRIKY, stn CP3249; MNHN-IM-2007-38234 (Fig. 7P–Q) • 1 lv; off Majunga; 15°25' S, 45°57' E; depth 609–620 m; MIRIKY, stn CP3251; MNHN-IM-2007-38247 • 1 lv; 15°22' S, 45°58' E; depth 650–850 m; MIRIKY, stn CP3252; MNHN-IM-2007-38223 • 1 lv; SW Madagascar, Lavanono sector; 25°43' S, 44°24' E; depth 729–732 m; ATIMO VATAE, stn CP3597; MNHN-IM-2009-15032 • 1 lv; same data as for preceding; MNHN-IM-2009-15039 • 1 lv; same data as for preceding; MNHN-IM-2009-15092 (Figs 7R–S, 79E) • 1 lv; same data as for preceding; MNHN-IM-2009-15134 • 1 lv; same data as for preceding; MNHN-IM-2009-15136 (Figs 7T–V, 85D) • 1 lv; S of Pointe Barrow; 25°32' S, 44°16' E; depth 549–576 m; ATIMO VATAE, stn CP3585; MNHN-IM-2009-15091 • 1 lv; E of Faux-Cap; 25°37' S, 46°20' E; depth 433–456 m; ATIMO VATAE, stn DW3564; MNHN-IM-2009-15364.

Other material

MADAGASCAR • 1 lv; W Madagascar, Betsiboka; 15°20' S, 45°59' E; depth 583–860 m; PAMELA-MOZ01, stn CP1; MNHN-IM-2013-64020 • 1 lv; off Majunga; 15°22' S, 46°00' E; depth 493–662 m; MIRIKY, stn CP3250; MNHN-IM-2023-1104 • 3 dd; off Majunga; 15°22' S, 45°58' E; depth 850–900 m; MIRIKY, stn CP3252; MNHN-IM-2023-1271 • 1 dd; off Majunga; 15°25' S, 45°55' E; depth 243–950 m; MIRIKY, stn CP3253; MNHN-IM-2023-1272 • 1 lv; between Majunga and Cap Saint-André; 15°31' S, 45°45' E; depth 640–800 m; MIRIKY, stn CP3268; MNHN-IM-2023-1102 • 1 lv; 15°31' S, 45°46' E; depth 760–850 m; MIRIKY, stn CP3269; MNHN-IM-2023-1101 • 4 lv; 15°31' S, 45°42' E; depth 760–777 m; MIRIKY, stn CP3270; MNHN-IM-2023-1100 • 1 lv juv.; 15°31' S, 45°45' E; depth 780–800 m; MIRIKY, stn CP3271; MNHN-IM-2023-1103 • 6 lv, 3 dd; SW Madagascar, Lavanono sector; 25°43' S, 44°24' E; depth 729–732 m; ATIMO VATAE, stn CP3597; MNHN-IM-2023-1107 • 1 lv; S of Pointe Barrow; 25°32' S, 44°16' E; depth 549–576 m; ATIMO VATAE, stn CP3585; MNHN-IM-2023-1249 • 1 dd juv.; 25°35' S, 44°15' E; depth 821–910 m; ATIMO VATAE, stn CP3595; MNHN-IM-2023-1105 • 7 dd; SE Madagascar, E of Faux-Cap; 25°37' S, 46°21' E; depth 618–624 m; ATIMO VATAE, stn CP3566/DW3565; MNHN-IM-2023-1106 • 1 lv; SW Madagascar, off Toliara; from commercial trawlers; NMBE MOLL-0584882.

Description

Measurements (holotype): SL 49.2 mm, ShW 17.3 mm.

Refer to Hadorn & Fraussen (2024).

Distribution

Mozambique Channel, western Madagascar (Fig. 9). Live-collected specimens at depths of 456–780 m; empty or crabbed shells at depths of 600–821 m.

Remarks

The species is syntopic with *V. retiarius* at several stations and is morphologically (but not phylogenetically) most similar to it. *Vermeijius retiarius* differs in having a proportionally longer and more slender spire, fewer axial ribs on the last whorl, broader interspaces between axial ribs, and more prominent primary spiral cords that remain well visible on axial ribs across all whorls. Additional distinguishing features include a more constricted suture, a smaller, more convex, and less inflated last whorl, resulting in a clearly smaller aperture, and a slightly shorter, narrower, and more tapered siphonal canal.

Vermeijius pallidus and *V. virginiae* are readily distinguished from *V. insperatus* by their multispiral protoconch, more convex teleoconch whorls, more numerous and narrower axial ribs extending from

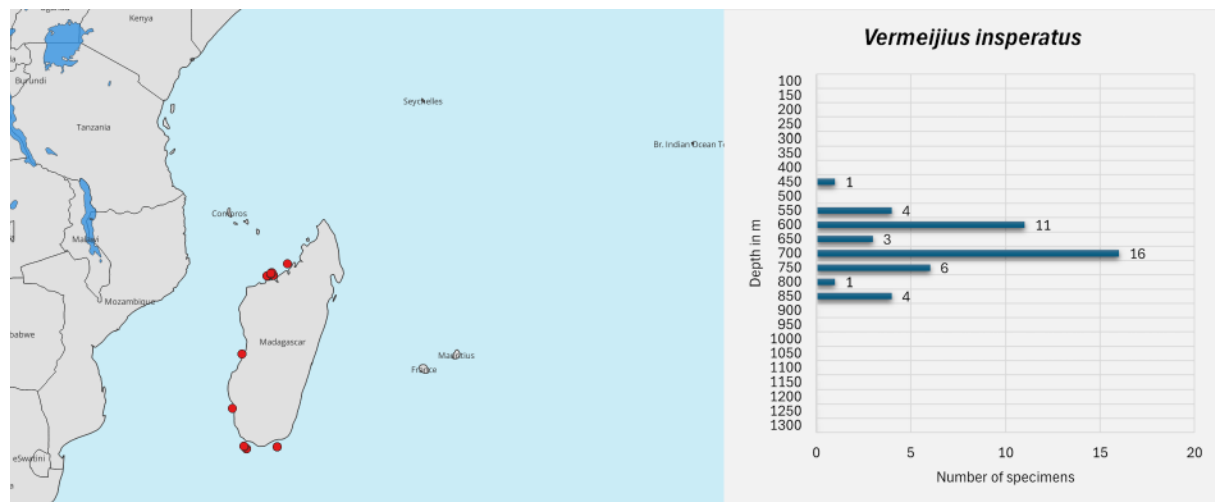


Fig. 9. Geographical and bathymetrical distribution of *Vermeijius insperatus* Hadorn & Fraussen, 2024. Each column represents the number of specimens (lv or dd).

suture to suture, markedly stronger spiral sculpture, significantly longer and narrower siphonal canal, and the presence of internal lirae within the aperture.

Differences from *V. atimovatae* sp. nov. are outlined under that species.

***Vermeijius palmarium* (Hadorn & Fraussen, 2006)**

Figs 10A–G, 11, 82J, 85E

Fusinus palmarium Hadorn & Fraussen, 2006b: 89–92, figs 1–6.

Fusinus palmarium – Mallard & Robin 2017: 71, figs 1–3. — Robin 2021: 278, 1st row middle.

Vermeijius palmarium – Kantor *et al.* 2018: 45.

Diagnosis

Shell large for genus (up to 41 mm SL), fusiform, uniformly white, with elongate, pointed spire and long, nearly straight siphonal canal; spire of 8.5–9.5 convex whorls, including protoconch; upper whorls convex, later whorls carinated below mid-whorl, subsutural slope broad, straight; suture distinct, constricted; fine axial growth lines well visible on all teleoconch whorls. Protoconch (Figs 10G, 85E) paucispiral, white, bulbous, glossy, of 1.75–2 convex whorls; final 0.25 whorl with 3 strong, widely spaced axial riblets from suture to suture; transition to teleoconch abrupt, marked by fine varix; diameter 0.7–0.8 mm. Axial sculpture of strong, broad ribs from suture to suture on upper whorls, more prominent at periphery, slightly withdrawing from adapical suture on penultimate or last whorl; interspaces relatively deep, as broad as ribs or slightly broader; 6–8 ribs on upper teleoconch whorls, 7–9 on penultimate, 7–10 on last whorl. Spiral sculpture of 4–5 primary cords on early teleoconch, 5 on later whorls; from second or third teleoconch whorl onwards, one fine intercalated secondary cord between primary cords; tertiary cords from fourth whorl onwards on both sides of slightly stronger secondary cords, increasing to 2 on last whorl; cords strong and sharp over ribs, three abapical cords more prominent, peripheral one strongest. Aperture roundly ovate, rather small, pointed adapically, constricted abapically; outer lip thick, strongly convex, edge slightly crenulated, with up to 15 fine, indistinct internal lirae; inner lip slightly

calloused, smooth, attached to parietal wall. Siphonal canal straight, long, narrow, tapering anteriorly. Operculum typical of genus, light brown, filling aperture; nucleus terminal. Periostracum unknown.

Material examined

Holotype

AUSTRALIA • dd; Queensland, Great Barrier Reef, off Swain Reefs, off Hixson Cay; 22°33' S, 153°26' E; depth 216–227 m; AMS C.422362 (Figs 10A–B, 82J).

Paratypes

AUSTRALIA • 1 dd, SL 39.8 mm, ShW 12.5 mm; same data as for holotype; QM Mo.78450 • 1 dd, SL 37.1 mm, ShW 12.0 mm; same data as for holotype; MNHN • 1 dd, SL 38.4 mm, ShW 12.5 mm; same data as for holotype; ANSP (ex RH) (Fig. 10C–D).

Sequenced material

None sequenced.

Other material

AUSTRALIA • 4 dd; Queensland, off Cape Moreton; depth 120 m; NMBE MOLL-0584176 (Figs 10E–G, 85E).

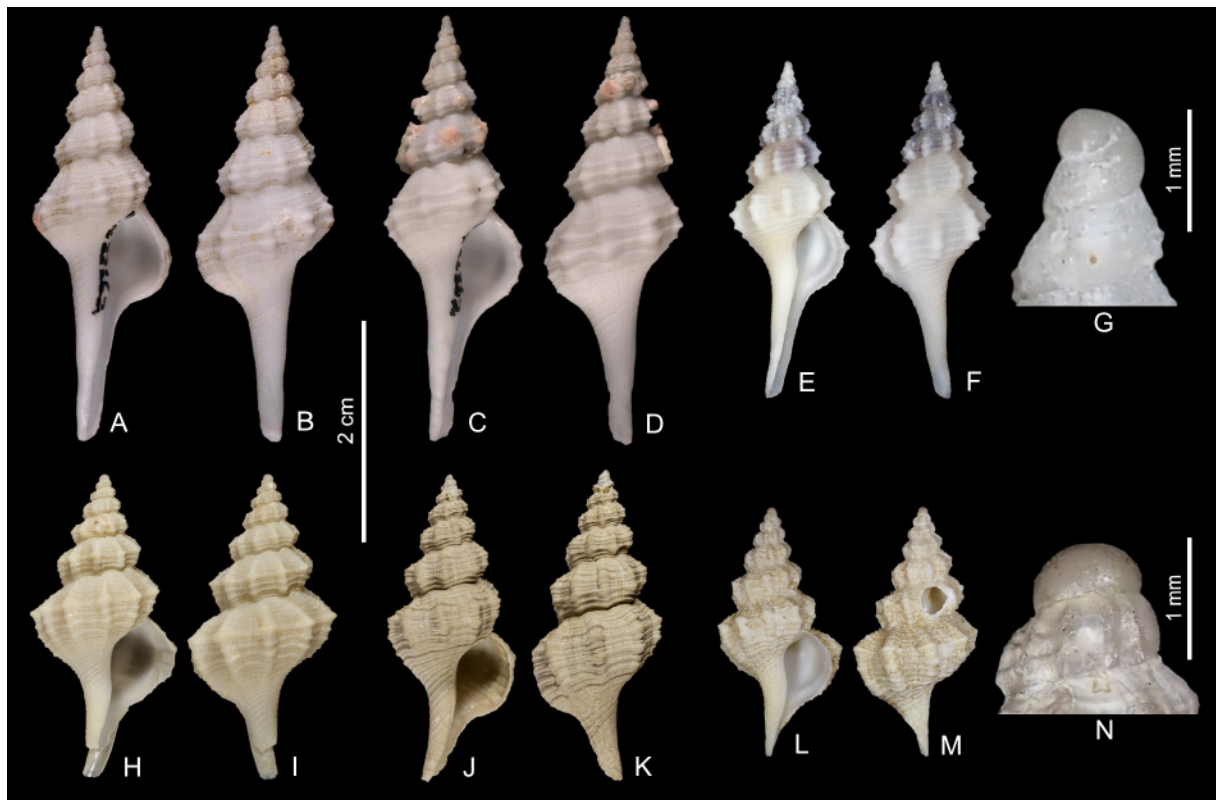


Fig. 10. A–G. *Vermeijius palmarium* (Hadorn & Fraussen, 2006). A–B. Holotype, AMS C.422362, Australia, Queensland, Great Barrier Reef, off Swain Reefs, off Hixson Cay, depth 216–227 m, SL 37.1 mm. C–D. Paratype, ANSP (ex RH), same data as for holotype, SL 38.4 mm. E–G. NMBE MOLL-0584176, Australia, Queensland, off Cape Moreton, depth 120 m, SL 30.5 mm. – H–N. *Vermeijius wallacei* (Hadorn & Fraussen, 2006). H–I. Holotype, MNHN-IM-2000-9404, Indonesia, Tanimbar Islands, KARUBAR, stn CP69, depth 356–368 m, SL 27.0 mm. J–K. Paratype, MNHN-IM-2000-9405, same data as for holotype, SL 27.1 mm. L–N. MNHN-IM-2023-1243, same data as for holotype, SL 22.3 mm. All shells at the same scale, except protoconchs.

Description

Measurements (holotype): SL 37.1 mm, ShW 12.4 mm.

Refer to Hadorn & Fraussen (2006b).

Distribution

Eastern Australia, from Queensland (Swain Reefs) to New South Wales (southeast off Clarence River) (Fig. 11). Empty shells at depths of 120–405 m; one live specimen collected at 210 m on coarse calcareous nodules.

Remarks

Assigned to *Vermeijius* by Kantor *et al.* (2018: 45). This species differs from all congeners by its broad, nearly straight shoulder slope and by a comparatively long, slender siphonal canal.

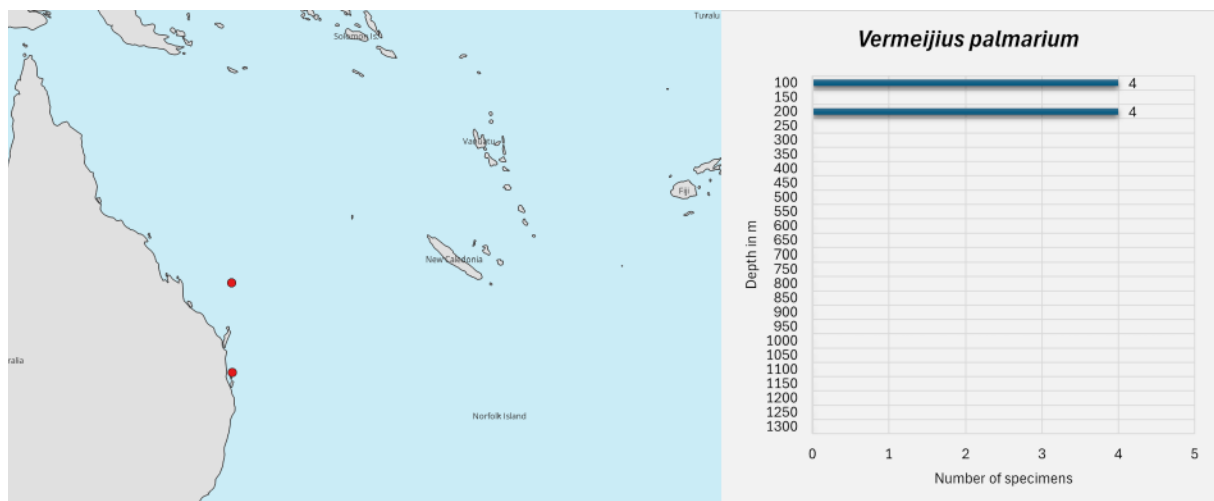


Fig. 11. Geographical and bathymetrical distribution of *Vermeijius palmarium* (Hadorn & Fraussen, 2006). Each column represents the number of specimens (lv or dd).

Vermeijius wallacei (Hadorn & Fraussen, 2006)

Figs 10H–N, 12, 83K, 85F

Fusinus wallacei Hadorn & Fraussen, 2006a: 96–97, figs 9–12, 33.

Fusinus wallacei – Mallard & Robin 2017: 105, fig. 1. — Robin 2021: 282, 2nd row left.

Vermeijius wallacei – Kantor *et al.* 2018: 45.

Diagnosis

Shell medium-sized for genus (up to 28 mm SL), fusiform, spire broad, of 7–8 uniformly whitish, strongly convex, carinated whorls; axial sculpture strong, well developed; spiral cords well visible, usually forming distinct double angulation at periphery; shoulder slope slightly convex; suture deeply incised, undulating with axial sculpture; axial growth lines well visible on all whorls. Protoconch (Figs 10N, 85F) relatively large, paucispiral, of 1.5 bulbous, whitish, smooth whorl; transition to teleoconch with 1–2 strong axial riblets from suture to suture, ending in varix; diameter ~1.0 mm. Axial sculpture of 7–9 ribs

on upper whorls, 8–10 on penultimate and last whorl; ribs narrow, prominent, extending from suture to suture, becoming sharp and pointed at periphery on later whorls; interspaces deeply impressed, wide, broader than ribs. Spiral sculpture of 4 primary cords on early teleoconch; two central cords stronger, usually forming distinct single or double angulation at periphery; from second or third teleoconch whorl onwards, fine intercalated secondary cord present between primary cords; fine tertiary cords present on both sides of secondary cords on penultimate and/or last whorl; cords strongly developed, forming sharp, pointed nodes at periphery when crossing axial ribs. Aperture round, white; outer lip simple, finely crenulated, with some internal lirae; parietal callus thin, smooth, appressed. Siphonal canal relatively long, nearly straight, bent to left and slightly backwards, tapering anteriorly; outer side with weak spiral cords and fine intercalated threads. Periostracum thin, olive-coloured. Operculum typical of genus, corneous, light brown, matching aperture; nucleus terminal. Radula examined in one specimen (Hadorn & Fraussen 2006a: fig. 33). Lateral teeth broad, slightly arcuate, with strongly attenuated outer anterior corner, producing long ‘handle’. Lateral teeth with six recurved, closely spaced, nearly equal-sized major cusps and one smaller inner cusp. Central tooth elongate, club-shaped, with narrower anterior margin gradually expanding to much broader posterior margin bearing three medium-long, sharp cusps, central cusp longest.

Material examined

Holotype

INDONESIA • 1v; Tanimbar Islands; 8°42' S, 131°53' E; depth 356–368 m; KARUBAR, stn CP69; MNHN-IM-2000-9404 (Figs 10H–I, 83K).

Paratypes

INDONESIA • 1 dd; same data as for holotype; MNHN-IM-2000-9405 (Fig. 10J–K) • 1 dd; same data as for holotype; MZB.Gst.13.322 • 1 lv; Tanimbar Islands; 8°57' S, 131°27' E; depth 346–352 m; KARUBAR, stn CP77; ex RH; ANSP • 1 dd; Tanimbar Islands; 8°01' S, 132°51' E; depth 271–273 m; KARUBAR, stn CP46; KF.

Sequenced material

None sequenced.

Other material

INDONESIA • 1 lv, 3 dd; Tanimbar Islands; 8°42' S, 131°53' E; depth 356–368 m; KARUBAR, stn CP69; MNHN-IM-2023-1242 • 1 lv; same data as for preceding; MNHN-IM-2023-1243 (Figs 10L–N, 85F) • 1 dd; same data as for preceding; NMBE MOLL-0576364.

Description

Measurements (holotype): SL 27.0 mm, ShW 13.1 mm.

Refer to Hadorn & Fraussen (2006a).

Distribution

Known only from the Tanimbar Islands, Indonesia (Fig. 12). Live-collected specimens recorded at depths of 352–356 m; empty or crabbed shells at depths of 273–356 m.

Remarks

Assigned to *Vermeijius* by Kantor *et al.* (2018: 45). This species is readily distinguished from all other *Vermeijius* species by its wide spire angle and conspicuously strong carina on the later whorls.

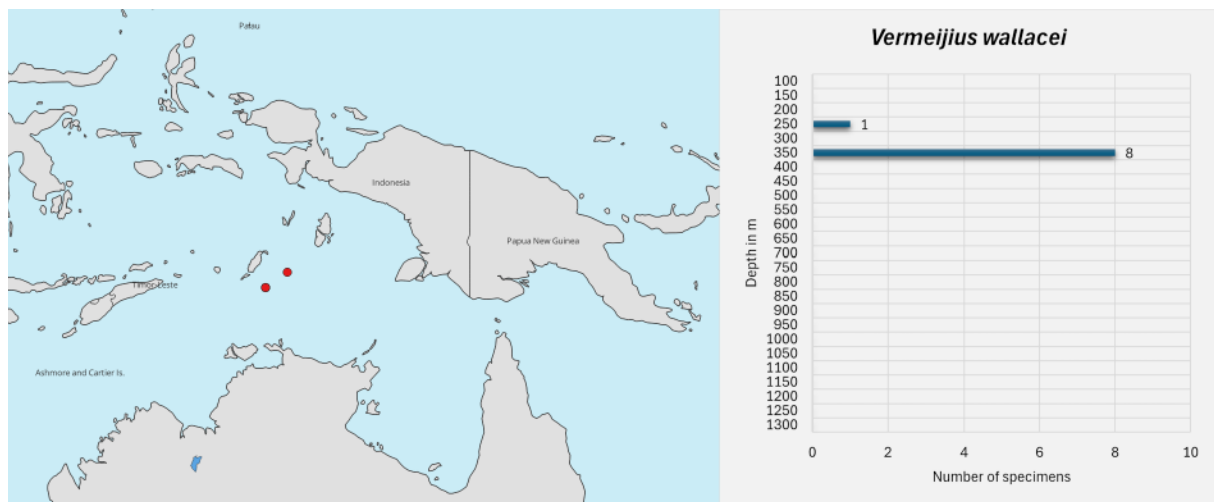


Fig. 12. Geographical and bathymetrical distribution of *Vermeijius wallacei* (Hadorn & Fraussen, 2006). Each column represents the number of specimens (lv or dd).

***Vermeijius alcyoneum* (Hadorn & Fraussen, 2006) comb. nov.**

Figs 13–14, 79G–H, 82K, 85G

Fusinus alcyoneum Hadorn & Fraussen, 2006a: 97–98, figs 13–16, 34 [partim, not figs 17–18 = *Vermeijius fijiensis* sp. nov.].

Fusinus alcyoneum – Mallard & Robin 2017: 14, figs 1–2. — Robin 2021: 269, 1st row left.

non *Fusinus alcyoneum* Hadorn & Fraussen, 2006 – Criscione 2024: 19, fig. 17 [= *Vermeijius* sp.].

Diagnosis

Shell large for genus (up to 46 mm SL), fusiform, stout, relatively heavy, of 11–12 convex whorls; spire broad; suture constricted, undulating; shell white. Protoconch (Figs 13I, 85G) multispiral, flesh-coloured, translucent, glossy, smooth, of ~2.75–3 whorls, suture indistinct; final 0.25 whorl with 4–5 strongly convex, fine axial riblets from suture to suture; diameter ~0.9 mm. Axial sculpture of prominent, broad ribs extending from suture to suture on all whorls; 7–9 on upper whorls, 9–10 on last whorl; interspaces broad, deeply impressed, as wide as ribs; axial growth lines well visible in interspaces. Spiral sculpture of 3 primary cords on early teleoconch; additional cord appearing on second whorl together with one fine intercalated secondary cord between primary cords; from third or fourth teleoconch whorl onwards, fine, sharp intercalated tertiary cords present, increasing to up to 7 on last whorl; cords stronger over ribs. Aperture ovate, constricted at both ends, white; outer lip crenulated, with short, close-set internal lirae, stronger near siphonal canal; inner lip curved, callus thin, appressed, smooth, without columellar folds, with small calloused tooth near posterior canal. Siphonal canal short, strongly curved, broad; outer side with spiral cords and intercalated threads, weakening towards tip. Periostracum thin, greenish. Operculum corneous, reddish-brown, matching aperture, rounded apically, pointed abapically; nucleus terminal. Radulae (Fig. 79G–H), examined in three specimens (MNHN-IM-2007-34929, MNHN-IM-2007-34930, MNHN-IM-2023-1252), rather similar in all, long, comprising up to 175 transverse rows of teeth, of which about 15–20 rows nascent. Radula narrow, distance between outer edges of lateral teeth about 100, 180, 140 µm (0.8%, 1.22%, 1.0% of AL without canal). Lateral teeth broad, with slightly to moderately arcuate anterior margin and strongly attenuated outer anterior corner, producing long ‘handle’. Obtuse cusp or knob present at transition of outer cusp side into handle. Lateral teeth with five recurved, closely

spaced major cusps, second innermost and outermost largest and of about equal length, and one smaller inner cusp. Central tooth trapeziform, with three medium-long, sharp cusps, central cusp slightly longer. Distinct transverse folds of membrane situated serially between rows of lateral teeth and not fusing with central teeth. Examined radulae very similar to that illustrated by Hadorn & Fraussen (2006a: fig. 34).

DNA diagnosis

DNA diagnosis (based on 7 *cox1* sequences): ‘A’ in the site 343, ‘A’ in the site 376, ‘T’ in the site 619.

Material examined

Holotype

NEW CALEDONIA • dd; S New Caledonia; 24°55′ S, 168°22′ E; depth 513 m; SMIB 3, stn DW03; MNHN-IM-2000-9406 (Figs 13A–B, 82K).

Sequenced material

CORAL SEA • 1 lv juv.; Chesterfield; 19°38′ S, 158°44′ E; depth 568–570 m; EBISCO, stn DW2603; MNHN-IM-2007-32521 (Figs 13G–I, 85G).

LOYALTY RIDGE • 1 lv; Mont J; 23°54′ S, 169°46′ E; depth 630 m; TERRASSES, stn DW3043; MNHN-IM-2007-36538.

NEW CALEDONIA • 1 lv; N New Caledonia, Grand Passage; 18°50′ S, 163°14′ E; depth 616–628 m; CONCALIS, stn CP3012; MNHN-IM-2007-35096.

NORFOLK RIDGE • 1 lv; Banc Aramis; 25°23′ S, 168°57′ E; depth 630–1150 m; NORFOLK 2, stn DW2070; MNHN-IM-2007-34929 (Figs 13J–K, 79G) • 1 lv; 25°24′ S, 168°20′ E; depth 623–691 m; NORFOLK 2, stn DW2074; MNHN-IM-2007-34930 • 1 lv; Banc Éponge; 24°54′ S, 168°22′ E; depth 500–505 m; NORFOLK 2, stn DW2081; MNHN-IM-2007-34919 • 1 lv; 24°52′ S, 168°22′ E; depth 586–730 m; NORFOLK 2, stn DW2084; MNHN-IM-2007-34928 (Fig. 13C–D).

Other material

CORAL SEA • 1 lv; Chesterfield; 19°36′ S, 158°43′ E; depth 580 m; MUSORSTOM 5, stn DW355; MNHN-IM-2023-980 • 2 lv juv.; 19°38′ S, 158°44′ E; depth 568–570 m; EBISCO, stn DW2603; MNHN-IM-2023-932.

LOYALTY ISLANDS • 1 dd; N Lifou; 20°40′ S, 166°58′ E; depth 510–590 m; BIOGEOCAL, stn DW308; MNHN-IM-2023-989 • 2 lv juv.; S of Lifou; 21°06′ S, 167°34′ E; depth 600 m; MUSORSTOM 6, stn DW468; MNHN-IM-2023-1010.

LOYALTY RIDGE • 1 dd; Banc Ellet; 22°53′ S, 169°25′ E; depth 580–780 m; EXBODI, stn CP3871; MNHN-IM-2023-988 • 1 dd juv.; 23°54′ S, 169°50′ E; depth 652–750 m; BATHUS 3, stn CP788; MNHN-IM-2023-991 • 2 lv juv., 1 dd juv.; 24°44′ S, 170°08′ E; depth 770–830 m; BATHUS 3, stn DW776; MNHN-IM-2023-969 • 3 lv; 23°54′ S, 169°46′ E; depth 625–640 m; BATHUS 3, stn DW781; MNHN-IM-2023-942 • 1 lv; 23°56′ S, 169°46′ E; depth 611–615 m; BATHUS 3, stn DW784; MNHN-IM-2023-947 • 1 lv; 23°56′ S, 169°46′ E; depth 607–608 m; BATHUS 3, stn DW785; MNHN-IM-2023-952 • 1 dd juv.; 23°54′ S, 169°49′ E; depth 699–715 m; BATHUS 3, stn DW786; MNHN-IM-2023-994 • 5 dd; 23°49′ S, 169°48′ E; depth 685–715 m; BATHUS 3, stn DW790; MNHN-IM-2023-949 • 1 dd juv.; 23°35′ S, 169°37′ E; depth 657–660 m; BATHUS 3, stn DW798; MNHN-IM-2023-1003 • 1 lv juv., 1 dd; 23°35′ S, 169°37′ E; depth 655 m; BATHUS 3, stn DW800; MNHN-IM-2023-951 • 1 dd; Mont J; 23°54′ S, 169°46′ E; depth 630 m; TERRASSES, stn DW3043; MNHN-IM-2023-1008 • 1 dd; same data as for preceding; MNHN-IM-2023-1009 • 5 dd;

Mont J; 23°49' S, 169°46' E; depth 650–690 m; TERRASSES, stn DW3044; MNHN-IM-2023-957 • 2 dd; Récifs de l'Astrolabe-Haut fond nord; 19°44' S, 165°44' E; depth 574–610 m; EXBODI, stn DW3912; MNHN-IM-2023-961 • 1 dd; 19°45' S, 165°45' E; depth 620–725 m; EXBODI, stn DW3914; MNHN-IM-2023-930 • 1 lv; 22°22' S, 168°43' E; depth 500–550 m; VOLSMAR, stn DW37; MNHN-IM-2023-960 • 1 lv juv.; 22°12' S, 168°38' E; depth 480–540 m; VOLSMAR, stn DW43; MNHN-IM-2023-996.

NEW CALEDONIA • 1 lv; N of New Caledonia, Grand Passage; 18°56' S, 163°24' E; depth 350–400 m; HALICAL 1, stn 01–04; MNHN-IM-2023-985 • 1 lv; 18°55' S, 163°24' E; depth 352–397 m; HALICAL 1, stn DW02; MNHN-IM-2023-1002 • 2 lv juv.; E of New Caledonia; 20°56' S, 165°35' E; depth 591–660 m; BATHUS 1, stn CP702; MNHN-IM-2023-964 • 2 dd; S of New Caledonia; 22°54' S, 167°17' E; depth 525–547 m; BATHUS 2, stn DW721; MNHN-IM-2023-936 • 1 lv; S of Ile des Pins; 23°02' S, 167°44' E; depth 550–590 m; KANACONO, stn DW4747; MNHN-IM-2013-63515 • 1 lv juv.; SW of New Caledonia; 23°02' S, 166°56' E; depth 530–570 m; BATHUS 2, stn CP735; MNHN-IM-2023-968 • 1 dd; S of New Caledonia; depth 500 m; NMBE MOLL-0576162.

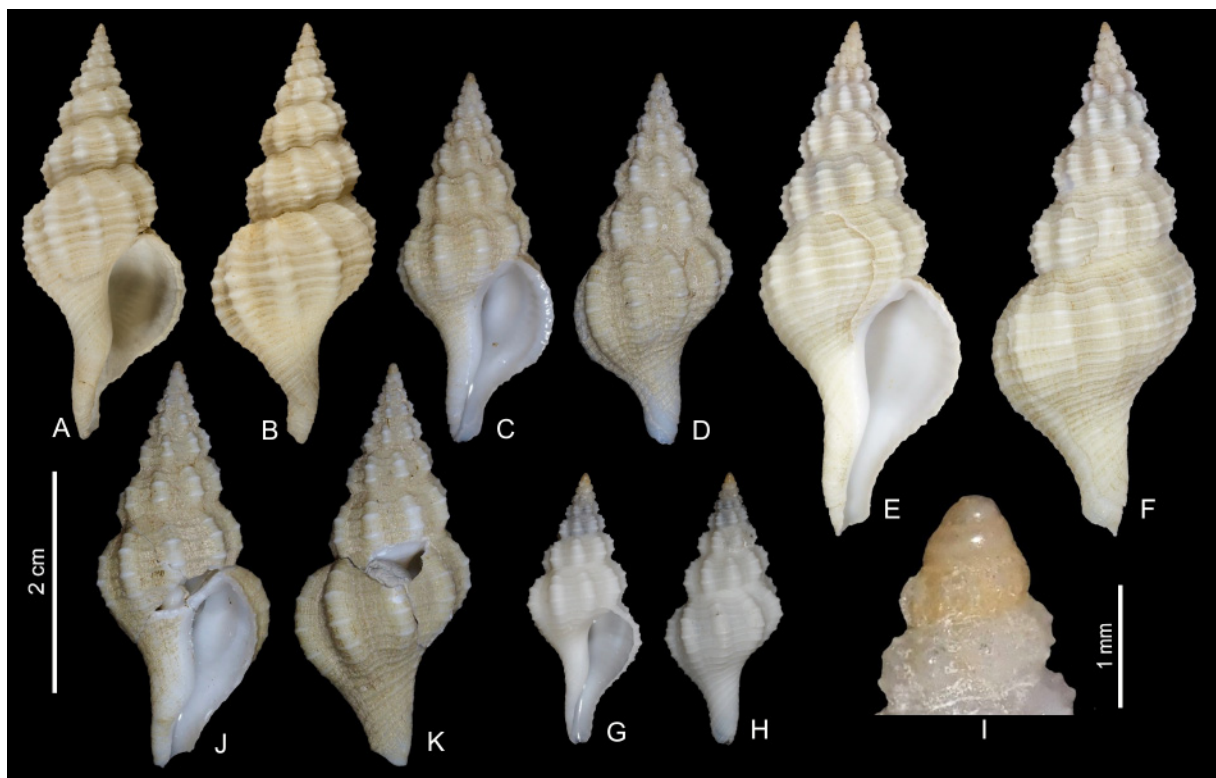


Fig. 13. *Vermeijius alcyoneum* (Hadorn & Fraussen, 2006) comb. nov. **A–B.** Holotype, MNHN-IM-2000-9406, S New Caledonia, SMIB 3, stn DW03, depth 513 m, SL 37.3 mm. **C–D.** MNHN-IM-2007-34928, S New Caledonia, Norfolk Ridge, Banc Éponge, NORFOLK 2, stn DW2084, depth 586–730 m, SL 32.65 mm (sequenced). **E–F.** MNHN-IM-2023-954, S New Caledonia, Norfolk Ridge, Introuvable Bank, NORFOLK 1, stn DW1699, depth 581–600 m, SL 46.4 mm. **G–I.** MNHN-IM-2007-32521, Coral Sea, Chesterfield, EBISCO, stn DW2603, depth 568–570 m, SL 23.85 mm (sequenced). **J–K.** MNHN-IM-2007-34929, S New Caledonia, Norfolk Ridge, Banc Aramis, NORFOLK 2, stn DW2070, depth 630–1150 m, SL 36.1 mm (sequenced). All shells at the same scale, except protoconch.

NORFOLK RIDGE • 1 dd; Banc Athos; 25°16' S, 168°56' E; depth 614–690 m; NORFOLK 2, stn DW2067; MNHN-IM-2023-978 • 3 dd; same data as for preceding; MNHN-IM-2023-982 • 1 lv, 1 dd; Banc Cryptelia; 23°19' S, 168°15' E; depth 190–212 m; NORFOLK 1, stn DW1727; MNHN-IM-2023-940 • 1 dd; 23°17' S, 168°14' E; depth 405–455 m; NORFOLK 2, stn DW2132; MNHN-IM-2023-981 • 1 dd; 23°15' S, 168°14' E; depth 420–540 m; TERRASSES, stn DW3077; MNHN-IM-2023-1000 • 3 dd; Banc Éponge (Mount B); 24°55' S, 168°22' E; depth 508–532 m; SMIB 8, stn DW146–147; MNHN-IM-2023-971 • 1 dd; 24°54' S, 168°22' E; depth 508–510 m; SMIB 8, stn DW149; MNHN-IM-2023-948 • 1 lv juv., 2 dd; 24°54' S, 168°22' E; depth 514–530 m; SMIB 8, stn DW152; MNHN-IM-2023-935 • 6 lv; Banc Éponge; 24°55' S, 168°22' E; depth 504–530 m; LITHIST, stn DW07; MNHN-IM-2023-966 • 1 dd; 24°55' S, 168°22' E; depth 509–564 m; NORFOLK 1, stn CP1685; MNHN-IM-2023-993 • 1 dd; 24°55' S, 168°22' E; depth 539–545 m; NORFOLK 1, stn CP1687; MNHN-IM-2023-987 • 1 lv; 24°56' S, 168°21' E; depth 508–541 m; NORFOLK 1, stn DW1684; MNHN-IM-2023-983 • 1 dd; 24°55' S, 168°21' E; depth 509–513 m; NORFOLK 1, stn DW1691; MNHN-IM-2023-1004 • 1 lv, 2 dd; 24°54' S, 168°22' E; depth 500–505 m; NORFOLK 2, stn DW2081; NMBE MOLL-0588448 • 2 dd; 24°52' S, 168°22' E; depth 586–730 m; NORFOLK 2, stn DW2084; MNHN-IM-2023-1005 • 2 dd; 24°56' S, 168°22' E; depth 518–586 m; NORFOLK 2, stn DW2087; MNHN-IM-2023-934 • 1 dd; same data as for preceding; MNHN-IM-2023-997 • 1 dd; 24°56' S, 168°21' E; depth 508–553 m; SMIB 10, stn DW215; MNHN-IM-2023-943 • 1 dd; Banc Introuvable; 24°40' S, 168°40' E; depth 575–589 m; NORFOLK 1, stn DW1694; MNHN-IM-2023-950 • 1 dd; same data as for preceding; MNHN-IM-2023-972 • 1 dd; 24°40' S, 168°40' E; depth 562–587 m; NORFOLK 1, stn DW1695; MNHN-IM-2023-970 • 1 dd juv.; 24°40' S, 168°39' E; depth 569–616 m; NORFOLK 1, stn DW1697; MNHN-IM-2023-992 • 1 lv; 24°40' S, 168°39' E; depth 581–600 m; NORFOLK 1, stn DW1699; MNHN-IM-2023-954 (Fig. 13E–F) • 2 dd; 24°40' S, 168°40' E; depth 591–1032 m; NORFOLK 2, stn DW2058; MNHN-IM-2023-977 • 3 dd; 24°40' S, 168°38' E; depth 582–600 m; NORFOLK 2, stn DW2060; MNHN-IM-2023-962 • 1 dd; Banc Jumeau Est; 23°41' S, 168°15' E; depth 381–493 m; NORFOLK 1, stn DW1707; MNHN-IM-2023-944 • 1 dd; same data as for preceding; MNHN-IM-2023-1001 • 4 dd; 23°44' S, 168°16' E; depth 380–385 m; NORFOLK 2, stn CP2048; MNHN-IM-2023-965 • 2 dd; 24°40' S, 168°39' E; depth 555–565 m; NORFOLK 2, stn DW2057; MNHN-IM-2023-975 • 1 dd; 23°45' S, 168°18' E; depth 888–916 m; NORFOLK 2, stn DW2113; MNHN-IM-2023-990 • 1 dd; Banc Jumeau Ouest; 23°41' S, 168°00' E; depth 382–386 m; NORFOLK 1, stn CP1670; MNHN-IM-2023-945 • 1 lv, 2 dd; Banc Kaimon Maru; 24°45' S, 168°06' E; depth 600–896 m; NORFOLK 2, stn DW2091; MNHN-IM-2023-974 • 1 dd; 24°44' S, 168°06' E; depth 580–583 m; NORFOLK 2, stn DW2097; MNHN-IM-2023-976 • 1 dd juv.; Banc Munida; 23°01' S, 168°17' E; depth 550 m; NORFOLK 2, stn DW2142; MNHN-IM-2023-1006 • 1 lv; Banc Stylaster; 23°41' S, 167°41' E; depth 485–505 m; NORFOLK 2, stn DW2034; MNHN-IM-2023-958 • 1 lv, 1 dd; 23°40' S, 167°40' E; depth 515–540 m; NORFOLK 2, stn DW2035; MNHN-IM-2023-959 • 2 dd; 23°40' S, 167°41' E; depth 517–570 m; NORFOLK 2, stn DW2037; MNHN-IM-2023-956 • 4 dd; Banc Zorro; 25°24' S, 168°19' E; depth 609 m; NORFOLK 2, stn DW2073; MNHN-IM-2023-967 • 2 dd; 25°24' S, 168°20' E; depth 623–691 m; NORFOLK 2, stn DW2074; MNHN-IM-2023-963 • 1 dd; 25°23' S, 168°20' E; depth 650–1000 m; NORFOLK 2, stn DW2075; MNHN-IM-2023-973 • 2 lv; 25°21' S, 168°19' E; depth 666–1000 m; NORFOLK 2, stn DW2077; MNHN-IM-2023-1252 • 1 dd; Norfolk Ridge; 23°19' S, 168°00' E; depth 601–608 m; BATHUS 3, stn DW824; MNHN-IM-2023-938 • 1 dd; 23°22' S, 168°00' E; depth 597–605 m; BATHUS 3, stn DW825; MNHN-IM-2023-979 • 1 dd juv.; 23°11' S, 167°10' E; depth 675–680 m; BIOCAL, stn DW33; MNHN-IM-2023-995 • 1 lv, 2 dd; 24°55' S, 168°22' E; depth 505–515 m; BIOCAL, stn DW66; MNHN-IM-2023-939 • 1 dd; 24°55' S, 168°22' E; depth 500 m; CHALCAL 2, stn CC01; MNHN-IM-2023-937 • 1 lv, 2 dd; 24°55' S, 168°21' E; depth 500 m; CHALCAL 2, stn CC02; MNHN-IM-2023-946 • 4 dd; 24°54' S, 168°22' E; depth 527 m; CHALCAL 2, stn DW72; MNHN-IM-2023-999 • 1 lv; 24°40' S, 168°38' E; depth 573 m; CHALCAL 2, stn DW73; MNHN-IM-2023-1007 • 2 dd; 24°40' S, 168°38' E; depth 650 m; CHALCAL 2, stn DW74; MNHN-IM-2023-986 • 1 dd; 24°55' S, 168°22' E; depth 520 m; SMIB 3, stn DW01; MNHN-IM-2023-941 • 1 lv juv.; 24°54' S, 168°22' E; depth 530–537 m; SMIB 3, stn DW02;

MNHN-IM-2023-984 • 3 dd; 24°55' S, 168°22' E; depth 502–512 m; SMIB 3, stn DW05; MNHN-IM-2023-998 • 1 dd; 24°55' S, 168°21' E; depth 505 m; SMIB 3, stn DW06; MNHN-IM-2023-953 • 2 lv, 2 dd; 24°55' S, 168°21' E; depth 505 m; SMIB 3, stn DW07; MNHN-IM-2023-955 • 1 dd; 24°55' S, 168°21' E; depth 500–530 m; SMIB 4, stn DW36; MNHN-IM-2023-931 • 1 dd; 24°45' S, 168°07' E; depth 430–450 m; BERYX 11, stn CP21; MNHN-IM-2023-933.

Description

Measurements (holotype): SL 37.3 mm, ShW 14.9 mm.

Refer to Hadorn & Fraussen (2006a).

Distribution

Known from the Coral Sea, including Chesterfield, New Caledonia, and Loyalty Islands, extending southwards along the Norfolk and Loyalty Ridge (Fig. 14). Live-collected specimens recorded at depths of 217–770 m; empty or crabbed specimens at depths of 212–888 m.

Remarks

In the original description, material from Fiji (Bligh Water) was identified as *Vermeijius alcyoneum*. Upon re-examination, these specimens possess a white paucispiral protoconch, in contrast to the reddish multispiral protoconch of *V. alcyoneum*. They are now described as *Vermeijius fijiensis* sp. nov., a Fiji endemic which differs primarily by having a paucispiral protoconch and a longer, more slender spire.

A similar case involves a specimen from Vanuatu, which was also initially identified as *V. alcyoneum* and herein described as *Vermeijius malampaensis* sp. nov., which shares with *V. alcyoneum* an overall shell shape and sculpture but differs chiefly by its paucispiral protoconch. Further detailed differences are provided under *V. malampaensis*.

A specimen from Cocos (Keeling) Islands, collected by RV *Investigator* expedition IN2022_V08 (stn 136, 754–890 m depth), and figured by Criscione (2024: 19, fig. 17) as *Fusinus alcyoneum*, shows several distinguishing features. Although superficially similar, it differs in having adapical whorls that are slightly symmetrically trapezoidal rather than convex, a shorter and broader spire, more distinct axial sculpture, a more constricted suture, and more convex whorls.

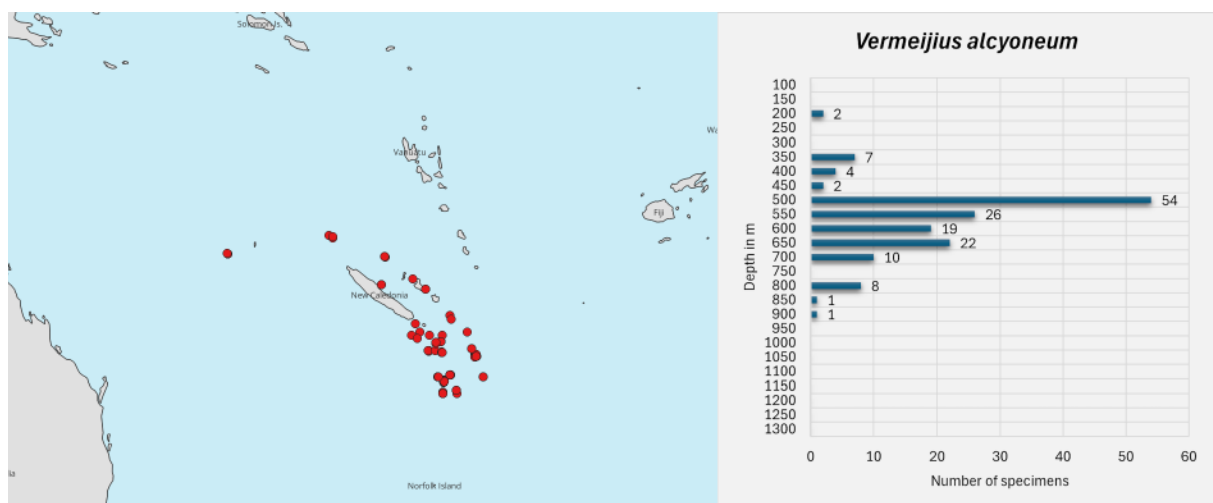


Fig. 14. Geographical and bathymetrical distribution of *Vermeijius alcyoneum* (Hadorn & Fraussen, 2006). Each column represents the number of specimens (lv or dd).

Vermeijius inglorius (Hadorn & Fraussen, 2006) comb. nov.
Figs 15–16, 80A, 82L, 85H

Fusinus inglorius Hadorn & Fraussen, 2006a: 92, 94, figs 1–4, 31.

Fusinus inglorius – Mallard & Robin 2017: 55, figs 1–2. — Robin 2021: 275, 1st row middle.
“*Fusinus*” *inglorius* – Callomon & Snyder 2019: 89, fig. 191a–b.

Diagnosis

Shell medium-sized for genus (up to 39 mm SL), fusiform, off-white, with elongate spire of ~9 convex whorls including protoconch; surface often rough, spire tip usually eroded; suture distinct, constricted, undulating. Protoconch (Figs 15H, 85H) paucispiral, bulbous, white, glossy, smooth, of ~1.5 whorl; transition to teleoconch and first teleoconch whorl usually eroded; final part with 4–6 closely spaced, irregular axial growth lines; transition indistinct; diameter 0.8–1.0 mm. Axial sculpture of rather weak, narrow ribs extending from suture to suture on all teleoconch whorls; interspaces as broad as ribs; 8–10 ribs on three uppermost teleoconch whorls, 9–11 on following whorls, 11–14 on penultimate and last whorl; ribs on last whorl occasionally weaker or absent. Spiral sculpture fine, weak, inconspicuous; teleoconch beginning with 4 primary cords, two central cords more prominent; one secondary cord between primary cords from second teleoconch whorl onwards; from third whorl onwards, fine tertiary cords present on both sides of secondary cords, increasing to 4 on last whorl; secondary cords occasionally reaching strength of primary cords on later whorls. Aperture ovate, white, pointed adapically; parietal callus smooth, glossy, appressed, not detached, occasionally with small simple adapical denticle; columellar folds absent; outer lip simple, smooth within, edge slightly crenulated. Siphonal canal short, about as long as aperture, curved, widely open, slightly recurved. Operculum typical of genus, corneous, light brown, ovate, rounded adapically, pointed abapically, filling aperture; outer side with fine concentric growth lines; nucleus terminal. Periostracum olive, thin, well adherent. Radulae (Fig. 80A), examined in three specimens (MNHN-IM-2023-1245, MNHN-IM-2023-1251), rather similar in all, long, comprising 140–180 transverse rows of teeth, of which about 10–15 rows nascent. Radula narrow, distance between outer edges of lateral teeth about 130–135 μm (1.2%–1.35% of AL without canal). Lateral teeth broad, with slightly arcuate anterior margin and strongly attenuated outer anterior corner, producing long ‘handle’. Lateral teeth with five recurved, closely spaced, unequal major cusps and one smaller inner cusp. Outermost and second from inner margin major cusps longest, of nearly equal length, outermost cusp thickest. Tooth outline weakly to distinctly concave, with distinct obtuse cusp at transition of outer cusp side into ‘handle’. Central tooth slightly variable in length, with three short, sharp cusps, central cusp slightly longer. Distinct transverse folds of membrane situated serially between rows of lateral teeth and not fusing with lateral margins of central teeth.

DNA diagnosis

DNA diagnosis (based on 5 *cox1* sequences): ‘C’ in the site 169, ‘G’ in the site 352.

Material examined

Holotype

TAIWAN • 1v; northeast coast, off Tashi; 24°53.2' N, 122°04.0' E; depth 506–680 m; TAIWAN 2001, stn CP99; NMNS-5111-001 (Figs 15A–B, 82L).

Paratype

TAIWAN • 1 lv, SL 33.1 mm, ShW 12.2 mm; same data as for holotype; MNHN-IM-2000-9402 (Fig. 15C–D).

Sequenced material

SOUTH CHINA SEA • 1 lv; continental slope; 20°02' N, 114°09' E; depth 333–421 m; NanHai 2014, stn CP4117; MNHN-IM-2013-44546 • 1 lv; same data as for preceding; MNHN-IM-2013-44545 • 1 lv; Pratas Islands, S off DongSha; 20°33' N, 116°39' E; depth 538–560 m; ZhongSha 2015, stn DW4161; MNHN-IM-2013-59498 (Fig. 15I–J) • 1 lv; S off Taiwan Bank; 22°03' N, 118°45' E; depth 587–756 m; ZhongSha 2015, stn CP4166; MNHN-IM-2013-59610 (Figs 15E–H, 85H).

TAIWAN • 1 lv; NE Taiwan, off Tashi (Toucheng); 24°52' N, 122°3' E; depth 600 m; TAIWAN 2001, stn CP71; MNHN-IM-2007-32586 (Fig. 15K–L).

Other material

TAIWAN • 1 lv; NE Taiwan, off Tashi; 24°24' N, 122°18' E; depth 638–824 m; TAIWAN 2000, stn CP55; MNHN-IM-2023-1089 • 1 dd juv.; 24°28' N, 122°13' E; depth 438 m; TAIWAN 2000, stn DW56; MNHN-IM-2023-1098 • 1 dd; 24°52' N, 122°04' E; depth 540–700 m; TAIWAN 2001, stn CP111; MNHN-IM-2023-1088 • 1 lv; 24°51' N, 122°02' E; depth 500–600 m; TAIWAN 2001, stn CP112; MNHN-IM-2007-32664 • 3 lv; 24°52' N, 122°03' E; depth 520–640 m; TAIWAN 2001, stn CP120; MNHN-IM-2023-1245 (Figs 15M–N, 80A); NMBE MOLL-0588449 • 1 dd; 24°50' N, 122°01' E;

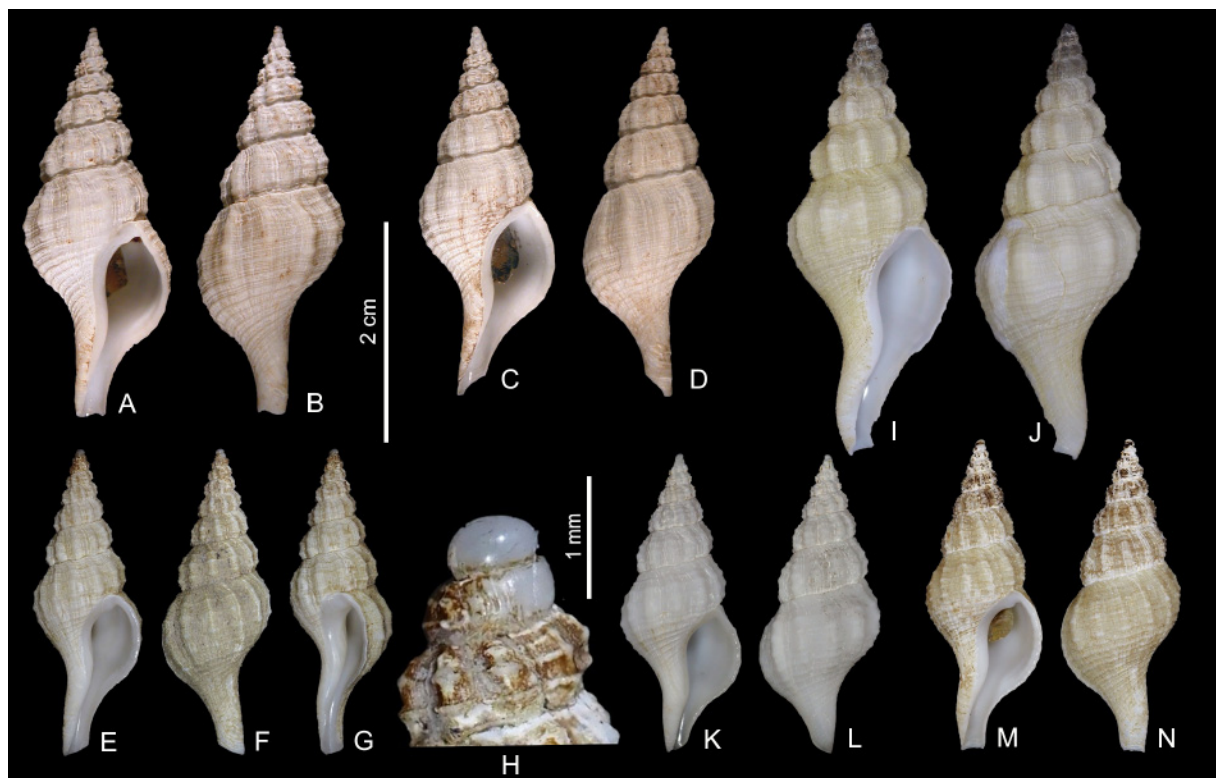


Fig. 15. *Vermeijius inglorius* (Hadorn & Fraussen, 2006) comb. nov. **A–B.** Holotype, NMNS-5111-001, NE Taiwan, off Tashi, TAIWAN 2001, stn CP99, depth 506–680 m, SL 34.8 mm. **C–D.** Paratype, MNHN-IM-2000-9402, same data as for holotype, SL 33.1 mm. **E–H.** MNHN-IM-2013-59610, South China Sea, Taiwan, S off Taiwan Bank, ZhongSha 2015, stn CP4166, depth 587–756 m, SL 27.6 mm (sequenced). **I–J.** MNHN-IM-2013-59498, South China Sea, Pratas Island, S off DongSha, ZhongSha 2015, stn DW4161, depth 538–560 m, SL 38.85 mm (sequenced). **K–L.** MNHN-IM-2007-32586, NE Taiwan, off Tashi, TAIWAN 2001, stn CP71, depth 600 m, SL 26.4 mm (sequenced). **M–N.** MNHN-IM-2023-1245, NE Taiwan, off Tashi, TAIWAN 2001, stn CP120, depth 520–640 m, SL 27.7 mm. All shells at the same scale, except protoconch.

depth 370 m; TAIWAN 2001, stn CP68; MNHN-IM-2023-1090 • 2 lv; 24°52' N, 122°03' E; depth 600 m; TAIWAN 2001, stn CP71; MNHN-IM-2023-1084, MNHN-IM-2023-1251 • 1 dd; 24°54' N, 122°02' E; depth 360 m; TAIWAN 2001, stn CP77; MNHN-IM-2023-1096 • 4 lv, 1 dd; 24°51' N, 122°03' E; depth 650 m; TAIWAN 2001, stn CP88; MNHN-IM-2023-1086 • 1 dd; same data as for preceding; MNHN-IM-2023-1092 • 1 dd; 24°54' N, 122°01' E; depth 310–420 m; TAIWAN 2001, stn CP89; MNHN-IM-2023-1083 • 1 lv, 1 dd; 24°54' N, 122°04' E; depth 472–586 m; TAIWAN 2001, stn CP96; MNHN-IM-2023-1093 • 1 dd; same data as for preceding; MNHN-IM-2023-1094 • 1 lv, 5 dd; 24°53.2' N, 122°04' E; depth 506–680 m; TAIWAN 2001, stn CP99; MNHN-IM-2023-1085 • 2 dd; off Suao; 24°30' N, 122°06' E; depth 421–531 m; TAIWAN 2004, stn CP268; MNHN-IM-2023-1087 • 1 dd; same data as for preceding; MNHN-IM-2023-1099 • 2 dd; 24°31' N, 122°06' E; depth 397–399 m; TAIWAN 2004, stn CP269; MNHN-IM-2023-1095 • 1 lv juv., 1 dd; same data as for preceding; MNHN-IM-2023-1246 • 1 lv; SE Taiwan, Bashi channel; 21°44' N, 120°51' E; depth 478–509 m; TAIWAN 2000, stn FP38; MNHN-IM-2023-1091 • 1 dd; off SW Taiwan; 21°47' N, 120°40' E; depth 840–930 m; SAKIZAYA 2019, stn CP4204; MNHN-IM-2023-1097 • 1 lv; S off Taiwan Bank; 22°07' N, 118°43' E; depth 443–618 m; ZhongSha 2015, stn CP4165; MNHN-IM-2023-1273.

Description

Measurements (holotype): SL 34.8 mm, ShW 13.5 mm.

Refer to Hadorn & Fraussen (2006a).

Distribution

Known only from Taiwan and the South China Sea (Fig. 16). Live-collected specimens recorded at depths of 399–650 m; empty or crabbed shells at depths of 360–840 m.

Remarks

Vermeijius retiarius (von Martens, 1901) (East African coast to Sri Lanka) closely resembles *V. inglorius* in overall sculpture and the often rough, eroded shell surface, but differs by its larger adult size, broader, heavier and thicker shell, and more pronounced, broader axial ribs which are fewer in number on all whorls.

Differences from *Vermeijius mainbaza* sp. nov. (Mozambique) are detailed under that species.

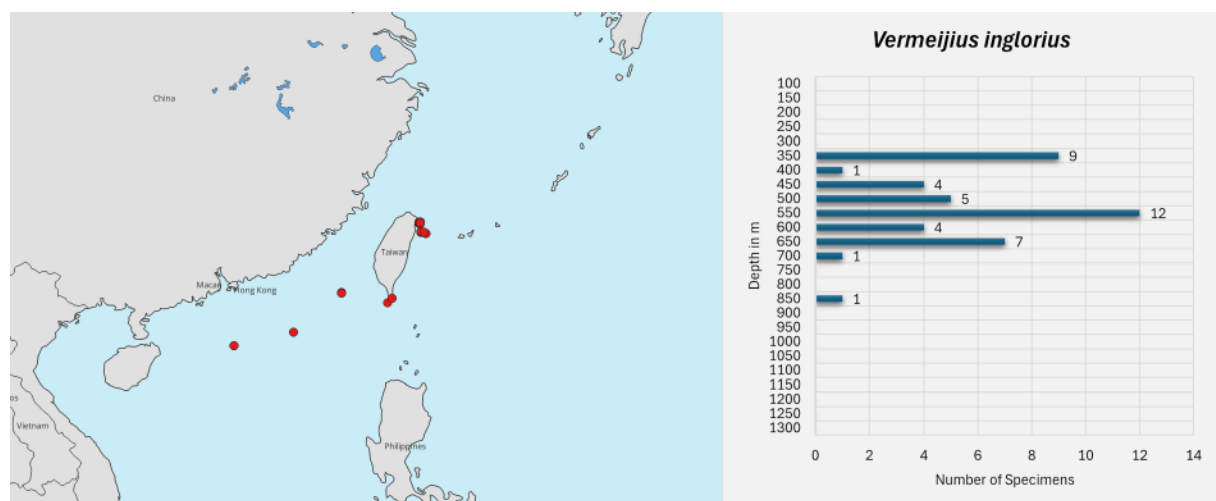


Fig. 16. Geographical and bathymetrical distribution of *Vermeijius inglorius* (Hadorn & Fraussen, 2006). Each column represents the number of specimens (lv or dd).

Vermeijius albulus sp. nov.

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Figs 17A–M, 18, 80C, 82M, 85I

DNA diagnosis

DNA diagnosis (based on 7 *cox1* sequences): ‘A’ in the site 271, ‘C’ in the site 328.

Etymology

The adjective ‘*albulus*’ is Latin for ‘whitish’. It is formed by combining ‘*albus*’ (‘white’) with the diminutive suffix ‘-ulus’, indicating a slight degree of whiteness and referring to the uniformly dull-white colour of the shell.

Material examined

Holotype (sequenced)

SOLOMON ISLANDS • 1 lv; Guadalcanal, Kaoka Bay; 9°40′ S, 160°45′ E; depth 650–725 m; SALOMONBOA 3, stn CP2858; MNHN-IM-2007-36008 (Figs 17A–D, 82M).

Paratypes

SOLOMON ISLANDS • 1 lv, SL 44.3 mm, ShW 16.5 mm, sequenced; Santa Isabel Island, W of San Jorge Island; 8°24′ S, 159°23′ E; depth 897–1057 m; SALOMON 2, stn CP2197; MNHN-IM-2007-32566 • 1 lv, SL 30.5 mm, ShW 10.8 mm, sequenced; N of San Cristobal; 10°21′ S, 161°55′ E; depth 653–711 m; SALOMONBOA 3, stn CP2822; MNHN-IM-2007-36054 (Fig. 17E–F) • 1 lv, SL 36.2 mm, ShW 14.0 mm; same data as for holotype; NMBE MOLL-0588451 (Figs 17G–I, 85I).

Additional sequenced material

SOLOMON ISLANDS • 1 lv; N of San Cristobal; 10°21′ S, 161°55′ E; depth 653–711 m; SALOMONBOA 3, stn CP2822; MNHN-IM-2007-36055 • 1 lv; 10°44′ S, 161°21′ E; depth 545–753 m; SALOMONBOA 3, stn CP2834; MNHN-IM-2007-36268 • 1 lv; 10°25′ S, 162°02′ E; depth 532–883 m; SALOMONBOA 3, stn CP2825; MNHN-IM-2007-36064 (Figs 17L–M, 80C) • 1 lv; E of Malaita; 8°41′ S, 161°04′ E; depth 556–864 m; SALOMONBOA 3, stn CP2800; MNHN-IM-2007-36047.

Other material

PAPUA NEW GUINEA • 1 lv juv.; Milne Bay Province, off islands and reefs of Lancasay; 8°14′ S, 150°32′ E; depth 760–769 m; BIOPAPUA, stn CP3736; MNHN-IM-2023-928 • 1 dd; New Britain, Kimbe Bay; 5°21′ S, 150°45′ E; depth 490–715 m; BIOPAPUA, stn CP3679; MNHN-IM-2023-923 (Fig. 17J–K) • 1 lv; NW of Rabaul; 4°04′ S, 151°50′ E; depth 702–724 m; BIOPAPUA, stn CP3672; MNHN-IM-2023-1248 • 1 lv; NE New Ireland, Gazelle Channel; 2°54′ S, 151°05′ E; depth 350–847 m; MADEEP, stn CP4260; MNHN-IM-2023-924.

SOLOMON ISLANDS • 1 dd; E of Guadalcanal; 9°37′ S, 160°42′ E; depth 435–461 m; SALOMON 1, stn CP1858; MNHN-IM-2023-925 • 2 lv; Guadalcanal, Kaoka Bay; 9°40′ S, 160°45′ E; depth 650–725 m; SALOMONBOA 3, stn CP2858; MNHN-IM-2023-926 • 1 lv, 1 dd; E of Malaita; 8°41′ S, 161°04′ E; depth 556–864 m; SALOMONBOA 3, stn CP2800; MNHN-IM-2023-927 • 1 dd; W of Malaita; 9°12′ S, 160°55′ E; depth 706–722 m; SALOMONBOA 3, stn CP2777; MNHN-IM-2023-929 • 1 lv; San Cristobal, N of San Cristobal; 10°19′ S, 161°54′ E; depth 686–864 m; SALOMONBOA 3, stn CP2821; MNHN-IM-2007-36258.

Description

Measurements (holotype): SL 33.9 mm, ShW 11.9 mm.

Shell medium-sized to large for genus (up to 44.4 mm SL), moderately slender, fusiform, composed of 1.75 protoconch and 8.5 teleoconch whorls. Protoconch paucispiral (Figs 17I, 85I), consisting of 1.5 glossy, bulbous initial whorls with terminally very fine axial growth lines, followed by ~0.25 whorl bearing 2 arcuate, strong, irregular axial riblets. Transition to teleoconch marked by onset of teleoconch spiral sculpture. Protoconch diameter 0.85 mm, exposed height ~0.9 mm. Teleoconch whorls moderately convex, double-keeled; suture slightly impressed, undulating, following axial sculpture of preceding whorl. Axial sculpture of broad, raised ribs extending from suture to suture: ~8 on early whorls, 9 on antepenultimate whorl, 10 on penultimate, 11–12 on last whorl. Ribs more pronounced on early whorls, becoming weaker on later whorls. Interspaces approximately equal to ribs in width. Spiral sculpture with 3 evenly spaced, strong, broad, well-rounded primary cords on early whorls; central and abapical

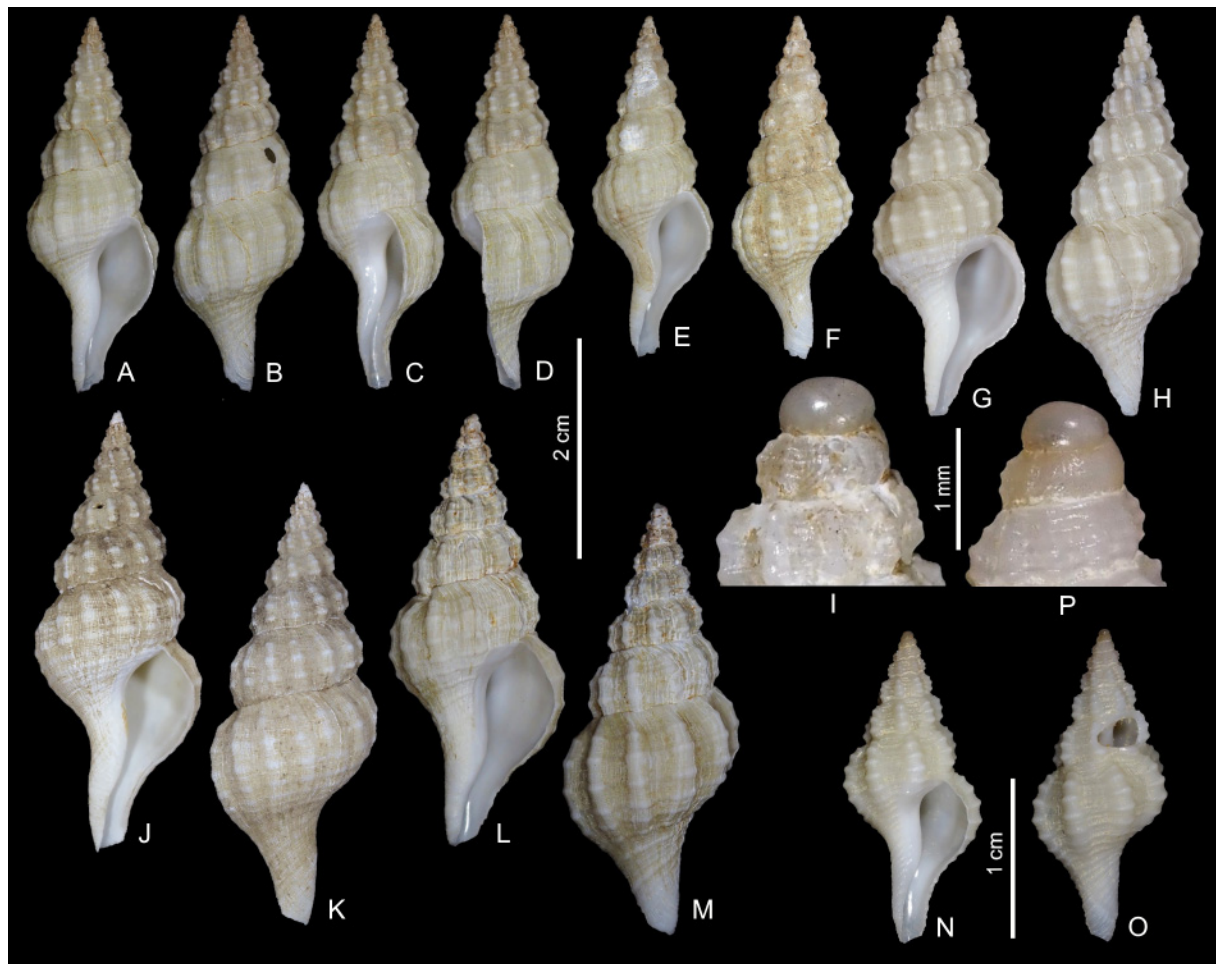


Fig. 17. A–M. *Vermeijius albulus* sp. nov. A–D. Holotype, MNHN-IM-2007-36008, Solomon Islands, Guadalcanal, Kaoka Bay, SALOMONBOA 3, stn CP2858, depth 650–725 m, SL 33.9 mm (sequenced). E–F. Paratype, MNHN-IM-2007-36054, Solomon Islands, N San Cristobal, SALOMONBOA 3, stn CP2822, depth 653–711 m, SL 30.5 mm (sequenced). G–I. Paratype, NMBE MOLL-0588451, same data as for holotype, SL 36.2 mm. J–K. MNHN-IM-2023-923, Papua New Guinea, New Britain, Kimbe Bay, BIOPAPUA, stn CP3679, depth 490–715 m, SL 39.3 mm. L–M. MNHN-IM-2007-36064, Solomon Islands, N San Cristobal, SALOMONBOA 3, stn CP2825, depth 532–883 m, SL 38.7 mm (sequenced). – N–P. *Vermeijius abditus* sp. nov., holotype, MNHN-IM-2007-35637, N New Caledonia, Grand Passage, CONCALIS, stn CP3027, depth 600–1100 m, SL 19.3 mm (sequenced). All shells at the same scale, except *V. abditus* and protoconch images.

cords distinctly stronger, forming clear double keel on upper whorls, less prominent on penultimate and last whorl. From second teleoconch whorl onwards, secondary and finer tertiary spiral threads present between primary cords, number increasing rapidly. Numerous axial growth lines intersecting spiral sculpture produce fine net-like appearance. Last whorl with 5–7 broad, flat spiral cords between suture and base and ~7–8 on canal, intercalated with finer threads; cords stronger adapically, becoming finer and more irregular towards canal tip. Siphonal canal relatively short, about as long as aperture, open, slightly curved. Aperture relatively small, ovate. Outer lip smooth internally. Inner lip fully adherent to columella, forming thin, glossy, smooth callus; no columellar plicae. Broad, weak parietal tooth present. Umbilicus absent. Protoconch greyish; aperture interior white. Teleoconch dull white; axial ribs slightly lighter than background. Operculum corneous, brownish, with terminal nucleus, filling aperture. Radula (Fig. 80C) examined in one specimen (MNHN-IM-2007-36064), long, comprising ~160 transverse rows of teeth, of which ~20 nascent. Radula narrow; distance between outer edges of lateral teeth ~165 μm (1.3% of AL without canal). Lateral teeth broad, arcuate, with strongly attenuated outer anterior corner, forming long ‘handle’. Lateral teeth with five recurved, closely spaced, unequal major cusps and one smaller inner cusp. Outermost cusp incompletely subdivided into two cusps, outer cusp shorter. Outermost and second from inner margin major cusps longest, nearly equal; outermost thickest. Tooth outline weakly concave, with weak rounded knob at transition to ‘handle’. Central tooth trapezoidal, with three short, sharp cusps, central cusp slightly longer. Distinct transverse folds of membrane present between rows of lateral teeth, not fusing with central teeth.

Distribution

Papua New Guinea to Solomon Islands (Fig. 18). Live-collected specimens at depths of 711–897 m; empty or crabbed shells at depths of 461–715 m.

Remarks

Vermeijius albulus sp. nov. is superficially similar to several congeners, none of which occur in the same geographic area.

Vermeijius inglorius (South and East China Seas around Taiwan) is similar in size, also uniformly whitish, and comparable in overall shape. It differs by a slightly broader and relatively shorter spire,

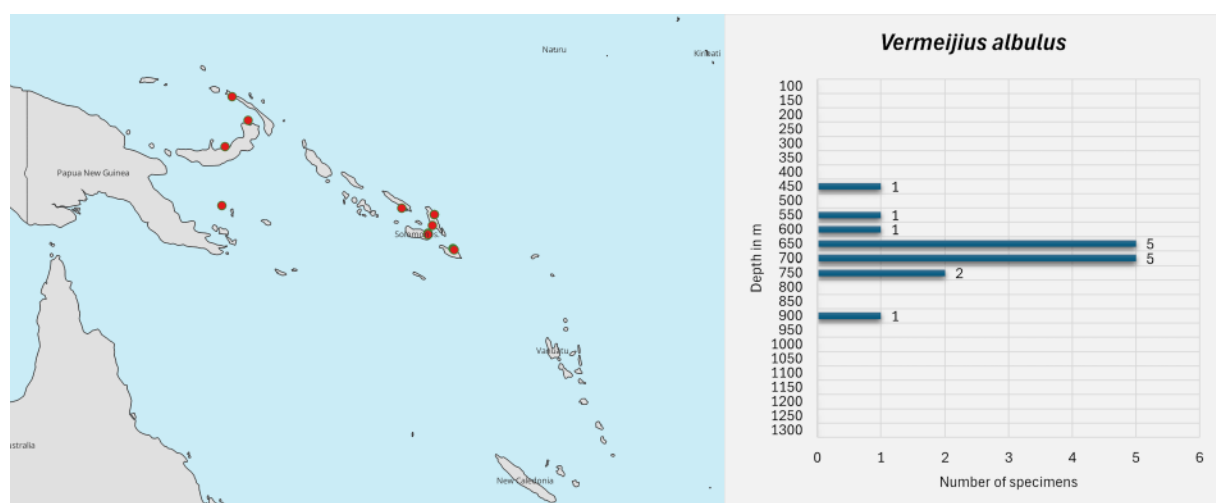


Fig. 18. Geographical and bathymetrical distribution of *Vermeijius albulus* sp. nov. Each column represents the number of specimens (lv or dd).

more inflated whorls, usually with irregular or almost obsolete axial sculpture on the last whorl, a larger aperture, and 3 sharp primary spiral cords on the upper whorls (vs 2 rounded, broad cords forming a double keel in *V. albulus*).

Vermeijius alcyoneum (New Caledonia) differs by its multispiral protoconch, shorter and broader spire, and sharper, more numerous spiral cords.

The rare *Vermeijius thielei* (Indonesia) differs by a significantly wider spire angle, a shorter and more curved siphonal canal, less convex whorls, a less deeply incised suture, more numerous axial ribs, more numerous but weaker primary spiral cords, and sharper secondary intercalated spiral threads.

Two morphologically similar species occur in the western Indian Ocean:

Vermeijius retarius (East African coast to Sri Lanka) is distinguished by its larger adult size, wider spiral angle, usually shorter spire, evenly convex whorls, more numerous primary spiral cords on the upper whorls, and a somewhat inflated last whorl.

Vermeijius insperatus (western Madagascar) differs by having a slimmer and slightly higher spire, fewer but somewhat more strongly developed axial ribs separated by wider interspaces, and more numerous, slightly sharper and finer spiral cords.

***Vermeijius abditus* sp. nov.**

urn:lsid:zoobank.org:act:B0095171-673D-4A8F-BE4B-524D18A76844

Figs 17N–P, 19, 83N, 85J

DNA diagnosis

DNA diagnosis (based on 1 *cox1* sequence): no diagnostic sites were recovered.

Etymology

The Latin adjective ‘*abditus*’ means ‘hidden’, ‘concealed’, or ‘secret’. It is the past participle of the verb ‘*abdo*’, which means ‘to remove’, ‘withdraw’, or ‘put away’. It refers to the fact that this species, with a paucispiral protoconch, remained hidden or overlooked among the material of *V. alcyoneum*.

Material examined

Holotype (sequenced)

NEW CALEDONIA • 1v subadult; N New Caledonia, Grand Passage; 20°17' S, 163°50' E; depth 600–1100 m; CONCALIS, stn CP3027; MNHN-IM-2007-35637 (Figs 17N–P, 83N, 85J).

Description

Measurements (holotype): SL 19.3 mm, ShW 8.5 mm.

Shell (holotype, subadult) small to medium-sized for genus (19.3 mm SL), with elongate, broad spire, fusiform, consisting of 1.75 protoconch and ~6 teleoconch whorls. Protoconch paucispiral (Figs 17P, 85J), glossy, comprising ~1.5 smooth whorls, followed by about 0.25 whorl bearing initially very fine arcuate axial riblets and then 3 strong arcuate axial riblets. Transition to teleoconch marked by onset of spiral sculpture. Protoconch diameter and exposed height ~0.7 mm. Teleoconch whorls slightly convex; suture impressed and undulating, following axial sculpture of preceding whorl. Axial sculpture of strong, rounded, prominent axial ribs extending from suture to suture, with 7–8 ribs on all whorls; interspaces relatively deep and wider than ribs. Spiral sculpture of 3 strong, rounded primary cords on

early whorls; from second teleoconch whorl onwards, an additional adapical cord appears, followed by intercalated secondary threads from third whorl onwards. On penultimate and last whorl, several fine tertiary threads on both sides of secondary cords. Spiral sculpture slightly more prominent on axial ribs than in interspaces, forming white, rounded, elongated knobs at intersections. Axial growth lines well visible, forming fine reticulate pattern at intersections with spiral sculpture. Base and canal covered with numerous regular, coarse and intercalated finer spiral threads, gradually weakening towards canal tip. Siphonal canal straight, relatively long, exceeding aperture length, widely open. Aperture relatively large, pyriform (features not fully developed due to subadult stage). Outer lip smooth internally. Inner lip fully adherent to columella, forming thin, glossy, smooth columellar callus; true columellar plicae absent, although very fine, inconspicuous raised cord present on columella. Broad, shallow parietal tooth present. Umbilicus absent. Protoconch light brownish; teleoconch and aperture interior white. Periostracum whitish. Operculum not preserved. Radula not examined.

Distribution

Known only from the type locality (Fig. 19). Holotype collected alive at depths of 600–1100 m.

Remarks

Vermeijius malampaensis sp. nov. (Vanuatu to Papua New Guinea) is conchologically the most similar and also has a paucispiral protoconch. It differs by having a more complex, but less pronounced spiral sculpture, more numerous intercalated spiral threads on the penultimate and last whorl, less pronounced white nodes on the axial ribs, a more constricted suture on early whorls, a larger adult size, and a shorter siphonal canal.

Vermeijius fijiensis sp. nov. (Fiji) also has a paucispiral protoconch but is distinguishable by its clearly larger adult size, significantly longer and more slender spire, more strongly convex whorls with a deeply incised suture, a longer, straight siphonal canal, and less pronounced spiral sculpture, particularly on the later whorls.

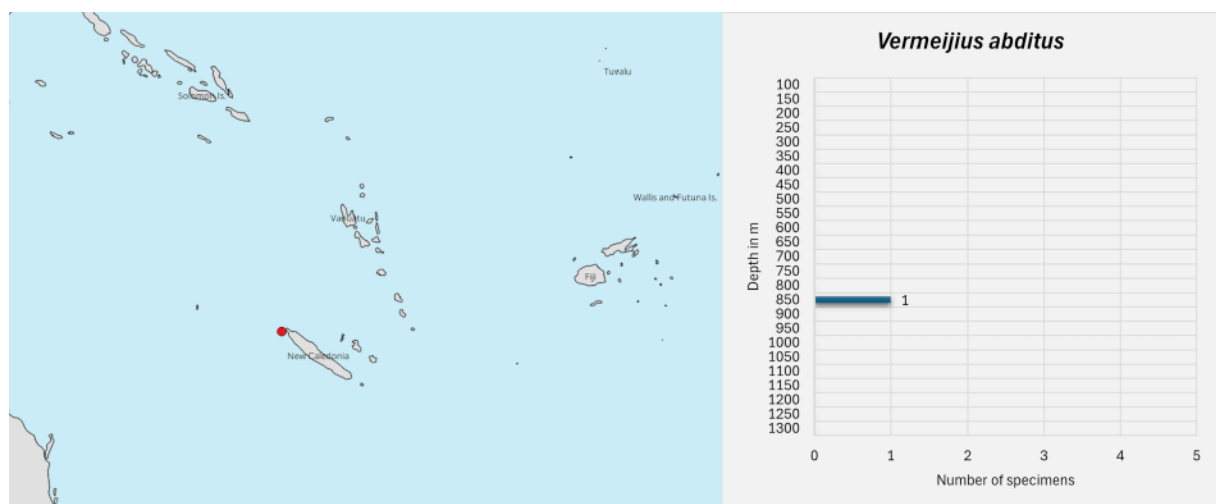


Fig. 19. Geographical and bathymetrical distribution of *Vermeijius abditus* sp. nov. Each column represents the number of specimens (lv or dd).

Vermeijius pallidus (Western Pacific) differs by its multispiral protoconch, higher spire with more convex whorls, more deeply incised suture, significantly longer siphonal canal, and generally more numerous axial ribs.

Vermeijius admirabilis sp. nov.

urn:lsid:zoobank.org:act:A53DD92F-7619-42F1-A712-4B200C2C7D02

Figs 20–21, 80D, 82F, 85K

DNA diagnosis

DNA diagnosis (based on 4 *cox1* sequences): ‘G’ in the site 97, ‘G’ in the site 184, ‘T’ in the site 214.

Etymology

The Latin adjective ‘*admirabilis*’ (‘admirable’, ‘wonderful’) derives from ‘*admirare*’ (‘to admire’), itself from ‘*mirus*’ (‘wonderful’, ‘marvelous’). The suffix ‘*-abilis*’ denotes something worthy of admiration. The name refers to the elegant beauty of this rare *Vermeijius*.

Material examined

Holotype (sequenced)

SOLOMON ISLANDS • 1 lv; Kolombangara Island, Vella Gulf; 8°04’ S, 156°54’ E; depth 399–427 m; SALOMON 2, stn CP2260; MNHN-IM-2007-32530 (Figs 20A–C, 82F).

Paratypes

SOLOMON ISLANDS • 1 lv, SL 76.5 mm, ShW 29.7 mm, sequenced; Solomon Islands, N of Malaita; 8°15’ S, 160°48’ E; depth 411–414 m; SALOMONBOA 3, stn DW2793; MNHN-IM-2007-36162 (Figs 20D–E, 80D) • 1 lv, SL 48.9 mm, ShW 17.4 mm; same data as for holotype; NMBE MOLL-0588452 (Figs 20F–H, 85K).

Additional sequenced material

SOLOMON ISLANDS • 1 lv; Kolombangara Island, Vella Gulf; 8°04’ S, 156°56’ E; depth 399–427 m; SALOMON 2, stn CP2260; MNHN-IM-2007-32531 • 1 lv; same data as for preceding; MNHN-IM-2007-32532.

Other material

SOLOMON ISLANDS • 2 lv; Kolombangara Island, Vella Gulf; 8°04’ S, 156°56’ E; depth 399–427 m; SALOMON 2, stn CP2260; MNHN-IM-2023-922.

Description

Measurements (holotype): SL 56.2 mm, ShW 20.6 mm.

Shell large to very large for genus (up to 76.5 mm SL), with moderately broad spire, fusiform, comprising 1.75 protoconch and 8 teleoconch whorls. Protoconch paucispiral (Figs 20H, 85K), comprising 1.75 bulbous whorls; transition to teleoconch eroded in all examined specimens. Protoconch diameter and exposed height ~0.9 mm. Teleoconch whorls strongly convex, inflated, occasionally with indistinct central carina on later whorls. Suture deeply impressed. Axial sculpture of strong, raised ribs extending from suture to suture; about 7–8 on adapical whorls, 9 on penultimate whorl. Ribs weakening rapidly on last whorl, becoming irregular and nearly absent on last half-whorl. Interspaces relatively deep, wider than ribs. Spiral sculpture of 5 strong, raised primary cords on early whorls, separated by relatively deep grooves; from third teleoconch whorl onward, secondary and shortly thereafter tertiary intercalated threads present between primary cords. Central primary cord often strongest, forming indistinct carina.

Axial growth lines well visible, thickened, producing reticulate pattern at intersections with spiral cords. Base and canal with numerous coarse and finer intercalated spiral threads, gradually weakening towards canal tip. Siphonal canal relatively long, approximately equal to aperture length, open, slightly curved. Aperture large, ovate, smooth internally. Subadult specimens with shallow internal lirae corresponding to stronger external spiral cords. Inner lip fully adherent to columella, forming thin, glossy, smooth callus; columellar plicae absent. Broad, indistinct parietal tooth present. Umbilicus absent. Shell uniformly cream or white inside and outside; some specimens with slightly reddish spire tip. Operculum corneous, brown-yellow, with terminal nucleus, filling aperture. Radula (Fig. 80D) examined in one specimen (paratype, MNHN-IM-2007-36162), unusual for *Vermeijius*, very long, comprising ~250 transverse rows of teeth, of which ~15 nascent. Radula narrow; distance between outer edges of lateral teeth ~305 μm (1.2% of AL without canal). Lateral teeth very broad, arcuate, with strongly attenuated outer anterior corner, forming long ‘handle’. Distinct obtuse cusp at transition to ‘handle’. Lateral teeth with 8 recurved, closely spaced major cusps, gradually decreasing in size from second innermost to outermost, and one smaller inner cusp; smaller cusplets irregularly present between some major cusps. Central tooth short,

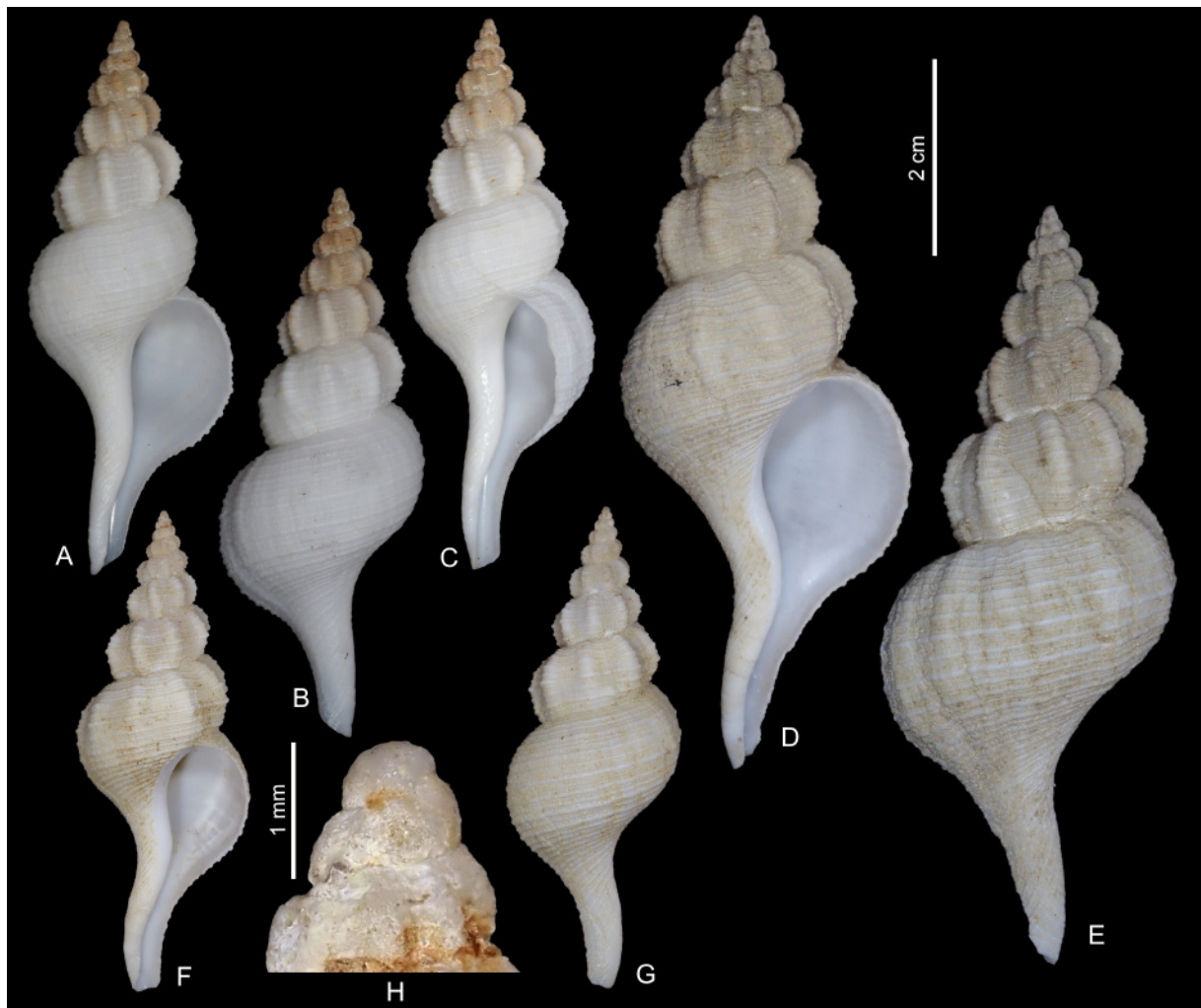


Fig. 20. *Vermeijius admirabilis* sp. nov. **A–C.** Holotype, MNHN-IM-2007-32530, Solomon Islands, Kolombangara Island, Vella Gulf, SALOMON 2, stn CP2260, depth 399–427 m, SL 56.2 mm (sequenced). **D–E.** Paratype, MNHN-IM-2007-36162, Solomon Islands, N Malaita, SALOMONBOA 3, stn DW2793, depth 411–414 m, SL 76.5 mm (sequenced). **F–H.** Paratype, NMBE MOLL-0588452, same data as for holotype, SL 48.9 mm. All shells at the same scale, except protoconch.

trapezoidal, with three short, sharp cusps, central cusp slightly longer, occasionally with additional cusplets. Distinct transverse membrane folds present between rows of lateral teeth, not fusing with central teeth.

Distribution

Known only from Solomon Islands (Fig. 21). Live-collected specimens at depths of 399–414 m.

Remarks

Vermeijius admirabilis sp. nov. is among the largest known *Vermeijius* species and is easily recognisable by having a smooth last whorl that lacks axial sculpture, making it difficult to confuse with other congeners.

The most similar species is *V. costuliferus* sp. nov. (Vanuatu), which differs by a shorter spire, smaller adult size, more convex whorls, more pronounced and narrower axial ribs, and stronger, more developed spiral sculpture.

Juvenile *V. admirabilis* may be confused with *V. papuaensis* sp. nov. (Papua New Guinea), as both exhibit distinct, well-developed axial sculpture on the earlier whorls. However, *V. papuaensis* is distinguished by its smaller adult size, more convex whorls, and significantly more developed, but fewer primary spiral cords.

Vermeijius admirabilis sp. nov. occurs syntopically at one station with *Vermeijius pallidus*, which differs by its multispiral protoconch, less inflated whorls, smaller aperture, more pronounced axial sculpture on the last whorl, and a longer, straight siphonal canal.

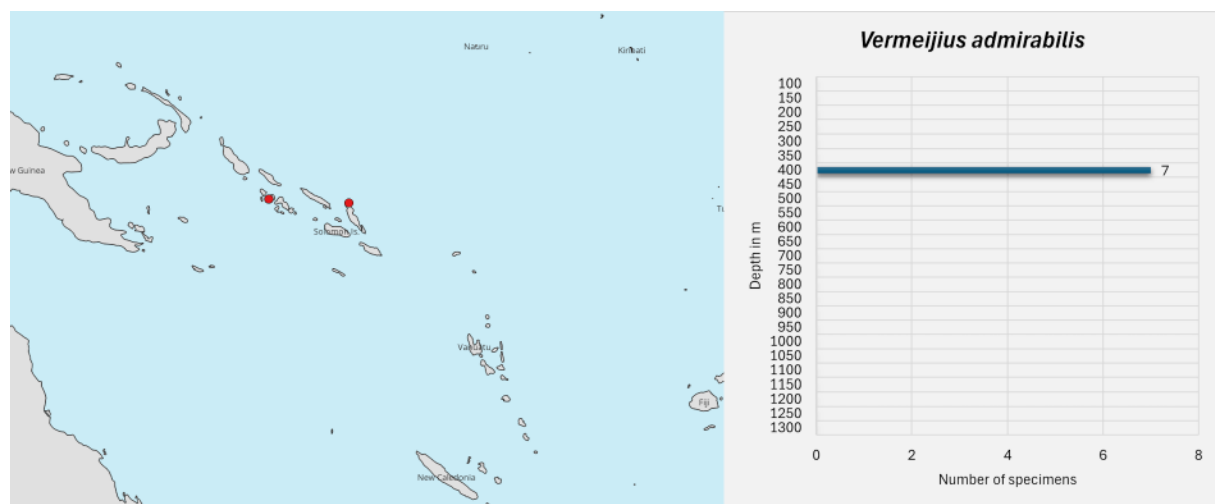


Fig. 21. Geographical and bathymetrical distribution of *Vermeijius admirabilis* sp. nov. Each column represents the number of specimens (lv or dd).

Vermeijius spectabilis sp. nov.

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Figs 22–23, 83C, 85L

Pseudolatirus sp. – Couto *et al.* 2016: 320, fig. 6i.

DNA diagnosis

DNA diagnosis (based on 3 *cox1* sequences): ‘A’ in the site 181, ‘A’ in the site 190, ‘C’ in the site 271, ‘C’ in the site 274.

Etymology

The word ‘*spectabilis*’ is a Latin adjective meaning ‘notable’, ‘admirable’, or ‘remarkable’. It is derived from the Latin verb ‘*spectare*’ (‘to look at’, ‘observe’) and the suffix ‘*-abilis*’ (which forms adjectives indicating the capacity or ability to be acted upon). Thus, ‘*spectabilis*’ literally means ‘capable of being looked at or observed’, implying that something is worth noting or observing.

Material examined

Holotype (sequenced)

CORAL SEA • 1v; Chesterfield, S of Banc Nova; 22°48′ S, 159°23′ E; depth 408–410 m; EBISCO, stn DW2525; MNHN-IM-2007-32510 (Figs 22A–E, 83C, 85L).

Paratypes

CORAL SEA • 1 lv, SL 35.15 mm, ShW 14.6 mm; Chesterfield Plateau; 19°52′ S, 158°40′ E; depth 540–580 m; MUSORSTOM 5, stn DW338; MNHN-IM-2023-1180 (Fig. 22I–M) • 1 dd, SL 25.25 mm, ShW 12.2 mm; 19°52′ S, 158°38′ E; depth 400 m; MUSORSTOM 5, stn DC361; MNHN-IM-2023-1183 (Fig. 22N–O) • 1 dd, SL 24.5 mm, ShW 12.9 mm; Chesterfield Plateau; 19°33′ S, 158°41′ E; depth 486–494 m; EBISCO, stn DW2610; NMBE MOLL-0588475.

SOLOMON ISLANDS • 1 lv, SL 26.2 mm, ShW 12.7 mm, sequenced; Choiseul, W Choiseul Island, Bougainville Strait; 6°35′ S, 156°20′ E; depth 315–418 m; SALOMON 2, stn DW2229; MNHN-IM-2007-32571 (Fig. 22F–H).

Additional sequenced material

SOLOMON ISLANDS • 1 lv; Guadalcanal, Sealark Channel; 9°20′ S, 160°13′ E; depth 328–342 m; SALOMONBOA 3, stn DW2860; MNHN-IM-2007-36058.

Other material

CORAL SEA • 3 dd; Chesterfield Plateau; 19°33′ S, 158°41′ E; depth 486–494 m; EBISCO, stn DW2610; MNHN-IM-2023-1181 • 1 dd; N of Bellona; 20°20′ S, 158°44′ E; depth 390–394 m; EBISCO, stn DW2576; MNHN-IM-2023-1184 • 1 dd; W of Bellona; 21°03′ S, 158°35′ E; depth 500–614 m; EBISCO, stn DW2555; MNHN-IM-2023-1185 • 1 dd; Argo Bank; 23°02′ S, 159°28′ E; depth 315–1260 m; KANADEEP, stn DW4962; MNHN-IM-2023-1192.

LOYALTY ISLANDS • 1 lv; E of Ouvéa; 20°31′ S, 166°50′ E; depth 440–460 m; BIOCAL, stn DW82; MNHN-IM-2023-1188 (Fig. 22P–Q).

LOYALTY RIDGE • 1 dd; between Banc de l’Orne and Walpole; 22°20′ S, 169°01′ E; depth 400–520 m; EXBODI, stn DW3862; MNHN-IM-2023-1191 • 1 dd; 22°22′ S, 168°43′ E; depth 500–550 m; VOLSMAR, stn DW37; MNHN-IM-2023-1182.

PAPUA NEW GUINEA • 1 dd; seamounts off NW Bougainville; 5°33' S, 154°00' E; depth 369–377 m; BIOPAPUA, stn DW3745; MNHN-IM-2023-1190.

SOLOMON ISLANDS • 1 dd juv.; E of Guadalcanal; 9°52' S, 160°51' E; depth 256–329 m; SALOMON 1, stn DW1820; MNHN-IM-2023-1186.

VANUATU • 3 dd juv.; W of Malekula; 16°14' S, 167°21' E; depth 375–397 m; MUSORSTOM 8, stn DW1060; MNHN-IM-2023-1187 • 1 dd; 16°15' S, 167°20' E; depth 458–512 m; MUSORSTOM 8, stn DW1061; MNHN-IM-2023-1189.

Description

Measurements (holotype): SL 33.1 mm, ShW 14.3 mm.

Shell medium-sized for genus (up to 36.9 mm SL), moderately broad, solid, fusiform, comprising 1.75 protoconch and 8.5 teleoconch whorls. Protoconch paucispiral (Figs 22E, H, M, 85L), consisting of 1.5 glossy, bulbous initial whorls, followed by 0.25 whorl bearing 3 arcuate, irregularly strong axial riblets. Transition to teleoconch marked by last, strongest arcuate axial rib and onset of spiral sculpture. Protoconch diameter 0.75 mm, exposed height ~0.7 mm. Teleoconch whorls trapezoidal; penultimate and

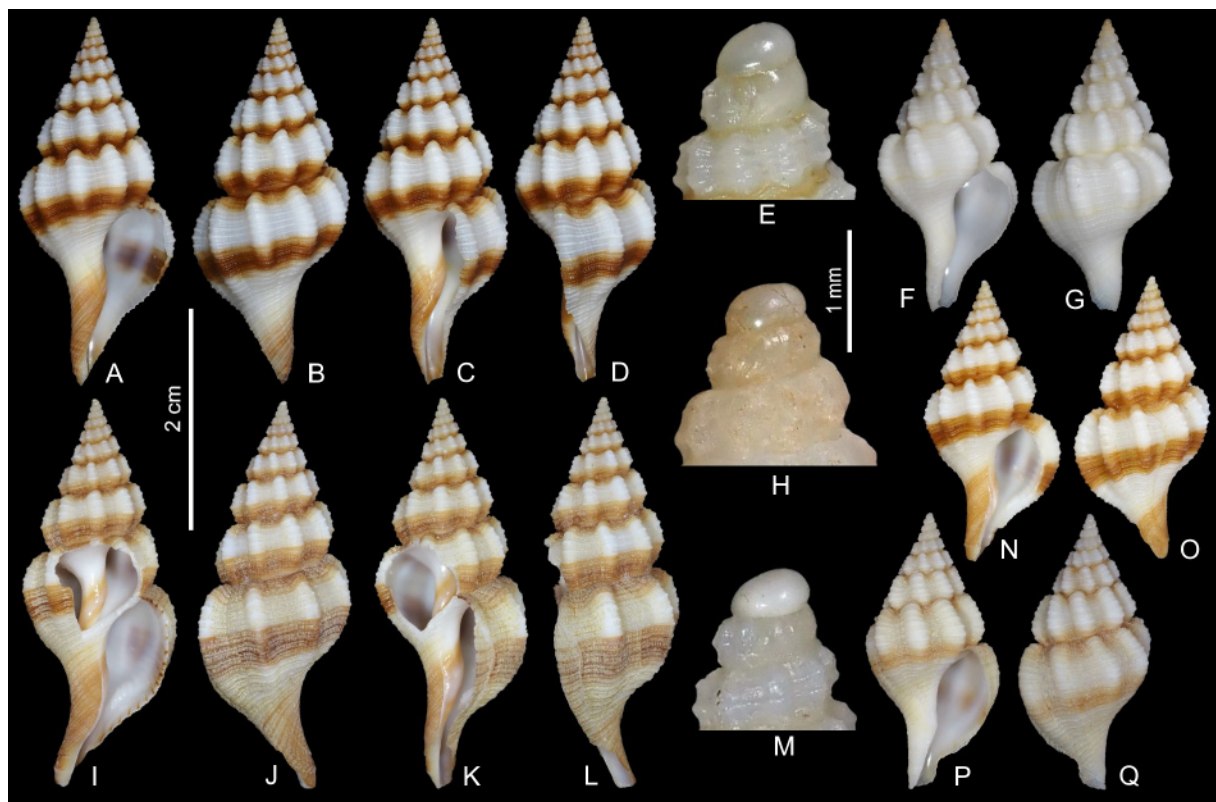


Fig. 22. *Vermeijius spectabilis* sp. nov. **A–E.** Holotype, MNHN-IM-2007-32510, Coral Sea, Chesterfield, S Banc Nova, EBISCO, stn DW2525, depth 408–410 m, SL 33.1 mm (sequenced). **F–H.** Paratype, MNHN-IM-2007-32571, Solomon Islands, W of Choiseul, Bougainville Strait, SALOMON 2, stn DW2229, depth 315–418 m, SL 26.2 mm (sequenced). **I–M.** Paratype, MNHN-IM-2023-1180, Coral Sea, Chesterfield Plateau, MUSORSTOM 5, stn DW338, depth 540–580 m, SL 35.15 mm. **N–O.** Paratype, MNHN-IM-2023-1183, Coral Sea, Chesterfield Plateau, MUSORSTOM 5, stn DC361, depth 400 m, SL 25.25 mm. **P–Q.** MNHN-IM-2023-1188, Loyalty Islands, E of Ouvéa, BIOCAL, stn DW82, depth 440–460 m, SL 24.9 mm. All shells at the same scale, except protoconchs.

last whorl convex. Suture conspicuously constricted, undulating, following axial sculpture of preceding whorl. Axial sculpture of broad, raised ribs extending from suture to suture; 8–9 ribs on all whorls. Ribs inflated adapically, rising above suture, sloping downwards with straight sides towards abapical suture, then constricted near abapical suture. Interspaces initially as broad as ribs, becoming slightly wider on last whorl. Spiral sculpture of 3 primary cords on early whorls; abapical cord strongest; adapical cord also prominent, outlining upper whorl edge. From second teleoconch whorl onwards, secondary spiral threads present, rapidly reaching thickness of primary cords. Later whorls with fine tertiary threads on both sides of secondary threads. Numerous fine axial growth lines intersect spiral sculpture. Last whorl and canal with coarser spiral cords and finer intercalated threads, sometimes with additional fine threads. Siphonal canal relatively short, straight, slightly shorter than aperture, open, slightly bent abaxially. Callus near base of siphonal canal slightly detached. Aperture relatively large, ovate. Outer lip finely crenulated following spiral sculpture, lirate within. Inner lip fully adherent to columella, forming thin, glossy callus; columellar plicae absent. Broad, shallow parietal tooth present. At base of siphonal canal, labral side with up to 5 strongly calloused, elongate teeth; parietal side with 1–2 irregular, weak teeth. Umbilicus absent. Protoconch white; teleoconch cream with reddish-brown bands above and below suture; canal also reddish-brown. Aperture interior white, reddish-brown spiral bands visible through outer lip. Periostracum light brown, with dense spiral rows of broad, short opisthocline thorns at intersections of axial growth lines and spiral sculpture. Operculum not preserved. Radula not examined.

Distribution

From Papua New Guinea, Solomon Islands, Vanuatu, to New Caledonia and the Coral Sea (Chesterfield) (Fig. 23). Live-collected specimens at depths of 342–540 m; empty or crabbed shells at depths of 329–500 m.

Remarks

Some sequenced specimens from the Solomon Islands (MNHN-IM-2007-32571 [paratype] and MNHN-IM-2007-36058) are almost uniformly white, with the reddish-brown spiral bands only faintly indicated. However, they are genetically indistinguishable from more strongly pigmented, reddish-brown banded specimens.

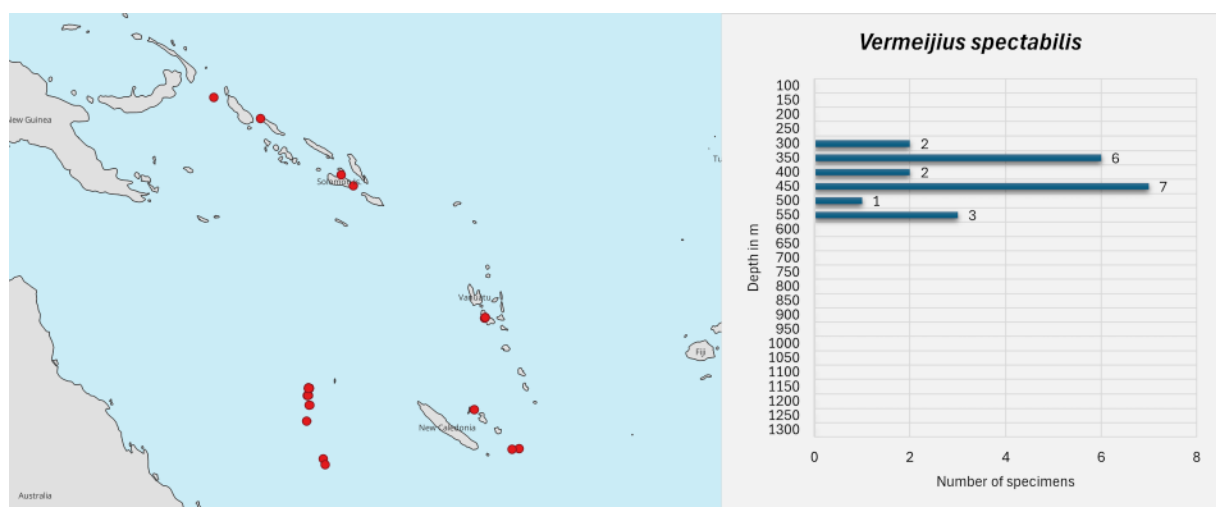


Fig. 23. Geographical and bathymetrical distribution of *Vermeijius spectabilis* sp. nov. Each column represents the number of specimens (lv or dd).

Conchologically, this species resembles several others that share the typical *Vermeijius* whorl profile – symmetrical trapezoidal in shape with chamfered or bevelled edges:

Vermeijius geminatus sp. nov. (Coral Sea, New Caledonia, Vanuatu, Tonga) is nearly identical in colouration, size, and spiral and axial sculpture but differs by having a multispiral protoconch. Without the protoconch, it is difficult to distinguish it from *V. spectabilis*. In general, *V. geminatus* tends to have a slightly shorter spire and typically slightly more numerous, closer-spaced, and slightly less pronounced axial ribs, separated by usually slightly narrower interspaces.

Vermeijius sayaensis sp. nov. (Saya de Malha Bank to Madagascar) is similar in general shape and colouration but differs by its multispiral protoconch, stronger and rounded spiral sculpture with only occasional intercalated secondary threads, somewhat weaker axial ribs with shallower interspaces, and weaker brown spiral bands along the suture and at the base, interrupted by the white axial ribs.

Vermeijius tarasoc sp. nov. (French Polynesia) is also superficially similar but differs by its smaller adult size, shorter spire, more compact overall shell form, stronger and more rounded primary spiral cords with only occasional intercalated spiral threads, and less conspicuous coloration. The reddish-brown spiral bands are absent, replaced instead by slightly reddish-brown tinted primary spiral cords. Axial ribs are also less prominent.

Vermeijius spectabilis occurs at BIOPAPUA station DW3745, in syntopy with *V. pauxillus*. The latter differs by its markedly smaller adult size and a uniformly white shell lacking the reddish-brown banding.

***Vermeijius tarasoc* sp. nov.**

urn:lsid:zoobank.org:act:7DB03996-6818-4271-A761-A478DB04FF1B

Figs 24–25, 80E, 83E, 85M

DNA diagnosis

DNA diagnosis (based on 2 *cox1* sequences): ‘C’ in the site 61, ‘C’ in the site 247, ‘C’ in the site 500.

Etymology

Named after the TARASOC expedition conducted in French Polynesia in 2009, itself coined from the first syllables of TARAvA seamounts chain, and SOCIety islands. All known specimens were collected during this expedition. Used as a noun in apposition.

Material examined

Holotype (sequenced)

FRENCH POLYNESIA • 1v; off Tahiti; 17°35' S, 149°17' W; depth 430–580 m; TARASOC, stn DW3502; MNHN-IM-2007-38758 (Figs 24A–E, 83E, 85M).

Paratypes

FRENCH POLYNESIA • 1lv, SL 21.0 mm, ShW 10.2 mm, sequenced; between Raiatea and Taha'a; 16°43' S, 151°26' W; depth 430 m; TARASOC, stn DW3436; MNHN-IM-2007-38764 (Figs 24F–J, 80E) • 1dd, SL 17.45 mm, ShW 9.25 mm; off Moorea; 17°29' S, 149°45' W; depth 610 m; TARASOC, stn DW3481; MNHN-IM-2023-1221 (Fig. 24K–M) • 1dd, SL 16.25 mm, ShW 8.3 mm; between Raiatea and Taha'a; 16°43' S, 151°26' W; depth 550–615 m; TARASOC, stn DW3442; MNHN-IM-2023-1222 (Fig. 24N–P).

Other material

FRENCH POLYNESIA • 2dd; off Society Islands; depth 300–900; TARASOC (unintentional mixing); MNHN-IM-2023-1274.

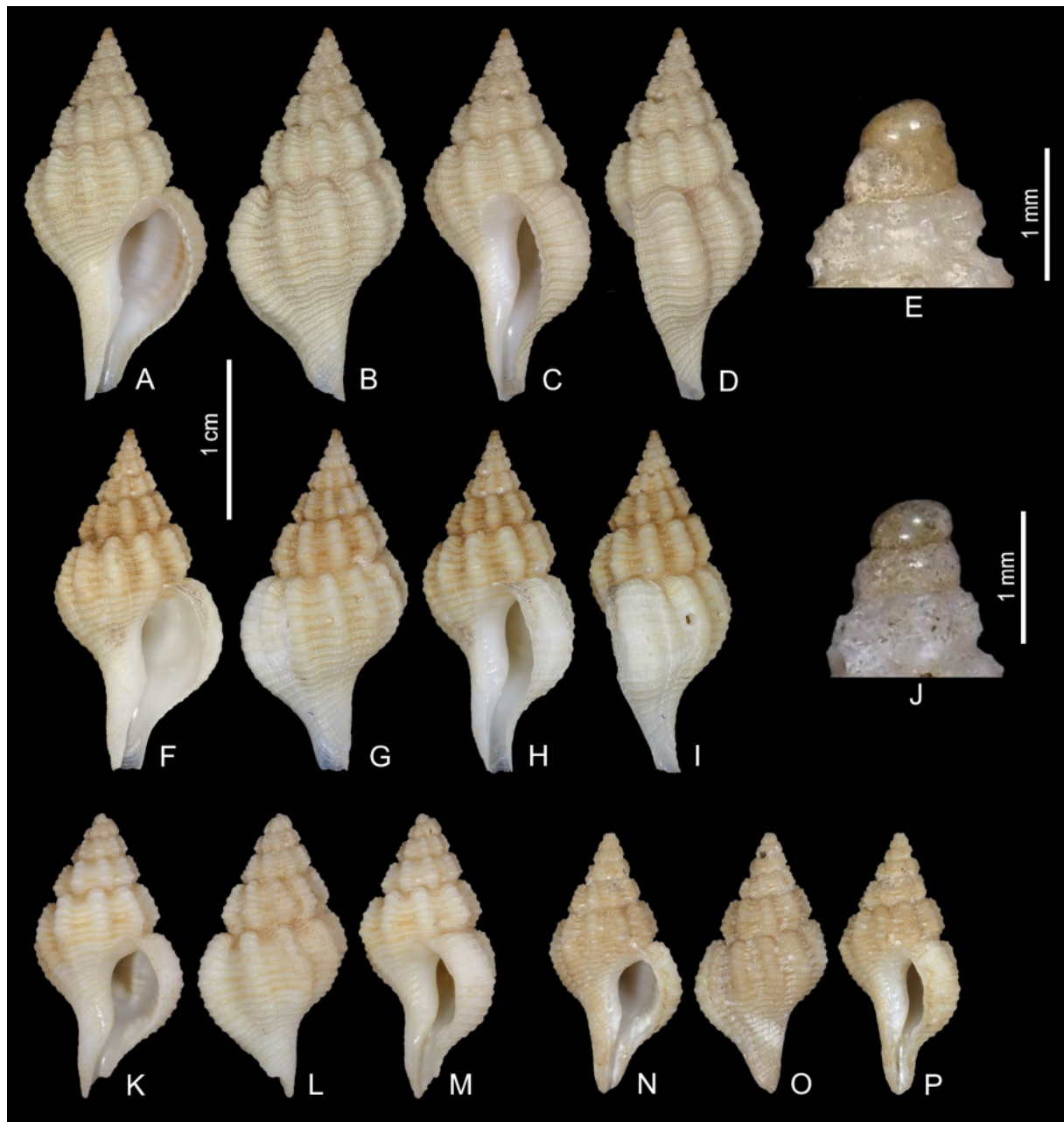


Fig. 24. *Vermeijius tarasoc* sp. nov. **A–E.** Holotype, MNHN-IM-2007-38758, Society Islands, Tahiti, TARASOC, stn DW3502, depth 430–580 m, SL 23.3 mm (sequenced). **F–J.** Paratype, MNHN-IM-2007-38764, Society Islands, between Raiatea and Taha’a, TARASOC, stn DW3436, depth 430 m, SL 21.0 mm (sequenced). **K–M.** Paratype, MNHN-IM-2023-1221, Society Islands, Moorea, TARASOC, stn DW3481, depth 610 m, SL 17.45 mm. **N–P.** Paratype, MNHN-IM-2023-1222, Society Islands, Raiatea, between Raiatea and Taha’a, TARASOC, stn DW3442, depth 550–615 m, SL 16.25 mm. All shells at the same scale, except protoconchs.

Description

Measurements (holotype): SL 23.3 mm, ShW 11.3 mm.

Shell small to medium-sized for genus (up to 23.3 mm SL), with broad, short spire, solid, fusiform, comprising 1.75 protoconch and 7 teleoconch whorls. Protoconch paucispiral (Figs 24E, J, 85M), with 1.5 glossy, bulbous initial whorls followed by 0.25 whorl bearing 3 arcuate, unevenly strong axial riblets. Transition to teleoconch marked by last, strongest arcuate axial rib and onset of spiral sculpture. Protoconch diameter 0.75 mm, exposed height ~0.7 mm. Teleoconch whorls trapezoidal; last whorl convex; suture deeply constricted, slightly undulated following axial sculpture of preceding whorl. Axial sculpture consisting of broad, raised ribs extending from suture to suture; 8–9 ribs on early whorls, 9–10 on last whorl; adapically inflated and projecting above suture, sloping downwards with straight sides towards abapical suture. Interspaces as broad as ribs. Spiral sculpture of 3 primary cords on early whorls, with abapical cord strongest. From second teleoconch whorl onwards, secondary spiral threads appear between primary cords; one secondary thread between abapical and central cord, and two threads just above suture, quickly attaining thickness of primary cords. Fine tertiary threads develop on both sides of secondary threads on later whorls. Numerous fine axial growth lines intersect spiral sculpture. Last whorl and canal covered with uniformly coarser spiral cords and finer intercalated threads. Siphonal canal relatively short, straight, slightly shorter than aperture, open. Aperture relatively large, ovate. Outer lip finely crenulated following spiral sculpture, lirate within. Inner lip fully adherent to columella, forming thin, glossy, smooth columellar callus; columellar plicae absent. At base of siphonal canal, labral side typically with 1–2 strongly calloused, elongate teeth; parietal side usually with 1–2 irregular, calloused teeth. Broad, shallow parietal tooth present. Umbilicus absent. Protoconch brownish; teleoconch cream-coloured, with interspaces between axial ribs sometimes faintly reddish-brown tinged; stronger spiral cords often reddish-brown, especially on last whorl. Aperture interior white; reddish-brown outer markings sometimes faintly visible internally. Periostracum light greenish-brown. Operculum not preserved. Radula (Fig. 80E), examined in one specimen (paratype, MNHN-IM-2007-38764), medium-long, comprising about 135 transverse rows of teeth, of which about 20 rows nascent. Radula narrow, distance between outer edges of lateral teeth about 145 μm (1.75% of AL without canal). Lateral teeth medium-broad and long, with arcuate anterior margin and strongly attenuated outer anterior corner, producing long ‘handle’. Distinct recurved short cusp present at transition from outer cusp to handle. Lateral teeth with five subequal major cusps on left side and six on right side, short, recurved, closely spaced, and one smaller inner cusp. Central tooth trapezoidal, long, with three short, sharp, subequal cusps. Weak transverse folds of membrane situated serially between rows of lateral teeth and not fusing with central teeth.

Distribution

French Polynesia, Society Islands, from Taha’a to Tahiti (Fig. 25). Live-collected specimens at depths of 430–580 m; empty or crabbed shells at depths of 550–610 m.

Remarks

Four additional species are superficially similar to *V. tarasoc* sp. nov.

Vermeijius spectabilis sp. nov. (Papua New Guinea to New Caledonia) differs by its larger adult size, higher spire, weaker and somewhat sharper primary spiral cords with intercalated secondary spiral threads, and having reddish-brown bands below the suture and at the base.

Vermeijius geminatus sp. nov. (Coral Sea, New Caledonia, Vanuatu, Tonga) is distinguishable by its multispiral protoconch and slightly larger shell.

Vermeijius sayaensis sp. nov. (Saya de Malha Bank to Madagascar) differs by its multispiral protoconch, slightly higher spire, significantly longer siphonal canal, broad reddish-brown bands below the suture and at the base, more prominent white spiral sculpture, and less inflated last whorl.

Vermeijius pauxillus sp. nov. (Papua New Guinea) is considerably smaller, uniformly white, with a relatively flat, flesh-coloured paucispiral protoconch, comparatively weaker and less distinct axial ribs, and noticeably coarser but fewer spiral cords.

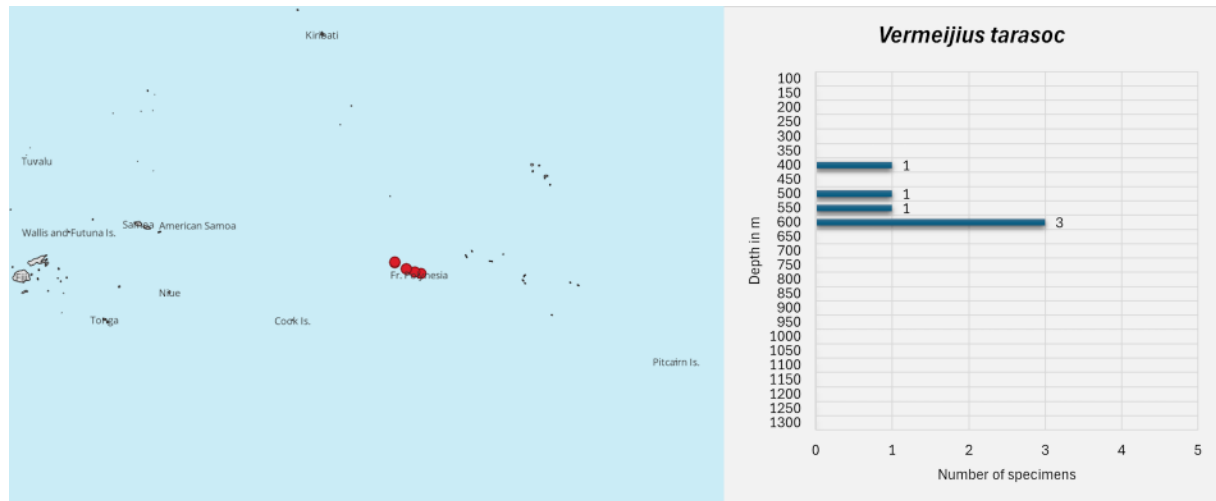


Fig. 25. Geographical and bathymetrical distribution of *Vermeijius tarasoc* sp. nov. Each column represents the number of specimens (lv or dd).

***Vermeijius bellatulus* sp. nov.**

urn:lsid:zoobank.org:act:13525F11-62B3-465D-BFAF-0FBBF680A4717

Figs 26–27, 80F, 84G–H, 85N

DNA diagnosis

DNA diagnosis (based on 1 *cox1* sequence): ‘G’ in the site 175, ‘G’ in the site 265.

Etymology

The Latin adjective ‘*bellatulus*’ means ‘pretty’ or ‘lovely’. It is the diminutive of ‘*bellus*’, which also means ‘beautiful’ or ‘handsome’. It refers to the small size of this new species and its pretty reddish-coloured lines.

Material examined

Holotype (sequenced)

NEW CALEDONIA • lv; S New Caledonia, SW of Ile des Pins; 22°53’ S, 167°17’ E; depth 530–545 m; KANACONO, stn DW4666; MNHN-IM-2013-68669 (Figs 26A–D, 84G).

Paratypes

NEW CALEDONIA • 1 lv, SL 8.5 mm, ShW 4.0 mm; same data as for holotype; MNHN-IM-2013-68663 (Figs 26I–L, 80F, 85N) • 1 lv, SL 6.7 mm, ShW 3.1 mm; same data as for holotype; MNHN-IM-2013-68668 (Fig. 26G–H) • 1 lv, SL 6.15 mm, ShW 3.0 mm; same data as for holotype; MNHN-

IM-2013-68670 (Fig. 26E–F) • 1 dd, SL 11.65 mm, ShW 4.85 mm; S of New Caledonia; 23°00' S, 167°21' E; depth 514–525 mm; SMIB 8, stn DW200; MNHN-IM-2023-1021 (Figs 26M–N, 84H) • 1 lv, SL 11.2 mm, ShW 4.95 mm; Norfolk Ridge; 22°59' S, 168°23' E; depth 500–558 m; SMIB 8, stn DW193–196; NMBE MOLL-0588476.

Other material

NEW CALEDONIA • 3 dd; S of New Caledonia; 22°52' S, 167°16' E; depth 530–541 m; BATHUS 2, stn DW720; MNHN-IM-2023-1030 • 2 lv; 22°54' S, 167°17' E; depth 525–547 m; BATHUS 2, stn DW721; MNHN-IM-2023-1024 • 4 lv; same data as for preceding; MNHN-IM-2024-20075 • 4 lv, 10 dd; Norfolk Ridge; 22°59' S, 168°23' E; depth 500–558 m; SMIB 8, stn DW193–196; MNHN-IM-2023-1022, MNHN-IM-2023-1027 • 2 lv, 1 dd; 22°59' S, 167°21' E; depth 500–504 m; SMIB 8, stn DW201; MNHN-IM-2023-1026 • 1 dd; W of Ile des Pins; 22°57' S, 167°16' E; depth 427–433 m; NORFOLK 1, stn DW1733; MNHN-IM-2023-1023 • 1 dd; 22°53' S, 167°13' E; depth 415–445 m; NORFOLK 1, stn DW1735; MNHN-IM-2023-1028 • 5 lv, 1 dd; S of Ile des Pins; depth 450 m; NMBE MOLL-0587866 • 15 lv juv., 1 dd; SW of Ile des Pins; 22°47' S, 167°15' E; depth 440–450 m; BIOCAL, stn DW44; MNHN-IM-2023-1025 (Fig. 26O–P) • 9 dd; SW of Ile des Pins; 22°53' S, 167°17' E; depth 530–545 m; KANACONO, stn DW4666; MNHN-IM-2023-1029 • 1 lv; 22°54' S, 167°17' E; depth 496–505 m; KANACONO, stn DW4722; MNHN-IM-2013-69464.

Description

Measurements (holotype): SL 9.9 mm, ShW 4.2 mm.

Shell small for genus (up to 12.5 mm SL), with relatively high spire, solid, fusiform, comprising 1.5 protoconch and 3.5–4.5 teleoconch whorls. Protoconch paucispiral (Fig. 26L, 85N), with 1.5 glossy, upright, inflated whorls bearing 3–4 fine axial riblets before abrupt termination. Transition to teleoconch marked by onset of spiral sculpture. Protoconch diameter and exposed height ~0.8 mm. Teleoconch whorls convex; suture constricted, slightly undulated, following axial sculpture of preceding whorl. Axial sculpture of raised ribs extending from suture to suture; number and spacing variable: 8–9 on early whorls, 8–12 on last whorl; last 1–2 ribs often distinctly broader and stronger. Interspaces approximately equal in width to ribs. Spiral sculpture of 3 primary cords on early whorls; adapical cord initially finer, soon becoming equal in strength. From second or third teleoconch whorl onwards, one additional stronger cord appears adapically and abapically, with fine secondary threads between primary cords. Spiral cords more prominent over ribs than in interspaces. Fine, closely spaced axial growth lines intersect spiral sculpture. Last whorl and base ornamented with coarser spiral cords and finer intercalated threads; canal with regular fine threads, weakening towards tip. Siphonal canal relatively short, about as long as aperture, widely open, straight or slightly bent abaxially. Aperture relatively large, ovate. Outer lip with indistinct internal lirae. Inner lip fully adherent to columella, forming thin, glossy, smooth columellar callus; columellar plicae absent. At base of siphonal canal, labral side with a single strongly developed, calloused tooth; parietal side occasionally with indistinct small tooth. Broad, shallow parietal tooth present. Umbilicus absent. Protoconch white; teleoconch whitish to cream, sometimes with faint reddish-brown tint on shoulder and canal and/or on coarser spiral cords on penultimate and last whorl (e.g., paratype MNHN-IM-2013-68663); occasionally entirely white and translucent (e.g., holotype MNHN-IM-2013-68669). Aperture interior white. Periostracum unknown. Operculum corneous, brownish-yellow, with terminal nucleus, filling aperture. Radula (Fig. 80F), examined in two specimens (paratype MNHN-IM-2013-68663, MNHN-IM-2013-69464), similar in both, medium-long, comprising ~115–120 transverse rows of teeth, of which ~20 nascent. Radula narrow; distance between outer edges of lateral teeth ~55–60 µm (1.9% of AL without canal). Lateral teeth medium-broad, arcuate, with strongly attenuated outer anterior corner forming long 'handle'. Lateral teeth with 4–5 recurved, closely spaced, unequal major cusps and one smaller inner cusp. Outermost and second inner cusps longest, nearly equal. Distinct short cusp present at transition to handle. Central tooth trapezoidal, with three short, sharp cusps,

central cusp slightly variable in length. Indistinct transverse membrane folds present between rows of lateral teeth, not fusing with central teeth.

Distribution

Southern New Caledonia, Norfolk and Loyalty Ridges (Fig. 27). Live-collected specimens at depths of 450–530 m; empty or crabbed shells at depths of 433–530 m.

Remarks

The species most similar to *V. bellatulus* sp. nov. is *V. putillus* sp. nov. from Norfolk Ridge, New Caledonia, which shares a comparable adult size and a nearly identical, inflated protoconch.

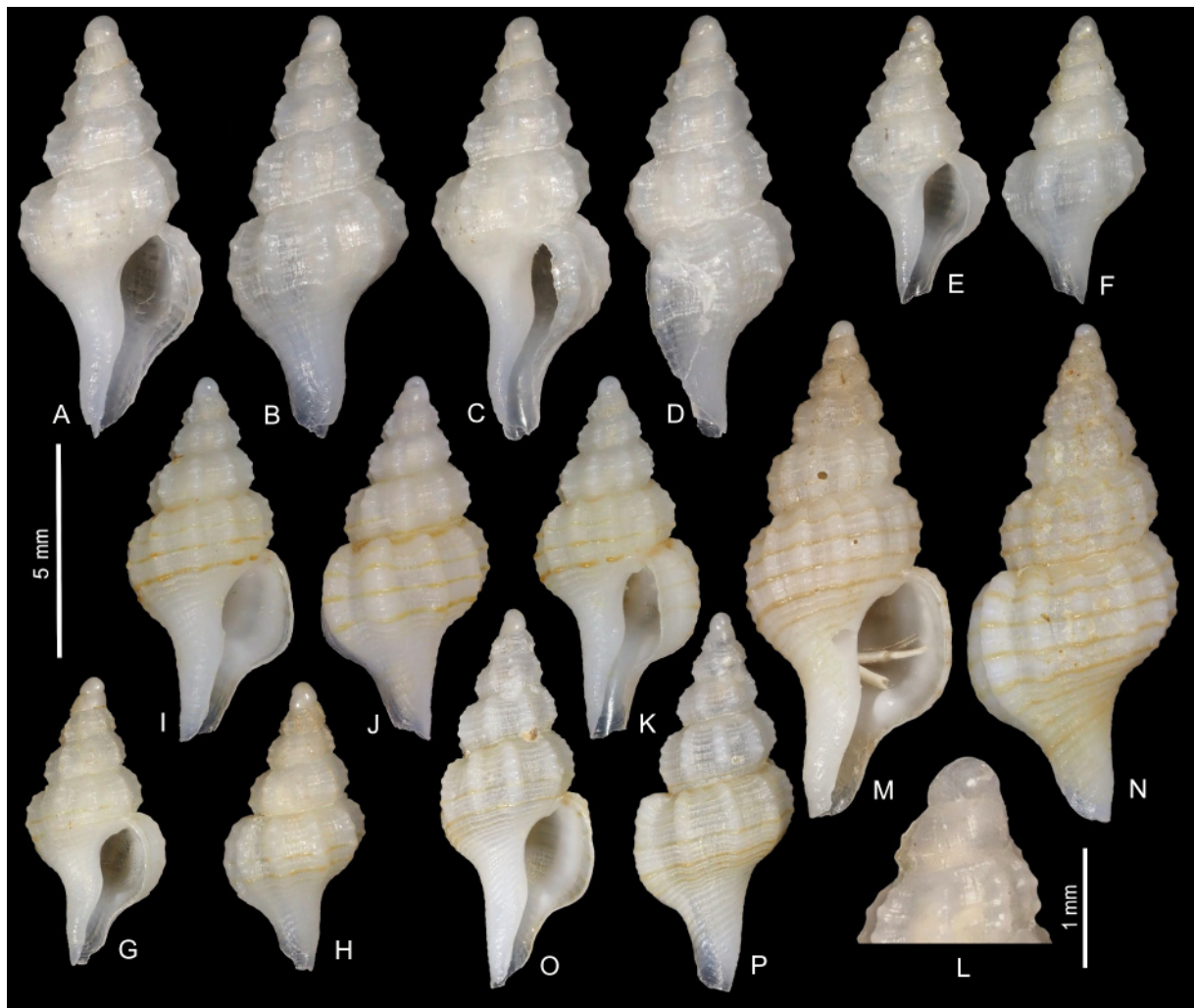


Fig. 26. *Vermeijius bellatulus* sp. nov. **A–D.** Holotype, MNHN-IM-2013-68669, S New Caledonia, SW Ile des Pins, KANACONO, stn DW4666, depth 530–545 m, SL 9.9 mm (sequenced). **E–F.** Paratype, MNHN-IM-2013-68670, same data as for holotype, SL 6.15 mm. **G–H.** Paratype, MNHN-IM-2013-68668, same data as for holotype, SL 6.7 mm. **I–L.** Paratype, MNHN-IM-2013-68663 same data as for holotype, SL 8.5 mm. **M–N.** Paratype, MNHN-IM-2023-1021, S New Caledonia, Norfolk Ridge, SMIB 8, stn DW200, depth 514–525 m, SL 11.65 mm. **O–P.** MNHN-IM-2023-1025, S New Caledonia, SW of Ile des Pins, BIOCAL, stn DW44, depth 440–450 m, SL 8.9 mm. All shells at the same scale, except protoconch.

Vermeijius putillus sp. nov. is distinguishable by its slightly trapezoidal whorl profile, slightly more numerous teleoconch whorls (4.5–5 vs 3.5–4.5), less inflated whorls, smaller aperture, more pronounced axial ribs on all whorls (although terminal ribs are weaker in many specimens), more prominent primary spiral cords that remain clearly visible in the interspaces between the axial ribs, fewer but stronger spiral cords on the canal, and a uniformly white shell.

Vermeijius brevicostatus sp. nov. (New Caledonia) differs by its somewhat larger adult size, symmetrical trapezoidal whorl profile, much stronger axial ribs, more numerous primary spiral cords with an intercalated secondary thread, a longer siphonal canal, and a reddish-brown band located below the suture and at the base.

Vermeijius sp. (northwestern Madagascar) has a similar size and protoconch but differs markedly in its dominant spiral sculpture with an intercalated finer spiral thread, a less deeply incised suture, and a shorter, broader spire.

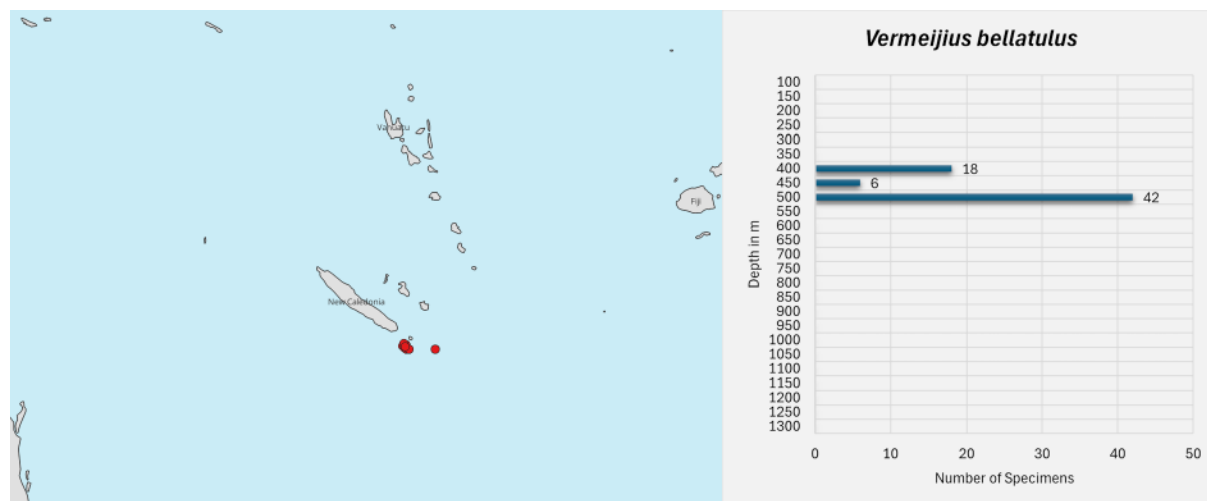


Fig. 27. Geographical and bathymetrical distribution of *Vermeijius bellatulus* sp. nov. Each column represents the number of specimens (lv or dd).

***Vermeijius snyderi* sp. nov.**

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Figs 28–29, 83A, 85O

Pseudolathyrus sp. – Springsteen & Leobrera 1986: 178, 180, pl. 48 fig. 11.

“*Fusinus*” *pallidus* – Snyder & Callomon 2008: 84, pl. 337 fig. 1.

Pseudolathyrus aff. *pallidus* – Couto *et al.* 2016: 319, fig. 6h.

Pseudolathyrus pallidus – Mallard & Robin 2017: 154, figs 2–3 [partim, not figs 1, 4, 5 = *V. pallidus*].

DNA diagnosis

DNA diagnosis (based on 4 *cox1* sequences): ‘C’ in the site 418, ‘G’ in the site 583, ‘C’ in the site 634.

Etymology

Named in honour of the late Martin Avery Snyder (1943–2024), in recognition of his contributions to the taxonomy and systematics of Fascioliariidae. His “*Catalogue of the Fascioliariidae / Guide to the Fusidae*” was a lifelong work of scholarship, passion, and attention to details.

Material examined

Holotype (sequenced)

PHILIPPINES • 1 lv; between Panglao and Siquijor; 9°27' N, 123°35' E; depth 762–786 m; PANGLAO 2005, stn CP2388; on sand and mud; MNHN-IM-2007-32569 (Figs 28A–E, 83A, 85O).

Paratypes

PHILIPPINES • 1 lv, SL 30.6 mm, ShW 11.4 mm, sequenced; Bohol, Maribojoc Bay; 9°39' N, 123°46' E; depth 396–418 m; PANGLAO 2005, stn CP2332; on mud; MNHN-IM-2007-32567 (Fig. 28F–I) • 1 dd, SL 35.4 mm, ShW 13.1 mm; same data as for holotype; MNHN-IM-2023-1202 • 2 dd, SL 39.0 mm, ShW 13.7 mm / SL 39.7 mm, ShW 14.1 mm; same data as for holotype; NMBE MOLL-0588450 (Fig. 28J–M).

Additional sequenced material

PHILIPPINES • 1 lv; 9°37' N, 123°40' E; depth 606–631 m; PANGLAO 2005, stn CP2334; MNHN-IM-2007-32583 • 1 lv; Maribojoc Bay; 9°36' N, 123°44' E; depth 382–434 m; PANGLAO 2005, stn CP2395; MNHN-IM-2007-32913 (Fig. 28N–O).

Other material

PHILIPPINES • 9 dd; same data as for holotype; MNHN-IM-2023-1197 • 32 dd; same data as for holotype; MNHN-IM-2023-1200 • 1 lv, 20 dd; 9°28' N, 123°38' E; depth 784–786 m; PANGLAO 2005, stn CP2389; MNHN-IM-2023-1198 • 1 lv juv.; off Balicasag Island; 9°31' N, 123°41' E; depth 100 m; PANGLAO 2004, stn P3; MNHN-IM-2023-1196 • 5 dd; 9°32' N, 123°39' E; depth 757–760 m; PANGLAO 2005, stn CP2336; MNHN-IM-2023-1210 • 1 dd; 9°29' N, 123°41' E; depth 242–400 m; PANGLAO 2005, stn CP2392; MNHN-IM-2023-1212 • 2 dd; 9°30' N, 123°42' E; depth 356–396 m; PANGLAO 2005, stn CP2393; MNHN-IM-2023-1220 • 1 lv; 9°29' N, 123°40' E; depth 470–566 m; PANGLAO 2005, stn CP2394; MNHN-IM-2023-1193 • 8 dd; same data as for preceding; MNHN-IM-2023-1207 • 1 lv; 9°29' N, 123°44' E; depth 271–318 m; PANGLAO 2005, stn CP2340; MNHN-IM-2023-1214 • 1 dd; 9°31' N, 123°40' E; depth 397–410 m; PANGLAO 2005, stn DW2401; MNHN-IM-2023-1211 • 1 lv, 2 dd; off Pamilacan Island; 9°24' N, 123°50' E; depth 544–712 m; PANGLAO 2005, stn CP2341; MNHN-IM-2023-1276 • 1 dd; 9°24' N, 123°53' E; depth 1240–1258 m; PANGLAO 2005, stn CP2342; MNHN-IM-2023-1215 • 2 lv; Bohol, Maribojoc Bay; 9°39' N, 123°47' E; depth 255–268 m; PANGLAO 2005, stn CP2331; MNHN-IM-2023-1194 • 1 dd juv.; 9°39' N, 123°46' E; depth 396–418 m; PANGLAO 2005, stn CP2332; MNHN-IM-2023-1277 • 19 dd; 9°38' N, 123°44' E; depth 584–596 m; PANGLAO 2005, stn CP2333; MNHN-IM-2023-1206 • 1 lv juv., 2 dd; 9°37' N, 123°40' E; depth 606–631 m; PANGLAO 2005, stn CP2334; MNHN-IM-2023-1219 • 1 lv juv., 1 dd; 9°36' N, 123°44' E; depth 382–434 m; PANGLAO 2005, stn CP2395; MNHN-IM-2023-1217 (Fig. 28P–Q) • 3 lv, 20 dd; 9°36' N, 123°42' E; depth 609–673 m; PANGLAO 2005, stn CP2396; MNHN-IM-2023-1199 • 3 lv, 24 dd; 9°35' N, 123°42' E; depth 642–669 m; PANGLAO 2005, stn CP2397; MNHN-IM-2023-1203 • 1 dd; 9°39' N, 123°43' E; depth 481–505 m; PANGLAO 2005, stn CP2404; MNHN-IM-2023-1213 • 3 lv, 4 dd; 9°39' N, 123°46' E; depth 387–453 m; PANGLAO 2005, stn CP2405; MNHN-IM-2023-1201 • 9 dd; same data as for preceding; MNHN-IM-2023-1204 • 1 lv, 1 dd juv.; 9°41' N, 123°47' E; depth 334–389 m; PANGLAO 2005, stn CP2406; MNHN-IM-2023-1216 • 2 dd; S of Bohol; 9°31' N, 124°03' E; depth 810–812 m; PANGLAO 2005, stn CP2351; MNHN-IM-2023-1195 • 5 dd; 9°27' N, 124°03' E; depth 923–1260 m; PANGLAO 2005, stn CP2352; MNHN-IM-2023-1205 • 3 lv, 3 dd; S of Panglao; 9°27' N, 123°43' E; depth 627–645 m; PANGLAO 2005, stn CP2390; MNHN-IM-2023-1208 •

4 dd; W of Panglao; 9°34' N, 123°38' E; depth 729–733 m; PANGLAO 2005, stn CP2335; MNHN-IM-2023-1209 • 1 dd; Mindoro, Tablas Strait; 12°20' N, 121°43' E; depth 673–675 m; MUSORSTOM 3, stn CP122; MNHN-M-2023-1218 • 1 lv; off Panglao; by local fishermen; NMBE MOLL-0587872 • 1 dd; S Mindanao, off Balut Island; depth 200–300 m; NMBE MOLL-0585729 • 1 lv juv.; S Mindanao, off Balut Island; NMBE MOLL-0584895.

Description

Measurements (holotype): SL 33.2 mm, ShW 12.0 mm.

Shell medium-sized for genus (up to 39.7 mm SL), fusiform with tall spire, comprising 1.75 protoconch and 7–8 teleoconch whorls. Protoconch paucispiral (Figs 28E, I, 85O), with 1.5 glossy, bulbous initial whorls, followed by ~0.25 whorl with 3–4 strong axial riblets extending from suture to suture. Transition to teleoconch marked by axial riblet and onset of spiral sculpture. Protoconch diameter and exposed height ~1.0 mm. Teleoconch whorls strongly convex; unkeeled on upper whorls, occasionally with indistinct carina above periphery on later whorls; suture deeply impressed. Axial sculpture of narrow, sharply raised ribs running from suture to suture; ~9 on early whorls, 7–10 on penultimate and last whorl. Interspaces sharply demarcated, deep, distinctly wider than ribs. Spiral sculpture on early whorls of 5 strongly raised, almost rectangular primary cords, best visible between axial ribs; adapical cord weakest. From fourth teleoconch whorl onwards, fine intercalated secondary spiral thread present, sometimes also between adapical suture and adapicalmost primary cord. Additional fine spiral thread occasionally present on later whorls. Axial growth lines thickened, clearly visible, forming reticulate pattern with small nodes at intersections with spiral sculpture. Base and canal with numerous rounded spiral threads, coarse and fine, gradually weakening towards canal tip. Siphonal canal long, open, nearly straight, distinctly longer than aperture. Aperture large, ovate. Outer lip with shallow internal grooves corresponding to stronger external spiral cords; some specimens with closely spaced internal lirae. Inner lip fully adherent to columella, forming thin, glossy, smooth columellar callus; columellar plicae absent. At base of siphonal canal, labral side sometimes with 2 indistinct elongate teeth. Small, elongate parietal tooth present. Umbilicus absent. Shell uniformly cream or white, inside and outside. Periostracum thin, brown-greenish, inconspicuous, poorly adhering, with small darker thorns at intersections of axial growth lines and spiral sculpture. Operculum corneous, brownish-yellow, with terminal nucleus, filling aperture. Radula not examined.

Distribution

Philippines, most records from central Philippines, particularly Bohol (Fig. 29). Live-collected specimens recorded at depths of 100–784 m; empty or crabbed shells found at depths of 268–1240 m.

Remarks

The number and the strength of axial ribs in *Vermeijius snyderi* sp. nov. are somewhat variable, though genetically consistent across specimens. Individuals from shallower water often exhibit fewer, broader axial ribs, a more robust shell, and typically a lirate aperture.

Vermeijius snyderi sp. nov. was previously figured as *Fusinus* or *Pseudolatirus pallidus* by Snyder & Callomon (2008) and Mallard & Robin (2017). It differs from *V. pallidus* primarily in possessing a paucispiral protoconch, smaller adult size, more slender shell, less inflated whorls, and generally weaker axial sculpture.

An undescribed, similar species from Tosa, Japan, figured by Callomon & Snyder (2009: 9–11, figs 21–23; 2019: 89, figs 193–195) as *Pseudolatirus* or *Vermeijius* sp. cf. *pallidus*, differs from *V. snyderi* sp. nov. in having evenly convex whorls, a less deeply incised suture, broader axial ribs with shallower interspaces, and more closely spaced, stronger spiral sculpture.

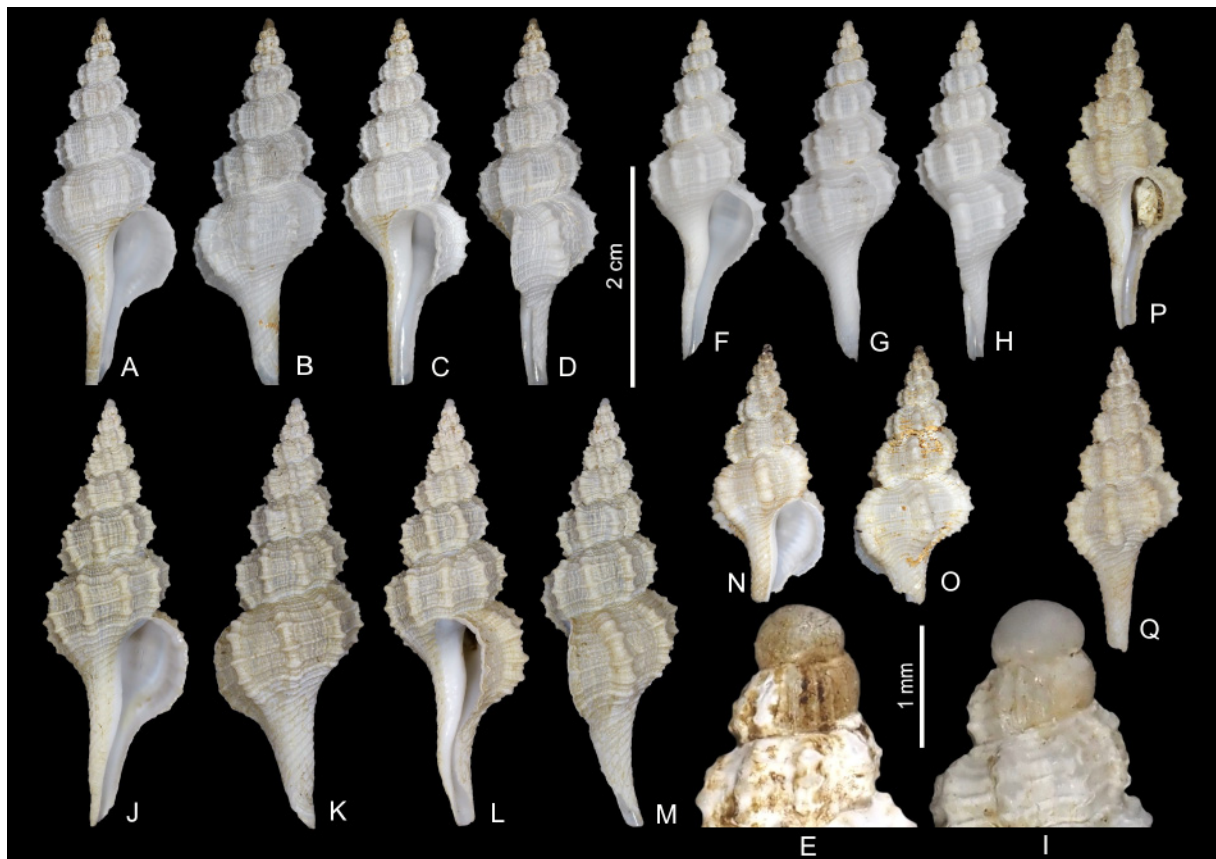


Fig. 28. *Vermeijius snyderi* sp. nov. **A–E.** Holotype, MNHN-IM-2007-32569, Philippines, between Panglao and Siquijor, PANGLAO 2005, stn CP2388, depth 762–786 m, SL 33.2 mm (sequenced). **F–I.** Paratype, MNHN-IM-2007-32567, Philippines, Bohol, Maribojoc Bay, PANGLAO 2005, stn CP2332, depth 396–418 m, SL 30.6 mm (sequenced). **J–M.** Paratype, NMBE MOLL-0588450, same data as for holotype, SL 39.0 mm. **N–O.** MNHN-IM-2007-32913, Philippines, Bohol, Maribojoc Bay, PANGLAO 2005, stn CP2395, depth 382–434 m, SL 23.0 mm (sequenced). **P–Q.** MNHN-IM-2023-1217, Philippines, Bohol, Maribojoc Bay, PANGLAO 2005, stn CP2395, depth 382–434 m, SL 27.4 mm. All shells at the same scale, except protoconchs.

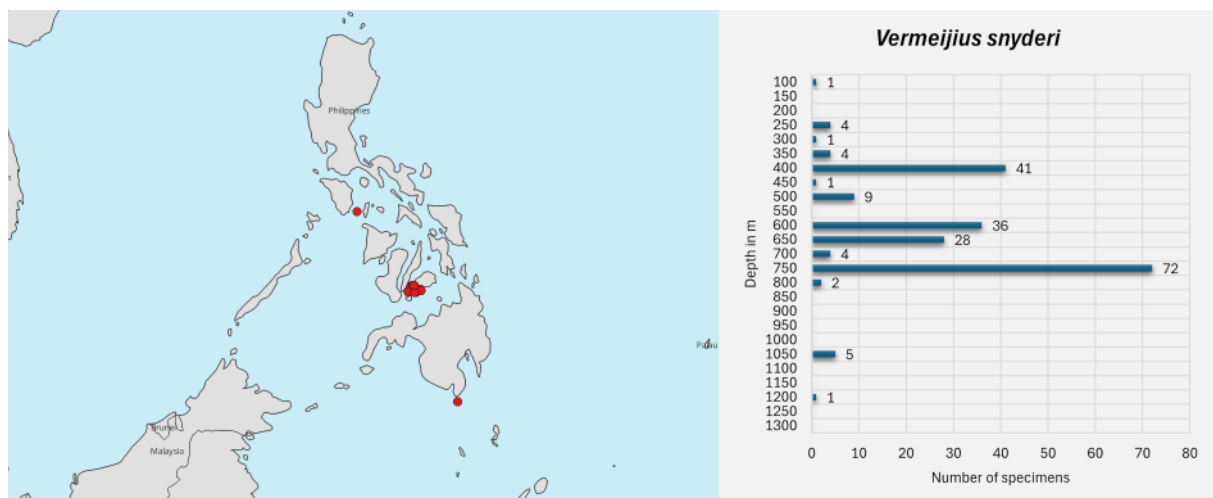


Fig. 29. Geographical and bathymetrical distribution of *Vermeijius snyderi* sp. nov. Each column represents the number of specimens (lv or dd).

Vermeijius palmarium (Queensland, Australia) is also uniformly whitish and similar in size, but differs in having less convex whorls, a drooping shoulder, and weaker axial sculpture on the later whorls, where ribs are reduced to peripheral knobs. The siphonal canal is also slightly longer.

For differentiation from *V. celatus*, see under that species.

***Vermeijius celatus* sp. nov.**

urn:lsid:zoobank.org:act:E97AEEED-E990-4F3C-B639-A4030B408797

Figs 30–31, 83B, 85P

DNA diagnosis

DNA diagnosis (based on 2 *cox1* sequences): ‘C’ in the site 238, ‘C’ in the site 442.

Etymology

The Latin adjective ‘*celatus*’ translates to ‘hidden’, ‘concealed’, or ‘covered’. It is the past participle of the verb ‘*celare*’, which means ‘to hide’ or ‘to conceal’. Therefore, ‘*celatus*’ signifies something that is not visible, or that has been deliberately kept out of sight. *Vermeijius celatus* sp. nov. was hidden among the material of *V. snyderi* sp. nov. and was only discovered due to the different DNA sequences.

Material examined

Holotype (sequenced)

PHILIPPINES • 1v; Bohol Sea, between Siquijor and Mindanao; 8°52′ N, 123°37′ E; depth 569–583 m; PANGLAO 2005, stn CP2358; on sand; MNHN-IM-2007-32517 (Figs 30A–D, 83B).

Paratypes

PHILIPPINES • 2 dd, SL 28.8 mm, ShW 10.4 mm / SL 27.2 mm, ShW 9.6 mm; same data as for holotype; MNHN-IM-2023-1041 (Fig. 30H–K) • 1 lv, SL 21.0 mm, ShW 7.9 mm, sequenced; Bohol Sea, between Siquijor and Mindanao; 8°53′ N, 123°34′ E; depth 516–543 m; PANGLAO 2005, stn CP2361; on sand; MNHN-IM-2007-32494 (Figs 30E–G, 85P) • 1 lv, SL 29.69 mm, ShW 10.3 mm; Bohol/Sulu Sea sill; 8°51′ N, 123°10′ E; depth 982–989 m; PANGLAO 2005, stn CP2385; NMBE MOLL-0588479 (Fig. 30N–Q).

Other material

PHILIPPINES • 1 lv, 4 dd; Bohol/Sulu Sea sill; 8°51′ N, 123°10′ E; depth 982–989 m; PANGLAO 2005, stn CP2385; MNHN-IM-2023-1040 (Fig. 30L–M) • 1 dd; 8°49′ N, 123°02′ E; depth 2120–2149 m; PANGLAO 2005, stn CP2386; MNHN-IM-2023-1038 • 1 dd; 8°57′ N, 123°33′ E; depth 679–740 m; PANGLAO 2005, stn CP2362; MNHN-IM-2023-1039.

Description

Measurements (holotype): SL 28.0 mm, ShW 9.9 mm.

Shell medium-sized for genus (up to 34.33 mm SL), fusiform with tall spire, comprising 1.5 protoconch and 7 teleoconch whorls. Protoconch paucispiral (Figs 30G, K, 85P), with 1.5 glossy, bulbous initial whorls, ending with 1–2 distinct axial riblets extending from suture to suture. Transition to teleoconch marked by axial riblet and onset of spiral sculpture. Protoconch diameter and exposed height ~1.0 mm. Teleoconch whorls strongly convex; unkeeled on adapical whorls, sometimes with carina above periphery on later whorls; suture well impressed. Axial sculpture of pronounced, narrow, raised ribs extending from suture to suture; ~9 on upper whorls, 7–10 on penultimate and last whorl. Interspaces deep and distinctly wider than ribs. Spiral sculpture on early whorls with 4–5 raised, rounded (V- or U-shaped) primary

cords; sixth cord present abapically just above suture; adapical cords on shoulder weaker. From second or third teleoconch whorl onwards, fine intercalated secondary spiral thread present; additional fine tertiary thread typically present on later whorls. Axial growth lines thickened, clearly visible, forming reticulate pattern with small nodes at intersections with spiral sculpture. Base and siphonal canal with numerous rounded spiral threads, coarse and finer intercalated, gradually weakening towards canal tip. Siphonal canal long, open, almost straight, longer than aperture. Aperture large, ovate. Outer lip often smooth internally in subadult specimens; some individuals with closely spaced lirae. Inner lip fully adherent to columella, forming thin, glossy, smooth columellar callus; columellar plicae absent. At base of siphonal canal, labral side sometimes with 2–3 indistinct elongate teeth. Small, elongate parietal tooth present. Umbilicus absent. Protoconch white; aperture interior whitish; teleoconch cream or whitish. Periostracum thin, straw-coloured, with lamellar structure and dense spiral rows of slightly opisthocline pointed projections at intersections of axial growth lines and spiral sculpture. Operculum corneous, brownish-yellow, with terminal nucleus, filling aperture. Radula not examined.

Distribution

Philippines, Bohol, between Siquijor and Mindanao, and Bohol/Sulu Sea sill (Fig. 31). Live-collected specimens at depths of 543–982 m; empty or crabbed shells at depths of 583–2120 m.

Remarks

Vermeijius celatus sp. nov. is conchologically very similar to *V. snyderi* sp. nov. and is difficult to distinguish based on morphology alone. Without molecular data, this species would likely have

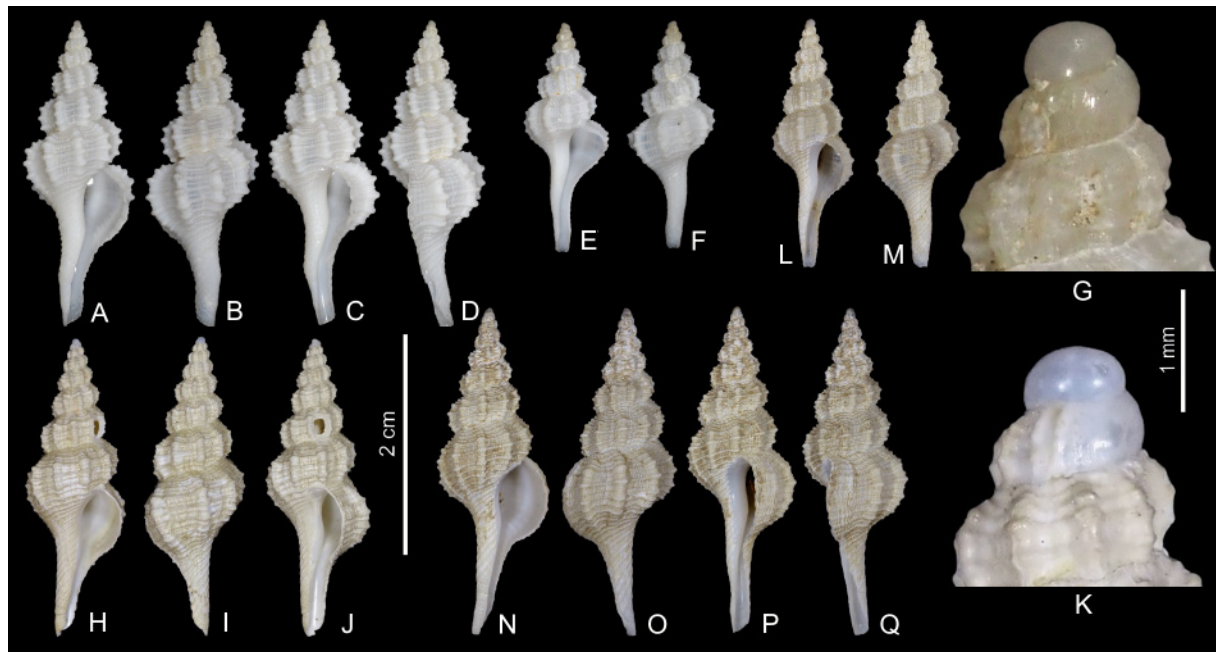


Fig. 30. *Vermeijius celatus* sp. nov. **A–D.** Holotype, MNHN-IM-2007-32517, Philippines, Bohol Sea, between Siquijor and Mindanao, PANGLAO 2005, stn CP2358, depth 569–583 m, SL 28.0 mm (sequenced). **E–G.** Paratype, MNHN-IM-2007-32494, Philippines, Bohol Sea, between Siquijor and Mindanao, PANGLAO 2005, stn CP2361, depth 516–543 m, SL 21.0 mm (sequenced). **H–K.** Paratype, MNHN-IM-2023-1041, same data as for holotype, SL 27.2 mm. **L–M.** MNHN-IM-2023-1040, Philippines, Negros, Bohol/Sulu seas sill, PANGLAO 2005, stn CP2385, depth 982–989 m, SL 22.0 mm. **N–Q.** Paratype, NMBE MOLL-0588479, Philippines, Negros, Bohol/Sulu seas sill, PANGLAO 2005, stn CP2385, depth 982–989 m, SL 29.69 mm. All shells at the same scale, except protoconchs.

remained unrecognized, with shells misidentified as *V. snyderi*. *Vermeijius celatus* differs in possessing a protoconch with only 1–2 axial ribs (vs 3–4 in *V. snyderi*), V- to U-shaped primary spiral cords between axial ribs (vs rectangular), slightly more pronounced and distinct spiral sculpture, earlier appearance of secondary spiral threads, greater number of fine spiral threads on shoulder, and a periostracum with more densely spaced, finer prickles on shoulder. It also attains a slightly smaller adult size on average.

Vermeijius pallidus (Western Pacific) differs primarily by its multispiral protoconch, clearly larger adult size, less slender shell, more inflated whorls, and typically stronger axial sculpture.

The undescribed species from Japan, figured as *Pseudolatirus* or *Vermeijius* sp. cf. *pallidus* by Callomon & Snyder (2009: 9–11, figs 21–23; 2019: 89, figs 193–195), differs from *V. celatus* sp. nov. in having evenly convex whorls, a less deeply incised suture, broader axial ribs with shallower interspaces, and more closely spaced, stronger spiral sculpture.

Vermeijius palmarium (Queensland, Australia) differs in having less convex whorls, a drooping shoulder, and weaker axial sculpture on the later whorls, where it is reduced to knobs at the periphery. The siphonal canal is also slightly longer.

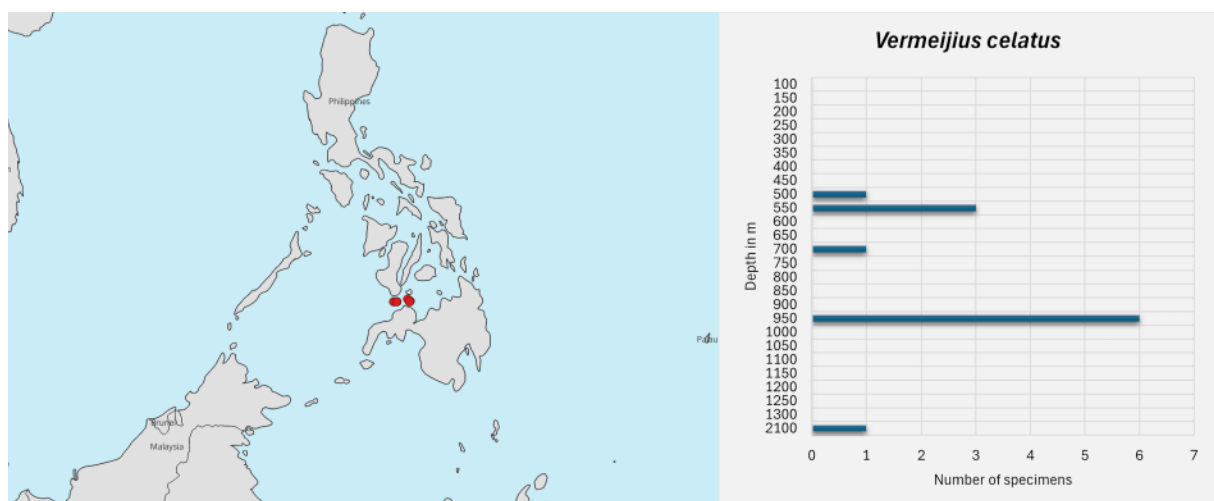


Fig. 31. Geographical and bathymetrical distribution of *Vermeijius celatus* sp. nov. Each column represents the number of specimens (lv or dd).

***Vermeijius cracens* sp. nov.**

urn:lsid:zoobank.org:act:B6FAE7B7-F9D9-4B2A-A4DA-61FDEAADE5EB

Figs 32–33, 83O, 85Q

DNA diagnosis

DNA diagnosis (based on 1 *cox1* sequence): ‘G’ in the site 238, ‘T’ in the site 547.

Etymology

The Latin adjective ‘*cracens*’ means ‘slender’, ‘graceful’, or ‘slight’. Therefore, ‘*cracens*’ ultimately signifies a state of slenderness, grace, or leanness, reflecting its root meaning of thinning or becoming less substantial. It refers to the exceptional slimness of this new species.

Material examined

Holotype (sequenced)

MADAGASCAR • 1v subadult; NW Madagascar, between Nosy Be and Banc du Leven; 12°30' S, 48°18' E; depth 346–376 m; MIRIKY, stn CP3189; MNHN-IM-2007-38052 (Figs 32A–E, 83O, 85Q).

Paratypes

MADAGASCAR • 4 dd, SL 29.6 mm, ShW 10.5 mm / SL 26.75 mm, ShW 9.7 mm / SL 25.85 mm, ShW 8.6 mm / SL 20.4 mm, ShW 7.4 mm; NW Madagascar, W of Cap d'Ambre; 12°07' S, 48°58' E; depth 362–431 m; MIRIKY, stn DW3197; MNHN-IM-2023-1053 (Fig. 32L) • 1 dd, SL 31.25 mm, ShW 10.7 mm; NW Madagascar, W of Cap d'Ambre; 12°07' S, 48°58' E; depth 362–431 m; MIRIKY, stn DW3197; NMBE MOLL-0588478 (Fig. 32M–N) • 1 dd, SL 29.8 mm, ShW 10.0 mm; NW Madagascar, W of Cap d'Ambre; 12°08' S, 48°53' E; depth 496–501 m; MIRIKY, stn DW3195; MNHN-IM-2023-1046 (Fig. 32O–P).

Other material

MADAGASCAR • 1 dd; NW Madagascar, between Nosy Be and Banc du Leven; 12°36' S, 48°16' E; depth 331–364 m; MIRIKY, stn CP3182; MNHN-IM-2023-1051 • 5 dd; same data as for holotype; MNHN-IM-2023-1047 (Figs 32F–K) • 1 dd juv.; 12°34' S, 47°54' E; depth 367–369 m; MIRIKY, stn DW3212; MNHN-IM-2023-1048 • 1 dd; 12°33' S, 47°56' E; depth 391–438 m; MIRIKY, stn DW3217; MNHN-IM-2023-1045 • 1 lv; same data as for preceding; MNHN-IM-2023-1050 • 1 dd; 12°51' S, 48°12' E; depth 341–345 m; MIRIKY, stn DW3226; MNHN-IM-2023-1052 • 2 dd; W of Nosy Be; 13°24' S, 47°57' E; depth 435–600 m; MIRIKY, stn DW3231; MNHN-IM-2023-1049.

Description

Measurements (holotype): SL 26.6 mm, ShW 7.7 mm.

Shell medium-sized for genus (up to 31.25 mm SL), conspicuously slender, with elongate spire, solid, fusiform, comprising about 1.75 protoconch and 6.5–7 teleoconch whorls. Protoconch paucispiral (Figs 32E, K, 85Q), with 1.5 glossy, bulbous initial whorls; final 0.25 whorl near transition with very fine, irregular axial growth lines. Transition to teleoconch marked by onset of spiral sculpture. Protoconch size variable, diameter 0.85–1.0 mm, exposed height 0.9–1.1 mm. Teleoconch whorls strongly convex; suture deeply impressed and undulating, following axial sculpture of preceding whorl. Axial sculpture of relatively strong, raised ribs extending from suture to suture; ~7–8 on early whorls, 10–11 weaker and often irregular on last whorl; in many specimens final two ribs distinctly stronger. Interspaces shallow, about as wide or slightly wider than ribs. Spiral sculpture of 5–6 raised, rounded primary cords on first teleoconch whorl; adapical cord adjacent to suture, abapical cord within or just above suture. From second whorl onwards, secondary spiral threads present between primary cords; from antepenultimate whorl onwards, fine tertiary threads on both sides of secondaries. Fine axial growth lines intersect spiral sculpture, forming delicate reticulate pattern. Base and canal with numerous coarser and finer intercalated spiral threads, gradually weakening towards canal tip. Siphonal canal conspicuously long, clearly exceeding aperture length, open, straight, slightly bent abaxially. Aperture small, ovate. Outer lip smooth or with widely spaced internal lirae. Inner lip fully adherent to columella, forming thin, glossy, smooth columellar callus; columellar plicae absent. At base of siphonal canal, labral side typically with 2 elongate, calloused teeth; parietal side occasionally with 1–2 inconspicuous, irregular, calloused teeth. Broad, shallow parietal tooth present. Umbilicus absent. Periostracum light olive-brown, bearing rows of broad, elongate spines at intersections of axial growth lines and spiral sculpture. Protoconch, teleoconch, and aperture uniformly whitish. Radula not examined.

Distribution

Northwestern Madagascar (Fig. 33). Live-collected specimens at depths of 376–391 m; empty or crabbed shells at depths of 345–496 m.

Remarks

The only sequenced specimen (holotype) appears to be atypical. It lacks axial sculpture on the last whorl and shows only broad, widely spaced spiral cords. Five additional specimens were collected at the type locality along with the holotype. All exhibit axial ribs on the last whorl and a distinct spiral



Fig. 32. *Vermeijius cracens* sp. nov. **A–E.** Holotype, MNHN-IM-2007-38052, NW Madagascar, between Nosy Be and Banc du Leven, MIRIKY, stn CP3189, depth 346–376 m, SL 26.6 mm (sequenced). **F–H.** MNHN-IM-2023-1047, same data as for holotype, SL 23.25 mm. **I–K.** MNHN-IM-2023-1047, same data as for holotype, SL 28.0 mm. **L.** Paratype, MNHN-IM-2023-1053, NW Madagascar, W of Cap d’Ambre, MIRIKY, stn DW3197, depth 362–431 m, SL 29.6 mm. **M–N.** Paratype, NMBE MOLL-0588478, NW Madagascar, W of Cap d’Ambre, MIRIKY, stn DW3197, depth 362–431 m, SL 31.25 mm. **O–P.** Paratype, MNHN-IM-2023-1046, NW Madagascar, W of Cap d’Ambre, MIRIKY, stn DW3195, depth 496–501 m, SL 29.8 mm. All shells at the same scale, except protoconchs.

sculpture, including both coarse and finer intercalated spiral threads. Specimens from the type locality vary considerably in the strength of both axial and spiral sculpture but consistently share a very slender shape with a high spire and a long, straight siphonal canal.

No other *Vermeijius* species is truly similar. Species from the Mozambique Channel can be delimited as follows:

Vermeijius virginiae occurs syntopically at one station with *V. cracens* sp. nov. It differs by its significantly larger adult size, multispiral protoconch, more convex whorls, more deeply incised suture, and well-developed axial ribs on the last whorl.

Vermeijius retiarius is also much larger, with a broader spire angle, less convex whorls, slightly inflated last whorl, significantly larger aperture, shorter and broader siphonal canal, and fewer primary spiral cords on upper whorls.

Vermeijius insperatus is larger, with a longer and more slender spire, less convex whorls, nearly smooth subsutural concavity, spiral sculpture almost obsolete between axial ribs, fewer but stronger and broader axial ribs, and a relatively short siphonal canal.

The only other similarly slender species is *V. snyderi* sp. nov. (Philippines). It differs in its slightly keeled whorls, clearly visible axial growth lines between widely spaced spiral sculpture, stronger and broader primary spiral cords forming prominent nodes on axial ribs, and axial ribs present on all whorls.

Vermeijius chinoi sp. nov. (Japan) is also uniformly white and similar in general shape but differs by its thin, light, translucent shell, smaller adult size, shorter spire, shorter siphonal canal, and closely spaced, narrow, and inconspicuous axial ribs.

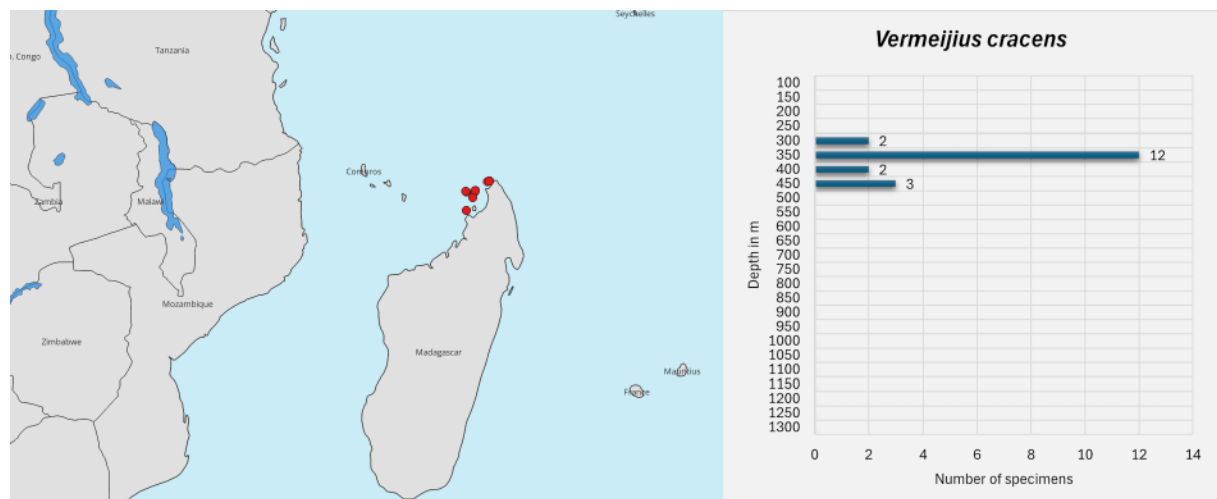


Fig. 33. Geographical and bathymetrical distribution of *Vermeijius cracens* sp. nov. Each column represents the number of specimens (lv or dd).

Vermeijius atimovatae sp. nov.

urn:lsid:zoobank.org:act:68603EAE-EAD4-4BD7-B9A9-E44270040311

Figs 34–35, 83I, 85R

DNA diagnosis

DNA diagnosis (based on 5 *cox1* sequences): ‘C’ in the site 197, ‘G’ in the site 223, ‘C’ in the site 401.

Etymology

The species is named after the ATIMO VATAE expedition to the “Deep South” of Madagascar, during which it was discovered. It is used as a noun in apposition.

Material examined

Holotype (sequenced)

MADAGASCAR • 1 lv; SE Madagascar, between Lokaro and Sainte Luce; 24°53′ S, 47°28′ E; depth 184–203 m; ATIMO VATAE, stn DW3515; MNHN-IM-2009-15077 (Figs 34A–E, 83I, 85R).

Paratypes

MADAGASCAR • 1 lv, SL 22.9 mm, ShW 9.5 mm, sequenced; same data as for holotype; MNHN-IM-2009-15040 (Fig. 34F–G) • 1 lv, SL 18.6 mm, ShW 7.9 mm, sequenced; same data as for holotype; MNHN-IM-2009-15370 • 1 lv, SL 20.4 mm, ShW 8.8 mm, sequenced; SE Madagascar, between Lokaro and Sainte Luce; 24°51.2′ S, 47°28.2′ E; depth 80–86 m; ATIMO VATAE, stn CP3520; MNHN-IM-2009-15113 (Fig. 34H–J) • 1 dd, SL 17.0 mm, ShW 7.6 mm; 24°24′ S, 47°33′ E; depth 424–438 m; ATIMO VATAE, stn DW3528; NMBE MOLL-0588477.

Additional sequenced material

MADAGASCAR • 1 lv; E of Faux-Cap; 25°37′ S, 46°20′ E; depth 433–456 m; ATIMO VATAE, stn DW3564; MNHN-IM-2009-15018.

Other material

MADAGASCAR • 1 lv; SE Madagascar, between Lokaro and Sainte Luce; 24°53′ S, 47°28′ E; depth 305–307 m; ATIMO VATAE, stn DW3514; MNHN-IM-2009-15373 • 1 dd; same data as for preceding; MNHN-IM-2023-1017 • 7 dd; 24°53′ S, 47°28′ E; depth 184–203 m; ATIMO VATAE, stn DW3515; MNHN-IM-2023-1015 • 2 dd; off Manantenina; 24°23′ S, 47°32′ E; depth 395–407 m; ATIMO VATAE, stn DW3525; MNHN-IM-2023-1011 • 3 dd; 24°24′ S, 47°34′ E; depth 502–504 m; ATIMO VATAE, stn DW3526; MNHN-IM-2023-1013 (Fig. 34K–L) • 6 dd; 24°24′ S, 47°33′ E; depth 424–438 m; ATIMO VATAE, stn DW3528; MNHN-IM-2023-1019 • 9 dd; same data as for preceding; MNHN-IM-2023-1020 • 4 dd; 24°24′ S, 47°33′ E; depth 402–407 m; ATIMO VATAE, stn DW3529; MNHN-IM-2023-1016 • 7 dd; off Sainte Luce; 24°43′ S, 47°32′ E; depth 296–307 m; ATIMO VATAE, stn DW3534; MNHN-IM-2023-1014 • 1 dd; S of Faux-Cap; 26°09′ S, 45°40′ E; depth 538–549 m; ATIMO VATAE, stn DW3556; MNHN-IM-2023-1012 • 1 lv juv.; E of Faux-Cap; 25°37′ S, 46°20′ E; depth 433–456 m; ATIMO VATAE, stn DW3564; MNHN-IM-2023-1018 (Fig. 34M–O).

Description

Measurements (holotype): SL 24.9 mm, ShW 11.2 mm.

Shell small to medium-sized for genus (up to 24.9 mm SL), with moderately broad spire, fusiform, comprising 1.75 protoconch and 5–6 teleoconch whorls. Protoconch paucispiral (Figs 34E, O, 85R), with 1.5 glossy, bulbous initial whorls; followed by very fine axial growth lines, then 1–3 irregular, stronger axial riblets near transition. Transition to teleoconch marked by onset of spiral sculpture. Protoconch diameter 0.9–1.0 mm, exposed height 0.85–0.9 mm. Teleoconch whorls convex, bicarinate,

with distinct subsutural concavity; suture deeply impressed and undulating, following axial sculpture of preceding whorl; broad, slightly inflated subsutural collar well developed on later whorls. Axial sculpture of strong, raised, widely spaced ribs running from below subsutural ramp to abapical suture; ~7 per whorl; interspaces shallow and about twice as wide as ribs. Spiral sculpture of 3 raised, widely spaced primary cords on first teleoconch whorl; adapical cord weakest, with 2 strong abapical cords forming bicarinate profile on all whorls; fine secondary and tertiary threads present from first teleoconch whorl onwards by intercalation; on last whorl, ~4–5 tertiary threads present on both sides of each secondary thread between primary cords. Fine, closely spaced axial growth lines intersect spiral sculpture, forming delicate reticulate pattern. Base and canal with numerous coarser and finer intercalated spiral threads of varying strength. Siphonal canal broad, relatively long, approximately equal to aperture length, open, straight. Aperture relatively large, ovate. Outer lip internally smooth. Inner lip fully adherent to columella, forming thin, glossy, smooth columellar callus; columella without true plicae, sometimes with weak elongate ridge resembling columellar plicae. In fully mature specimens, edge of callus near base of siphonal canal slightly detached. At base of siphonal canal, labral side with 1–2 irregular, calloused teeth; parietal side usually with 1–2 irregular teeth. Distinct large parietal tooth present. Umbilicus absent.

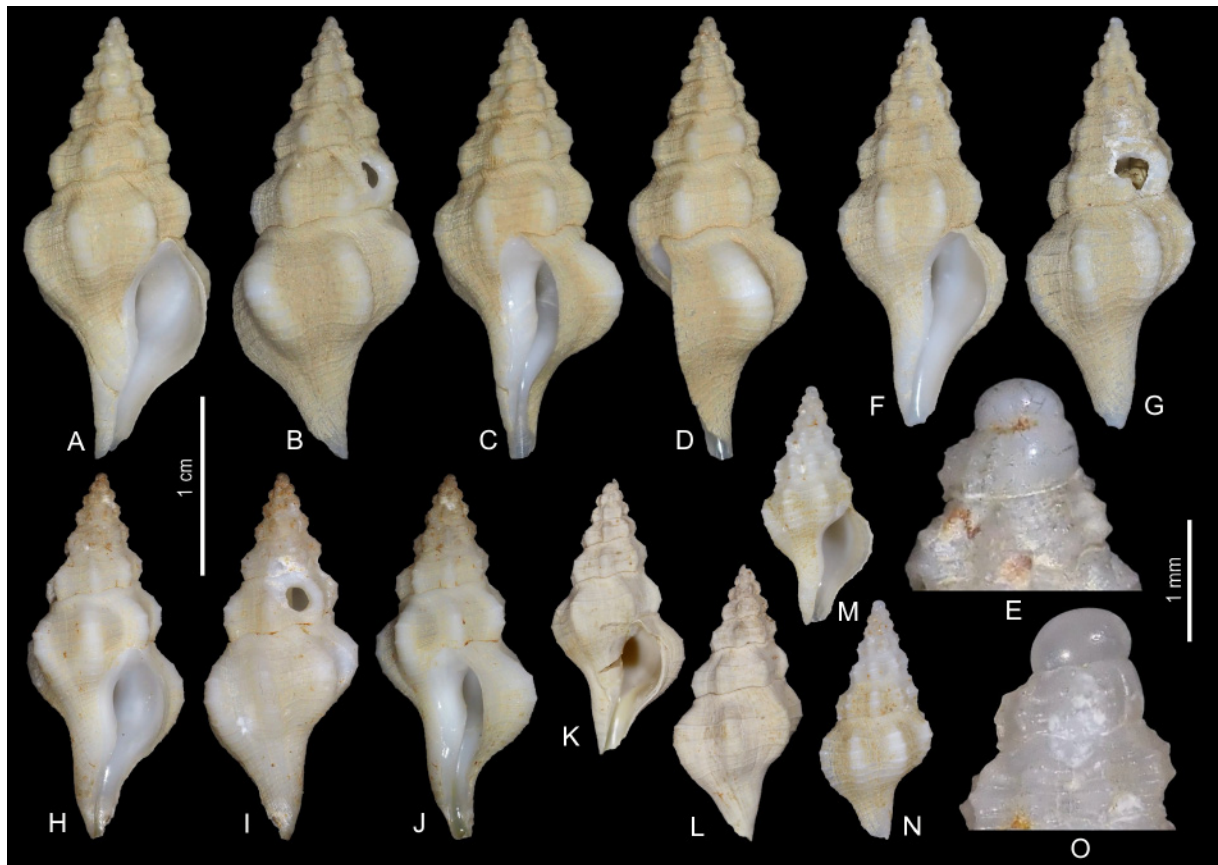


Fig. 34. *Vermeijius atimovatae* sp. nov. A–E. Holotype, MNHN-IM-2009-15077, SE Madagascar, between Lokaro and Sainte Luce, ATIMO VATAE, stn DW3515, depth 184–203 m, SL 24.9 mm (sequenced). F–G. Paratype, MNHN-IM-2009-15040, same data as for holotype, SL 22.9 mm (sequenced). H–J. Paratype, MNHN-IM-2009-15113, SE Madagascar, between Lokaro and Sainte Luce, ATIMO VATAE, stn CP3520, depth 80–86 m, SL 20.4 mm (sequenced). K–L. MNHN-IM-2023-1013, SE Madagascar, off Manantenina, ATIMO VATAE, stn DW3526, depth 502–504 m, SL 15.75 mm. M–O. MNHN-IM-2023-1018, SE Madagascar, E of Faux-Cap, ATIMO VATAE, stn DW3564, depth 433–456 m, SL 13.7 mm. All shells at the same scale, except protoconchs.

Protoconch white; teleoconch and aperture uniformly white. Periostracum light brown, with closely spaced axial rows of narrow, short spines at intersections of axial growth lines and spiral sculpture. Operculum not preserved. Radula not examined.

Distribution

Southeastern Madagascar, from off Manantenina to Faux Cap (Fig. 35). Live-collected specimens at depths of 86–433 m; empty or crabbed shells at depths of 203–538 m.

Remarks

In southeastern Madagascar, East of Faux Cap, ATIMO VATAE stn DW3564, *Vermeijius atimovatae* sp. nov. occurs syntopically with *V. insperatus*, confirmed by molecular sequences (*V. atimovatae*: MNHN-IM-2009-15018; *V. insperatus*: MNHN-IM-2009-15364). At the nearby station CP3566/DW3565, some aberrant forms of *V. insperatus* occur, including specimens with almost smooth later whorls, long slender spires, or features resembling those of *V. atimovatae*. These stations likely represent the outermost limit of *V. insperatus* in southern Madagascar, where its distribution overlaps with that of *V. atimovatae* East of Faux Cap.

Vermeijius insperatus (western Madagascar) shares a similar microsculpture of fine, closely spaced spiral threads between the primary spiral cords but differs in having a longer and more slender spire, a longer siphonal canal, larger adult size, more convex and unkeeled whorls, and 3 (vs 2) primary spiral cords on early whorls, which are rounded and more prominent on the axial ribs.

Vermeijius retiarius (East Africa to Sri Lanka) also exhibits a similar microsculpture but can be distinguished by its larger adult size, higher and more slender spire, convex unkeeled whorls with rounded primary spiral cords, and more numerous, narrower axial ribs.

Interestingly, *Fusolaturus brinkae* (Lussi, 1996) (southern Mozambique to South Africa) is conchologically very similar to *V. atimovatae* sp. nov. The shell shape, size, and aperture are comparable; however, *F. brinkae* differs by its strongly convex, unkeeled whorls, absence of a subsutural collar, more pronounced oblique axial ribs extending from suture to suture, and a weak but relatively more developed

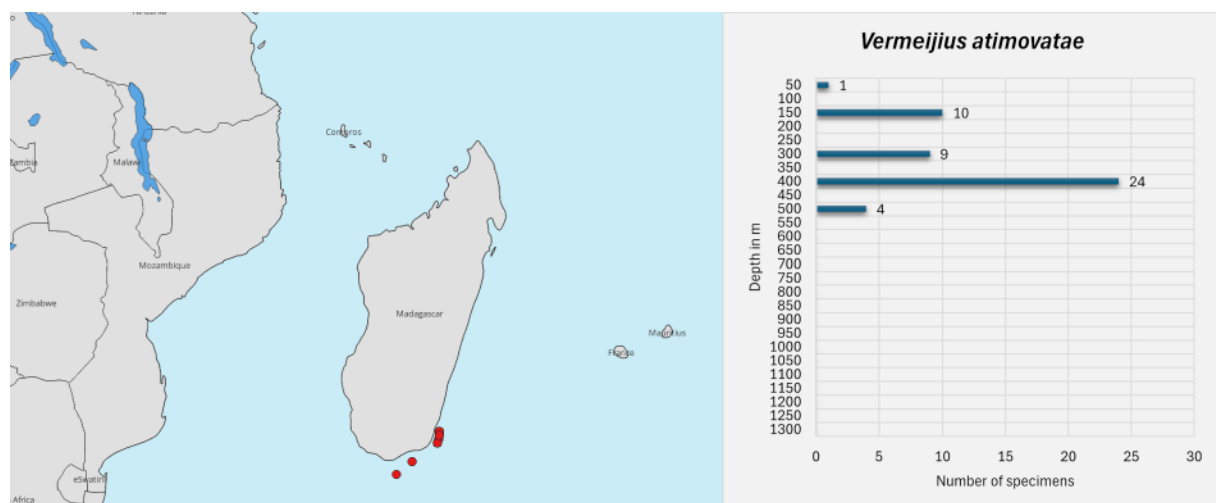


Fig. 35. Geographical and bathymetrical distribution of *Vermeijius atimovatae* sp. nov. Each column represents the number of specimens (lv or dd).

spiral sculpture. Based on these conchological affinities, it is here formally transferred to the genus *Vermeijius*, see below.

Vermeijius mainbaza sp. nov. (Mozambique) is similar in general shape and size but differs by its convex, unkeeled whorls, absence of a subsutural collar, more numerous but weaker axial ribs, coarser spiral sculpture, and rougher axial growth lines.

***Vermeijius brinkae* (Lussi, 1996) comb. nov.**
Figs 36–37, 83H, 85S

Latirus brinkae Lussi, 1996: 41–43, figs 1–5.

Latirus brinkae – Mallard & Robin 2005: pl. 41.

Fusolaturus brinkae – Marais & Kilburn 2010: 108. — Mallard & Robin 2017: 324, fig. 1.

Diagnosis

Shell medium-sized for genus (up to 34 mm SL), fusiform, with relatively broad, pointed spire; siphonal canal moderately long, slightly curved. Protoconch (Figs 36I, P, 85S) paucispiral, of ~1.5 smooth, bulbous whorls followed by 0.25 whorl with fine axial growth lines and some fine axial riblets near abrupt termination. Transition to teleoconch marked by onset of spiral sculpture. Protoconch diameter 1.0–1.1 mm, exposed height 0.9–1.0 mm. Teleoconch of about 6 whorls; suture moderately deep. Axial sculpture of 5–9 strongly curved ribs per whorl, increasing in number from early to later whorls, extending from suture to suture; interspaces approximately equal in width to ribs. Spiral sculpture of closely spaced cords and threads of variable thickness over entire shell surface. Aperture ovate; outer lip smooth internally. Columella with thin callus, bordered by shallow groove in mature specimens; one small transverse fold at base of columella; one tooth in parietal region near anal notch. Periostracum not visible. Operculum corneous, chestnut-brown, claw-shaped, with terminal nucleus. Colour uniformly white.

Material examined

Holotype

SOUTH AFRICA • 1v; off Durban; 29°51' S, 31°01' E; depth 300 m; NMSA V836/T1317 (Figs 36A–B, 83H).

Sequenced material

None sequenced.

Other material

MOZAMBIQUE • 2 lv juv.; Zambeze transect; 19°34' S, 36°45' E; depth 352–357 m; MAINBAZA, stn CC3151; MNHN-IM-2023-1035 (Fig. 36N–P) • 3 dd; same data as for preceding; MNHN-IM-2023-1036 • 3 dd; same data as for preceding; MNHN-IM-2023-1037 (Fig. 36L–M).

SOUTH AFRICA • 4 lv, 2 dd; KwaZulu-Natal, off Richards Bay; depth 300 m; NMBE MOLL-0576377 (Fig. 36J–K) • 1 dd; off Durban; NMBE MOLL-0576100 (Figs 36G–I, 85S) • 3 dd; Durban, off The Gate; RA (Fig. 36C–F).

Description

Measurements (holotype): SL 31.5 mm, ShW 14.0 mm.

Refer to Lussi (1996).

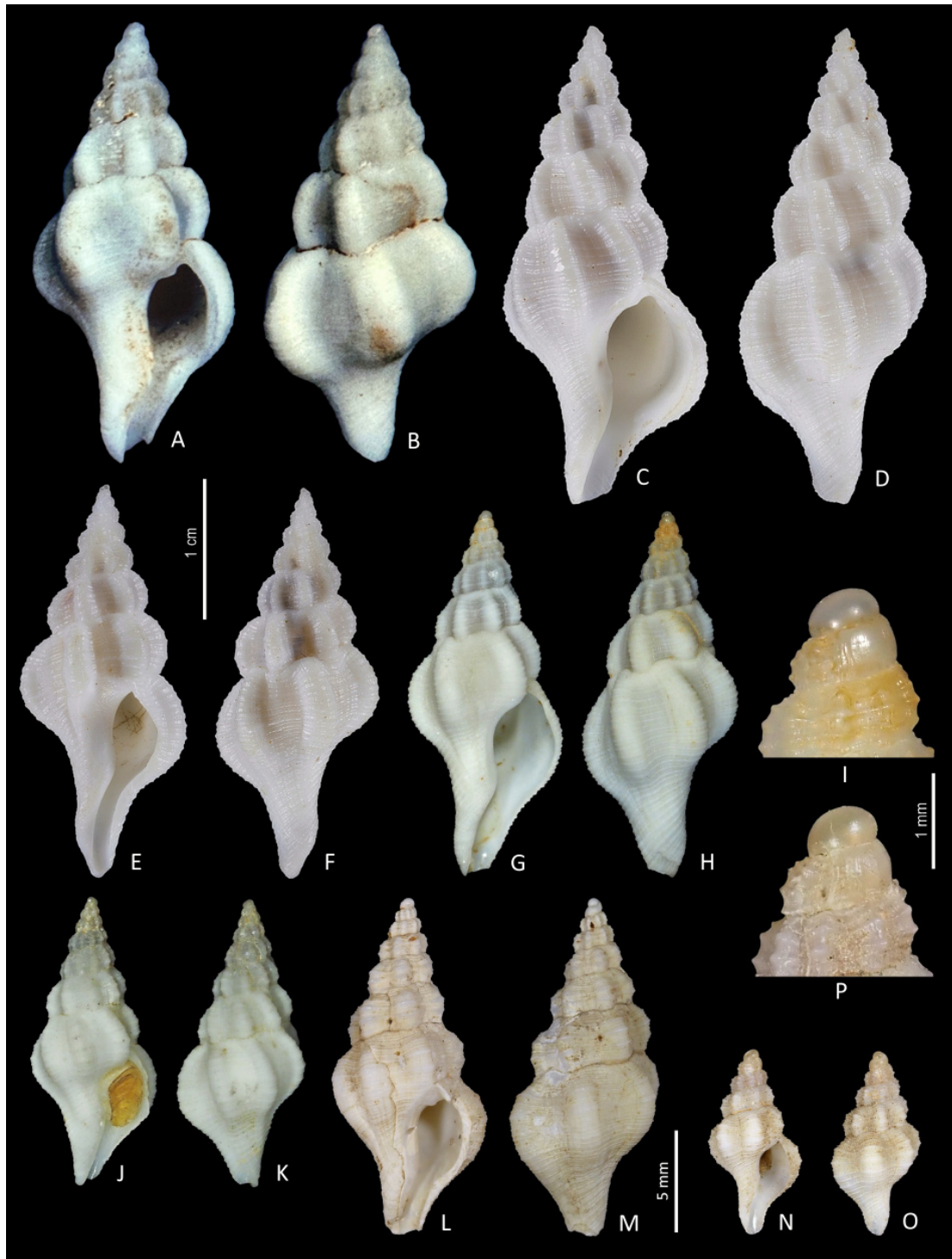


Fig. 36. *Vermeijius brinkae* (Lussi, 1996). **A–B.** Holotype, NMSA V836/T1317, South Africa, KwaZulu-Natal, off Durban, depth 300 m, SL 31.5 mm. **C–D.** RA, South Africa, Durban, off The Gate, deep water, SL 33.44 mm. **E–F.** RA, South Africa, Durban, off The Gate, deep water, SL 27.16 mm. **G–I.** NMBE MOLL-0576100, South Africa, KwaZulu-Natal, off Durban, SL 25.2 mm. **J–K.** NMBE MOLL-0576377, South Africa, KwaZulu-Natal, off Richards Bay, depth 300 m, SL 20.1 mm. **L–M.** MNHN-IM-2023-1037, Mozambique, Zambeze transect, MAINBAZA, stn CC3151, depth 352–357 m, SL 16.6 mm. **N–P.** MNHN-IM-2023-1035, Mozambique, Zambeze transect, MAINBAZA, stn CC3151, depth 352–357 m, SL 9.15 mm. Scale bars: A–H, J–K = 1 cm; I, P = 1 mm; L–O = 5 mm.

Distribution

Southern Mozambique to Durban, South Africa (Fig. 37). Live specimens and empty shells at depths of 250–352 m.

Remarks

Latirus brinkae Lussi, 1996 was assigned to *Fusolatirus* by Marais & Kilburn (2010: 108), without comment. Based on conchological similarity to both *Vermeijius atimovatae* sp. nov. (sequenced) and *V. mainbaza* sp. nov., it is here assigned to *Vermeijius* (comb. nov.).

Lussi (1996: 42, fig. 3) described the protoconch of *V. brinkae* as “smooth, fragile, as indicated by the many examples obtained with broken apex, translucent white and consisting of 2.5 whorls. Diameter of protoconch 0.8 mm.” However, the specimens available to us from KwaZulu-Natal and southern Mozambique consistently show a typical paucispiral protoconch (Figs 36I, P, 85S).

For detailed comparisons with *V. atimovatae* and *V. mainbaza*, see remarks under those species.

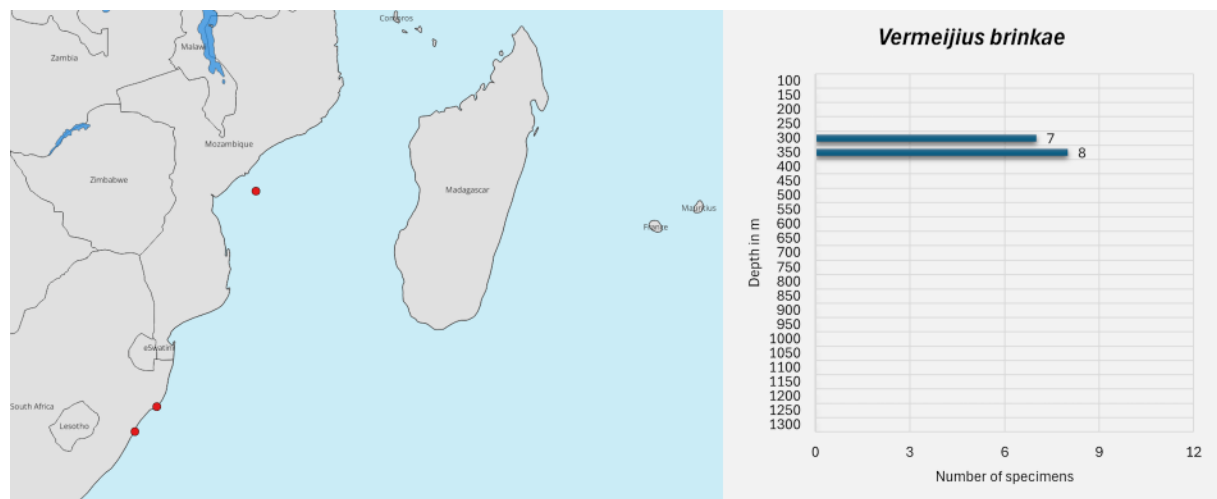


Fig. 37. Geographical and bathymetrical distribution of *Vermeijius brinkae* (Lussi, 1996). Each column represents the number of specimens (lv or dd).

Vermeijius aiken (Lussi, 2014) comb. nov. Figs 38–39, 83G

Pseudolatirus aiken Lussi, 2014: 10–11.

Pseudolatirus aiken – Mallard & Robin 2017: 151, fig. 1.

Okutanius aiken – Kantor *et al.* 2018: 44, fig. 9h–i. — Robin 2021: 267, 3rd row middle.

Takashius aiken – Kantor *et al.* 2022: 60.

Diagnosis

Shell medium-sized for genus (up to 30 mm SL), strong, fusiform. Protoconch and uppermost teleoconch whorls eroded; protoconch conical, multispiral, of >3 whorls (apex broken), cream-coloured. Early

teleoconch whorls trapezoidal, becoming convex on later whorls; siphonal canal moderately long. Aperture broad, ovate, with nearly smooth columella, bearing very weak ridges in lower part. Spiral sculpture of unevenly spaced distinct cords of varying strength; axial ribs strong, weakly opisthocline, closely spaced, not aligned along spire. Background colour creamy, with two darker brown spiral bands and darker shell base. Primary spiral cords white.

Material examined

Holotype

SOUTH AFRICA • dd; southern KwaZulu-Natal, off Park Rynie; depth 110 m; NMSA W9698/T3896 (Figs 38A–B, 83G).

Paratypes

SOUTH AFRICA • 1 dd, SL 29.99 mm, ShW 11.54 mm; southern KwaZulu-Natal, off Park Rynie; depth 110 m; dredged; RA (Fig. 38E–F) • 1 dd, SL 28.48 mm, ShW 10.87 mm; KwaZulu-Natal, off Durban; depth 150 m; dredged; ML (Fig. 38C–D).

Sequenced material

None sequenced.

Description

Measurements (holotype): SL 26.04 mm, ShW 10.33 mm.

Refer to Lussi (2014) and Kantor *et al.* (2018).

Distribution

Southern KwaZulu-Natal, between Durban and Park Rynie (Fig. 39). Recorded at depths of 110–150 m.

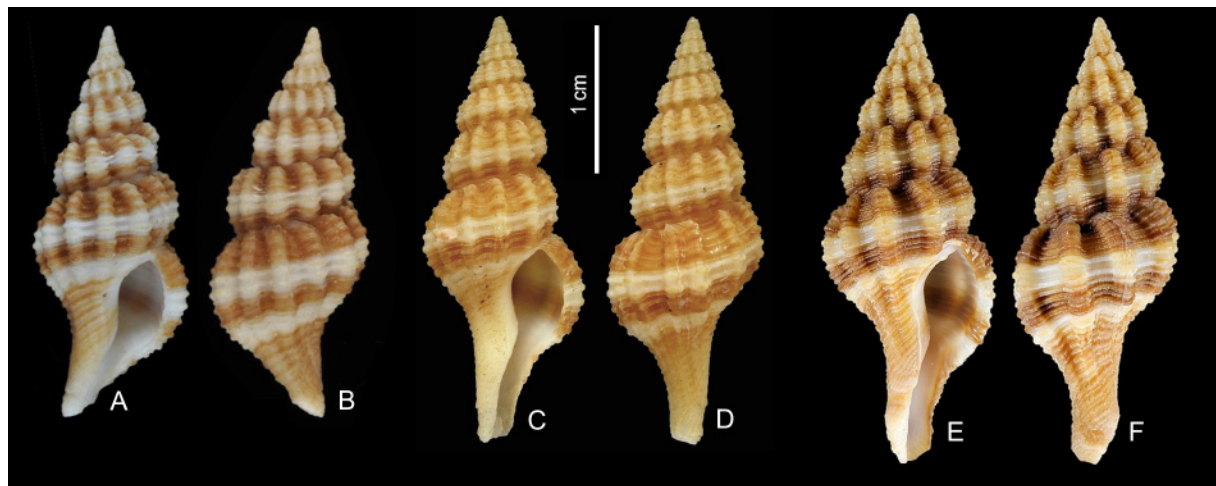


Fig. 38. *Vermeijius aikenii* (Lussi, 2014) comb. nov. **A–B.** Holotype, NMSA W9698/T3896, South Africa, southern KwaZulu-Natal, off Park Rynie, depth 110 m, SL 26.04 mm (from Lussi 2014). **C–D.** Paratype, ML, South Africa, KwaZulu-Natal, off Durban, depth 150 m, SL 28.48 mm (images by Markus Lussi, South Africa). **E–F.** Paratype, RA, same data as for holotype, SL 29.99 mm (images by Roy Aiken/Mark Page, South Africa). All shells at the same scale.

Remarks

The upper whorls of *Vermeijius aikenii* have the symmetrical trapezoidal profile typical of several other *Vermeijius* species (e.g., *V. spectabilis* sp. nov., *V. geminatus* sp. nov., *V. tarasoc* sp. nov., *V. sayaensis* sp. nov., *V. brevicostatus* sp. nov., *V. pauxillus* sp. nov.). The rounded, robust axial ribs on the lower whorls are also characteristic of these species. Several of them further share the presence of reddish-brown spiral banding and a multispiral protoconch. Due to this close conchological resemblance, particularly to the characteristic whorl shape, it is assigned to the genus *Vermeijius* (comb. nov.).

Kantor *et al.* (2018: 44) redescribed *V. aikenii* and observed that the holotype is partially distorted. They further noted that only the holotype was known. However, according to the original description, three additional paratypes are listed. Two of these are conspecific and morphologically similar (Fig. 38C–F). Examination of paratype 3 of *V. aikenii* in the Roy Aiken collection has revealed that it is a heavily worn specimen of *Takashius kuroseanus* (Okutani, 1975). Its axial ribs are significantly fewer, less convex, and much broader, with wider and more weakly depressed interspaces. The whorl profile and spiral sculpture also differ markedly.

Based on the images of the type material (Fig. 38A–F), it was determined that *V. aikenii* possesses a cream-coloured multispiral protoconch.

Conchologically, the most similar species are *V. spectabilis* sp. nov., *V. geminatus* sp. nov. and *V. sayaensis* sp. nov.:

Vermeijius spectabilis sp. nov. (Papua New Guinea to New Caledonia) can be distinguished by its paucispiral protoconch.

Vermeijius geminatus sp. nov. (Coral Sea, New Caledonia, Vanuatu, Tonga) has a multispiral protoconch and similar colouration, but differs in its shorter and broader spire and shorter siphonal canal (relative to the normally developed paratype of *V. aikenii*), as well as its lighter colouration, significantly narrower reddish-brown subsutural band, and distinctly finer spiral sculpture.

Vermeijius sayaensis sp. nov. (Saya de Malha Bank to Madagascar) also possesses a multispiral protoconch but differs in its more compact form, broader and shorter spire, more numerous trapezoidal whorls, less deeply incised suture, and a faint reddish-brown subsutural band interrupted by completely white axial ribs. The interspaces between the axial ribs are also less prominently depressed.

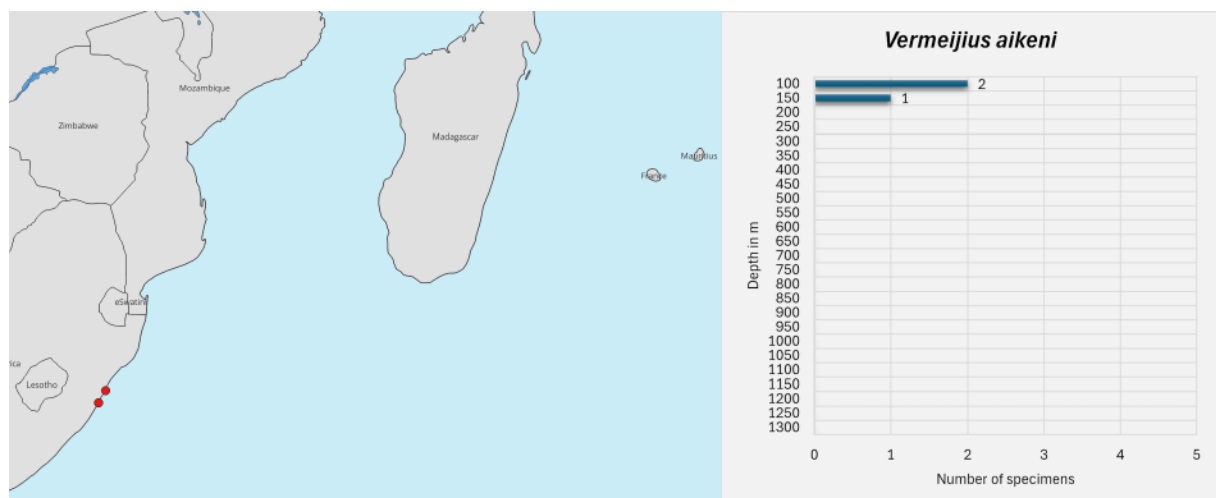


Fig. 39. Geographical and bathymetrical distribution of *Vermeijius aikenii* (Lussi, 2014). Each column represents the number of specimens (lv or dd).

Vermeijius thielei (Schepman, 1911) comb. nov.
Figs 40–41, 82H

Fusus thielei Schepman, 1911: 291–293, pl. 19 fig. 2, pl. 23 fig. 9.

Fusus thielei – Fraussen *et al.* 2007: 98, 100, figs 26–27.

Fusinus thielei – Mallard & Robin 2017: 94, fig 1.

Diagnosis

Shell large for genus (up to 46 mm SL), fusiform, with conical spire and strongly curved canal. Protoconch smooth, incomplete. 8–9 convex teleoconch whorls; suture sharply impressed. Sculpture of rounded concentric ribs, 14 on penultimate whorl, much fainter on last whorl, where still visible below suture, fading at periphery or slightly below it; ribs crossed by less conspicuous spiral cords, of which 3 per whorl more prominent, with numerous unequal, fine intercalated spiral threads; crossing axial growth lines and producing fine cancellate appearance. Aperture ovate, nearly rounded above. Columellar side with porcellaneous enamel layer, rather thick, but appressed; faint upper rib present. Siphonal canal rather wide, first curved to left, then to right. Outer lip simple, faintly crenulated corresponding to external spirals, smooth within. Shell externally dull white; aperture porcellaneous. Operculum typical, rather dark corneous, with terminal nucleus.

Material examined

Holotype

INDONESIA • Iv; Timor Sea; 10°48'6"S, 123°23'1"E; depth 918 m; SIBOGA, stn 300; ZMA. MOLL.136773 (Figs 40A, 82H).

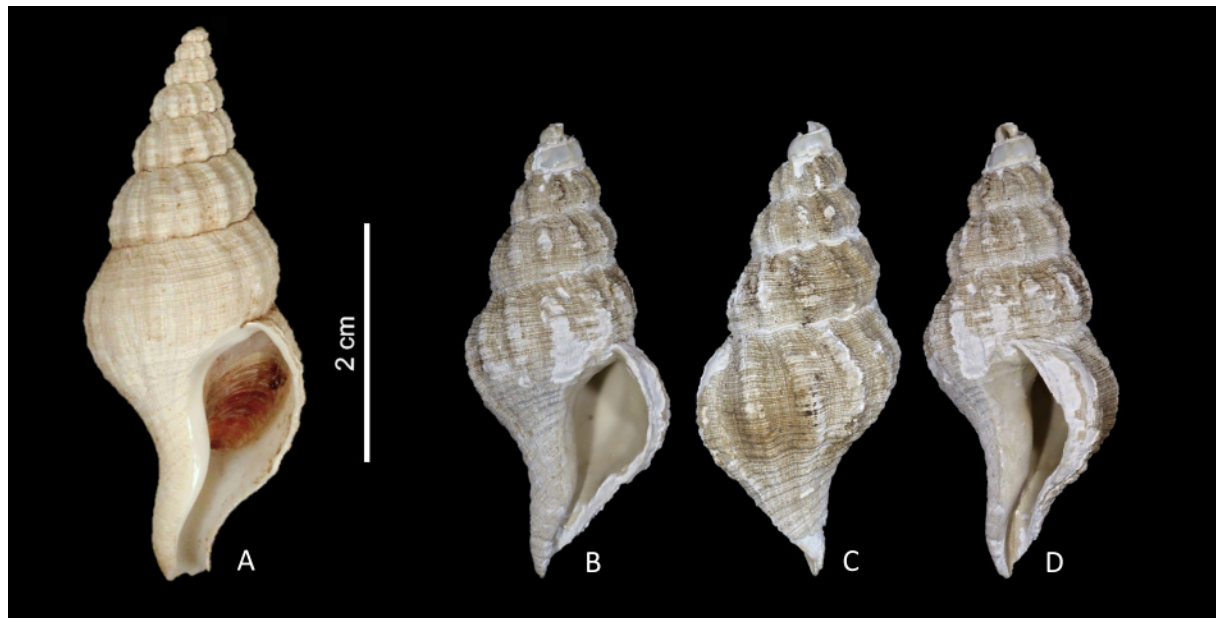


Fig. 40. *Vermeijius thielei* (Schepman, 1911) comb. nov. **A.** Holotype, ZMA.MOLL.136773, Timor Sea, SIBOGA, stn 300, depth 918 m, SL 46.0 mm. **B–D.** MNHN-IM-2023-1225, Arafura Sea, Indonesia, Maluku, Tanimbar Islands, KARUBAR, stn CP38, depth 620–666 m, SL 37.9 mm. All shells at the same scale.

Sequenced material

None sequenced.

Other material

INDONESIA • 1 dd; Arafura Sea, Maluku, off Tanimbar Islands; 7°40' S, 132°27' E; depth 620–666 m; KARUBAR, stn CP38; MNHN-IM-2023-1225 (Fig. 40B–D).

Description

Measurements (holotype): SL 46 mm.

Refer to Schepman (1911).

Distribution

Indonesia, Timor and Arafura Sea (Fig. 41). One live-collected specimen at a depth of 918 m; one empty shell at depths of 620–666 m.

Remarks

Due to the conchological similarity to *Vermeijius inglorius* and *V. albulus*, *Fusinus thielei* (Schepman, 1911) is here placed within the genus *Vermeijius*. The radula of the holotype (Fig. 40A), illustrated by Schepman (1911: pl. 23 fig. 9), is typical of the genus and comparable to those of other *Vermeijius* species (Figs 79–80), further supporting this generic placement.

Fraussen *et al.* (2007: 98, 100) reported an empty shell from the North Fiji Basin, MUSORSTOM 7 stn DW576 (Waterwitch Bank), 12°31' S, 176°53' W; 680–685 m depth, which they tentatively identified as *Fusus thielei*. Re-examination of this specimen reveals that it belongs to *Amiantofusus* Fraussen, Kantor & Hadorn, 2007 and is not conspecific with *V. thielei*. The radula of *Amiantofusus*, as figured by Fraussen *et al.* (2007: figs 15–17, 22–23), is characterized by a strikingly long, narrow, central tooth bearing three minute cusps. In contrast, the radula of *V. thielei*, with its subrectangular central tooth, is rather similar to that of *V. virginiae* and thus consistent with that of *Vermeijius*.

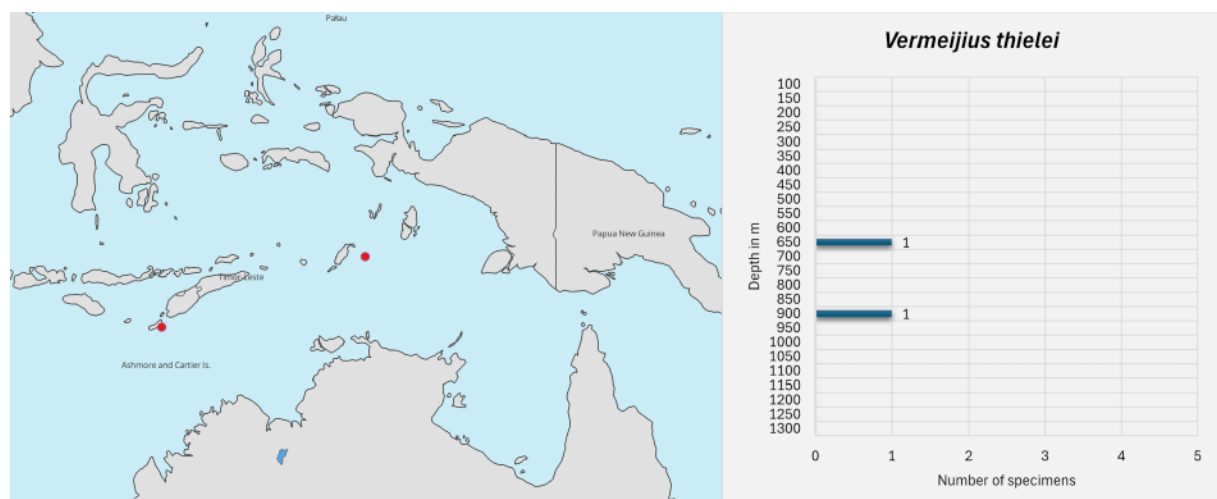


Fig. 41. Geographical and bathymetrical distribution of *Vermeijius thielei* (Schepman, 1911). Each column represents the number of specimens (lv or dd).

Vermeijius thielei is most similar to *V. inglorius* (Taiwan), which differs in its smaller adult size, lighter shell, slightly longer and more slender spire, more convex whorls, more constricted suture, usually more pronounced spiral sculpture on the early whorls, and a narrower, less curved, and often longer siphonal canal. The radula of *V. inglorius* also differs, having shorter lateral teeth with only 4 cusps, as opposed to 5 or 6 in *V. thielei*.

Vermeijius albulus sp. nov. (Papua New Guinea and Solomon Islands) is likewise uniformly whitish and of similar adult size, but differs in its more elongate and slender shell, higher spire, more prominent axial ribs on all whorls, and strong primary spiral cords forming white nodes on the axial ribs.

***Vermeijius papuaensis* sp. nov.**

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Figs 42–43, 82N, 85T

Etymology

Named after the known distribution area, the waters of Papua New Guinea.

Material examined

Holotype

PAPUA NEW GUINEA • dd; W coast of New Ireland; 4°15' S, 152°40' E; depth 600 m; BIOPAPUA, stn DW3782; MNHN-IM-2023-1160 (Figs 42A–E, 82N, 85T).

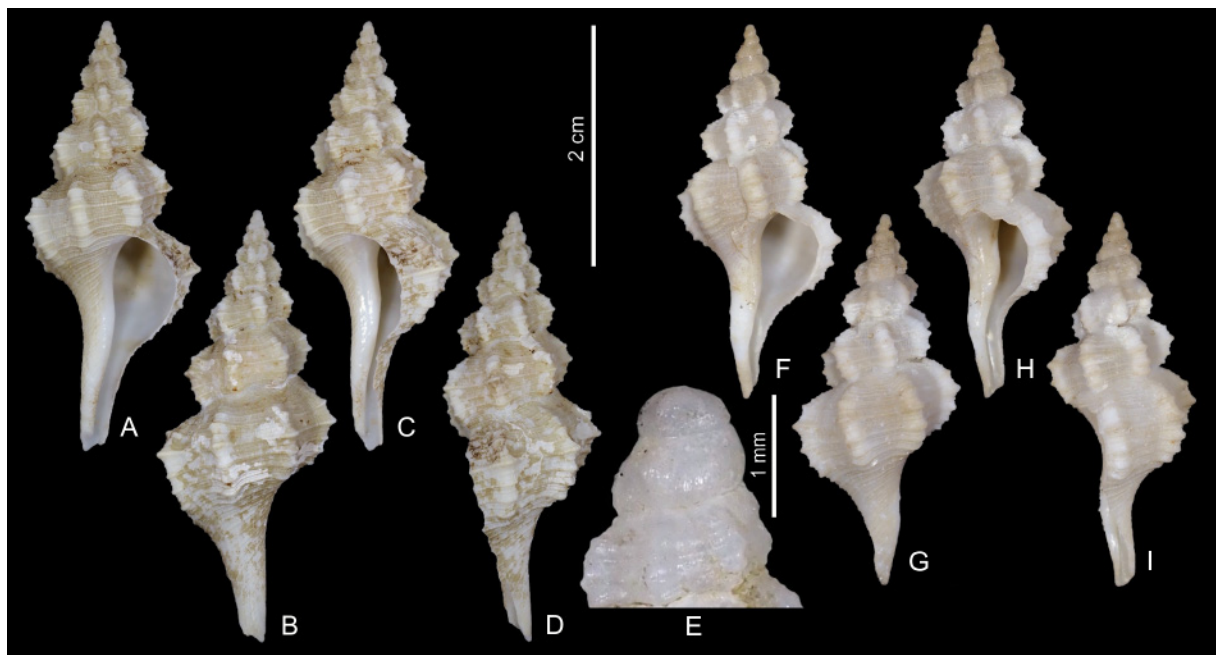


Fig. 42. *Vermeijius papuaensis* sp. nov. A–E. Holotype, MNHN-IM-2023-1160, Papua New Guinea, W coast of New Ireland, BIOPAPUA, stn DW3782, depth 600 m, SL 36.4 mm. F–I. Paratype, MNHN-IM-2023-1159, Papua New Guinea, Milne Bay Province, off islands and reefs of Lancasay, BIOPAPUA, stn DW3735, depth 450–500 m, SL 31.0 mm. All shells at the same scale, except protoconch.

Paratype

PAPUA NEW GUINEA • 1 dd, SL 31.0 mm, ShW 13.9 mm; Milne Bay Province, off islands and reefs of Lancasay; 8°15' S, 150°34' E; depth 450–500 m; BIOPAPUA, stn DW3735; MNHN-IM-2023-1159 (Fig. 42F–I).

Sequenced material

None sequenced.

Other material

PAPUA NEW GUINEA • 1 fragment; Milne Bay Province, off islands and reefs of Lancasay; 8°16' S, 150°29' E; depth 340–358 m; BIOPAPUA, stn DW3732; MNHN-IM-2023-1161.

Description

Measurements (holotype): SL 36.4 mm, ShW 15.1 mm.

Shell medium-sized for genus (up to 36.4 mm SL), fusiform, with elongate spire, composed of 1.75 protoconch and 7 teleoconch whorls. Protoconch paucispiral (Figs 42E, 85T), with 1.5 bulbous, smooth whorls followed by 0.25 whorl with very fine axial growth lines. Transition to teleoconch eroded in all examined specimens, marked by onset of spiral sculpture. Protoconch diameter and exposed height ~1.0 mm. Teleoconch whorls strongly convex, keeled from second or third whorl onwards. Suture deeply impressed and undulating, following axial sculpture of preceding whorl. Axial sculpture of strong, raised, narrow ribs extending from suture to suture; 6–7 per whorl. Interspaces deep, about twice rib width on later whorls. Spiral sculpture of 4 strong, raised primary cords on first teleoconch whorl; from second whorl onwards, two weaker adapical cords develop abapically of suture; by third whorl, central cord most prominent, forming pronounced central keel; secondary intercalated spiral threads present between primary cords; on penultimate and last whorl, fine tertiary threads present on both sides of secondary threads. Prominent axial growth lines intersect spiral sculpture, producing rough reticulate pattern. Base and canal with numerous weaker spiral threads, coarse and fine, gradually diminishing towards canal tip. Siphonal canal long, clearly exceeding aperture length, open, nearly straight. Aperture large, round-ovate; interior smooth or with few widely spaced short lirae corresponding to external axial ribs (no fully mature specimens available; terminal apertural features not developed). Inner lip fully adherent to columella,

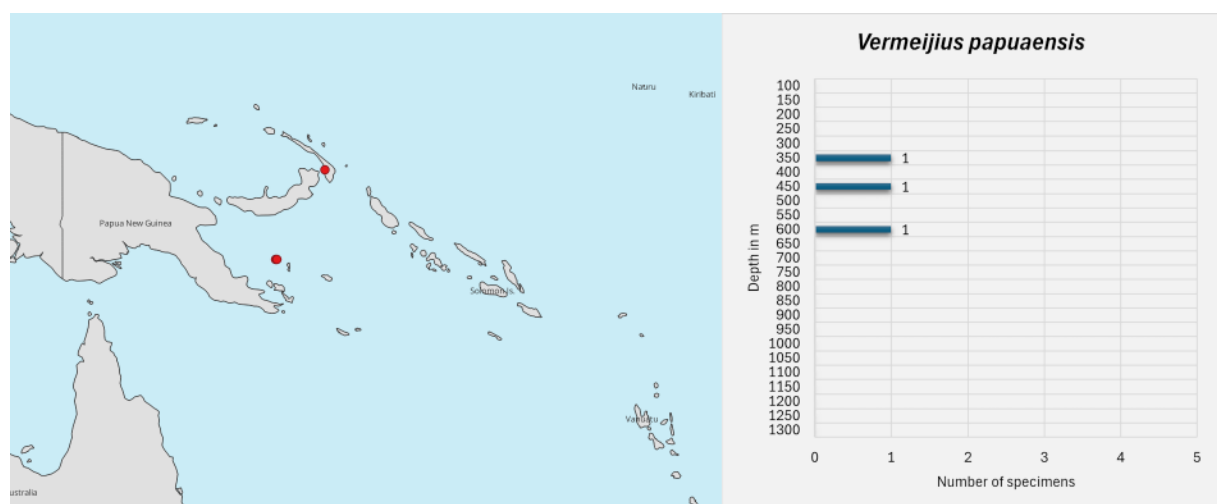


Fig. 43. Geographical and bathymetrical distribution of *Vermeijius papuaensis* sp. nov. Each column represents the number of specimens (lv or dd).

forming thin, glossy, smooth columellar callus; columellar plicae absent. At base of siphonal canal, parietal side with 1–2 irregular, very fine, calloused lirae. Umbilicus absent. Protoconch white. Shell uniformly white externally and internally. Periostracum olive-green, smooth, thin, without projections at intersections of axial growth lines and spiral sculpture. Operculum and radula unknown.

Distribution

Known only from Papua New Guinea (Fig. 43). Empty or crabbed shells collected at depths of 358–600 m.

Remarks

Vermeijius snyderi sp. nov. (Philippines) shows some similarity but differs by its more delicate shell shape, smaller spire angle, more numerous and narrower axial ribs, finer spiral sculpture, and a slightly longer siphonal canal.

Vermeijius costuliferus sp. nov. (Vanuatu) differs in having a broader spire angle, more inflated and regularly convex whorls, stronger axial ribs, and more closely spaced but less sharply defined spiral cords.

Adult specimens of *V. admirabilis* sp. nov. (Solomon Islands) are easily distinguished by the absence of axial ribs on the final whorl and the larger overall adult size. Juvenile specimens are also strongly axially ribbed, but differ in having more convex whorls, weaker spiral sculpture with more numerous intercalated spiral threads, and a larger, rounded aperture.

Vermeijius costuliferus sp. nov.

urn:lsid:zoobank.org:act:BE85E445-E29C-4EA1-87D8-F0221F0433F0

Figs 44–45, 82G, 85U

Etymology

The Latin adjective ‘*costuliferus*’ means ‘rib-bearing’ or ‘having ribs’. It combines the Latin words ‘*costula*’ (meaning ‘small rib’ or ‘riblet’) and ‘*ferre*’ (meaning ‘to bear’ or ‘to carry’). Therefore, ‘*costuliferus*’ literally describes something that has or bears ribs or rib-like structures, referring to the axial sculpture of this new species.

Material examined

Holotype

VANUATU • dd; W of Malo; 15°43′ S, 167°04′ E; depth 309–402 m; BOA 1, stn CP2414; MNHN-IM-2023-1043 (Figs 44A–D, 82G).

Paratype

VANUATU • 1 dd, SL 34.0 mm, ShW 15.5 mm; Vanuatu, W of Malo; 15°43′ S, 167°02′ E; depth 314–547 m; BOA 0, stn CP2328; MNHN-IM-2023-1044 (Figs 44E–I, 85U).

Sequenced material

None sequenced.

Description

Measurements (holotype): SL 51.0 mm, ShW 22.8 mm.

Shell large for genus (up to 51.0 mm SL), fusiform, with broad, short spire, comprising 1.75 protoconch and 8 teleoconch whorls. Protoconch paucispiral (Figs 44I, 85U), consisting of 1.5 smooth, bulbous whorls followed by 0.25 whorl with very fine axial growth lines. Transition to teleoconch marked by onset of spiral sculpture. Protoconch diameter 1.1 mm, exposed height ~0.9 mm. Teleoconch whorls strongly convex, conspicuously inflated; unkeeled on upper whorls, occasionally with indistinct central keel on later whorls. Suture deeply impressed, slightly undulating, following axial sculpture of preceding whorl. Axial sculpture of strong, raised, narrow ribs extending from suture to suture; 7–8 on spire whorls, 8–9 on last whorl. Interspaces deep, about twice rib width on later whorls. Spiral sculpture of 5 strong primary cords on early whorls; from second whorl onwards, fine sixth cord appears adapically below suture; from third whorl onwards, fine secondary threads intercalated between primary cords; on penultimate and last whorl, fine tertiary threads present on both sides of secondary ones. Central primary cord often slightly stronger, forming indistinct keel. Prominent axial growth lines intersect spiral cords, producing reticulate pattern. Base and siphonal canal with numerous weaker spiral threads, coarse and fine, fading towards canal tip. Siphonal canal relatively long, slightly longer than aperture length, open, slightly curved. Aperture large, almost round. Outer lip strongly lirated internally; subadult specimens with shallow internal grooves corresponding to external spiral cords. Inner lip fully adherent to columella, forming thin, glossy, smooth columellar callus; columellar plicae absent. At base of siphonal canal, labral side with strongly calloused elongate teeth; parietal side with 1–2 irregular teeth. Broad, shallow parietal tooth present. Umbilicus absent. Protoconch white. Shell whitish to cream, with yellowish-tinged interspaces between axial ribs; aperture white; base and canal pale. Periostracum light brown, bearing small, relatively long thorns at intersections of axial growth lines and spiral sculpture. Operculum and radula unknown.

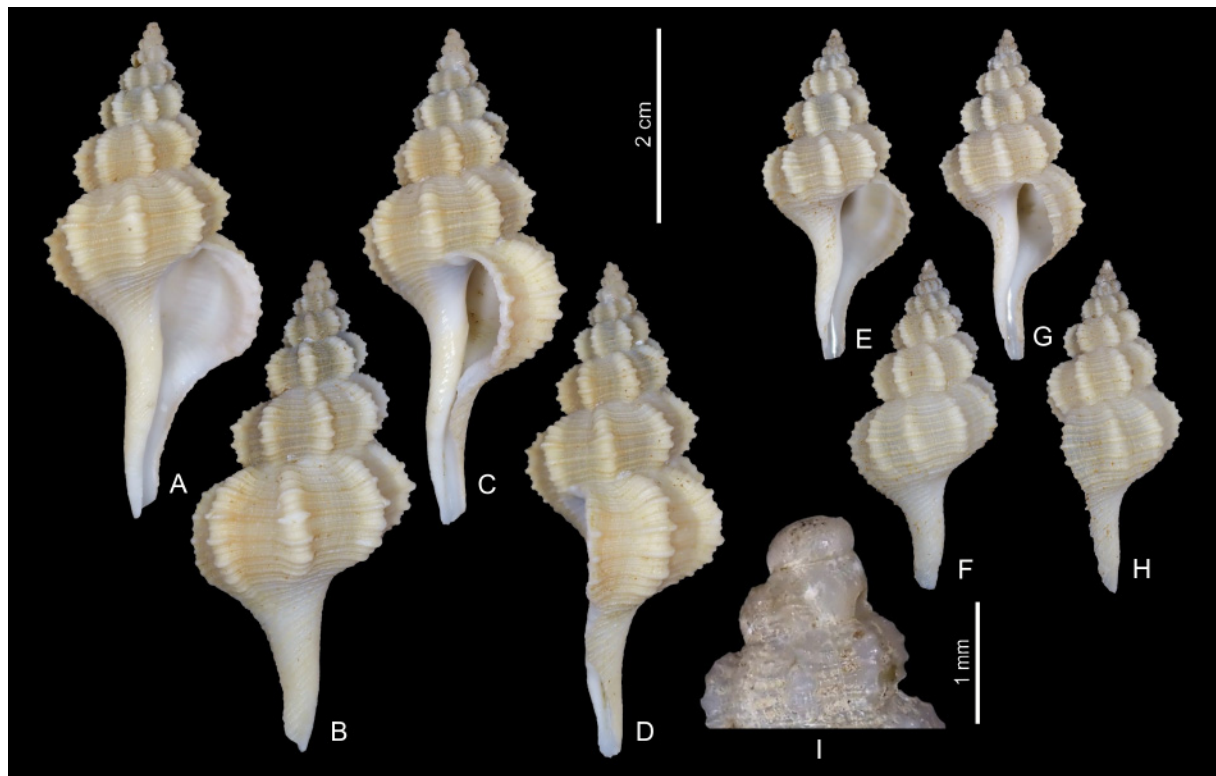


Fig. 44. *Vermeijius costuliferus* sp. nov. **A–D.** Holotype, MNHN-IM-2023-1043, Vanuatu, W Malo, BOA 1, stn CP2414, depth 309–402 m, SL 51.0 mm. **E–I.** Paratype, MNHN-IM-2023-1044, Vanuatu, W Malo, BOA 0, stn CP2328, depth 314–547 m, SL 34.0 mm. All shells at the same scale, except protoconch.

Distribution

Known only from Vanuatu (Fig. 45). Empty shells at depths of 314–402 m.

Remarks

Vermeijius costuliferus sp. nov. was recorded at BOA 1 station CP2414, in syntopy with *V. pallidus*. The latter differs notably by its multispiral protoconch, and further by having a more slender shell profile, a proportionally higher spire, less inflated whorls, and typically more numerous and closely spaced axial ribs.

Vermeijius papuaensis sp. nov. (Papua New Guinea) is also comparable, but can be distinguished by its higher and more slender spire, smaller spire angle, weaker axial ribs, and narrower, more widely spaced spiral cords.

Juvenile specimens of *V. admirabilis* sp. nov. (Solomon Islands) may resemble *V. costuliferus* sp. nov., but differ in their longer and more slender spire, less convex whorls, less deeply incised suture, less pronounced axial ribs, and somewhat weaker spiral sculpture.

Specimens of *V. snyderi* sp. nov. (Philippines) are overall not likely to be confused due to their smaller adult size, lighter and more slender shells, and finer axial sculpture. However, one morphological form displays axial sculpture similar to *V. costuliferus* sp. nov., along with a deeply incised suture and strongly convex whorls. Even this form is clearly separable by its smaller adult size, longer and slimmer spire, less inflated whorls, and slightly stronger primary spiral cords.

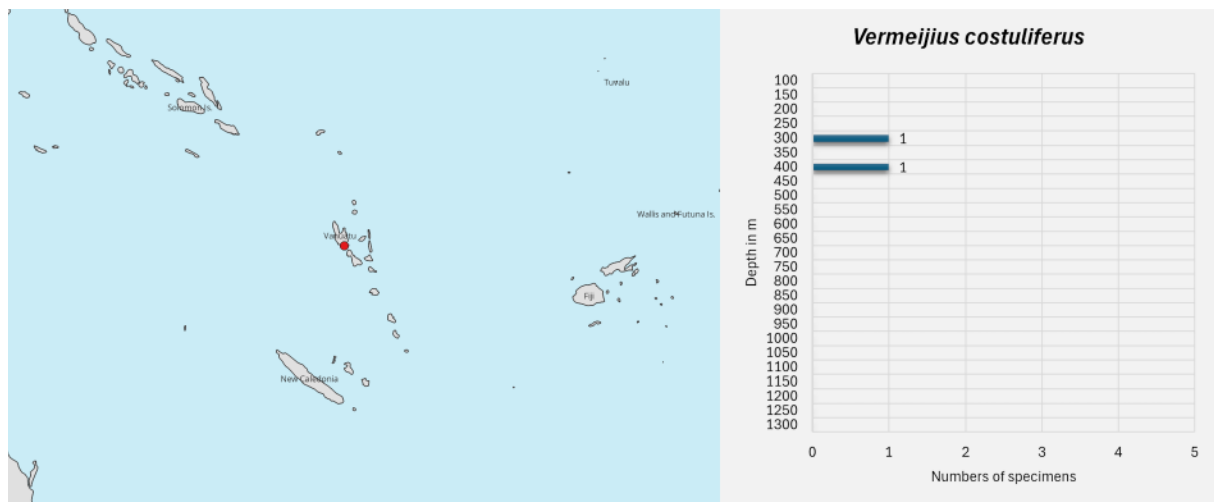


Fig. 45. Geographical and bathymetrical distribution of *Vermeijius costuliferus* sp. nov. Each column represents the number of specimens (lv or dd).

Vermeijius tashiensis sp. nov.

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Figs 46–47, 82O

Etymology

Named after the type locality.

Material examined

Holotype

TAIWAN • dd; NE Taiwan, off Tashi; 24°48' N, 122°11' E; depth 335–420 m; TAIWAN 2001, stn CP107; MNHN-IM-2023-1223 (Figs 46A–D, 82O).

Paratypes

TAIWAN • 1 dd, SL 29.4 mm, ShW 13.6 mm; same data as for holotype; MNHN-IM-2023-1224 (Fig. 44E–H).

Sequenced material

None sequenced.

Description

Measurements (holotype): SL 36.6 mm, ShW 15.1 mm.

Shell medium-sized for genus (up to 36.6 mm SL), relatively lightweight yet solid, fusiform, broad, with elongate spire. Spire comprising > 6 inflated teleoconch whorls; protoconch and spire tip not preserved.

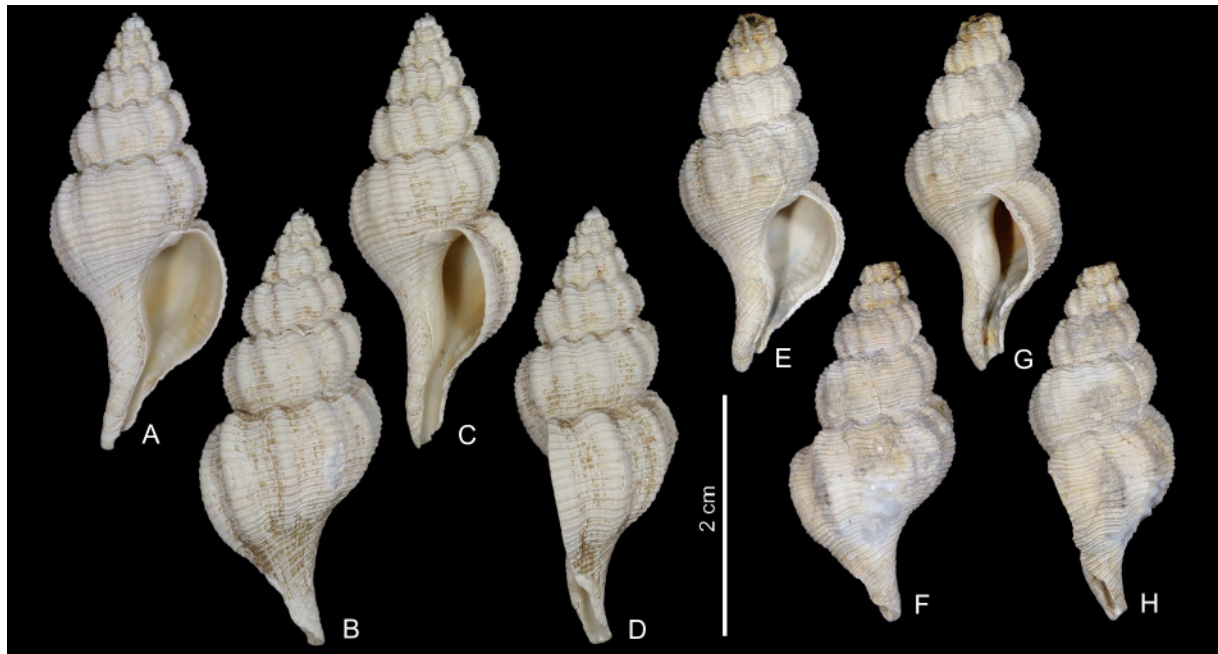


Fig. 46. *Vermeijius tashiensis* sp. nov. **A–D.** Holotype, MNHN-IM-2023-1223, NE Taiwan, off Tashi, TAIWAN 2001, stn CP107, depth 335–420 m, SL 36.6 mm. **E–H.** Paratype, MNHN-IM-2023-1224, same data as for holotype, SL 29.4 mm. All shells at the same scale.

Early teleoconch whorls trapezoidal; penultimate and last whorl strongly convex; suture conspicuously deeply constricted and undulated, following axial sculpture of preceding whorl. Axial sculpture of broad, raised ribs extending from suture to suture; 8–9 on early whorls, increasing to 11–12 on penultimate and last whorl. On early whorls, ribs adapically inflated, with sides straight and sloping downwards, then constricted near abapical suture; from antepenultimate whorl onwards, whorls becoming convex and axial ribs weaker and less prominent. Interspaces slightly narrower than ribs throughout teleoconch. Spiral sculpture on earlier whorls (not preserved) likely of 3 primary cords. On apicalmost preserved whorl, additional strong cords developed adapically and abapically; secondary spiral threads intercalated between primary cords. On succeeding whorls, secondary cords reaching equal strength as primary ones; fine tertiary threads intercalated. Last whorl and siphonal canal with regular strong cords and fine spiral threads. Spiral sculpture intersected by numerous fine, inconspicuous axial growth lines. Siphonal canal relatively long, approximately equal to aperture length, open, slightly bent abaxially; callus at base of siphonal canal slightly detached. Aperture large, ovate. Outer lip finely crenulated following spiral sculpture, weakly lirate internally. Inner lip fully adherent to columella, forming thin, glossy, smooth columellar callus; columellar plicae absent. At base of siphonal canal, labral side with 3–4 strongly calloused, elongate teeth. Broad, shallow parietal tooth present. Umbilicus absent. Teleoconch uniformly greyish (empty shells); aperture interior white, faintly yellowish in areas corresponding to external interspaces between axial ribs. Periostracum light brown, with relatively long, pointed thorns at intersections of axial growth lines and spiral sculpture. Operculum and radula unknown.

Distribution

Known only from the type locality (Fig. 47). Empty shells at depths of 335–420 m.

Remarks

None of the known *Vermeijius* species is particularly similar. The closest is probably *V. spectabilis* sp. nov., which differs in having a reddish-brown band in the middle of the whorls and below the suture, a reddish-brown siphonal canal, more numerous and more strongly developed axial ribs separated by deeper and wider interspaces, more convex whorls, and a less deeply incised suture.

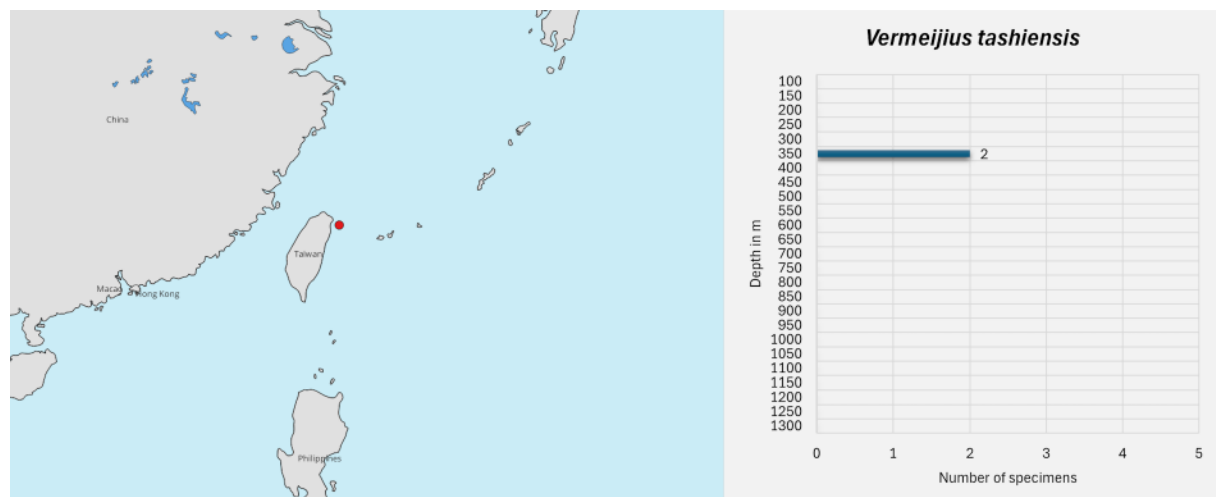


Fig. 47. Geographical and bathymetrical distribution of *Vermeijius tashiensis* sp. nov. Each column represents the number of specimens (lv or dd).

Vermeijius pallidus (Western Pacific) differs by its higher spire, narrower spire angle, more numerous evenly convex whorls, smaller aperture, and significantly longer siphonal canal.

Trophonofusus muricatoides (Yokoyama, 1920), a Japanese Pliocene fossil, has a similar deeply incised suture and rounded aperture, but differs in its much smaller adult size (12.4 mm SL vs 36.6 mm SL), convex early spire whorls (vs symmetrical trapezoidal), weaker axial ribs, and simpler, less developed spiral sculpture. For a detailed discussion and delimitation of *Trophonofusus* Kuroda & Habe, 1971, see the Remarks section under the genus *Vermeijius*.

***Vermeijius geminatus* sp. nov.**

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Figs 48–49, 83D, 85V

Etymology

The Latin adjective ‘*geminatus*’ means ‘twinning’, ‘doubled’, or ‘paired’. It is the past participle of the verb ‘*geminare*’, which signifies ‘to double’ or ‘to repeat’. This term often describes something that occurs in pairs or that is duplicated, reflecting its root meaning. The name refers to the almost similar-looking species *Vermeijius spectabilis*, which has a paucispiral protoconch, versus the multispiral protoconch of *V. geminatus* sp. nov.

Material examined

Holotype

NEW CALEDONIA • dd; S New Caledonia, Norfolk Ridge, Banc Éponge; 24°52′ S, 168°22′ E; depth 586–730 m; NORFOLK 2, stn DW2084; MNHN-IM-2023-1067 (Figs 48A–E, 83D, 85V).

Paratypes

NEW CALEDONIA • 1 dd, SL 21.6 mm, ShW 10.4 mm; S New Caledonia, Norfolk Ridge, Banc Éponge; 24°54′ S, 168°22′ E; depth 500–505 m; NORFOLK 2, stn DW2081; MNHN-IM-2023-1063 (Fig. 48H–J) • 1 dd, SL 27.9 mm, ShW 12.9 mm; S New Caledonia, Norfolk Ridge, Banc Introuvable; 24°40′ S, 168°40′ E; depth 591–1032 m; NORFOLK 2, stn DW2058; MNHN-IM-2023-1065 (Fig. 48F–G) • 1 dd, SL 23.3 mm, ShW 11.5 mm; Norfolk Ridge; 23°40′ S, 167°59′ E; depth 420–438 m; BATHUS 3, stn DW807; MNHN-IM-2023-1066.

Sequenced material

None sequenced.

Other material

CORAL SEA • 1 dd; Banc Capel; 24°41′ S, 159°43′ E; depth 500–540 m; MUSORSTOM 5, stn DW272; MNHN-IM-2023-1070 (Fig. 48K–L) • 1 dd; Banc Nova; 22°24′ S, 159°33′ E; depth 780–930 m; MUSORSTOM 5, stn DW313; MNHN-IM-2023-1080.

LOYALTY RIDGE • 1 dd juv.; 22°22′ S, 168°44′ E; depth 380–420 m; VOLSMAR, stn DW38; MNHN-IM-2023-1074.

NEW CALEDONIA • 1 dd; N New Caledonia, Grand Passage; 18°49′ S, 163°16′ E; depth 613–647 m; BATHUS 4, stn DW918; MNHN-IM-2023-1071 • 1 dd; S New Caledonia, Norfolk Ridge, Banc Éponge; 24°56′ S, 168°22′ E; depth 518–586 m; NORFOLK 2, stn DW2087; MNHN-IM-2023-1075 • 1 dd; 23°22′ S, 168°00′ E; depth 597–605 m; BATHUS 3, stn DW825; MNHN-IM-2023-1073 • 1 dd; 23°37′ S, 167°39′ E; depth 550–690 m; BERYX 11, stn DW38; MNHN-IM-2023-1079 • 1 lv; 24°55′ S, 168°22′ E; depth 505–515 m; BIOCAL, stn DW66; MNHN-IM-2023-1078 • 1 dd; 24°55′ S, 168°22′ E; depth 502–

512 m; SMIB 3, stn DW05; MNHN-IM-2023-1068 • 1 dd; 23°00' S, 167°19' E; depth 525 m; SMIB 3, stn DW21; MNHN-IM-2023-1076 • 1 dd; 24°55' S, 168°22' E; depth 525–560 m; SMIB 4, stn DW39; MNHN-IM-2023-1077.

NEW HEBRIDES ARC • 1 dd juv.; S of Vanuatu, Monts Gemini; 20°59' S, 170°03' E; depth 450 m; VOLSMAR, stn DW51; MNHN-IM-2023-1064 (Fig. 48P–R) • 1 dd juv.; SE of Mont Vauban; 22°25' S, 171°41' E; depth 505–665 m; EXBODI, stn DW3891; MNHN-IM-2023-1072 (Fig. 48M–O).

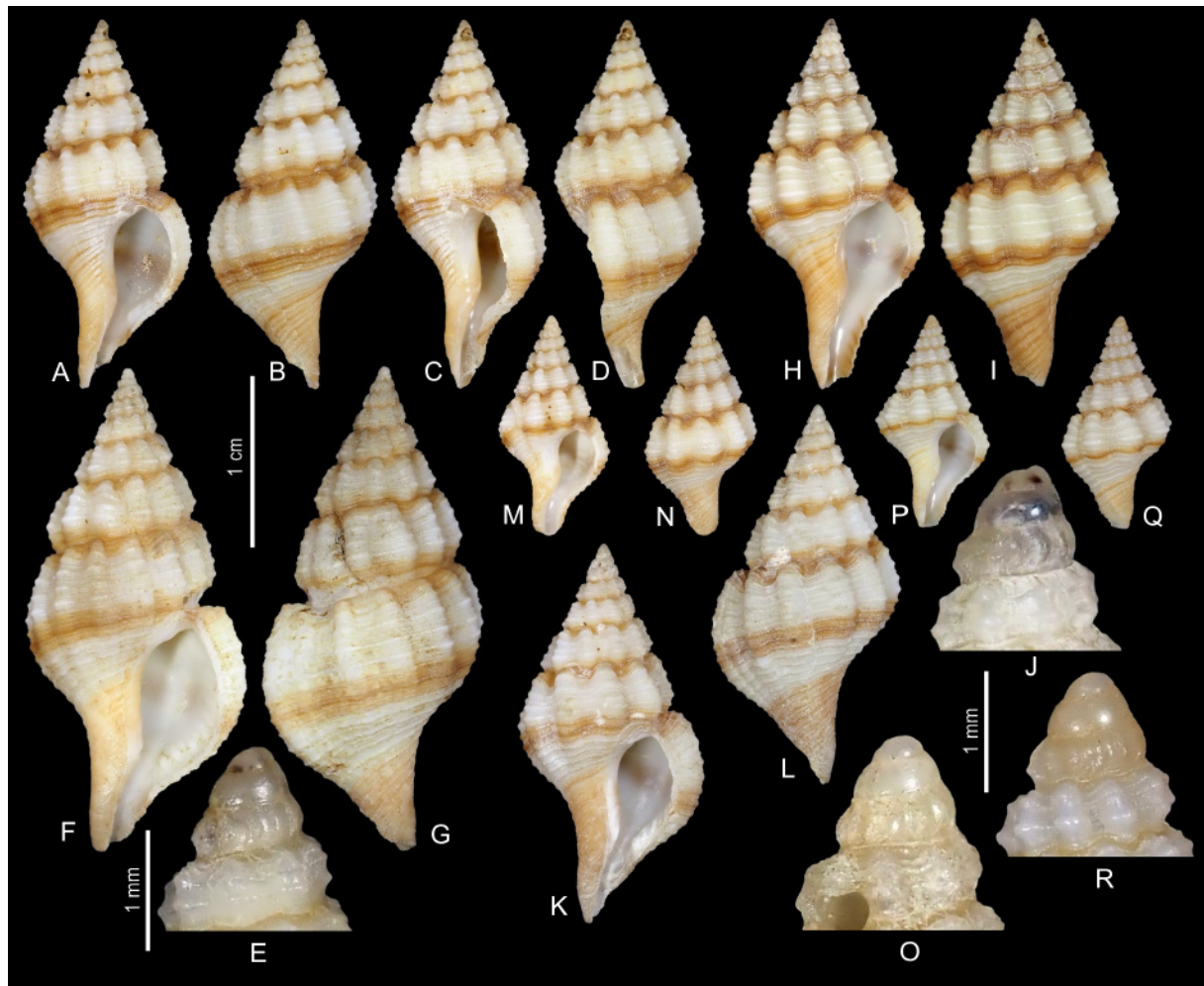


Fig. 48. *Vermeijius geminatus* sp. nov. **A–E.** Holotype, MNHN-IM-2023-1067, S New Caledonia, Norfolk Ridge, Banc Éponge, NORFOLK 2, stn DW2084, depth 586–730 m, SL 21.3 mm. **F–G.** Paratype, MNHN-IM-2023-1065, S New Caledonia, Norfolk Ridge, Banc Introuvable, NORFOLK 2, stn DW2058, depth 591–1032 m, SL 27.9 mm. **H–J.** Paratype, MNHN-IM-2023-1063, S New Caledonia, Norfolk Ridge, Banc Éponge, NORFOLK 2, stn DW2081, depth 500–505 m, SL 21.6 mm. **K–L.** MNHN-IM-2023-1070, Coral Sea, Banc Capel, MUSORSTOM 5, stn DW272, depth 500–540 m, SL 22.0 mm. **M–O.** MNHN-IM-2023-1072, Matthew and Hunter Islands, New Hebrides Arc, SE Mont Vauban, EXBODI, stn DW3891, depth 505–665 m, SL 13.0 mm. **P–R.** MNHN-IM-2023-1064, S Vanuatu, Monts Gemini, VOLSMAR, stn DW51, depth 450 m, SL 12.2 mm. All shells at the same scale, except protoconchs.

TONGA • 1 dd juv.; S of Nomuka group; 20°38' S, 174°58' W; depth 482–498 m; BORDAU 2, stn DW1554; MNHN-IM-2023-1081 • 1 dd juv.; S of Tonga Islands seamount; 23°03' S, 175°53' W; depth 483–531 m; BORDAU 2, stn DW1617; MNHN-IM-2023-1069.

Description

Measurements (holotype): SL 21.3 mm, ShW 9.7 mm.

Shell medium-sized for genus (up to 37.4 mm SL), broad, solid, fusiform, consisting of 3 protoconch and 7 teleoconch whorls. Protoconch multispiral (Figs 48E, J, O, R, 85V), obtusely conical, with 2.5 evenly convex, smooth whorls, followed by 0.5 whorl bearing 6–7 distinct, arcuate axial riblets. Transition to teleoconch marked by onset of spiral sculpture. Protoconch diameter 0.9 mm, exposed height ~0.85 mm. Teleoconch whorls trapezoidal; penultimate and last whorl convex; suture conspicuously deeply constricted, undulating, following axial sculpture of preceding whorl. Axial sculpture of broad, raised ribs extending from suture to suture; 8–9 on early whorls, 10–12 on penultimate and last whorl. Ribs adapically inflated, with sides straight, sloping downwards with straight sides, then constricted near the abapical suture. Interspaces approximately equal in width to ribs. Spiral sculpture comprises 3 primary cords on early whorls; abapical cord strongest; from the second teleoconch whorl onwards, secondary spiral threads appear between primary cords; secondary thread between abapical and central primary cord and two threads just above suture, rapidly reaching thickness of primary cords; on later whorls, fine tertiary threads appear on both sides of secondary threads. Numerous fine axial growth lines intersect spiral sculpture. Last whorl and canal covered with uniform, coarser spiral cords and finer intercalated threads. Siphonal canal slightly shorter than aperture, straight, open, slightly bent abaxially; callus near base of siphonal canal slightly detached. Aperture relatively large, ovate. Outer lip finely crenulated following the spiral sculpture, internally lirate. Inner lip fully adherent to columella, forming a thin, glossy, smooth columellar callus; columellar plicae absent. At base of siphonal canal, labral side typically with 2–4 elongate, strongly calloused teeth; parietal side occasionally with 1–2 irregular, inconspicuous, calloused teeth. Broad, shallow parietal tooth present. Umbilicus absent. Protoconch and teleoconch cream-coloured; teleoconch with reddish-brown bands above and below suture; one or two spiral cords within reddish-brown band above suture (only visible on last whorl) often somewhat stronger and darker-coloured than other spiral cords; siphonal canal tinged reddish-brown; aperture interior white, with spiral bands on outer shell faintly visible internally. Periostracum light brown. Operculum and radula unknown.

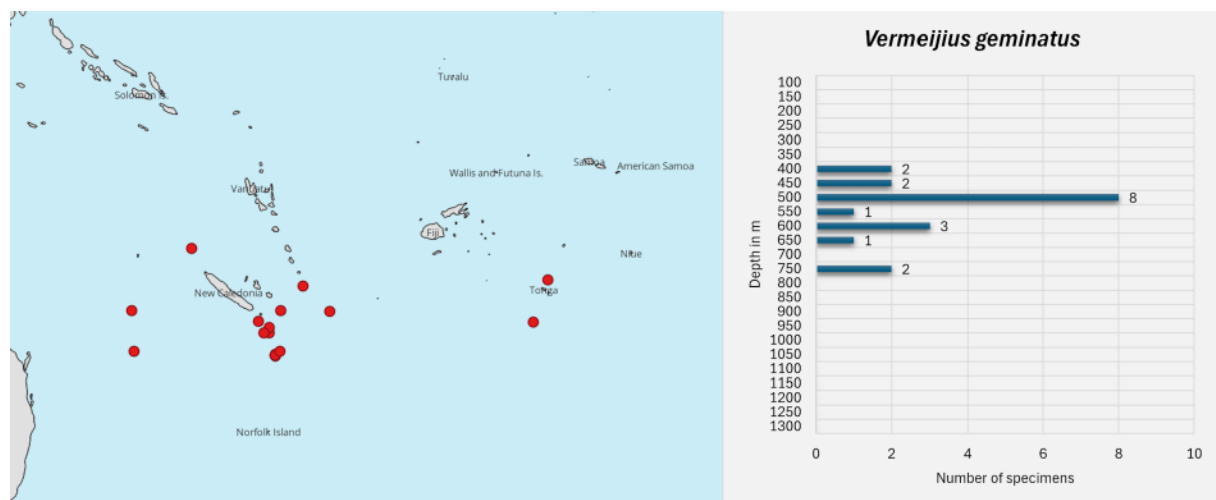


Fig. 49. Geographical and bathymetrical distribution of *Vermeijius geminatus* sp. nov. Each column represents the number of specimens (lv or dd).

Distribution

From Coral Sea, New Caledonia, and Vanuatu to Tonga (Fig. 49). Live-collected specimens at depths of 505–515 m; empty or crabbed shells at depths of 420–780 m.

Remarks

Three other species are superficially similar:

Vermeijius spectabilis sp. nov. (Papua New Guinea to New Caledonia) is superficially very similar but differs by its paucispiral protoconch. Specimens lacking the protoconch are harder to distinguish, but *V. spectabilis* generally has a slightly higher spire, less compact growth, and usually fewer but more prominent axial ribs with slightly wider interspaces.

Vermeijius tarasoc sp. nov. (French Polynesia) differs by its paucispiral protoconch, smaller adult size, stockier shape, broader and shorter spire, fewer but stronger and broader axial ribs, coarser and slightly reddish-tinted primary spiral cords, and absence of reddish-brown banding.

Vermeijius sayaensis sp. nov. (Saya de Malha Bank to Madagascar) has a similar shape and colouration and a multispiral protoconch, but differs by its more constricted base, longer siphonal canal, wider and stronger axial ribs on the last whorl, coarser primary spiral cords, and reddish-brown bands interrupted by white axial ribs.

Vermeijius sayaensis sp. nov.

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Figs 50–51, 83F, 85W

Etymology

Named after the type locality.

Material examined

Holotype

INDIAN OCEAN • 1v; W Saya de Malha Bank; 1°00' S, 60°19' E; depth 193–198 m; SAYA, stn DW5407; MNHN-IM-2019-25242 (Figs 50A–E, 83F, 85W). Property of United Nation Development Programme – Mauritius and Seychelles Joint Management Area (UNDP–JMA) and under custody of MNHN.

Sequenced material

None sequenced.

Other material

MADAGASCAR • 1 dd; NW Madagascar, between Nosy Be and Banc du Leven; 12°33' S, 47°52' E; depth 302–327 m; MIRIKY, stn DW3214; MNHN-IM-2023-1275 (Fig. 50F–I).

Description

Measurements (holotype): SL 18.7 mm, ShW 7.8 mm.

Shell medium-sized for genus (up to 22.25 mm SL), fusiform, solid, with moderately broad spire, comprising 2.75 protoconch and 6 teleoconch whorls. Protoconch multispiral (Figs 50E, 85W), obtusely conical, with 2.5 evenly convex, smooth whorls followed by 0.25 whorl bearing 6–7 distinct arcuate axial riblets. Transition to teleoconch marked by onset of spiral sculpture. Protoconch diameter 0.9 mm,

exposed height ~0.85 mm. Teleoconch whorls trapezoidal; last whorl convex. Suture deeply constricted, slightly undulating, following axial sculpture of preceding whorl. Axial sculpture of broad, raised ribs extending from suture to suture; 8–9 on all whorls. Ribs adapically inflated and extending above suture line, with sides straight, sloping downwards, then constricted near the abapical suture. Interspaces slightly narrower than ribs on early whorls, gradually becoming slightly wider towards last whorl. Spiral sculpture of 3 primary cords on early whorls; abapical cord strongest; from second teleoconch whorl onwards, secondary threads intercalated between primary cords; secondary thread between abapical and central cord and those above abapical suture quickly reaching strength of primary cords. On last whorl, fine tertiary threads present on base. Numerous fine axial growth lines intersect spiral sculpture. Last whorl and canal with regular coarser spiral cords, occasionally with finer intercalated threads. Siphonal canal relatively long, clearly exceeding aperture length, widely open, bent abaxially (strong curvature in holotype may be accentuated due to breakage and repair). Aperture large, ovate. Outer lip finely crenulated following spiral sculpture, distinctly lirate within. Inner lip fully adherent to columella, forming thin, glossy, smooth columellar callus; columellar plicae absent. At base of siphonal canal, labral side with strongly calloused elongate tooth; parietal side with 3 inconspicuous, irregular teeth. Broad,

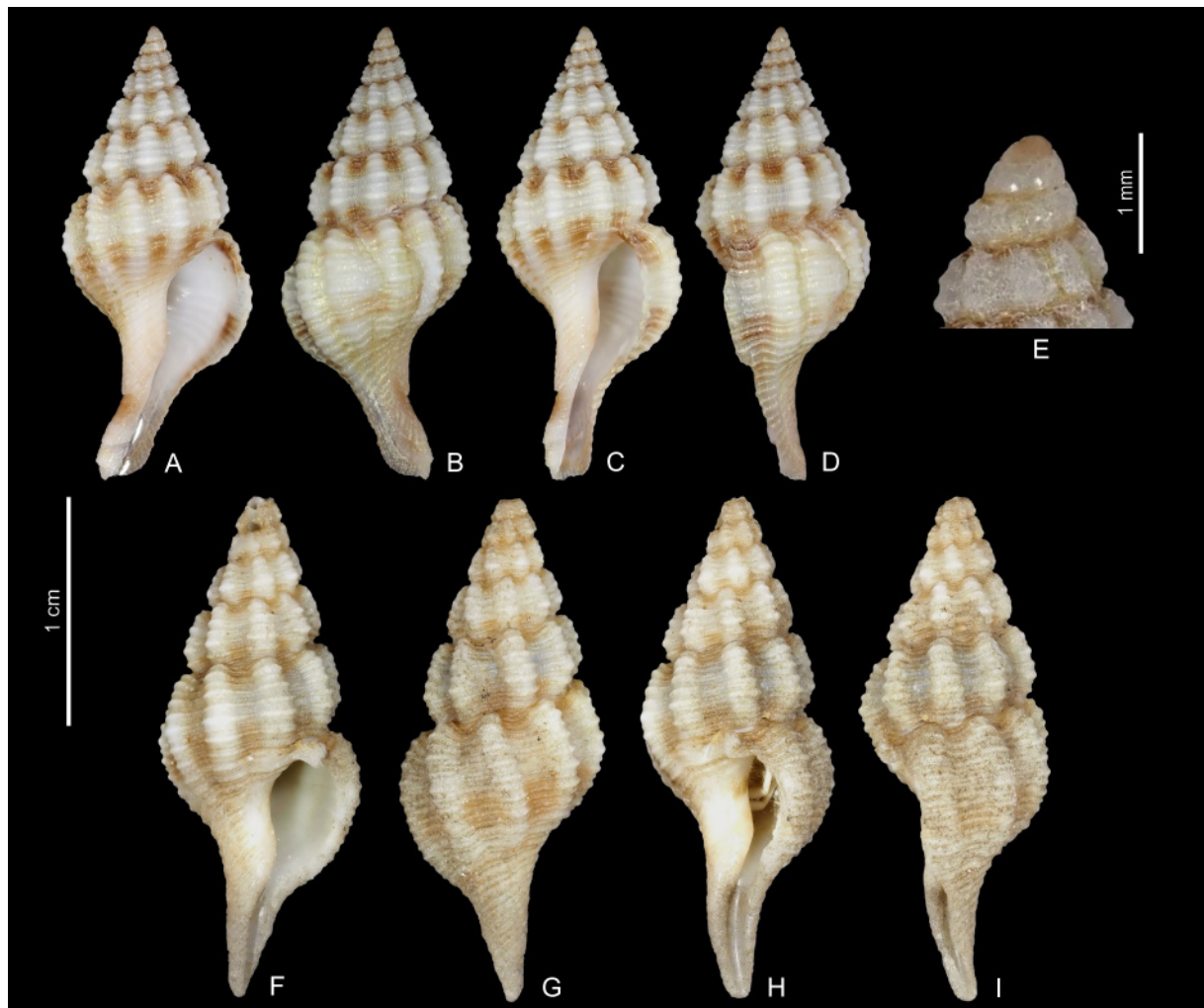


Fig. 50. *Vermeijius sayaensis* sp. nov. **A–E.** Holotype, MNHN-IM-2019-25242, W Saya de Malha Bank, SAYA, stn DW5407, depth 193–198 m, SL 18.7 mm. **F–I.** MNHN-IM-2023-1275, NW Madagascar, between Nosy Be and Banc du Leven, MIRIKY, stn DW3214, depth 302–327 m, SL 22.25 mm. All shells at the same scale, except protoconch.

shallow parietal tooth present. Umbilicus absent. Protoconch whitish with reddish-brown tip; teleoconch cream-coloured, with reddish-brown spiral bands above and below suture, interrupted by white axial ribs; canal slightly tinged reddish-brown; aperture interior white, reddish-brown bands faintly visible internally. Periostracum unknown. Operculum not preserved. Radula not examined.

Distribution

Known from the type locality and from northwestern Madagascar. Collected alive at depths of 193–198 m; one shell occupied by a hermit crab was found at depths of 302–327 m.

Remarks

Vermeijius aikenii (South Africa) is probably the most similar, sharing a multispiral protoconch, trapezoidal upper whorls, and reddish-brown bands below the suture and on the base. It differs by its higher, slimmer spire, larger adult size, less inflated last whorl, slightly more numerous and more sharply defined axial ribs, noticeably deeper interspaces between the ribs, more pronounced spiral cords, stronger reddish-brown bands over the shoulder, a distinct dark band at the base, and a reddish-tinged siphonal canal.

Vermeijius geminatus sp. nov. (Coral Sea, New Caledonia, Vanuatu, Tonga) is similar in form, colouration, and multispiral protoconch, but differs by a slightly shorter and broader spire, a shorter siphonal canal, finer spiral sculpture, more numerous but narrower axial ribs, and more distinct, uninterrupted reddish-brown bands, including a reddish-brown siphonal canal.

Vermeijius spectabilis sp. nov. (Papua New Guinea to New Caledonia) is of similar shape and colouration but differs by having a paucispiral protoconch, a more delicate, higher spire tip, finer and sharper spiral sculpture, slightly more pronounced axial ribs separated by deeper interspaces, and stronger, uninterrupted reddish-brown bands along the suture and base.

Vermeijius tarasoc sp. nov. (French Polynesia) has a similar form but differs in its paucispiral protoconch, shorter and more compact spire, shorter and straighter siphonal canal, reddish-brown tinted primary spiral cords, and absence of reddish-brown bands.

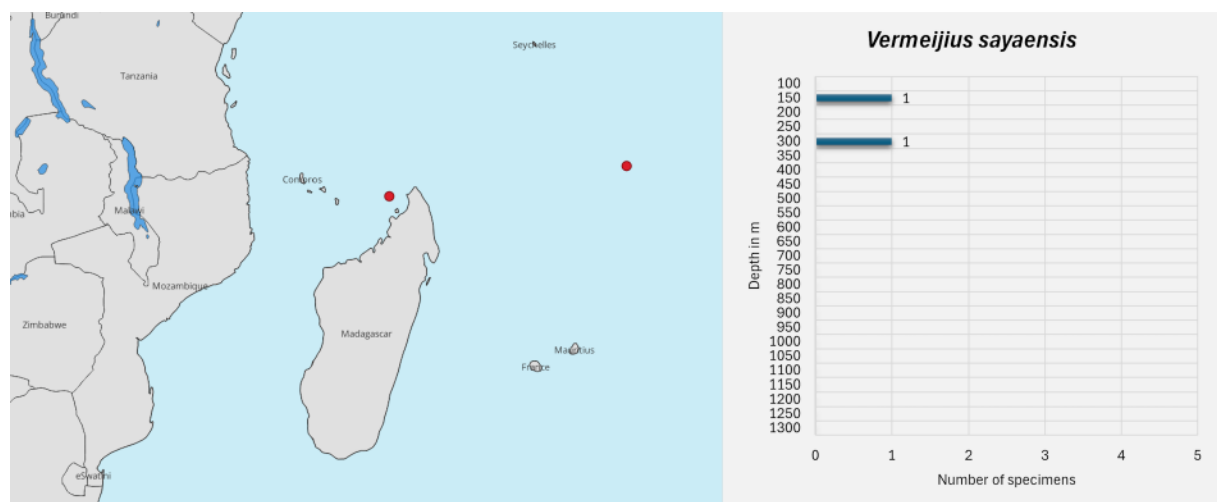


Fig. 51. Geographical and bathymetrical distribution of *Vermeijius sayaensis* sp. nov. Each column represents the number of specimens (lv or dd).

Vermeijius pauxillus sp. nov.

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Figs 52–53, 84D, 85X

Etymology

The Latin adjective ‘*pauxillus*’ means ‘small’ or ‘little’, a diminutive form derived from the Latin word ‘*paucus*’, also meaning ‘few’ or ‘small’. The name refers to the small size of this new species.

Material examined

Holotype

PAPUA NEW GUINEA • dd; seamount off NW Bougainville Island; 5°33' S, 154°00' E; depth 369–377 m; BIOPAPUA, stn DW3745; MNHN-IM-2023-1162 (Figs 52A–E, 84D, 85X).

Paratypes

PAPUA NEW GUINEA • 1 dd, SL 12.3 mm, ShW 6.0 mm; same data as for holotype; MNHN-IM-2023-1163 (Fig. 52F–H) • 1 dd, SL 14.0 mm, ShW 6.9 mm; same data as for holotype; NMBE MOLL-0588453 (Fig. 52I–M) • 1 dd, SL 11.4 mm, ShW 5.3 mm; Papua New Guinea, W Buka Island; 5°33' S, 153°59' E; depth 383–720 m; MADEEP, stn DW4268; MNHN-IM-2023-1164.

Sequenced material

None sequenced.

Other material

PAPUA NEW GUINEA • 2 dd; same data as for holotype; MNHN-IM-2023-1165 • 1 dd; New Britain, W Vitu Island Archipel, Whirlwind reefs; 4°41' S, 148°15' E; depth 600–607 m; MADEEP, stn DW4239; MNHN-IM-2023-1166.

Description

Measurements (holotype): SL 14.0 mm, ShW 7.0 mm.

Shell small for genus (up to 14.0 mm SL), fusiform, solid, with broad, short spire, comprising 1.5 protoconch and 5.25 teleoconch whorls. Protoconch paucispiral (Figs 52E, M, H, 85X), with 1.5 simple, glossy, bulbous whorls bearing very fine axial growth lines near abrupt termination. Transition to teleoconch marked by onset of spiral sculpture. Protoconch diameter 0.85 mm, exposed height ~0.65 mm. Teleoconch whorls trapezoidal; last whorl convex. Suture strongly constricted, undulating, following axial sculpture of preceding whorl. Axial sculpture of raised ribs extending from suture to suture; 9–10 on early whorls, 10–12 on last whorl; ribs adapically convex, with sides straight, sloping downwards, then constricted near the abapical suture. Interspaces slightly narrower than ribs. Spiral sculpture of 3 primary cords on early whorls; abapical cord strongest. From second teleoconch whorl onwards, secondary spiral threads intercalated between primary cords; on last whorl (sometimes penultimate), fine tertiary threads present on both sides of secondary threads. Spiral sculpture intersected by widely spaced, fine axial growth lines. Last whorl and siphonal canal with coarser spiral cords and finer intercalated threads. Siphonal canal relatively short, approximately as long as aperture, straight, widely open, slightly bent abaxially. Aperture relatively large, ovate. Outer lip lirate within. Inner lip fully adherent to columella, forming thin, glossy, smooth columellar callus; columellar plicae absent. At base of siphonal canal, labral side typically with 2–3 strongly calloused, elongate teeth; parietal side occasionally with 1–2 irregular, calloused teeth. Broad, shallow parietal tooth present. Umbilicus absent. Protoconch light brown; teleoconch uniformly white; aperture interior white. Periostracum whitish, thin, inconspicuous, bearing small, short thorns at intersections of axial growth lines and spiral sculpture. Operculum and radula unknown.

Distribution

Known only from Papua New Guinea (Fig. 53). Empty or crabbed shells collected at depths of 377–600 m.

Remarks

Vermeijius pauxillus sp. nov. resembles a miniature version of several other species:

Vermeijius spectabilis sp. nov. (Papua New Guinea to New Caledonia), *V. geminatus* sp. nov. (Coral Sea, New Caledonia, Vanuatu, Tonga), and *V. sayaensis* sp. nov. (Saya de Malha Bank to Madagascar) all share a similar general shell shape with trapezoidal whorls, a convex last whorl, and a deeply incised suture. However, all three differ by their significantly larger adult size and by the presence of reddish-brown bands below the suture and at the base. Moreover, *V. geminatus* and *V. sayaensis* have a multispiral protoconch. Note also that *V. pauxillus* occurs at BIOPAPUA station DW3745, in syntopy with *V. spectabilis*.

Vermeijius brevicostatus sp. nov. (New Caledonia) is comparable in size and also has trapezoidal whorls, but differs by its more slender overall shape, shorter siphonal canal, weaker spiral sculpture, fewer axial ribs, and faint reddish-brown bands below the suture and at the base.

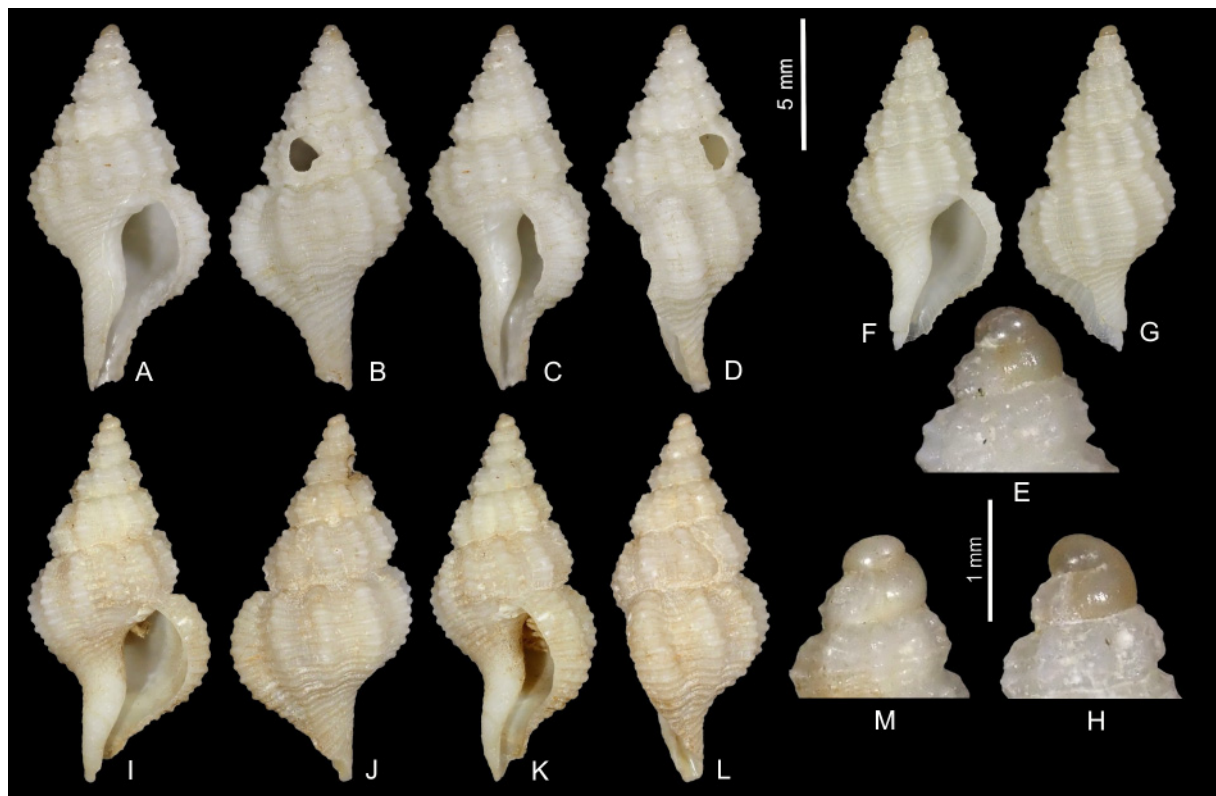


Fig. 52. *Vermeijius pauxillus* sp. nov. A–E. Holotype, MNHN-IM-2023-1162, Papua New Guinea, seamount off NW Bougainville Island, BIOPAPUA, stn DW3745, depth 369–377 m, SL 14.0 mm. F–H. Paratype, MNHN-IM-2023-1163, same data as for holotype, SL 12.3 mm. I–M. Paratype, NMBE MOLL-0588453, same data as for holotype, SL 14.0 mm. All shells at the same scale, except protoconchs.

Vermeijius putillus sp. nov. (Norfolk Ridge, New Caledonia) differs by having a slightly smaller adult size, a higher spire with a narrower spire angle, more convex whorls, and a white, erect protoconch.

Vermeijius tarasoc sp. nov. (French Polynesia) is also similar in overall form but differs by its larger adult size, slimmer spire tip, more inflated last whorl, more deeply incised suture, more evenly developed and more numerous spiral cords, and stronger, broader, but fewer axial ribs.

Vermeijius malampaensis sp. nov., which also occurs in Papua New Guinea, is easily distinguished by its significantly larger adult size, longer and more slender spire, convex (rather than trapezoidal) whorls, less constricted suture, fewer but stronger axial ribs, and more pronounced spiral sculpture, especially prominent on the axial ribs.

Vermeijius putillus sp. nov. (Norfolk Ridge, New Caledonia) is superficially similar in size, sculpture, and colouration, but differs by its erect white protoconch, slightly smaller adult size, more slender spire, less inflated last whorl, convex (vs trapezoidal) upper whorls, and simpler but more robust spiral sculpture that forms distinct white nodes on the axial ribs.

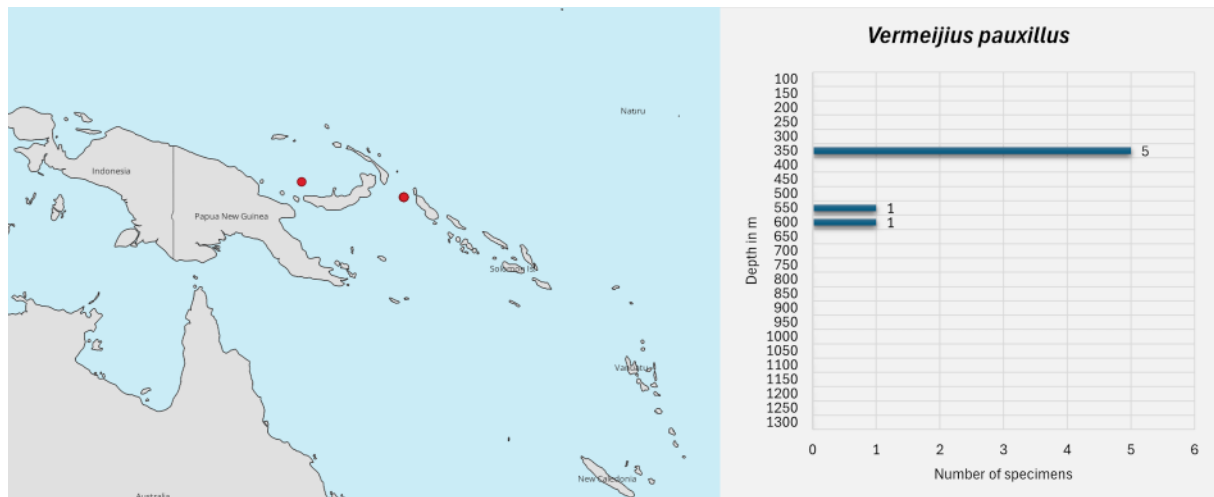


Fig. 53. Geographical and bathymetrical distribution of *Vermeijius pauxillus* sp. nov. Each column represents the number of specimens (lv or dd).

Vermeijius brevicostatus sp. nov.

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Figs 54–55, 80H, 84E, 85Y

Etymology

The Latin word ‘*brevicostatus*’ is an adjective derived from the adjectives ‘*brevis*’ meaning ‘short’ and ‘*costatus*’ meaning ‘ribbed’ or ‘ridged’, referring to the short-looking axial ribs of this new species.

Material examined

Holotype

NEW CALEDONIA • 1v; S New Caledonia, Norfolk Ridge, Banc Jumeau Est; 23°43' S, 168°15' E; depth 470–621 m; NORFOLK 2, stn DW2049; MNHN-IM-2023-1033 (Figs 54A–D, 84E).

Paratypes

NEW CALEDONIA • 1 dd juv., SL 11.3 mm, ShW 5.6 mm; same data as for holotype; MNHN-IM-2023-1034 (Fig. 54M–N) • 1 lv, SL 10.1 mm, ShW 5.3 mm; S New Caledonia, Norfolk Ridge, Banc Jumeau Est; 23°47' S, 168°17' E; depth 400–420 m; NORFOLK 1, stn DW1704; MNHN-IM-2023-1031 (Fig. 54H–L) • 1 lv, SL 12.6 mm, ShW 6.1 mm; S New Caledonia, Norfolk Ridge, Banc Jumeau Est; 23°48' S, 168°17' E; depth 493–850 m; NORFOLK 2, stn DW2110; MNHN-IM-2023-1253 (Figs 54E–G, 80H, 85Y).

Sequenced material

None sequenced.

Other material

NEW CALEDONIA • 1 dd; N New Caledonia, Grand Passage; 18°16' S, 162°57' E; depth 574–660 m; CONCALIS, stn DW2980; MNHN-IM-2023-1032 (Fig. 54O–P).

Description

Measurements (holotype): SL 14.4 mm, ShW 6.8 mm.

Shell small for genus (up to 14.4 mm SL), fusiform, solid, with relatively high spire composed of 1.5 protoconch and 5–6 teleoconch whorls. Protoconch paucispiral (Figs 54G, L, 85Y), comprising 1.5 simple, glossy, bulbous whorls, bearing very fine axial growth lines near the abrupt termination. Transition to teleoconch marked by onset of spiral sculpture. Protoconch diameter 0.8 mm, exposed height ~0.7 mm. Teleoconch whorls trapezoidal; last whorl convex, slightly keeled. Suture deeply constricted, undulating, following axial sculpture of preceding whorl. Axial sculpture consists of raised ribs extending from suture to suture; ~8 ribs on early whorls, 8–10 on last whorl. Ribs adapically convex, with sides straight, sloping downwards, then constricted near the abapical suture. Interspaces approximately equal in width to ribs. Spiral sculpture comprises 3 primary cords on early whorls; abapical cord strongest; from second teleoconch whorl onwards, secondary spiral threads intercalated between primary cords, followed by finer tertiary threads. Spiral sculpture intersected by closely spaced, fine axial growth lines. Last whorl and siphonal canal ornamented with coarser spiral cords and finer intercalated threads. Siphonal canal shorter than the aperture, widely open, slightly bent abaxially. Aperture relatively large, ovate. Outer lip liriate within. Inner lip fully adherent to columella, forming a thin, glossy, smooth columellar callus; columellar plicae absent. At base of siphonal canal, labral side typically with 1–3 elongate, strongly calloused teeth; parietal side occasionally with 1–2 irregular, calloused teeth. Broad, shallow parietal tooth present. Umbilicus absent.

Protoconch white; teleoconch cream-coloured, sometimes with faint reddish-brown bands above and below suture; aperture interior white. Periostracum light brown, bearing small, short thorns at intersections of axial growth lines and spiral sculpture. Operculum corneous, yellow-brown, with terminal nucleus, filling aperture. Radula (Fig. 80H) examined in paratype (MNHN-IM-2023-1253), long, comprising about 165 transverse rows of teeth, of which about 10 rows nascent. Radula narrow, distance between outer edges of lateral teeth about 95 μm (1.9% of AL without canal). Lateral teeth medium-broad, with weakly arcuate anterior margin, with strongly attenuated outer anterior corner, producing a long ‘handle’. With a distinct short cusp at the transition of outermost cusp into handle. Lateral teeth with 6–7 recurved, closely spaced, unequal major cusps, second inner longest, and one smaller inner cusp. Central tooth trapezoidal, with three long, sharp cusps, central longest. Distinct transverse folds of the membrane are situated serially between rows of lateral teeth and fuse with central teeth.

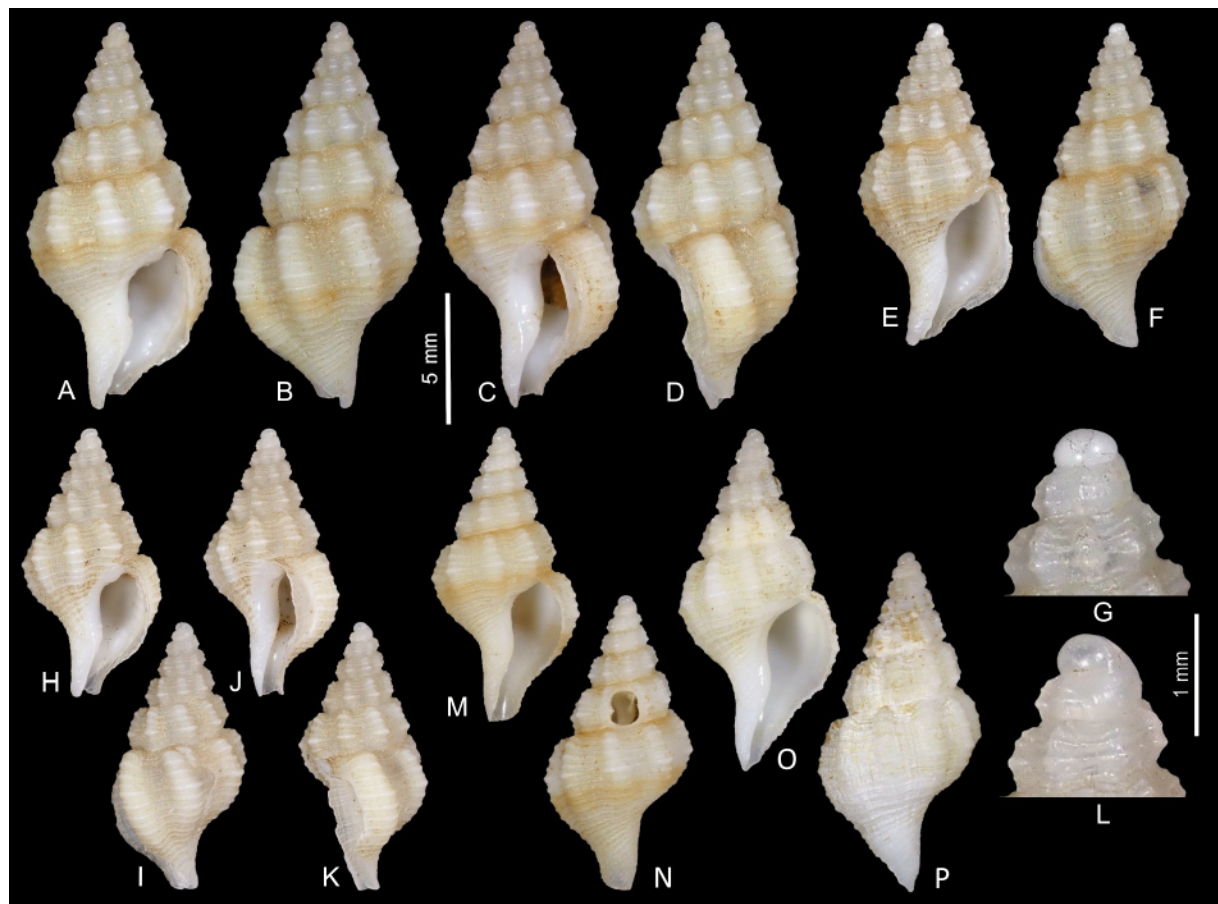


Fig. 54. *Vermeijius brevicostatus* sp. nov. **A–D.** Holotype, MNHN-IM-2023-1033, S New Caledonia, Norfolk Ridge, Banc Jumeau Est, NORFOLK 2, stn DW2049, depth 470–621 m, SL 14.4 mm. **E–G.** Paratype, MNHN-IM-2023-1253, S New Caledonia, Norfolk Ridge, Banc Jumeau Est, NORFOLK 2, stn DW2110, depth 493–850 m, SL 12.6 mm. **H–L.** Paratype, MNHN-IM-2023-1031, S New Caledonia, Norfolk Ridge, Banc Jumeau Est, NORFOLK 1, stn DW1704, depth 400–420 m, SL 10.1 mm. **M–N.** Paratype, MNHN-IM-2023-1034, same data as for holotype, SL 11.3 mm. **O–P.** MNHN-IM-2023-1032, N New Caledonia, Grand Passage CONCALIS, stn DW2980, depth 574–660 m, SL 12.9 mm. All shells at the same scale, except protoconchs.

Distribution

New Caledonia (Fig. 55). Live-collected specimens at depths of 420–493 m; empty or crabbed shells at depths of 574–621 m.

Remarks

Vermeijius bellatulus sp. nov. (New Caledonia) is of similar size but differs by its slightly translucent, glassy shell, an inflated, strongly erect protoconch, convex, unkeeled whorls, inconspicuous spiral sculpture, and usually a higher spire and longer siphonal canal.

Vermeijius pauxillus sp. nov. (Papua New Guinea) is another similarly sized species with trapezoidal whorls, but differs by having more numerous, somewhat more closely spaced axial ribs, a convex, unkeeled last whorl, and more robust spiral sculpture, both on and between the axial ribs.

Vermeijius putillus sp. nov. (Norfolk Ridge, New Caledonia), of similar size, differs by its inflated, erect protoconch, convex (vs trapezoidal) whorls, less deeply incised suture, simpler and coarser spiral sculpture, convex (vs keeled) last whorl, and a uniformly white shell.

Vermeijius geminatus sp. nov., *V. spectabilis* sp. nov., *V. tarasoc* sp. nov. and *V. sayaensis* sp. nov., all differ by their significantly larger adult size and usually more intense reddish-brown banding below the suture and on the base (except for *V. tarasoc*). Moreover, *V. geminatus* and *V. sayaensis* also possess a multispiral protoconch.

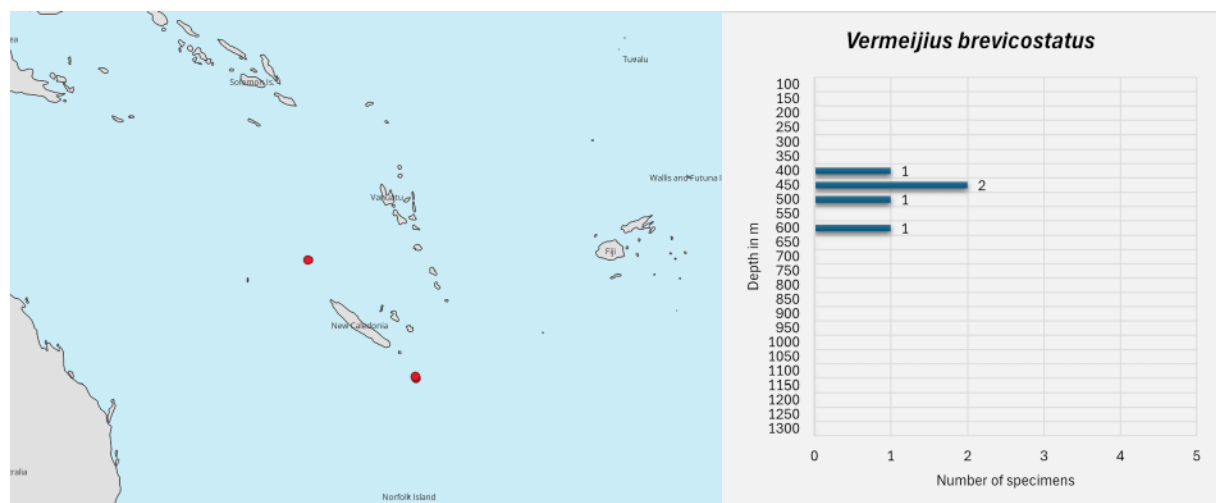


Fig. 55. Geographical and bathymetrical distribution of *Vermeijius brevicostatus* sp. nov. Each column represents the number of specimens (lv or dd).

Vermeijius putillus sp. nov.

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Figs 56–57, 84F, 86A

Etymology

The Latin adjective ‘*putillus*’ means ‘very small’ or ‘tiny’, a diminutive related to ‘*pusillus*’ (from ‘*puer*’, meaning ‘boy, lad, child’). The name refers to the conspicuously small adult size of this new species.

Material examined

Holotype

NEW CALEDONIA • dd; S New Caledonia, Norfolk Ridge; 23°40' S, 167°45' E; depth 470 m; CHALCAL 2, stn DW76; MNHN-IM-2023-1167 (Figs 56A–E, 84F, 86A).

Paratypes

NEW CALEDONIA • 1 dd, SL 8.6 mm, ShW 4.0 mm; same data as for holotype; MNHN-IM-2023-1169 (Fig. 56F–H) • 1 lv juv., SL 5.55 mm, ShW 2.7 mm; same data as for holotype; MNHN-IM-2023-1168 (Fig. 56N–O) • 1 dd, SL 7.9 mm, ShW 3.6 mm; S New Caledonia, Norfolk Ridge; 23°37' S, 167°42' E; depth 447–450 m; SMIB 8, stn DW169; NMBE MOLL-0588454 (Fig. 56I–M).

Sequenced material

None sequenced.

Other material

NEW CALEDONIA • 2 dd; S New Caledonia, Norfolk Ridge; 23°37' S, 167°42' E; depth 447–450 m; SMIB 8, stn DW169; MNHN-IM-2023-1171 • 1 dd; S New Caledonia, Stylaster Bank; 23°38' S, 167°43' E; depth 433–450 m; SMIB 8, stn DW166; MNHN-IM-2023-1170.

Description

Measurements (holotype): SL 9.55 mm, ShW 4.2 mm.

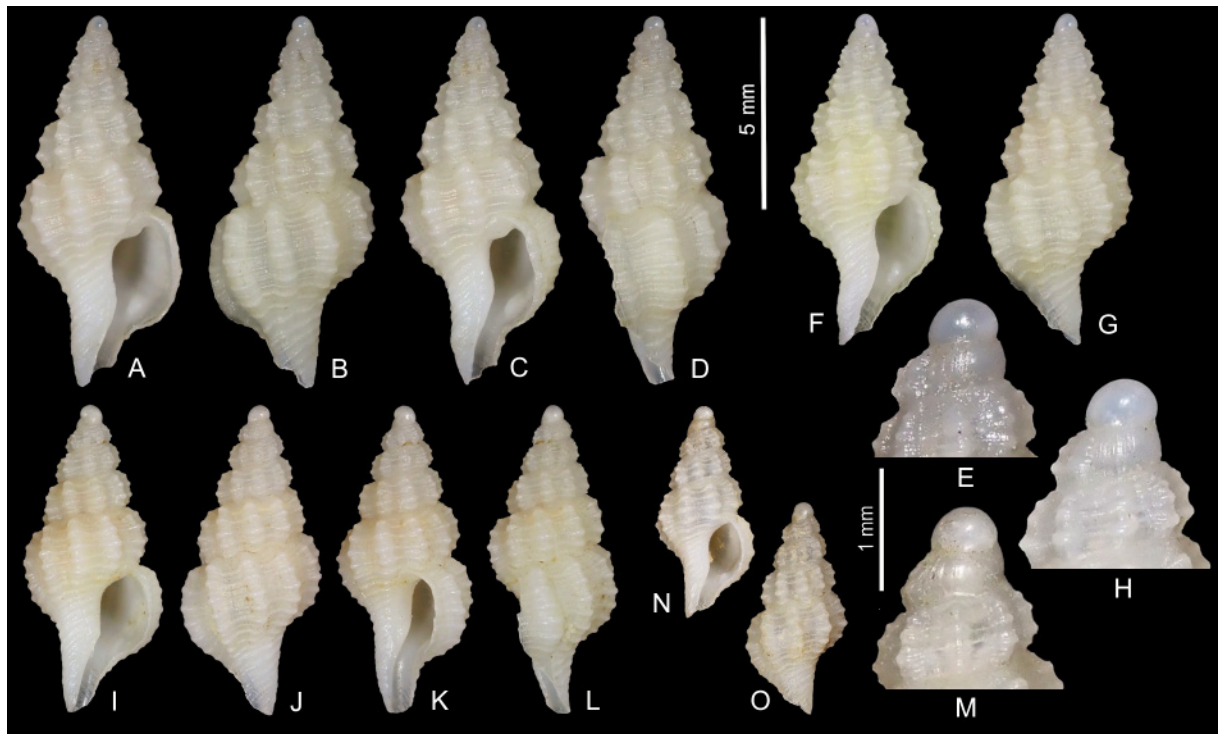


Fig. 56. *Vermeijius putillus* sp. nov. A–E. Holotype, MNHN-IM-2023-1167, S New Caledonia, Norfolk Ridge, CHALCAL 2, stn DW76, depth 470 m, SL 9.55 mm. F–H. Paratype, MNHN-IM-2023-1169, same data as for holotype, SL 8.6 mm. I–M. Paratype, NMBE MOLL-0588454, S New Caledonia, Norfolk Ridge, SMIB 8, stn DW169, depth 447–450 m, SL 7.9 mm. N–O. Paratype, MNHN-IM-2023-1168, same data as for holotype, SL 5.5 mm. All shells at the same scale, except protoconchs.

Shell small for genus (up to 9.6 mm SL; smallest species of the genus), fusiform, solid, with relatively high spire, comprising 1.5 protoconch and 4.5–5 teleoconch whorls. Protoconch paucispiral (Figs 56E, H, M, 86A), with 1.5 simple, glossy, upright, inflated whorls bearing 5 fine axial riblets near abrupt termination. Transition to teleoconch marked by onset of spiral sculpture. Protoconch diameter ~0.75 mm, exposed height ~0.7 mm. Early teleoconch whorls slightly trapezoidal; penultimate and last whorl convex. Suture constricted, undulating, following axial sculpture of preceding whorl. Axial sculpture of raised ribs extending from suture to suture; 8–9 on early whorls, 9–10 on last whorl. Ribs adapically convex, with sides slightly convex, sloping downwards, then constricted near the abapical suture. Interspaces approximately equal in width to ribs. Spiral sculpture of 3 primary cords on early whorls; abapical cord strongest; from second teleoconch whorl onwards, secondary spiral threads intercalated between primary cords, often followed by finer tertiary threads. Closely spaced, inconspicuous axial growth lines intersect spiral sculpture. Last whorl, base and siphonal canal with coarser spiral cords and one finer intercalated thread; canal lacking intercalated threads. Siphonal canal short, about equal to aperture length, widely open, straight or slightly bent abaxially. Aperture relatively small, ovate. Outer lip with about 5 coarse internal lirae. Inner lip fully adherent, forming thin, glossy, smooth columellar callus; columellar plicae absent. At base of siphonal canal, labral side typically with a single conspicuously strong, calloused tooth; parietal side occasionally with 1–2 irregular teeth. Broad, shallow parietal tooth present. Umbilicus absent. Protoconch white; teleoconch, last whorl and siphonal canal uniformly whitish; aperture interior white. Periostracum unknown. Operculum yellowish, corneous, with terminal nucleus, filling aperture. Radula not examined.

Distribution

Known only from south of New Caledonia, Norfolk Ridge (Fig. 57). One live-collected specimen was obtained at a depth of 470 m; empty or crabbed shells at depths of 450–470 m.

Remarks

Placed in *Vermeijius* based on conchological similarities to the sequenced species *V. bellatulus* sp. nov.

Vermeijius bellatulus sp. nov. (New Caledonia) differs by its convex whorl profile, smaller number of teleoconch whorls, usually somewhat inflated last whorl, less pronounced axial ribs, weaker spiral

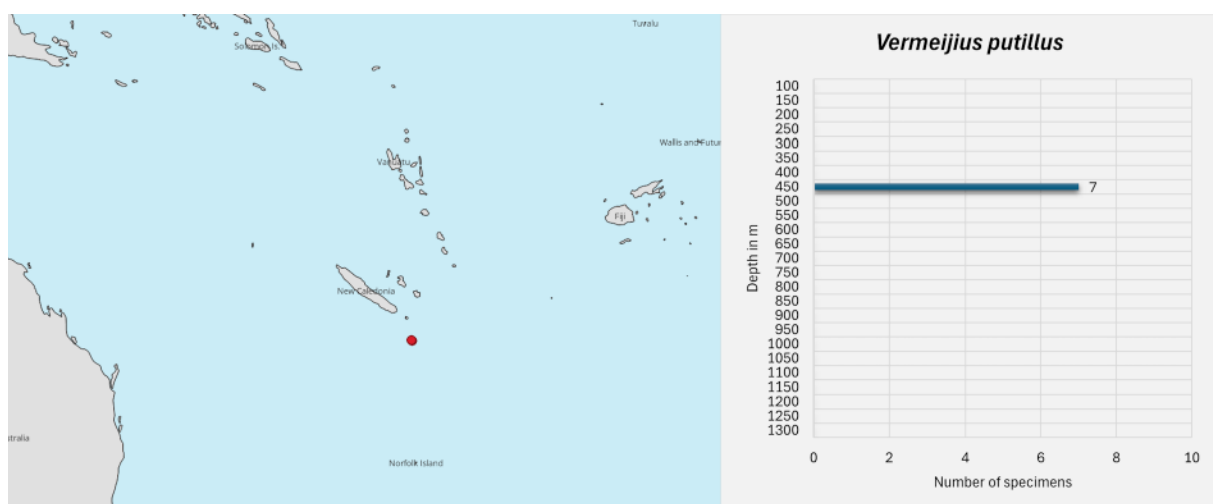


Fig. 57. Geographical and bathymetrical distribution of *Vermeijius putillus* sp. nov. Each column represents the number of specimens (lv or dd).

sculpture, more numerous and finer spiral cords on the siphonal canal, and often reddish-brown tinged spiral cords on the penultimate and last whorl.

Vermeijius brevicostatus sp. nov. (New Caledonia) is similar in size but differs by having a flatter, wider protoconch, distinctly trapezoidal whorls, a more deeply incised suture, more complex and finer spiral sculpture, a slightly keeled last whorl, and often light reddish-brown banding below the suture and on the base.

Vermeijius pauxillus sp. nov. (Papua New Guinea) is superficially similar in size, sculpture, and colouration but differs by its flat, broad, slightly reddish-brown tinged protoconch, slightly larger adult size, broader spire, inflated last whorl, more deeply incised suture, trapezoidal upper whorls, and more complex, yet finer spiral sculpture.

Vermeijius miriky sp. nov.

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Figs 58–59, 84B, 86B

Etymology

The species is named after the MIRIKY expedition, itself named after the fishery vessel on which the survey was conducted. Used as a noun in apposition.

Material examined

Holotype

MADAGASCAR • dd; NW Madagascar, W of Cap d'Ambre; 12°06' S, 48°54' E; depth 560–653 m; MIRIKY, stn DW3200; MNHN-IM-2023-1126 (Figs 58A–D, 84B, 86B).

Paratypes

MADAGASCAR • 2 dd, SL 13.2 mm, ShW 5.1 mm / SL 14.5 mm, ShW 6.2 mm; same data as for holotype; MNHN-IM-2023-1125 (Figs 58E–H, N–O) • 1 dd, SL 15.2 mm, ShW 6.0 mm; same data as for holotype; NMBE MOLL-0588455 (Fig. 58I–M).

Sequenced material

None sequenced.

Other material

MADAGASCAR • 4 dd; same data as for holotype; MNHN-IM-2023-1124.

Description

Measurements (holotype): SL 15.6 mm, ShW 6.2 mm.

Shell small for genus (up to 15.6 mm SL), fusiform, with high spire composed of 1.75 protoconch and 5–6 teleoconch whorls. Protoconch paucispiral (Figs 58H, M, 86B), comprising 1.5 glossy, smooth whorls followed by 0.25 whorl bearing 2–3 closely spaced, fine but distinct, straight axial riblets and 2–3 axial riblets crossed by initial traces of spiral sculpture. Transition to teleoconch often indistinct, marked by development of stronger spiral cords and stronger axial ribs. Protoconch diameter 0.8–0.9 mm, exposed height ~0.8 mm. Teleoconch whorls strongly convex. Suture deeply impressed and undulating, following axial sculpture of preceding whorl. Axial sculpture consists of strong, raised ribs extending from suture to suture, usually weakening or nearly obsolete on last whorl; 7–9 on spire whorls, 9–11 on penultimate and last whorl. Interspaces deep and about as wide as ribs on early whorls, occasionally irregular and shallower on later whorls, sometimes nearly obsolete. Spiral sculpture of 5

broad, raised, relatively widely spaced primary cords on early whorls; the 2 adapical cords distinctly weaker; from second teleoconch whorl onwards, clearly weaker intercalated secondary threads present between primary cords. Several very fine tertiary threads present on both sides of secondary threads on penultimate and last whorl. Axial growth lines well visible, forming indistinct reticulate pattern at intersections with spiral cords. Base and siphonal canal with numerous coarser spiral cords and finer intercalated threads, gradually weakening towards canal tip. Siphonal canal long, clearly exceeding aperture length, open, slightly bent abaxially. Aperture relatively small, ovate. Outer lip smooth or with indistinct, interrupted lirae internally. Inner lip fully adherent to columella, forming thin, glossy, smooth columellar callus; columellar plicae absent. At base of siphonal canal, labral side with 1–2 elongate, calloused teeth; parietal side occasionally with weak elongate tooth. Indistinct, shallow parietal tooth present. Umbilicus absent. Protoconch white; teleoconch and aperture interior uniformly white. Periostracum light brown, bearing broad, short thorns at intersections of axial growth lines and spiral sculpture. Operculum and radula unknown.

Distribution

Known only from the type locality. Empty or crabbed shells collected at depths of 560–653 m.

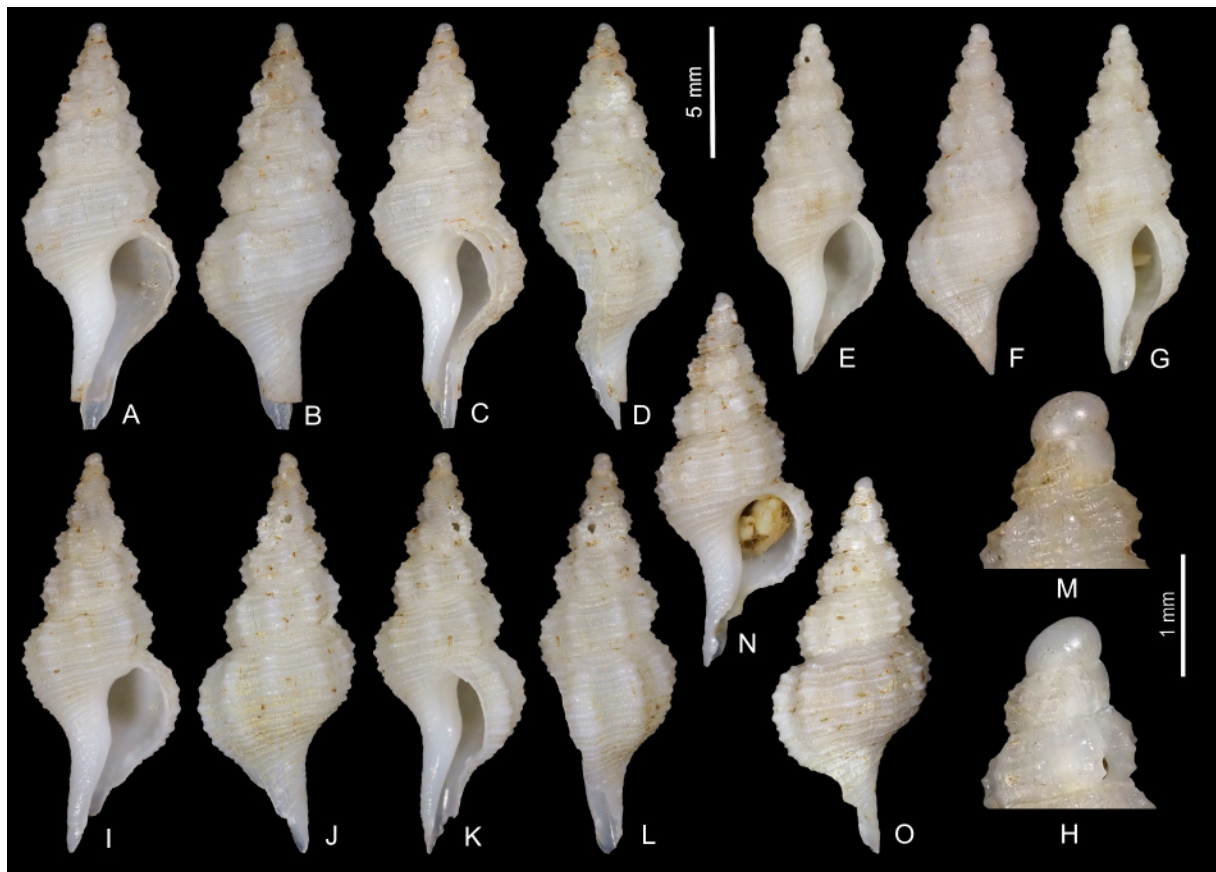


Fig. 58. *Vermeijius miriky* sp. nov. **A–D.** Holotype, MNHN-IM-2023-1126, NW Madagascar, W of Cap d'Ambre, MIRIKY, stn DW3200, depth 560–653 m, SL 15.6 mm. **E–H.** Paratype, MNHN-IM-2023-1125, same data as for holotype, SL 13.2 mm. **I–M.** Paratype, NMBE MOLL-0588455, same data as for holotype, SL 15.2 mm. **N–O.** Paratype, MNHN-IM-2023-1125, same data as for holotype, SL 14.5 mm. All shells at the same scale, except protoconchs.

Remarks

Vermeijius insperatus Hadorn & Fraussen, 2024 (western Madagascar) differs markedly by its significantly larger adult size, higher and slimmer spire, smooth subsutural concavity, significantly coarser and fewer axial ribs, prominent nodes at the intersection of axial ribs and widely spaced primary spiral cords, and numerous intercalated secondary spiral threads between the primary cords.

Vermeijius atimovatae sp. nov. (southeastern Madagascar) differs by its larger adult size, wider spire angle, heavier and more solid shell, less convex whorls, less deeply incised suture, concave shoulder slope, fewer primary spiral cords with numerous intercalated fine spiral threads, and fewer but significantly stronger and broader axial ribs.

Juvenile specimens of *Vermeijius mainbaza* sp. nov. (Mozambique) resemble in appearance but are distinguished by a larger adult size, slightly larger spire angle, larger protoconch, coarser axial sculpture on the initial whorls, overall rougher axial and spiral sculpture, more adherent periostracum, and coarser axial growth lines between the spiral cords.

Vermeijius sp. (northwestern Madagascar) is also a small white species but differs by having a shorter and wider spire, a shorter siphonal canal, more pronounced rounded primary spiral cords forming white nodes on the axial ribs, and a lower number of axial ribs.

Vermeijius putillus sp. nov. (Norfolk Ridge, New Caledonia) is another small white species but differs by its more erect and smaller protoconch, shorter and broader spire, shorter siphonal canal, and significantly stronger spiral sculpture on all whorls.

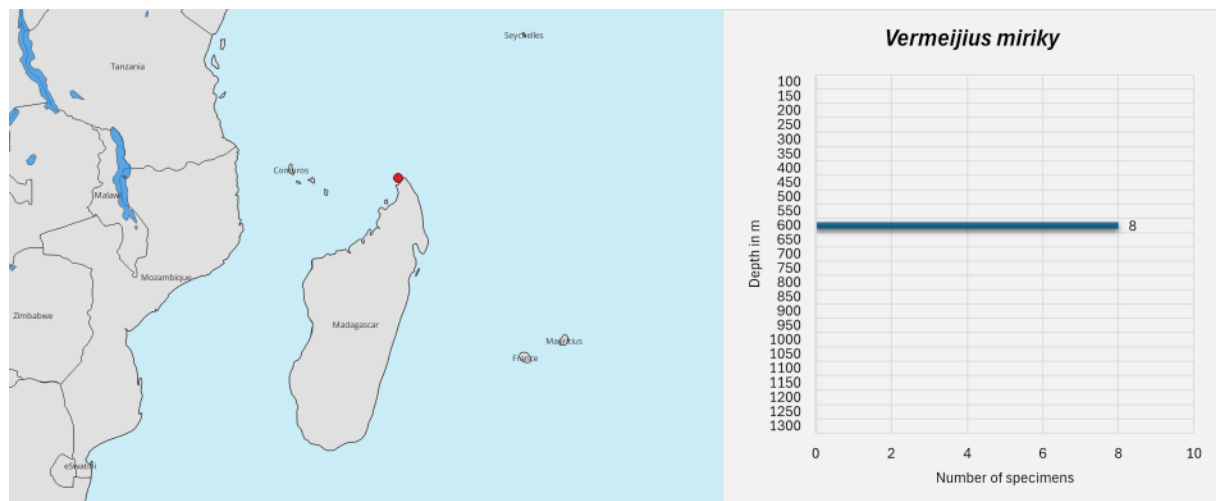


Fig. 59. Geographical and bathymetrical distribution of *Vermeijius miriky* sp. nov. Each column represents the number of specimens (lv or dd).

Vermeijius sp.

Figs 60–61, 80B, 84K, 86C

Material examined

Sequenced material

None sequenced.

Other material

MADAGASCAR • 1 lv subadult; NW Madagascar, between Nosy Be and Banc du Leven; 12°26' S, 48°13' E; depth 578–580 m; MIRIKY, stn CP3192; MNHN-IM-2023-1244 (Figs 60, 80B, 84K, 86C).

Description

Measurements: SL 9.8 mm, ShW 4.7 mm.

Shell (subadult) small for genus (9.8 mm SL), fusiform, with moderately broad, elongate spire, comprising 1.75 protoconch and 4 teleoconch whorls. Protoconch paucispiral (Figs 60E, 86C), with 1.5 glossy, smooth, bulbous whorls followed by 0.25 whorl bearing very fine axial growth lines. Transition to teleoconch marked by onset of spiral sculpture. Protoconch diameter 1.0 mm, exposed height ~0.9 mm. Teleoconch whorls convex. Suture impressed, undulating, following axial sculpture of preceding whorl. Axial sculpture of strong, raised ribs extending from suture to suture; ~7 on all whorls. Interspaces shallow, about as wide as ribs. Spiral sculpture of 5 raised, well-rounded primary cords on all whorls; abapical cord situated within or just above suture; adapical cord weakest. From second whorl onwards, secondary spiral threads present between primary cords; last whorl with additional fine tertiary threads on both sides of secondary threads. Fine axial growth lines visible between spiral sculpture, forming delicate net-like pattern at intersections with spiral cords. Base and siphonal canal with regular coarser spiral cords and finer intercalated threads, gradually weakening towards canal tip. Siphonal canal relatively long, slightly exceeding aperture length, widely open, straight. Apertural features not developed in this subadult specimen. Outer lip smooth internally. Inner lip fully adherent to columella, forming relatively thick, glossy, smooth columellar callus; columellar plicae absent. Shallow parietal tooth present. Umbilicus absent. Periostracum light olive-brown, bearing rows of narrow, elongate spines at intersections of axial growth lines and spiral sculpture. Protoconch, teleoconch, and aperture uniformly white. Operculum yellowish, corneous, with terminal nucleus, filling aperture. Radula (Fig. 80B) examined in holotype, long, narrow, distance between outer edges of lateral teeth ~55 μ m (1.7% of AL without canal). Lateral

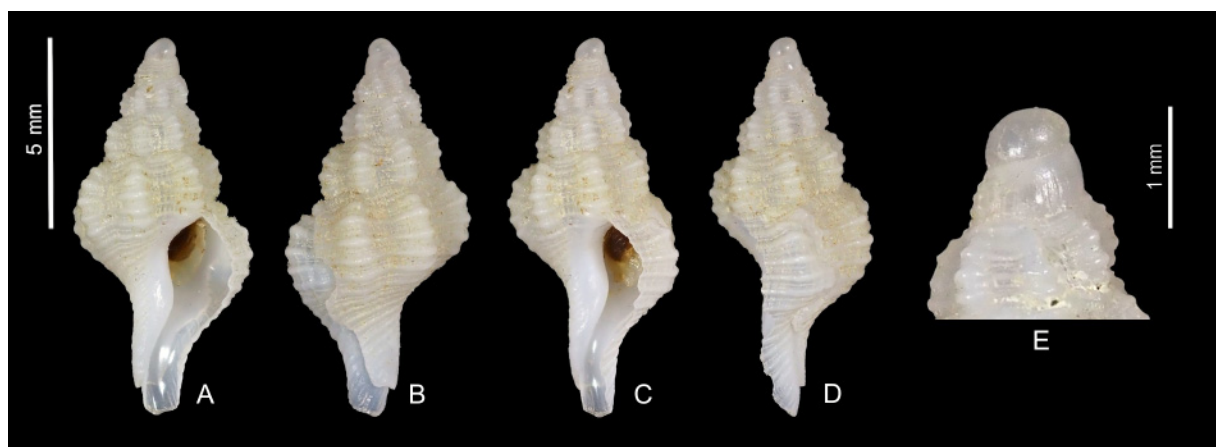


Fig. 60. *Vermeijius* sp., MNHN-IM-2023-1244, NW Madagascar, between Nosy Be and Banc du Leven, MIRIKY, stn CP3192, depth 578–580 m, SL 9.8 mm. All shells at the same scale, except protoconch.

teeth broad, with slightly arcuate anterior margin and strongly attenuated outer anterior corner, producing a long ‘handle’. There is a distinct very short cusp at transition of outermost cusp into handle. Lateral teeth with five recurved, closely spaced major cusps, second inner and outermost being largest, of about the same length, and one smaller inner cusp. Central tooth narrow at anterior margin, strongly broadening towards posterior margin, with three medium-long, sharp, subequal-in-length cusps. Distinct transverse folds of the membrane situated serially between rows of lateral teeth and fuse with lateral margins of central teeth.

Distribution

Known only from northwestern Madagascar (Fig. 61), between Nosy Be and Banc du Leven; a single live specimen was collected at a depth of 578–580 m.

Remarks

The specimen cannot be assigned to any known species. However, it is not formally described here, as the only available specimen is not fully mature. For this reason, we refrain from naming it for the time being.

Vermeijius miriky sp. nov. (northwestern Madagascar) differs by its higher and more slender spire, more constricted suture, finer and less pronounced spiral sculpture, and weaker axial ribs.

Vermeijius bellatulus sp. nov. (New Caledonia) is also similar in size but differs by its weaker spiral sculpture, more deeply incised suture, longer and more slender spire, and often reddish-brown tinged primary spiral cords on the last whorls.

Vermeijius insperatus (western Madagascar) differs by having a clearly larger shell, a much slimmer spire, a longer siphonal canal, significantly more convex whorls, and a smooth subsutural concavity.

Vermeijius putillus sp. nov. (Norfolk Ridge, New Caledonia) is comparable in size and also white, but differs by its slightly higher and slimmer spire, slightly shorter siphonal canal, and more convex, slightly trapezoidal whorls.

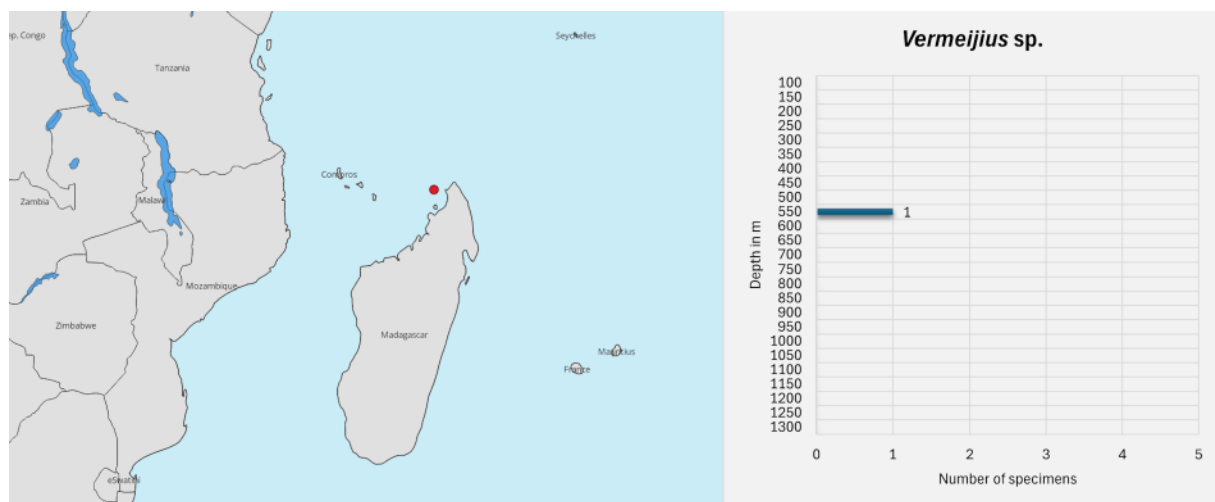


Fig. 61. Geographical and bathymetrical distribution of *Vermeijius* sp. Each column represents the number of specimens (lv or dd).

Vermeijius mainbaza sp. nov. (Mozambique) differs by its larger adult size, slimmer and higher spire, slightly more convex whorls, rougher axial and spiral sculpture, more deeply depressed interspaces between the axial ribs, and conspicuous coarse axial growth lines between the spiral cords.

Vermeijius mainbaza sp. nov.

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Figs 62–63, 83J, 86D

Etymology

Named after the MAINBAZA cruise, an acronym for MAputo, INhambane, BAZaruto and ZAmbeze (Mozambique localities where deep-water transects were conducted). Used as a noun in apposition.

Material examined

Holotype

MOZAMBIQUE • 1 lv juv., SL 17.8 mm, ShW 7.1 mm; same data as for holotype; MNHN-IM-2023-1110 (Figs 62A–D, 83J).

Paratypes

MOZAMBIQUE • 1 lv juv., SL 17.8 mm, ShW 7.1 mm; same data as for holotype; MNHN-IM-2023-1113 (Fig. 62L–N) • 1 lv juv., SL 12.5 mm, ShW 5.4 mm; Inhambane transect; 23°33' S, 35°55' E; depth 684–698 m; MAINBAZA, stn CP3141; MNHN-IM-2023-1112 (Figs 62I–K, 86D) • 1 dd juv., SL 15.4 mm,

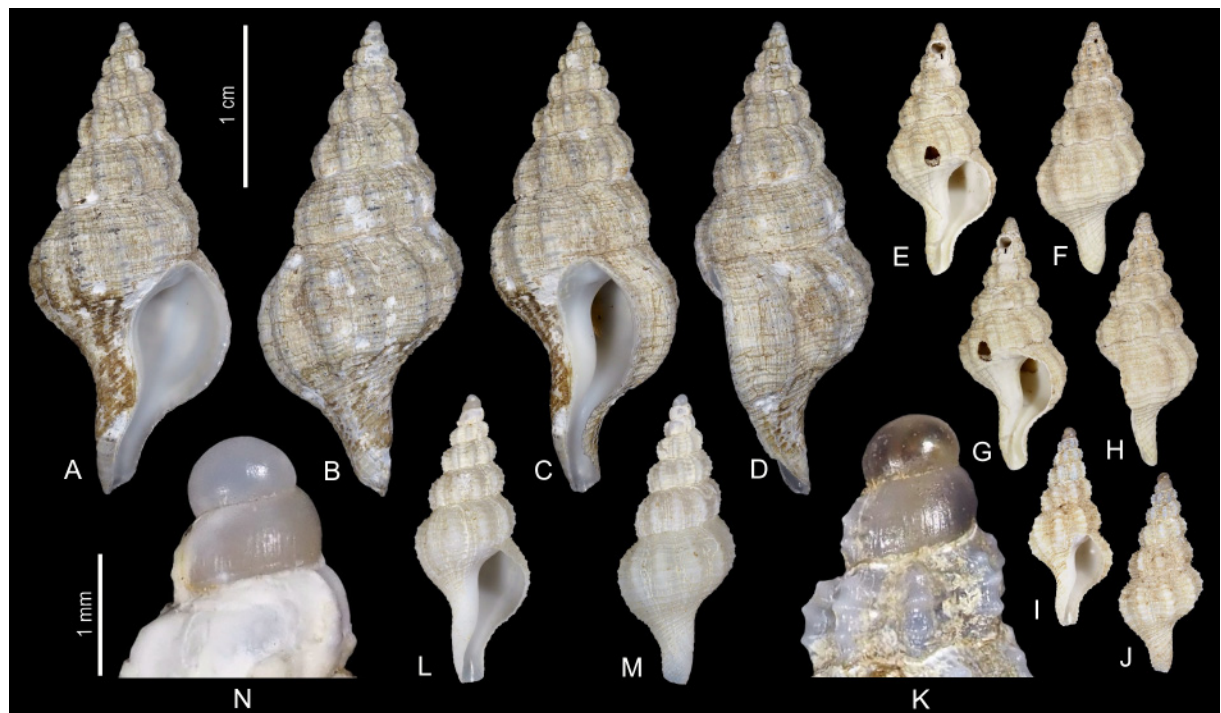


Fig. 62. *Vermeijius mainbaza* sp. nov. **A–D.** Holotype, MNHN-IM-2023-1110, Mozambique, Inhambane transect, MAINBAZA, stn CP3139, depth 1092–1195 m, SL 29.2 mm. **E–H.** Paratype, MNHN-IM-2023-1111, Mozambique, Inhambane transect, MAINBAZA, stn CP3140, depth 886–989 m, SL 15.4 mm. **I–K.** Paratype, MNHN-IM-2023-1112, Mozambique, Inhambane transect, MAINBAZA, stn CP3141, depth 684–698 m, SL 12.5 mm. **L–N.** Paratype, MNHN-IM-2023-1113, same data as for holotype, SL 17.8 mm. All shells at the same scale, except protoconchs.

ShW 6.7 mm; Inhambane transect; 23°33' S, 36°02' E; depth 886–898 m; MAINBAZA, stn CP3140; MNHN-IM-2023-1111 (Fig. 62E–H).

Sequenced material

None sequenced.

Other material

MOZAMBIQUE • 1 lv juv.; Inhambane transect; 23°35' S, 36°06' E; depth 1092–1195 m; MAINBAZA, stn CP3139; MNHN-IM-2023-1114 • 1 dd juv.; 23°33' S, 35°55' E; depth 684–698 m; MAINBAZA, stn CP3141; MNHN-IM-2023-1115.

Description

Measurements (holotype): SL 29.2 mm, ShW 12.6 mm.

Shell medium-sized for genus (up to 29.2 mm SL), fusiform, with moderately broad, high spire, comprising 1.75 protoconch and 7 teleoconch whorls. Protoconch paucispiral (Figs 62K, N, 86D), with 1.5 glossy, bulbous whorls followed by 0.25 whorl bearing fine axial growth lines, becoming slightly coarser and more irregular. Transition to teleoconch marked by onset of spiral sculpture. Protoconch diameter 1.1–1.2 mm, exposed height 1.1–1.2 mm. Teleoconch whorls convex, indistinctly carinated on penultimate and last whorl. Suture impressed, undulating, following axial sculpture of preceding whorl. Axial sculpture of strong, raised ribs extending from suture to suture; 8–10 on spire whorls, 10–11 slightly weaker ribs on penultimate and last whorl. Interspaces shallow, approximately as wide as ribs. Spiral sculpture of 4 raised, relatively sharp primary cords on first teleoconch whorl; abapical cord situated in or just above suture; adapical cord clearly weakest; from second or third whorl onwards, fifth cord occasionally present adapically, with secondary spiral threads between primary cords; from antepenultimate whorl onwards, fine tertiary threads present on both sides of secondary threads. Fine, closely spaced axial growth lines clearly visible between spiral sculpture, forming delicate net-like pattern at intersections. Base and siphonal canal with regular coarser spiral cords and finer intercalated threads. Siphonal canal relatively short, slightly shorter than aperture length, open, straight, slightly bent abaxially. Aperture relatively large, ovate. Outer lip smooth internally. Inner lip fully adherent to columella, forming thick, glossy, smooth columellar callus; columellar plicae absent. In fully mature specimens, callus margin slightly detached near base and along siphonal canal. Teeth at base of siphonal canal absent. Shallow, large parietal tooth present. Umbilicus absent. Protoconch white to grayish; teleoconch and aperture uniformly whitish. Periostracum olive-brown, bearing rows of narrow, elongate spines at intersections of axial growth lines and spiral sculpture. Operculum corneous, brown-yellow, with terminal nucleus, filling aperture. Radula not examined.

Distribution

Known only from Mozambique, Inhambane transect (Fig. 63). Live-collected specimens at depths of 698–1092 m; empty or crabbed shells at depths of 698–886 m.

Remarks

Vermeijius brinkae (southern Mozambique to South Africa) differs by its larger adult size, less constricted base, broad, rounded, and widely spaced axial ribs on the later whorls, fine and closely spaced spiral cords of variable thickness, and a slightly inflated last whorl. Early teleoconch whorls exhibit sharper, closely spaced axial ribs, finer and sharper spiral sculpture, and they are slightly keeled on the first 4–5 whorls.

Juvenile specimens of *Vermeijius mainbaza* sp. nov. (Mozambique) resemble *V. miriky* sp. nov. (northwestern Madagascar). The latter differs by its smaller adult size, slightly smaller spire angle,

smaller protoconch, weaker axial sculpture on the early whorls, finer axial and spiral sculpture, and much finer axial growth lines between the spiral cords.

Vermeijius retarius (East Africa to Sri Lanka) differs by its significantly larger size, higher and more slender spire, slight subsutural concavity, more convex whorls, fewer primary spiral cords, more numerous intercalated fine spiral threads between the primary spiral cords, and only indistinct axial growth lines between the spiral cords.

Vermeijius sp. (northwestern Madagascar) differs by its smaller adult size, broader and shorter spire, slightly less convex whorls, smoother and rounded axial and spiral sculpture, less deeply depressed interspaces between the axial ribs, and only indistinct axial growth lines between the spiral cords.

Adult specimens of *V. virginiae* (Mozambique Channel) cannot be confused. Juveniles differ primarily by having a multispiral protoconch, but also by more convex whorls, a more deeply incised suture, and a significantly longer siphonal canal.

Vermeijius insperatus (western Madagascar) differs by being also significantly larger, with a higher and slimmer spire, more convex whorls, a smooth subsutural concavity, and a simpler spiral sculpture.

Vermeijius atimovatae sp. nov. (southeastern Madagascar) differs by having keeled whorls, a less constricted base, distinct subsutural concavity, significantly fewer but broader axial ribs, finer spiral sculpture, and only inconspicuous axial growth lines between the spiral cords.

Vermeijius inglorius (Taiwan) has a similar inconspicuous and rough appearance, but differs by its larger shell, higher spire and siphonal canal, greater number of axial ribs, often more distinct spiral sculpture, and less conspicuous axial growth lines between the spiral cords.

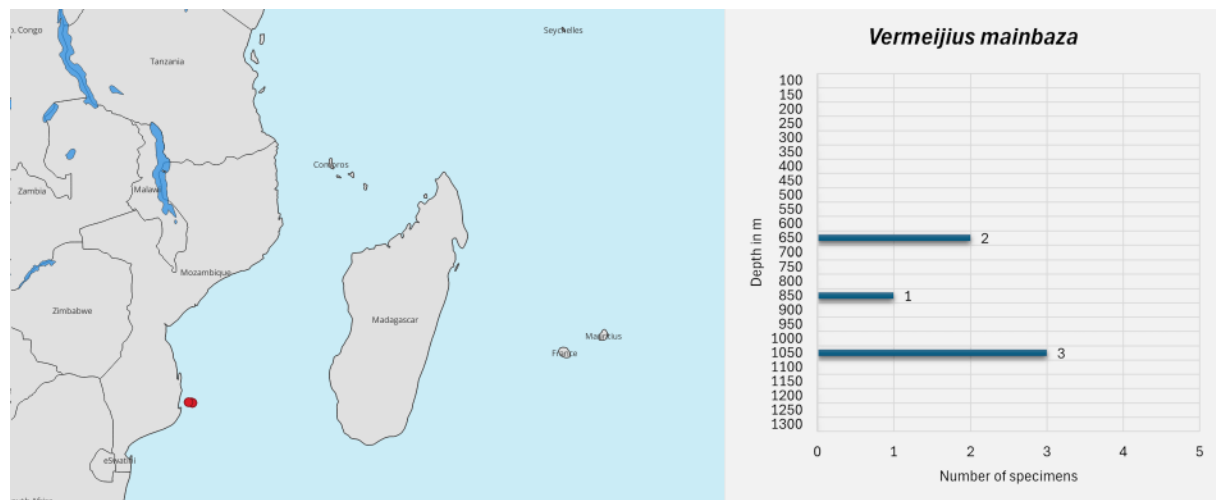


Fig. 63. Geographical and bathymetrical distribution of *Vermeijius mainbaza* sp. nov. Each column represents the number of specimens (lv or dd).

Vermeijius comorensis sp. nov.

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Figs 64–65, 84A, 86E

Etymology

The specific name refers to the Comoro Islands, where the type material was collected.

Material examined

Holotype

COMORO ISLANDS • Iv; S of Mayotte; 13°05' S, 45°07' E; depth 489–496 m; BIOMAGLO, stn DW4826; MNHN-IM-2023-1289 (Figs 64A–D, 84A).

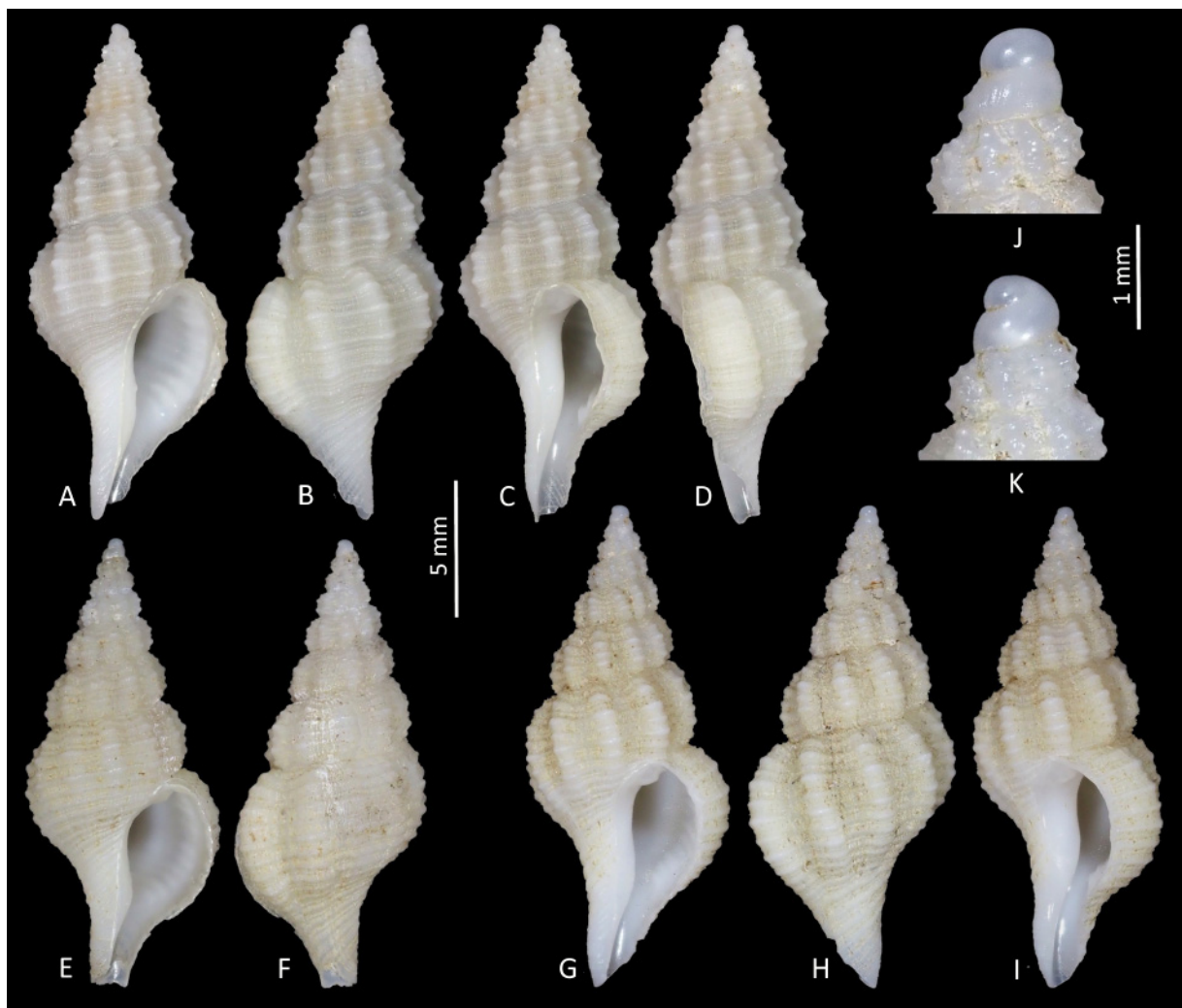


Fig. 64. *Vermeijius comorensis* sp. nov. **A–D.** Holotype, MNHN-IM-2023-1289, Comoro Islands, S Mayotte, BIOMAGLO, stn DW4826, depth 489–496 m, SL 18.2 mm. **E–F.** Paratype, MNHN-IM-2023-1287, Comoro Islands, NE of Mayotte, BIOMAGLO, stn DW4871, depth 462–486 m, SL 16.53 mm. **G–K.** Paratype MNHN-IM-2023-1292, Comoro Islands, NW of Mayotte, BIOMAGLO, stn DW4861, depth 480–486 m, SL 17.73 mm. All shells at the same scale, except protoconchs.

Paratypes

COMORO ISLANDS • 1 dd, SL 16.53 mm, ShW 7.22 mm; NE of Mayotte; 12°44' S, 45°19' E; BIOMAGLO, stn DW4871; depth 462–486 m; MNHN-IM-2023-1287 (Fig. 64E–F) • 1 dd, SL 17.73 mm, ShW 7.51 mm; NW of Mayotte; 12°30' S, 44°58' E; BIOMAGLO, stn DW4861; depth 480–486 m; MNHN-IM-2023-1292 (Figs 64G–K, 86E) • 1 lv, SL 14.36 mm, ShW 5.9 mm; SE of Mohéli; 12°28' S, 43°53' E; BIOMAGLO, stn DW4832; depth 556–566 m; NMBE MOLL-0589825.

Sequenced material

None sequenced.

Other material

COMORO ISLANDS • 1 lv, 4 dd; NE of Mayotte; 12°44' S, 45°19' E; BIOMAGLO, stn DW4872; depth 502–568 m; MNHN-IM-2023-1286 • 2 lv; 12°42' S, 45°19' E; BIOMAGLO, stn DW4874; depth 706–887 m; MNHN-IM-2023-1288 • 2 dd; 12°44' S, 45°20' E; BIOMAGLO, stn DW4875; depth 617–664 m; MNHN-IM-2023-1290 • 1 dd; NW of Mayotte; 12°30' S, 44°56' E; BIOMAGLO, stn DW4863; depth 606–610 m; MNHN-IM-2023-1284 • 1 dd; S of Mayotte; 13°05' S, 45°07' E; BIOMAGLO, stn DW4826; depth 489–496 m; MNHN-IM-2023-1283 • 4 dd; SE of Mayotte; 12°56' S, 45°15' E; BIOMAGLO, stn DW4864; depth 455–487 m; MNHN-IM-2023-1291 • 1 dd; SW of Mayotte; 13°01' S, 44°57' E; BIOMAGLO, stn DW4851; depth 660–664 m; MNHN-IM-2023-1285 • 1 lv; 12°27' S, 43°54' E; SE of Mohéli; BIOMAGLO, stn DW4831; depth 512–521 m; MNHN-IM-2023-1294 • 2 dd; 12°28' S, 43°53' E; BIOMAGLO, stn DW4832; depth 556–566 m; MNHN-IM-2023-1293.

Description

Measurements (holotype): SL 18.2 mm, ShW 7.45 mm.

Shell small for genus (up to 18.2 mm SL), fusiform, with high spire, comprising ~1.6 protoconch and ~6 teleoconch whorls. Protoconch paucispiral (Figs 64J–K, 86E), with ~1.5 glossy, smooth, inflated whorls followed by 0.125 whorl bearing 2–4 indistinct straight axial riblets of varying strength. Transition to teleoconch indistinct, marked by onset of spiral sculpture. Diameter 0.8–0.85 mm, exposed height 0.85–0.9 mm. Teleoconch whorls convex. Suture impressed, slightly undulating, following axial sculpture of preceding whorl. Axial sculpture of strong, raised, relatively narrow ribs extending from suture to suture; 9–10 on all whorls. Interspaces weakly impressed, approximately equal in width to ribs. Spiral sculpture of 3 broad, raised, rounded primary cords on first teleoconch whorl, two abapical cords slightly stronger. Secondary intercalated threads present from second whorl onwards, weaker than primary cords in holotype MNHN-IM-2023-1289 or as strong as primary cords in paratype MNHN-IM-2023-1292. Additionally, 1–3 very fine tertiary threads present on both sides of secondary threads on later whorls. Axial growth lines well visible, producing indistinct reticulate pattern at intersections with spiral sculpture. Base and siphonal canal with about 9 primary spiral cords and 1–3 intercalated fine threads. Siphonal canal relatively long, about as long as aperture, widely open, slightly bent abaxially in apertural view. Aperture relatively large, ovate. Outer lip usually with 7–10 strong internal lirae. Inner lip fully adherent to columella, forming thin, glossy, smooth columellar callus; columellar plicae absent. At base of siphonal canal, labral side often with 1–2 distinct calloused teeth; parietal side usually with 1–2 strong, elongate teeth. Prominent parietal tooth present. Umbilicus absent. Protoconch white; teleoconch and aperture interior uniformly white. Periostracum light olive green, with minute short thorns at intersections of axial growth lines and spiral sculpture. Operculum corneous, yellow-brown, with terminal nucleus, filling aperture. Radula unknown.

Distribution

Known only from around Mayotte and Mohéli, Comoro Islands (Fig. 65). Live-collected specimens at depths of 496–706 m; empty or crabbed shells at depths of 487–664 m.

Remarks

Vermeijius antea sp. nov. (Glorieuses) differs by its markedly smaller adult size (9.75 mm vs up to 18 mm), shorter siphonal canal, more convex whorls, coarser and simpler spiral sculpture with fewer, widely spaced cords, weaker, less pronounced axial ribs, and a smaller, upright protoconch.

Vermeijius corbariae sp. nov. (Glorieuses) is smaller (12.45 mm vs 18 mm), has a short siphonal canal, higher and more slender spire, more convex whorls, coarser spiral sculpture with fewer cords, more numerous, closely spaced axial ribs, and an inflated, upright protoconch.

Vermeijius miriky sp. nov. (northwestern Madagascar) attains a similar size (up to 15.6 mm) but has a higher, more slender spire, narrow, inconspicuous axial ribs, stronger spiral sculpture on the penultimate and last whorl, more numerous spiral cords on early whorls (5 vs 3), and its last whorl is not inflated.

Vermeijius sp. (northwestern Madagascar) shares the general spiral and axial sculpture but has a shorter, broader spire, more constricted base, proportionally longer siphonal canal, fewer but broader axial ribs (7 vs 10), less constricted sutures on early whorls, and more numerous, smoother spiral cords forming broad nodules on the axial ribs.

Vermeijius putillus sp. nov. (Norfolk Ridge, New Caledonia) differs by its smaller size (up to 9.55 mm), smaller protoconch, slightly trapezoidal early whorls, fewer spiral cords, and a larger, broader labral tooth at the base of the siphonal canal.

Vermeijius pauxillus sp. nov. (Papua New Guinea) differs by its more compact, robust shell, larger spire angle, trapezoidal early whorls, and light-brown protoconch with a smaller initial whorl.

Some specimens resemble *V. alcyoneum* from New Caledonia, but the latter is considerably larger (up to 46.3 mm) and is clearly distinguished by its multispiral protoconch.

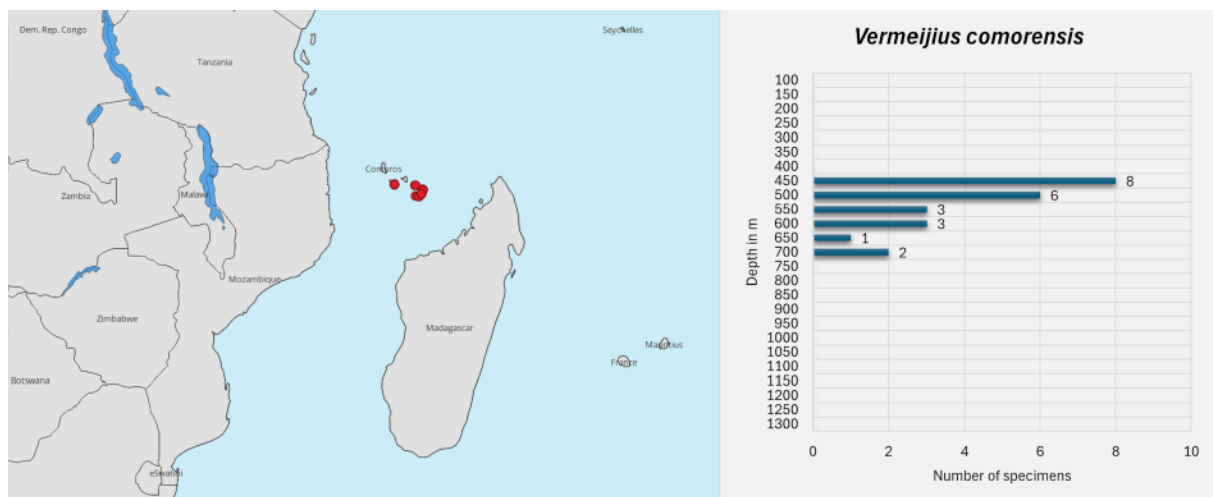


Fig. 65. Geographical and bathymetrical distribution of *Vermeijius comorensis* sp. nov. Each column represents the number of specimens (lv or dd).

Vermeijius corbariae sp. nov.

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Figs 66–67, 84I, 86F

Etymology

Named after Laure Corbari, Principal Investigator of the BIOMAGLO cruise on board R.V. *Antea*, which explored the northernmost part of the Mozambique Channel and revealed, among many discoveries, a flock of new *Vermeijius* species.

Material examined

Holotype

GLORIEUSES • 1v; NE of Grande Glorieuse; 11°29' S, 47°29' E; depth 583–614 m; BIOMAGLO, stn DW4813; MNHN-IM-2023-1297 (Figs 66A–F, 84I, 86F).

Paratypes

GLORIEUSES • 1 dd, SL 11.55 mm, ShW 4.7 mm; same data as for holotype; MNHN-IM-2023-1282 • 1 lv, SL 12.45 mm, ShW 5.3 mm; same data as for holotype; MNHN-IM-2023-1279 (Fig. 66K–L) • 1 lv, SL 10.5 mm, ShW 4.24 mm; same data as for holotype; NMBE MOLL-0589824 (Fig. 66G–H).

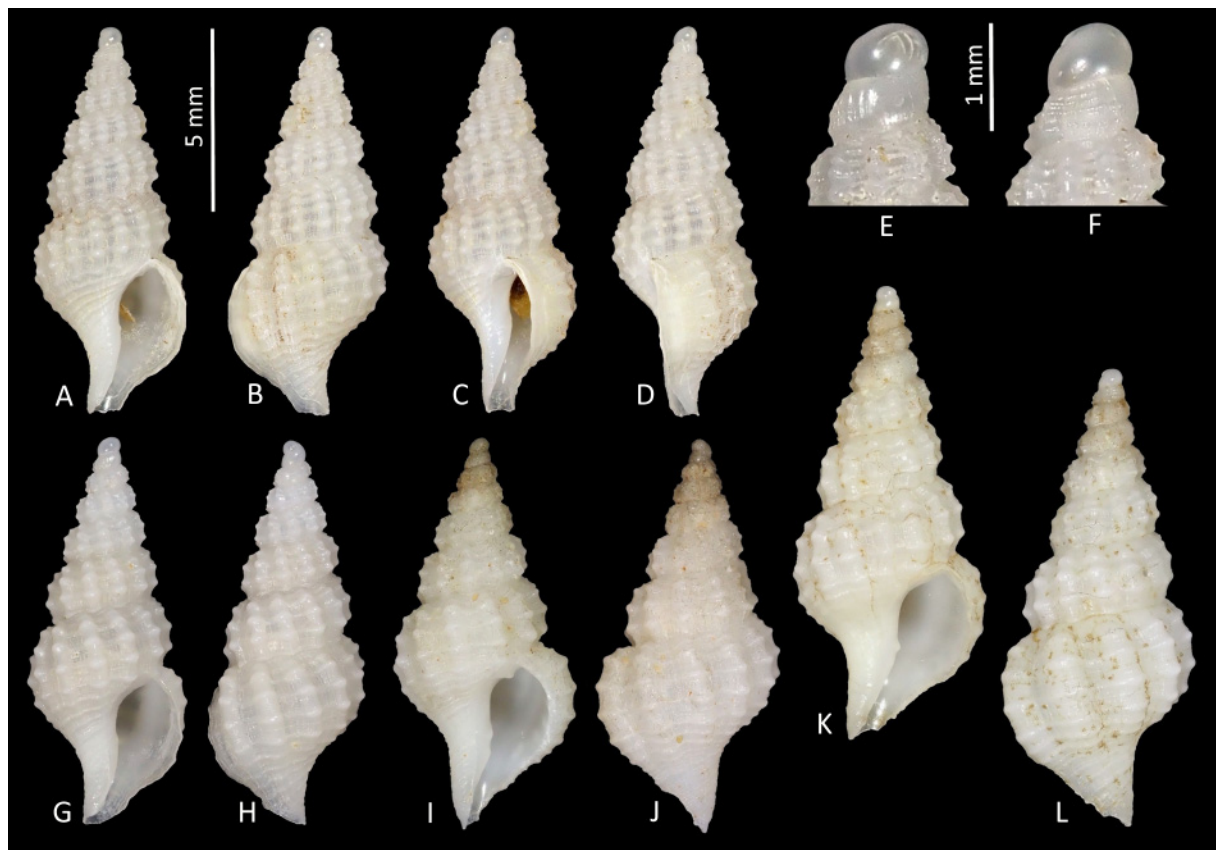


Fig. 66. *Vermeijius corbariae* sp. nov. **A–F.** Holotype, MNHN-IM-2023-1297, NE of Grande Glorieuse, BIOMAGLO, stn DW4813, depth 583–614 m, SL 10.65 mm. **G–H.** Paratype, NMBE MOLL-0589824, same data as for holotype, SL 10.5 mm. **I–J.** MNHN-IM-2023-1280, NE of Grande Glorieuse, BIOMAGLO, stn DW4812, depth 390–417 m, SL 10.83 mm. **K–L.** Paratype, MNHN-IM-2023-1279, same data as for holotype, SL 12.45 mm. All shells at the same scale, except protoconchs.

Sequenced material

None sequenced.

Other material

GLORIEUSES • 4 lv, 11 dd; NE of Grande Glorieuse; 11°29' S, 47°29' E; BIOMAGLO, stn DW4812; depth 390–417 m; MNHN-IM-2023-1280 (Fig. 66I–J) • 2 lv, 1 dd; 11°29' S, 47°29' E; BIOMAGLO, stn DW4813; depth 583–614 m; MNHN-IM-2023-1281.

Description

Measurements (holotype): SL 10.65 mm, ShW 4.25 mm.

Shell small for genus (up to 12.5 mm SL), fusiform, with high spire, comprising ~1.75 protoconch and 6 teleoconch whorls. Protoconch paucispiral (Figs 66E–F, 86F), with ~1.5 glossy, smooth, inflated whorls followed by 0.25 whorl bearing numerous distinct but irregular, straight axial riblets of uneven strength. Transition to teleoconch often indistinct, marked by onset of spiral sculpture. Diameter ~0.75 mm, exposed height ~0.9 mm. Teleoconch whorls convex. Suture impressed, slightly undulating, following axial sculpture of preceding whorl. Axial sculpture of strong, raised, narrow ribs extending from suture to suture; ~8–9 on first teleoconch whorl, 10–12 on following whorls, 11–14 on penultimate and last whorl. Interspaces distinctly impressed, approximately equal in width to ribs. Spiral sculpture of 3–4 broad, raised primary cords on early whorls, two abapical cords slightly stronger. When only 3 cords initially present, indistinct fourth cord appearing adapically below suture from antepenultimate whorl onward. Fifth cord appearing abapically just above suture from second teleoconch whorl onward or later. Small white nodes formed at intersections of spiral cords and axial ribs. Very fine, inconspicuous secondary spiral threads of slightly unequal strength appearing from third teleoconch whorl onward between primary cords; number increasing from whorl to whorl, reaching 4–7 on last whorl. Axial growth lines well visible, forming indistinct reticulate pattern at intersections with spiral sculpture. Base and siphonal canal with about 7–8 primary spiral cords and several intercalated threads of varying strength. Siphonal canal short, clearly shorter than aperture, widely open, slightly bent abaxially. Aperture relatively small, narrowly ovate. Outer lip usually completely smooth internally; occasionally with ~6–7 very short, strong internal lirae when axial rib situated close to aperture margin. Inner lip fully adherent to columella, forming thin, glossy, smooth columellar callus; columellar plicae absent. At base of siphonal canal, labral side often with 1–2 indistinct calloused teeth; parietal side usually with 1–2 strong, elongate teeth. Prominent, long parietal tooth often present. Umbilicus absent. Protoconch white; teleoconch and aperture interior uniformly white. Periostracum inconspicuous, light olive green, with minute short projections at intersections of axial growth lines and fine secondary spiral threads. Operculum corneous, yellow-brown, with terminal nucleus, filling aperture. Radula unknown.

Distribution

Known only from Glorieuses (Fig. 67). Live-collected and empty or crabbed specimens at depths of 417–583 m.

Remarks

The sympatric (but not syntopic) *V. antea* sp. nov. (Glorieuses) differs by its more constricted suture, more convex whorl profile, usually fewer primary spiral cords (3 vs 4–5), broader but less numerous axial ribs, a less constricted base, strong internal lirae on the outer lip, fewer intercalated secondary spiral threads on last whorl, and a smaller yet proportionally higher protoconch composed of two whorls.

Vermeijius comorensis sp. nov. (Comoro Islands) is larger (18 mm vs 12.45 mm), has a longer siphonal canal, a shorter and broader spire, and less convex whorls. Its spiral sculpture comprises more cords, and it bears fewer, more broadly spaced, stronger axial ribs. The species also possesses a broad, plump protoconch.

Vermeijius miriky sp. nov. (northwestern Madagascar) differs in having a longer siphonal canal, markedly fewer axial ribs on the early whorls, which become weaker on last whorl, and more widely spaced primary spiral cords that do not form rounded nodules at the axial intersections.

Vermeijius sp. (northwestern Madagascar) differs in having a shorter and broader spire, a longer siphonal canal, and markedly fewer but broader axial ribs.

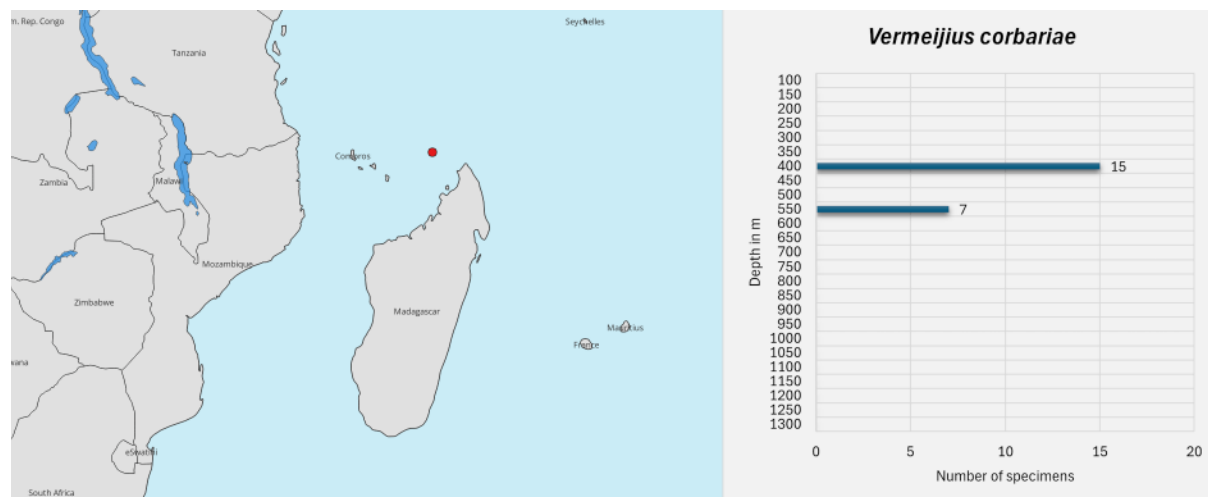


Fig. 67. Geographical and bathymetrical distribution of *Vermeijius corbariae* sp. nov. Each column represents the number of specimens (lv or dd).

Vermeijius antea sp. nov.

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Figs 68–69, 84J, 86G

Etymology

The species is named after the research vessel *Antea*, which operated during the expedition that yielded the type specimen; used as a noun in apposition.

Material examined

Holotype

GLORIEUSES • dd; N of Grande Glorieuse; 11°27' S, 47°19' E; depth 240–255 m; BIOMAGLO, stn DW4800; MNHN-IM-2023-1278 (Figs 68, 84J, 86G).

Sequenced material

None sequenced.

Description

Measurements (holotype): SL 9.8 mm, ShW 4.0 mm.

Shell small for genus (9.8 mm SL), fusiform, with high spire, comprising ~2 protoconch and ~6 teleoconch whorls. Protoconch paucispiral (Figs 68E–F, 86G), with 1.75 glossy, smooth whorls followed by ~0.25 whorl bearing numerous closely spaced, fine, straight axial riblets. Transition to teleoconch

marked by onset of spiral sculpture. Diameter 0.7 mm, exposed height ~0.8 mm. Teleoconch whorls strongly convex. Suture deeply impressed, slightly undulating, following axial sculpture of preceding whorl. Axial sculpture of strong, raised ribs extending from just below adapical to abapical suture, slightly more pronounced at periphery; ~8 per whorl. Interspaces deep, approximately equal in width to ribs. Spiral sculpture of three broad, raised, widely spaced primary cords on early whorls, adapical cord slightly weaker. Fourth primary cord appearing abapically on penultimate whorl, just above suture. Elongate white nodes formed at intersections of spiral cords and axial ribs. Very fine, inconspicuous secondary spiral threads of slightly unequal strength present already on spire whorls between coarse primary cords; number increasing from whorl to whorl, reaching 12–15 on last whorl. Axial growth lines inconspicuous, most clearly visible between adapical suture and adapical primary spiral cord, and in interspaces between axial ribs. Base and siphonal canal with about 8 primary spiral cords and numerous very fine intercalated threads. Siphonal canal short, clearly shorter than aperture, widely open, slightly bent abaxially. Aperture relatively small, narrowly ovate. Outer lip with eight strong internal lirae. Inner lip fully adherent to columella, forming thin, glossy, smooth columellar callus; columellar plicae absent. At base of siphonal canal, labral side with indistinct calloused tooth; parietal side with two weak, elongate teeth. Indistinct, shallow parietal tooth present. Umbilicus absent. Protoconch white; teleoconch and aperture interior uniformly creamy white. Periostracum, operculum and radula unknown.

Distribution

Known only from Glorieuses (Fig. 69). An empty shell was found at depths of 240–255 m.

Remarks

Although the species is currently known from a single specimen, its combination of morphological characters clearly sets it apart from all described *Vermeijius* species. Comparison with the available material of congeners shows no overlap with the known range of intraspecific variation, and there is no indication that the specimen could belong to any previously named taxon. Given the rarity of *Vermeijius* material from deep-water habitats in the Mozambique Channel and the difficulty of obtaining additional samples, the description of this unique specimen is justified in order to document its distinctiveness.

Vermeijius corbariae sp. nov. (Glorieuses) differs in having a less constricted suture and less convex whorls, a substantially larger protoconch, more numerous and more closely spaced axial ribs, and a greater number of primary spiral cords that form small white nodules at the axial intersections.

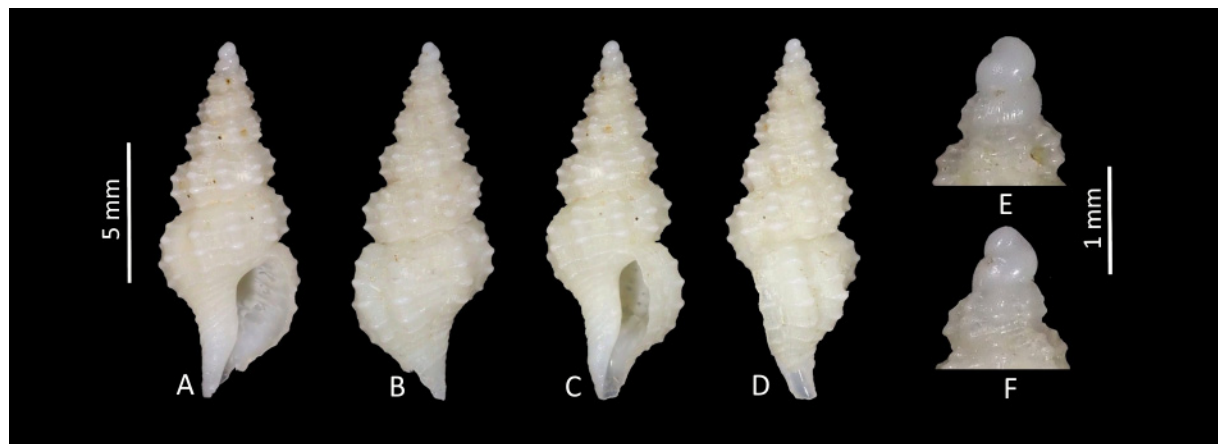


Fig. 68. *Vermeijius antea* sp. nov., holotype, MNHN-IM-2023-1278, N of Grande Glorieuse, BIOMAGLO, stn DW4800, depth 240–255 m, SL 9.8 mm. All shells at the same scale, except protoconchs.

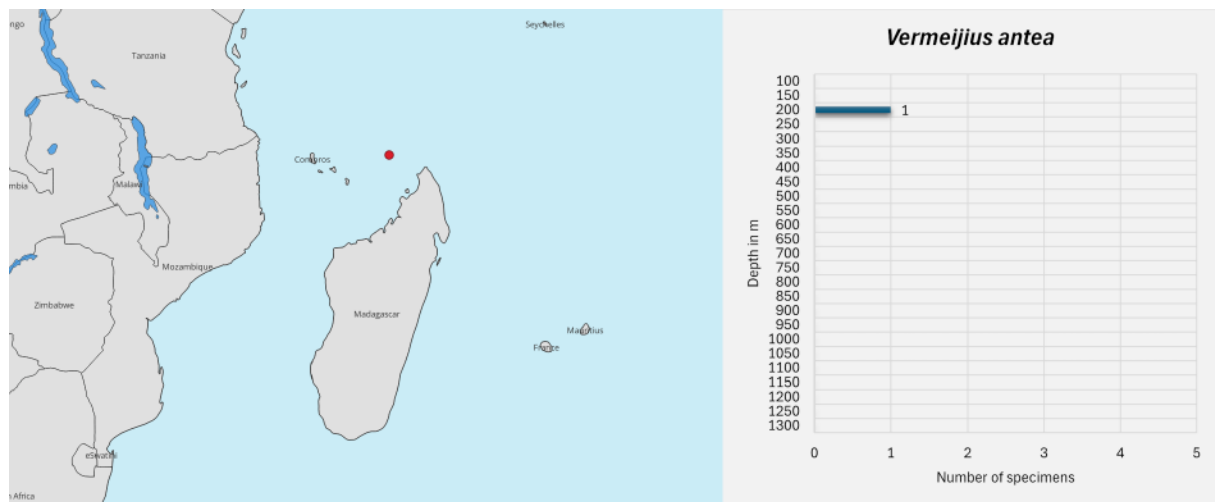


Fig. 69. Geographical and bathymetrical distribution of *Vermeijius antea* sp. nov. Each column represents the number of specimens (lv or dd).

Vermeijius comorensis sp. nov. (Comoro Islands) differs by its markedly larger adult size (up to 18 mm vs 9.75 mm), a longer siphonal canal, less convex whorls, a finer and more complex spiral sculpture with more numerous and more closely spaced cords, stronger and more pronounced axial ribs, and a larger protoconch.

Vermeijius miriky sp. nov. (northwestern Madagascar) differs in having a distinctly longer siphonal canal, less convex whorls, a less distinct and non-nodulose spiral sculpture, more spiral cords on the siphonal canal, and an outer lip that is smooth or bears only indistinct, interrupted lirae internally.

***Vermeijius malampaensis* sp. nov.**

urn:lsid:zoobank.org:act:4C7FBCAA-75E7-4DC9-BF61-80FD4E1E721E

Figs 70–71, 80G, 83L, 86H

Etymology

Named after the type locality, which is lying in the Malampa Province, located in the center of Vanuatu, where most specimens were collected. The name of the province is formed from the first syllable of the names of the three main islands: MALEkula, AMbrym, and PAama.

Material examined

Holotype

VANUATU • lv; between Malekula and NW Epi; 16°38' S, 168°01'–167°58' E; depth 586–646 m; BOA 0, stn CP2307; MNHN-IM-2023-1250 (Figs 70A–E, 80G, 83L, 86H).

Paratypes

VANUATU • 1 dd, SL 32.5 mm, ShW 14.0 mm; S of Malekula; 16°37' S, 167°59' E; depth 604–605 m; BOA 0, stn CP2305; MNHN-IM-2023-1116 • 1 dd, SL 24.5 mm, ShW 10.4 mm; W of Malo; 15°44' S, 167°02' E; depth 373–800 m; BOA 1, stn CP2412; MNHN-IM-2023-1118 (Fig. 70H–K) • 1 dd, SL 28.0 mm, ShW 12.2 mm; SE of Malekula; 16°35' S, 167°58' E; depth 582–614 m; BOA 1, stn CP2461; MNHN-IM-2023-1122 (Fig. 70F–G).

Sequenced material

None sequenced.

Other material

PAPUA NEW GUINEA • 1 dd; New Ireland, off Feni Islands; 3°59' S, 153°46' E; depth 760–823 m; BIOPAPUA, stn CP3761; MNHN-IM-2023-1121.

SOLOMON ISLANDS • 1 dd; Guadalcanal, Sealark Channel; 9°20' S, 160°13' E; depth 328–342 m; SALOMONBOA 3, stn DW2860; MNHN-IM-2023-1123.

VANUATU • 2 dd; between Malekula and Ambrym; 16°23' S, 167°50' E; depth 591–627 m; BOA 1, stn CP2471; MNHN-IM-2023-1119 • 1 dd; SE of Malekula; 16°31' S, 167°55' E; depth 550–565 m; BOA 1, stn CP2468; MNHN-IM-2023-1120 (Fig. 70L–M) • 1 dd; W of Malekula; 16°02' S, 166°39' E; depth 778–811 m; MUSORSTOM 8, stn DW1128; MNHN-IM-2023-1117.

Description

Measurements (holotype): SL 29.2 mm, ShW 13.15 mm.

Shell medium-sized for genus (up to 32.5 mm SL), fusiform, with elongate, broad spire, comprising 1.75 protoconch and ~7 teleoconch whorls. Protoconch paucispiral (Figs 70E, K, 86H), glossy, with

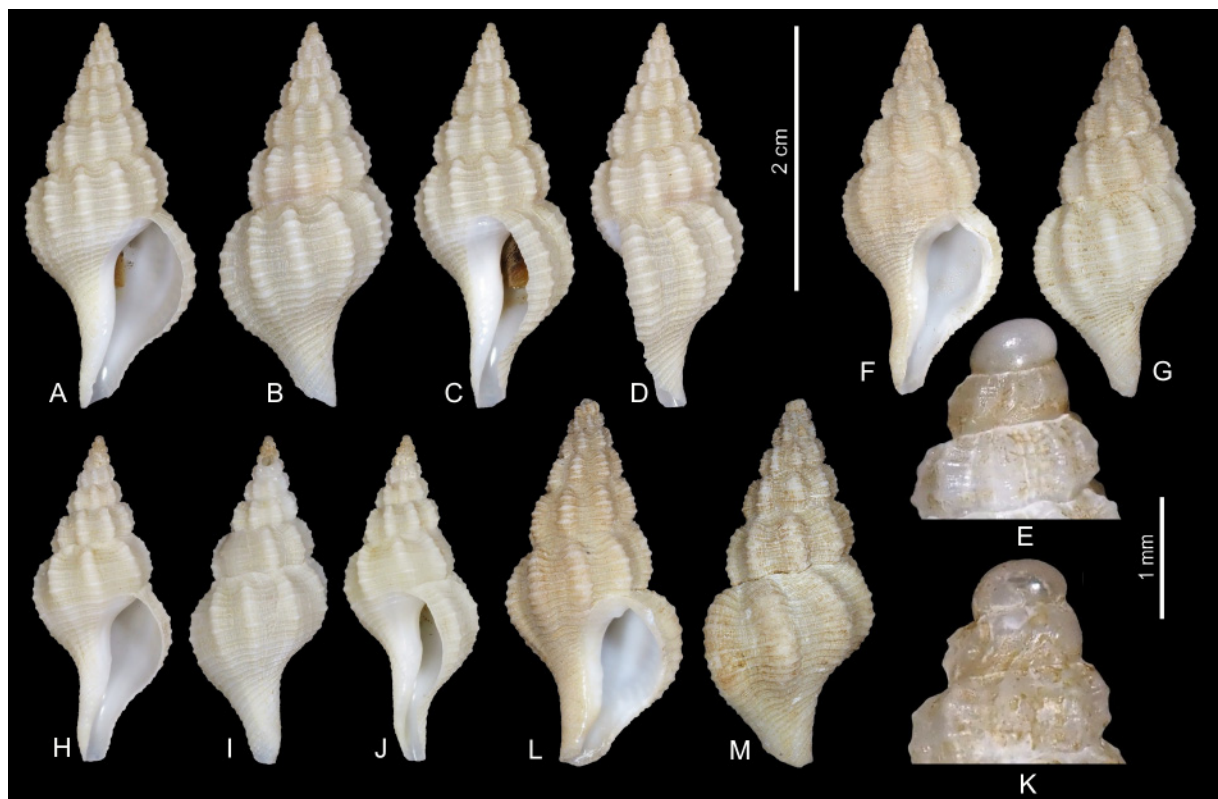


Fig. 70. *Vermeijius malampaensis* sp. nov. A–E. Holotype, MNHN-IM-2023-1250, Vanuatu, NW Epi, BOA 0, stn CP2307, depth 586–646 m, SL 29.2 mm. F–G. Paratype, MNHN-IM-2023-1122, Vanuatu, SE of Malekula, BOA 1, stn CP2461, depth 582–614 m, SL 28.0 mm. H–K. Paratype, MNHN-IM-2023-1118, Vanuatu, W Malo, BOA 1, stn CP2412, depth 373–800 m, SL 24.5 mm. L–M. MNHN-IM-2023-1120, Vanuatu, SE Malekula, BOA 1, stn CP2468, depth 550–565 m, SL 28.0 mm. All shells at the same scale, except protoconchs.

1.25 smooth whorls followed by ~0.5 whorl bearing very fine axial riblets and about 4 arcuate axial ribs, increasingly pronounced towards terminal margin. Transition to teleoconch marked by onset of spiral sculpture. Protoconch diameter 0.9 mm, exposed height 0.85–0.9 mm. Teleoconch whorls convex; suture impressed, undulating, following axial sculpture of preceding whorl. Axial sculpture of strong, rounded, prominent ribs extending from suture to suture; ~8 on all early whorls, increasing to 11 on last whorl. Interspaces deep, about equal in width to ribs. Spiral sculpture of 3 strong primary cords on early whorls; from second teleoconch whorl onwards, secondary threads intercalated between primary cords and between adapical and abapical sutures; from third teleoconch whorl onwards, very fine tertiary threads present on both sides of secondary threads; number increasing on penultimate and last whorl through further intercalation. Spiral sculpture slightly more pronounced on axial ribs than in interspaces. Well-developed axial growth lines intersect spiral sculpture, producing fine reticulate pattern. Base and siphonal canal with regularly spaced coarser spiral threads and finer intercalated threads, gradually weakening towards canal tip. Siphonal canal straight, slightly shorter than aperture length, widely open. Aperture relatively large, nearly round. Outer lip often smooth internally, occasionally weakly lirate. Inner lip fully adherent to columella, forming thin, glossy, smooth columellar callus; true columellar plicae absent, sometimes with a very fine, inconspicuous raised cord. At base of siphonal canal, labral side typically with 2–3 strongly calloused, elongate teeth; parietal side often with 2–3 irregular, small teeth. Broad, prominent parietal tooth present. Umbilicus absent. Protoconch whitish to light brown; teleoconch uniformly white to greenish; aperture interior white. Periostracum not preserved. Operculum corneous, brown-yellow, with terminal nucleus, filling aperture. Radula (Fig. 80G) examined in holotype (MNHN-IM-2023-1250), long, comprising about 165 transverse rows of teeth, of which about 20 rows nascent. Radula narrow, distance between outer edges of lateral teeth ~140 μm (1.4% of AL without canal). Lateral teeth broad, with slightly arcuate anterior margin and strongly attenuated outer anterior corner, producing long ‘handle’. Distinct obtuse, very short cusp at transition of outermost cusp into handle. Lateral teeth with eight recurved, closely spaced major cusps, second inner one slightly larger, plus one smaller inner cusp. Central tooth short, trapeziform, with three short, obtuse cusps, subequal in length. Distinct transverse folds of membrane situated serially between rows of lateral teeth and not fused with lateral margins of central teeth.

Distribution

Vanuatu and Solomon Islands to Papua New Guinea (Fig. 71). Live-collected specimens at depths of 586–646 m; empty or crabbed shells at depths of 342–778 m. Records outside Vanuatu require

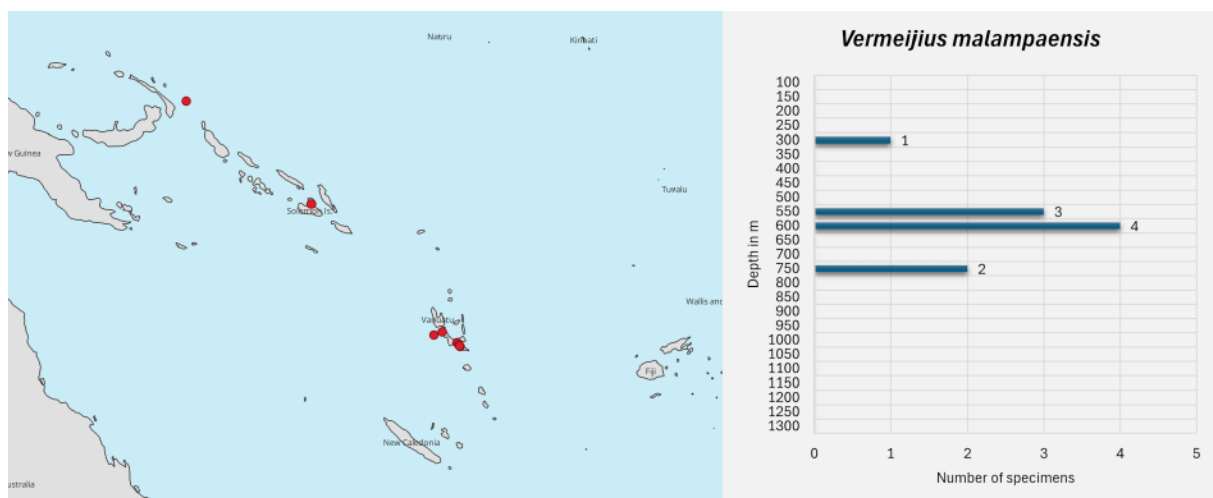


Fig. 71. Geographical and bathymetrical distribution of *Vermeijius malampaensis* sp. nov. Each column represents the number of specimens (lv or dd).

confirmation, as only one poorly preserved specimen is known from both Papua New Guinea and the Solomon Islands.

Remarks

In the original description of *V. alcyoneum*, a shell from Vanuatu (MUSORSTOM 8 stn DW1128) was listed as *Fusinus alcyoneum*. Re-examination shows that this specimen corresponds to the material described herein as *V. malampaensis* sp. nov. *Vermeijius alcyoneum* is superficially similar but differs by having a flesh-coloured multispiral protoconch with about 2.75 whorls (vs paucispiral), larger adult size, more deeply incised suture, and more convex whorls.

Vermeijius abditus sp. nov. (New Caledonia) is most similar and also has a paucispiral protoconch, but differs by its simpler and more pronounced spiral sculpture, fewer intercalated spiral threads on the penultimate and last whorl, more pronounced white nodes on the axial ribs, less constricted suture on the early whorls, smaller adult size, and longer siphonal canal.

Vermeijius fijiensis sp. nov. (Fiji) also has a paucispiral protoconch, but differs by its clearly larger adult size, significantly longer and more slender spire, more strongly convex whorls with a deeply incised suture, and longer, straight siphonal canal.

Vermeijius pallidus (Western Pacific) differs by having a multispiral protoconch, higher spire with more convex whorls and a more deeply incised suture, significantly longer siphonal canal, and usually more numerous axial ribs.

Vermeijius fijiensis sp. nov.

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Figs 72–73, 82I, 86I

Fusinus alcyoneum Hadorn & Fraussen, 2006a: 97–98, figs 17–18 [partim, not figs 13–16, 34 = *V. alcyoneum*].

Etymology

Named after the type locality.

Material examined

Holotype

FIJI • 1v; Bligh Water; 17°02' S, 178°02' E; depth 694–703 m; MUSORSTOM 10, stn CP1331; MNHN-IM-2023-1060 (Figs 72A–D, 82I).

Paratypes

FIJI • 2 1v, SL 41.3 mm, ShW 15.4 mm / SL 16.7 mm, ShW 6.8 mm; same data as for holotype; MNHN-IM-2023-1062 (Figs 72H–N, 86I) • 1 dd, SL 40.7 mm, ShW 15.3 mm; Bligh Water; 16°58' S, 177°58' E; depth 797–799 m; MUSORSTOM 10, stn CC1336; MNHN-IM-2023-1055 (Fig. 72E–G) • 1 1v, SL 42.8 mm, ShW 15.8 mm; Bligh Water; 16°58' S, 177°58' E; depth 797–799 m; MUSORSTOM 10, stn CC1336; depth 700 m; NMBE MOLL-0576131.

Sequenced material

None sequenced.

Other material

FIJI • 1 dd; Bligh Water; 17°32' S, 178°53' E; depth 843–887 m; MUSORSTOM 10, stn CP1309; MNHN-IM-2023-1061 • 2 lv, 1 dd; 17°02' S, 178°02' E; depth 694–703 m; MUSORSTOM 10, stn CP1331; MNHN-IM-2023-1056 • 1 lv; 16°56' S, 178°08' E; depth 640–687 m; MUSORSTOM 10, stn CP1332; MNHN-IM-2023-1057 • 2 lv, 1 dd; 16°58' S, 177°58' E; depth 797–799 m; MUSORSTOM 10, stn CC1336; MNHN-IM-2023-1059 • 1 lv; 17°03' S, 177°47' E; depth 635–670 m; MUSORSTOM 10, stn CC1337; MNHN-IM-2023-1058 • 2 lv; 17°20' S, 178°32' E; depth 673–683 m; MUSORSTOM 10, stn CP1346; MNHN-IM-2023-1054 • 1 lv; 17°20' S, 178°32' E; depth 673–683 m; MUSORSTOM 10, stn CP1346; NMBE MOLL-0576130.

Description

Measurements (holotype): SL 40.15 mm, ShW 14.7 mm.

Shell large for genus (up to 46.7 mm SL), fusiform, with elongate spire, comprising 1.75 protoconch and ~9 teleoconch whorls. Protoconch paucispiral (Figs 72N, 86I), glossy, with ~1.25 smooth whorl followed by 0.5 whorl bearing indistinct arcuate axial growth lines and 3 strong arcuate axial ribs near abrupt termination. Transition to teleoconch marked by onset of spiral sculpture. Protoconch diameter 0.95 mm, exposed height ~0.9 mm. Teleoconch whorls strongly convex, with indistinct double keel. Suture deeply impressed, undulating, following axial sculpture of preceding whorl. Axial sculpture



Fig. 72. *Vermeijius fijiensis* sp. nov. **A–D.** Holotype, MNHN-IM-2023-1060, Fiji, Bligh Water, MUSORSTOM 10, stn CP1331, depth 694–703 m, SL 40.15 mm. **E–G.** Paratype, MNHN-IM-2023-1055, Fiji, Bligh Water, MUSORSTOM 10, stn CC1336, depth 797–799 m, SL 40.7 mm. **H–K.** Paratype, MNHN-IM-2023-1062, same data as for holotype, SL 41.3 mm. **L–N.** Paratype, MNHN-IM-2023-1062, same data as for holotype, SL 16.7 mm. Scale bars: A–K = 2 cm; L–M = 1 cm; N = 1 mm.

of strong, raised ribs extending from suture to suture; 8–9 on early whorls, ~10 on penultimate and last whorl. Interspaces relatively deep, slightly wider than ribs. Spiral sculpture of 3 strong primary cords on early whorls; adapical cord weakest, remaining two forming indistinct double keel on later whorls; from second teleoconch whorl onwards, additional cords appearing adapically and abapically; secondary threads present between primary cords, followed by several fine tertiary threads on both sides of secondary threads from fourth whorl onwards. Spiral sculpture more pronounced on axial ribs than in interspaces. Fine axial growth lines forming reticulate pattern at intersections with spiral cords. Base and canal with regular coarser cords and intercalated finer threads, gradually weakening towards canal tip. Siphonal canal relatively long, exceeding aperture length, widely open, straight. Aperture relatively large, nearly round. Outer lip slightly crenulated, indistinctly lirate within. Inner lip fully adherent to columella, forming thin, glossy, smooth columellar callus; columellar plicae absent, with one very fine, inconspicuous raised cord (best seen in worn shells). At base of siphonal canal, labral side typically with several elongate, calloused teeth; parietal side smooth. Broad, shallow parietal tooth present. Umbilicus absent. Protoconch light brown; teleoconch cream-coloured; aperture interior white. Periostracum light brown, bearing minute thorns at intersections of axial growth lines and spiral sculpture. Operculum corneous, brown-yellow, with terminal nucleus, filling aperture. Radula not examined.

Distribution

Known only from Fiji, Bligh Water (Fig. 73). Live-collected specimens at depths of 670–797 m; empty or crabbed shells at depths of 703–843 m.

Remarks

Hadorn & Fraussen (2006a: 97–98, figs 17–18) figured a specimen from Fiji, Bligh Water, as *Fusinus alcyoneum*. Re-examination of their Fiji material reveals a paucispiral protoconch, contrasting with *V. alcyoneum* which has a multispiral protoconch. *Vermeijius fijiensis* sp. nov. is distinguished by having a paucispiral protoconch, a significantly higher and more slender spire, a straighter siphonal canal, more convex whorls, and a somewhat more deeply incised suture.

Vermeijius albulus sp. nov. (Papua New Guinea and Solomon Islands) is similar in size and shape but differs by having much broader, rounded, and fewer primary spiral cords that form broad white nodes on the axial ribs, numerous fine spiral threads between the primary spiral cords, and occasionally weaker, more irregular axial sculpture on the penultimate and last whorl.

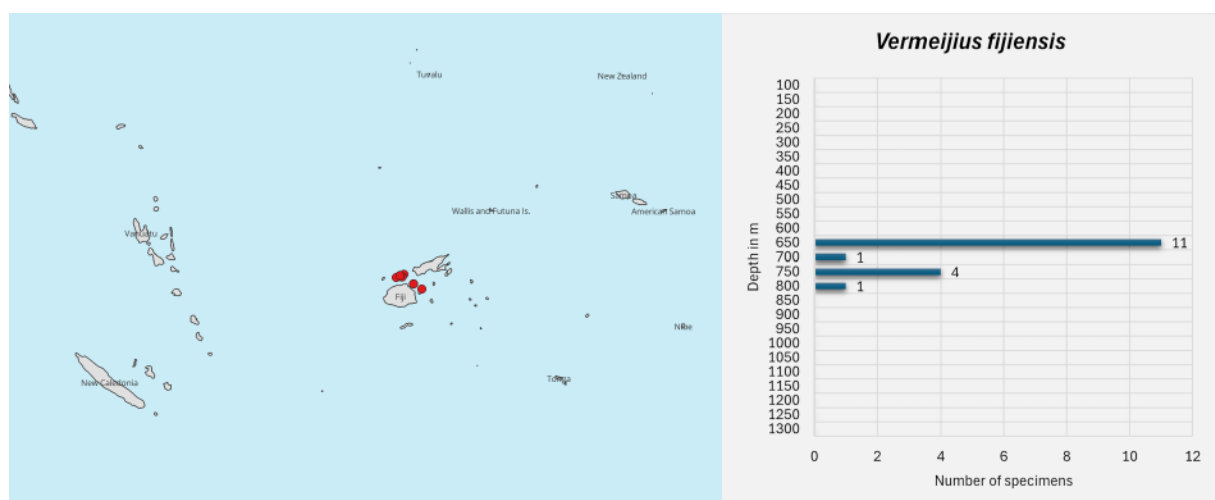


Fig. 73. Geographical and bathymetrical distribution of *Vermeijius fijiensis* sp. nov. Each column represents the number of specimens (lv or dd).

The widespread *V. pallidus* (Western Pacific) differs primarily by having a multispiral protoconch, larger adult size, longer, straight siphonal canal, more convex whorls, usually more strongly developed axial ribs, and notably stronger, sharper spiral sculpture. Among the Fiji material (MUSORSTOM 10 stn CC1336) there is an abnormal single specimen tentatively identified as *V. pallidus*. This specimen appears to represent the eastern range limit and occurs syntopically with *V. fijiensis*.

***Vermeijius chinoi* sp. nov.**

urn:lsid:zoobank.org:act:78F89868-4F73-4851-A817-801C798FFCE0

Figs 74–75, 83M, 86J

Etymology

Named after Mitsuo Chino (Japan) to honour his expertise and dedication to Japanese and NW Pacific malacology.

Material examined

Holotype

JAPAN • 1v; Tokyo Prefecture, mouth of Tokyo Bay; depth 200–300 m; NMBE MOLL-0588558 (Figs 74A–E, 83M).

Paratypes

JAPAN • 2 lv, SL 19.7 mm, ShW 7.5 mm / SL 17.8 mm, ShW 7.2 mm; same data as for holotype; NMBE MOLL-0576861 (Figs 74F–I, M–O, 86J) • 1 dd, SL 25.9 mm, ShW 9.1 mm; Kanagawa Prefecture, Sagami Bay, Yokosuka, Nagai; NSMT-Mo 79858 (ex MC) (Fig. 74J–L) • 1 dd, SL 22.6 mm, ShW 8.6 mm; Kanagawa Prefecture, Sagami Bay, Yokosuka, Nagai; UMUT RM 34556 (ex MC).

Sequenced material

None sequenced.

Other material

JAPAN • 2 dd; Kanagawa Prefecture, Sagami Bay, Yokosuka, Nagai; by commercial trawler; NMBE MOLL-0584991.

Description

Measurements (holotype): SL 24.2 mm, ShW 8.6 mm.

Shell medium-sized for genus (up to 25.9 mm SL), fusiform, thin-shelled, with slender, high spire, comprising ~1.75 protoconch and 5.5–6 teleoconch whorls. Protoconch paucispiral (Figs 74E, I, 86J), with 1.5 glossy, bulbous whorls followed by 0.25 whorl bearing 4–5 strong axial riblets. Transition to teleoconch marked by onset of spiral sculpture. Protoconch size variable: diameter 1.1 mm, exposed height 1.05–1.3 mm. Teleoconch whorls strongly convex. Suture deeply impressed. Axial sculpture of ~11–12 strong, narrow, raised ribs on early whorls, extending from suture to suture; 14–16 weaker, flatter ribs from penultimate whorl onwards, often irregular in thickness and sometimes obsolete on last whorl. Interspaces relatively shallow, slightly narrower than ribs. Spiral sculpture of 5 raised, rounded, relatively weak primary cords on first teleoconch whorl; from second whorl onwards, secondary spiral threads between primary cords and below adapical suture; fine tertiary threads from penultimate whorl onwards. Fine, inconspicuous axial growth lines intersect spiral sculpture. Base and siphonal canal with numerous coarser spiral cords and intercalated finer threads, gradually weakening towards canal tip. Siphonal canal conspicuously long, slightly exceeding aperture length, open, straight, slightly bent abaxially. Aperture relatively large, ovate. Outer lip smooth internally, slightly translucent, external

sculpture visible internally. Inner lip fully adherent to columella, forming thin, glossy, smooth columellar callus; columellar plicae absent. Teeth at base of siphonal canal absent. Inconspicuous, shallow parietal tooth present. Umbilicus absent. Protoconch, teleoconch, and aperture uniformly whitish. Operculum corneous, brown-yellow, with terminal nucleus, filling aperture. Radula and periostracum unknown.

Distribution

Japan, Sagami Bay (Fig. 75). Live and empty shells at depths of 200–300 m on coarse sand and stones.

Remarks

The light, somewhat translucent, and elegant shell of *V. chinoi* sp. nov. is difficult to confuse with any other species. Nevertheless, this species has sometimes been misidentified in Japanese literature as



Fig. 74. *Vermeijius chinoi* sp. nov. A–E. Holotype, NMBE MOLL-0588558, Japan, Tokyo Prefecture, mouth of Tokyo Bay, depth 200–300 m, SL 24.2 mm. F–I. Paratype, NMBE MOLL-0576861, same data as for holotype, SL 17.8 mm. J–L. Paratype, NSMT-Mo 79858, Japan, Kanagawa Prefecture, Sagami Bay, Yokosuka, Nagai, SL 25.9 mm. M–O. Paratype, NMBE MOLL-0576861, same data as for holotype, SL 19.7 mm. All shells at the same scale, except protoconchs.

the fossil species *Trophonofusus muricatoides* (Yokoyama, 1920), originally described from Pliocene deposits on the Miura Peninsula, west of Tokyo, Japan (Fig. 78).

Callomon & Snyder (2019: 89, fig. 190) noted that all Recent material identified as *T. muricatoides* in collections and examined by the authors apparently represents other taxa, suggesting that the species may no longer be extant. Taki & Oyama (1954: pl. 4 fig. 17) had assigned it to *Fusinus* based on its inflated whorls and prominent early axial sculpture, but the extremely subducted suture, resembling that of some *Latiaxis* species (Gastropoda: Muricidae), distinguishes it from all known fusinine taxa. For a detailed discussion and delimitation of *Trophonofusus* Kuroda & Habe, 1971, see the Remarks section under the genus *Vermeijius*.

Trophonofusus muricatoides differs by its significantly smaller adult size (12.4 mm SL vs ~25 mm SL), more convex whorls, extremely deeply incised suture, almost round aperture, shorter and broader canal, weak axial sculpture on the last whorl, and reddish-brown primary spiral cords.

Vermeijius snyderi sp. nov. (Philippines) differs by its larger shell, higher and slimmer spire, more convex whorls, more deeply incised suture, longer, straight siphonal canal, and fewer, more distinct axial ribs.

Vermeijius miriky sp. nov. (northwestern Madagascar) differs by its slightly larger shell, less inflated whorls, shorter siphonal canal, significantly fewer axial ribs with broader interspaces, and fewer primary spiral cords.

Vermeijius cracens sp. nov. (northwestern Madagascar) is similar and also uniformly white, but differs by having a thicker and more solid shell, larger adult size, higher spire, longer siphonal canal, and significantly fewer axial ribs with wider interspaces.

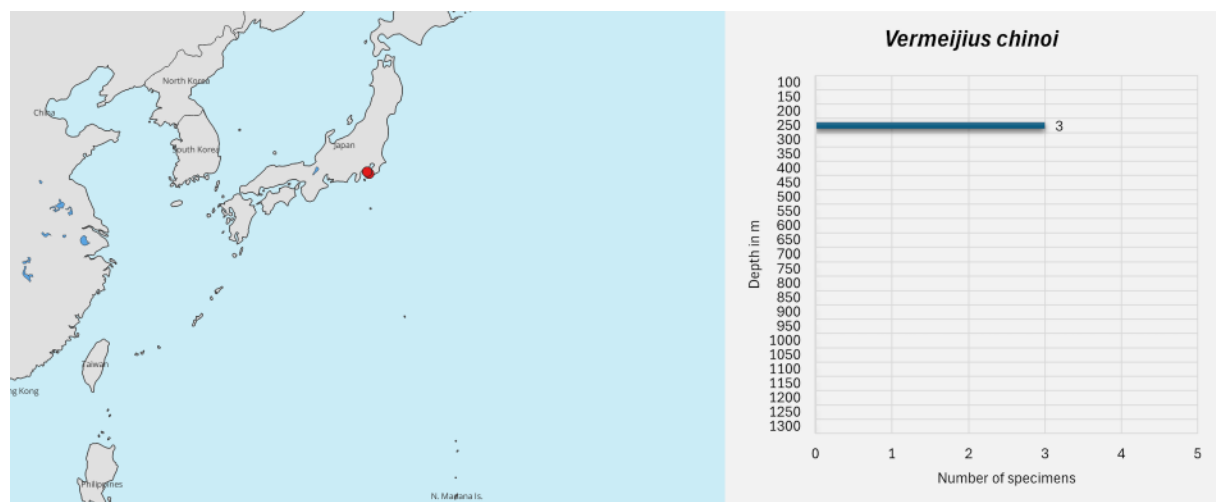


Fig. 75. Geographical and bathymetrical distribution of *Vermeijius chinoi* sp. nov. Each column represents the number of specimens (lv or dd).

Vermeijius macdonaldensis sp. nov.

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Figs 76–77, 84C, 86K

Etymology

Named after the MacDonald seamount, the type locality.

Material examined

Holotype

AUSTRAL ISLANDS • dd; Macdonald Seamount; 28°59' S, 140°14' W; depth 50–100 m; BENTHAUS, stn DW1866; MNHN-IM-2023-1108 (Figs 76A–E, 84C).

Paratype

AUSTRAL ISLANDS • 1 dd juv., SL 6.1 mm, ShW 3.4 mm; Macdonald Seamount, 28°58' S, 140°15' W; depth 240–440 m; BENTHAUS, stn DW1869; MNHN-IM-2023-1109 (Figs 76F–G, 86K).

Sequenced material

None sequenced.

Description

Measurements (holotype): SL 16.25 mm, ShW 7.5 mm.

Shell small for genus (up to 16.5 mm SL), fusiform, solid, with broad, elongate spire comprising ~3–3.5 protoconch and 6.5 teleoconch whorls. Protoconch multispiral (Figs 76E, 86K), obtusely conical, with 2.75–3.25 evenly convex, smooth whorls; final smooth whorl with abapical cord along suture, followed by 0.25 whorl bearing 5–7 fine, slightly arcuate axial riblets separated by wide spaces. Transition to teleoconch marked by onset of spiral sculpture. Protoconch diameter 0.8 mm, exposed height 0.75–0.8 mm. Teleoconch whorls strongly convex, double-keeled on early whorls. Suture deeply impressed, undulating, following axial sculpture of preceding whorl. Axial sculpture of 9 strong, broad, raised ribs on early whorls, extending from suture to suture; about 10 on penultimate and last whorl; interspaces

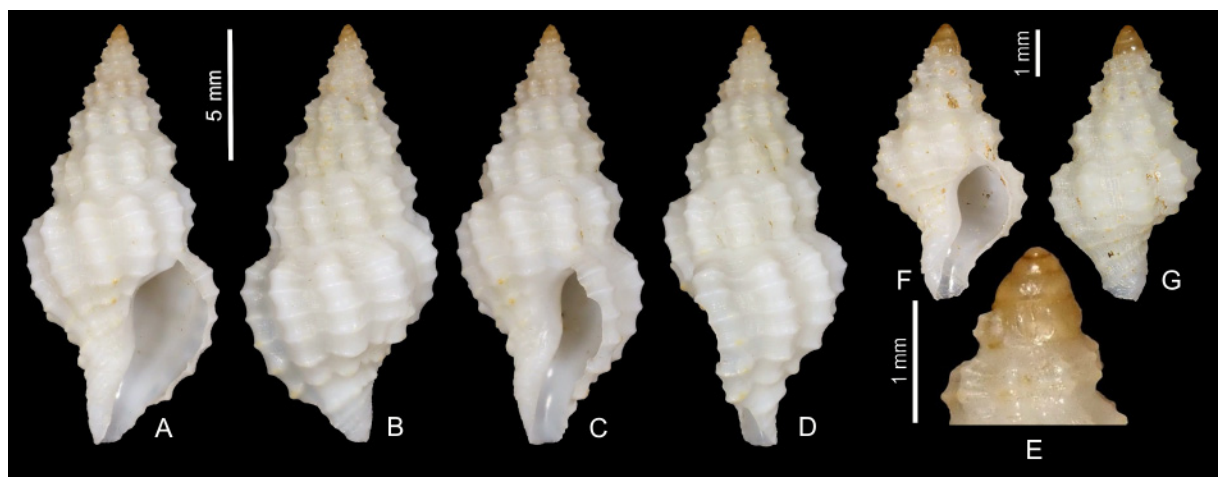


Fig. 76. *Vermeijius macdonaldensis* sp. nov. **A–E.** Holotype, MNHN-IM-2023-1108, Austral Islands, Macdonald Seamount, BENTHAUS, stn DW1866, depth 50–100 m, SL 16.25 mm. **F–G.** Paratype, MNHN-IM-2023-1109, Austral Islands, Macdonald Seamount, BENTHAUS, stn DW1869, depth 240–440 m, SL 6.1 mm. Scale bars: A–D = 5 mm; E and F–G = 1 mm.

conspicuously narrow. Spiral sculpture of 3 raised, prominent primary cords on first teleoconch whorl; fourth, weaker adapical cord appearing on second whorl; abapical cord lying in suture, two central cords forming double keel on early whorls. Spiral cords widely spaced. From antepenultimate whorl onwards, fine secondary spiral threads appearing between primary cords, increasing to 5–6 on last whorl. Fine, inconspicuous axial growth lines intersect spiral sculpture. Base and siphonal canal ornamented with 4 conspicuously strong spiral cords and numerous intercalated very fine secondary threads, rapidly weakening towards canal tip. Siphonal canal relatively long, slightly exceeding aperture length, widely open, straight, slightly bent abaxially. Aperture relatively small, ovate. Outer lip with 6–7 strong, interrupted lirae internally. Inner lip fully adherent to columella, forming thick, glossy, smooth columellar callus; columellar plicae absent. At base of siphonal canal, labral side occasionally with elongate, strong, calloused tooth; parietal side with up to 5 strong, small, irregular teeth. Shallow parietal tooth present. Umbilicus absent. Protoconch reddish-brown; teleoconch and aperture uniformly white; spiral ribs partially tinged reddish-brown at intersections with axial ribs, particularly on later whorls. Operculum and radula unknown.

Distribution

Known only from the southernmost Austral Islands (French Polynesia) (Fig. 77). Empty shells at depths of 100–240 m.

Remarks

Vermeijius macdonaldensis sp. nov. is almost impossible to confuse with other species of the genus due to its particularly strong and sharp spiral sculpture. Although *V. macdonaldensis* does not fully fit the current concept of *Vermeijius*, no more suitable genus is presently available. We therefore retain it tentatively in *Vermeijius* pending future clarification based on additional material.

Vermeijius putillus sp. nov. (Norfolk Ridge, New Caledonia) is of similar size and uniformly whitish, but differs primarily by having a paucispiral protoconch, more constricted base, fewer whorls (5 vs 6.5), less numerous intercalated secondary spiral threads on the penultimate and last whorl, and significantly finer spiral sculpture on the siphonal canal.

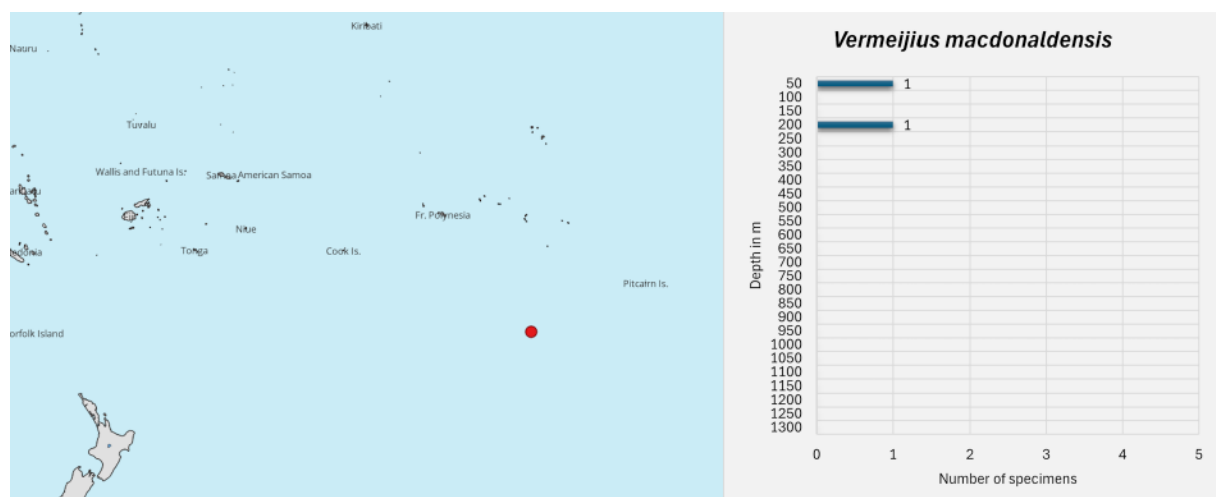


Fig. 77. Geographical and bathymetrical distribution of *Vermeijius macdonaldensis* sp. nov. Each column represents the number of specimens (lv or dd).

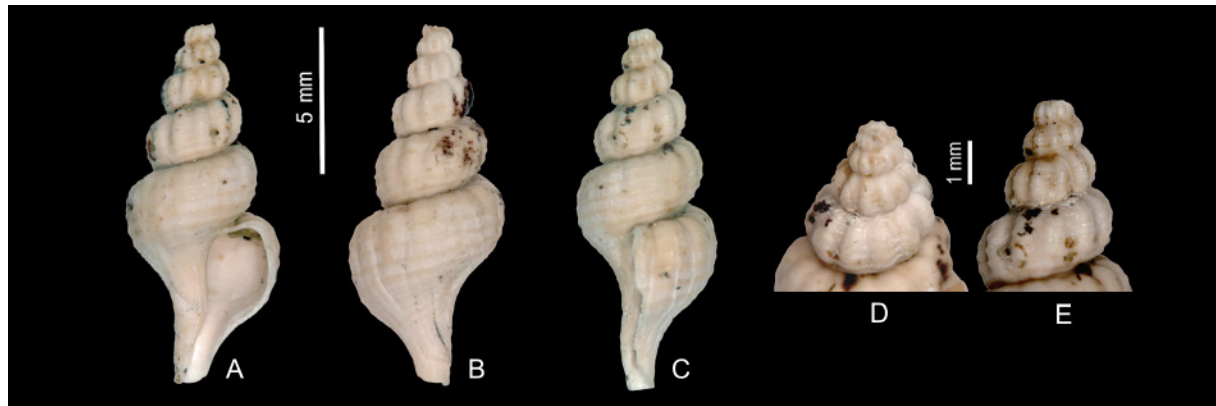


Fig. 78. *Trophonofusus muricatoides* (Yokoyama, 1920), holotype, UMUT CM 20162, Japan, Kanagawa Prefecture, Miura City (Pliocene), SL 12.4 mm. Scale bars: A–C = 5 mm; D–E = 1 mm.

Discussion

The newly recognized diversity within the genus *Vermeijius* is unexpectedly high and well supported by extensive molecular data. Starting from the type species *V. pallidus* and those species initially assigned to the genus (*V. virginiae*, *V. retiarius*, *V. palmarium*, *V. guidonis*, *V. wallacei*), DNA evidence has since revealed that *Vermeijius* is far more heterogeneous than previously assumed.

Several taxa that had only provisionally been assigned to a genus – such as *Fusinus inglorius* and *F. alcyoneum* – have now been confidently placed within *Vermeijius* based on molecular data. Additionally, the inclusion of species with trapezoidal whorls (e.g., *V. spectabilis* sp. nov.) has further expanded the morphological range of the genus. Numerous undescribed species with similar shell architecture have also been linked to *Vermeijius*, including *Takashius aikenii* from South Africa, which can now be reassigned to this genus.

Further diversification of the genus is evident in the inclusion of several minute species that, in the absence of molecular data, would likely not have been assigned to *Vermeijius*. The sequencing of *V. bellatulus* sp. nov., for example, has provided a molecular reference point for the placement of morphologically similar species, such as *V. putillus* sp. nov., *V. pauxillus* sp. nov., and *V. miriky* sp. nov.

Another noteworthy expansion is the incorporation of *V. atimovatae* sp. nov., from southeastern Madagascar, which shows considerable morphological similarity to *V. brinkae* – a species previously placed in *Latirus* or *Fusolatirus*. *Vermeijius mainbaza* sp. nov. also clusters within this group.

In summary, molecular evidence has greatly expanded our understanding of *Vermeijius*, revealing it to be a morphologically and genetically diverse genus. Without molecular support, many of these species would likely have remained misassigned or unrecognised. Continued sequencing of additional taxa will be crucial to further clarify the limits and internal structure of the genus.

Radular morphology

In the original description of *Vermeijius* (Kantor *et al.* 2018), the radulae of only two species – *V. pallidus* and *V. virginiae*, sister species in the present phylogeny – were examined. These two have rather similar radulae characterised by subrectangular central teeth, a feature that was consequently considered diagnostic for distinguishing *Vermeijius* from *Granulifusus* and *Takashius*. However, the examination of 11 additional species reveals high radular variability within the genus, with intrageneric variation exceeding the observed intergeneric differences.

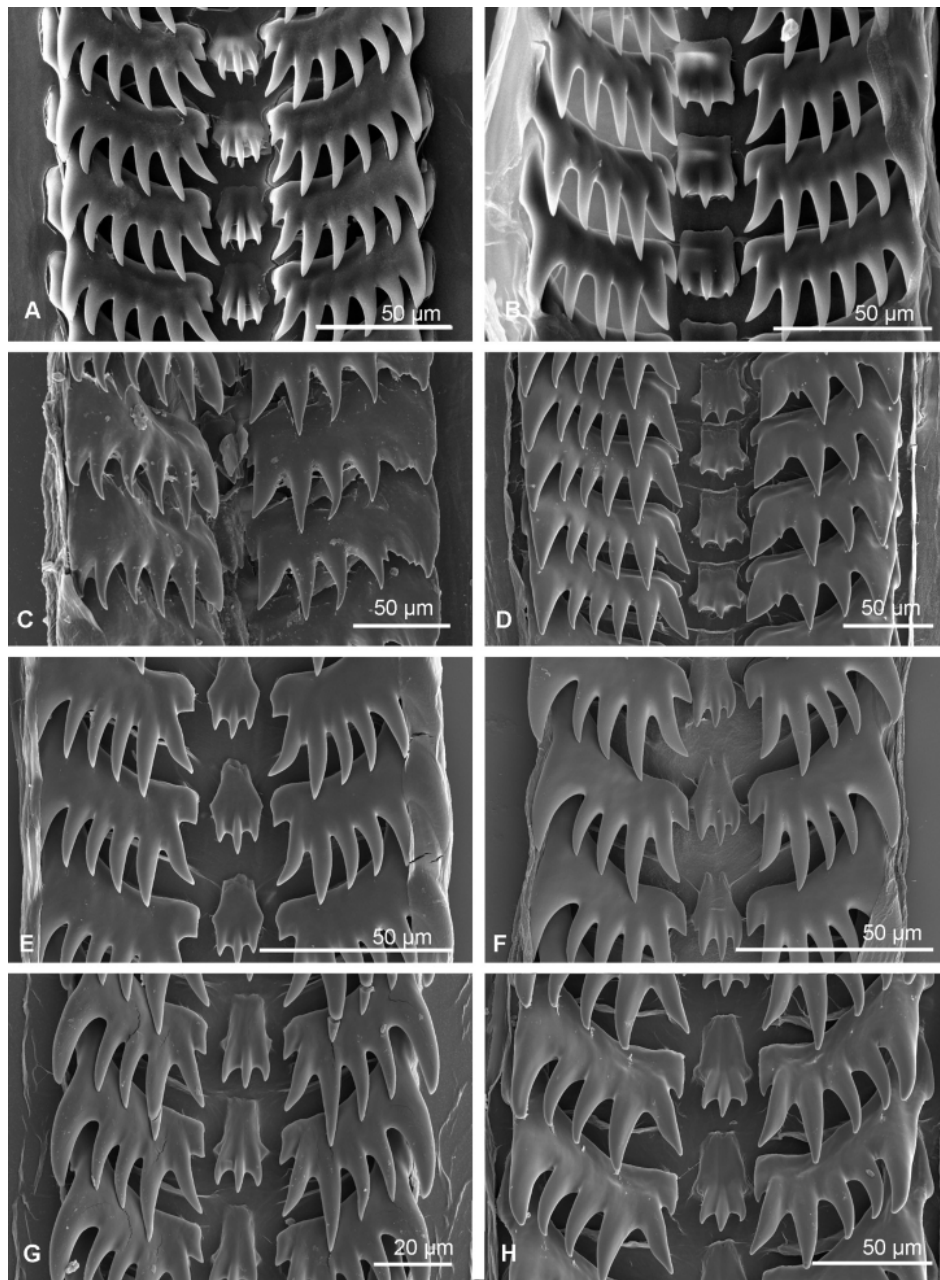


Fig. 79. Radulae of *Vermeijius* spp. **A.** *V. pallidus* (Kuroda & Habe, 1961), MNHN-IM-2007-35093, New Caledonia, Grand Passage, CONCALIS, stn CP2962, depth 580–647 m, SL 45.55 mm. **B.** *V. virginiae* (Hadorn & Fraussen, 2002), MNHN-IM-2009-15030, SW Madagascar, ATIMO VATAE, stn CP3585, depth 549–576 m, SL 51.4 mm. **C–D.** *V. retarius* (von Martens, 1901). **C.** MNHN-IM-2007-38112, W Madagascar, off Majunga, MIRIKY, stn CP3252, depth 650–850 m, SL 53.9 mm (shell, see Fig. 7G–H). **D.** MNHN-IM-2023-1247, W Madagascar, between Majunga and Cap Saint-André, MIRIKY, stn CP3278, depth 750–780 m, SL 45.6 mm. **E–F.** *V. insperatus* Hadorn & Fraussen, 2024. **E.** MNHN-IM-2009-15092, SW Madagascar, Lavanono sector, ATIMO VATAE, stn CP3597, depth 729–732 m, SL 37.0 mm (shell, see Fig. 7R–S). **F.** MNHN-IM-2023-1249, Madagascar, S of Pointe Barrow, ATIMO VATAE, stn CP3585, depth 549–576 m, SL 37.0 mm. **G–H.** *V. alcyoneum* (Hadorn & Fraussen, 2006). **G.** MNHN-IM-2007-34929, S New Caledonia, Norfolk Ridge, Banc Aramis, NORFOLK 2, stn DW2070, depth 630–1150 m, SL 36.1 mm (shell, see Fig. 13J–K). **H.** MNHN-IM-2007-34930, Norfolk Ridge, NORFOLK 2, stn DW2074, depth 623–691 m, SL 44.7 mm.

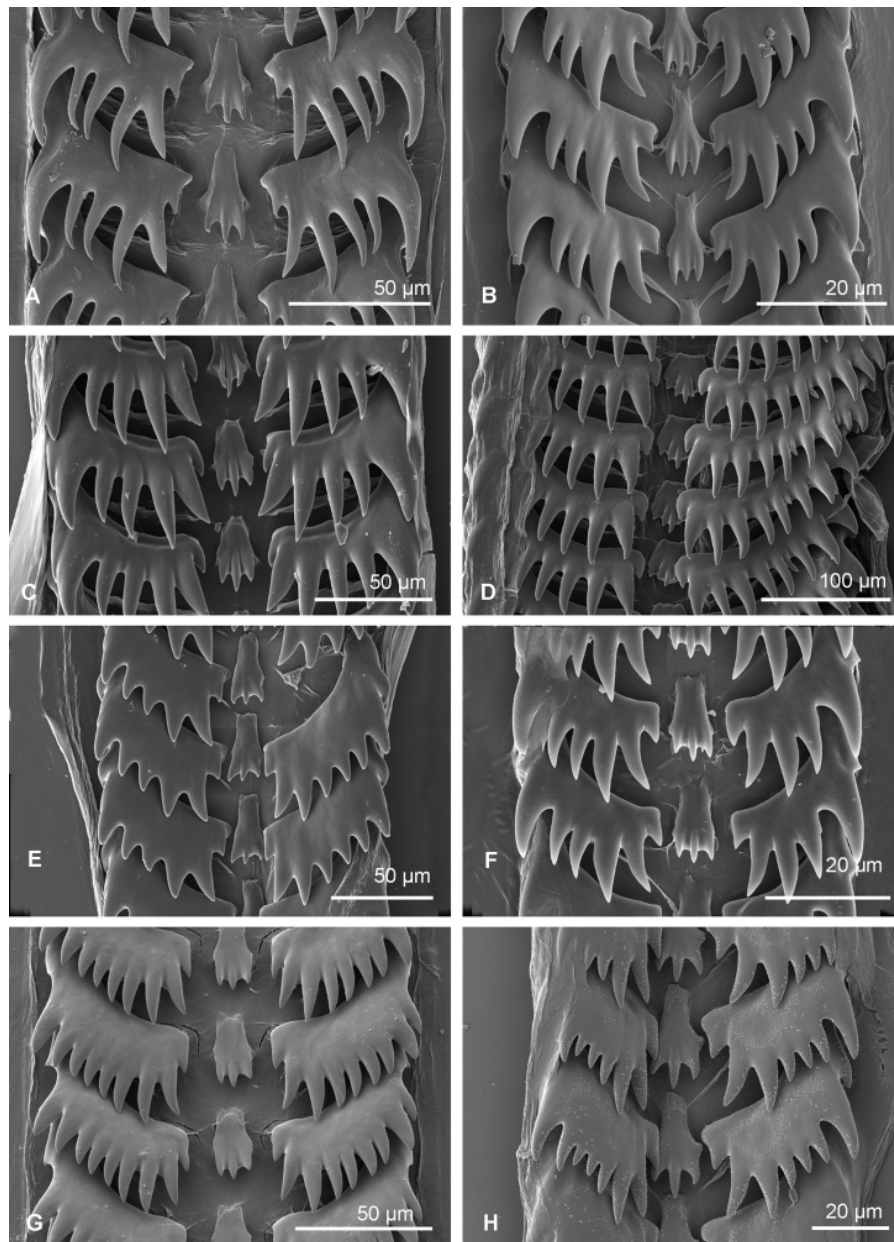


Fig. 80. Radulae of *Vermeijius* spp. **A.** *V. inglorius* (Hadorn & Fraussen, 2006), MNHN-IM-2023-1245, NE Taiwan, off Tashi, TAIWAN 2001, stn CP120, depth 520–640 m, SL 27.7 mm (shell, see Fig. 15M–N). **B.** *V.* sp., MNHN-IM-2023-1244, NW Madagascar, between Nosy Be and Banc du Leven, MIRIKY, stn CP3192, depth 578–580 m, SL 9.8 mm (shell, see Fig. 60). **C.** *V. albulus* sp. nov., MNHN-IM-2007-36064, Solomon Islands, SALOMONBOA 3, stn CP2825, depth 532–883 m, SL 38.7 mm (shell, see Fig. 17L–M). **D.** *V. admirabilis* sp. nov., paratype, MNHN-IM-2007-36162, Solomon Islands, N Malaita, SALOMONBOA 3, stn DW2793, depth 411–414 m, SL 76.5 mm (shell, see Fig. 20D–E). **E.** *V. tarasoc* sp. nov., paratype, MNHN-IM-2007-38764, Society Islands, between Raiatea and Taha’a, TARASOC, stn DW3436, depth 430 m, SL 21.0 mm (shell, see Fig. 24F–J). **F.** *V. bellatulus* sp. nov., paratype, MNHN-IM-2013-68663, S New Caledonia, SW of Ile des Pins, KANACONO, stn DW4666, depth 530–545 m, SL 8.5 mm (shell, see Fig. 26I–L). **G.** *V. malampaensis* sp. nov., holotype, MNHN-IM-2023-1250, Vanuatu, NW Epi, BOA 0, stn CP2307, depth 586–646 m, SL 29.2 mm (shell, see Fig. 70A–E). **H.** *V. brevicostatus* sp. nov., paratype, MNHN-IM-2023-1253, S New Caledonia, Norfolk Ridge, Banc Jumeau Est, NORFOLK 2, stn DW2110, depth 493–850 m, SL 12.6 mm (shell, see Fig. 54E–G).

Therefore, no clear-cut distinctions in radular morphology can be drawn between the mentioned genera, nor between *Vermeijius* and *Amiantofusus*.

Within *Vermeijius*, the number of major cusps on the lateral teeth varies from 4 to 8, and their shape ranges from rather short and blunt (e.g., *V. tarasoc* sp. nov. – Fig. 80E) to long and sharply pointed (e.g., *V. alcyoneum* – Fig. 79G). In all species, the lateral teeth form an attenuated ‘handle’. The transition from the outermost cusp into this handle can be gradual, with a rounded angulation (e.g., *V. pallidus*, *V. virginiae*, *V. retiarius* – Fig. 79A–D), or sharp, often with an additional, more-or-less developed cusp (e.g., *V. bellatulus* sp. nov. and *V. brevicostatus* sp. nov. – Fig. 80F, H). Finally, the shape of the central teeth varies from short and subrectangular, nearly square (Fig. 79A–B), to very narrow and long (Fig. 80A–B).

Distribution patterns

Vermeijius is a genus broadly distributed throughout the Indo-West Pacific, from French Polynesia in the east, through the Central and Western Indo-Pacific and northern Australia to Somalia, Mozambique, Madagascar and South Africa in the west, and Taiwan and Japan in the north. This review is based mainly on material collected during oceanographic cruises organized by the MNHN and therefore largely reflects the museum’s recent sampling efforts. Molecular-grade deep-water material of *Vermeijius* was first collected in 2005 during the PANGLAO 2005 expedition in the Philippines rather than the actual distributional range of the genus.

The number of recorded species varies considerably between regions, ranging from 10 in Madagascar, Mozambique, and the Comoros to 2 species in western India and a single species along the Mascarene

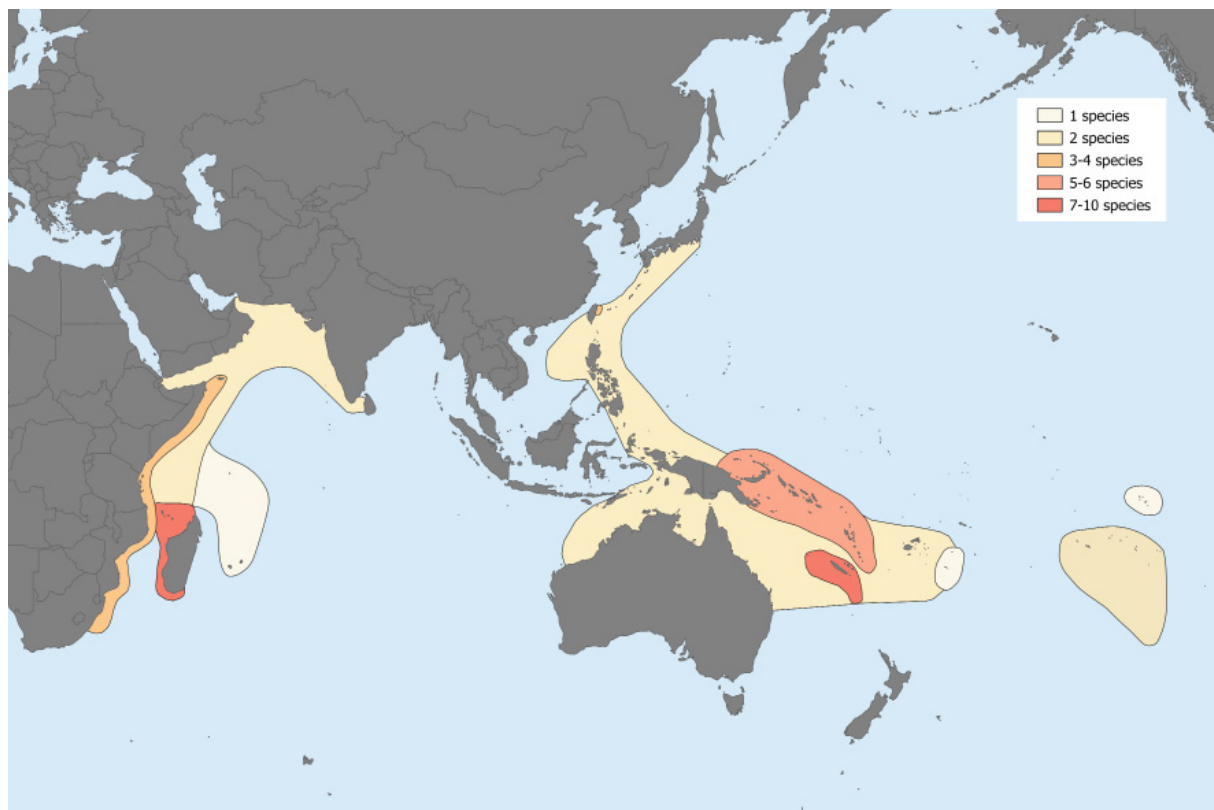


Fig. 81. Geographic distribution of *Vermeijius* diversity in the Indian Ocean and western Pacific regions, with colour intensity in a sequential yellow-red scale proportional to species richness.

Ridge (Fig. 81). However, these numbers do not necessarily reflect the actual diversity of the genus in each region, as they are strongly influenced by sampling effort.

In general, the observed distribution of *Vermeijius* species, as confirmed by molecular data, is characterised by rather narrow ranges. Most species are restricted to a single archipelago or to two adjacent regions. Nearly all of these species possess a paucispiral protoconch with fewer than two whorls, suggesting non-planktotrophic development and consequently limited dispersal ability. Only three species exhibit markedly broader distributions. *Vermeijius pallidus* occurs throughout much of the western Pacific, and *V. virginiae* ranges from Somalia along the East African coast, through the Mozambique Channel, and southward to South Africa. *Vermeijius guidonis* is also widespread, occurring from western India across the Arabian Sea to Somalia. Both *V. pallidus* and *V. virginiae* possess multispiral protoconchs, indicating a substantially greater dispersal capacity. The protoconch of *V. guidonis* remains unknown, and it is plausible that this species may likewise have a multispiral protoconch. Furthermore, it has not been sequenced yet, and molecular data may reveal cryptic, more localized species, within *V. guidonis*.

However, there are several species with multispiral protoconchs (*V. geminatus* sp. nov., *V. alcyoneum*, *V. sayaensis* sp. nov., *V. aikenii*, *V. macdonaldensis* sp. nov.) that nevertheless occur within relatively small geographic ranges. This may reflect insufficient sampling in certain areas (*V. macdonaldensis*, *V. sayaensis*) or the apparent rarity of these species (*V. sayaensis*, *V. aikenii*). In contrast, the restricted ranges of *V. alcyoneum*, despite intensive sampling, appear genuinely confined to New Caledonia and the Coral Sea, while *V. geminatus* extends from the Coral Sea, New Caledonia to Vanuatu and Tonga.

The broad geographic distribution of *Vermeijius*, in combination with i) narrow species distributional ranges and ii) general rarity, indicates that we are probably still far from exhaustive sampling of its Indo-Pacific diversity. Further benthic exploration is likely to yield new species for many years to come.

Acknowledgements

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Fig. 82 (next page). *Vermeijius* spp. **A.** *V. pallidus* (Kuroda & Habe, 1961), figured paratype, NSMT-Mo 40378, Japan, Kochi Prefecture, off Cape Ashizuri, SL 52.2 mm. **B.** *V. virginiae* (Hadorn & Fraussen, 2002), holotype, MNHN-IM-2000-9626, SW Madagascar, Campagne Crevettière 1986, stn CH79, depth 525 m, SL 59.0 mm. **C.** *V. guidonis* (Delsaerdt, 1995), paratype, MNHN-IM-2023-1082, south Somalia, offshore Mogadishu, SL 45.6 mm. **D.** *V. retiarius* (von Martens, 1901), lectotype, ZMB 61012, S Somalia, northern Brawa (near Mogadishu), *Valdivia* stn 256, depth 1134 m, SL 38.5 mm. **E.** *V. insperatus* Hadorn & Fraussen, 2024, holotype, NMBE MOLL-0576873, W Madagascar, off Morondava, depth 600 m, SL 49.2 mm. **F.** *V. admirabilis* sp. nov., holotype, MNHN-IM-2007-32530, Solomon Islands, Kolombangara Island, Vella Gulf, SALOMON 2, stn CP2260, depth 399–427 m, SL 56.2 mm (sequenced). **G.** *V. costuliferus* sp. nov., holotype, MNHN-IM-2023-1043, Vanuatu, W Malo, BOA 1, stn CP2414, depth 309–402 m, SL 51.0 mm. **H.** *V. thielei* (Schepman, 1911), holotype, ZMA.MOLL.136773, Timor Sea, SIBOGA, stn 300, depth 918 m, SL 46.0 mm. **I.** *V. fijiensis* sp. nov., holotype, MNHN-IM-2023-1060, Fiji, Bligh Water, MUSORSTOM 10, stn CP1331, depth 694–703 m, SL 40.15 mm. **J.** *V. palmarium* (Hadorn & Fraussen, 2006), holotype, AMS C.422362, Australia, Queensland, Great Barrier Reef, off Swain Reefs, off Hixson Cay, depth 216–227 m, SL 37.1 mm. **K.** *V. alcyoneum* (Hadorn & Fraussen, 2006), holotype, MNHN-IM-2000-9406, S New Caledonia, SMIB 3, stn DW03, depth 513 m, SL 37.3 mm. **L.** *V. inglorius* (Hadorn & Fraussen, 2006), holotype, NMNS-5111-001, NE Taiwan, off Tashi, TAIWAN 2001, stn CP99, depth 506–680 m, SL 34.8 mm. **M.** *V. albulus* sp. nov., holotype, MNHN-IM-2007-36008, Solomon Islands, Guadalcanal, Kaoka Bay, SALOMONBOA 3, stn CP2858, depth 650–725 m, SL 33.9 mm (sequenced). **N.** *V. papuaensis* sp. nov., holotype, MNHN-IM-2023-1160, Papua New Guinea, W coast of New Ireland, BIOPAPUA, stn DW3782, depth 600 m, SL 36.4 mm. **O.** *V. tashiensis* sp. nov., holotype, MNHN-IM-2023-1223, NE Taiwan, off Tashi, TAIWAN 2001, stn CP107, depth 335–420 m, SL 36.6 mm. Different scales for 82A–I and 82J–O.

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Fig. 83 (next page). *Vermeijius* spp. **A.** *V. snyderi* sp. nov., holotype, MNHN-IM-2007-32569, Philippines, between Panglao and Siquijor, PANGLAO 2005, stn CP2388, depth 762–786 m, SL 33.2 mm (sequenced). **B.** *V. celatus* sp. nov., holotype, MNHN-IM-2007-32517, Philippines, Bohol Sea, between Siquijor and Mindanao, PANGLAO 2005, stn CP2358, depth 569–583 m, SL 28.0 mm (sequenced). **C.** *V. spectabilis* sp. nov., holotype, MNHN-IM-2007-32510, Coral Sea, Chesterfield, S Banc Nova, EBISCO, stn DW2525, depth 408–410 m, SL 33.1 mm (sequenced). **D.** *V. geminatus* sp. nov., holotype, MNHN-IM-2023-1067, S New Caledonia, Norfolk Ridge, Banc Éponge, NORFOLK 2, stn DW2084, depth 586–730 m, SL 21.3 mm. **E.** *V. tarasoc* sp. nov., holotype, MNHN-IM-2007-38758, Society Islands, Tahiti, TARASOC, stn DW3502, depth 430–580 m, SL 23.3 mm (sequenced). **F.** *V. sayaensis* sp. nov., holotype, MNHN-IM-2019-25242, W Saya de Malha Bank, SAYA, stn DW5407, depth 193–198 m, SL 18.7 mm. **G.** *V. aiken*i (Lussi, 2014), holotype, NMSA W9698/T3896, South Africa, southern KwaZulu-Natal, off Park Rynie, depth 110 m, SL 26.04 mm (from Lussi 2014). **H.** *V. brinkae* (Lussi, 1996), holotype, NMSA V836/T1317, South Africa, KwaZulu-Natal, off Durban, depth 300 m, SL 31.5 mm. **I.** *V. atimovatae* sp. nov., holotype, MNHN-IM-2009-15077, SE Madagascar, between Lokaro and Sainte Luce, ATIMO VATAE, stn DW3515, depth 184–203 m, SL 24.9 mm (sequenced). **J.** *V. mainbaza* sp. nov., holotype, MNHN-IM-2023-1110, Mozambique, Inhambane transect, MAINBAZA, stn CP3139, depth 1092–1195 m, SL 29.2 mm. **K.** *V. wallacei* (Hadorn & Fraussen, 2006), holotype, MNHN-IM-2000-9404, Indonesia, Tanimbar Islands, KARUBAR, stn CP69, depth 356–368 m, SL 27.0 mm. **L.** *V. malampaensis* sp. nov., holotype, MNHN-IM-2023-1250, Vanuatu, NW Epi, BOA 0, stn CP2307, depth 586–646 m, SL 29.2 mm. **M.** *V. chinoi* sp. nov., holotype, NMBE MOLL-0588558, Japan, Tokyo Prefecture, mouth of Tokyo Bay, depth 200–300 m, SL 24.2 mm. **N.** *V. abditus* sp. nov., holotype, MNHN-IM-2007-35637, N New Caledonia, Grand Passage, CONCALIS, stn CP3027, depth 600–1100 m, SL 19.3 mm (sequenced). **O.** *V. cracens* sp. nov., holotype, MNHN-IM-2007-38052, NW Madagascar, between Nosy Be and Banc du Leven, MIRIKY, stn CP3189, depth 346–376 m, SL 26.6 mm (sequenced). All shells at the same scale.

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Fig. 84 (next page). *Vermeijius* spp. **A.** *V. comorensis* sp. nov., holotype, MNHN-IM-2023-1289, Comoro Islands, S Mayotte, BIOMAGLO, stn DW4826, depth 489–496 m, SL 18.2 mm. **B.** *V. miriky* sp. nov., holotype, MNHN-IM-2023-1126, NW Madagascar, W of Cap d'Ambre, MIRIKY, stn DW3200, depth 560–653 m, SL 15.6 mm. **C.** *V. macdonaldensis* sp. nov., holotype, MNHN-IM-2023-1108, Austral Islands, Macdonald Seamount, BENTHAUS, stn DW1866, depth 50–100 m, SL 16.25 mm. **D.** *V. pauxillus* sp. nov., holotype, MNHN-IM-2023-1162, Papua New Guinea, Bougainville Island, Seamounts, off NW Bougainville, BIOPAPUA, stn DW3745, depth 369–377 m, SL 14.0 mm. **E.** *V. brevicostatus* sp. nov., holotype, MNHN-IM-2023-1033, S New Caledonia, Norfolk Ridge, Banc Jumeau Est, NORFOLK 2, stn DW2049, depth 470–621 m, SL 14.4 mm. **F.** *V. putillus* sp. nov., holotype, MNHN-IM-2023-1167, S New Caledonia, Norfolk Ridge, CHALCAL 2, stn DW76, depth 470 m, SL 9.55 mm. **G.** *V. bellatulus* sp. nov., holotype, MNHN-IM-2013-68669, S New Caledonia, SW Ile des Pins, KANACONO, stn DW4666, depth 530–545 m, SL 9.9 mm (sequenced). **H.** *V. bellatulus* sp. nov., paratype, MNHN-IM-2023-1021, S New Caledonia, Norfolk Ridge, SMIB 8, stn DW200, depth 514–525 m, SL 11.65 mm. **I.** *V. corbariae* sp. nov., holotype, MNHN-IM-2023-1297, NE of Grande Glorieuse, BIOMAGLO, stn DW4813, depth 583–614 m, SL 10.65 mm. **J.** *V. antea* sp. nov., holotype, MNHN-IM-2023-1278, N of Grande Glorieuse, BIOMAGLO, stn DW4800, depth 240–255 m, SL 9.8 mm. **K.** *V.* sp., MNHN-IM-2023-1244, NW Madagascar, between Nosy Be and Banc du Leven, MIRIKY, stn CP3192, depth 578–580 m, SL 9.8 mm. All shells at the same scale.

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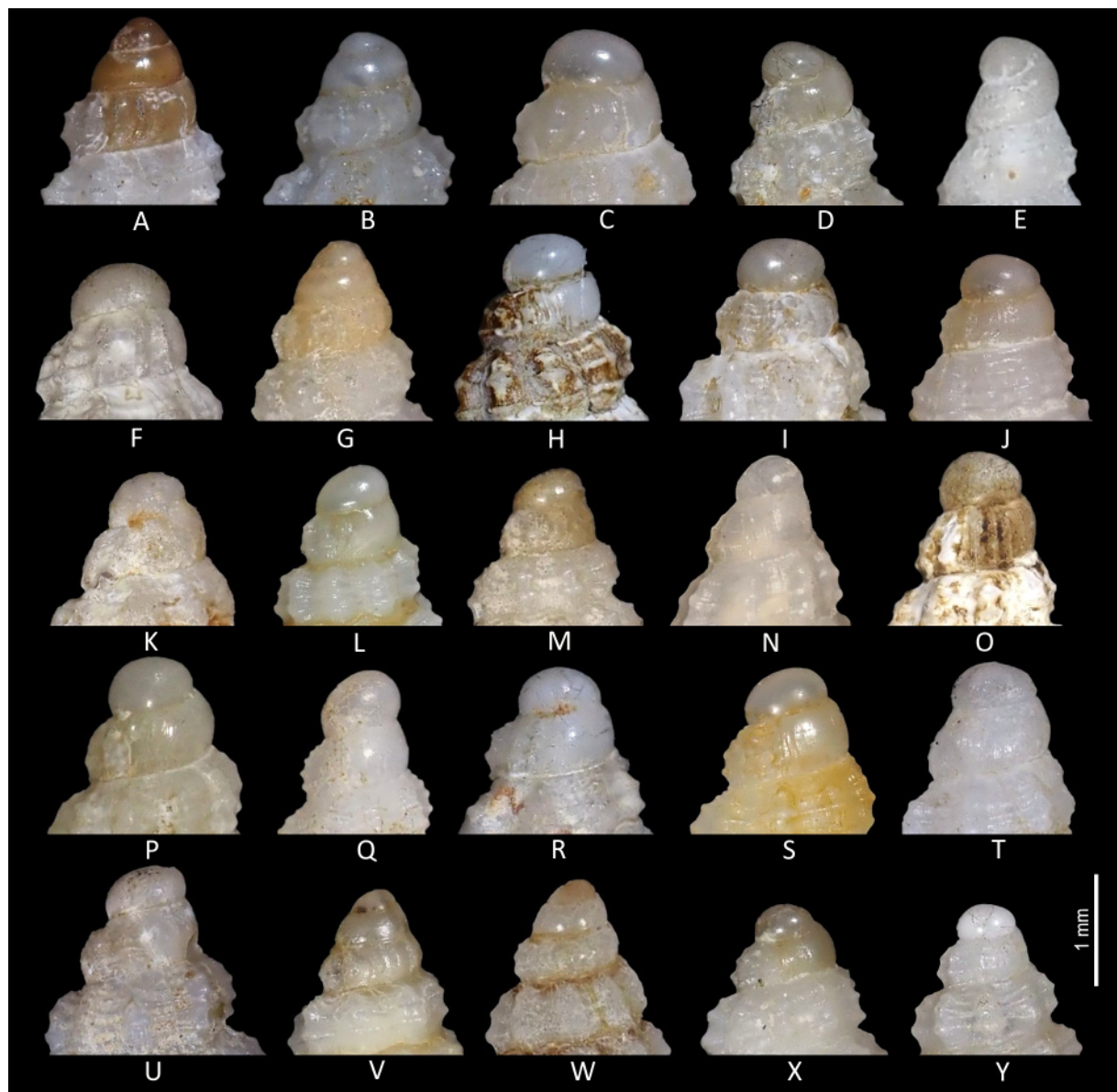
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Fig. 85 (next page). Protoconchs of *Vermeijius* spp. **A.** *V. pallidus* (Kuroda & Habe, 1961), MNHN-IM-2013-59667, SL 35.6 mm (sequenced). **B.** *V. virginiae* (Hadorn & Fraussen, 2002), MNHN-IM-2009-15025, SL 54.0 mm (sequenced). **C.** *V. retarius* (von Martens, 1901), MNHN-IM-2009-15043, SL 27.4 mm (sequenced). **D.** *V. insperatus* Hadorn & Fraussen, 2024, MNHN-IM-2009-15136, SL 28.65 mm (sequenced). **E.** *V. palmarium* (Hadorn & Fraussen, 2006), NMBE MOLL-0584176, SL 30.5 mm. **F.** *V. wallacei* (Hadorn & Fraussen, 2006), MNHN-IM-2023-1243, SL 22.3 mm. **G.** *V. alcyoneum* (Hadorn & Fraussen, 2006), MNHN-IM-2007-32521, SL 23.85 mm (sequenced). **H.** *V. inglorius* (Hadorn & Fraussen, 2006), MNHN-IM-2013-59610, SL 27.6 mm (sequenced). **I.** *V. albulus* sp. nov., paratype, NMBE MOLL-0588451, SL 36.2 mm. **J.** *V. abditus* sp. nov., holotype, MNHN-IM-2007-35637, SL 19.3 mm (sequenced). **K.** *V. admirabilis* sp. nov., paratype, NMBE MOLL-0588452, SL 48.9 mm. **L.** *V. spectabilis* sp. nov., holotype, MNHN-IM-2007-32510, SL 33.1 mm (sequenced). **M.** *V. tarasoc* sp. nov., holotype, MNHN-IM-2007-38758, SL 23.3 mm (sequenced). **N.** *V. bellatulus* sp. nov., paratype, MNHN-IM-2013-68663, SL 8.5 mm. **O.** *V. snyderi* sp. nov., holotype, MNHN-IM-2007-32569, SL 33.2 mm (sequenced). **P.** *V. celatus* sp. nov., paratype, MNHN-IM-2007-32494, SL 21.0 mm (sequenced). **Q.** *V. cracens* sp. nov., holotype, MNHN-IM-2007-38052, SL 26.6 mm (sequenced). **R.** *V. atimovatae* sp. nov., holotype, MNHN-IM-2009-15077, SL 24.9 mm (sequenced). **S.** *V. brinkae* (Lussi, 1996), NMBE MOLL-0576100, SL 25.2 mm. **T.** *V. papuaensis* sp. nov., holotype, MNHN-IM-2023-1160, SL 36.4 mm. **U.** *V. costuliferus* sp. nov., paratype, MNHN-IM-2023-1044, SL 34.0 mm. **V.** *V. geminatus* sp. nov., holotype, MNHN-IM-2023-1067, SL 21.3 mm. **W.** *V. sayaensis* sp. nov., holotype, MNHN-IM-2019-25242, SL 18.7 mm. **X.** *V. pauxillus* sp. nov., holotype, MNHN-IM-2023-1162, SL 14.0 mm. **Y.** *V. brevicostatus* sp. nov., paratype, MNHN-IM-2023-1253, SL 12.6 mm. All protoconchs at the same scale.

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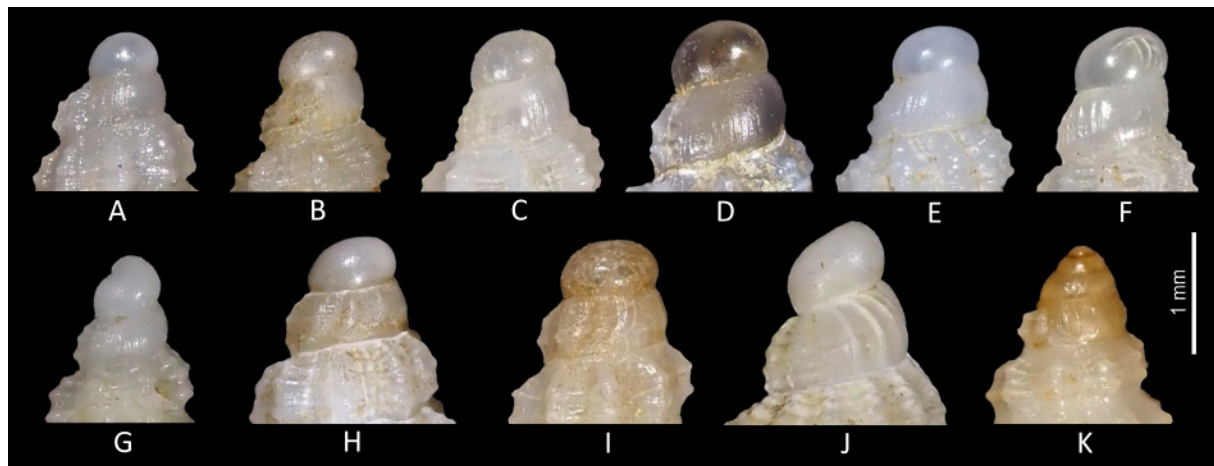


Fig. 86. Protoconchs of *Vermeijius* spp. **A.** *V. putillus* sp. nov., holotype, MNHN-IM-2023-1167, SL 9.55 mm. **B.** *V. miriky* sp. nov., holotype, MNHN-IM-2023-1126, SL 15.6 mm. **C.** *V.* sp., MNHN-IM-2023-1244, SL 9.8 mm. **D.** *V. mainbaza* sp. nov., paratype, MNHN-IM-2023-1112, SL 12.5 mm. **E.** *V. comorensis* sp. nov., paratype MNHN-IM-2023-1292, SL 17.73 mm. **F.** *V. corbariae* sp. nov., holotype, MNHN-IM-2023-1297, SL 10.65 mm. **G.** *V. antea* sp. nov., holotype, MNHN-IM-2023-1278, SL 9.8 mm. **H.** *V. malampaensis* sp. nov., holotype, MNHN-IM-2023-1250, SL 29.2 mm. **I.** *V. fijiensis* sp. nov., paratype, MNHN-IM-2023-1062, SL 16.7 mm. **J.** *V. chinoi* sp. nov., paratype, NMBE MOLL-0576861, SL 17.8 mm. **K.** *V. macdonaldensis* sp. nov., paratype, MNHN-IM-2023-1109, SL 6.1 mm. All protoconchs at the same scale.

Supplementary files

Supp. file 1. List of examined material included in molecular phylogenetic analysis. Abbreviation: GB = GenBank. <https://doi.org/10.5852/ejt.2026.1095.3326.14601>

Supp. file 2. Comparison table of all *Vermeijius* species. <https://doi.org/10.5852/ejt.2026.1095.3326.14602>