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Description of Two New Species of *Dermomurex* (Gastropoda: Muricidae) with a Review of *Dermomurex* (*Takia*) in the Indo-West Pacific

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Abstract: The subgenus *Dermomurex* (*Takia*) is reviewed and one new species, *D*. (*T*.) *manonae* n. sp., is described from New Caledonia. It is distinguished from the similar *D*. (*T*.) *wareni* Houart, 1990 based on genetic differences and a few shell characters. From other species it differs in its shell and intritacalx morphology. The four Indo-West Pacific species are reviewed and illustrated, namely *D*. (*T*.) *bobyini* Kosuge, 1984, *D*. (*T*.) *infrons* Vokes, 1974, *D*. (*T*.) *wareni* Houart, 1990 and *D*. (*T*.) *manonae* n. sp. *Dermomurex* (subgenus?) *paulinae* n. sp. is described from New Caledonia in an undetermined subgenus and is distinguished from *D*. (*D*.) *africanus* Vokes, 1978 from South Africa by its shell and intritacalx morphology. *Trialatella* is synonymized with *Dermomurex s.s*.

Keywords: *Dermomurex*, Indo-West Pacific, New Caledonia, classification, new species

Introduction

The genus *Dermomurex* is usually divided into five subgenera: *Dermomurex s.s*., *D*. (*Gracilimurex*), *D*. (*Trialatella*), *D*. (*Takia*) and *D*. (*Viator*). Vokes (1985) gave a simple key to separate the subgenera. This key is used below with some additional characters.

Dermomurex Monterosato, 1890 has a shell with a narrow inductura (inner or columellar lip), a moderately broad or broad last teleoconch whorl, six or seven axial varices on the first teleoconch whorls and three to six varices on the last whorl and a short or moderately long siphonal canal, often with the apertural varix extending over it almost to the tip of the canal.

The subgenus *Trialatella* Berry, 1964 has the same shell characters as *Dermomurex s.s*. but the last teleoconch whorl always has three varices.

The subgenus *Gracilimurex* Thiele, 1929 has a very high-spired shell, six or seven varices on the first teleoconch whorls that are reduced to two, three and occasionally four varices on the last whorl. The other varices persist on the last whorl as low axial ribs.

The subgenus *Takia* Kuroda, 1953 has a shell with a broad inductura, a broad last teleoconch whorl, five or six varices from first to last teleoconch whorl and a medium sized or long siphonal canal, onto which the apertural varix does not extend.

The subgenus *Viator* Vokes, 1974 has a shell with a moderately high spire, a broad last

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teleoconch whorl, six varices from first to last teleoconch whorl and a long to very long canal with the apertural varix extending over most of it.

All these subgenera are morphologically distinct from each other except for *Trialatella*, which, as noted by Merle *et al*. (2011: 212–214), Houart (2015: 153) and Garrigues & Lamy (2017: 42–43), is not really separable from *Dermomurex s.s*. As noted by Houart (2015), it is not readily apparent how to separate some species of *Dermomurex s.s.* from *Dermomurex* (*Trialatella*). For example, *Dermomurex fitialeatai* Houart, 2015 could be referred to *Trialatella* because it has three axial varices per whorl on the third to last teleoconch whorls, but to *Dermomurex s.s.* because the spire is elongate rather than short as in *Trialatella*. Merle *et al.* (2011: 212–213) noted species of uncertain assignment, and doubted the need for *Trialatella*. A genetic study of both type species, *D.* (*D.*) *scalaroides* (Blainville, 1829) and *D.* (*T.*) *cunninghamae* (Berry, 1964) could clarify this classification.

These subgenera are considered as "alternate representations" in WoRMS (MolluscaBase, 2019). However, they probably reflect rapid evolutionary diversification of the genus from the Early Oligocene, with both *Aspella* Mörch, 1877, a related genus, and *Dermomurex* undoubtedly having a common ancestor in the lower Tertiary (Vokes, 1975: 123). More studies are needed on this group but in the meantime, we tentatively continue to use the subgeneric subdivision as a working classification.

The presence of an intritacalx, a chalky layer with a typical microsculpture pattern, deposited on the shell by the animal during shell formation, is a common character in all species of *Dermomurex* and a few other muricid genera such as *Aspella*. The very distinctive morphology of this intritacalx is a useful tool for species identification.

The radula in *Dermomurex* is muricid with a flattened pentacuspid rachidian tooth and a smooth marginal area, without denticles or marginal cusps.

Subfamilial Classification

The genera *Attiliosa* Emerson, 1968 and *Dermomurex* were included by Keen (1971a, b) in the subfamily Aspellinae, along with the type genus *Aspella*. However, the molecular phylogeny of Barco *et al*. (2010) failed to support the traditional classification, highlighting the polyphyly in several morphologically defined muricid subfamilies. In that work, *Attiliosa* was shown to form a clade with *Favartia* and *Muricopsis*, and all were included in the subfamily Muricopsinae. *Dermomurex* was more distantly related and tentatively assigned to Aspellinae, although *Aspella* was missing in the dataset of Barco *et al*. (2010).

Here we delimit Aspellinae to include *Aspella*, *Dermomurex* and *Ingensia* Houart, 2001, in partial agreement with Bouchet *et al*. (2017) and Houart (2018), but excluding *Attiliosa*, as indicated by Barco *et al*. (2010).

Material and Methods

Material

The material studied here includes specimens collected on various cruises conducted by the MNHN/IRD. Other specimens are from the collections of the KwaZulu-Natal Museum, Pietermaritzburg, South Africa, the National Museum of Nature and Science, Tokyo, Japan, the Natural History Museum, London, United Kingdom and the personal research collection of the first author.

Specimens from the following expeditions of the MNHN/IRD in the Indo-West Pacific were examined:

KARUBAR, 1991 (Indonesia), MUSORSTOM 8, 1994 (Vanuatu) (doi.org/10.17600/94100040),

TAIWAN 2000, 2002, 2004 (Taiwan), BENTHAUS, 2002 (French Polynesia) (doi.org/10.17600/2100100), ATIMO VATAE, 2010 (Mozambique-Madagascar) (doi.org/10.17600/10110040), MIRIKY, 2009 (Mozambique-Madagascar).

From New Caledonia: *VAUBAN* 1978-79, BIOCAL, 1985, MUSORSTOM 4, 1985 (doi.org/10.17600/85009111), CHALCAL 2, 1986 (doi.org/10.17600/86006511), SMIB 1, 1986 (doi.org/10.17600/86009711), SMIB 2, 1986 (doi.org/10.17600/86009611), MUSORSTOM 5, 1986 (doi.org/10.17600/86006611), SMIB 3, 1987, MUSORSTOM 6, 1989 (doi.org/10.17600/89004811), SMIB 4, 1989 (doi.org/10.17600/89004911), SMIB 5, 1989, SMIB 6, 1990 (doi.org/10.17600/90005911), SMIB 8, 1993 doi.org/10.17600/93000640), BATHUS 2, 1993 (doi.org/10.17600/93000360), BATHUS 3, 1993 (doi.org/10.17600/93000370), BATHUS 4, 1994 (doi.org/10.17600/9410003), NORFOLK 1, 2001 (doi.org/10.17600/1100050), NORFOLK 2, 2003 (doi.org/10.17600/3100030), EBISCO, 2005 (doi.org/10.17600/5100080), CONCALIS, 2008 (doi.org/10.17600/8100010), TERRASSES, 2008 (doi.org/10.17600/8100100), EXBODI, 2011 (doi.org/10.17600/11100080) , KANACONO, 2016 (doi.org/10.17600/16003900), KANADEEP, 2017 (doi.org/10.17600/17003800).

Most of the material studied here is housed in the MNHN; the institutions or collections in which other material is deposited are indicated.

Morphological analyses

The characters used to describe shell morphology address the general aspect of the shell including its shape, size, and colour, the shape of the spire including the number and features of the protoconch and teleoconch whorls, details of the suture and of the subsutural ramp, the structure and pattern of the intritacalx, details of axial and spiral sculpture, the aperture, the siphonal canal, and when available, the characters of the operculum and radula.

The method used to determine diameter and height, and to count the number of protoconch whorls, follows Bouchet & Kantor (2004) as shown in Fig. 1. The morphology of the radula is described starting from the rachidian tooth, followed by the lateral teeth (Fig. 2). Unless otherwise indicated, species descriptions are based on the holotype and paratypes. The given bathymetric ranges are the inner values of the recorded depths: the deepest minimum and the shallowest maximum of each recorded depth range.

Molecular analyses

The molecular dataset includes all available *Dermomurex* specimens with an associated tissue sample collected during the cruises conducted by the MNHN/IRD (Table 1), together with *Aspella*, the type genus of the subfamily Aspellinae (Barco *et al*., 2010). Total genomic DNA was extracted using the DNA Mini Kit (Qiagen) following the manufacturer's protocol. A part of the mitochondrial cytochrome oxidase I (COI) was amplified with primers LCO1490 and HCO2198 (Folmer *et al*., 1994) and the PCR products were sequenced by the Eurofins sequencing facility. The outgroup comprises *Attiliosa* and *Favartia* species representing the subfamily Muricopsinae, which form the sister clade of *Dermomurex* in Barco *et al*.'s phylogeny (2010).

The dataset was analyzed under the maximum likelihood criterion, using RAxML-HPC2 (Stamatakis, 2006), with each codon position treated as an unlinked partition, selecting a GTR+ Gamma+ I model and random starting tree, with empirical base frequencies and estimated α-shape parameters and GTR-rates. Nodal support was estimated using 100 bootstrap replicates. K2P distances were calculated with PAUP* (Swofford, 2003).

Abbreviations

Repository: IMT – Institute of Malacology, Tokyo, Japan; MNHN – Muséum national d'Histoire naturelle, Paris, France; NHMUK – Natural History Museum, London, United Kingdom; NM –

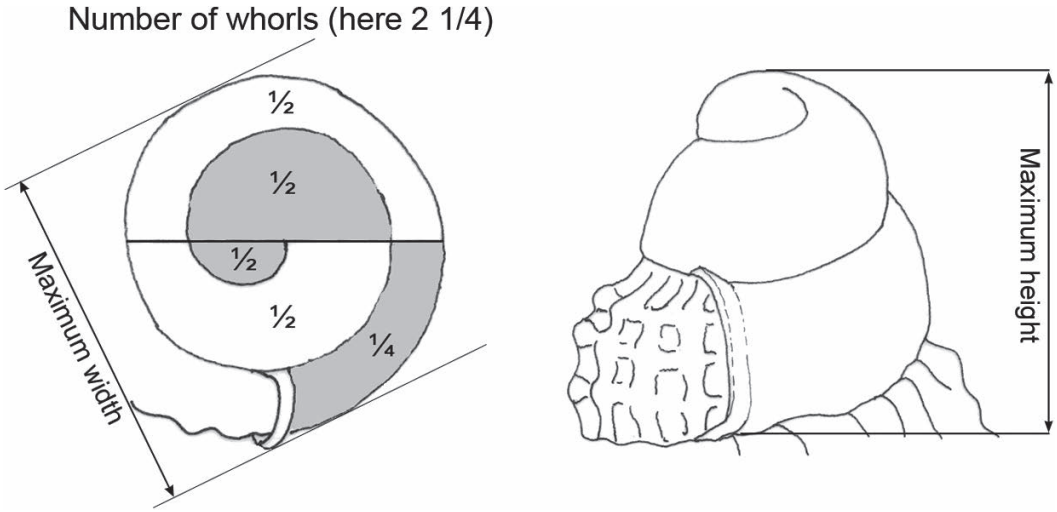

Fig. 1. Methods for determining diameter and height and for counting the number of protoconch whorls.

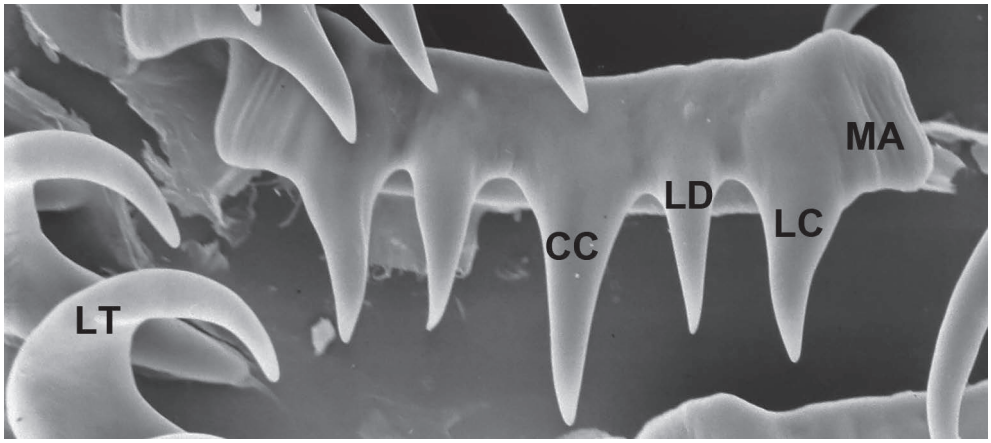

Fig. 2. Terminology used to describe the radula, here *Dermomurex* (*Takia*) *wareni* Houart, 1990. CC – central cusp; LD – lateral denticle; LC – lateral cusp; MA – marginal area; LT – lateral teeth (following Kool, 1993).

KwaZulu-Natal Museum, Pietermaritzburg, South Africa; NSMT – National Museum of Nature and Science, Tokyo, Japan; RH – Collection of the first author; SAMA – South Australian Museum, Adelaide, Australia.

Other institute: IRD – Institut de Recherche pour le Développement (formerly ORSTOM).

Station number prefixes: CAS – casiers (lobster pot); CP – Chalut à perche (beam trawl); DC – Drague Charcot (Charcot dredge); DW – Drague Warén (Warén dredge).

Specimens: dd – empty shell(s); lv – live collected specimen(s).

Terminology used to describe the spiral cords and the apertural denticles (after Merle 2001, 2005) (Fig. 9K–L). Variable features are given in parentheses

Convex part of teleoconch whorl and siphonal canal: ab – abapical (or abapertural); ad – adapical (or adapertural); ADP – adapertural primary cord on the siphonal canal; IP – infrasutural

primary cord on subsutural ramp; P – primary cord; P1 – shoulder cord; P2–P5 – primary cords of the convex part of the teleoconch whorl; s – secondary cord.

Aperture: D1 to D5 – abapical denticles.

Results and Discussion

Molecular phylogeny

Newly obtained sequences were deposited in GenBank and BOLD (Barcode of Life Datasystem) (Table 1).

The phylogenetic analysis supports the recognition of the two genera *Aspella* and *Dermomurex*, which form sister, monophyletic lineages in the phylogenetic tree (Fig. 3). However, while the *Aspella* clade is strongly supported, the bootstrap values of all basal branches in the *Dermomurex* lineage are very low (<66%). This might have arisen from the use of a single mitochondrial gene in the analysis and our results should be verified using a more robust dataset including multiple, independent genes.

All morpho-species represented by more than one individual correspond to distinct lineages, all with strong bootstrap support and generally modest intraspecific genetic divergence (K2P distance <1.6%). Only in *D. lanceolatus* did we recover slightly higher intraspecific genetic distances (K2P distance 1.9–2.3%).

Despite a limited taxonomic sampling, our results indicate that the current subgeneric division in *Dermomurex* is in need of revision. If the monophyly of the subgenus *Takia*, here represented by four species (*D. spinosus*, *D. wareni*, *D. bobyini*, *D. manonae*), is apparently confirmed, the subgenera *Trialatella* and *Dermomurex s.s.* are polyphyletic. *D.* (*Trialatella*) *abyssicolus* is nested within the clade formed by *D. colombi* and *D. alabastrum*, both assigned to the nominate subgenus *Dermomurex*, while the other three *Trialatella* species (*D. boucheti*, *D. neglectus*, *D. oxum*) belong to a distinct lineage together with *D.* (*Dermomurex*) *lanceolatus*. The value of the morphological characters used to differentiate the two subgenera have been questioned before (*e.g.* Merle *et al*., 2011; Houart, 2015; Garrigues & Lamy, 2017) and based on our results, we concur that *Trialatella* should be synonymized with *Dermomurex*.

One of the two new species described here, *D. paulinae*, is recovered as a basal lineage, sister to all other species in the genus. However, the bootstrap support of all basal nodes within the *Dermomurex* lineage are extremely low (25%), making the position of *D. paulinae* highly uncertain. Although the shell morphology supports its inclusion in the subgenus *Dermomurex* (see below), our results should be confirmed using multiple markers and a more inclusive sampling.

Taxonomy

Family Muricidae Rafinesque, 1815
Subfamily Aspellinae Keen, 1971
Genus *Dermomurex* Monterosato, 1890
Subgenus *Takia* Kuroda, 1953

Type species by original designation: *Murex inermis* Sowerby II, 1841 (not *M. inermis* Philippi, 1836) = *Dermomurex infrons* Vokes, 1974.

Remarks

Kuroda (1953: 190) established the monotypical genus *Takia* with *Murex inermis* Sowerby II, 1841 from Japan designated as the type species. Vokes (1974: 2) placed *Takia* as a subgenus of *Dermomurex* and provided a new name, *Dermomurex* (*Takia*) *infrons nom. nov*., for the type species, as *M. inermis* Sowerby II, 1841 is a primary junior homonym of *M. inermis* Philippi, 1836.

Table 1. Specimens used in the molecular phylogenetic analysis.

Taxon	Voucher N.	Expedition	Station	Genbank	BOLD ID
Aspella mauritiana Radwin & D'Attilio, 1976	MNHN-IM-2013-49130	Walters Shoal MD208	WB05	MN520809	MUBA891-19
Aspella mauritiana Radwin & D'Attilio, 1976	MNHN-IM-2013-49131	Walters Shoal MD208	WB05	MN520799	MUBA890-19
Aspella mauritiana Radwin & D'Attilio, 1976	MNHN-IM-2013-66420	Walters Shoal MD208	WB05	MN520776	MUBA887-19
Aspella mauritiana Radwin & D'Attilio, 1976	MNHN-IM-2013-66429	Walters Shoal MD208	WB10	MN520783	MUBA888-19
Aspella mauritiana Radwin & D'Attilio, 1976	MNHN-IM-2013-66433	Walters Shoal MD208	WS03	MN520837	MUBA889-19
Aspella media Houart, 1987	MNHN-IM-2009-4893	SANTO 2006	NR04	MN520787	MPOM054-10
Aspella producta (Pease, 1861)	MNHN-IM-2009-14261	ATIMO VATAE	TB02-TB03	MN520807	MUBA350-15
Aspella producta (Pease, 1861)	MNHN-IM-2009-22475	ATIMO VATAE	TB02-TB03	MN520798	MUBA333-15
Aspella producta (Pease, 1861)	MNHN-IM-2009-22498	ATIMO VATAE	TA47	MN520820	MUBA430-15
Aspella producta (Pease, 1861)	MNHN-IM-2009-22499	ATIMO VATAE	TA41	MN520806	MUBA431-15
Aspella producta (Pease, 1861)	MNHN-IM-2009-27460	INHACA 2011	MS16	MN520823	MUBA586-15
Dermomurex abyssicolus (Crosse, 1865)	MNHN-IM-2013-20249	KARUBENTHOS 2012	GM07	MN520780	MUBA636-15
Dermomurex abyssicolus (Crosse, 1865)	MNHN-IM-2013-20347	KARUBENTHOS 2012	GR12	MN520778	MUBA637-15
Dermomurex abyssicolus (Crosse, 1865)	MNHN-IM-2013-20426	KARUBENTHOS 2012	GM06	MN520786	MUBA638-15
Dermomurex abyssicolus (Crosse, 1865)	MNHN-IM-2013-20574	KARUBENTHOS 2012	GM11	MN520774	MUBA639-15
Dermomurex abyssicolus (Crosse, 1865)	MNHN-IM-2013-20768	KARUBENTHOS 2012	GR12	MN520779	MUBA640-15
Dermomurex abyssicolus (Crosse, 1865)	MNHN-IM-2013-7748	KARUBENTHOS 2012	GB20	MN520794	MUBA602-15
Dermomurex abyssicolus (Crosse, 1865)	MNHN-IM-2013-7876	KARUBENTHOS 2012	GM11	MN520791	MUBA608-15
Dermomurex abyssicolus (Crosse, 1865)	MNHN-IM-2013-7877	KARUBENTHOS 2012	GM11	MN520788	MUBA609-15
Dermomurex abyssicolus (Crosse, 1865)	MNHN-IM-2013-7878	KARUBENTHOS 2012	GM11	MN520777	MUBA610-15
Dermomurex abyssicolus (Crosse, 1865)	MNHN-IM-2013-7939	KARUBENTHOS 2012	GM27	MN520832	MUBA690-15
Dermomurex abyssicolus (Crosse, 1865)	MNHN-IM-2013-8850	KARUBENTHOS 2012	GB28	MN520784	MUBA628-15
Dermomurex abyssicolus (Crosse, 1865)	MNHN-IM-2013-8862	KARUBENTHOS 2012	GD57	MN520840	MUBA630-15
Dermomurex abyssicolus (Crosse, 1865)	MNHN-IM-2013-9055	KARUBENTHOS 2012	GS12	MN520811	MUBA694-15
Dermomurex alabastrum (A. Adams, 1864)	MNHN-IM-2013-20821	KARUBENTHOS 2012	GR19	MN520827	MUBA643-15
Dermomurex alabastrum (A. Adams, 1864)	MNHN-IM-2013-72190	MADIBENTHOS	AR106	MN520839	MUBA876-19
Dermomurex alabastrum (A. Adams, 1864)	MNHN-IM-2013-72460	MADIBENTHOS	AR074	MK308474	MUBA858-18
Dermomurex alabastrum (A. Adams, 1864)	MNHN-IM-2013-8677	KARUBENTHOS 2012	GR55	MN520833	MUBA625-15
Dermomurex bobyini (Kosuge, 1984)	MNHN-IM-2007-36978	MIRIKY	CP3209	MN520805	MUBA011-15
Dermomurex bobyini (Kosuge, 1984)	MNHN-IM-2009-14398	ATIMO VATAE	DW3525	MN520797	MUBA289-15
Dermomurex boucheti Garrigues & Merle, 2014	MNHN-IM-2013-8857	KARUBENTHOS 2012	GD60	KJ591660	BOMGA016-14
Dermomurex colombi Houart, 2006	MNHN-IM-2013-70443	MADIBENTHOS	AB117	MK308440	MUBA823-18
Dermomurex colombi Houart, 2006	MNHN-IM-2013-71965	MADIBENTHOS	AM038	MK308475	MUBA847-18
Dermomurex colombi Houart, 2006	MNHN-IM-2013-71966	MADIBENTHOS	AM038	MK308481	MUBA814-18
Dermomurex colombi Houart, 2006	MNHN-IM-2013-72534	MADIBENTHOS	AS081	MK308471	MUBA871-18
Dermomurex colombi Houart, 2006	MNHN-IM-2013-72605	MADIBENTHOS	AB130	MK308468	MUBA794-18
Dermomurex lanceolatus Garrigues & Lamy, 2019	MNHN-IM-2013-60701	KARUBENTHOS 2	DW4567	MK216529	MUBA748-18
Dermomurex lanceolatus Garrigues & Lamy, 2019	MNHN-IM-2013-70420	MADIBENTHOS	AD218	MK216525	MUBA762-18
Dermomurex lanceolatus Garrigues & Lamy, 2019	MNHN-IM-2013-72491	MADIBENTHOS	AD234	MK216534	MUBA763-18
Dermomurex manonae sp. nov.	MNHN-IM-2009-22795	EXBODI	DW3855	MN520830	MUBA462-15
Dermomurex manonae sp. nov.	MNHN-IM-2009-22797	EXBODI	CP3893	MN520790	MUBA463-15
Dermomurex manonae sp. nov.	MNHN-IM-2009-22800	EXBODI	CP3898	MN520808	MUBA464-15
Dermomurex manonae sp. nov.	MNHN-IM-2009-22801	EXBODI	DW3855	MN520792	MUBA874-19
Dermomurex manonae sp. nov.	MNHN-IM-2009-22803	EXBODI	DW3855	MN520812	MUBA465-15
Dermomurex manonae sp. nov.	MNHN-IM-2009-22804	EXBODI	DW3900	MN520824	MUBA466-15
Dermomurex manonae sp. nov.	MNHN-IM-2009-22805	EXBODI	DW3855	MN520802	MUBA467-15
Dermomurex manonae sp. nov.	MNHN-IM-2009-22806	EXBODI	DW3896	MN520821	MUBA468-15

Table 1. (continued)

Dermomurex manonae sp. nov.	MNHN-IM-2009-22807	EXBODI	DW3896	MN520810	MUBA469-15
Dermomurex manonae sp. nov.	MNHN-IM-2009-22808	EXBODI	DW3900	MN520836	MUBA470-15
Dermomurex manonae sp. nov.	MNHN-IM-2009-22809	EXBODI	DW3896	MN520835	MUBA471-15
Dermomurex manonae sp. nov.	MNHN-IM-2009-22932	EXBODI	DW3896	MN520815	MUBA498-15
Dermomurex manonae sp. nov.	MNHN-IM-2009-22933	EXBODI	DW3896	MN520819	MUBA499-15
Dermomurex manonae sp. nov.	MNHN-IM-2009-22934	EXBODI	DW3896	MN520831	MUBA500-15
Dermomurex manonae sp. nov.	MNHN-IM-2009-22936	EXBODI	DW3900	MN520803	MUBA502-15
Dermomurex manonae sp. nov.	MNHN-IM-2009-4866	CONCALIS	CP2960	MN520796	MPOM036-10
Dermomurex manonae sp. nov.	MNHN-IM-2013-63353	KANACONO	CP4739	MN520829	MUBA881-19
Dermomurex manonae sp. nov.	MNHN-IM-2013-63373	KANACONO	DW4660	MN520795	MUBA882-19
Dermomurex manonae sp. nov. Holotype	MNHN-IM-2013-63386	KANACONO	DW4737	MN520801	MUBA883-19
Dermomurex manonae sp. nov.	MNHN-IM-2013-63389	KANACONO	CP4739	MN520822	MUBA884-19
Dermomurex neglectus (Habe & Kosuge, 1971)	MNHN-IM-2009-4908	PANGLAO 2004	L76-L77	GU575372	MPOM065-10
Dermomurex oxum Petuch, 1979	MNHN-IM-2013-56514	GUYANE 2014	CP4380	MN520789	MUBA875-19
Dermomurex paulinae sp. nov. Holotype 63386	MNHN-IM-2019-1363	KANACONO	DW4734	MN520817	MUBA892-19
Dermomurex spinosus Garrigues & Lamy, 2017	MNHN-IM-2013-60327	KARUBENTHOS 2	DW4538	KY370967	MUBA744-16
Dermomurex spinosus Garrigues & Lamy, 2017	MNHN-IM-2013-60820	KARUBENTHOS 2	DW4577	MF124182	MUBA745-17
Dermomurex wareni Houart, 1990	MNHN-IM-2007-36415	TERRASSES	DW3122	MN520804	MUBA873-19
Dermomurex wareni Houart, 1990	MNHN-IM-2007-36416	TERRASSES	DW3122	MN520826	MUBA733-15
Dermomurex wareni Houart, 1990	MNHN-IM-2009-4575	TERRASSES	CP3115	MN520816	MPOM002-10
Dermomurex wareni Houart, 1990	MNHN-IM-2009-4867	CONCALIS	DW2979	MN520813	MPOM037-10
Dermomurex wareni Houart, 1990	MNHN-IM-2009-4868	CONCALIS	DW2979	MN520781	MPOM038-10
Dermomurex wareni Houart, 1990	MNHN-IM-2009-5031	NORFOLK 2	DW2156	GU575373	MPOM151-10
Dermomurex wareni Houart, 1990	MNHN-IM-2009-5032	NORFOLK 2	DW2156	MN520834	MPOM152-10
Dermomurex wareni Houart, 1990	MNHN-IM-2009-5033	NORFOLK 2	DW2156	MN520825	MPOM153-10
Dermomurex wareni Houart, 1990	MNHN-IM-2009-5035	NORFOLK 2	DW2155	MN520793	MPOM154-10
Dermomurex wareni Houart, 1990	MNHN-IM-2009-5036	NORFOLK 2	DW2155	MN520800	MPOM155-10
Dermomurex wareni Houart, 1990	MNHN-IM-2009-5430	TERRASSES	DW3118	MN520785	NEOGA1019-10
Dermomurex wareni Houart, 1990	MNHN-IM-2013-48624	KANADEEP	DW4975	MN520818	MUBA886-19
Dermomurex wareni Houart, 1990	MNHN-IM-2013-65589	KANADEEP	DW4974	MN520838	MUBA885-19
Dermomurex wareni Houart, 1990	MNHN-IM-2013-68482	KANACONO	DW4661	MN520775	MUBA877-19
Dermomurex wareni Houart, 1990	MNHN-IM-2013-68488	KANACONO	DW4661	MN520814	MUBA878-19
Dermomurex wareni Houart, 1990	MNHN-IM-2013-68489	KANACONO	DW4661	MN520828	MUBA879-19
Dermomurex wareni Houart, 1990	MNHN-IM-2013-68553	KANACONO	CP4662	MN520782	MUBA880-19
Outgroup					
Attiliosa nodulifera (G.B. Sowerby II, 1841)	MNHN-IM-2009-4955	SANTO 2006	EP36	GU575368	
Favartia balteata (Beck, 1841)	MNHN-IM-2009-5021	SANTO 2006	FB90	GU575374	
Favartia jeanae Bertsch & D'Attilio, 1980	MNHN-IM-2009-4929	PANGLAO 2004	L46	GU575375	
Favartia mactanensis (Emerson & D'Attilio, 1979)	MNHN-IM-2009-4931	PANGLAO 2004	P1	GU575376	
Favartia ponderi Myers & D'Attilio, 1976	MNHN-IM-2009-4940	PANGLAO 2004	B20	GU575378	
Favartia rosamiae (D'Attilio & Myers, 1985)	MNHN-IM-2009-5024	SANTO 2006	FB90	GU575379	
Favartia salmonea (Melvill & Standen, 1899)	MNHN-IM-2009-4933	PANGLAO 2004	P1	GU575377	

Vokes (1975: 130, 150, pl. 5, fig. 7) assigned *Aspella myrakeenae* Emerson & D'Attilio, 1970 from West Mexico to *Dermomurex* (*Takia*). Radwin & D'Attilio (1976: 16, 109) used *Takia* at the genus level, but retained it as monotypical, referring *Aspella myrakeenae* to *Dermomurex s.s.* Vokes

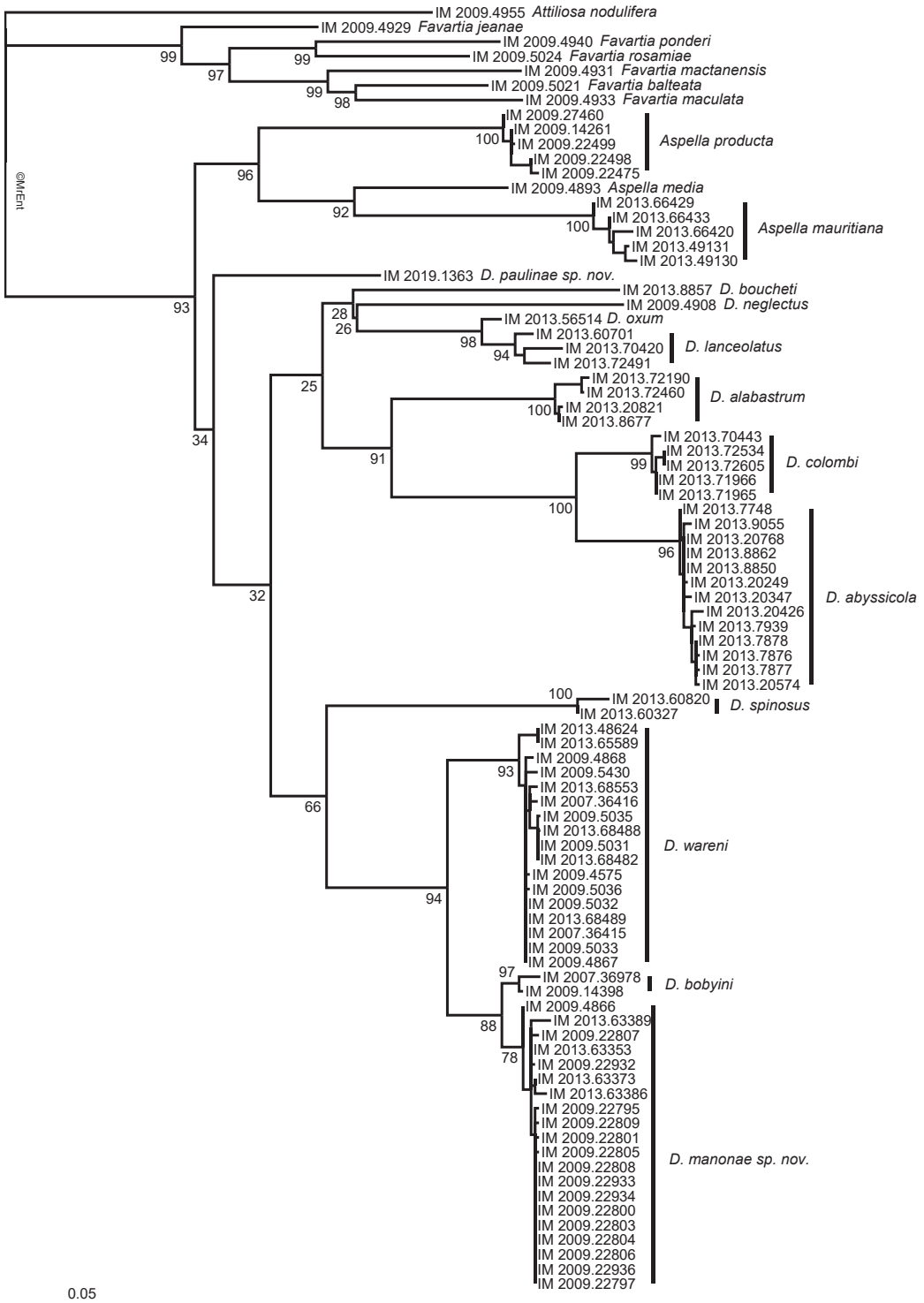

Fig. 3. Maximum likelihood phylogeny of *Dermomurex* included in this paper. Bootstrap values are indicated at all major nodes. For clarity, these are omitted for intraspecific nodes. The tree has been edited in MrEnt v.2.5 (Zuccon & Zuccon, 2014).

(1978) described a new species from South Africa as *Dermomurex* (*Takia*) *africanus*, followed by Kosuge (1984) who described *Takia bobyini* from the Philippines and Houart (1990), in a paper describing new species from New Caledonia, who described *Dermomurex* (*Takia*) *wareni*, bringing the number of species then assigned to *Takia* to four, all from the Indo-West Pacific. Houart (1996) described *Dermomurex* (*Takia*) *gofasi* from the Mid-Atlantic. Merle *et al.* (2011: 214) assigned both *D. myrakeenae* and *D. africanus* Vokes, 1978 to *Dermomurex s.s.* On the other hand, they also assigned the Australian species *D. angustus* (Verco, 1895) (Fig. 6I–K) to *Takia.* The shell of *D. angustus* is fusiform with a narrow, ovate last teleoconch whorl, a narrow inductura and an apertural varix that extends to the tip of short siphonal canal as in *Dermomurex s.s.*

We here reassign *D. angustus* to *Dermomurex s.s.*

Dermomurex (*Takia*) now includes the following six species, including a new one described herein:

Dermomurex (*Takia*) *bobyini* (Kosuge, 1984)*
Dermomurex (*Takia*) *gofasi* Houart, 1996
Dermomurex (*Takia*) *infrons* Vokes, 1974
Dermomurex (*Takia*) *manonae* n. sp.*
Dermomurex (*Takia*) *spinosus* Garrigues & Lamy, 2017*
Dermomurex (*Takia*) *wareni* Houart, 1990*
*Analysed here

Indo-West Pacific Species

Dermomurex (*Takia*) *bobyini* (Kosuge, 1984)
(Figs 6D–E, 7A–N)

Takia bobyini Kosuge, 1984: 144, pl. 50, figs 1–2.
Dermomurex (*Takia*) *bobyini* — Houart, 1994: 35, fig. 105 (holotype); Houart, 2008: 178, pl. 384, figs 6–7; Merle *et al.*, 2011: 594, pl. 175, figs 10–12.
Dermomurex bobyini — Robin, 2008: 260, fig. 3.
Dermomurex (*Takia*) *infrons* — Merle *et al.*, 2011: 592 (in part), pl. 174, figs 11–14 [not *Dermomurex* (*Takia*) *infrons* Vokes, 1974].

Type material: Holotype, IMT 83–16 (Fig. 6D–E).

Type locality: Philippine Islands, Bohol, Panglao, 219 m.

Other material examined: **Madagascar** (new locality). MIRIKY, stn CP3209, between Nosy-bé and Banc du Leven, 12°43´S, 48°14´E, 291–353 m, MNHN-IM-2007-36978, 1 lv sequenced (Fig. 7L–M); stn DW3213, 12°31´S, 47°52´E, 289–262 m, MNHN-IM-2007-36947, 1 lv; stn CP3294, off Baie Nazendry, 14°29´S, 47°27´E, 263–331 m, MNHN-IM-2012-41595, 1 dd. **Southeastern Madagascar**. ATIMO VATAE, stn DW3525, secteur de Manantenina, 24°23´S, 47°32´E, 395–407 m, MNHN-IM-2009-14398, 1 lv sequenced (Fig. 7N). **Philippines**. North Siquijor, 100–120 m, RH, 1 lv; Aliguay, 150–200 m, RH, 1 lv; Balut Island, RH, 1 lv; Mindanao, Balut Island, 250–300 m, RH, 1 lv.

Distribution: Until now only recorded from the Philippines. First record from Madagascar. Living at 100–250 m.

Remarks: See *D.* (*T.*) *infrons* for differences from that species. It also seems that *D. bobyini* grows larger, reaching a length of 48 mm compared to *D. infrons*, which reaches a maximum length of 35 mm.

The shell morphology and the intritacalx structure is similar in both the Philippines and Madagascar specimens. However, a genetic analysis of specimens from the Philippines would be

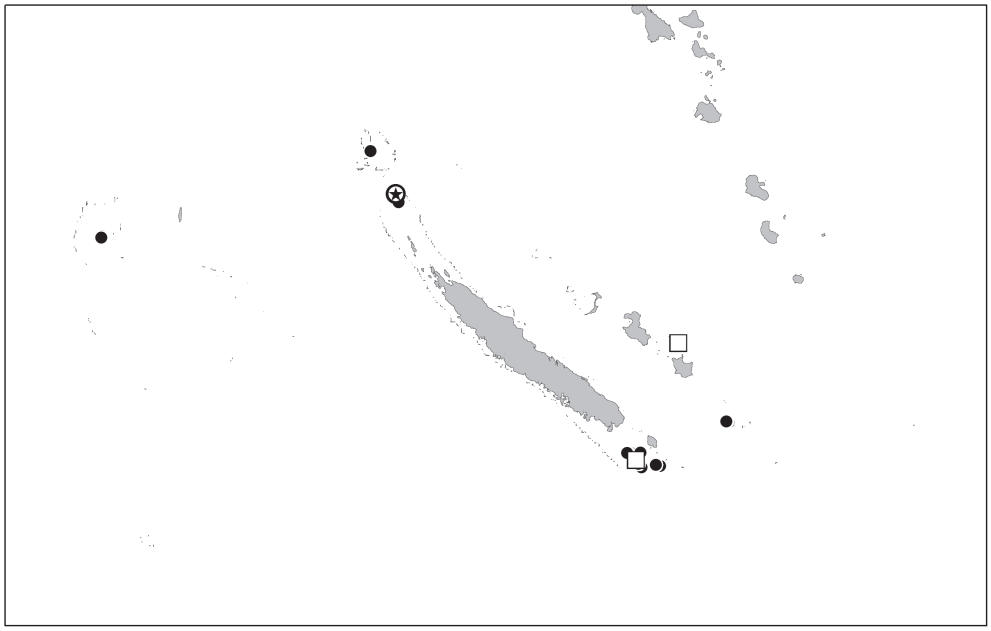

Fig. 4. Distribution of *Dermomurex* (*Takia*) *wareni* Houart, 1990; star, type locality; square, syntopy with *D.* (*T.*) *manonae* n. sp.

useful to ensure that both populations belong to the same species.

***Dermomurex* (*Takia*) *infrons* Vokes, 1974**
(Figs 6F–H, 8A–M)

Murex inermis Sowerby II, 1841a in 1834–1841: pl. 192, fig. 87; 1841b: 146 (not Philippi, 1836).
Takia inermis — Kira, 1954: 48, pl. 24, fig. 3; Kira, 1959: 60, pl. 24, fig. 3; Kuroda, Habe & Oyama, 1971: 234 (Japanese), 153 (English), pl. 43, fig. 15; Okutani, 1983: 8, pl. 25, fig. 2.
Dermomurex (*Takia*) *infrons* Vokes, 1974: 2, new name for *Murex inermis* Sowerby, 1841 (not Philippi, 1836).
Takia infrons — Radwin & D'Attilio, 1976: 109, pl. 1, figs 30–31; Kaicher, 1979: card 2013.
Dermomurex (*Takia*) *infrons* — Fair, 1976: 50, text-fig. 30; Houart, 1990: figs 5–6; Houart, 1997: 290; Tsuchiya, 2000: 375, pl. 186, fig. 52; Hasegawa, 2006: 253; Houart & Tröndlé, 2008: 62, figs 49–50; Merle *et al.*, 2011 (part): pl. 174, figs 5–7 (only); Tsuchiya, 2017: 951, pl. 244, fig. 3.
NOT *Dermomurex* (*Takia*) *infrons* — Merle *et al.*, 2011 (part): 219, fig. A (only); pl. 174, figs 8–10 [= *D.* (*T.*) *manonae* n. sp.].
NOT *Dermomurex* (*Takia*) *infrons* — Merle *et al.*, 2011 (part): 219, figs B–C (only); pl. 174, figs 11–14 [= *D.* (*T.*) *bobyini* (Kosuge, 1984)].

Type material: Syntype of *Murex inermis*, NHMUK 1984121 (Fig. 6F–G).
Type locality: "ad mare Japonicum".
Other material examined: **South Africa**. Transkei, off Stony Point, 32°36′S, 28°42′E, 95 m, NM C4482, 1 lv (Fig. 6H); Transkei, off Sandy Point, 32°40′S, 28°40′E, 94 m, NM C4027, 1 dd; East Cape, off Kidd's Beach, 33°15′S, 27°58′E, 85 m, NM B8507, 1 dd. **Indonesia**. KARUBAR, Tanimbar Islands, stn DW50, 07°59′S, 133°02′E, 184–186 m, MNHN, 1 lv; Tanimbar Islands, stn

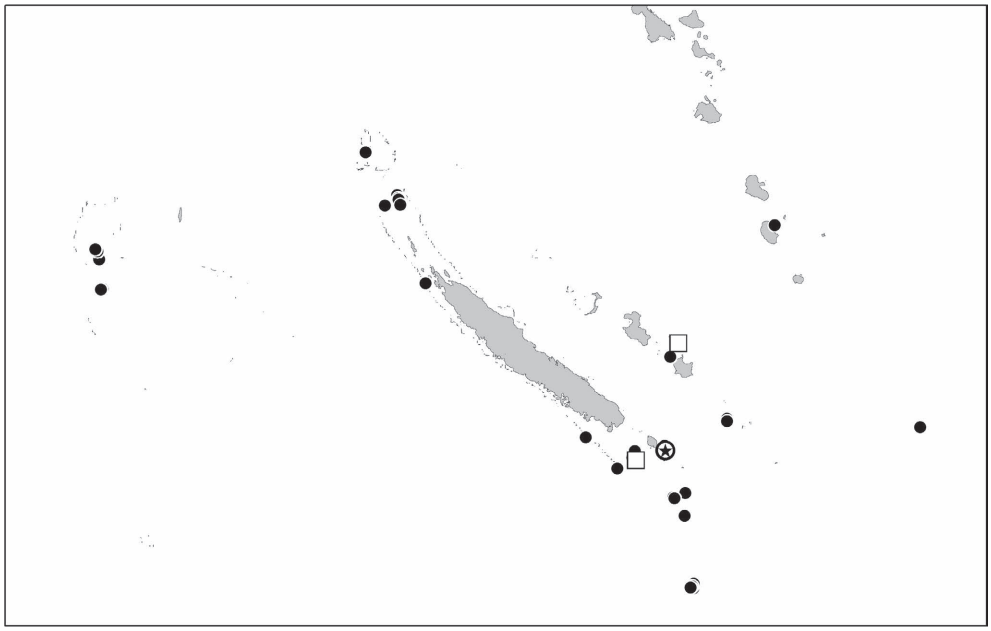

Fig. 5. Distribution of *Dermomurex* (*Takia*) *manonae* n. sp.; star, type locality; square, syntopy with *D.* (*T.*) *wareni* Houart, 1990.

DW49, 08°00´S, 132°59´E, 206–210 m, MNHN, 1 lv. **Taiwan**. TAIWAN 2000, stn DW34, Bashi channel, 22°02´N, 120°36´E, 246 m, MNHN, 5 dd; stn CP35, Bashi channel, 22°02´N, 120°27´E, 246 m, MNHN, 2 lv, 1 dd (Fig. 8C–H); stn DW36, Bashi channel, 21°55´N, 120°36´E, 305 m, MNHN, 1 dd; TAIWAN 2002, stn CP162, SW coast of Taiwan, 22°10´N, 120°38´E, 190–200 m, MNHN-IM-2010-6284, 1 dd; TAIWAN 2004, stn CP270, NE coast of Taiwan, off Suao, 24°32´N, 122°01´E, 340–407 m, MNHN-IM-2010-6285, 1 dd. **East China Sea**. 240 m (Fig. 8I–K), RH, 1 dd; 280 m, RH, 1 lv. **Japan**. Kochi Prefecture, Shikoku, Tosa Bay, NSMT, 2 lv; Sagami Bay, NSMT, 2 lv; Kochi Prefecture, NSMT-Mo 54083 (Fig. 8A–B). **Austral Archipelago**. BENTHAUS, stn CAS2008, 22°27´S, 151°19´W, 280–300 m, MNHN-IM-2008-2885, 1 lv (Fig. 8L–M).

Distribution: South Africa, Indonesia, Taiwan, East China Sea, Japan and Austral Archipelago, living at 95–395 m.

Remarks: *Dermomurex* (*Takia*) *infrons* was confused with *D.* (*T.*) *bobyini* by Merle *et al.* (2011). However, the shell of *D. infrons* is less shouldered with a narrower subsutural area. It is more rounded as opposed to the angulate *D. infrons*. *D. infrons* also has weakly broader axial varices, already present on early teleoconch whorls and the siphonal canal is usually shorter in comparison to total shell length, 25–29% in *D. infrons*, 29–37% in *D. bobyini.*

The intritacalx is also different, being dirty white, thicker and smoother, only sculptured by very weak spiral grooves (Fig. 8F–G) in *D. infrons*, covered by a thin, light brown periostracum, as opposed to a thinner, white intritacalx in *D. bobyini*, with numerous, crowded, strong spiral grooves (Fig. 7F–G).

Dermomurex* (*Takia) manonae n. sp.
(Figs 5, 9A–N)

Dermomurex (*Takia*) *infrons* — Houart, 1986: 430, pl. 3, fig. 12; Merle *et al.*, 2011 (part): 592, pl. 174, figs 8–10 (only) [not *Dermomurex* (*Takia*) *infrons* Vokes, 1974].

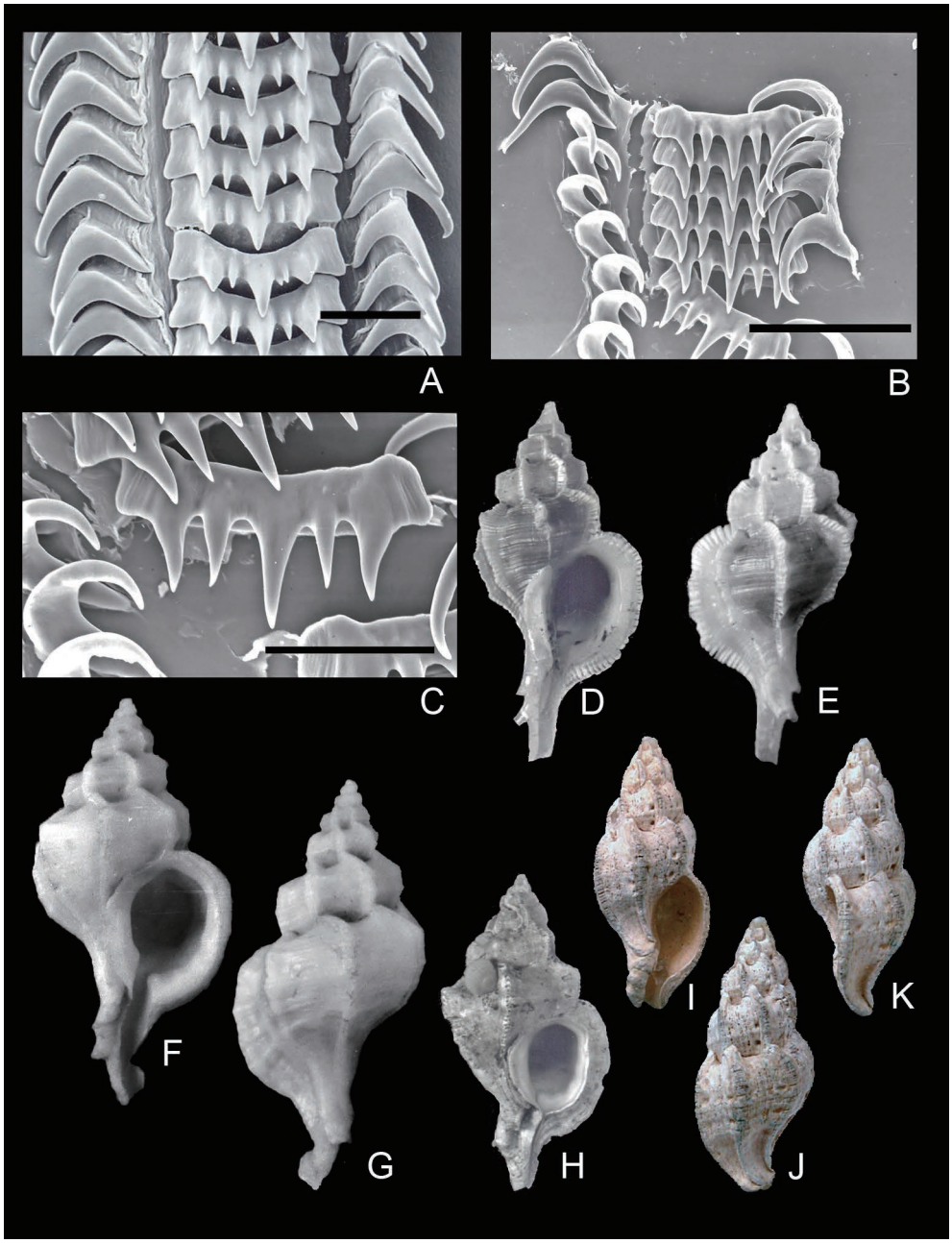

Fig. 6. A. Radula of *Dermomurex* (*Dermomurex*) *africanus* Vokes, 1978, South Africa, Transkei, RH (scale 50 µm). **B–C**. Radula of *Dermomurex* (*Takia*) *wareni* Houart, 1990, New Caledonia, MUSORSTOM 6, stn DW230 (scale B: 100 µm; C: 50 µm). **D–E**. *Dermomurex* (*Takia*) *bobyini* Kosuge, 1984, holotype, Philippine Islands, Bohol, Panglao, 219 m, IMT 83-16, 22.1 mm. **F–H**. *Dermomurex* (*Takia*) *infrons* Vokes, 1974; F–G, syntype of *Murex inermis* Sowerby II, 1841, "ad mare Japonicum", NHMUK 1984121, 25 mm; H, South Africa, Transkei, off Stony Point, NM C4482, 19.5 mm. **I–K**. *Dermomurex* (*Dermomurex*) *angustus* (Verco, 1895), syntype, St Vincent Gulf, South Australia, SAMA D13482, photos courtesy Shirley Sorokin (SAMA).

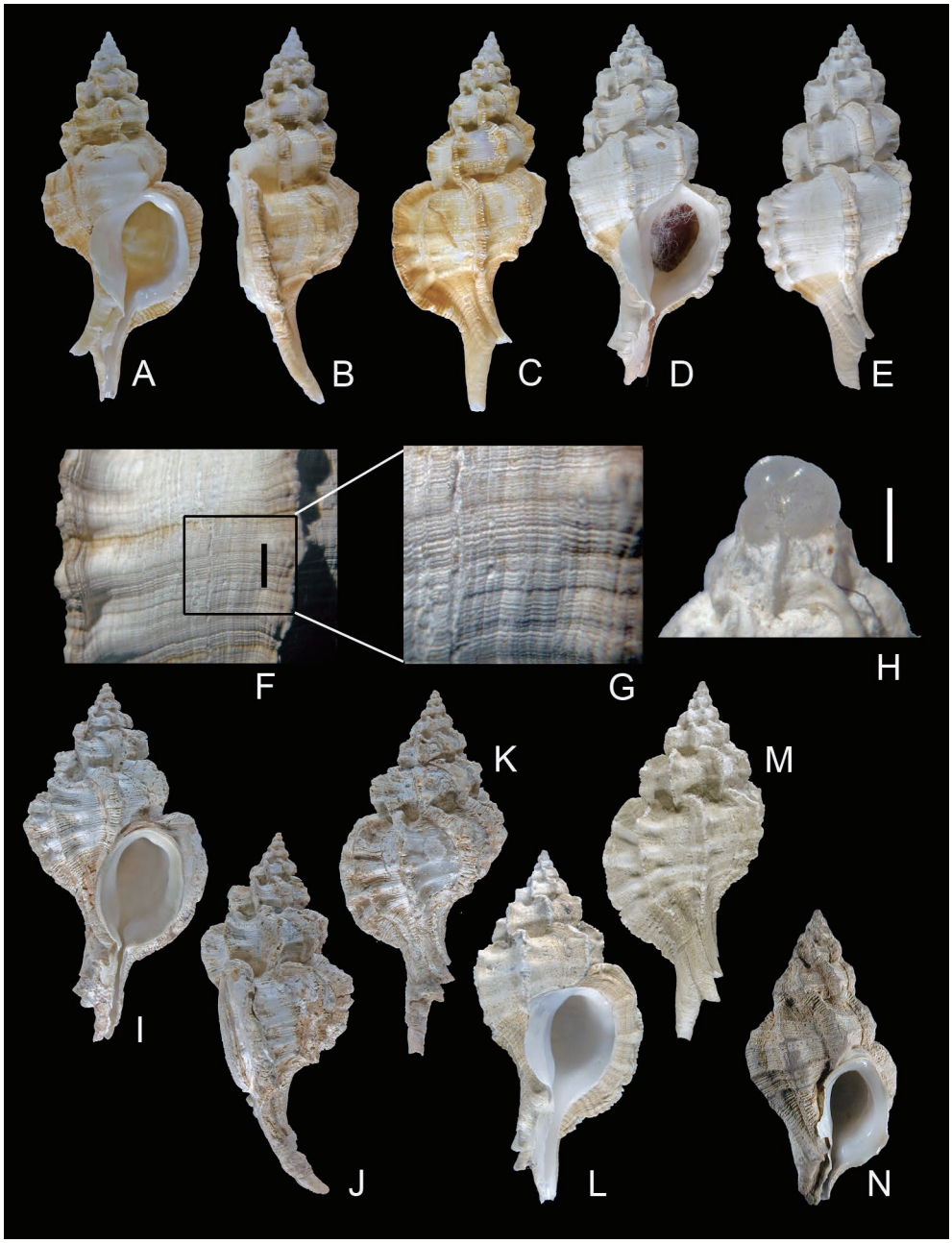

Fig. 7. *Dermomurex* (*Takia*) *bobyini* Kosuge, 1984. **A–C**. Philippines, Balut I., RH, 43.5 mm. **D–H**. Philippines, Balut I., Mindanao, 250–300 m, RH, 35.8 mm; F–G, intritacalx (scale 1 mm); H, protoconch (scale 500 µm). **I–K**. Philippines, North Siquijor, 100–120 m, RH, 43.3 mm. **L–M**. MIRIKY, stn CP3209, between Nosy-Bé and Banc du Leven, 12°43'S, 48°14'E, 291–353 m, MNHN-IM-2007-36978, 30.8 mm. **N**. ATIMO VATAE, stn DW3525, Madagascar, sector of Manantenina, 24°23´S, 47°32´E, 395–407 m, MNHN-IM-2009-14398, 34.7 mm.

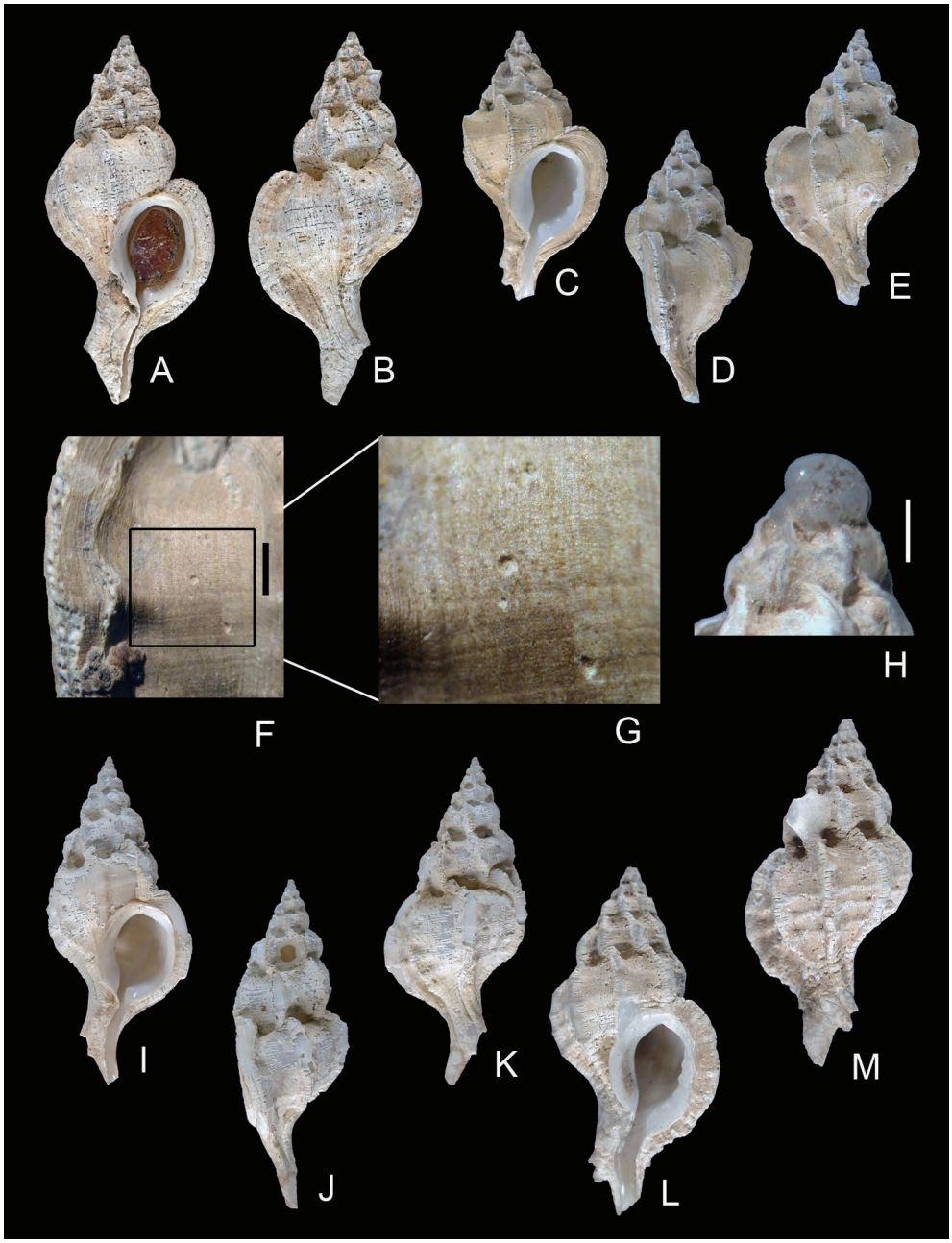

Fig. 8. *Dermomurex* (*Takia*) *infrons* Vokes, 1974. **A–B**. Japan, Kochi Prefecture, NSMT-Mo 54083, 33 mm (photo courtesy K. Hasegawa, NSMT). **C–H**. TAIWAN 2000, stn CP35, Taiwan, Bashi channel, 22°02´N, 120°27´E, 246 m, MNHN, 19.1 mm; F–G, intritacalx (scale 1 mm); H, protoconch (scale 500 µm). **I–K**. East China Sea, 240 m, RH, 30.4 mm. **L–M**. BENTHAUS, Austral Archipelago, stn CA2008, 22°28´S, 151°19´W, 280–300 m, MNHN, 23.1 mm.

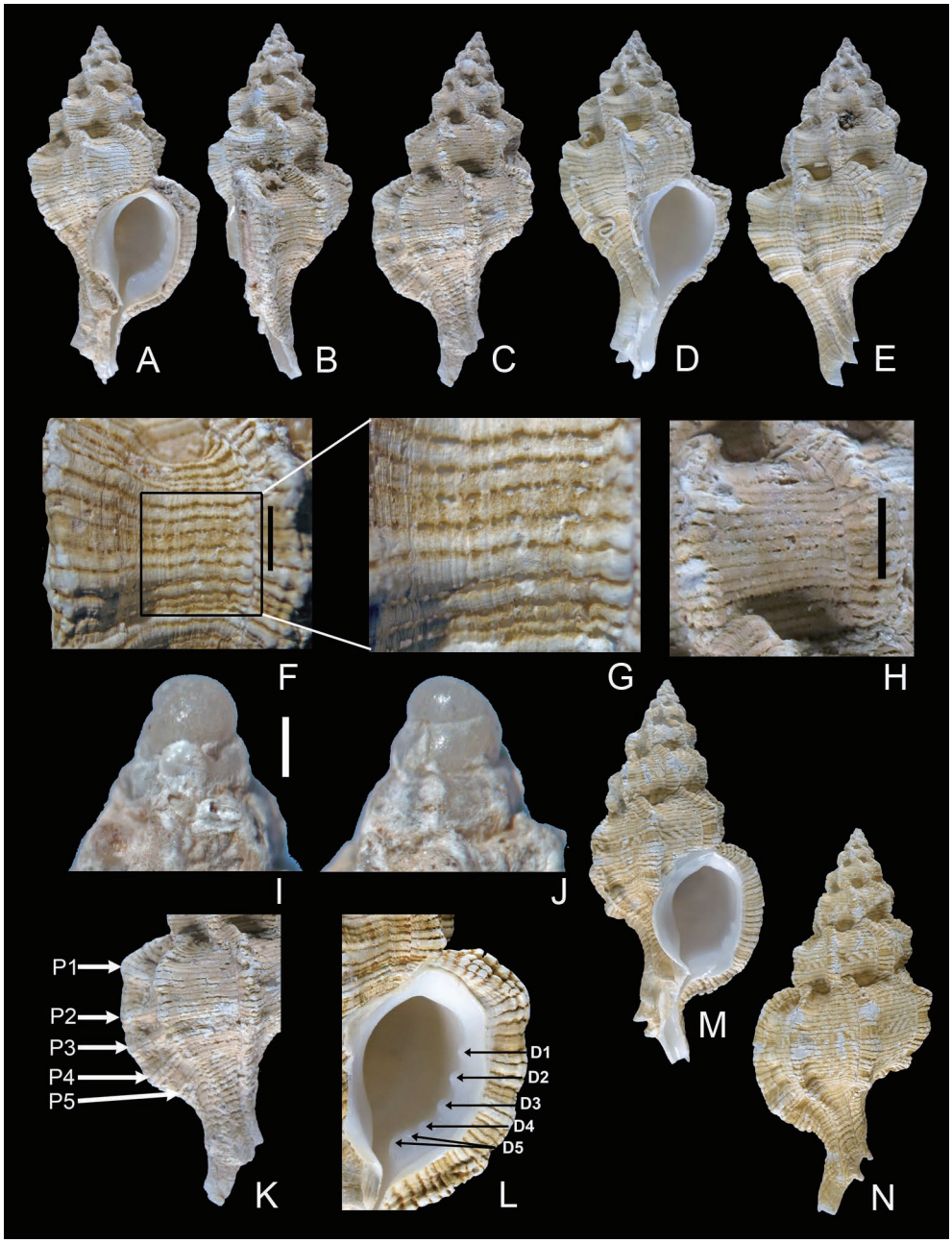

Fig. 9. *Dermomurex* (*Takia*) *manonae* n. sp. **A–C**, **H**, **K**. Holotype, KANACONO, stn DW4737, New Caledonia, 22°45´S, 167°42´E, 387–456 m, MNHN-IM-2013-63386, 37.3 mm; H, periostracum (scale bar 2 mm); K, spiral cord morphology. **D–E**. Paratype, KANACONO, stn DW4660, New Caledonia, 22°45´S, 167°13´E, 405–400 m, MNHN-IM-2013-63373, 32.2 mm. **F–G**. Paratype, New Caledonia, KANACONO, stn CP4739, 22°41´S, 167°41´E, 393–358 m, MNHN-IM-2013-63389, intritacalx (scale bar 2 mm). **I–J**. MUSORSTOM 6, stn DW478, New Caledonia, Royalty Ridge, 21°09´S, 167°54´E, 400 m, MNHN-IM-2000-34796, protoconch (scale bar 500 µm). **L**. Paratype, KANACONO, stn CP4739, New Caledonia, 22°41´S, 167°41´E, 393–358 m, MNHN-IM-2013-63353, apertural denticles morphology. **M–N**. Paratype, NORFOLK 1, stn CP1683, Norfolk Ridge, Banc Kaimon-Maru, 24°43´S, 168°08´E, 248–272 m, MNHN-IM-2000-34799, 43.8 mm.

Type material: Holotype, MNHN-IM-2013-63386, **New Caledonia**, KANACONO, stn DW4737, 22°45′S, 167°42′E, 387–456 m, (BOLD MUBA883-19; GenBank MN520801), lv, (Fig. 9A–C, H, K). Paratypes. **New Caledonia**, KANACONO, stn DW4660, 22°45′S, 167°13′E, 400–405 m, MNHN-IM-2013-63373 (BOLD MUBA882-19; GenBank MN520795), 1 lv (Fig. 9D–E); stn DW4737, 22°45′S, 167°42′E, 387–456 m, MNHN-IM-2000-34795, 1 lv, 1 dd; stn CP4739, 22°41′S, 167°41′E, 358–393 m, MNHN-IM-2013-63353 (BOLD MUBA881-19; GenBank MN520829) and MNHN-IM-2013-63389 (BOLD MUBA884-19; GenBank MN520822), 2 lv (Fig. 9F–G, L); MUSORSTOM 6, stn DW478, 21°09′S, 167°54′E, 400 m, MNHN-IM-2000-34796 (syntopic with *D.* (*T.*) *wareni*), 1 lv (Fig. 9 I–J); SMIB 4, stn DW43, 24°47′S, 168°09′E, 235–245 m, MNHN-IM-2000-34797, 1 lv; NORFOLK 1, stn CP1682, 24°43′S, 168°10′E, 331–379 m, MNHN-IM-2000-34798, 1 lv; stn CP1683, 24°43′S, 168°08′E, 248–272 m, MNHN-IM-2000-34799, 1 lv (Fig. 9M–N), RH, 1 lv; NORFOLK 2, stn DW2091, 24°45′S, 168°06′E, 600–896 m, MNHN-IM-2010-6293, 1 lv; EXBODI, stn DW3855, 22°19′S, 168°41′E, 340–345 m, MNHN-IM-2012-20933, 6 dd.

Type locality: New Caledonia, 22°45′S, 167°42′E, lv, 387–456 m.

Other material examined **(all MNHN)**: **New Caledonia**. *VAUBAN* 1978-79, stn DW33, 22°33′S, 166°25′E, 290–350 m, 1 lv. SMIB 2, stn DW8, 22°54′S, 167°13′E, 435–447 m, 1 lv (sympatric with *D.* (*T.*) *wareni*). MUSORSTOM 5, stn DW339, 19°53′S, 158°38′E, 380–395 m, 1 lv; stn DC378, 19°54′S, 158°38′E, 355 m, 1 lv. MUSORSTOM 6, stn DW472, 21°09′S, 167°55′E, 300 m, 1 dd; stn DW478, 21°09′S, 167°54′E, 400 m, 1 lv (syntopic with *D.* (*T.*) *wareni*); stn DW482, 21°21′S, 167°47′E, 375 m, 1 lv. SMIB 4, stn DW44, 24°46′S, 168°08′E, 270–300 m, 1 lv. SMIB 5, stn DW87, 22°19′S, 168°41′E, 370 m, 1 lv; stn DW94, 22°20′S, 168°43′E, 275 m, 1 lv. SMIB 6, stn DW119, 18°59′S, 163°26′E, 295–305 m, 1 dd; stn DW123, 18°57′S, 163°25′E, 330–350 m, 1 lv. SMIB 8, stn DW154, 24°46′S, 168°08′E, 235–252 m, 1 dd; stn DW155, 24°46′S, 168°08′E, 257–262 m, 1 dd; stn DW158, 24°47′S, 168°08′E, 262–290 m, 1 dd; stn DW159, 24°46′S, 168°08′E, 241–245 m, 2 lv. BATHUS 3, stn DW827, 23°22′S, 168°01′E, 381–469 m, 1 lv; stn DW838, 23°01′S, 166°56′E, 400–402 m, 1 dd. BATHUS 4, stn DW895, 20°15′S, 163°52′E, 315–350 m, 1 lv; stn DW931, 18°55′S, 163°24′E, 360–377 m, 1 lv; stn CP939, 18°58′S, 163°25′E, 304–320 m, 1 lv; stn DW940, 19°00′S, 163°26′E, 305 m, 2 lv; stn DW942, 19°04′S, 163°27′E, 264–270 m, 1 lv. NORFOLK 1, stn DW1657, 23°28′S, 167°52′E, 305–322 m, 1 dd; stn CP1671, 23°41′S, 168°00′E, 320–397 m, 1 dd; stn DW1679, 24°43′S, 168°10′E, 298–324 m, 2 dd; stn DW1737, 22°52′S, 167°12′E, 343–400 m, 2 lv. NORFOLK 2, stn DW2023, 23°27′S, 167°51′E, 282–297 m, MNHN-IM-2010-6296, 1 dd; stn CP2095, 24°46′S, 168°10′E, 283–310 m, MNHN-IM-2010-6295, 1 dd. EBISCO, stn DW2577, 20°20′S, 158°39′E, 399–602 m, MNHN-IM-2010-6291, 1 lv, 1 dd; stn DW2580, 20°22′S, 158°40′E, 440–448 m, MNHN-IM-2010-6287, 1 dd. CONCALIS, stn CP2960, 19°05′S, 163°13′E, 382–387 m, MNHN-IM-2009-4866, 1 lv; stn DW2979, 18°16′S, 162°54′E, 350 m, MNHN-IM-2009-4867, 1 lv; MNHN-IM-2009-4868, 1 dd. EXBODI, stn DW3855, 22°18′S, 168°41′E, 340–345 m, MNHN-IM-2009-22795, 1 lv; MNHN-IM-2009-22801, 1 lv; MNHN-IM-2009-22803, 1 lv; MNHN-IM-2009-22805, 1 lv; stn DW3896, 22°20′S, 168°40′E, 340–343 m, MNHN-IM-2009-22806, 1 lv; MNHN-IM-2009-22807, 1 lv; MNHN-IM-2009-22809, 1 lv; MNHN-IM-2009-22932, 1 lv; MNHN-IM-2009-22933, 1 lv; MNHN-IM-2009-22934, 1 lv; stn CP3898, 22°25′S, 171°47′E, 786–814 m, MNHN-IM-2009-22797, 1 lv; MNHN-IM-2009-22800, 1 lv; stn DW3900, 22°17′S, 168°41′E, 355–357 m, MNHN-IM-2009-22804, 1 lv; MNHN-IM-2009-22808, 1 lv; MNHN-IM-200922936, 1 lv. KANADEEP, stn DW4974, 19°47′S, 158°36′E, 460–490 m, MNHN-IM-2013-65589, 1 lv; stn DW4975, 19°45′S, 158°35′E, 386–428 m, MNHN-IM-2013-48624, 1 lv. **Vanuatu**. MUSORSTOM 8, stn DW978, 19°23′S, 169°27′E, 408–413 m, 1 lv; stn DW1058, 16°12′S, 167°21′E, 319 m, 1 lv.

Distribution: Southern and northern New Caledonia, extending to the Chesterfield Reefs and Vanuatu, living at 245–786 m (Fig. 5).

Description: Shell large for the subgenus, up to 43.8 mm in length (paratype MNHN-IM-2000-34799) (Fig. 9M–N). Length / width ratio 2.1–2.3. Lanceolate, broadly ovate, angular, nodose, lightly built. Subsutural ramp moderately broad, weakly sloping, weakly convex. Shell dirty white, covered by a thick, light tan intritacalx and a thin, light brown periostracum (Fig. 9H). Intritacalx darker between primary spiral cords, very weakly striate, conforming to shape of covered spiral sculpture (Fig. 9F–G). Aperture glossy white. Spire high with 1.5–1.6 protoconch whorls and teleoconch of up to 7 broadly convex, weakly angular, strongly shouldered nodose whorls. Suture of whorls strongly impressed. Protoconch small, whorls rounded, smooth, maximum width and height 800 µm; terminal lip weakly raised and curved, rounded, opisthocline. Axial sculpture of teleoconch whorls consisting of high, narrow, rounded or weakly angular, nodose varices. First to penultimate whorls with 6 or 7 varices. Last whorl with 6. Spiral sculpture of low, broad, rounded, flat or weakly perceptible primary cords. Entire shell covered with secondary and tertiary rounded cords and additional threads, on crest of and between primary cords. P1–P4 relatively obvious, P5 weakly perceptible. Secondary spiral cords slightly broader on crest than between primary cords. Low, rounded nodes, apparent at intersection of primary cords with axial varices, more obvious on penultimate and last whorls. Aperture roundly ovate. Columellar lip broad, strongly flaring, smooth, occasionally with very low parietal tooth at adapical extremity; rim strongly erect in part, a small portion adherent at adapical extremity. Anal notch shallow, broad. Outer lip narrow, erect, smooth, with 5 denticles of variable dimension within: D1–D5, occasionally split or obsolete (Fig. 9L). Siphonal canal moderately long, broad, weakly dorsally bent, with numerous secondary and tertiary spiral cords; narrowly open ventrally.

Operculum light brown with apical nucleus in lower right. Attached surface with broad callused rim. Radula unknown.

Etymology: Named after Manon Becks, oldest granddaughter of the first author.

Remarks: *Dermomurex* (*Takia*) *bobyini*, a species occurring mainly in the Philippines, is similar in form and length and in having four conspicuous spiral cords forming small knobs at the intersections with the axial varices, but the secondary and tertiary spiral cords in *D.* (*T.*) *manonae* n. sp. are less numerous, broader and flatter. The intritacalx when completely intact is also quite different, being light tan in *D.* (*T.*) *manonae* n. sp. and corresponding to the shell sculpture underlying it (Fig. 9F–G). In *D.* (*T.*) *bobyini*, the intritacalx, when intact, is white, thick, covered by numerous, fine spiral striae and does not correspond to the shell sculpture (Fig. 7F–G) except the weakly higher spiral cords P1–P4. The holotype of *D.* (*T.*) *bobyini* (Fig. 6D–E) has the intritacalx badly worn, leaving only the underlying shell sculpture visible.

Dermomurex (*T.*) *manonae* n. sp. was illustrated by Merle *et al.* (2011: pl. 174, figs 8–10 only) as *D.* (*T.*) *infrons*. *D.* (*T.*) *manonae* differs from *D.* (*T.*) *infrons* in having a different intritacalx morphology. The holotype of *D.* (*T.*) *infrons* is a worn specimen without any trace of intritacalx (Fig. 6F–G). But having examined several examples of that species from Japan, Taiwan, the China Sea and Indonesia which have an identical shell morphology, *i.e.* a broad last teleoconch whorl, rounded axial varices and a roundly ovate, broad aperture, the first author identified those specimens with certainty as *D.* (*T.*) *infrons*.

The holotype of *Murex inermis* [(= *Dermomurex* (*Takia*) *infrons*)] having insufficient intritacalx for comparison, the other specimens were used to compare it with *D.* (*T.*) *manonae*. The intritacalx of *D.* (*T.*) *infrons* consists of a thick, light tan coloured, almost smooth, chalky layer with numerous, discrete spiral striae, covered by a thin, tan periostracum (Fig. 8F–G), very different from that of *D.* (*T.*) *manonae* (see description) (Fig. 9F–G). Moreover, the primary spiral cords in *D.* (*T.*) *manonae* are more conspicuous and the secondary and tertiary cords are broader and less numerous.

Dermomurex (*T.*) *manonae* n. sp. was misidentified or doubtfully identified as *D.* (*T.*) *wareni* by Houart (1990) and in the collections of the MNHN. Yet, despite the morphological similarity, the two species are genetically apart, with *D.* (*T.*) *manonae* actually closer to *D.* (*T.*) *bobyini* than to

D. (*T.*) *wareni*. It is interesting to note the contrast between the limited genetic divergence between *D.* (*T.*) *manonae* and *D.* (*T.*) *bobyini* despite the clear shell differences.

Dermomurex (*T.*) *manonae* further differs from *D.* (*T.*) *wareni* in having four distinct, broad, primary cords on the teleoconch whorls. These cords are strongly longitudinally grooved, forming broad, secondary and tertiary cords on their crest and being more conspicuous on the last whorl. The broad primary cords are only barely or not perceptible in *D.* (*T.*) *wareni* and the secondary and tertiary cords are narrower and flatter. *D.* (*T.*) *manonae* also differs in having more or less strong nodes where the four primary cords cross the axial varices, and in having a more angular shell.

Dermomurex (*Takia*) *manonae* n. sp. is syntopic with *D.* (*T.*) *wareni* at two stations, SMIB 2, stn DW8 and MUSORSTOM 6, stn DW478.

***Dermomurex* (*Takia*) *wareni* Houart, 1990**
(Figs 2, 4, 6B–C, 10A–M)

Dermomurex (*Takia*) *wareni* Houart, 1990: 206, figs 1, 2, 7, 9, 16–17, 20.
Dermomurex (*Takia*) *wareni* — Houart, 1994: 102, fig. 21; Merle *et al.*, 2011: 220, figs 6–9.

Type material: Holotype, MNHN-IM-2000-873 (Fig. 10A–B).

Type locality: New Caledonia, 18°55´S, 163°24´E, 460 m, Grand-Passage [MUSORSTOM 4: stn DW496].

***Other material examined* (all MNHN)**: **New Caledonia**. Programme LAGON, stn DW444, 18°15´S, 162°59´E, 300–350 m, 1 lv. BIOCAL, stn CP45, 22°47´S, 167°15´E, 430–465 m, 1 lv. MUSORSTOM 4, stn DW221, 22°59´S, 167°37´E, 535–560 m, 1 lv; stn DW222, 22°58', 167°33´E, 410–440 m, 1 lv; stn DW229, 22°51´S, 167°13´E, 445–460 m, 1 dd; stn DW230, 22°52´S, 167°12´E, 390–420 m, 1 lv (radula illustrated, Fig. 3B–C). SMIB 1, stn DW2, 22°52´S, 167°13´E, 415 m, 2 lv. SMIB 2, stn DW1, 22°53´S, 167°13´E, 438–444 m, 1 lv; stn DW4, 22°53´S, 167°13´E, 410–417 m, 1 lv; stn DW6, 22°56´S, 167°16´E, 442–460 m, 1 lv; stn DW8, 22°54´S, 167°13´E, 435–447 m, 1 lv (syntopic with *D.* (*T.*) *manonae* n. sp.); stn DW12, 22°53´S, 167°14´E, 445–460 m, 1 lv; stn DW14, 22°53´S, 167°13´E, 405–444 m, 1 lv; stn DW17, 22°55´S, 167°15´E, 428–448 m, 1 lv. SMIB 3, stn DW22, 23°03´S, 167°19´E, 503 m, 1 lv; stn DW25, 22°56´S, 167°16´E, 437 m, 1 lv, 2 dd; stn DW26, 22°55´S, 167°16´E, 450 m, 1 lv; stn DW29, 22°47´S, 167°12´E, 405 m, 4 lv. MUSORSTOM 6, stn DW478, 21°09´S, 167°54´E, 400 m, 1 dd (syntopic with *D.* (*T.*) *manonae* n. sp.). SMIB 5, stn DW93, 22°20´S, 168°42´E, 255 m, 1 lv. SMIB 8, stn DW197, 23°52´S, 168°13´E, 414–436 m, 1 dd; stn DW198, 22°52´S, 168°13´E, 414–430 m, 1 dd; stn DW199, 23°52´S, 167°12´E, 408–410 m, 1 dd. BATHUS 2, stn DW719, 22°48´S, 167°16´E, 444–445 m, 1 lv; stn DW729, 22°52´S, 167°12´E, 400 m, 2 dd. BATHUS 4, stn DW924, 18°55´S, 163°24´E, 344–360 m, 1 lv, 2 dd; stn DW925, 18°55´S, 163°24´E, 370–405 m, 2 lv, 1 dd; stn DW927, 18°56´S, 163°22´E, 444–452 m, 1 dd. NORFOLK 1, stn DW1733, 22°56´S, 167°15´E, 427–433 m, 1 lv; stn DW1734, 22°53´S, 167°12´E, 403–429 m, 2 lv (Fig. 10C–E); stn DW1735, 22°52´S, 167°12´E, 415–445 m, 1 lv; stn DW1736, 22°51´S, 167°12´E, 383–407 m, 3 lv. NORFOLK 2, stn CP2153, 22°47´S, 167°12´E, 395–400 m, MNHN-IM-2010-6294, 1 lv;; stn DW2155, 22°52´S, 167°13´E, 453–455 m, MNHN-IM-2009-5035-36, 2 lv; stn DW2156, 22°54´S, 167°15´E, 468–500 m, MNHN-IM-2009-5031-34, 4 lv; stn DW2156, 22°54´S, 167°15´E, 468–500 m, MNHN-IM-2010-6292, 2 lv. EBISCO, stn DW2607, 19°33´S, 158°40´E, 400–413 m, MNHN-IM-2010-6289, 1 lv; 3 dd; stn DW2610, 19°34´S, 158°41´E, 486–494 m, MNHN-IM-2010-6290, 1 lv, 2 dd; stn DW2612, 19°35´S, 158°41´E, 392 m, MNHN-IM-2010-6288, 2 lv, 2 dd. CONCALIS, stn DW2943, 18°57´S, 163°23´E, 380–430 m, MNHN-IM-2012-9141, 1 dd; stn DW2947, 19°02´S, 163°26´E, 272–284 m, MNHN-IM-2012-9142, 1 dd. TERRASSES, stn CP3115, 22°48´S, 167°15´E, 470 m, MNHN-IM-2009-4575, 1

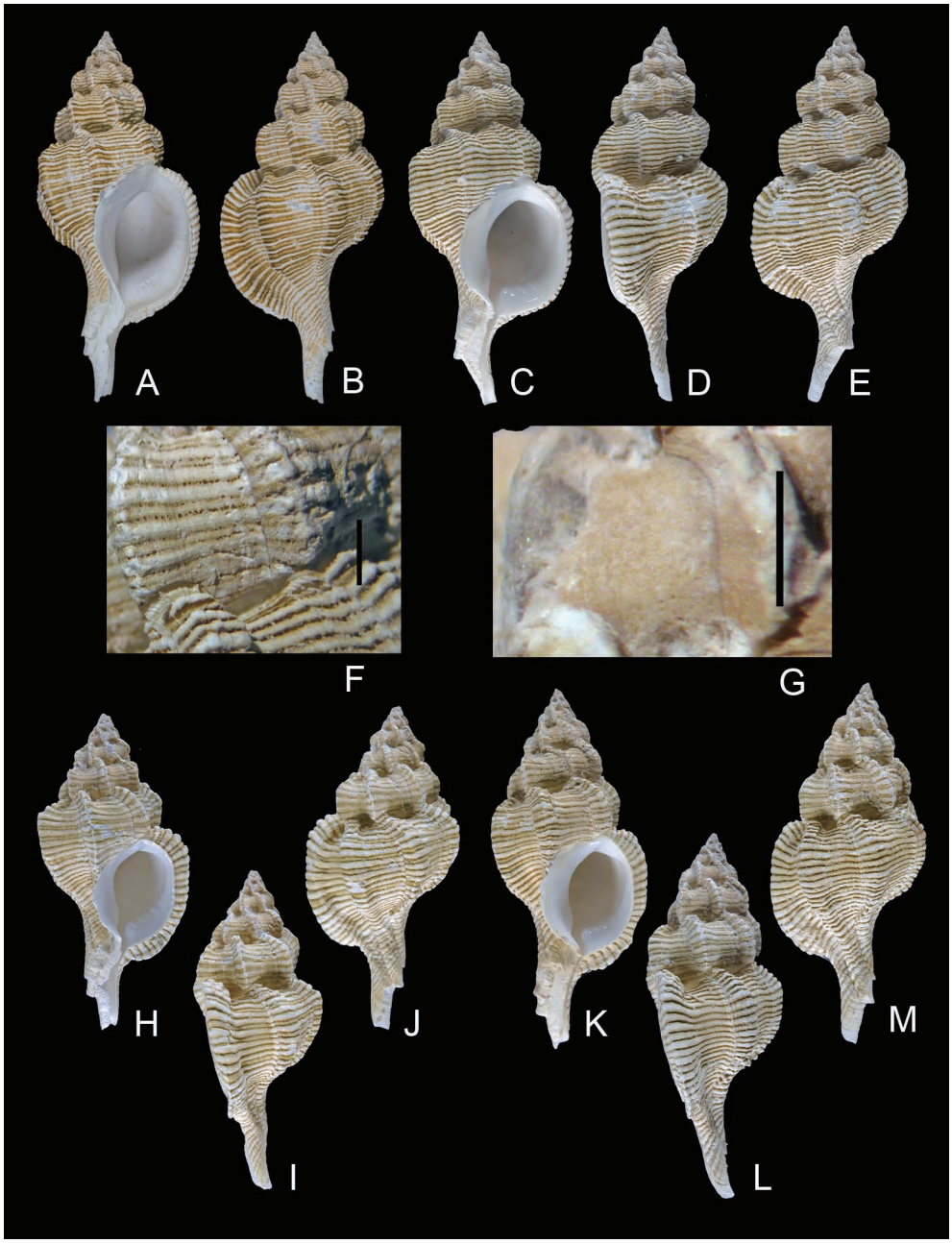

Fig. 10. *Dermomurex* (*Takia*) *wareni* Houart, 1990. **A–B**. Holotype, MUSORSTOM 4, stn DW196, northern New Caledonia, 18°55´S, 163°24´E, 450 m, MNHN-IM-2000-873, 54.5 mm (photo M. Caballer, MNHN). **C–E**, NORFOLK 1, stn DW1734, Southern New Caledonia, 22°53´S, 167°12´E, 403–429 m, MNHN, 56.6 mm. **F–G**, KANACONO, CP4662, New Caledonia, 22°49´S, 167°14´E, 410–440 m, MNHN-IM-2013-68553; F, intritacalx (scale 2 mm); G, periostracum (scale 1 mm). **H–J**. KANACONO, stn DW4661, New Caledonia, 22°48´S, 167°07´E, 405–410 m, MNHN-IM-2013-68489, 29.8 mm. **K–M**. KANACONO, stn CP4662, New Caledonia, 22°49´S, 167°14´E, 410–440 m, MNHN-IM-2013-68553, 35.5 mm.

lv; stn DW3118, 22°51´S, 167°15´E, 500 m, MNHN-IM-2009-5430, 1 lv; stn DW3122, 22°47´S, 167°12´E, 390–410 m, MNHN-IM-2012-9082, 2 lv; MNHN-IM-2007-36415, 1 lv; MNHN-IM-2007-36416, 1 lv; MNHN-IM-2007-36422, 1 lv. EXBODI, stn DW3855, 22°19´S, 168°41´E, 340–345 m, MNHN-IM-2012-41636, 1 lv; stn DW3896, 22°19´S, 168°41´E, 340–343 m, MNHN-IM-2012-20910, 4 dd. KANACONO, stn DW4661, 22°54´S, 167°15´E, 468–500 m, MNHN-IM-2013-68478, MNHN-IM-2013-68482 (BOLD MUBA877-19; GenBank MN520775), MNHN-IM-2013-68488 (BOLD MUBA878-19; GenBank MN520814), MNHN-IM-2013-68489 (Fig. 10H–J) (BOLD MUBA879-19; GenBank MN520828), 4 lv; stn CP4662, 22°49´S, 167°14´E, 410–440 m, MNHN-IM-2013-68553 (Fig. 10F–G, K–M) (BOLD MUBA880-19; GenBank MN520782), 1 lv; stn CP4663, 22°51´S, 167°15´E, 440–482 m, 1 lv; stn DW4697, 22°48´S, 167°15´E, 449–465 m, 1 lv; stn DW4698, 22°47´S, 167°18´E, 460 m, 1 lv; stn DW4719, 22°47´S, 167°05´E, 335–350 m, 1 lv; stn DW4721, 22°54´S, 167°15´E, 473–490 m, 1 lv.

Distribution: Northern and southern New Caledonia, and Coral Sea, living at 255–535 m (Fig. 4).

Remarks: This is the largest known extant species of *Dermomurex* (*Takia*), reaching a length of almost 57 mm (Fig. 10C–E). It was confused with *D.* (*T.*) *manonae* by the first author in the literature and in the collections of MNHN. However genetic studies and some shell characters clearly separate the two species. See under *D.* (*T.*) *manonae* n. sp. for further details.

The radula is typical for the genus with a flattened pentacuspid rachidian tooth bearing a long, narrow central cusp, slightly shorter lateral denticles and lateral cusps. The marginal area is slightly wrinkled but without denticles or marginal cusps (Fig. 6B–C).

Undetermined subgenus
(see Molecular Phylogenys in "Results and Discussion")

Dermomurex* (subgenus?) *paulinae n. sp.
(Fig. 11G–M)

Type material: Holotype, **New Caledonia**, KANACONO, stn DW4734, 22°37´S, 167°36´E, 122–210 m, MNHN-IM-2019-1363, lv (BOLD MUBA892-19; GenBank MN520817). Paratype, **New Caledonia**, KANACONO, stn DW4732, 22°34´S, 167°36´E, 168–194 m, 1 lv MNHN-IM-2000-34800.

Type locality: New Caledonia, Ile des Pins, 22°34´S, 167°36´E, lv, 168–194 m.

Distribution: Southern New Caledonia, west of Ile des Pins, living at 168–210 m.

Description: Shell up to 15.3 mm in length (paratype). Length / width ratio 1.8. Biconical, broadly-ovate, heavy, weakly nodose. Subsutural ramp narrow, weakly sloping, weakly convex. Shell uniformly white. Intritacalx light beige with shallow spiral striae crossed with few, shallower axial striae. Aperture glossy white. Spire high. Teleoconch of up to 6 broad, convex, weakly shouldered whorls. Suture of whorls impressed. Paucispiral protoconch partially broken in the paratype. Protoconch whorls rounded, smooth, maximum width 800 µm, terminal lip narrow, rounded, weakly erect, opisthocline. Axial sculpture of teleoconch whorls consisting of 6 moderately high, strong, narrow, rounded varices from first to last whorl. Spiral sculpture of rounded, narrow or moderately broad primary cords and a single secondary cord, only obvious on last teleoconch whorl, consisting of IP, P1–P5, s5, ADP; P4 broadest. Additional spiral sculpture consisting of some weak, low spiral threads of various strengths, between and on crests of primary spiral cords. Aperture broad, roundly-ovate. Columellar lip moderately broad, flaring, smooth, partially erect, a small portion adherent at adapical extremity. Anal notch shallow, broad. Outer lip narrow, weakly erect, smooth. Paratype with five, very weak low denticles within, consisting of D1–D5. Siphonal canal short, broad, strongly dorsally recurved, ventrally open, with low ADP.

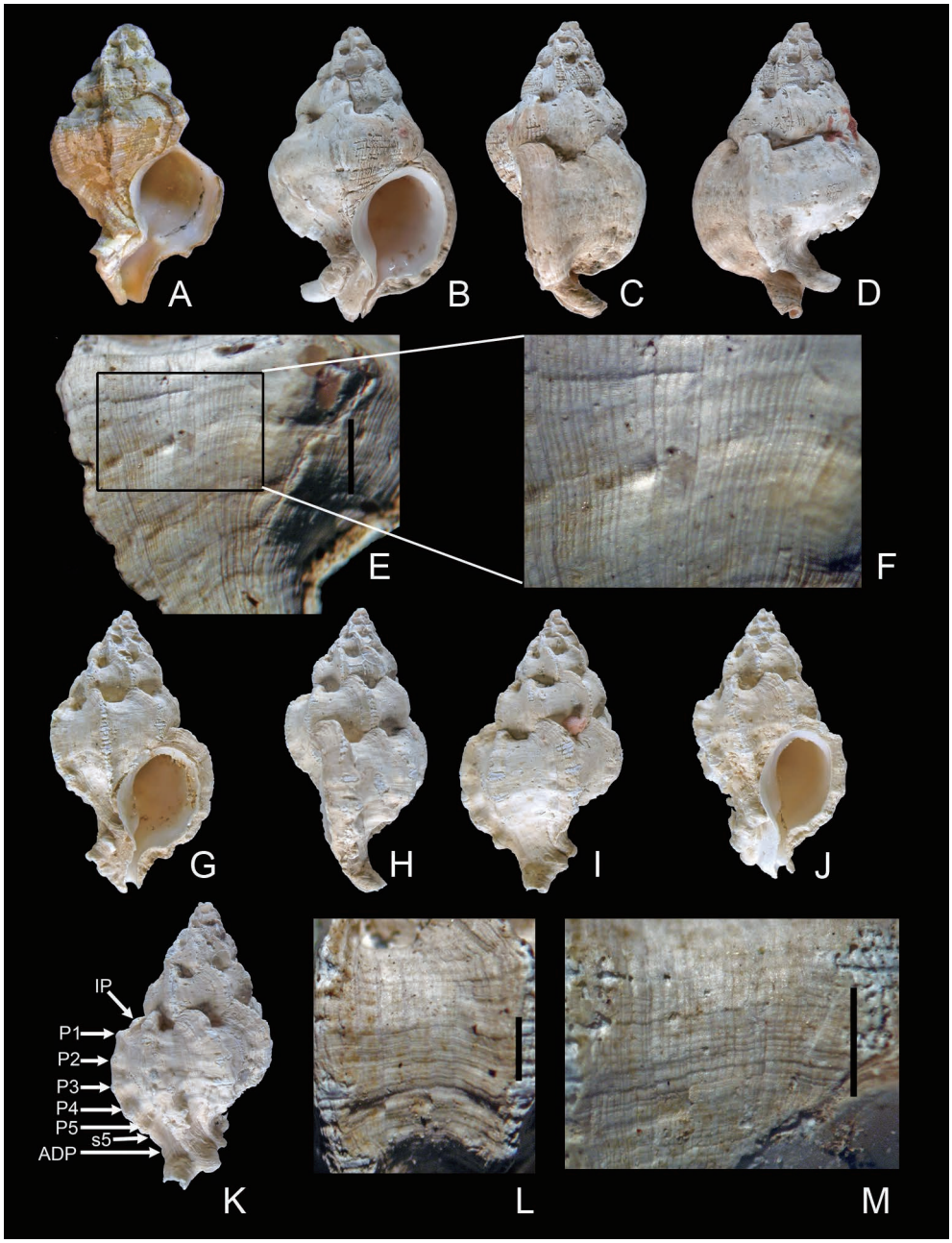

Fig. 11. A–F. *Dermomurex* (*Dermomurex*) *africanus* Vokes, 1978; A, holotype, off Zululand, northern South Africa, NM A246/T2140, 14.5 mm (photo Igor Muratov, NM); B–D, South Africa, Transkei, Coffee Bay, 25 m, RH, 16.8 mm; E–F, Intritacalx, South Africa, Natal, Richards Bay, RH (scale 1 mm). **G–M**. *Dermomurex* (*subgenus* ?) *paulinae* n. sp.; G–I, paratype, KANACONO, stn DW4732, New Caledonia, 22°34´S, 167°36´E, 194–168 m, MNHN-IM-2000-34800, 15.3 mm; J–K, holotype, KANACONO, stn DW4734, New Caledonia, 22°37´S, 167°36´E, 133–122 m, MNHN-IM-2019-1363, 14.0 mm (K: spiral cord morphology); L–M, paratype, intritacalx, MNHN-IM-2000-34800 (scale 1 mm).

Operculum and radula unknown.

Etymology: Named after Pauline Becks, youngest granddaughter of the first author.

Remark: *Dermomurex* (subgenus?) *paulinae* n. sp. strongly differs from most other Indo-West Pacific species in having a broader shell with a broader aperture and a short siphonal canal. *D.* (*Dermomurex*) *africanus* (Fig. 11A–F) resembles *D. paulinae* n. sp. in having a broad, small shell with a short siphonal canal, but *D.* (*D.*) *africanus* differs in having a more angular shell, a broader last teleoconch whorl, a broader, more strongly sloping subsutural ramp, and an obvious, broad P1 spiral cord and broader P2–P4 cords compared to the narrower P1–P5 cords in *D. paulinae* n. sp. The intritacalx clearly separates these two species, being minutely axially striate in *D.* (*D.*) *africanus* (Fig. 11E–F) while predominantly spirally striate in *D. paulinae* n. sp. (Fig. 11L–M) with few additional, shallow, axial striae.

Dermomurex (*Dermomurex*) *africanus* Vokes, 1978
(Figs 6A, 11A–F)

Dermomurex (*Takia*) *africanus* Vokes, 1978: 402, pl. 6, fig. 8.
Dermomurex africanus — Kaicher, 1979: card 2044.
Dermomurex (*Takia*) *africanus* — Houart, 1994: 28; Houart *et al.*, 2010: 188, text figs.
Dermomurex (*Dermomurex*) *africanus* — Merle *et al.*, 2011: 214, 588, pl. 172, figs 15–17.

Type material: Holotype, NM A246/T2140 (Fig. 11A).

Type locality: Off Zululand, northern South Africa (ex pisce).

Other material examined: **South Africa**, Transkei, Coffee Bay, 25 m, RH, 1 lv; Natal, Richards Bay, ex pisce, RH, 1 lv; Natal, Richards Bay, dredged, RH, 1 lv.

Distribution: South Africa, KwaZulu-Natal Province, living at 25 m.

Remarks: *Dermomurex* (*Dermomurex*) *africanus* differs from *Dermomurex* (*Takia*) species to which it was originally assigned in having a smaller shell with a moderately low spire, a broad aperture with a narrow inductura, and a short, strongly backwardly recurved siphonal canal.

The radula is flattened with a rachidian tooth bearing a long, fairly broad central cusp, much shorter and narrower lateral denticles and moderately long, broad, lateral cusps. The marginal area is smooth without denticles or marginal cusps. Lateral denticles are sickle shaped with a broad base (Fig. 6A).

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インド・西太平洋産オシロイツノオリイレ亜属の再検討，および *Dermomurex* 属 2 新種の記載

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要　約

インド・西太平洋産 *Dermomurex*（*Takia*）オシロイツノオリイレ亜属の再検討を行い，ニューカレドニアから 1 新種 *D.*（*D.*）*manonae* n. sp. を記載した。本種は最も近似する *D.*（*T.*）*wareni* Houart, 1990 からは，遺伝的な違いとともに幾つかの貝殻の形態の違いから区別される。他の種とは，殻の形態と殻表の脆弱構造（intritacalx）が異なる。これによりインド・西太平洋から本亜属の種として以下の 4 種が認められることとなった：*D.*（*T.*）*infrons* Vokes, 1974 オシロイツノオリイレ , *D.*（*T.*）*bobyini* Kosuge, 1984, *D.*（*T.*）*wareni* Houart, 1990 ワレンヨウラクおよび *D.*（*D.*）*manonae* n. sp.。ニューカレドニアから今回記載したもう 1 つの新種，*Dermomurex*（subgenus?）*paulinae* n. sp. は同じ *Dermomurex* の未確定の亜属に含まれるものと考えられ，貝殻の形態からは南アフリカ産の *D.*（*D.*）*africanus* Vokes, 1978 に近似するが，脆弱構造の違いなどで区別される。また，今回 *Trialatella* 属は *Dermomurex s.s.* の異名とされた。