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(Gastropoda: Mollusca) 1 2 PHYLOGENETIC
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► **To cite this version:**

Alexander E Fedosov, Gavin Malcolm, Yves Terryn, Juliette Gorson, Maria Vittoria Modica, et al..
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CLASSIFICATION OF TEREBRIDAE. *Journal of Molluscan Studies*, 2019, 85 (4), pp.359-388.
10.1093/mollus/eyz004 . hal-02559725

HAL Id: hal-02559725

<https://hal.science/hal-02559725>

Submitted on 30 Apr 2020

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1 Phylogenetic classification of the family Terebridae (Gastropoda: Mollusca)

2

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22 PHYLOGENETIC CLASSIFICATION OF TEREBRIDAE

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35 The conoidean family Terebridae Mörch, 1852 is an intriguing lineage of marine gastropods that
36 are of considerable interest due to their multifaceted anatomy and complex venoms. Terebrids
37 are abundant easily recognizable and widely distributed in tropical and subtropical waters,
38 however the systematics of this group requires revision.. Here we elaborate the classification of
39 Terebridae based on a recently published molecular phylogeny including 154 species, shell and
40 anterior alimentary system characters. The 407 living species of the family, including 7 species
41 described herein, are assigned to three subfamilies: Pellifroniinae new subfamily, Pervicaciinae
42 Rudman, 1969 and Terebrinae Mörch, 1852. The new subfamily Pellifroniinae includes five
43 deep-water species in two genera *Pellifronia* Terryn & Holford, 2008 and *Bathyterebra* n. gen..
44 Pellifroniinae possess radulae of duplex marginal teeth, well developed proboscis and venom
45 gland, and a very small rhynchodeal introvert. The subfamily Pervicaciinae encompasses ~ 50
46 species in the predominantly Indo-Pacific genera *Duplicaria* Dall, 1908 and *Partecosta* Dance &
47 Earnes, 1966. Pervicaciinae possess salivary glands, a radula of solid recurved marginal teeth
48 and weakly developed rhynchodeal introvert, but lack proboscis and venom gland. The
49 remaining Terebridae species are classified into 15 genera in the subfamily Terebrinae (including
50 four genera described herein); nine genera are defined based on the phylogenetic data, and six –
51 solely on shell morphology.

52 The Indo-Pacific genera *Profunditerebra* n. gen., *Maculauger* n. gen. and *Myurellopsis* n. gen.
53 each include about a dozen species. The first is restricted to the deep waters of the Indo-West
54 Pacific, and the latter two range widely in both geographic and bathymetric distribution. The
55 *Neoterebra* n. gen. encompasses about 65 species from a range of localities in the eastern
56 Pacific, Caribbean and Atlantic, and from varying depths.

57 The highly diversified genera *Terebra* Bruguière, 1789, *Punctoterebra* Bartsch, 1923, *Myurella*
58 Hinds, 1845, and *Duplicaria*, each comprise several morphological clusters. To characterize
59 these genera we propose DNA based diagnoses combined with more informative descriptions in
60 defining most of the supraspecific taxa of Terebridae to provide a comprehensive revision of the
61 group.

62

64 The conoidean family Terebridae, or auger snails, is a diverse lineage of predatory marine
65 gastropods with about 400 currently accepted recent species (Bratcher & Cernohorsky 1987;
66 Taylor 1990; WoRMS 2018). Terebrids are specialized sand and mud dwellers. Although many
67 terebrid species thrive in deep sea in both Pacific and Atlantic, the family reaches its highest
68 diversity in shallow coastal waters of the Indo-West Pacific (Miller 1970; Kantor et al. 2012).
69 The local abundance of Terebridae can be remarkable: in some habitats terebrids by far
70 outnumber other molluscan taxa, and can be collected by hundreds per dive (Kantor et al. 2012).
71 Being locally diverse and abundant, and furthermore easily recognizable among other molluscs
72 due to their elongate, multi-whorled shells, Terebridae is an excellent model taxon for studying
73 patterns of microevolution (Castelin et al., 2012; Holford et al., 2009; Fedosov et al. 2014), or
74 assessing magnitudes of local biodiversity (Kantor et al. 2012; Modica et al. 2014). Furthermore,
75 there is a growing interest in the Terebridae family as similar to cone-snails, terebrids employ
76 complex venoms for hunting that can be investigated to understand venom evolution, function
77 and diversification, and to discover novel potent bioactive compounds (Puillandre & Holford,
78 2010; Imperial et al. 2003, 2007; Kendrel et al. 2013; Gorson et al. 2015; 2016; Verdes et. al.
79 2017).

80 The placement of the Terebridae into Conoidea is widely accepted because of the presence
81 of a toxoglossan envenomation apparatus in most terebrids (Taylor 1990). Affinities with other
82 Conoidea and relationships within Terebridae have been addressed with both, traditional
83 morphological (Rudman 1969; Taylor 1990; Taylor et al. 1993), and molecular phylogenetic
84 approaches (Holford et al. 2009; Puillandre et al. 2011; Castelin et al. 2012). A striking diversity
85 of anterior digestive system anatomies among Terebridae, has led Rudman (1969) to question the
86 monophyly of the family, and establish the family Pervicaciidae mainly for species of the genus
87 *Duplicaria* lacking the venom gland, and possessing an ancestral radula type. The distinctive
88 features of Pervicaciidae were further acknowledged by Taylor (1990), however, its independent
89 origin from the rest of Terebridae was rejected based on an extensive morphological dataset
90 (Taylor et al. 1993). The monophyly of Terebridae, including *Duplicaria* was further confirmed
91 by molecular studies (Holford et al. 2009; Castelin et al. 2012), which recognized *Duplicaria* as
92 one of the early diverging lineages of the family, together with an enigmatic deep-water species
93 '*Terebra*' *jungi* Lai, 2001 (Holford et al. 2009; Castelin et al. 2012). *T. jungi* was subsequently
94 reassigned to a separate genus *Pellifronia* (Holford & Terry, 2008). However, beyond these
95 punctuated revisions, little has been done to reconcile the systematics of Terebridae with the
96 emerging phylogenetic framework of the family.

97 The present day taxonomy of the Terebridae as published in Terry (2007) is largely based
98 on shell characters, and no new genus or family group taxa, except *Pellifronia*, have been
99 proposed since 1969. As taxonomic sampling for phylogenetic analyses of Terebridae improved,
100 culminating in the recently published updated phylogeny of the family (Gorson et al. submitted),
101 the inconsistency between the evolutionary relationships and systematics of the Terebridae has
102 further increased. Given the molecular efforts, it is now clear that the genus level classification
103 of the family needs to be revised because many of the currently recognized genera were found
104 non-monophyletic in prior published phylogenies (Holford et al. 2009; Castelin et al. 2012,
105 Modica et al. 2014, Gorson et al. submitted). Additionally, the growing multidisciplinary interest
106 in the Terebridae warrants a revision of the family.

107 Here we present a revision of the Terebridae classification that is informed by recent
108 terebrid phylogenetic analyses. We describe a new taxonomic arrangement of Terebridae, with
109 most genera defined based on the inferred phylogenetic relationships. As the genus level
110 taxonomy undergoes thorough revision, placement of all known terebrid species have been
111 revisited, and complete species lists are provided for each genus. Transition from the traditional
112 shell-based taxonomy to the new classification, which is based largely on the phylogenetic
113 relationships, posed some methodological issues, in particular in the proposition of informative
114 and useful diagnoses. The observed multiple cases of convergent evolution of shell morphology
115 prompted us to introduce molecular character based diagnoses to the recognized taxa of the
116 Terebridae. Although use of molecular characters to diagnose supraspecific taxa remains
117 uncommon, when the molecular data is decisive it is viewed as a necessary step in transition to
118 new classifications as applied here with the Terebridae.

120 *Rationales for name attribution and ranking of recognized phylogenetic clades*

121 As detailed in Puillandre et al. 2014, transition from the phylogenetic tree to a classification
 122 includes several steps, namely: 1) delineating putative taxa based on the inferred monophyletic
 123 lineages, morphology and phylogeography; 2) attributing names to these groups; and 3) ranking the
 124 recognized taxa. Here we followed the same general strategy, using the recently published updated
 125 phylogeny of the family Terebridae as a source of phylogenetic information (Gorson et al.
 126 submitted). Only well-supported clades in the phylogenetic analysis of (Gorson et al. submitted) are
 127 named. When molecular clades to be named are identified, a name is pinpointed to a molecular
 128 clade primarily based on the inclusion of a type species of a nominative genus in this clade (when
 129 several type species are included, priority is given to the oldest genus name). If no such species is
 130 included, the name is applied based on concordance in morphological characteristics between the
 131 species in a clade and a type species of a nominative genus. If no available names are found for a
 132 molecular clade, a new nominative taxon is proposed. Decisions on naming clades are made aiming
 133 for minimal phenotypical variability in a candidate taxon, but avoiding unnecessary fragmentation
 134 of taxa. We thus followed a conservative approach; for instance, although the names
 135 *Cinguloterebra* Oyama, 1961, *Dimidacus* Iredale, 1929, *Myurellina* Bartsch, 1923 and
 136 *Triplostephanus* Dall, 1908, are available for four well-supported subclades of the Gorson et al.
 137 (submitted) clade C, all the lineages in the clade C are here referred to *Terebra*, a decision
 138 substantiated by the observed homogeneity of anatomy and radular morphology across the clade C
 139 (Gorson et al. submitted) (Fig. 1). On the contrary, six subclades of the major clade E were each
 140 assigned genus rank, leading to naming four new genera, *Profunditerebra* n. gen. (Clade E3),
 141 *Neoterebra* n. gen. (Clade E4), *Maculauger* n. gen. (Clade E5A) and *Myurellopsis* n. gen. (Clade
 142 E5B), in addition to the names *Myurella* applied to the clade E1 and *Punctoterebra* – to the clade
 143 E2. Recognition of six separate genera within this well supported clade is justified by the observed
 144 substantial differences among subclades in foregut anatomy, radular morphology and distribution.

145 Two well-supported lineages of the Gorson et al. (submitted), referred to as F1 and F2 therein, share
 146 the characteristic “*Duplicaria*” arrangement of foregut structures (Fig. 1). However, they are
 147 distinctive in shell size, morphology and distribution. *Duplicaria duplicata* (Linnaeus, 1958), the
 148 type species of the genus, is included in the clade F1, therefore, the name can be allocated to either
 149 the clade F1 or the entire clade F (i.e. F1+F2). As proposing genera recognizable by shell
 150 morphology undoubtedly increases the operational ability of a classification, we allocate the name
 151 *Duplicaria* to the clade F1 of Gorson et al. (submitted) only. The name *Partecosta* Dance & Eames,
 152 1966 is available for the phylogenetic lineage F2, based on the notable resemblance of sequenced
 153 species in this lineage to *Terebra fuscobasis* E. A. Smith, 1877, the type species of *Partecosta*, and
 154 is so applied here. Genetic and anatomical distinctiveness of the Gorson et al. (submitted) clade F in
 155 relation to other studied Terebridae is sufficient, in our opinion, for recognizing it as a subfamily;
 156 the name Pervicaciinae is therefore restored and applied to it. Consequently, the two other main
 157 clades of Terebridae (clade A and the clade comprising the rest of the Terebridae), are also assigned
 158 the subfamily rank: Pellifroniinae n. subfam. for clade A, and Terebrinae for the Terebridae except
 159 clades A and F.

160 The median estimated times of diversification in each of the recognized genera range from 14
 161 million years ago (Mya) (*Maculauger*) to 29 Mya (*Terebra*), which suggests that diversification of

Fig. 1

162 terebrid genera has taken place in Oligocene-Miocene (Gorson et al. submitted). These estimates
163 fall within the range estimated for the most recent common ancestors in other genera of
164 neogastropods in the muricid subfamily Rapaninae (Claremont et al. 2013) and in the family
165 Conidae (Duda & Kohn 2005; Puillandre et al. 2014).

166 *Allocation of species to genus level groups*

167 In identifying the 1400 sequenced specimens analysed in Gorson et al (2018), we found that the
168 species boundaries as predicted by shell morphology in many cases corresponds to complexes of
169 closely related species (Gorson et al. submitted). In most cases, revealed molecular operational
170 taxonomic units (MOTUs) were distinguishable by shell morphology, and in several cases we
171 demonstrate that species previously considered as synonyms actually correspond to distinct species.
172 We thus raised to species level those that we can confidently identify. Phylogenetic analysis of
173 Gorson et al. (submitted) also identified several MOTUs that undoubtedly correspond to
174 undescribed species. Although massive description of new species is not the goal of the present
175 study, those new species that are deemed important for understanding boundaries and identities of
176 the newly introduced genera, are described herein. In only one case were specimens of a currently
177 accepted species found to be junior synonyms of another species. Despite many striking
178 parallelisms in shell morphology uncovered by the phylogenetic analysis (see Discussion), we
179 found that in general species with similar morphology predictably grouped together in distinct
180 clusters within a given clade. This confirmed that shell morphology is an overall reliable proxy that
181 could be used to allocate species for which no sequence data is available for the proposed taxa
182 (further discussed below).

183 *Morphological and molecular circumscription of taxa*

184 For the morphological circumscription of taxa we adopted a three-step approach. In a first
185 “indicative” step, we identified species and groups of species based on their distinctive features in
186 both shell morphology and anatomy within each genus-level clade identified in the phylogenetic
187 tree (Gorson et al. submitted). The International Commission on Zoological Nomenclature (ICZN)
188 allows two alternative options for establishing morphological identity of a taxon: (1) to propose a
189 diagnosis – i.e. ‘a summary of the characters that differentiate the new nominal taxon from related
190 or similar taxa’ (ICZN Recommendation 13A), or (2) to propose a description, in which
191 taxonomically informative and uninformative characters are not separated (Renner 2016). In a
192 second “diagnostic” step, we were able to use the defined features to add other non-sequenced
193 species to the proposed taxa and to formulate a synopsis of morphological characteristics for each
194 generic taxon. As multiple cases of convergent evolution of shell features were demonstrated for
195 Terebridae (Gorson et al. submitted), the synopsis content was usually not sufficient for
196 unequivocal identification of a primarily phylogenetically defined genus. In such cases, a formal
197 *Description* was provided, and additional information on how the members of each genus can be
198 differentiated from similar but unrelated forms is to be found in our *Remarks* sections. In several
199 genera, several distinctive subclades were recognized by the phylogenetic analysis, and they could
200 have been considered as subgenera. Here we chose to not define subgenera to avoid introduction of
201 multiple new names for lineages whose morphological identities are not entirely understood at
202 present. However, we retained in the remarks, brief descriptions of the potential subgroups for
203 reasons of clarity and usability. In a third step, we investigated the species that were difficult to
204 allocate with confidence to the phylogenetically defined genera. We found that in many cases these

205 species formed groups, which, when diagnosed for distinctive morphological features, were found
206 to be attributable to currently accepted genera for which no DNA sequence data is available. As no
207 phylogenetic data is available on these genera, we cannot resolve their status with certainty, and
208 thus such genera are retained as valid. In the systematic section below, for each genus we propose a
209 formal diagnosis or description, depending on our ability to identify the characteristics that
210 differentiate a proposed genus from other groups in Terebridae and provide a list of member
211 species.

212 We compiled molecular diagnoses to supplement traditional taxonomic diagnoses and
213 descriptions in response to the fact that recognition of primarily phylogenetically defined genera by
214 morphological means was often problematic. As the four-gene (COI, 18S, 12S, and 23S)
215 phylogenetic analysis (Gorson et al. submitted) was not comprehensive for all species and
216 specimens per clade, the credibility of a molecular diagnosis derived from this dataset would have
217 been questioned. To combat this we used only the COI dataset including only sequences with no
218 more than 5 ambiguously called nucleotides (963 records), representing 179 putative species.
219 Initially, species were attributed to pre-defined clades based on the results of the four-gene analyses
220 of Gorson et al. (2018) and that was consistent with allocations to genera and subfamilies in a
221 classification detailed below. The total length of the COI alignment was 658 base pairs (the
222 “barcode” fragment defined by the Folmer et al (1994) primers), which were thus numbered from 1
223 to 658. First, an attempt was made to find pure diagnostic single-nucleotide positions (i.e. at a given
224 position, all the members of the clade and none of the non-members of the clade share a given
225 nucleotide) using the R package SPIDER 1.4-1 (Brown et al. 2012). However, only one diagnostic
226 single nucleotide character was identified for each of the clades A1 and E5A, and none in the
227 others. Thus we explored the possibility of providing molecular diagnoses based on diagnostic
228 combinations of nucleotides (i.e. at two or more positions, all the members of the clade and none of
229 the non-members of the clade share a combination of nucleotides). To our knowledge, only CAOS
230 (Sarkar et al. 2008) is capable of detecting such diagnostic combinations. However, as CAOS
231 implements a tree-based algorithm, it poses certain requirements to the data to run efficiently, such
232 as a pre-defined group is only provided diagnosis (referred to as characteristic attributes or CA’s by
233 Sarkar et al. 2008 and Rach et al. 2008) if it corresponds to a clade in the provided tree. The tree
234 reconstructed using all our COI sequences (Gorson et al. submitted) did not retrieve all the
235 subfamilies and genera monophyletic, thus making CAOS not applicable. Consequently, we
236 developed a custom Python script (available upon request) that is based on an alternative, purely
237 statistical approach, and implements iterated random search to identify diagnostic combinations of
238 nucleotides for each predefined group in an assemblage of aligned sequences. The in-house Python
239 script provided the most comprehensive and reproducible results for our dataset.

240

RESULTS

241

242 *Levels of confidence in attribution to genera*

243 Valid recent species entries (401) from current WoRMS database (as per February 1 2018) were
244 used in our analysis. DNA sequence data were available for 135 currently accepted species
245 (Gorson et al. submitted) that constitute 134 species entries (except *Oxymeris troendlei*
246 (Bratcher, 1981), which was found to be a junior synonym of *O. maculata* (Gmelin, 1791)).
247 These 134 species as well as seven new species revealed by the phylogenetic analysis of Gorson
248 and coauthors (2018) and described herein are allocated to genera with a superscript 1 (¹),
249 indicating highest degree of confidence.

250 The use of morphological characters in combination with geographic distribution resulted in a
251 non-ambiguous placement into one of the groups recognized phylogenetically of 166 more
252 species; these are marked with superscript 2 (²).

253 In multiple cases, shell morphology initially appeared to be inconclusive for confident attribution
254 of a species to a genus, as more than one hypothesis on its placement was proposed; in such
255 cases we suggested a tentative allocation taking into account all available morphological and
256 distribution data. This is the case for 59 species entries marked with superscript 3 (³).

257 Of the remaining species, 39 showed no clearly definable affinity to any single molecularly
258 defined genus. However, based on the shell morphology alone, each species could be allocated to
259 one of six terebrid genera *Granuliterebra* Oyama, 1961, *Hastulopsis* Oyama, 1961, *Pristiterebra*
260 Oyama, 1961, *Gradaterebra* Cotton & Godfrey, 1932, *Perirhoe* Dall, 1908, *Microtrypetes*
261 Pilsbry & Lowe, 1932. These six genera remain solely defined by shell characters pending
262 further molecular data.

263 Six species showed no definite resemblance to any terebrid genus, these are here treated as
264 *incertae sedis* and more data are needed to suggest credible genus allocations.

265 Finally, two species, *Terebra walkeri* E. A. Smith, 1899 and *Euterebra mariato* Pilsbry & Lowe,
266 1932 are excluded from Terebridae, and should be reassigned to Cerithiidae and Columbellidae
267 respectively.

268 *Identification of COI DNA based diagnoses*

269 Numerous diagnostic combinations were returned for all but three genera, and were sorted by
270 length with priority given to short combinations. The diagnostic nucleotides identified for the
271 clades A1 and E5A by SPIDER were also recovered by our in-house Python script. However, we
272 failed to identify diagnostic combinations of nucleotides for the genera *Terebra* and
273 *Punctoterebra*, and only found diagnostic combinations for *Hastula* H. Adams & A. Adams,
274 1853, when four sequences with a substitution at the position 181 of the COI fragment were
275 removed from the dataset. As a result, for *Terebra*, *Punctoterebra*, and *Hastula* taxa we propose
276 separate diagnoses for the inferred phylogenetic clusters within each genus.

277

278

SYSTEMATICS

279

Superfamily Conoidea Fleming, 1822

280

Family Terebridae Mörch 1852

281

[Synonyms: Acusidae Gray, 1853]

282 *Description:* Shell elongate or conical, multi-whorled, with very high spire and relatively small last whorl.
283 Aperture small, with anterior siphonal notch, or very short straight siphonal canal. Anal sinus indistinct.
284 *Anatomy.* Operculum always present, horny, rounded or leaf-shaped, with terminal nucleus. Head with
285 two very short closely set eye tentacles with eye situated near their tips. Rhynchodaeal introvert always
286 present, small to very large. Proboscis, radula, salivary gland, accessory salivary gland, venom gland and
287 accessory proboscis structure present or absent. Radula, when present, composed of marginal teeth only –
288 varying in shape from flat, solid and recurved, semi-enrolled or duplex to hollow hypodermic.

289

290

Subfamily Pellifroniinae n. subfam.

291

(Fig. 2)

292 *Type genus:* *Pellifronia* Terry & Holford, 2008

293

294 *Zoobank registration:* urn:lsid:zoobank.org:act:E827742C-E1B3-42DD-B5EB-5D7EAA6E2C95

295

296 *Diagnosis.* Diagnostic nucleotide combinations in the COI barcode region provided in the Table 1.

297 *Description:* Shell small to medium-sized (12-50 mm), with predominant axial sculpture. Early
298 teleoconch whorls often with angulated profile, later – flattened or even slightly concave to convex.
299 Sculpture of numerous closely set ribs, even, or forming raised nodules bordering upper or lower suture.
300 Spiral sculpture absent or of very shallow and wide subsutural depression.

301 *Anatomy.* Rhynchodaeal introvert small, proboscis, radular sac, odontophore, salivary and venom glands
302 well developed. Radula with well-developed membrane, bearing two rows of wide marinal teeth of
303 duplex type. Accessory proboscis structure absent.

304

305 *Remarks:* The subfamily comprises five described species in two genera, *Bathyterebra* and *Pellifronia*
306 that occur in Indo-Pacific and Caribbean at bathyal depths. Anatomy of the studied species of the
307 subfamily demonstrates characters that are believed to be ancestral for Terebridae in general – i.e. weakly
308 developed rhynchodaeal introvert and radular teeth of duplex type (Castelin et al. 2012).

309

310

Genus *Pellifronia* Terry & Holford, 2008

311

(Fig 2. A – D)

312 *Type species:* *Terebra jungi* Lai, 2001; OD.

313 *Definition* This genus includes species closely related to *Pellifronia jungi* (Lai, 2001) based on the
314 molecular phylogenetic analysis (Gorson et al. submitted) and those that show a combination of
315 conchological, anatomical and distribution characteristics closely comparable to *Pellifronia jungi* or any
316 genetically proven member of the genus.

317 *Diagnosis.* Diagnostic nucleotide combinations in the COI barcode region provided in the Table 1.

318 *Description:* Shell medium-sized (25-50 mm), elongate, light brown. Protoconch brown, paucispiral,
319 cyrthoconoid, of 1.5-2.5 whorls. Coarse sculpture of pronounced ribs, orthocline or prosocline, sometimes
320 arcuate on late teleoconch whorls. Axial ribs often thickened in their adapical and/or abapical part(s),
321 giving slightly concave outline to spire whorls. Last adult whorl with flattened adapical portion, and short
322 somewhat angulate transition to shell base. Siphonal canal moderately long, recurved at its tip, shallowly
323 notched; siphonal fasciole weak or indistinct. Aperture elongate, curved.

324 *Anatomy.* Rhynchodeal introvert small, proboscis, radular sac, odontophore, salivary and venom glands
325 well developed. Accessory proboscis structure absent. Radula with well-developed membrane, bearing two
326 rows of wide marginal teeth of duplex type.

327

328 *Distribution:* Indo-Pacific, bathyal depths

329

330 *Remarks:* The genus differs from the closely related *Bathyterebra* in having stronger axial sculpture, more
331 flattened whorl outline and last adult whorl constricted to siphonal canal with visible angulation. Species
332 of *Pellifronia* can be distinguished by their coarse sculpture, swollen ribs ends with slightly raised
333 subsutural area. Similar species in other genera, e.g. *Neoterebra puncturosa* (S.S. Berry, 1959), *N.*
334 *crenifera* (Deshayes, 1859) and *Granuliterebra bathyrhaphe* (E.A. Smith, 1875), normally have a sharper
335 nodular structure on the subsutural band or ribs' endings, or can be separated by the lack of radula
336 (species of *Neoterebra*).

337

338 *Included species:*

339 *Pellifronia brianhayesi* (Terry & Sprague, 2008)²;

340 *P. jungi* (Lai, 2001)¹.

341

342 **Genus *Bathyterebra* n. gen.**

343 (Fig. 2 E – I)

344

345 *Type species:* *Terebra benthalis* Dall, 1889; OD herein.

346

347 *Zoobank registration:* urn:lsid:zoobank.org:act:EF1F9047-25AB-4400-A1D4-C705B757E114

348

349 *Definition:* This genus includes species closely related to *Bathyterebra benthalis* (Dall, 1889) based on
350 the molecular phylogenetic analysis (Gorson et al. submitted), and those that show a combination of
351 conchological, anatomical and distribution characteristics closely comparable to *Bathyterebra benthalis*
352 or any genetically proven member of the genus.

353 *Diagnosis.* Diagnostic nucleotide combinations in the COI barcode region provided in the Table 1.

354 *Description:* Shell small, of 12-30 mm, elongate, white to tan. Protoconch paucispiral, cyrthoconoid, of
355 about 1.5 glossy whorls. Sculpture of fine dense orthocone ribs, interrupted by depression in adapical
356 portion of whorl. Axial ribs weakening throughout their height on mature whorls, often forming weak
357 nodules bordering the adapical depression, giving distinctly angulated outline to early spire whorls; late
358 teleoconch whorls gently convex. Last adult whorl evenly convex, transiting to shell base without visible
359 angulation. Siphonal canal stout, slightly recurved at its tip, shallowly notched; siphonal fasciole weak, or
360 rather strong. Aperture elongate, rather wide.

361 *Anatomy.* Rhynchodeal introvert small, proboscis, radular sac, salivary and venom glands well developed.
362 Accessory proboscis structure absent. Radula with well-developed membrane, bearing two rows of wide
363 marginal teeth of duplex type.

364

365 *Distribution:* South China Sea, New Caledonia, Caribbean, bathyal depths

366

367 *Etymology:* The genus name refers to the bathyal depths, at which three known species of the genus were
368 sampled. Gender feminine.

369

370 *Remarks:* *Bathyterebra* spp. can be differentiated from most other genera of Terebridae by the
371 combination of relatively faint sculpture lacking spiral elements, with weakly defined subsutural band and
372 relatively high last adult whorl with convex outline. In shell proportions the genus somehow resembles
373 *Oxymeris* Dall, 1903; however, the latter genus has more flattened whorls and typically can be easily
374 differentiated by a notably larger size at maturity.

375

376 *Included species:*

377 *Bathyterebra benthalis* (Dall, 1889)¹ comb. nov.;

378 *B. coriolisi* (Aubry, 1999)¹ comb. nov.;

379 *B. zhongshaensis* Malcolm, Terryn & Fedosov¹ sp. nov.

380

381 **Subfamily Perviciinae Rudman, 1969**

382 (Fig. 3)

383 *Type genus:* *Pervicacia* Iredale, 1924 (= *Duplicaria* Dall, 1908)

384 *Description:* Shells elongate ranging from 10 to 100 mm, with high spire, predominant axial sculpture and
385 wide aperture.

386 *Anatomy.* Rhynchodeal introvert rather small, salivary gland and radular sac present, radula of solid
387 curved marginal teeth attached to strong membrane. Venom gland, proboscis and accessory proboscis
388 structure absent.

389

390 **Genus *Duplicaria* Dall, 1908**

391 (Fig. 3 A – E)

392 [Synonyms: *Diplomeriza* Dall, 1919 (Unnecessary nom. nov. pro *Duplicaria* Dall, 1908, by Dall treated
393 as a homonym of the non-existent "*Duplicaria* Rafinesque, 1833"); *type species:* *Buccinum duplicatum*
394 Linnaeus, 1758; by typification of replaced name; *Myurellisca* Bartsch 1923; *type species:* *Myurella*
395 *duplicatoides* Bartsch, 1923; OD; *Pervicacia* Iredale, 1924; *type species:* *Terebra ustulata* Deshayes,
396 1857; OD]

397

398 *Type species:* *Buccinum duplicatum* Linnaeus, 1758; OD.

399 *Definition:* The genus is primarily defined based on the results of the phylogenetic analysis (Gorson et al.
400 submitted), and comprises species which have been demonstrated to form a well-supported clade with the
401 type species *Duplicaria duplicata* (Linnaeus, 1758), and additionally species which show shell
402 morphology, anatomical or genetic characteristics closely comparable to *Duplicaria duplicata* or any
403 genetically proven member of the genus.

404

405 *Diagnosis.* Diagnostic nucleotide combinations in the COI barcode region provided in the Table 2.

406

Fig. 3

Table 2

- 407 *Description:* Shell elongate, small to large-sized, adult size 20-100mm, with wide aperture and
 408 predominant axial sculpture, either continuous from suture to suture or interrupted by a shallow to deep
 409 subsutural indentation. Spiral structure obsolete, sometimes, microscopic striae or weak band joining
 410 nodes.
- 411 *Anatomy.* Rhynchodeal introvert rather small, salivary gland and radular sac present, radula of solid
 412 curved marginal teeth attached to strong membrane. Venom gland proboscis and accessory proboscis
 413 structure absent.
- 414
- 415 *Distribution:* Tropical and subtropical Indo-Pacific and West Africa.
- 416
- 417 *Remarks:* By shell morphology 3 distinct clusters can be delineated within *Duplicaria*:
- 418 *Duplicaria duplicata* group. Small to large shells, adult size 25-100 mm, with paucispiral protoconch and
 419 sculpture of strong axial ribs. Deep narrow spiral groove delineating distinct flattened subsutural band and
 420 no spiral structure. Whorl outline flattened, or shouldered due to elevated ribs below the subsutural band.
- 421 *Duplicaria tristis* (Deshayes, 1859) group. Small shells, adult size 10-30 mm, paucispiral protoconch with
 422 sculpture of strong axial ribs, subsutural area weakly impressed.
- 423 *Duplicaria tricincta* (E.A. Smith, 1877) group. Small shells, adult size 10-25 mm, paucispiral protoconch.
 424 Strong spiral ribs. A more convex shape with outline flattened due to elevation of ribs below the
 425 subsutural area. Ribs weakening on mature whorls.
- 426
- 427 *Included species:*
- | | |
|---|---|
| 428 <i>Duplicaria albozonata</i> (E. A. Smith, 1875) ² ; | 444 <i>D. hiradoensis</i> (Pilsbry, 1921) ² ; |
| 429 <i>D. australis</i> (E. A. Smith, 1873) ² ; | 445 <i>D. jukesi</i> (Deshayes, 1857) ² ; |
| 430 <i>D. badia</i> (Deshayes, 1859) ² ; | 446 <i>D. juliae</i> (Aubry, 1999) ² ; |
| 431 <i>D. bernardii</i> (Deshayes, 1857) ¹ ; | 447 <i>D. kieneri</i> (Deshayes, 1859) ² ; |
| 432 <i>D. brevicula</i> (Deshayes, 1859) ¹ ; | 448 <i>D. kirai</i> (Oyama, 1962) ² ; |
| 433 <i>D. concolor</i> (E. A. Smith, 1873) ² ; | 449 <i>D. koreana</i> (Yoo, 1976) ² ; |
| 434 <i>D. copula</i> (Hinds, 1844) ² ; | 450 <i>D. morbida</i> (Reeve, 1860) ² ; |
| 435 <i>D. costellifera</i> (Pease, 1869) ² ; | 451 <i>D. mozambiquensis</i> Bratcher & Cernohorsky, |
| 436 <i>D. crakei</i> (Burch, 1965) ² ; | 452 1982 ¹ ; |
| 437 <i>D. duplicata</i> (Linnaeus, 1758) ¹ ; | 453 <i>D. silvanae</i> (Aubry, 1999) ³ ; |
| 438 <i>D. dussumierii</i> (Kiener, 1839) ² ; | 454 <i>D. similis</i> (E. A. Smith, 1873) ² ; |
| 439 <i>D. evoluta</i> (Deshayes, 1859) ² ; | 455 <i>D. sowerbyana</i> (Deshayes, 1857) ² ; |
| 440 <i>D. fictilis</i> (Hinds, 1844) ² ; | 456 <i>D. tricincta</i> (E. A. Smith, 1877) ¹ ; |
| 441 <i>D. gemmulata</i> (Kiener, 1839) ³ ; | 457 <i>D. tristis</i> (Deshayes, 1859) ¹ ; |
| 442 <i>D. helenae</i> (Hinds, 1844) ³ ; | 458 <i>D. ustulata</i> (Deshayes, 1857) ² ; |
| 443 <i>D. herberti</i> n. sp. Malcolm, Terry & Fedosov ¹ ; | 459 <i>D. veronicae</i> (Nicolay & Angioy, 1993) ² . |

460

461 **Genus *Partecosta* Dance & Eames, 1966**

462 (Fig. 3 F – O)

463 *Type species:* *Strioterebrum wilkinsi* Dance & Eames, 1966 [= *Terebra fuscobasis* E. A. Smith, 1877];
 464 OD.

465 *Definition:* This genus includes species that show a combination of conchological, anatomical and
466 distribution characteristics closely comparable to *Strioterebrum wilkinsi* Dance & Eames, 1966, including
467 all species in the clade F2 of the (Gorson et al. submitted), or any species proven phylogenetically close
468 to them.

469 *Diagnosis.* Diagnostic nucleotide combinations in the COI barcode region provided in the Table 2.

470

471 *Description:* Shell small, adult size 10-30 mm, pale or tan, often with spiral bands and dark basal area.
472 Protoconch from 1.5 to 3 whorls. Dominant sculpture of axial ribs spanning across whorl's height,
473 resulting in even, slightly convex whorl outline, or (typically) interrupted by depression or narrow groove
474 forming subsutural row of nodules. Spiral sculpture indistinct or represented by fine regular striae.
475 Siphonal canal very short, stout, indistinctly or very shallowly notched, with strong fasciole. Aperture
476 wide, pyriform.

477 *Anatomy.* Rhynchodeal introvert rather small; salivary gland and radular sac present, radula of solid
478 curved marginal teeth attached to strong membrane. Venom gland proboscis and accessory proboscis
479 structure absent.

480

481 *Distribution:* Indian Ocean, intertidal and shallow subtidal depths.

482

483 *Remarks:* Three clusters with varying sculpture patterns can be recognized:

484 *Partecosta fuscobasis* group with sculpture of strong ribs and clearly delineated subsutural band forming
485 distinct nodules at intersections with ribs (Figs 3F - I). It is closely comparable to species of the New
486 World genus *Neoterebra*, however, can be differentiated by smaller size at maturity, wider aperture,
487 usually with wide anterior notch, and solid curved radular teeth.

488 *Partecosta trilineata* (Bozzetti, 2008) group with glossy shells sculptured by strong continuous ribs, no
489 distinct spiral sculpture or subsutural band (Figs 3K, L). Very similar sympatric forms are known in the
490 genus *Punctoterebra* (i.e. *P. solangeae* Bozzetti, 2015 group), that can only be reliably differentiated by
491 anatomical characters (radula of solid curved teeth in *Partecosta* spp. and lacking in *P. solangeae*).

492 *Partecosta macleani* (Bratcher, 1988) group with flattened whorl outline, very short and robust siphonal
493 canal, and very weak sculpture represented by rounded, almost indistinct subsutural nodules extended into
494 even less distinct axial folds on whorl periphery (Fig 3M). Some species of *Hastula* are close to
495 *Partecosta macleani*, however, they are commonly larger, have polished surface and retain distinct
496 ribbing at least on the adapical portions of the whorls.

497

498 *Included species:*

- | | |
|---|--|
| 499 <i>Partecosta albofuscata</i> (Bozzetti, 2008) ¹ comb. nov.; | 509 <i>P. fuscocincta</i> (E. A. Smith, 1877) ² comb. nov.; |
| 500 | 510 <i>P. herosae</i> (Terry & Rosado, 2011) ² comb. nov.; |
| 501 <i>P. bozzettii</i> n. sp. Malcolm, Terry & Fedosov ¹ ; | 511 |
| 502 <i>P. fuscolutea</i> Bozzetti, 2008 ² comb. nov.; | 512 <i>P. macandrewii</i> (E. A. Smith, 1877) ² comb. nov.; |
| 503 <i>P. macleani</i> (Bratcher, 1988) ¹ comb. nov.; | 513 |
| 504 <i>P. nassoides</i> (Hinds, 1844) ¹ comb. nov.; | 514 <i>P. padangensis</i> (Thiele, 1925) ² comb. nov.; |
| 505 <i>P. sandrinae</i> (Aubry, 2008) ¹ comb. nov.; | 515 <i>P. tantilla</i> (E. A. Smith, 1873) ² comb. nov.; |
| 506 <i>P. trilineata</i> (Bozzetti, 2008) ¹ comb. nov.; | 516 <i>P. tenera</i> (Hinds, 1844) ³ comb. nov. |
| 507 <i>P. varia</i> (Bozzetti, 2008) ¹ comb. nov.; | 517 <i>P. veliae</i> (Aubry, 1991) ³ comb. nov. |
| 508 <i>P. fuscobasis</i> (E. A. Smith, 1877) ² comb. nov.; | |

518

519

Subfamily Terebrinae Mörch 1852

520 *Type genus: Terebra* Bruguière, 1789

521 *Description:* Shell elongate, multi-whorled, with varying whorl outline, sculpture and colour pattern.
522 Aperture very small relative to shell height, moderately wide to very wide, with short, straight or very
523 weakly recurved, widely open siphonal canal.

524 *Anatomy.* Rhynchodeal introvert large, occupying most of the rhynchocoel cavity. Radula, proboscis,
525 venom gland, salivary gland and accessory proboscis structure present or absent. Radula when present –
526 consisting of hypodermic, flat, semi-enrolled or very rarely – duplex marginal teeth, never of solid type.

527

528 *Remarks:* Although the subfamily is consistent with a highly supported clade in the phylogenetic tree of
529 Gorson et al. (submitted), its conceptual circumscription (i.e. based on the shared synapomorphic
530 characters) is difficult. Among such characters only the large rhynchodeal introvert that occupies most of
531 the rhynchocoel cavity can be mentioned. Foregut anatomy offers some other characters that can
532 practically facilitate recognition of Terebrinae. Until proven otherwise, all the radula-less terebrids are in
533 the Terebrinae, as well, as all species with flat, semi-enrolled or hypodermic radular teeth. Practically,
534 recognition of the terebrines can be aided by the fact that the two other terebrid subfamilies are notably
535 more compact and are generally clearly delineated; therefore, everything that is definitively not a member
536 of neither Pellifroniinae nor Pervicaciinae is here considered in Terebrinae.

537

538

Genus *Terebra* Bruguière, 1789

539

(Figs 4, 5)

540 *Type species: Buccinum subulatum* Linnaeus, 1767; Type by subsequent monotypy.

541

542 [Synonyms: *Triplostephanus* Dall, 1908; *type species: Terebra triseriata* Gray, 1834; OD;
543 *Cinguloterebra* Oyama, 1961; *type species: Terebra hedleyana* Pilsbry, 1905 (= *Terebra adamsii* E. A.
544 Smith, 1873); OD; *Dimidacus* Iredale, 1929 (nomen novum pro *Terebrina* Bartsch, 1923, non
545 Rafinesque, 1815); *type species: Terebra cingulifera* Lamarck, 1822; by typification of replaced name;
546 *Myurellina* Bartsch, 1923; *type species: Terebra ornata* Gray, 1834; OD; *Subula* Schumacher, 1817
547 (unnecessary replacement name for *Terebra*); *type species: Buccinum subulatum*; typification of
548 replacement names; *Terebrina* Bartsch, 1923 (invalid: junior homonym of *Terebrina* Rafinesque, 1815);
549 *type species: Terebra cingulifera* Lamarck, 1822; OD; *Terebrum* Montfort, 1810 (unnecessary
550 amendment of *Terebra* Bruguière, 1789); *type species: Buccinum subulatum* Linnaeus, 1767; by
551 typification of replaced name; *Paraterebra* Woodring, 1928; *type species: Terebra texana* Dall, 1898;
552 OD; *Panaterebra* Olsson, 1967; *type species: Terebra robusta* Hinds, 1844; OD]

553

554 *Definition:* The genus is primarily defined based on results of the phylogenetic analysis (Gorson et al.
555 submitted), and includes species clustering into a well-supported clade of *Terebra subulata* (Linnaeus,
556 1767), and species, showing resemblance in shell morphology, anatomy and distribution to any
557 genetically proven member of the genus.

558

559 *Diagnosis.* Diagnostic nucleotide combinations in the COI barcode region provided separately for the
560 seven clades of the genus inferred by Gorson et al. (submitted) in the Table 3.

560

Fig. 4

Fig. 5

Table 3

561

562 *Description:* Shell elongate, medium-sized to large, reaching 192 mm, with truncated base shortly
563 constricted to siphonal canal, sometimes with distinct angulation. Sculpture from very weak, limited to
564 often obsolete subsutural groove, to very strong. Subsutural band simple, or consisting of two closely set
565 cords, often gemmate. Lower whorl portion smooth or with varying sculpture pattern, with spiral
566 elements being stronger or at least pronounced equally with axials. Shell base separated from siphonal
567 canal by concave waist. Aperture elongate to quadrangular.

568 *Anatomy.* Rhynchodeal introvert, proboscis, venom gland, salivary gland and radula well-developed.
569 Radula consisting of hypodermic marginal teeth, with only the bases attached to strongly reduced
570 membrane. Accessory proboscis structure present or absent.

571

572 *Distribution:* Indo Pacific, West Africa, Panamic, Caribbean and Western Atlantic

573

574 *Remarks:* The genus *Terebra* is here established in the boundaries consistent with the clade C of Gorson
575 et al. (submitted). This clade is in turn subdivided into eight lineages, referred to as C1 – C7 (see figure
576 4), their relationships being not resolved. The clades C1, C2, C3-2, C4, and C7 are well supported; clade
577 C5 comprising one species only – *Terebra argus*. Because of the extreme heterogeneity of the clade C our
578 attempts to provide a molecular diagnosis failed, and therefore, we compiled separate diagnoses for the
579 inferred lineages within C (Table 3). Although lineages C3-1 and C3-2 do not constitute a clade, their
580 affinity is not rejected by the phylogenetic analysis, and here they are grouped together based on the
581 biogeographic considerations. The genus *Terebra* is enormously heterogeneous in regard of shell
582 morphology as well (Fig. 5); some common morphotypes can be delineated based on shell morphology,
583 but their correspondence with inferred phylogenetic groupings is far from being perfect. Below we
584 provide brief overview of these morphotypes:

585 Typical *Terebra* are characterized by a weakly sculptured or smooth medium sized shell, with gently
586 convex or subcylindrical whorls, often bearing pattern of large spots. Species referable to this morphotype
587 are included in clades C1 (*T. subulata* and *T. guttata* (Röding, 1798)), C4 (*T. ornata* Gray, 1834) and C6
588 (*T. argus* Hinds, 1844). This morphotype is probably closest to *Oxymeris*, and differentiation of the two
589 lineages is tricky. In most cases *Terebra* spp. can be recognized by the narrower anterior notch; however,
590 examination of the foregut to determine whether proboscis and radula are present is advised for definite
591 allocation.

592 The *fenestrata* morphotype comprises most heavily sculptured species, which are distinctive because of
593 strong, often elevated gemmate subsutural band which is closely followed by second spiral band of
594 similar morphology, but usually weaker and/or narrower. The lower portion of the whorl is sculptured
595 with spiral cords, or have cancellate pattern. Species exhibiting this morphotype comprise the clade C2,
596 and strikingly similar species can be also found in the clades C7 (*T. aff. adamsii* (E. A. Smith, 1873), *T.*
597 *aff. rubrobrunnea* Preston, 1908 MNHN IM-2013-14908, *Terebra anilis* (Röding, 1798)) and C8
598 (*Terebra cumingi* Deshayes, 1857 species complex). Strong, often elevated, gemmate or beaded spiral
599 elements readily differentiate this morphotype from most terebrid genera. The similar pattern however is
600 present in *Granuliterebra* spp., the species of which being differentiated by the single subsutural band and
601 usually by a prevailing axial sculpture on the lower portion of the whorl.

602 *Triplostephanus* morphotype unifies species with very high spire and very small, quadrate aperture.
603 Whorls flattened or slightly concave due to raised subsutural band, and lower part of whorl sculptured by
604 regular cords, while axial sculpture is not developed. The clade C5 is mostly represented by species
605 exhibiting this morphotype; however, species with sub-cylindrical whorls and stepped outline of spire
606 (such as *Terebra laevigata* Gray, 1834 and *Terebra funiculata* Hinds, 1844) are found in C5 as well. The

607 combination of a very high spire and flattened whorl outline makes this morphotype very distinctive
608 among Terebridae.

609 While the three described morphotypes represent extremes of the conchological diversity of *Terebra*,
610 there is a plethora of intermediate forms. For example, *Terebra taurina* (Lightfoot, 1786) and *Terebra*
611 *fujitai* Kuroda & Habe, 1952 of the clade C3 have bifurcate ribbed subsutural band, similar to *fenestrata*
612 morphotype, although notably lower. Similarly, a bifurcate nodulose subsutural band is present in
613 *Terebra corrugata* Lamarck, 1822, a species showing close affinity to *Terebra subulata* in the clade C1.
614 The apparent lack of phylogenetic signal in the distribution of these morphotypes across the clade C
615 precludes assignment of any taxonomic rank to them. Moreover, the general lack of homogeneity in shell
616 characteristics within subclades of *Terebra* makes their establishment as supraspecific taxonomic units
617 pointless as well.

618 Taking into consideration extreme conchological variation within *Terebra*, it is difficult to suggest
619 general diagnostic criteria of this genus. However, it should be noted, that prevailing spiral sculpture
620 below subsutural band allows differentiation of *Terebra* from most other terebrid genera. Similarly,
621 bifurcate subsutural band has not been recorded in any species outside *Terebra*. These characters in
622 combination with the presence of a complete complex of foregut organs and radular teeth of hypodermic
623 type allow for reliable differentiation of *Terebra* spp.

624

625 *Included species:*

- | | |
|--|---|
| 626 <i>Terebra achatas</i> Weaver, 1960 ² ; | 651 <i>T. cossignanii</i> Aubry, 2008 ² ; |
| 627 <i>T. adamsii</i> (E. A. Smith, 1873) ² ; | 652 <i>T. cumingii</i> (Deshayes, 1857) ¹ ; |
| 628 <i>T. albocancellata</i> Bratcher, 1988 ³ ; | 653 <i>T. deshayesii</i> Reeve, 1860 ² ; |
| 629 <i>T. albomarginata</i> Deshayes, 1859 ¹ ; | 654 <i>T. donpisorii</i> Terryn, 2017 ³ ; |
| 630 <i>T. amanda</i> Hinds, 1844 ¹ ; | 655 <i>T. elliscrossi</i> (Bratcher, 1979) ¹ ; |
| 631 <i>T. anilis</i> (Röding, 1798) ¹ ; | 656 <i>T. erythraeensis</i> Terryn & Dekker, 2017 ³ ; |
| 632 <i>T. archimedis</i> Deshayes, 1859 ¹ ; | 657 <i>T. eximia</i> (Deshayes, 1859) ² ; |
| 633 <i>T. argosyia</i> Olsson, 1971 ² ; | 658 <i>T. fenestrata</i> (Hinds, 1844) ¹ ; |
| 634 <i>T. argus</i> Hinds, 1844 ¹ ; | 659 <i>T. fernandae</i> Aubry, 1995 ³ ; |
| 635 <i>T. babylonia</i> Lamarck, 1822 ¹ ; | 660 <i>T. fernandesi</i> Bouchet, 1983 ³ ; |
| 636 <i>T. balabacensis</i> Aubry & Picardal, 2011 ³ ; | 661 <i>T. fijiensis</i> (E. A. Smith, 1873) 3; |
| 637 <i>T. bellanodosa</i> Grabau & King, 1928 ³ ; | 662 <i>T. floridana</i> (Dall, 1889) ³ ; |
| 638 <i>T. binii</i> (Aubry, 2014) ² ; | 663 <i>T. formosa</i> Deshayes, 1857 ¹ ; |
| 639 <i>T. boucheti</i> (Bratcher, 1981) ² ; | 664 <i>T. fujitai</i> (Kuroda & Habe, 1952) ¹ ; |
| 640 <i>T. bratcheri</i> Cernohorsky, 1987 ³ ; | 665 <i>T. funiculata</i> Hinds, 1844 ¹ ; |
| 641 <i>T. caddeyi</i> (Bratcher & Cernohorsky, 1982) ² ; | 666 <i>T. gabriellae</i> Aubry, 2008 ³ ; |
| 642 <i>T. caelata</i> Adams & Reeve, 1850 ¹ ; | 667 <i>T. gaiae</i> Aubry, 2008 ³ ; |
| 643 <i>T. castaneostriata</i> Kosuge, 1979 ³ ; | 668 <i>T. giorgioi</i> Aubry, 1999 ³ ; |
| 644 <i>T. cingulifera</i> Lamarck, 1822 ¹ ; | 669 <i>T. grayi</i> E. A. Smith, 1877 ³ ; |
| 645 <i>T. circinata</i> Deshayes, 1857 ² ; | 670 <i>T. guineensis</i> Bouchet, 1983 ³ ; |
| 646 <i>T. cognata</i> E. A. Smith, 1877 ³ ; | 671 <i>T. guttata</i> (Röding, 1798) ¹ ; |
| 647 <i>T. commaculata</i> (Gmelin, 1791) ² ; | 672 <i>T. helichrysum</i> Melville & Standen, 1903 ³ ; |
| 648 <i>T. connelli</i> (Bratcher & Cernohorsky, 1985) ² ; | 673 <i>T. histrio</i> Deshayes, 1857 ³ ; |
| 649 <i>T. consobrina</i> Deshayes, 1857 ¹ ; | 674 <i>T. hoarai</i> (Drivas & Jay, 1988) ¹ ; |
| 650 <i>T. corrugata</i> Lamarck, 1822 ¹ ; | 675 <i>T. insalli</i> (Bratcher & Burch, 1976) ² ; |

- 676 *T. irregularis* Thiele, 1925³;
 677 *T. jacksoniana* (Garrard, 1976)³;
 678 *T. jenningsi* (Burch, 1965)¹;
 679 *T. knudseni* Bratcher, 1983²;
 680 *T. laevigata* Gray, 1834¹;
 681 *T. lauretanae* Tenison-Woods, 1878³;
 682 *T. levantina* Aubry, 1999³;
 683 *T. ligata* Hinds, 1844²;
 684 *T. lillianae* Withney, 1976²;
 685 *T. lima* (Deshayes, 1857)²;
 686 *T. lindae* Petuch, 1987²;
 687 *T. mamillata* (Watson, 1886)²;
 688 *T. mariesi* (E. A. Smith, 1880)²;
 689 *T. marrowae* (Bratcher & Cernohorsky, 1982)²;
 690 *T. montgomeryi* Burch, 1965²;
 691 *T. neglecta* (Poppe, Tagaro & Terryn, 2009)²;
 692 *T. nodularis* Deshayes, 1859³;
 693 *T. noumeaensis* Aubry, 1999³;
 694 *T. ornata* Gray, 1834¹;
 695 *T. pellyi* E. A. Smith, 1877³;
 696 *T. picta* Hinds, 1844³;
 697 *T. polygonia* Reeve, 1860³;
 698 *T. praelonga* Deshayes, 1859²;
 699 *T. pretiosa* Reeve, 1842²;
 700 *T. pseudopicta* Aubry, 2008³;
 701 *T. pseudoturbonilla* Talavera, 1975³;
 702 *T. punctatostriata* Gray, 1834²;
 703 *T. punctum* (Poppe, Tagaro & Terryn, 2009)²;
 704 *T. quoygaimardi* Cernohorsky & Bratcher,
 705 1976¹;
 706 *T. raybaudii* Aubry, 1993²;
 707 *T. reticularis* (Pecchioli in Sacco, 1891)³;
 708 *T. robusta* Hinds, 1844¹;
 709 *T. rosae* Aubry, 2015³;
 710 *T. russetae* (Garrard, 1976)³;
 711 *T. salisburyi* Drivas & Jay, 1998²;
 712 *T. stearnsii* Pilsbry, 1891¹;
 713 *T. straminea* Gray, 1834¹;
 714 *T. subangulata* Deshayes, 1859³;
 715 *T. subulata* (Linnaeus, 1767)¹;
 716 *T. succinea* Hinds, 1844³;
 717 *T. swobodai* Bratcher, 1981³;
 718 *T. tagaruae* Terryn, 2017²;
 719 *T. taiwanensis* Aubry, 1999³;
 720 *T. taurina* (Lightfoot, 1786)¹;
 721 *T. tessellata* Gray, 1834²;
 722 *T. tricolor* G. B. Sowerby I, 1825¹;
 723 *T. triseriata* (Gray, 1834)¹;
 724 *T. twilae* Bouchet, 1983³;
 725 *T. unicolor* Preston, 1908¹;
 726 *T. vanuatuensis* Aubry, 1999³;
 727 *T. vappereau* Tröndlé, Boutet & Terryn, 2013²;
 728 *T. venilia* Tenison-Woods, 1879³;
 729 *T. vicdani* (Kosuge, 1981)²;
 730 *T. virgo* Schepman, 1913³;
 731 *T. waikikiensis* (Pilsbry, 1921)²;

732

733

Genus *Hastula* H. Adams & A. Adams, 1858

734

(Fig. 6 A – E)

735 *Type species: Buccinum strigilatum*¹ Linnaeus, 1758; SD Cossmann, (1896: 53).

736 [Synonyms: *Impages* E. A. Smith, 1873; *type species: Terebra caerulea* Lamarck, 1822 (= *Buccinum*
 737 *hecticum* Linnaeus, 1758); SD, Cossmann (1896); *Acuminia* Dall, 1908; *type species: Buccinum*
 738 *lanceatum* Linnaeus, 1767; OD; *Hastulina* Oyama, 1961; *type species: Terebra casta* Hinds, 1844; OD;
 739 *Egentelaria* Rehder, 1980; *type species: Terebra stylata* Hinds, 1844; OD.]

740 *Definition:* This genus includes species closely related to *Hastula strigilata* (Linnaeus, 1758), based on
 741 the molecular phylogenetic analysis (Gorson et al. submitted) and those that show a combination of
 742 conchological, anatomical and distribution characteristics closely comparable to *Hastula strigilata* or any
 743 genetically proven member of the genus.

744

Fig. 6

745 *Diagnosis.* Diagnostic nucleotide combinations in the COI barcode region provided for the entire clade
 746 with the exception of four specimens of *H. albula* (see Materials and Methods) and separately, for the
 747 subclade *H. albula* - *H. natalensis* - *H. aff. casta* of the clade D (Table 4).

748

749 *Description:* Shell small to medium-sized, shiny, adult size (12-90 mm). Protoconch pauci- or multispiral
 750 of about 1 to 5 whorls. Axial sculpture represented by crenulations on whorl's subsutural portion, or by
 751 fine ribs on part or throughout the whorls' height; spiral sculpture represented by single subsutural
 752 groove, seldom with additional row of punctations. Siphonal canal stout, very short, with well-developed
 753 fasciole. Aperture elongate to rounded.

754 *Anatomy.* Rhynchodeal introvert, proboscis, venom gland, salivary gland and radula well-developed.
 755 Radula consisting of hypodermic marginal teeth attached to thin, reduced membrane. Walls of marginal
 756 teeth often with multiple perforations (Figs 6 E, F)

757

758 *Distribution:* Throughout Indo-Pacific, West Africa, Caribbean.

759

760 *Remarks:* Species of *Hastula* are rather easy to recognize amongst Terebridae, by their typically shiny
 761 shells, with fine closely set of axial ribs and usually by the lack of clearly defined subsutural band. The
 762 shell morphology in the *Partecosta macleani* group closely resembles species of *Hastula*; however, the
 763 latter genus is usually notably larger at maturity, and shells of comparable size can be differentiated by
 764 texture – polished surface in *Hastula* versus dull in *Partecosta*. Furthermore, species of *Hastula* possess
 765 venom gland and hypodermic radular teeth, whereas *Partecosta* spp. lack venom gland and their radulae
 766 consist of solid teeth.

767

768 *Included species:*

- | | |
|--|---|
| 769 <i>Hastula aciculina</i> (Lamarck, 1822) ² ; | 788 <i>H. exacuminata</i> Sacco, 1891 ² ; |
| 770 <i>H. acumen</i> (Deshayes, 1859) ¹ ; | 789 <i>H. filmerae</i> (G. B. Sowerby III, 1906) ² ; |
| 771 <i>H. alboflava</i> Bratcher, 1988 ² ; | 790 <i>H. hamamotoi</i> Tsuchida & Tanaka, 1999 ² ; |
| 772 <i>H. albula</i> (Menke, 1843) ¹ ; | 791 <i>H. hastata</i> (Gmelin, 1791) ¹ ; |
| 773 <i>H. androyensis</i> Bozzetti, 2008 ² ; | 792 <i>H. hectica</i> (Linnaeus, 1758) ¹ ; |
| 774 <i>H. anomala</i> (Gray, 1834) ² ; | 793 <i>H. imitatrix</i> (Auffenberg & Lee, 1988) ² ; |
| 775 <i>H. anosyana</i> (Bozzetti, 2016) ² ; | 794 <i>H. inconstans</i> (Hinds, 1844) ² ; |
| 776 <i>H. apicitincta</i> (G. B. Sowerby III, 1900) ² ; | 795 <i>H. knockeri</i> (E. A. Smith, 1872) ² ; |
| 777 <i>H. bacillus</i> (Deshayes, 1859) ² ; | 796 <i>H. lanceata</i> (Linnaeus, 1767) ¹ ; |
| 778 <i>H. casta</i> (Hinds, 1844) ¹ ; | 797 <i>H. leloeffi</i> Bouchet, 1983 ² ; |
| 779 <i>H. celidonota</i> (Melvill & Sykes, 1898) ² ; | 798 <i>H. lepida</i> (Hinds, 1844) ² ; |
| 780 <i>H. cernohorskyi</i> Burch, 1965 ² ; | 799 <i>H. marqueti</i> (Aubry, 1994) ² ; |
| 781 <i>H. cinerea</i> (Born, 1778) ¹ ; | 800 <i>H. maryleeae</i> R. D. Burch, 1965 ² ; |
| 782 <i>H. continua</i> Deshayes, 1859 ² ; | 801 <i>H. matheroniana</i> (Deshayes, 1859) ¹ ; |
| 783 <i>H. crossii</i> (Deshayes, 1859) ¹ ; | 802 <i>H. nana</i> (Deshayes, 1859) ² ; |
| 784 <i>H. cuspidata</i> (Hinds, 1844) ² ; | 803 <i>H. natalensis</i> (E. A. Smith, 1903) ¹ ; |
| 785 <i>H. denizi</i> Rolán & Gubbioli, 2000 ² ; | 804 <i>H. parva</i> (Baird, 1873) ¹ ; |
| 786 <i>H. engi</i> Malcolm & Terryn, 2017 ² ; | 805 <i>H. penicillata</i> (Hinds, 1844) ¹ ; |
| 787 <i>H. escondida</i> (Terryn, 2006) ² ; | 806 <i>H. philippiana</i> (Deshayes, 1859) ² ; |

- 807 *H. puella* (Thiele, 1925)¹; 814 *H. stylata* (Hinds, 1844)¹;
 808 *H. raphanula* (Lamarck, 1822)¹; 815 *H. tenuicolorata* Bozzetti, 2008¹;
 809 *H. rufopunctata* (E. A. Smith, 1877)²; 816 *H. tiedemani* Burch, 1965²;
 810 *H. salleana* (Deshayes, 1859)¹; 817 *H. venus* Aubry, 2008²;
 811 *H. sandrogorii* Ryall, Terryn & Rosado, 2017²; 818 *H. verreauxi* (Deshayes, 1857)¹;
 812 *H. solida* (Deshayes, 1857)¹; 819 *H. westralica* (Aubry, 1999)²;
 813 *H. strigilata* (Linnaeus, 1758)¹; 820 *H. daniae* (Aubry, 2008)³.

821

822

Genus *Oxymeris* Dall, 1903

823

(Fig. 6 F – H)

824

825 *Type species: Buccinum maculatum* Linnaeus, 1758; OD.

826

827 [Synonym: *Abretia* H. & A. Adams, 1853 (invalid: junior homonym of *Abretia* Rafinesque, 1814), type
 828 species *Terebra cerithina* Lamarck, 1822; SD, Dall, 1908, *The Nautilus*, 21(11): 125; *Abretiella* Bartsch,
 829 1923;(replacement name for *Abretia* H. & A. Adams, 1853); *type species: Terebra cerithina* Lamarck,
 830 1822; by typification of replaced name; *Nototerebra* Cotton, 1947; type species: *Terebra albida* Gray,
 831 1834; OD]

832

833 *Definition:* The genus includes species closely related to *Oxymeris maculata* (Linnaeus, 1758), based on
 834 the molecular phylogenetic analysis (Gorson et al. submitted) and those that show a combination of
 835 conchological, anatomical and distribution features closely comparable to *Oxymeris maculata* (Linnaeus,
 836 1758) or any genetically proven member of the genus.

837

838 *Diagnosis.* Diagnostic nucleotide combinations in the COI barcode region provided in the Table 5.

839

840 *Description:* Shell medium-sized to large, adult size reaching 273 mm, weakly sculptured, typically with
 841 orthoconoid spire and rather wide aperture. Protoconch multispiral of 3 – 3.75 whorls. Whorls flattened in
 842 outline. Sculpture of subsutural band, smooth or with regular crenulations; juvenile sculpture often
 843 consisting of axial ribs. Last adult whorl inflated; siphonal canal short and stout. Aperture wide, elliptic to
 844 rounded.

845 **Anatomy.** Rhynchodeal introvert very large, proboscis absent or vestigial, salivary gland absent or very
 846 small, radula venom gland and accessory proboscis structure absent.

847

848 *Distribution:* Indo-Pacific, tropical East Pacific, West Africa.

849

850 *Remarks:* Species of *Oxymeris* are among the largest terebrids, and can usually be easily identified by
 851 their large, shiny shells, with an orthoconoid or even slightly acuminate spire, often with a bulbous last
 852 whorl, a very wide aperture and a very short siphonal canal, separated from the shell base by a deep
 853 groove. Nevertheless, some smaller species (i.e. *O. cerithina*) have spire with convex sides, and
 854 superficially resemble medium-sized *Punctoterebra* and *Myurella*. However, in most cases (except *O.*
 855 *crenulata*) the *Oxymeris* species can be recognized by the complete lack of axial sculpture other than
 856 growth lines, while axial elements of varying strength and shape are present in *Punctoterebra*, *Myurella*

857 and most other terebrid genera. Finally, widely set deep spiral grooves differentiate *Perirhoe* spp. from
858 *Oxymeris*.

859

860 *Included species:*

- | | |
|---|---|
| 861 <i>Oxymeris albida</i> (Gray, 1834) ² ; | 872 <i>O. felina</i> (Dillwyn, 1817) ¹ ; |
| 862 <i>O. areolata</i> (Link, 1807) ¹ ; | 873 <i>O. gouldi</i> (Deshayes, 1857) ² ; |
| 863 <i>O. barbieri</i> (Aubry, 2008) ² ; | 874 <i>O. lineopunctata</i> (Bozzetti, 2008) ² ; |
| 864 <i>O. caledonica</i> (G. B. Sowerby III, 1909) ¹ ; | 875 <i>O. maculata</i> (Linnaeus, 1758) ¹ ; |
| 865 <i>O. cerithina</i> (Lamarck, 1822) ¹ ; | 876 <i>O. ngai</i> Thach, 2016 ² ; |
| 866 <i>O. chlorata</i> (Lamarck, 1822) ¹ ; | 877 <i>O. senegalensis</i> (Lamarck, 1822) ² ; |
| 867 <i>O. consors</i> (Hinds, 1844) ¹ ; | 878 <i>O. strigata</i> (G. B. Sowerby I, 1825) ¹ ; |
| 868 <i>O. crenulata</i> (Linnaeus, 1758) ¹ ; | 879 <i>O. suffusa</i> (Pease, 1869) ² ; |
| 869 <i>O. dillwynii</i> (Deshayes, 1859) ² ; | 880 <i>O. swinneni</i> Terryn & Ryall, 2014 ² ; |
| 870 <i>O. dimidiata</i> (Linnaeus, 1758) ¹ ; | 881 <i>O. trochlea</i> (Deshayes, 1857) ² ; |
| 871 <i>O. fatua</i> (Hinds, 1844) ² ; | 882 <i>O. troendlei</i> (Bratcher, 1981) ¹ . |

883

884

Genus *Myurella* Hinds, 1845

(Fig. 7 A – D)

Fig. 7

885

886

887 *Type species: Terebra affinis* Gray, 1834; SD, Cossmann, 1896

888

889 [Synonyms: *Clathroterebra* Oyama, 1961; *type species: Terebra fortunei* Deshayes, 1857; OD;
890 *Decorihastula* Oyama, 1961; *type species: Terebra affinis* Gray, 1834; OD; *Terenolla* Iredale, 1929; *type*
891 *species: Terebra pygmaea* Hinds, 1844; OD]

892

893 *Definition:* The genus is primarily defined based on results of the phylogenetic analysis (Gorson et al.
894 submitted), and comprises species which have been demonstrated to form a well-supported clade with the
895 type species *Myurella affinis* (Gray, 1834), and additionally species which show shell morphology,
896 anatomical or genetic characteristics closely comparable to *Myurella affinis* or any genetically proven
897 member of the genus.

898

Table 6

899

Diagnosis. Diagnostic nucleotide combinations in the COI barcode region provided in the Table 6.

900

901 *Description:* Shell very small to medium-sized, with elongated, with high orthoconoid spire and sculpture
902 of arcuate or undulating ribs fine and narrow to flat and wide.

903 *Anatomy.* Rhynchodeal introvert very large, proboscis, radula and venom gland absent, salivary gland and
904 accessory proboscis structure present in few species.

905

906 *Distribution:* Indo-Pacific, at intertidal to upper bathyal depths.

907

908 *Remarks:* In regard of shell morphology, four distinct clusters can be recognized:

909 *Myurella affinis* group. Shell medium-sized; axial sculpture of low and wide, flattened ribs, subsutural
910 band with elongate nodules delineated by punctations, which are also pronounced in interspaces between
911 axial ribs. Similar species that earlier were classified to *Myurella*, but that were found not immediately
912 related to *T. affinis* (i. e. *M. undulata*, *M. columellaris* and *M. kilburni*) are here reclassified to the genus
913 *Myurellopsis*. The typical *Myurella* can be recognized by the lower axials and shallower interstices
914 between them. Because of the overall flatter axials, the subsutural band is visually continuous in
915 *Myurella*; on the contrary, due to the more elevated ribs in *Myurellopsis* spp., the subsutural band is
916 represented by a row of nodules.

917 *Myurella pseudofortunei* group. Shell elongate of variable size (17-60 mm), with very high and slender
918 spire, evenly convex whorls, indistinct subsutural band and narrow, clearly arcuate axial ribs; interspaces
919 with regular striae. Species of this group exhibit a very distinctive morphotype, which has little in
920 common with other species here attributed to *Myurella*. Terebrids with this morphology were previously
921 placed in the genus *Clathrotrebra* Oyama, 1961, of which some smaller species were found to be
922 unrelated lineages, the differences between which are still to be elaborated.

923 *Myurella pygmaea* group. Shell small, circa 10 mm, with curving outline, straight sides to whorls and
924 very short, tapering siphonal canal. Axial sculpture of numerous fine oblique ribs; subsutural band, or
925 other spiral elements absent. The group includes one species, the only representative of the former genus
926 *Terenolla*. The very small but rather solid, finely ribbed shell, of *Myurella pygmaea* is easily recognizable
927 amongst terebrids; its recognition is further aided by the color pattern with flesh background and a
928 contrasting dark-brown spiral line just below the suture.

929 *Myurella amoena* group. Shell medium-sized, sculptured with fine to strong ribs, subsutural band defined
930 by line of punctuations, spiral structure of narrow grooves or cords. The species of this group form a well-
931 supported clade and exhibit a shallow water morphotype that was formerly classified within *Hastulopsis*
932 Oyama, 1961. Similar deeper water species are found in the genus *Maculauger* n. gen., most of which can
933 be recognized by having a row of large spots on the periphery. The other similar species remain within
934 the genus *Hastulopsis*, comprising a number of Indian Ocean and Japanese endemic species. Species of
935 *Myurella amoena* group have strong but narrow ribs that are, however, notably stronger than spiral
936 elements. In *Myurellopsis* spp. the ribs are about as strong, but are wider and rounded, with interstices
937 being narrower than ribs themselves. Both *Hastulopsis* and *Maculauger* comprise species with axial and
938 spiral elements of comparable strength, resulting in a rather cancellate pattern, and a continuous
939 subsutural band.

940

941 *Included species:*

- | | |
|--|---|
| 942 <i>Myurella affinis</i> (Gray, 1834) ¹ ; | 954 <i>M. mactanensis</i> (Bratcher & Cernohorsky, |
| 943 <i>M. amoena</i> (Deshayes, 1859) ¹ ; | 955 1982) ² ; |
| 944 <i>M. andamanica</i> (Melvill & Sykes, 1898) ¹ ; | 956 <i>M. mindanaoensis</i> (Aubry, 2008) ¹ ; |
| 945 <i>M. bilineata</i> (Sprague, 2004) ¹ ; | 957 <i>M. multistriata</i> (Schepman, 1913) ¹ ; |
| 946 <i>M. brunneobandata</i> (Malcolm & Terry, | 958 <i>M. nebulosa</i> (G. B. Sowerby I, 1825) ¹ ; |
| 947 2012) ¹ ; | 959 <i>M. pertusa</i> (Born, 1778) ¹ ; |
| 948 <i>M. burchi</i> (Bratcher & Cernohorsky, 1982) ¹ ; | 960 <i>M. picardali</i> (Aubry, 2011) ² ; |
| 949 <i>M. conspersa</i> (Hinds, 1844) ¹ ; | 961 <i>M. pseudofortunei</i> (Aubry, 2008) ¹ ; |
| 950 <i>M. dedonderi</i> (Terry, 2003) ¹ ; | 962 <i>M. pygmaea</i> (Hinds, 1844) ¹ comb. nov.; |
| 951 <i>M. eburnea</i> (Hinds, 1844) ¹ ; | 963 <i>M. russoi</i> (Aubry, 1991) ² ; |
| 952 <i>M. flavofasciata</i> (Pilsbry, 1921) ¹ ; | 964 <i>M. suduirauti</i> (Terry & Conde, 2004) ² ; |
| 953 <i>M. fortunei</i> (Deshayes, 1857) ¹ ; | 965 <i>M. wellsilviae</i> (Aubry, 1994) ¹ . |

966

967 **Genus *Punctoterebra* Bartsch, 1923**

Fig. 8

(Fig. 8)

968
969 *Type species: Terebra nitida* Hinds, 1844; OD.

970
971 *Definition:* The genus is primarily defined based on results of the phylogenetic analysis (Gorson et al.
972 submitted), and comprises species which have been demonstrated to form a well-supported clade with
973 *Punctoterebra nitida* (Hinds, 1844), and additionally species which show shell morphology, anatomical
974 or genetic characteristics closely comparable to *Punctoterebra nitida* or any genetically proven member
975 of the genus.

976
977 *Diagnosis.* Diagnostic nucleotide combinations in the COI barcode region provided separately for the
978 four phylogenetic clusters of the *Punctoterebra* inferred by Gorson et al. (submitted) in the Table 7 (the
979 deep water lineage composed by two currently undescribed species represented by MNHN IM-2013-
980 52264 and MNHN IM-2013-52293 treated separately from the *Punctoterebra textilis* group).

981
982 *Description:* Shell elongate, small to medium sized (adult size below 50 mm), with high spire and
983 prevailing axial sculpture. Protoconch paucispiral or multispiral, of varying morphology. Axial ribs strong
984 on spire whorls, sometimes becoming obsolete on last whorl. Spiral sculpture limited to a weak punctate
985 groove delineating subsutural band, or well-developed represented by regular striae in interspaces
986 between axial ribs. Siphonal canal delineated from shell base by distinct concavity, often slightly
987 recurved.

988 *Anatomy.* Proboscis, venom gland, radula and salivary gland typically present, radula, when present,
989 composed of flat marginal teeth. Accessory proboscis structure absent.

990
991 *Distribution:* Throughout Indo-Pacific, intertidal to upper bathyal depths (to 405 m), typically shallow.

992
993 *Remarks:* With regard to shell morphology, species of the genus form three distinct clusters that are
994 consistent with three phylogenetic lineages inferred by (Gorson et al. submitted).

995 *Punctoterebra nitida* group. Shell small to medium-sized (<50mm), polished in appearance, with
996 subsutural band delineated by deep punctures or short grooves; sculpture predominantly represented by
997 axial ribs. The small species of the group (i.e. *P. plumbea* or *P. solangeae*) are conchologically very close
998 to some species of *Partecosta* (see Remarks section under latter genus).

999 *Punctoterebra teramachii* (Burch, 1965) group. Shells medium sized (<45mm) with dominant structure of
1000 orthocone axial ribs; spiral structure absent. Subsutural band clearly defined. Species of this group are
1001 conchologically close to the genus *Duplicaria*, from which they can be differentiated by the punctate
1002 subsutural groove and narrower aperture, and by morphology of radular teeth that are solid and recurved
1003 in *Duplicaria*, and flat (or absent) in *Punctoterebra* spp.

1004 *Punctoterebra textilis* (Hinds, 1844) group. Shell medium sized (<50mm), heavily sculptured, with gently
1005 convex whorls. Sculpture of arcuate ribs, interspaces bearing regular distinct striae; subsutural band
1006 delineated by a punctate groove of varying strength. Siphonal canal typically recurved, delineated from
1007 shell base by distinct waist of deep groove. This group is rather heterogeneous in shell morphology, with
1008 the core formed by heavily sculptured species of the *Punctoterebra textilis* – *P. succincta* (Gmelin, 1891)
1009 complex. Similar heavily sculptured shells characterize typical *Profunditerebra*; however, these can be
1010 distinguished by more rounded ribs, a row of nodules on the subsutural band, and by straight siphonal

1011 canal. The heavily sculptured species of *Terebra* in the *T. amanda* group can be readily differentiated by
 1012 their bifurcate subsutural bands. The inferred close affinity of the *Punctoterebra lineaperlata* (Terry &
 1013 Holford, 2008) to the species in the *P. textilis* group is, however, unexpected and needs further analysis.

1014

1015 *Included species:*

- | | |
|--|--|
| 1016 <i>Punctoterebra arabella</i> (Thiele, 1925) ² comb. nov.; | 1034 <i>P. longiscata</i> (Deshayes, 1859) ² comb. nov.; |
| 1017 | 1035 <i>P. nitida</i> (Hinds, 1844) ¹ comb. nov.; |
| 1018 <i>P. baileyi</i> (Bratcher & Cernohorsky, 1982) ¹ | 1036 <i>P. paucincisa</i> (Bratcher, 1988) ³ comb. nov.; |
| 1019 comb. nov.; | 1037 <i>P. plumbea</i> (Quoy & Gaimard, 1833) ¹ comb. nov.; |
| 1020 <i>P. ballina</i> (Hedley, 1915) ² comb. nov.; | 1038 |
| 1021 <i>P. caliginosa</i> (Deshayes, 1859) ¹ comb. nov.; | 1039 <i>P. polygyrata</i> (Deshayes, 1859) ¹ comb. nov.; |
| 1022 <i>P. caliginosa</i> (Deshayes, 1859) ² comb. nov.; | 1040 <i>P. rosacea</i> (Pease, 1869) ³ comb. nov.; |
| 1023 <i>P. castaneofusca</i> (Thiele, 1925) ¹ comb. nov.; | 1041 <i>P. roseata</i> (Adams & Reeve, 1850) ¹ comb. nov.; |
| 1024 <i>P. contracta</i> (E. A. Smith, 1873) ¹ comb. nov.; | 1042 <i>P. solangeae</i> (Bozzetti, 2015) ¹ comb. nov.; |
| 1025 <i>P. exiguides</i> (Schepman, 1913) ³ comb. nov.; | 1043 <i>P. souleyeti</i> (Deshayes, 1859) ¹ comb. nov.; |
| 1026 <i>P. fuscotaeniata</i> (Thiele, 1925) ² comb. nov.; | 1044 <i>P. succincta</i> (Gmelin, 1791) ¹ comb. nov.; |
| 1027 <i>P. illustris</i> (Malcolm & Terry, 2012) ² comb. nov.; | 1045 <i>P. swainsoni</i> (Deshayes, 1859) ² comb. nov.; |
| 1028 | 1046 <i>P. teramachii</i> (Burch, 1965) ¹ comb. nov.; |
| 1029 <i>P. isabella</i> (Thiele, 1925) ² comb. nov.; | 1047 <i>P. textilis</i> (Hinds, 1844) ¹ comb. nov.; |
| 1030 <i>P. japonica</i> (E. A. Smith, 1873) ³ comb. nov.; | 1048 <i>P. trismacaria</i> (Melville, 1917) ¹ comb. nov.; |
| 1031 <i>P. lineaperlata</i> (Terry & Holford, 2008) ¹ | 1049 <i>P. turrita</i> (E. A. Smith, 1873) ¹ comb. nov.; |
| 1032 comb. nov.; | 1050 <i>P. turschi</i> (Bratcher, 1981) ² comb. nov. |
| 1033 <i>P. livida</i> (Reeve, 1860) ³ comb. nov.; | |

1051

1052

Genus *Profunditerebra* n. gen.

1053

(Fig. 9 A – E)

1054 *Type species: Profunditerebra papuaprofundum* n. sp.; OD herein.

1055

1056 *Zoobank registration:* urn:lsid:zoobank.org:act:A5A78A3D-AB11-41C3-86F0-7C1451512FF4

1057

1058 *Definition:* This genus includes species closely related to *Profunditerebra papuaprofundum* n. sp., based on
 1059 the molecular phylogenetic analysis (Gorson et al. submitted) and those that show a combination of
 1060 conchological, anatomical and distribution characteristics closely comparable to *Profunditerebra*
 1061 *papuaprofundum* n. sp. or any genetically proven member of the genus.

1062

Diagnosis. Diagnostic nucleotide combinations in the COI barcode region provided in the Table 8.

1063

1064 *Description:* Shell small to medium-sized (<45 mm), with multispiral protoconch and slender siphonal
 1065 canal. Whorl subcylindrical or flattened. Sculpture pattern varying greatly with axial sculpture of
 1066 rounded ribs, weak to very strong and elevated. Spiral sculpture typically limited to striae in interstices
 1067 and a subsutural groove, absent or represented by strong cords generating overall cancellate pattern.

1068

Anatomy. Proboscis, radula, venom gland and salivary gland present. Radula of duplex marginal teeth
 1069 (Fig. 9E). Accessory proboscis structure absent.

1070

1071 *Distribution:* Almost exclusively in deep water (typically 150-600 m) of tropical Indo-West Pacific from
1072 Taiwan to New Caledonia; one species is known from shallow water of South Australia.

1073

1074 *Remarks:* *Profunditerebra* is the only terebrine genus with duplex radular teeth similar to those in
1075 Pellifroniinae; members of the two groups can be easily differentiated by shell characters. Species of
1076 *Profunditerebra* can be separated into four clusters based on their shell morphology; however, only the
1077 first cluster corresponds to a monophyletic lineage.

1078 *Profunditerebra papuaprofundi* n. sp. et gen. group. Shell uniformly coloured white to dark brown,
1079 heavily sculptured, with distinct subsutural groove and subcylindrical whorls. Sculpture of strong rounded
1080 ribs forming a row of prominent nodules on subsutural band. Spiral sculpture of fine striae limited to
1081 interstices between axials, or overriding them to form fine continuous cords (including on subsutural
1082 band), or coarse cancellate pattern. Species in *Neoterebra* (i.e. *N. armillata*) exhibit overall similar
1083 sculpture pattern, but can be differentiated from *Profunditerebra* by their flattened whorls. The
1084 *Punctoterebra textilis* group also includes some similar forms (see Remarks section under
1085 *Punctoterebra*).

1086 *Profunditerebra orientalis* (Aubry, 1999) group. Shells with flattened whorl profile, and variegated colour
1087 pattern. Sculpture of fine orthocline ribs intersected by cords of about equal strength or slightly weaker
1088 than axials to form delicate cancellate pattern. Subsutural band delineated by shallow punctuate groove.
1089 Species of this group can be easily differentiated from congeners that either lack spiral elements, or
1090 display an overall much coarser sculpture. Both *Profunditerebra orientalis* and *Profunditerebra hiscocki*
1091 closely resemble species in the genus *Maculauger* from which they can be confidently differentiated only
1092 by anatomy (all studied species of *Maculauger* are radula-less) or molecular characters.

1093 *Profunditerebra anseeuwi* (Terry, 2005) group. Shells with flattened whorl outline, subsutural band
1094 represented by short ribs or indentation. Sculpture of axial ribs pronounced throughout whorl's height, but
1095 weakening and becoming obsolete on later whorls; spiral sculpture absent. Species of this group are
1096 conchologically close to *Duplicaria* and to the *Punctoterebra teramachii* group; however, they can be
1097 differentiated from both by the overall weaker sculpture. Besides, these lineages can be confidently
1098 differentiated by the radular teeth morphology, with *Duplicaria* having solid and recurved teeth,
1099 *Profunditerebra* – duplex teeth, and *Punctoterebra* – flat teeth.

1100 *Profunditerebra brazieri* (Angas, 1871) stands apart from other species in the clade, being an endemic of
1101 subtropical shallow waters off Tasmania. Morphologically, it is close to the *Profunditerebra anseeuwi*
1102 group, but has a very weakly defined subsutural band.

1103

1104 *Etymology:* The genus name refers to the considerable depths, at which all known species of the genus
1105 occur. Gender feminine.

1106

1107 *Included species:*

1108 *Profunditerebra anseeuwi* (Terry, 2005)¹
1109 comb. nov.;

1110 *P. brazieri* (Angas, 1871)¹ comb. nov.;

1111 *P. evelynae* (Clench & Aguayo, 1939)³ comb.
1112 nov.;

1113 *P. macclesfieldensis* n. sp. Malcolm, Terry &
1114 Fedosov¹ sp. nov.;

1115 *P. orientalis* (Aubry, 1999)¹ comb. nov.;

1116 *P. papuaprofundi* n. sp. Malcolm, Terry &
1117 Fedosov¹ sp. nov.;

1118 *P. poppei* (Terry, 2003)¹ comb. nov.;

1119 *P. hiscocki* (Sprague, 2004)¹ comb. nov.

1120

1121

Genus *Neoterebra* n. gen.

1122

(Fig. 9 F – H)

1123

Type species: Terebra specillata Hinds, 1844; OD herein.

1124

1125

Zoobank registration: urn:lsid:zoobank.org:act:68993F36-2AD1-4DDE-A853-8832B4A9EE30

1126

1127

Definition: The genus is primarily defined based on results of the phylogenetic analysis (Gorson et al.

1128

submitted), and comprises species which have been demonstrated to form a well-supported clade with

1129

Neoterebra specillata (Hinds, 1844), and additionally species which show shell morphology, anatomical

1130

or genetic characteristics closely comparable to *Neoterebra specillata* or any genetically proven member

1131

of the genus.

1132

Table 9

33

Diagnosis. Diagnostic nucleotide combinations in the COI barcode region provided in the Table 9.

1134

1135

Description: Shell small to medium-sized (<60 mm) uniformly creamy-white to light brown or bearing

1136

pattern of brown blotches, with pointed multi- or paucispiral protoconch of 1.5 – about 3 whorls. Axial

1137

sculpture of orthocone or arcuate ribs, forming axially elongated subsutural nodules on well-defined

1138

band. Spiral sculpture from weak striae in interspaces between ribs to distinct cords, overriding ribs, often

1139

forming nodes at intersection or on lower portion of ribs. Last whorl typically shortly constricted to

1140

siphonal canal. Canal clearly separated from shell base, bearing well-pronounced fasciole.

1141

Anatomy. Radula absent; proboscis, venom gland and accessory proboscis structure typically absent;

1142

salivary gland typically present.

1143

1144

Distribution: Panamic and Caribbean, off Brazil, intertidal to upper bathyal depths, typically shallow.

1145

1146

Remarks: Shallow-water species of the *Neoterebra* differ notably from their congeners described from

1147

deep water of Brazil and Caribbean – the former being larger at maturity and sharing characteristic

1148

sculpture of strong axial ribs forming elevated, sometimes axially elongated nodules on subsutural band.

1149

Caribbean species have notably weaker subsutural band, and species from deep water commonly lack a

1150

recognizable subsutural band and display a fine cancellate pattern of narrow axial riblets, intersected by

1151

spiral cords of equal strength. Although the affinity of Panamic and Caribbean species is suggested by the

1152

analysis of COI, further studies are needed to document relationships and delineate major groupings

1153

within the genus.

1154

1155

Etymology: The name is a contraction of *neo* (*latin:* new) and *Terebra*, referring to the fact that species of

1156

this new genus only occur in East Pacific, Caribbean and off Brazil, constituting the majority of the New

1157

World terebrid fauna.

1158

1159

Included species:

1160 *Neoterebra acrior* (Dall, 1889)² comb. nov.;

1161 *N. alagoensis* (Lima, Tenorio & Barros, 2007)²

1162 comb. nov.;

- 1163 *N. alba* (Gray, 1834)² comb. nov.;
- 1164 *N. allyni* (Bratcher & Burch, 1970)² comb. nov.;
- 1165 *N. angelli* (J. Gibson-Smith & W. Gibson-Smith, 1984)² comb. nov.;
- 1166 *N. arcas* (Abbott, 1954)² comb. nov.;
- 1167 *N. armillata* (Hinds, 1844)¹ comb. nov.;
- 1168 *N. assu* (Simone, 2012)² comb. nov.;
- 1169 *N. berryi* (Campbell, 1961)² comb. nov.;
- 1170 *N. biminiensis* (Petuch, 1987)² comb. nov.;
- 1171 *N. brandi* (Bratcher & Burch, 1970)² comb. nov.;
- 1172 *N. brasiliensis* (E. A. Smith, 1873)² comb. nov.;
- 1173 *N. bridgesi* (Dall, 1908)³ comb. nov.;
- 1174 *N. carolae* (Bratcher, 1979)² comb. nov.;
- 1175 *N. churea* (Campbell, 1964)² comb. nov.;
- 1176 *N. colombiensis* (Simone & Gracia, 2006)² comb. nov.;
- 1177 *N. concava* (Say, 1826)² comb. nov.;
- 1178 *N. corintoensis* (Pilsbry & Lowe, 1932)² comb. nov.;
- 1179 *N. crassireticula* (Simone, 1999)² comb. nov.;
- 1180 *N. crenifera* (Deshayes, 1859)¹ comb. nov.;
- 1181 *N. curacaoensis* (De Jong & Coomans, 1988)² comb. nov.;
- 1182 *N. dislocata* (Say, 1822)¹ comb. nov.;
- 1183 *N. doellojuradoi* (Carcelles, 1953)² comb. nov.;
- 1184 *N. elata* (Hinds, 1844)¹ comb. nov.;
- 1185 *N. frigata* (Hinds, 1844)² comb. nov.;
- 1186 *N. glauca* (Hinds, 1844)² comb. nov.;
- 1187 *N. glossema* (Schwengel, 1942)¹ comb. nov.;
- 1188 *N. guadeloupensis* n. sp. Malcolm, Terry & Fedosov¹ sp. nov.;
- 1189 *N. guayaquilensis* (E. A. Smith, 1880)² comb. nov.;
- 1190 *N. hancocki* (Bratcher & Burch, 1970)² comb. nov.;
- 1191 *N. hemphilli* (Vanatta, 1924)² comb. nov.;
- 1192 *N. hondurasiensis* (Gargiulo, 2016)² comb. nov.;
- 1193 *N. intertincta* (Hinds, 1844)³ comb. nov.;
- 1200 *N. intumescyra* (Lima, Tenorio & Barros, 2007)² comb. nov.;
- 1201 *N. jacquelinae* (Bratcher & Burch, 1970)² comb. nov.;
- 1202 *N. juanica* (Dall & Simpson, 1901)² comb. nov.;
- 1203 *N. lamyi* (Terry, 2011)² comb. nov.;
- 1204 *N. larvaeformis* (Hinds, 1844)¹ comb. nov.;
- 1205 *N. leptapsis* (Simone, 1999)² comb. nov.;
- 1206 *N. limatula* (Dall, 1889)¹ comb. nov.;
- 1207 *N. lucana* (Dall, 1908)² comb. nov.;
- 1208 *N. mugridgeae* (García, 1999)² comb. nov.;
- 1209 *N. nassula* (Dall, 1889)² comb. nov.;
- 1210 *N. pacei* (Petuch, 1987)² comb. nov.;
- 1211 *N. panamensis* (Dall, 1908)² comb. nov.;
- 1212 *N. pedroana* (Dall, 1908)² comb. nov.;
- 1213 *N. petiveriana* (Deshayes, 1857)² comb. nov.;
- 1214 *N. plicata* (Gray, 1834)² comb. nov.;
- 1215 *N. protexta* (Conrad, 1846)² comb. nov.;
- 1216 *N. puncturosa* (Berry, 1959)¹ comb. nov.;
- 1217 *N. rancheria* (Bratcher, 1988)² comb. nov.;
- 1218 *N. riosi* (Bratcher & Cernohorsky, 1985)² comb. nov.;
- 1219 *N. roperi* (Pilsbry & Lowe, 1932)³ comb. nov.;
- 1220 *N. rushii* (Dall, 1889)² comb. nov.;
- 1221 *N. sanjuanense* (Pilsbry & Lowe, 1932)² comb. nov.;
- 1222 *N. shyana* (Bratcher & Burch, 1970)² comb. nov.;
- 1223 *N. simonei* (Lima, Tenorio & Barros, 2007)² comb. nov.;
- 1224 *N. specillata* (Hinds, 1844)¹ comb. nov.;
- 1225 *N. spirosulcata* (Simone, 1999)² comb. nov.;
- 1226 *N. sterigma* (Simone, 1999)² comb. nov.;
- 1227 *N. sterigmoides* (Simone & Gracia, 2006)¹ comb. nov.;
- 1228 *N. stohleri* (Bratcher & Burch, 1970)² comb. nov.;
- 1229 *N. tiarella* (Deshayes, 1857)³ comb. nov.;
- 1230 *N. variegata* (Gray, 1834)¹ comb. nov.;
- 1231 *N. vinosa* (Dall, 1889)² comb. nov.;

1244

1245

1246

Genus *Macaulager* n. gen.

(Fig. 7 E, F)

1247 *Type species: Terebra pseudopertusa* Bratcher & Cernohorsky, 1985; OD herein.

1248

1249 *Zoobank registration:* urn:lsid:zoobank.org:act:3565DB17-E4EF-478B-8757-3A682BB8F6CF

1250

1251 *Definition:* This genus includes species closely related to: *Maculauger pseudopertusus* (Bratcher &
1252 Cernohorsky, 1985), based on the molecular phylogenetic analysis (Gorson et al. submitted) and those
1253 that show a combination of conchological, anatomical and distribution characteristics closely comparable
1254 to *Maculauger pseudopertusus* or any genetically proven member of the genus.

Table 10 1255 *Diagnosis.* Diagnostic nucleotide combinations in the COI barcode region provided in the Table 10.

1256

1257 *Description:* Shell small to medium-sized (<60mm), typically, orange-brown with irregular maculations
1258 on subsutural band. Whorl outline flattened, or gently convex. Subsutural band lightly ribbed or flattened,
1259 separated from lower portion of the whorl by narrow groove of row of punctations. Axial and spiral
1260 sculpture elements of about equal strength producing cancellate sculpture below subsutural band.

1261 *Anatomy.* Proboscis, radula, venom gland and accessory proboscis structure absent, salivary gland present
1262 or absent.

1263

1264 *Distribution:* Indo-Pacific, subtidal and bathyal depths down to about 600 m.

1265 *Remarks:* The newly established genus *Maculauger* comprises several species that were formerly placed
1266 in *Hastulopsis*, and can be differentiated by the equal pronunciation of spiral and axial spiral elements,
1267 producing a fine cancellate sculpture when compared to similar species in *Myurella*. The species in
1268 *Hastulopsis* have very weak sculpture and are found in the Indian Ocean or endemic to Japan. Some
1269 species of *Maculauger*, such as *Maculauger campbelli*, are conchologically very close to *Profunditerebra*
1270 *orientalis* – a case where only anatomical and molecular characters can ensure correct identification (see
1271 Remarks section under *Profunditerebra*).

1272

1273 *Etymology:* The name of this new genus combines ‘macula’ referring to commonly maculated subsutural
1274 band in the species of the genus, with ‘auger’ – a common English epithet for Terebridae (auger shells).
1275 Gender masculine.

1276

1277 *Included species:*

1278 <i>Maculauger alveolatus</i> (Hinds, 1844) ¹ comb. nov.;	1283 <i>M. minipulcher</i> (Bozzetti, 2008) ¹ comb. nov.;
1279	1284 <i>M. pseudopertusus</i> (Bratcher & Cernohorsky,
1280 <i>M. campbelli</i> (R. D. Burch, 1965) ¹ comb. nov.;	1285 1985) ¹ comb. nov.;
1281 <i>M. castigatus</i> (A. H. Cooke, 1885) ¹ comb. nov.;	1286 <i>M. sudchiniensis</i> n. sp. Malcolm, Terryn &
1282 <i>M. cinctella</i> (Deshayes, 1859) ³ comb. nov.;	1287 Fedosov ¹ sp. nov.

1288

1289 **Genus *Myurellopsis* n. gen.**

1290 (Fig. 7 G – I)

1291 *Type species: Terebra undulata* Gray, 1834; OD herein.

1292

1293 *Zoobank registration:* urn:lsid:zoobank.org:act:EC3F14B2-3595-482B-9890-399BA78A7631

1294

1295 *Definition:* This genus includes species closely related to: *Myurellopsis undulata* (Gray, 1834), based on
1296 the molecular phylogenetic analysis (Gorson et al. submitted) and those that show a combination of
1297 conchological, anatomical and distribution characteristics closely comparable to *Myurellopsis undulata* or
1298 any genetically proven member of the genus.

1299 *Diagnosis.* Diagnostic nucleotide combinations in the COI barcode region provided in the Table 10.

1300

1301 *Description:* Shell small to medium-sized (<50mm), pinkish or orange, often with white subsutural band.
1302 Protoconch multispiral. Sculpture of strong rounded slightly undulating ribs, polished in appearance. Row
1303 of punctuations with groove partially cutting ribs forming subsutural band. Interstices between ribs deep
1304 and narrow, bearing regular striae and often darkly colored. Adapical parts of ribs forming one row of
1305 rounded nodules, separated from their lower portions by shallow depression or partial groove. Siphonal
1306 canal moderately long, tapering, with weakly developed fasciole.

1307 *Anatomy.* Two distinct states found in species of the genus: either all typical foregut structures present, or
1308 all are lacking; in the latter case accessory proboscis structure present.

1309

1310 *Distribution:* Throughout Indo-Pacific, intertidal to upper bathyal depths (to 358 m), typically shallow.

1311

1312 *Remarks:* Species in genus *Myurellopsis* n. gen. are closest to the *Myurella* spp., but can be differentiated
1313 by the sharper more elevated ribs often with nodes on the subsutural band or top of the whorls.

1314

1315 *Etymology:* The genus name refers to the close resemblance between its members and species in the
1316 genus *Myurella*. Gender feminine.

1317

1318 *Included species:*

- | | |
|---|--|
| 1319 <i>Myurellopsis alisi</i> (Aubry, 1999) ³ comb. nov.; | 1326 <i>M. nathaliae</i> (Drivas & Jay, 1988) ¹ comb. nov.; |
| 1320 <i>M. columellaris</i> (Hinds, 1844) ¹ comb. nov.; | 1327 <i>M. parkinsoni</i> (Bratcher & Cernohorsky, 1976) ¹ |
| 1321 <i>M. guphila</i> (Poppe, Tagaro & Terry, 2009) ¹ | 1328 comb. nov.; |
| 1322 comb. nov.; | 1329 <i>M. paucistriata</i> (E. A. Smith, 1873) ¹ comb. |
| 1323 <i>M. joserosadoi</i> (Bozzetti, 2001) ¹ comb. nov.; | 1330 nov.; |
| 1324 <i>M. kilburni</i> (R. D. Burch, 1965) ¹ comb. nov.; | 1331 <i>M. undulata</i> (Gray, 1834) ¹ comb. nov.; |
| 1325 <i>M. monicae</i> (Terry, 2005) ² comb. nov.; | 1332 <i>M. vaubani</i> (Aubry, 1999) ³ comb. nov. |

1333

1334

GENERA DEFINED BASED ON CONCHOLOGICAL CHARACTERS

1335

1336

Genus *Granuliterebra* Oyama, 1961

1337

(Fig. 10 A)

1338 *Type species:* *Terebra bathyrhaphe* E. A. Smith, 1875; OD.

1339 *Diagnosis:* Shells of small size (<36mm), slender, sculptured by strong ribs, bearing nodules on
1340 subsutural band and on bottom of ribs giving concave outline to whorls. Protoconch 2.5 to 4 whorls.

1341

1342 *Distribution:* Indian Ocean and western Pacific.

1343

1344 *Remarks:* Species in the genus *Pellifronia* are similar in having concave whorl outline but have notably
1345 weaker nodules and less clearly defined subsutural band. Species with similar nodulose sculpture exist in
1346 the genus *Neoterebra* but generally these have a wider apical angle to their outline or a very shiny texture.
1347 The species *Duplicaria tricincta*, with similar sculpture but including two raised thin spiral cords on
1348 whorls, was found to be in the genus *Duplicaria*.

1349

1350 *Included species:*

1351 *Granuliterebra bathyrhapse* (E. A. Smith,
1352 1875)⁴;

1353 *G. constricta* (Thiele, 1925)⁴;

1354 *G. eddunhami* Terryn & Holford, 2008⁴;

1355 *G. oliverai* Terryn & Holford, 2008⁴;

1356 *G. palawanensis* (Aubry & Picardal, 2011)⁴;

1357 *G. persica* (E. A. Smith, 1877)⁴.

1358

1359

Genus *Hastulopsis* Oyama, 1961

1360

(Fig. 10 B)

1361 *Type species:* *Terebra melanacme* E. A. Smith, 1873; OD.

1362

1363 *Diagnosis:* Shells small to medium-sized (up to 60 mm), shiny faintly axially ribbed, with numerous fine
1364 spiral incisions. Subsutural band generally not spirally decorated, and bordered by relatively deep incision
1365 (Terryn, 2007).

1366

1367 *Distribution:* Indian Ocean and western Pacific

1368 *Remarks:* The genus comprises two groups of shallow water species found along eastern coast of Africa
1369 to the Arabian Gulf and a group found in mainland Japan waters to Australia. Similar deeper water
1370 species are found in the genus *Maculauger* n. gen., most of which can be recognized by having a row of
1371 large spots on the periphery. The species within *Myurella* have a much stronger and more distinct
1372 sculpture features, and generally a brown basal area.

1373

1374 *Included species:*

1375 *Hastulopsis baliensis* Terryn & Dekker, 2017⁴;

1376 *H. blanda* (Deshayes, 1859)⁴;

1377 *H. cebuensis* Gargiulo, 2014⁴;

1378 *H. elialae* (Aubry, 1994)⁴;

1379 *H. gotoensis* (E. A. Smith, 1879)⁴;

1380 *H. loisae* (E. A. Smith, 1903)⁴;

1381 *H. maestratii* Terryn & Rosado, 2011⁴;

1382 *H. marmorata* (Deshayes, 1859)⁴;

1383 *H. masirahensis* Terryn & Rosado, 2016⁴;

1384 *H. melanacme* (E. A. Smith, 1873)⁴;

1385 *H. mirbatensis* Terryn & Rosado, 2016⁴;

1386 *H. suspensa* (E. A. Smith, 1904)⁴;

1387 *H. whiteheadae* (Aubry & Marquet, 1995)⁴.

1388

1389

Genus *Pristiterebra* Oyama, 1961

1390

(Fig. 10 C)

1391 *Type species:* *Terebra tsuboiana* Yokoyama, 1922†; OD.

1392 [Synonym: *Laeviacus* Oyama, 1961; Type species: *Terebra chibana* Yokoyama, 1922; OD]

1393

1394 *Diagnosis:* Shell small to medium-sized (20-65 mm). Whorls outline flattened to convex with
1395 predominant pustulose, or seldom cancellate sculpture. Whorl periphery shifted abapically, leading to
1396 truncated appearance of shell, with shell base shortly constricted to short siphonal canal. Aperture wide,
1397 especially in its anterior portion.

1398

1399 *Distribution:* Western Pacific

1400 *Remarks:* A characteristic truncated outline with a short siphonal canal and broad aperture allows for easy
1401 recognition of the *Pristiterebra* spp. among other terebrid genera. Species in *Pristiterebra* are nearest to
1402 the nodulose species of *Neoterebra*, i.e. *N. tuberculosa*, *N. glauca* and *N. petiveriana*, which can be
1403 recognised by the presence of a distinct subsutural groove. Some species of *Gradaterebra* and *Partecosta*
1404 have similar shell outline, but both can be differentiated from *Pristiterebra* by dominating axial sculpture
1405 or, rarely, complete lack of sculpture, and (*Partecosta*) by generally smaller adult size.

1406

1407 *Included species:*

- | | |
|---|---|
| 1408 <i>Pristiterebra bifrons</i> (Hinds, 1844) ⁴ ; | 1412 <i>P. miranda</i> (E. A. Smith, 1873) ⁴ comb. nov.; |
| 1409 <i>P. fraussenii</i> Poppe, Tagaro & Terryn, | 1413 <i>P. pustulosa</i> (E. A. Smith, 1879) ⁴ comb. nov.; |
| 1410 2009 ⁴ comb. nov.; | 1414 <i>P. tuberculosa</i> (Hinds, 1844) ⁴ comb. nov.. |
| 1411 <i>P. milelinae</i> (Aubry, 1999) ⁴ comb. nov.; | |

1415

1416 **Genus *Gradaterebra* Cotton & Godfrey, 1932**

1417 (Fig. 10 D)

1418 *Type species:* *Gradaterebra scalariformis* Cotton & Godfrey, 1932; OD.

1419

1420 *Diagnosis:* Small (<25 mm) often dull coloured shells with flattened to bulbous whorls, axial structure of
1421 prominent ribs, spiral structure absent, microscopical or represented by fine cords; last whorl inflated.

1422

1423 *Distribution:* Indian Ocean and SW Pacific

1424 *Remarks.* The genus mainly comprises small species from Australia and South Africa that can be
1425 differentiated based on adult size <25mm.

1426

1427 *Included species:*

- | | |
|--|--|
| 1428 <i>Gradaterebra scalariformis</i> (Cotton & Godfrey, | 1435 <i>G. ninfae</i> (Campbell, 1961) ⁴ comb. nov.; |
| 1429 1932) ⁴ comb. nov.; | 1436 <i>G. pilsbryi</i> (Aubry, 1999) ⁴ comb. nov.; |
| 1430 <i>G. assecla</i> (Iredale, 1924) ⁴ comb. nov.; | 1437 <i>G. planecosta</i> (Barnard, 1958) ⁴ comb. nov.; |
| 1431 <i>G. capensis</i> (E. A. Smith, 1873) ⁴ comb. nov.; | 1438 <i>G. severa</i> (Melvill, 1897) ⁴ comb. nov.; |
| 1432 <i>G. easmithi</i> (Aubry, 1999) ⁴ comb. nov.; | 1439 <i>G. sorrentense</i> (Aubry, 1999) ⁴ comb. nov.; |
| 1433 <i>G. kowiensis</i> (Turton, 1932) ⁴ comb. nov.; | 1440 <i>G. taylori</i> (Reeve, 1860) ⁴ comb. nov. |
| 1434 <i>G. lightfooti</i> (E. A. Smith, 1899) ⁴ comb. nov.; | |

1441

1442

1443

1444

Genus *Perirhoe* Dall, 1908

1445

(Fig. 10 E)

1446 *Type species: Perirhoe circumcincta* (Deshayes, 1857); OD.

1447 [Synonym: None.]

1448

1449 *Diagnosis:* Shell small to medium-sized (< 50mm), solid, axial structure weak to obsolete, spiral structure
1450 of irregular punctate grooves; subsutural band weakly defined.

1451

1452 *Distribution:* Southern Pacific, particularly New Caledonia.

1453

1454 *Remarks:* *Perirhoe* is close to the genus *Oxymeris* in terms of shell proportions; however, it can be readily
1455 differentiated from species of the latter by the distinct spiral grooves throughout the whorl's height. The
1456 sculpture pattern of widely set spiral grooves in *Perirhoe* resembles some species of *Terebra*, but the
1457 latter group has notably more slender shells with higher spire and less robust siphonal canal.

1458

1459 *Included species:*

1460 *Perirhoe circumcincta* (Deshayes, 1857)⁴;

1461 *Perirhoe valentinae* (Aubry, 1999)⁴ comb. nov.

1462

1463

1464

Genus *Microtrypetes* Pilsbry & Lowe, 1932

1465

(Fig. 10 F)

1466 *Type species: Microtrypetes iola* Pilsbry & Lowe, 1932; OD.

1467

1468 *Diagnosis:* Shell small (<20mm), dull, with turreted outline due to subcylindric to clearly cylindric whorl
1469 outline. Sculpture of strong and straight to fine curving axial ribs and fine spiral striae. Subsutural band
1470 indistinct or weakly defined. Siphonal canal rather long, curved.

1471

1472 *Distribution:* Eastern Pacific.

1473 *Remarks:* The genus can be differentiated from other New World genera of Terebridae by the stepped
1474 appearance of the spire due to cylindrical or sub-cylindrical whorl outline, by generally indistinct
1475 subsutural band, and by rather long for the family siphonal canal.

1476

1477 *Included species:*

1478 *Microtrypetes iola* Pilsbry & Lowe, 1932⁴;

1479 *M. polypenus* (Pilsbry & Lowe, 1932)⁴ comb. nov.

1480

1481

1483 **Abbreviations**

- 1484 GM: Private collection of Gavin Malcolm, UK;
 1485 JR: Private collection of José Rosado, Mozambique;
 1486 MMM: Malacologia Mostra Mondiale, Italy;
 1487 MNHN: Muséum national d'Histoire naturelle, Paris, France;
 1488 NHMUK: Natural History Museum of the United Kingdom, London, UK;
 1489 NMSA: National Museum of South Africa, KwaZulu-Natal Museum, Pietermaritzburg, South Africa;
 1490 SG: Private collection of Sandro Gori, Italy;
 1491 USNM: National Museum of Natural History, Smithsonian Institution, Washington, D.C.;
 1492 YT: Private collection of Yves Terryn, Belgium.

1493

1494 ***Bathyterebra zhongshaensis* Malcolm, Terryn & Fedosov new species**

1495 (Fig. 2H)

1496 *Type material*: Holotype, MNHN IM-2013-61800, 17.4 x 4.8 mm.

1497 *Type locality*: South China Sea, Helen Shoal, 19°13'N; 113°55'E, 470-494 m [ZhongSha 2015 Stn
 1498 DW4138]

1499 *Zoobank registration*: urn:lsid:zoobank.org:act:C8461C7A-BF53-48D4-BE1B-EF23F17413F8

Table 11	00 <i>Diagnostic nucleotide positions in COI alignment</i> : see Table 11.
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1501 *Description*: Shell small with orthocone spire and rather wide apical angle. Protoconch wide paucispiral,
 1502 comprising 2.5 whorls with small nucleus. Teleoconch of 9 whorls Early teleoconch whorls convex in
 1503 outline with strong sharply convex ribs; subsequent whorl's outline with narrow constriction formed by
 1504 indentation with straight ribs below the suture. Suture distinct and ragged. Mature whorls with less
 1505 convex outline, weaker and more numerous ribs, 30 on the penultimate whorl. Spiral sculpture of very
 1506 weak threads. Last whorl bulbous at its base but elongate with wide aperture. Columella straight with
 1507 weak fold. Overall colour white with extensive patches of light tan axial flammules on mature whorls.

1508

1509 *Habitat*: Found at depths between 470-494 m.1510 *Distribution*: Only known from type locality.

1511 *Etymology*: Named for the Zhongsha sand bars, which form a subsurface atoll that sits on top of the
 1512 Macclesfield Bank.

1513

1514 *Remarks*: *Bathyterebra zhongshaensis* n. sp. is similar to the deep-water species *Bathyterebra coriolisi*
 1515 (Aubry, 1999) and *Bathyterebra benthalis* (Dall, 1889). *Bathyterebra coriolisi* (Fig. 2E) is similar in
 1516 colour, in the sculpture of the early whorls and in the shape of its aperture. However, *Bathyterebra*
 1517 *coriolisi* differs in having a much narrower shape with a strong subsutural groove and fewer ribs on the
 1518 early whorls creating a band with nodes. Its subsutural groove becomes weaker and weaker with just a
 1519 slight indentation on mature whorls. *Bathyterebra benthalis* (Fig. 2I) is similar in colour and in overall
 1520 sculpture of the shell, but differs from the *Bathyterebra zhongshaensis* n. sp. in the outline of its mature
 1521 whorls being flat and the ribs on the early whorls are extremely convex creating nodes which dominate
 1522 the profile of the early whorls.

1523

1524

Duplicaria herberti Malcolm, Terryn & Fedosov new species

(Fig. 11 A – C)

Fig. 11

525

1526 *Duplicaria mozambiquensis* Bratcher & Cernohorsky, 1982 - Aubry 1992: fig. 9; Aubry et al. 2006:
1527 pl. 16.

1528

1529 *Type material:* Holotype, MNHN IM-2013-52381, lv, 29.7 mm. Paratypes: Mozambique, Inhaca Island
1530 26°03.1'S; 33°01.0'E, 50-53 m [INHACA 2011, Stn MD13]. Paratype 1, MNHN IM-2013-52373, 1 lv,
1531 17.4 mm; Paratype 2, MNHN IM-2013-52379, 1 lv, 23.0 mm; Paratype 3, MNHN IM-2013-52383, 1 lv,
1532 28.2 mm. Paratype 4, type locality, MNHN IM-2013-52385, 1 lv, 30.8 mm. Paratype 5, 26°05.0'S;
1533 32°59.0'E, 0-35 m, 24.0 mm [INHACA 2011 Stn MA15], 1 lv, MNHN IM-2013-52405, 24.0 mm;
1534 Paratypes 6 – 19, YT, Mozambique, Inhaca Island, 6-8 m, 14 lv, 22.4-32.5 mm; Paratype 20, SG,
1535 Mozambique, off Inhaca Island, 25°59'59.3"S; 32°54'43.2"E, 4 m, 1 lv, 24.0 mm; Paratypes 21 – 25, JR,
1536 Mozambique, off Inhaca Island, 4-8 m, 4 lv, 30.0-39.5 mm; Paratype 26: GM, Mozambique, Inhambane,
1537 1 lv, 26 mm; Paratype 27: YT, South Africa, Natal, off Durban Bluff, in sand dredging at bay head dump,
1538 1 dd, 32.0 mm.

1539 *Type Locality:* Mozambique, 26°00.0'S - 32°54.4'E, 4 m [INHACA 2011 Stn MR15]

1540 *Zoobank registration:* urn:lsid:zoobank.org:act:C26159E5-4A5A-4218-AC7F-A76103809749

1541 *Diagnostic nucleotide positions in COI alignment:* see Table 11.

1542

1543 *Description:* Shell of medium size, protoconch paucispiral consisting of about 1.0-1.5 broad whorls.
1544 Teleconch of holotype with 11 whorls. Outline of teleoconch whorls straight. Spiral sculpture absent.
1545 Subsutural band beset with axially elongated nodes corresponding to axial ribs on the remainder of the
1546 whorl. Subsutural band bordered by deep and wide depression lacking punctations. Straight axial ribs
1547 stretching across whorl, sharply angular apically and becoming more rounded abapically. Axial ribs
1548 half as wide as interspaces; 17 ribs on penultimate whorl of holotype. Axial growth lines pronounced
1549 throughout whorl height. Aperture wide, somewhat quadrate, brown with white band; columella straight
1550 with visible fold. Shell colour dark blackish brown, lighter coloured early whorls and a spiraling whitish
1551 line at the periphery.

1552

1553 *Habitat:* Retrieved from depths between 0 and 55 m.

1554 *Distribution:* Known from South Mozambique to off Durban, RSA.

1555 *Etymology:* The species honours Dr David G. Herbert (formerly Chief Curator of Mollusca, KwaZulu-
1556 Natal Museum, RSA), who contributed with detailed observations on the *D. mozambiquensis* type series
1557 at the KwaZulu-Natal Museum and provided additional historical information.

1558

1559 *Remarks:* Shell colour varies: juveniles have shiny beige to fawn colour; also lighter brown coloured
1560 specimens are known. This species has always been confused with *Duplicaria mozambiquensis* Bratcher
1561 & Cernohorsky, 1982, even by its authors. The holotype of *Duplicaria mozambiquensis* (NMSA
1562 H7843/T2541) is a small, slender shell of 22.3 mm. The type series of *Duplicaria mozambiquensis* shows
1563 a large discrepancy in many features between the holotype and all the paratypes which are specimens of
1564 *Duplicaria herberti* n. sp. Subsequent authors have to our knowledge always featured specimens of
1565 *Duplicaria herberti* n. sp. as *Duplicaria mozambiquensis* which should be considered a rarely
1566 encountered species.

1567 The whorls of *Duplicaria mozambiquensis* (Fig. 11D) have a narrower apical angle, its convex axial ribs
1568 giving the outline an extremely rounded convex impression, the subsutural band comprises round nodes,
1569 compared to elongated nodes on *D. herberti* n. sp. The axial ribs of *Duplicaria herberti* n. sp. become
1570 straight creating an angular projection posteriorly. The peripheral white band in *Duplicaria*
1571 *mozambiquensis* is wider and more clearly defined. Both have a subsutural furrow with minute axial
1572 growth striae, appearing as a punctate groove in *D. mozambiquensis*, while this feature is not present in
1573 *Duplicaria herberti* n. sp. We have no confirmation that *Duplicaria mozambiquensis* has ever been found
1574 in the south of Mozambique while specimens of *D. herberti* n. sp. are found extensively in the south of
1575 Mozambique and South Africa. Within *Duplicaria*, several species change the sculpture of their whorls as
1576 they grow and do so at variable rates of change. However a comparison of the early whorls of the two
1577 species highlights differences in the early whorls and protoconch of *Duplicaria mozambiquensis* and *D.*
1578 *herberti*. The protoconch of *Duplicaria mozambiquensis* is about 30% less wide than that of *D. herberti* n.
1579 sp. and the latter has a broader inflated shape. The early whorls of *D. mozambiquensis* have distinctive
1580 round nodes compared to convex ribs on *D. herberti* n. sp.

1581

1582 ***Partecosta bozzettii* Malcolm, Terryn & Fedosov new species**

1583 (Figs 3K, 11 E)

1584 *Type material*: Holotype, MNHN IM-2009-10163, 12.5 mm. Paratype 1, Type locality, MNHN IM-2009-
1585 10162, 1 lv, 11.8 mm.

1586 *Type Locality*: S Madagascar, Port d'Ehoala, 25°03'43.9"S; 46°57'42.9"E, 3-4 m [ATIMO VATAE Stn
1587 TP29].

1588 *Zoobank registration*: urn:lsid:zoobank.org:act:6E3E67B5-1B55-4A99-8D39-6517DA4D065C

1589 *Diagnostic nucleotide positions in COI alignment*: see Table 11.

1590 *Description*: Shell small; protoconch paucispiral of a single whorl with broad nucleus. Holotype with 9
1591 teleoconch whorls; outline of teleoconch whorls weakly convex. No subsutural band, or demarcation
1592 thereof, except for minor indentation of ribs; no visible spiral sculpture. Axial sculpture consists of almost
1593 straight, thin ribs, 14 on penultimate whorl, stretching across whorl height; interspaces notably wider than
1594 ribs. Last whorl elongate, tapering towards base. Columella straight, aperture elongate. Shell color off-
1595 white with darker tinged spiral band abapically on the whorls and below the periphery; brownish blotches
1596 between the axial ribs abapically on the whorls; dark brown/purplish inner columella.

1597 *Habitat*: In sand at 3-4 m.

1598 *Distribution*: Known only from the type locality.

1599 *Etymology*: The species honours Luigi Bozzetti (Italy), who has contributed tremendously to the
1600 knowledge of the S Madagascar molluscan fauna.

1601 *Remarks*: The species resembles *Partecosta trilineata* (Bozzetti, 2008) (Fig. 11F) but differs from the
1602 latter by its more globose and convex whorls and by having a single row of brown blotches instead of
1603 two. Moreover, the protoconch of *Partecosta trilineata* is differently shaped, has 2 whorls with a medium
1604 nucleus. The phylogenetic analysis shows significant genetic distance between the two species.
1605 *Partecosta bozzettii* n. sp. shares some resemblance to *Partecosta albofuscata* (Bozzetti, 2008) but again
1606 differs from the latter by its more convex whorls, distinct axial ribbing and shell color pattern. *Partecosta*
1607 *bozzettii* n. sp. is similar in general morphology and shell colour pattern to *Hastula daniae* (Aubry, 2008)
1608 (Fig. 2G) described from West Africa but the latter species has a multispiral protoconch and more globose
1609 mature whorls.

1610

1611 ***Profunditerebra papuaprofundii* Malcolm, Terryn & Fedosov new species**

1612

(Fig. 12 A, B)

1613 *Type material:* Holotype, MNHN IM-2013-58123, 19 x 4.4 mm. Paratype 1, W Buka Is, N Bougainville,
1614 N/O *Alis*, 5°43'S; 154°03'E, 490-530 m [MADEEP Stn DW4278], MNHN IM-2013-45571, 1 lv, 29.5 x
1615 6.3 mm; Paratype 2, same locality MNHN IM-2013-59946, 1 lv, 25.6 x 5.1 mm; Paratype 3, same
1616 locality, MNHN IM-2013-59944, 1 lv, 13.7 x 3.7 mm. Paratype 4: W Buka Is, N Bougainville, N/O *Alis*,
1617 5°35'S; 153°58'E, 623-640 m, [MADEEP Stn DW4271], MNHN IM-2013-59945, 1 lv, 16.3 x 4.3 mm.
1618 Paratype 5: W Buka Is, N Bougainville, N/O *Alis*, 5°37'S; 153°59'E, 421m, [MADEEP Stn DW4270],
1619 MNHN IM-2013-45509, 1 lv, 27.1 x 5.8 mm. Paratype 6: SW Santa Isabel Is., N/O *Alis*, 8°24'S;
1620 159°27'E, 362-432 m [SALOMON 2 Stn CP2193], MNHN IM-2013-30574, 1 lv, 33 x 6.1 mm (broken).

1621 *Other material examined:* Taiwan, 15°03' N; 116°31' E [NANHAI 2014 Stn DW4102], 1 lv, IM-2013-
1622 52276, 1 lv.

1623 *Type locality:* Papua New Guinea, off New Ireland, 2°21'S; 150°38'E, 496-609 m [KAVIENG 2014 Stn
1624 CP4422].

1625 *Zoobank registration:* urn:lsid:zoobank.org:act:ABAFB4A7-FCD6-4632-A07C-E9945D21EA7A

1626 *Diagnostic nucleotide positions in COI alignment:* see Table 11.

1627 *Description* (holotype): Shell of moderate size to 42 mm. Protoconch of 4 narrow, conical whorls with
1628 small nucleus. Teleoconch of 12 whorls; teleoconch whorl outline convex constricted abapically at the
1629 suture. Subsutural groove represented by weak indentation on early whorls becoming sharper groove
1630 cutting through the ribs on mature whorls. Sculpture of strong slightly convex narrow axial ribs on
1631 subsutural band aligned with those on succeeding portion of whorls, varying significantly between
1632 specimens in spacing, and in number from 18 to 25 (20 ribs on penultimate whorl). No spiral sculpture in
1633 interspaces except for striae on base below periphery. Last whorl cup-shaped, becoming more elongate on
1634 mature specimens. Aperture wide with slight callus; columella straight with 2 folds. Colour off-white
1635 with tinges of yellow or pink with shiny white columella.

1636 *Habitat:* Found at depths from 350-600 m.

1637 *Distribution:* Known from Papua New Guinea, the Solomon Islands and Taiwan.

1638 *Etymology:* Named after its deep water habitat in Papua New Guinea.

1639 *Remarks:* The only sequenced specimen of *Profunditerebra papuaprofundum* n. sp. with intact protoconch
1640 was designated as a holotype. It is notably smaller than other sequenced type specimens that reach shell
1641 length of 42 mm. The larger specimens demonstrate the increased curvature of ribs and increased number
1642 and density of ribs to 25 on penultimate whorl. *Profunditerebra papuaprofundum* n. sp. is phylogenetically
1643 closest to *Profunditerebra orientalis* (Aubry, 1999) and *Profunditerebra anseeuwi* (Terry, 2005).
1644 *Profunditerebra anseeuwi* has a weaker subsutural groove, straight and oblique ribs and a mottled colour
1645 pattern. *Profunditerebra orientalis* has more axial ribs, a mottled colour pattern and a sculpture of ribs
1646 and spiral cords creating nodes at intersections. Specimens of *Profunditerebra papuaprofundum* n. sp. with
1647 more numerous curving ribs are similar to *Maculauger cinctella* (Deshayes, 1859) and *Terebra textilis*
1648 Hinds, 1844 (Salvador & Pickering 2017). However *M. cinctella* (Fig. 12C) has a shorter protoconch of
1649 2.5 whorls, a much narrower noded subsutural band and many spiral striae within the interspaces
1650 between ribs on its whorls. In turn, *Terebra textilis* (Fig. 12D) differs in having a spiral groove defined by
1651 deep punctuations or partially cutting ribs and has several spiral striae in the interspaces between ribs.

1652

1653

1654 ***Profunditerebra macclesfieldensis* Malcolm, Terry & Fedosov new species**

1655

(Fig. 12 E, F)

1656 *Type material:* Holotype, MNHN IM-2013-61875, 22.4 x 4.3 mm. Paratype 1, type locality, MNHN IM-
1657 2013-61877, 1 lv, 22.2 x 4.2 mm; Paratype 2, type locality, MNHN IM-2013-61995, 1 lv, 27.2 x 5.1 mm.
1658 Paratype 3, New Ireland, 2°26'S; 149°55'E, 240-242 m [KAVIENG 2014 Stn DW4485], MNHN IM-
1659 2013-58887, 1 lv, 19.2 x 3.9 mm. Paratype 4, South China Sea. YT, 200 m, 1 dd, 23.1 mm. Paratype 5 –
1660 7, Philippines, off Aliguay Island, YT, dredged at 150-200 m, 3 lv, 20.6-29.5 mm.

1661 *Type locality:* N Macclesfield bank; South China Sea 16°07'N; 114°23'E, 161-m [ZhongSha 2015 Stn
1662 DW4144].

1663 *Zoobank registration:* urn:lsid:zoobank.org:act:F1081F38-DB65-4EDF-B73C-8743D92009A9

1664 *Diagnostic nucleotide positions in COI alignment:* see Table 11.

1665 *Description:* Shell sized up to 30 mm. 12 teleoconch whorls on holotype. Protoconch multispiral with 4
1666 translucent amber whorls and small nucleus. Teleoconch whorls with straight outline. Subsutural band
1667 defined by continuous punctuate groove. Axial ribs thin compared to interspaces gradually becoming
1668 more numerous resulting in about 25 ribs on penultimate whorl of holotype. Ribs only intersected by
1669 punctuate groove, extended onto flat subsutural band. On last whorl, the ribs fade at the periphery. No
1670 spiral sculpture visible between the ribs. Aperture long, creating elongate rounded shape to the last whorl.
1671 Columella straight with callus in mature specimens. Colour from brown to white with some brown
1672 markings.

1673 *Habitat:* Found at 160-240 m.

1674 *Distribution:* Known from the South China Sea, Philippines and Papua New Guinea.

1675 *Etymology:* Named after the type locality, the Macclesfield bank in the South China Sea.

1676

1677 *Remarks:* In terms of shell morphology *Profunditerebra macclesfieldensis* n.sp. is most similar to
1678 *Profunditerebra anseeuwi* (Terryn, 2005) (Fig. 12G), *Duplicaria duplicata* (Linnaeus, 1758) (Fig. 3A),
1679 and *Punctoterebra teramachii* (R.D. Burch, 1965) (Fig. 8B). *Profunditerebra anseeuwi* is the most
1680 similar in shell morphology; it has a much shorter columella creating a cup shape to the last whorl. Its ribs
1681 are set at an oblique angle and its colour is white, with broad brown spiral bands between the ribs and
1682 dark spots on the subsutural band. *Duplicaria duplicata* differs in having a paucispiral protoconch of 1.5
1683 whorls, a shorter aperture and its ribs are broad and closely packed. *Punctoterebra teramachii* has a much
1684 narrower apical angle, the profile of its whorls is more rounded and the subsutural band narrower.

1685

1686

1687

***Neoterebra guadeloupensis* Malcolm, Terryn & Fedosov new species**

1688

(Fig. 13 A, B)

1689 *Type material:* Holotype, MNHN IM2013-61448: 17.2 x 3.5 mm. Paratypes: Guadeloupe, off Fajou,
1690 16°22'N; 61°34', 80 m [KARUBENTHOS 2012 Stn GD02]. Paratype 1, MNHNIM-2013-20542, 1 lv, 6.5
1691 x 2 mm; Paratype 2, MNHNIM-2013-20541, 1 lv, 5.7 x 2 mm; Paratype 3, MNHN IM-2013-20539, 1 lv,
1692 10.4 mm x 2.6 mm. Paratype 4, Guadeloupe, Port Louis, 16° 22' 46'N; 61°34'W, 66 m [KARUBENTHOS
1693 2012 Stn GD35], MNHN IM-2013-9110, 1 lv, 7 x 2.1 mm.

1694 *Type Locality:* S Marie-Galante, Guadeloupe. 15°50'N, 61°19'W, 305-312 m [N/O *Antea*,
1695 KARUBENTHOS 2015 Stn DW4638].

1696 *Zoobank registration:* urn:lsid:zoobank.org:act:57E995EE-24F0-47A0-9DDC-E9D54948B056

1697 *Diagnostic nucleotide positions in COI alignment:* see Table 11.

Fig. 13

1698 *Description:* Shell small; protoconch multispiral, transparent with 3 whorls tinged yellow. Protoconch /
1699 teleoconch transition clear-cut with visible sinusigera. Teleoconch of holotype with 15 whorls; overall
1700 whorls outline straight to convex. Weak axial sculpture of 15 narrow axial ribs with wider interspaces
1701 increasing with maturity to 25 on penultimate whorl. Deep subsutural groove crossed obliquely by ribs.
1702 Subsutural band with strong elongate nodes; subsequently, two strongly projecting spiral cords at top and
1703 middle of whorl dominating sculpture forming a reticulate pattern of deep indentations with thin ribs. The
1704 upper cord projects in outline beyond the subsutural band. On the mature whorls interspaces sometimes
1705 with one or two weak spiral striae. Reticulate sculpture continuing on shell base; aperture long with weak
1706 callus; columella with 2 weak folds. Shell lacks any pattern, coloured in shades of white to yellow.

1707 *Habitat:* Deep water 60-310 m.

1708 *Distribution:* Only known from off Guadeloupe.

1709 *Etymology:* Named after the type locality, the French Caribbean island of Guadeloupe.

1710 *Remarks:* A number of Terebridae species have been described from the Western Atlantic and Caribbean
1711 seas which have a similar strong reticulate sculpture. These include *Neoterebra limatula* (Dall, 1889)
1712 which has more than 2 strong spiral cords in addition to the subsutural band (Fig. 13C) and has a
1713 paucispiral protoconch. *Neoterebra colombiensis* (Simone & Gracia, 2006) is very similar to *Neoterebra*
1714 *guadeloupensis* n. sp. but the spiral sculpture in the former species is less dominant giving a more
1715 uniform reticulate sculpture with nodes at intersections. Furthermore, *Neoterebra colombiensis* has a
1716 paucispiral protoconch in comparison to the multispiral protoconch of the *N. guadeloupensis* n. sp.
1717 *Neoterebra simonei* (De Lima, Tenorio & De Barros, 2007) is similar in colour and sculpture, however, it
1718 has 3 spiral cords in addition to the subsutural band and has a distinctive paucispiral protoconch of 1.5
1719 whorls. Other similar species from the region e.g. *Neoterebra intumescyca* (De Lima, Tenorio & De
1720 Barros, 2007), *Neoterebra alagoensis* (De Lima, Tenorio & De Barros, 2007) (Fig. 9F) all have
1721 paucispiral protoconchs and differing sculpture patterns.

1722

1723 ***Macaulaiger sudchinensis* Malcolm, Terryn & Fedosov new species**

1724 (Fig. 13 D, E)

1725 *Type material:* Holotype, MNHN IM-2013-61887, 19.9 x 3.9 mm. Paratypes, South China Sea, N
1726 Macclesfield Bank, 16°08'N, 114°19'E, 180-226 m [ZhongSha 2015 Stn CP4145], Paratype 1, 1 lv,
1727 MNHN IM-2013-61902, 20.2 x 3.2 mm; Paratype 2, 1 lv, MNHN IM-2013-61895, 20.7 x 3.7 mm.

1728 *Other examined material:* South China Sea, N Macclesfield Bank, 16°07'N; 114°19'E, 218-281 m
1729 [ZhongSha 2015 Stn CP4148], 2 dd.

1730 *Type Locality:* South China Sea, N Macclesfield Bank, 16°07'N; 114°23'E, 161 m [ZhongSha 2015 Stn
1731 DW4144].

1732 *Zoobank registration:* urn:lsid:zoobank.org:act:BB5F5C93-C9FE-44F0-B1EC-C00AA31EFF23

1733 *Diagnostic nucleotide positions in COI alignment:* see Table 11.

1734 *Description:* Shell sized to 21 mm, with rather narrow apical angle. Protoconch paucispiral of 1.5
1735 translucent whorls. Teleoconch of holotype with 14 whorls; outline of teleoconch whorls slightly convex.
1736 Subsutural band formed by deep punctures. Axial ribs narrow with wide interspaces; ribs circa 18-20 on
1737 penultimate whorl, straight on subsutural band, becoming oblique at subsutural groove and then curved
1738 on abapical part of whorls. Axial ribs intersected by 2 to 3 evenly spaced spiral grooves. Aperture long
1739 with straight columella. Ground colour chalky white, sometimes with vague brown marks on subsutural
1740 band.

1741 *Distribution:* Only known from the N Macclesfield Bank.

1742 *Habitat:* Found at depths of 160-220 m.

1743 *Etymology*: Named after the South China Sea.

1744 *Remarks*: *Maculauger campbelli* (R.D. Burch, 1965) has a similar protoconch and slender overall shape
1745 with slightly convex whorls but in comparison with *Maculauger sudchinensis* n. sp. has a more
1746 continuous subsutural groove, less pronounced sculpture, with 5-7 spiral grooves and a distinctive pattern
1747 of straw colour with random square spots. *Maculauger sudchinensis* n. sp. is similar to *Terebra*
1748 *helichrysum* (Melvill & Standen, 1903) (Fig. 13F), which however has a much shorter curved columella,
1749 a multispiral protoconch of 3.5 whorls, its whorls are shorter and it has an mottled orange colour pattern.
1750 *Terebra levantina* (Aubry, 1999) (Fig. 13G) has similar sculpture, but its whorls are much shorter, there
1751 are 4-6 spiral grooves on its whorls, and it has a mottled colour pattern.

1752

DISCUSSION

1753

1754 *Terebridae systematics: a case study for integrative taxonomy* This work describes the
1755 systematic revision of the venomous conoidean marine snail family Terebridae using an
1756 integrated molecular, morphological, and anatomical approach. With the increasing role of DNA
1757 sequence analysis in systematic studies, a critical step is the transition from inferred clades to
1758 formally described taxa. A phylogenetic tree allows recognition of clusters of closely related
1759 species, thus defining content of future taxa, but provides no means of ICZN valid
1760 circumscription of these taxa. Additionally, existing taxonomic practices are still deeply rooted
1761 in traditional morphology based alpha-taxonomy. Therefore, an informative morphology based
1762 diagnosis and / or description remains central for the formal establishment of new taxa.
1763 Similarly, when contents of previously known taxa are redefined based on a phylogenetic
1764 analysis, provision of reliable diagnostic morphological characters consistent with inferred
1765 phylogenetic relationships is challenging, but notably increases the operationability of the
1766 revised taxonomic arrangement. Thus, knowing the phylogenetic relationships provides
1767 necessary insight, as it enables a 'guided' detection of inconspicuous and previously likely
1768 ignored features that may prove to be very important for understanding the morphological
1769 identity of a taxon. In this vain we applied the recent 154 species molecular phylogenetic
1770 analyses of the Terebridae (Gorson et. al. submitted) to elaborate the classification of Terebridae
1771 in combination with shell and anterior alimentary system characters. Our results placed the 407
1772 living species of the family, including 7 species described herein, into three subfamilies:
1773 Pellifroniinae new subfamily, Pervicaciinae Rudman, 1969 and Terebrinae Mörch, 1852.
1774 Additionally, we devised an in-house computational method for analyzing COI fragments to
1775 propose DNA based diagnoses to define most of the supraspecific taxa of Terebridae. Using this
1776 approach we propose separate diagnoses for the inferred phylogenetic clusters within *Terebra*,
1777 *Punctoterebra*, and *Hastula* genera.

1778

1779 *Challenges of transition from shell-based to DNA based taxonomy*

1780 Traditional molluscan shell-based taxonomy is increasingly being challenged by DNA
1781 based methods. When these two methods are in agreement it adds a significant amount of rigor
1782 and validation to the process of species delimitation. However, when shell-based and DNA
1783 findings are incongruent, deciphering a robust diagnoses is an arduous task. The notable
1784 discrepancies between morphology-based and DNA-based hypotheses of terebrid genera
1785 challenged our ability to formally establish these taxa following traditional taxonomic practices.
1786 Morphological variation in some phylogenetic lineages of Terebridae were so notable that it was
1787 extremely difficult to propose an inclusive diagnosis that would still be informative. A perfect
1788 example of such distinct conchological clusters can be found in the genus *Punctoterebra*, where
1789 *P. solangeae* is hardly distinguishable from the sympatric species of *Partecosta*. Species of the
1790 *Punctoterebra teramachii* complex demonstrate shell characteristics typical of *Duplicaria*, and
1791 the *Punctoterebra textilis* group would perfectly fit in a cluster of heavily sculptured *Terebra*. To
1792 cope with this situation and satisfy requirements of ICZN, we provided inclusive descriptions of
1793 genera and elaborated guidelines for their differentiation in *Remarks*. In cases similar to the one
1794 of *Punctoterebra*, we treated several morphological groups included in a phylogenetic genus
1795 separately, as each of them appeared morphologically more similar to one or several unrelated
1796 lineages, than to inferred congeners. One would argue that splitting such heterogeneous groups

1797 could have been a reasonable solution, leading at least to narrower and more robust generic
1798 diagnoses. Nevertheless, informative and seemingly more practical diagnoses would have been
1799 the only advantage of such a scheme, since they would not have made the task of delineating a
1800 morphological cluster from similar but unrelated lineages any easier. On the other hand, when
1801 sequenced species (~ 1/3 of currently accepted), and morphologically readily attributable species
1802 (~ 1/3 of species) are distributed among about 25-30 clearly defined genera, the remaining 20-30
1803 percent of ‘problematic’ species, which do not match any proposed genus, end up in *incertae*
1804 *sedis*, which greatly compromises any proposed classification. However, the option of broadly
1805 defined genera, although not straightforward, allows for generally plausible placement of such
1806 divergent species. The proposed classification can be seen as a transition version that can be
1807 further elaborated with minimal rearrangement of the principal scheme established herein. The
1808 classification presented here although enclosing some compromises, fulfills its role to establish a
1809 framework consistent with the state-of-the-art phylogenetic relationships within Terebridae, and
1810 provides an account of morphological and molecular diversity in each proposed genus and
1811 subfamily, facilitating correct allocation of specimens and species.

1812

1813 *Accounting for varying selection pressures and rates of evolution in species delimitation*

1814 Ideally, a set of morphological characteristics would be found for each delineated taxon that
1815 would allow its unmistakable recognition. However, there no reliable expectation that
1816 phylogenetically defined lineages will necessarily be readily distinguishable morphologically
1817 (Bickford et al. 2007; Jörger & Schrödl, 2013). The comprehension that molecular and
1818 morphological characters do not necessarily evolve with comparable rate underpins the concept
1819 of cryptic species that has profoundly changed our estimates of the global species diversity on
1820 the planet (Knowlton, 1993; Bickford et al. 2007). It is to be expected that mechanisms which
1821 are accounted for morphological crypticism at the species level, be it morphological stasis or
1822 convergent evolution, can also act at a higher taxonomic level. On the contrary, descendants of a
1823 relatively recent radiation may exhibit wide range of morphologies under influence of different
1824 selection pressures on the diverging lineages as demonstrated in the terebrid genera *Duplicaria*,
1825 *Myurella* and *Punctoterebra*. Such cases of rapid divergence may lead to the erroneous
1826 phylogenetic hypotheses, if based solely on the morphology. Therefore, as shown with this
1827 revision of the Terebridae, the integrative approach is crucial to reconstruct phylogenetic
1828 relationships, when the molecular and morphological data considered separately lead to
1829 conflicting hypotheses of relatedness.

1830

1831

1832

ACKNOWLEDGMENTS

1833 The material in this paper originates from several shore-based expeditions and deep sea cruises,
1834 conducted respectively by MNHN and Pro-Natura International (PNI) as part of the Our Planet
1835 Reviewed programme (SANTO 2006, INHACA 2011, ATIMO VATAE and KAVIENG 2014;
1836 PI Philippe Bouchet) and/or by MNHN, Institut de Recherche pour le Développement (IRD) and
1837 other partners as part of the Tropical Deep-Sea Benthos programme (SALOMON 2, EXBODI,
1838 TERRASSES, MAINBAZA, MIRIKY, KARUBENTHOS 2, MADEEP, NANHAI 2014,
1839 ZHONGSHA 2015; PIs Philippe Bouchet, Sarah Samadi, Wei-Jen Chen, Tin-Yam Chan). In-
1840 country scientific partners included the University of Papua New Guinea (UPNG); National
1841 Fisheries College (Kavieng, Papua New Guinea); Universidade Eduardo Mondlane (Maputo);
1842 Parc National de la Guadeloupe, and Université des Antilles; University of Taipei and National
1843 Taiwan Ocean University (Keelung, Taiwan). Funders and sponsors included the Total
1844 Foundation, Stavros Niarchos Foundation, European Regional Development Fund (ERDF), the
1845 French Ministry of Foreign Affairs and Fonds Pacifique. Materials from expedition PANGLAO
1846 2005 (a joint project of MNHN, University of San Carlos, Cebu City, and the Philippines Bureau
1847 of Fisheries and Aquatic Research); sampling in Congo arranged by Bernard Thomassin. Access
1848 to ship time on the French Oceanographic Fleet is gratefully acknowledged; the Taiwan and
1849 South China Sea cruises were supported by bilateral cooperation research funding from the
1850 Taiwan Ministry of Science and Technology (MOST 102-2923-B-002-001-MY3, PI Wei-Jen
1851 Chen) and the French National Research Agency (ANR 12-ISV7-0005-01, PI Sarah Samadi).
1852 Additional materials were used from fieldwork expeditions organized in collaboration with the
1853 Smithsonian Tropical Research Institute in Panama in 2006-2008 with funding to MH (NSF-
1854 CHE 0610202). All expeditions operated under the regulations then in force in the countries in
1855 question and satisfy the conditions set by the Nagoya Protocol for access to genetic resources.
1856 The authors would like to thank Philippe Maestrati, Virginie Héros, Barbara Buge and Julien
1857 Brisset for their help in curating the vouchers. The authors are grateful to Peter Dance for his
1858 remarks on taxonomy, and to Yuri Kantor and John Taylor for generously sharing their data on
1859 anatomy. The authors are grateful to Andreia Salvador for images of the NHMUK type
1860 specimens (photos copyrighted by NHMUK). This work was supported in part by the
1861 CONOTAX project funded by the French National Research Agency (grant number ANR-13-
1862 JSV7-0013-01), by funding from the Camille and Henry Dreyfus Teacher-Scholar Award and
1863 NSF awards CHE-1247550 and CHE-1228921 to MH and by the Russian Science Foundation
1864 grant RSF 16-14-10118 (PI Yuri Kantor) to AF.

1865

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- 1957

1958

CAPTIONS

1959 **Figure 1.** Phylogenetic relationships of the main Terebridae lineages. All genera are numbered
1960 1-13 in the tree and a shell of the type species corresponding to each genus is depicted by
1961 number (1-13) to the left of the phylogenetic tree.

1962

1963 **Figure 2.** Subfamily Pellifroniinae.

1964 **A.** MNHN-IM-2013-52275 *Pellifronia jungi* NANHAI 2014 Stn DW4102 15°03'N; 116°31'E,
1965 339-533 m, 25.5 mm;

1966 **B.** MNHN-IM-2013-52249 *Pellifronia jungi* EXBODI Stn CP3831 22°02'S; 167°09'E, 523-560
1967 m, 24 mm;

1968 **C.** MNHN-IM-2007-30591 *Pellifronia jungi* SALOMON 2 Stn CP2195 08°26'S; 159°26'E, 543-
1969 593 m, 29 mm (broken);

1970 **D.** MNHN-IM-2000-20800 *Pellifronia brianhayesi* holotype, Southern Mozambique, 22.6 mm;

1971 **E.** MNHN-IM-2013-60185 *Bathyterebra benthalis* KARUBENTHOS 2015 Stn CP4524
1972 16°29'N; 61°42'W, 500-550 m, 35.5 mm;

1973 **F, G.** MNHN-IM-2013-61124 *Bathyterebra benthalis* KARUBENTHOS 2015 Stn DW4608, 9.3
1974 mm;

1975 **H.** MNHN-IM-2013-61800 *Bathyterebra zhongshaensis* n.sp. holotype ZhongSha 2015 Stn
1976 DW4138 19°13'N; 113°56'E, 470-494 m, 17 mm;

1977 **I.** MNHN-IM-2013-52331 *Bathyterebra coriolisi* CONCALIS Stn DW3001 18°32'S; 163°09'E,
1978 390-400 m, 12.4 mm.

1979

1980 **Figure 3.** Subfamily Pervicaciinae

1981 **A.** MNHN-IM-2009-29454 *Duplicaria duplicata* WESTERN AUSTRALIA 2011 Stn WB32
1982 33°33'S; 115°04'E, 5-15 m, 26.7 mm;

1983 **B.** MNHN-IM-2013-5638 *Duplicaria tricincta* PAPUA NIUGINI Stn PD67 05°15.5'S;
1984 145°46.8'E, 2-6 m, 6.9 mm;

1985 **C.** NHMUK 1979115 *Duplicaria tristis* Lectotype, 'Seas of Japan', 17.7 mm;

1986 **D.** MNHN-IM-2013-66140 *Duplicaria brevicula* Off Namibe, Southern Angola, 40-60 m, 12.9
1987 mm;

1988 **E.** MNHN-IM-2009-10908 *Duplicaria bernardi* Australia, 26°56'607"S; 153°23'813"E, shell
1989 broken;

1990 **F.** NHMUK 1873.7.5.8/1 *Terebra fuscobasis* Lectotype, Persian Gulf, 11.3 mm;

1991 **G.** NHMUK 1968251/1 *Terebra nassoides* Lectotype, Red Sea, 13.5 mm;

1992 **H.** MNHN-IM-2013-52342 *Partecosta varia* ATIMO VATAE Stn TM27 24°56.4'S; 47°06.9'E,
1993 0-1 m, 10.4 mm;

1994 **I.** MNHN-IM-2013-52359 *Partecosta sandrinae* INHACA 2011 Stn MM7 PL5 26°03.7'S;
1995 32°54.1'E, 0-1 m, 8.8 mm;

- 1996 **J.** MNHN-IM-2009-10133 *Partecosta* n.sp. aff *fuscolutea* ATIMO VATAE Stn BS06 25°26.8'S;
1997 44°54.9'E, 0-27 m, 6.9 mm;
- 1998 **K.** MNHN-IM-2009-10162 *Partecosta bozzettii* n.sp. paratype ATIMO VATAE Stn TP29
1999 25°03.7-03.8'S; 46°57.7'E, 3-4 m, 12.4 mm;
- 2000 **L.** MNHN-IM-2009-10164 *Partecosta trilineata* ATIMO VATAE Stn TP24 25°03.7-03.8'S;
2001 46°57.6-57.7'E, 2-7 m, 8.2 mm;
- 2002 **M.** MNHN-IM-2009-10115 *Partecosta macleani* ATIMO VATAE Stn TP19 25°04.4-04.7'S;
2003 46°55.3-56.3'E, 16-26 m, 8.9 mm;
- 2004 **N, O.** MNHN-IM-2009-10111 *Partecosta macleani* ATIMO VATAE Stn TP19 25°04.4-04.7'S;
2005 46°55.3-56.3'E, 16-26 m, 12 mm.
2006
- 2007 **Figure 4.** Phylogenetic relationships of the subclades of the genus *Terebra*. Schematic of
2008 subclades C1-C7 in the *Terebra* genus.
2009
- 2010 **Figure 5.** Genus *Terebra*.
- 2011 **A.** MNHN-IM-2013-47287 *Terebra subulata* (Subclade C-1) KAVIENG 2014 Stn KR12
2012 02°36,3'S; 150°46,3'E, 0 m, 62.8 mm;
- 2013 **B.** MNHN-IM-2007-30376 *Terebra guttata* (Subclade C-1) SANTO 2006 Stn FR08 15°33,1'S;
2014 167°12,2'E, 3-40 m, 74.6 mm;
- 2015 **C.** MNHN-IM-2013-46010 *Terebra* aff *fenestrata* (Subclade C-2) MADEEP Stn CP4330
2016 06°07.63'S; 149°12.1'E, 315-625 m, 43.5 mm;
- 2017 **D.** MNHN-IM-2007-30418 *Terebra* sp. aff *fenestrata* 2 (Subclade C-2) PANGLAO 2005 Stn
2018 CP2331 09°39'N; 123°48'E, 256-268 m, 23.1 mm;
- 2019 **E.** MNHN-IM-2007-15724 *Terebra fujitai* (Subclade C-3-1) PANGLAO 2005 Stn CP2343
2020 09°27'N; 123°49'E, 273-356 m, 95.7 mm;
- 2021 **F.** MNHN-IM-2013-51211 *Terebra triseriata* (Subclade C-4) KAVIENG 2014 Stn KD13
2022 02°44,6'S; 150°43,1'E, 0-15 m, 25.6 mm;
- 2023 **G.** MNHN-IM-2013-46900 *Terebra argus* (Subclade C-5) KAVIENG 2014 Stn KR06
2024 02°36,3'S; 150°46,2'E, 3-12 m, 53.7 mm;
- 2025 **H.** MNHN-IM-2013-51267 *Terebra babylonia* (Subclade C-6) KAVIENG 2014 Stn KR54
2026 02°42,3'S; 150°39,1'E, 7-10 m, 38.5 mm;
- 2027 **I.** MNHN-IM-2013-46237 *Terebra* n.sp. aff *cumingii* (Subclade C-7) MADEEP Stn CP4335
2028 06°05'S; 149°18'E, 240-250 m, 62.5 mm;
- 2029 **J.** MNHN-IM-2007-30382 *Terebra cingulifera* (Subclade C-7) SANTO 2006 Stn VM32
2030 15°26,6'S; 167°15,2'E, 0-1 m, 49.7 mm.
2031
- 2032 **Figure 6.** Genera *Hastula* and *Oxymeris*.
- 2033 **A.** MNHN-IM-2013-16102 *Hastula strigilata* PAPUA NIUGINI Stn PM41 05°08.1'S;
2034 145°49.3'E, 0-1 m, 32.4 mm;

- 2035 **B.** MNHN-IM-2009-07098 *Hastula solida* Inhaca Is, 25°59.0'S; 32°54.5'E, 0 m, 25.6 mm;
- 2036 **C.** MNHN-IM-2009-11870 *Hastula hectica* Tahiti, 17°30'28.28"S; 149°27'0.14"W, 0 m, 35.6
2037 mm;
- 2038 **D.** MNHN-IM-2013-9455 *Hastula cinerea* KARUBENTHOS 2012 Stn GM19 16°21.3'N;
2039 61°44.92'W, 0-1 m, 20.4 mm;
- 2040 **E.** MNHN IM-2007-30535 *Hastula lanceata radula* PANGLAO 2004 Stn B1, 9°33.0'N,
2041 123°46.50'E, 8-14 m, 32.5 mm (broken);
- 2042 **F.** *Hastula hectica radula*, The Philippines, Bohol, Panglao, Is, intertidal, radula;
- 2043 **G.** MNHN-IM-2013-40074 *Oxymeris maculata* PAKAIHI I TE MOANA Marqueses I, exact
2044 locality unknown, 113 mm;
- 2045 **H.** MNHN-IM-2013-46877 *Oxymeris crenulata* KAVIENG 2014 Stn KR06 02°36.3'S;
2046 150°46.2'E, 3-12 m, 85.9 mm;
- 2047 **I.** MNHN-IM-2013-10283 *Oxymeris felina* PAPUA NIUGINI Stn PB05 05°11.7'S; 145°49.4'E,
2048 0-20 m, 31 mm.

2049

2050 **Figure 7.** Genera *Myurella*, *Maculauger* n. gen. and *Myurellopsis* n. gen.

- 2051 **A.** MNHN-IM-2013-17860 *Myurella affinis* PAPUA NIUGINI Stn PR196 05°12.3'S;
2052 145°48.8'E, 0 m, 39.8 mm;
- 2053 **B.** MNHN-IM-2013-58677 *Myurella fortunei* KAVIENG 2014 Stn DW4468 02°45'S; 150°37'E,
2054 190-472 m, 25.2 mm;
- 2055 **C.** MNHN-IM-2013-46861 *Myurella amoena* KAVIENG 2014 Stn KR02 02°37.5'S; 150°46.5'E,
2056 10-14 m, 24.9 mm;
- 2057 **D.** MNHN-IM-2009-10121 *Myurella pygmaea* S Madagascar off Lovanono, 0-5 m, 6.1 mm;
- 2058 **E.** MNHN-IM-2009-9954 *Maculauger pseudopertusa* MIRIKY Stn DW3230 13°25'S; 47°57'E,
2059 71-158 m, 42.9 mm;
- 2060 **F.** MNHN-IM-2013-52252 *Maculauger campbelli* EXBODI Stn CP3836 22°08'S; 167°11'E,
2061 415-420 m, 20.5 mm;
- 2062 **G.** MNHN-IM-2013-10252 *Myurellopsis undulata* PAPUA NIUGINI Stn PR07 05°12.5'S;
2063 145°48.5'E, 2-17 m, 31.9 mm;
- 2064 **H.** MNHN-IM-2013-12712 *Myurellopsis kilburni* PAPUA NIUGINI Stn PS11 05°04.7'S;
2065 145°48.9'E, 0-5 m, 24.8 mm;
- 2066 **I.** MNHN-IM-2013-52369 *Myurellopsis joseradosoi* INHACA 2011 Stn MR13 25°59.7'S;
2067 32°54.5'E, 2-5 m, 17.9 mm.

2068

2069 **Figure 8.** Genus *Punctoterebra*.

- 2070 **A.** MNHN-IM-2013-13332 *Punctoterebra nitida* PAPUA NIUGINI Stn PD32 05°04.4'S;
2071 145°48.7'E, 1-8 m, 26.5 mm;

- 2072 **B.** MNHN-IM-2009-9973 *Punctoterebra teramachii* TERRASSES Stn DW3093 22°06'S;
2073 167°03'E, 190-200 m, 27.5 mm;
- 2074 **C.** MNHN-IM-2007-30424 *Punctoterebra polygyrata* SALOMON 2 Stn CP2282 08°37'S;
2075 157°21'E, 150-160 m, 22.3 mm;
- 2076 **D.** MNHN-IM-2007-30385 *Punctoterebra succincta* SANTO 2006 Stn VM32 15°26.6'S;
2077 167°15.2'E, 0-1 m, 42.9 mm;
- 2078 **E.** MNHN-IM-2009-10122 *Punctoterebra solangeae* ATIMO VATAE Stn BP18 25°26.1-
2079 26.4'S; 44°55.2-55.6'E, 17-20 m, 10.2 mm;
- 2080 **F.** MNHN-IM-2009-10093 *Punctoterebra* sp. aff *textilis* MIRIKY Stn CP3274 15°30.15'S;
2081 46°04.3'E, 29-36 m, 16.8 mm;
- 2082 **G.** MNHN-IM-2007-30547 *Punctoterebra souleyeti* SANTO 2006 Stn LD21 15°31,3'S,
2083 167°09,9'E, 1-6 m, 27 mm, radula.
2084
- 2085 **Figure 9.** Genera *Profunditerebra* n. gen. and *Neoterebra* n. gen.
- 2086 **A.** MNHN-IM-2013-58123 *Profunditerebra papuaprofundii* n.sp. KAVIENG 2014 Stn CP4422
2087 02°21'S; 150°38'E, 496-609 m, 19.2 mm;
- 2088 **B.** MNHN-IM-2009-29153 *Profunditerebra orientalis* EXBODI Stn DW3930 18°37'S;
2089 164°26'E, 448-464 m, 39.6 mm;
- 2090 **C.** MNHN-IM-2013-55861 *Profunditerebra brazieri* MORRISON AUSTRALIA Stn TA22
2091 43°10.4'S; 147°51.3'E, 1-7 m, 32.4 mm;
- 2092 **D.** NHMUK 1844.6.7.84 *Terebra specillata* Lectotype, San Blas, Mexico, 7 fms (=12.8 m), 39.3
2093 mm;
- 2094 **E.** MNHN-IM-2007-30546, *Profunditerebra poppei* SANTO 2006, Stn AT44 15°36'S,
2095 167°03'E, 86-118 m, (broken), radula;
- 2096 **F.** MNHN-IM-2000-25244 *Terebra assu* holotype, Brazil, Espírito Santo, off Conceição da
2097 Barra Stn MD55, stn DC75 18°59'S, 37°50'W, 295 m, 9.8 mm;
- 2098 **G.** MZSP 84238 *Terebra alagoensis* holotype, Brazil, continental slope off Alagoas, 10°05'57"S,
2099 35°46'24"W, 720 m, 9.8 mm;
- 2100 **H.** MNHN-IM-2013-20352 *Neoterebra sterigmoides* KARUBENTHOS 2012 Stn GD02
2101 16°22.57'N; 61°34.12'W, 0-80 m, 29.6 mm.
2102
- 2103 **Figure 10.** Genera defined solely by means of shell morphology.
- 2104 **A.** NHMUK 1873.8.6.10/1 *Terebra bathyrhapse* Lectotype, Gulf of Yedo Stn 35°35'N;
2105 139°48'E, 6-25 fms (=11-45.7 m), 24.8 mm;
- 2106 **B.** NMHUK 1873.8.6.11/1, *Hastulopsis melanachme* Lectotype, Cape Sima, Japan, 18fms (=33
2107 m), 17.8 mm;
- 2108 **C.** NHMUK 1968237, *Terebra bifrons* holotype, Japan, 51.0 mm;
- 2109 **D.** SAM D-110176, *Gradaterebra scalariformis* Newland Head, S. Australia, 20 fms (=36.6 m),
2110 12.1 mm;

- 2111 E. NHMUK 1978150 *Terebra circumcincta* holotype, Red Sea(erroreous?), no depth), 38.0 mm;
- 2112 F. ANSP 155289, *Microtrypetes iola* holotype, Mazatlan, Mexico, 20 fms (=36.6 m), 14.0 mm.
- 2113
- 2114 **Figure 11.** *Duplicaria herberti* n. sp., *Partecosta bozzettii* n.sp. and morphologically similar
- 2115 species.
- 2116 A. MNHN-IM-2013-52381 *Duplicaria herberti* n. sp. holotype, INHACA 2011 Stn MR15
- 2117 26°00.0'S; 32°54.4'E, 0-1 m), 29.7 mm;
- 2118 B. MNHN-IM-2013-52366 *Duplicaria herberti* n. sp. INHACA 2011 Stn MM1 26°02.3'S;
- 2119 32°54.1'E, 0-1 m), 12.4 mm;
- 2120 C. NMSA 566 *Duplicaria herberti* n. sp. Paratype of *D. mozambiquensis*, 27 mm;
- 2121 D. YT *Duplicaria mozambiquensis* Quelimane Pebane, 35-45 m, 19.6 mm;
- 2122 E. MNHN-IM-2009-10163 *Partecosta bozzettii* n.sp. holotype ATIMO VATAE Stn TP29
- 2123 25°03'43.9"S; 46°57'42.9"E, 3-4 m, 12.5 mm;
- 2124 F. MNHN-IM-2000-21473 *Partecosta trilineata* holotype, S Madagascar, Lavanono, 8.85 mm;
- 2125 G. *Partecosta daniae* MMM, holotype, Farol das Lagostas, Luanda, Angola, 12 mm.
- 2126
- 2127 **Figure 12.** *Profunditerebra papuaprofundii* n.sp., *Profunditerebra macclesfieldensis* n. sp. and
- 2128 morphologically similar species.
- 2129 A. MNHN-IM-2013-58123 *Profunditerebra papuaprofundii* n.sp. holotype, KAVIENG 2014 Stn
- 2130 CP4422 02°21'S; 150°38'E, 496-609 m, 19.0 mm;
- 2131 B. MNHN-IM-2013-45571 *Profunditerebra papuaprofundii* n.sp. paratype 1, same locality, 29.5
- 2132 mm;
- 2133 C. NHMUK 197988/1 *Terebra cinctella* Lectotype, Mouth of the Indus', 27.8 mm;
- 2134 D. NHMUK 1844.6.7.80 *Terebra textilis* Lectotype, 'Str Macassar', 25.7 mm;
- 2135 E. MNHN-IM-2013-61875 *Profunditerebra macclesfieldensis* n. sp. holotype, ZhongSha 2015
- 2136 Stn DW4144 16°6'N; 114°23'E, 160-200 m, 22.4 mm;
- 2137 F. MNHN-IM-2013-61877 *Profunditerebra macclesfieldensis* n. sp. Paratype 1, same locality,
- 2138 22.2 mm;
- 2139 G. MNHN-IM-2000-6224 *Profunditerebra anseeuwi* holotype, Philippines, Aliguay Island, Sulu
- 2140 Sea, 80-150 m, 29.8 mm.
- 2141
- 2142 **Figure 13.** *Neoterebra guadeloupensis* n. sp., *Macaulaeger sudchinensis* n. sp. and
- 2143 morphologically similar species.
- 2144 A. MNHN-2013-61448 *Neoterebra guadeloupensis* n. sp. holotype KARUBENTHOS 2015 Stn
- 2145 DW4638 15°50'N; 61°18'W, 305-312 m, 17.2 mm;
- 2146 B. MNHN-IM-2013-20531 *Neoterebra guadeloupensis* n. sp KARUBENTHOS 2012 Stn GD55
- 2147 16°22,48'N; 61°35,46'W, 85 m, 9.4 mm;
- 2148 C. USNM93971 *Terebra limatula* syntype Apalachicola Bay, Florida, USA, 17.8 mm;

- 2149 **D, E.** MNHN-IM-2013-61887 *Maculauger sudchinensis* n. sp. Holotype, ZhongSha 2015 Stn
2150 CP4144 16°6'N; 114°23'E, 160-200 m, 19.9 mm;
- 2151 **F.** NHMUK 1903.12.15.117 *Terebra helichrysum* Lectotype Persian Gulf, Mussandam, 47 fms
2152 (=86 m) , 24.5 mm;
- 2153 **G.** MNHN-IM-2000-2812 *Terebra levantina* holotype MUSORSTOM 2 Stn CP59 14°00'N;
2154 120°16'E, 186-190 m, 24.2 mm.
- 2155

2156 **Table 1.** Subfamily Pellifroniinae and included genera, diagnostic combinations of nucleotides in the COI
 2157 alignment.

Subfamily Pellifroniinae	
Species / sequences analyzed	4 / 25
Diagnostic nucleotide combinations	[299: 'G'] [334: 'A', 382: 'G', 607: 'T'] [88: 'T', 100: 'T', 379: 'A'] [163: 'T', 313: 'A', 530: 'A'] [118: 'T', 265: 'T', 415: 'G']
Genus Pellifronia	
Species / sequences analyzed	1 / 11
Diagnostic nucleotide combinations	[76: 'C'] [208: 'T', 553: 'A'] [301: 'A', 337: 'G'] [121: 'G', 205: 'G'] [334: 'A', 350: 'T'] [299: 'G', 304: 'T'] [22: 'T', 359: 'C'] [67: 'G', 88: 'T'] [325: 'T', 547: 'C'] [415: 'G', 565: 'A'] [238: 'A', 508: 'A'] [562: 'G', 622: 'T']
Genus Bathyterebra	
Species / sequences analyzed	3 / 14
Diagnostic nucleotide combinations	[76: 'T', 100: 'T'] [299: 'G', 454: 'A'] [50: 'C', 88: 'T'] [415: 'G', 622: 'C'] [74: 'C', 485: 'T', 562: 'A'] [73: 'A', 265: 'T', 334: 'A'] [35: 'C', 382: 'G', 530: 'A'] [349: 'A', 496: 'T', 565: 'G'] [110: 'C', 508: 'G', 547: 'T']

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2160 **Table 2.** Genera *Duplicaria* and *Patecosta*, diagnostic combinations of nucleotides in the COI alignment.

Genus <i>Duplicaria</i>	
Species / sequences analyzed	6 / 13
Diagnostic nucleotide combinations:	[328: 'A', 415: 'T', 530: 'A'] [7: 'A', 172: 'A', 478: 'T'] [263: 'C', 328: 'A', 478: 'T'] [265: 'T', 370: 'T', 478: 'T'] [172: 'A', 418: 'T', 478: 'T'] [301: 'T', 478: 'T', 530: 'A'] [91: 'T', 265: 'T', 301: 'T', 494: 'C'] [202: 'T', 418: 'T', 436: 'T', 485: 'T']
Genus <i>Patecosta</i>	
Species / sequences analyzed	8 / 17
Diagnostic nucleotide combinations:	[37: 'A', 40: 'T', 328: 'T', 343: 'T'] [37: 'A', 40: 'T', 50: 'T', 328: 'T'] [31: 'A', 37: 'A', 40: 'T', 343: 'T', 520: 'A'] [31: 'A', 37: 'A', 40: 'T', 343: 'T', 580: 'T'] [37: 'A', 55: 'T', 328: 'T', 343: 'T', 448: 'T'] [37: 'A', 55: 'T', 160: 'A', 343: 'T', 625: 'T']

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2163 **Table 3.** Genus *Terebra*, diagnostic combinations of nucleotides in the COI alignment.

C1	
Species / sequences analyzed	4 / 30
Diagnostic nucleotide combinations:	[508: 'T', 607: 'A'] [265: 'G', 547: 'T'] [28: 'A', 37: 'T', 547: 'T'] [31: 'A', 37: 'T', 313: 'A'] [31: 'A', 547: 'T', 631: 'T'] [67: 'T', 547: 'T', 631: 'T'] [133: 'T', 242: 'C', 607: 'A']
C2	
Species / sequences analyzed	2 / 16
Diagnostic nucleotide combinations:	[536: 'T', 607: 'G'] [91: 'T', 536: 'T'] [334: 'A', 538: 'A'] [538: 'A', 607: 'G'] [334: 'A', 536: 'T'] [508: 'T', 607: 'G'] [190: 'T', 538: 'A'] [190: 'T', 536: 'T']
C3	
Species / sequences analyzed	5 / 34
Diagnostic nucleotide combinations:	[74: 'T', 307: 'A', 337: 'A', 631: 'T'] [94: 'A', 154: 'C', 283: 'G', 520: 'A'] [154: 'C', 163: 'T', 535: 'A', 631: 'T'] [253: 'A', 337: 'A', 520: 'A', 631: 'T'] [58: 'T', 154: 'C', 469: 'A', 631: 'T']
C4	
Species / sequences analyzed	9/71
Diagnostic nucleotide combinations:	[643: 'T'] [58: 'T', 127: 'T'] [278: 'C', 289: 'T', 550: 'A'] [34: 'T', 121: 'T', 641: 'C'] [56: 'C', 127: 'T', 641: 'C'] [100: 'T', 121: 'T', 127: 'T'] [121: 'T', 127: 'T', 202: 'T']
C5	
Species / sequences analyzed	1 / 9
Diagnostic nucleotide combinations:	[274: 'G'] [238: 'C', 412: 'T'] [181: 'G', 595: 'C'] [151: 'C', 313: 'T'] [43: 'G', 289: 'G'] [292: 'G', 424: 'G'] [37: 'T', 61: 'G'] [95: 'T', 622: 'C'] [376: 'C', 607: 'A']
C6	
Species / sequences analyzed	8 / 44
Diagnostic nucleotide combinations:	[22: 'G', 379: 'T', 499: 'G'] [95: 'T', 499: 'G', 562: 'T'] [95: 'T', 409: 'T', 499: 'G'] [278: 'C', 379: 'T', 499: 'G'] [379: 'T', 499: 'G', 562: 'T'] [484: 'G', 499: 'G', 562: 'T'] [278: 'C', 499: 'G', 562: 'T']
C7	
Species / sequences analyzed	10 / 19
Diagnostic nucleotide combinations:	[222: 'T'] [221: 'G'] [28: 'G', 76: 'T'] [76: 'T', 158: 'C'] [79: 'T', 592: 'T'] [109: 'G', 278: 'C', 535: 'G'] [16: 'A', 37: 'T', 100: 'A'] [106: 'C', 148: 'G', 211: 'A']

2166 **Table 4.** Genus *Hastula*, diagnostic combinations of nucleotides in the COI alignment.

Genus <i>Hastula</i> (except four specimens of <i>H. albula</i>)	
Species / sequences analyzed	18 / 91
Diagnostic nucleotide combinations:	[67: 'T', 181: 'T', 221: 'C', 253: 'A'] [67: 'T', 95: 'C', 181: 'T', 598: 'A'] [67: 'T', 181: 'T', 222: 'C', 253: 'A'] [28: 'A', 67: 'T', 181: 'T', 253: 'A'] [67: 'T', 95: 'C', 181: 'T', 253: 'A'] [28: 'A', 67: 'T', 181: 'T', 581: 'T', 598: 'A'] [67: 'T', 181: 'T', 221: 'C', 581: 'T', 598: 'A'] [67: 'T', 181: 'T', 222: 'C', 581: 'T', 598: 'A']
subclade <i>H. albula</i> - <i>H. natalensis</i> - <i>H. aff. casta</i>	
Species / sequences analyzed	3 / 21
Diagnostic nucleotide combinations:	[349: 'T'] [127: 'T', 223: 'A'] [49: 'G', 547: 'T'] [347: 'C', 517: 'T'] [202: 'G', 205: 'G'] [43: 'A', 610: 'C'] [148: 'A', 157: 'C', 376: 'A'] [211: 'G', 307: 'T', 337: 'G']

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2169 **Table 5.** Genus *Oxymeris*, diagnostic combinations of nucleotides in the COI alignment.

Species / sequences analyzed	11 / 99
Diagnostic nucleotide combinations:	[127: 'T', 631: 'T']
	[67: 'A', 127: 'T', 250: 'T']
	[46: 'T', 67: 'A', 631: 'T']
	[67: 'A', 91: 'T', 631: 'T']
	[50: 'T', 127: 'T', 202: 'T', 250: 'T']
	[67: 'A', 455: 'A', 487: 'T', 631: 'T']

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2172 **Table 6.** Genus *Myurella*, diagnostic combinations of nucleotides in the COI alignment

Species / sequences analyzed	21 / 161
Diagnostic nucleotide combinations:	[485: 'C', 494: 'A', 565: 'T']
	[56: 'C', 433: 'T', 485: 'C', 565: 'T']
	[334: 'T', 433: 'T', 485: 'C', 565: 'T']
	[263: 'C', 433: 'T', 485: 'C', 539: 'C', 565: 'T']
	[263: 'C', 433: 'T', 485: 'C', 538: 'T', 565: 'T']
	[263: 'C', 334: 'T', 485: 'C', 538: 'T', 565: 'T']
	[49: 'T', 263: 'C', 433: 'T', 485: 'C', 565: 'T']

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2175 **Table 7.** Diagnostic nucleotide combinations in the COI alignment in subgroups of the genus
 2176 *Punctoterebra*.

<i>Punctoterebra nitida</i> group	
Species / sequences analyzed	8 / 48
Diagnostic nucleotide combinations:	[91: 'A', 184: 'A', 265: 'T', 542: 'T', 562: 'T', 580: 'T'] [76: 'A', 160: 'A', 181: 'T', 265: 'T', 268: 'A', 562: 'T'] [130: 'A', 160: 'A', 184: 'A', 265: 'T', 530: 'G', 562: 'T'] [130: 'A', 160: 'A', 184: 'A', 265: 'T', 295: 'T', 530: 'G'] [91: 'A', 184: 'A', 229: 'G', 265: 'T', 562: 'T', 580: 'T'] [112: 'A', 160: 'A', 184: 'A', 265: 'T', 557: 'C', 562: 'T'] [160: 'A', 184: 'A', 229: 'G', 265: 'T', 562: 'T', 580: 'T']
<i>Punctoterebra teramachii</i> group	
Species / sequences analyzed	5 / 6
Diagnostic nucleotide combinations:	[304: 'T', 382: 'T'] [50: 'C', 163: 'A', 184: 'G'] [74: 'C', 100: 'G', 223: 'T'] [376: 'T', 412: 'G', 469: 'G', 520: 'A'] [82: 'A', 169: 'A', 316: 'G', 379: 'A'] [46: 'G', 158: 'T', 322: 'A', 655: 'G']
<i>Punctoterebra multistriata</i> group	
Species / sequences analyzed	2 / 3
Diagnostic nucleotide combinations:	[46: 'G', 421: 'C'] [124: 'C', 319: 'G'] [115: 'C', 542: 'C'] [14: 'C', 385: 'C'] [193: 'C', 517: 'G'] [25: 'A', 163: 'G', 229: 'A'] [100: 'G', 130: 'G', 530: 'A']
<i>Punctoterebra textilis</i> group	
Species / Sequences analyzed	13 / 72
Diagnostic nucleotide combinations:	[40: 'T', 50: 'T', 494: 'A', 517: 'A', 548: 'T'] [40: 'T', 50: 'T', 92: 'T', 494: 'A', 517: 'A'] [40: 'T', 50: 'T', 494: 'A', 517: 'A', 581: 'T'] [14: 'T', 40: 'T', 50: 'T', 485: 'C', 494: 'A', 581: 'T'] [50: 'T', 106: 'T', 295: 'T', 343: 'T', 517: 'A', 607: 'T'] [50: 'T', 343: 'T', 494: 'A', 517: 'A', 541: 'T', 581: 'T'] [14: 'T', 40: 'T', 50: 'T', 56: 'C', 92: 'T', 494: 'A']

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2179 **Table 8.** Genus *Profunditerebra*, diagnostic combinations of nucleotides in the COI alignment.

Species / sequences analyzed	10 / 39
Diagnostic nucleotide combinations:	[154: 'T', 382: 'A', 388: 'A', 496: 'G']
	[139: 'T', 349: 'G', 379: 'T', 533: 'T', 631: 'A']
	[313: 'A', 349: 'G', 382: 'A', 496: 'G', 533: 'T']
	[154: 'T', 313: 'A', 349: 'G', 379: 'T', 631: 'A']
	[229: 'G', 298: 'A', 349: 'G', 379: 'T', 631: 'A']
	[22: 'A', 181: 'T', 313: 'A', 379: 'T', 382: 'A']
	[256: 'T', 298: 'A', 349: 'G', 379: 'T', 631: 'A']

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2182 **Table 9.** Genus *Neoterebra*, diagnostic combinations of nucleotides in the COI alignment.

Sequences analyzed	10 / 42
Diagnostic nucleotide combinations:	[52: 'A', 379: 'T', 401: 'T', 487: 'T', 494: 'A']
	[52: 'A', 379: 'T', 401: 'T', 485: 'C', 494: 'A', 502: 'A']
	[52: 'A', 151: 'T', 157: 'T', 295: 'T', 379: 'T', 415: 'T', 487: 'T']
	[52: 'A', 157: 'T', 222: 'C', 379: 'T', 485: 'C', 502: 'A', 557: 'C']
	[52: 'A', 157: 'T', 379: 'T', 415: 'T', 485: 'C', 502: 'A', 559: 'T']
	[157: 'T', 181: 'T', 379: 'T', 487: 'T', 494: 'A', 502: 'A', 557: 'C']
	[157: 'T', 181: 'T', 221: 'C', 379: 'T', 485: 'C', 502: 'A', 559: 'T']:

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2185 **Table 10.** Genera *Macaulager* and *Myurellopsis*, diagnostic combinations of nucleotides in the COI
 2186 alignment.

<i>Macaulager</i>	
Species / sequences analyzed	8 / 26
Diagnostic nucleotide combinations	[214: 'T'] [94: 'A', 520: 'G', 592: 'T'] [212: 'C', 242: 'C', 592: 'T'] [199: 'G', 580: 'G', 592: 'T'] [242: 'C', 583: 'A', 592: 'T'] [94: 'A', 388: 'G', 592: 'T'] [212: 'C', 494: 'A', 592: 'T']
<i>Myurellopsis</i>	
Species / sequences analyzed	8 / 65
Diagnostic nucleotide combinations	[307: 'T', 328: 'T', 349: 'A'] [50: 'C', 307: 'T', 379: 'T'] [95: 'C', 307: 'T', 349: 'A'] [199: 'A', 307: 'T', 379: 'T'] [40: 'T', 199: 'A', 379: 'T', 494: 'A'] [50: 'C', 304: 'A', 334: 'T', 484: 'A', 520: 'A']

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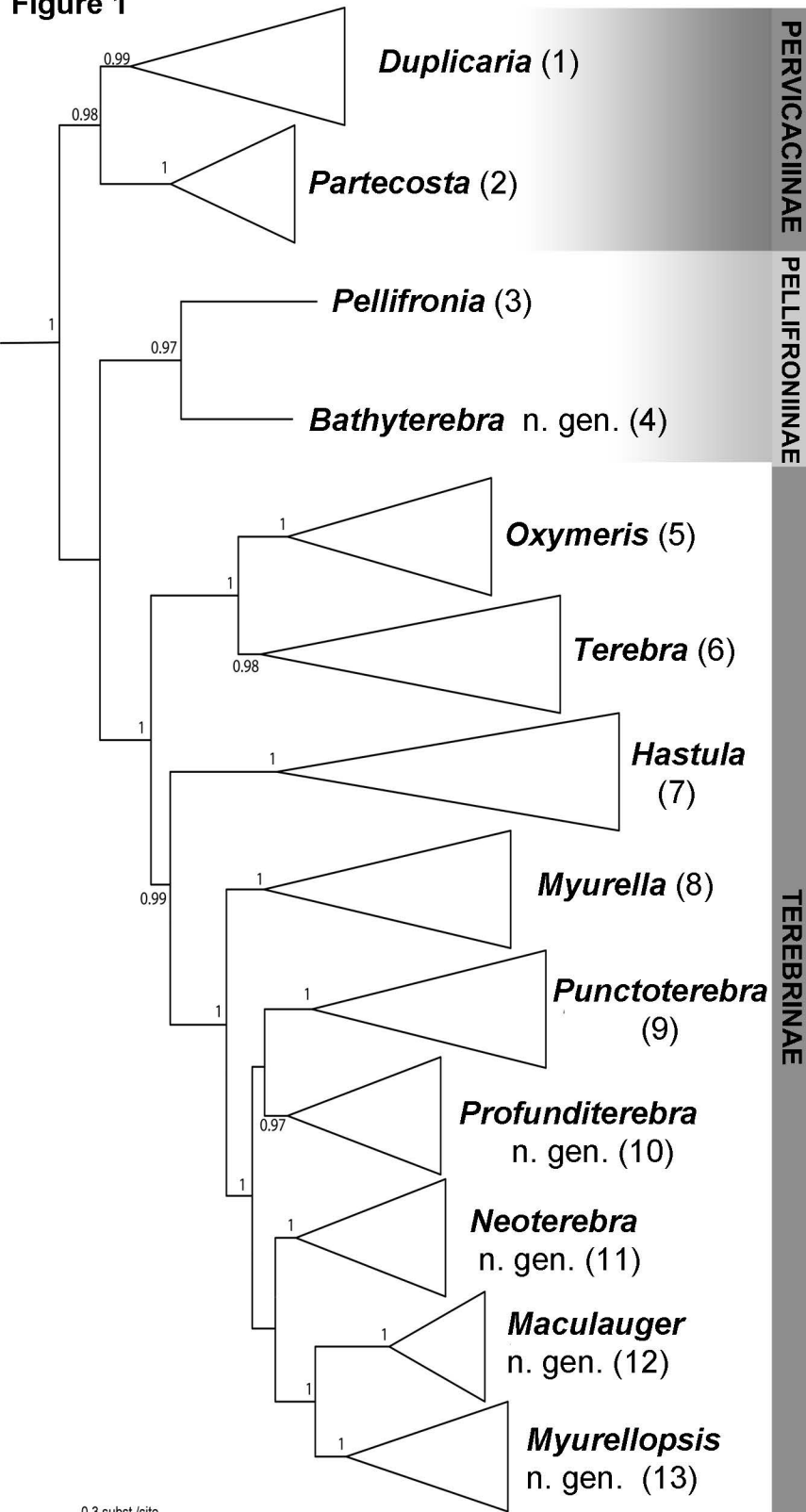
2189 **Table 11.** New species diagnostic combinations of nucleotides in the COI alignment.

<i>Bathytrema hongshaensis</i> n. sp.	
Diagnostic nucleotide combinations	[367: 'C', 499: 'C'] [284: 'C', 487: 'C'] [373: 'A', 502: 'G'] [91: 'G', 581: 'C'] [52: 'G', 85: 'C'] [223: 'G', 328: 'G'] [40: 'C', 322: 'G']
<i>Duplicaria herberti</i> n. sp.	
Diagnostic nucleotide combinations	[127: 'A', 451: 'G'] [184: 'T', 499: 'G'] [250: 'C', 526: 'A'] [130: 'G', 478: 'T'] [31: 'T', 241: 'A'] [244: 'G', 304: 'T'] [160: 'G', 232: 'A']
<i>Partecosta bozzettii</i> n. sp.	
Diagnostic nucleotide combinations	[121: 'G', 328: 'T'] [85: 'A', 616: 'C'] [271: 'A', 337: 'A'] [301: 'G', 541: 'G'] [347: 'C', 451: 'A'] [82: 'G', 350: 'T'] [13: 'C', 43: 'G']
<i>Profunditerebra papuaprofundii</i> n. sp.	
Diagnostic nucleotide combinations	[397: 'C', 457: 'C'] [169: 'G', 601: 'C'] [556: 'G', 658: 'C'] [278: 'C', 343: 'G'] [55: 'C', 487: 'G'] [289: 'T', 622: 'C'] [85: 'C', 355: 'G', 484: 'G']
<i>Profunditerebra macclesfieldensis</i> n. sp.	
Diagnostic nucleotide combinations	[61: 'C', 343: 'A'] [169: 'G', 400: 'C'] [445: 'C', 485: 'T'] [457: 'C', 655: 'G'] [367: 'C', 487: 'G'] [58: 'C', 475: 'A'] [91: 'T', 556: 'A']
<i>Neoterebra guadeloupensis</i> n. sp.	
Diagnostic nucleotide combinations	[40: 'G', 97: 'C'] [550: 'G', 628: 'A'] [127: 'G', 439: 'T'] [484: 'G', 493: 'A'] [112: 'A', 604: 'C'] [313: 'C', 625: 'G'] [526: 'G', 619: 'T']
<i>Macaulager sudchinensis</i> n. sp.	
Diagnostic nucleotide combinations	[238: 'G', 241: 'C'] [487: 'A', 514: 'T'] [169: 'A', 256: 'A'] [163: 'G', 646: 'C'] [313: 'G', 625: 'G'] [85: 'C', 409: 'C'] [217: 'G', 541: 'G']

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Figure 1



0.3 subst./site

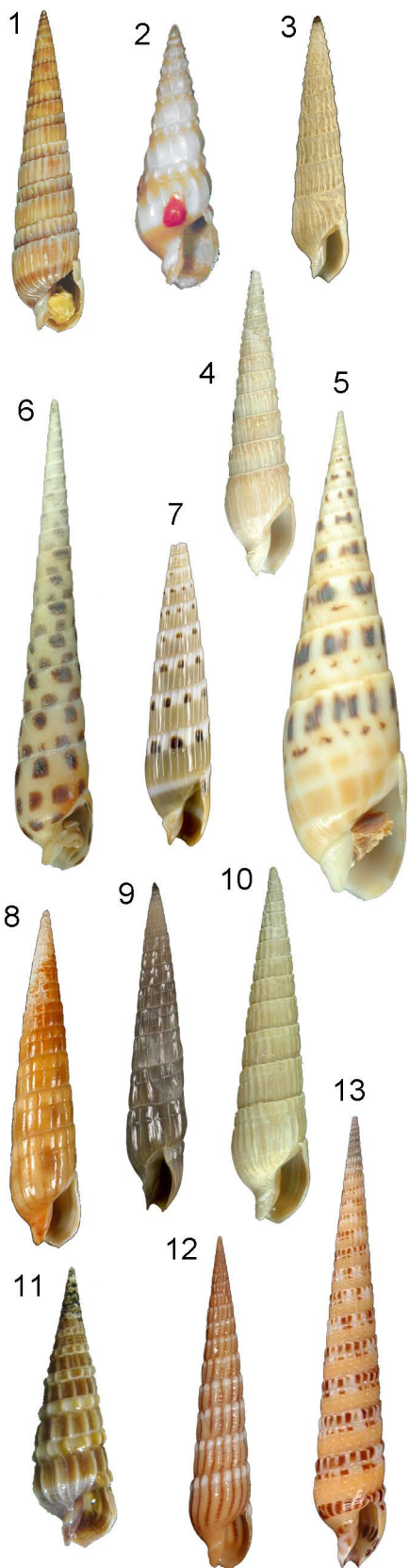
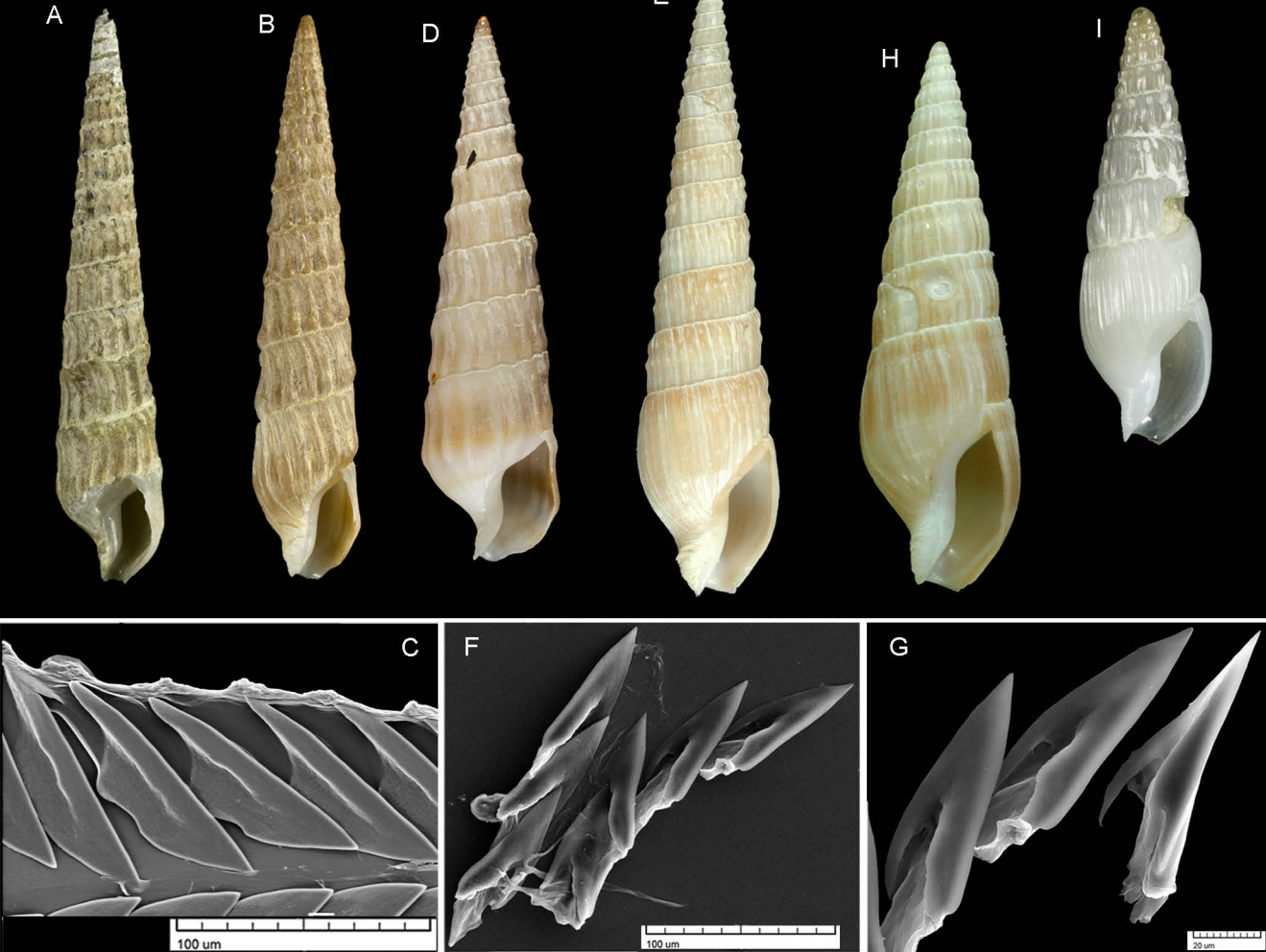


Figure 2



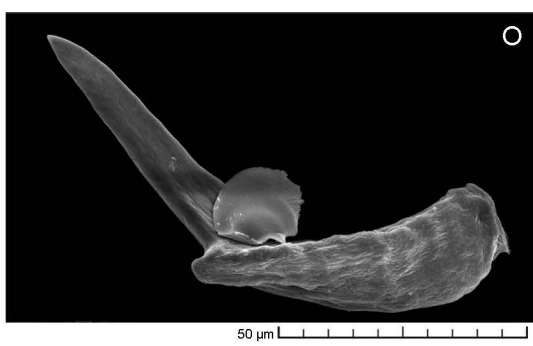
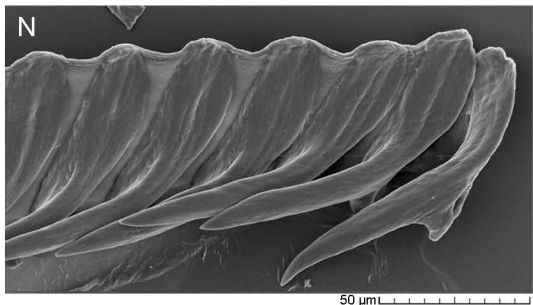
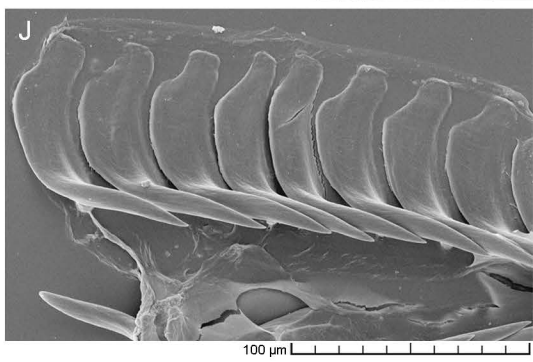
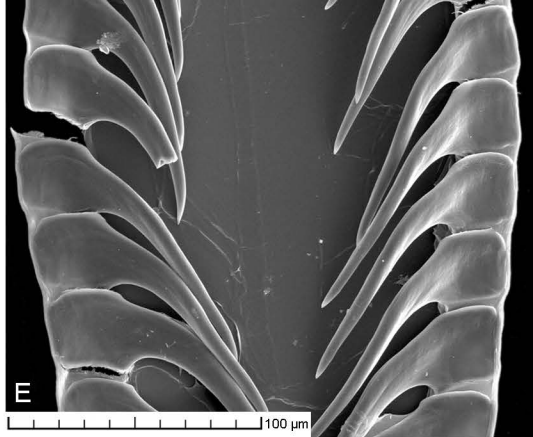
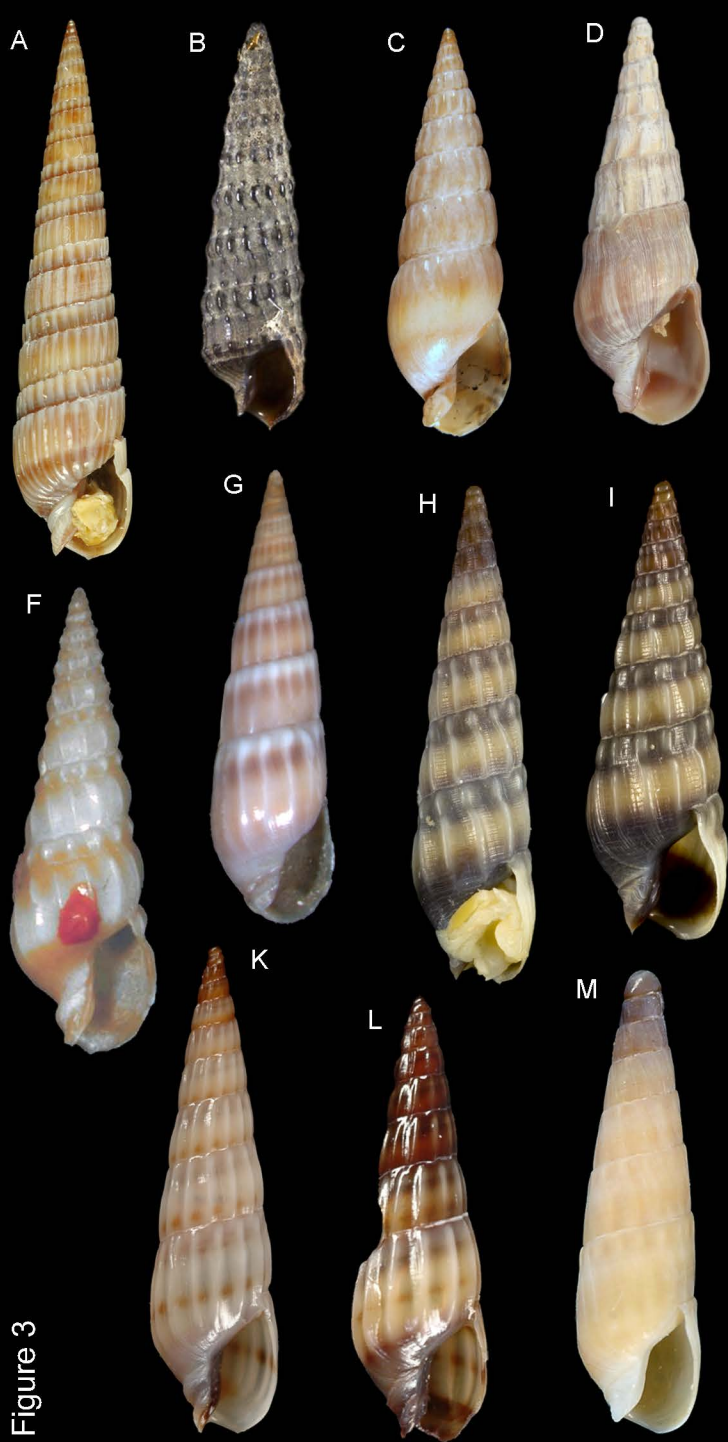


Figure 3

Figure 4

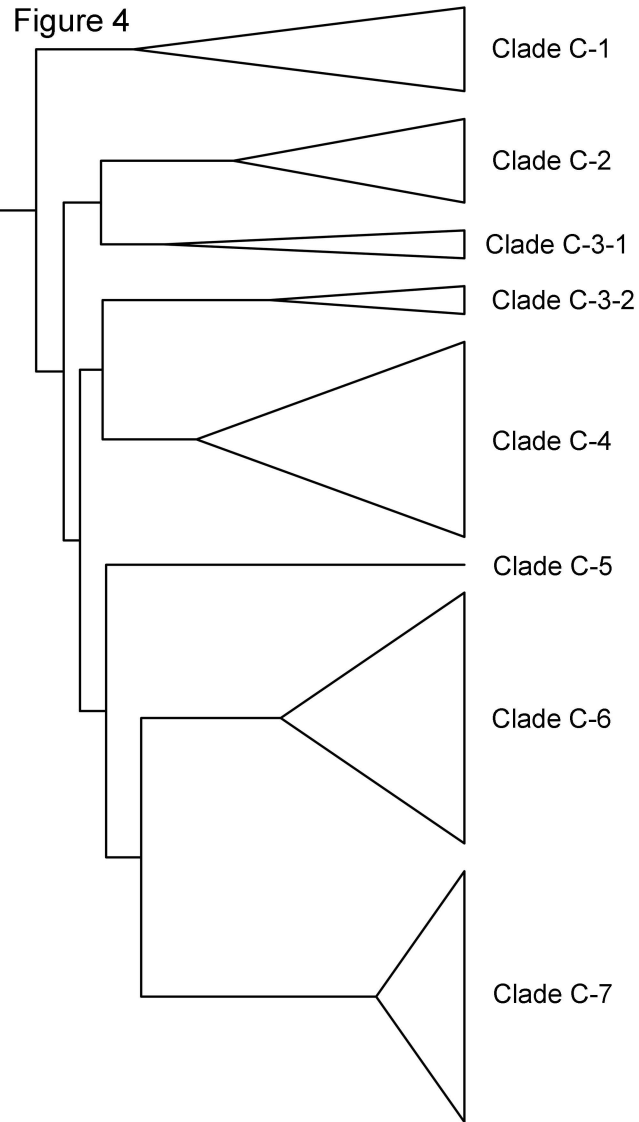
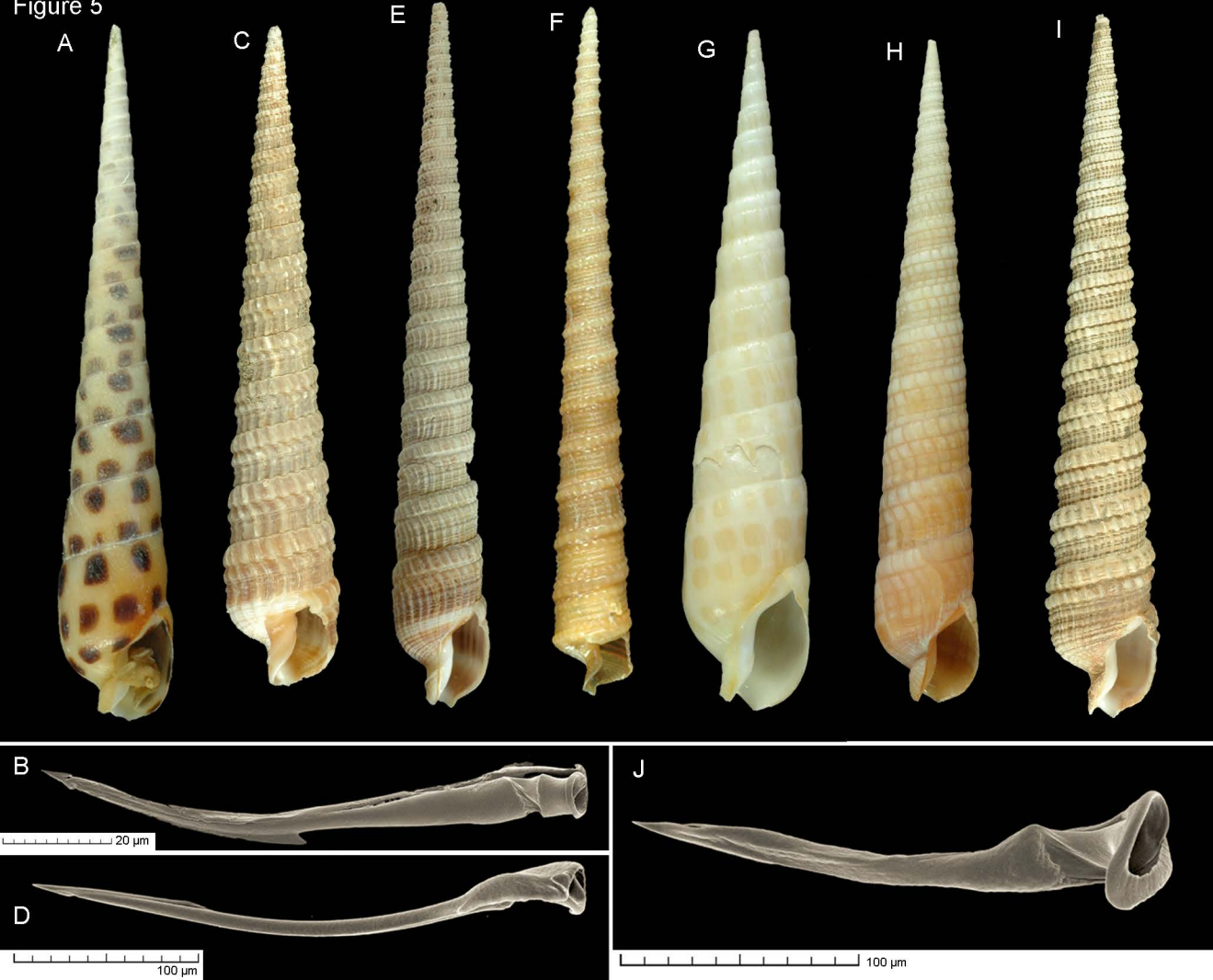


Figure 5



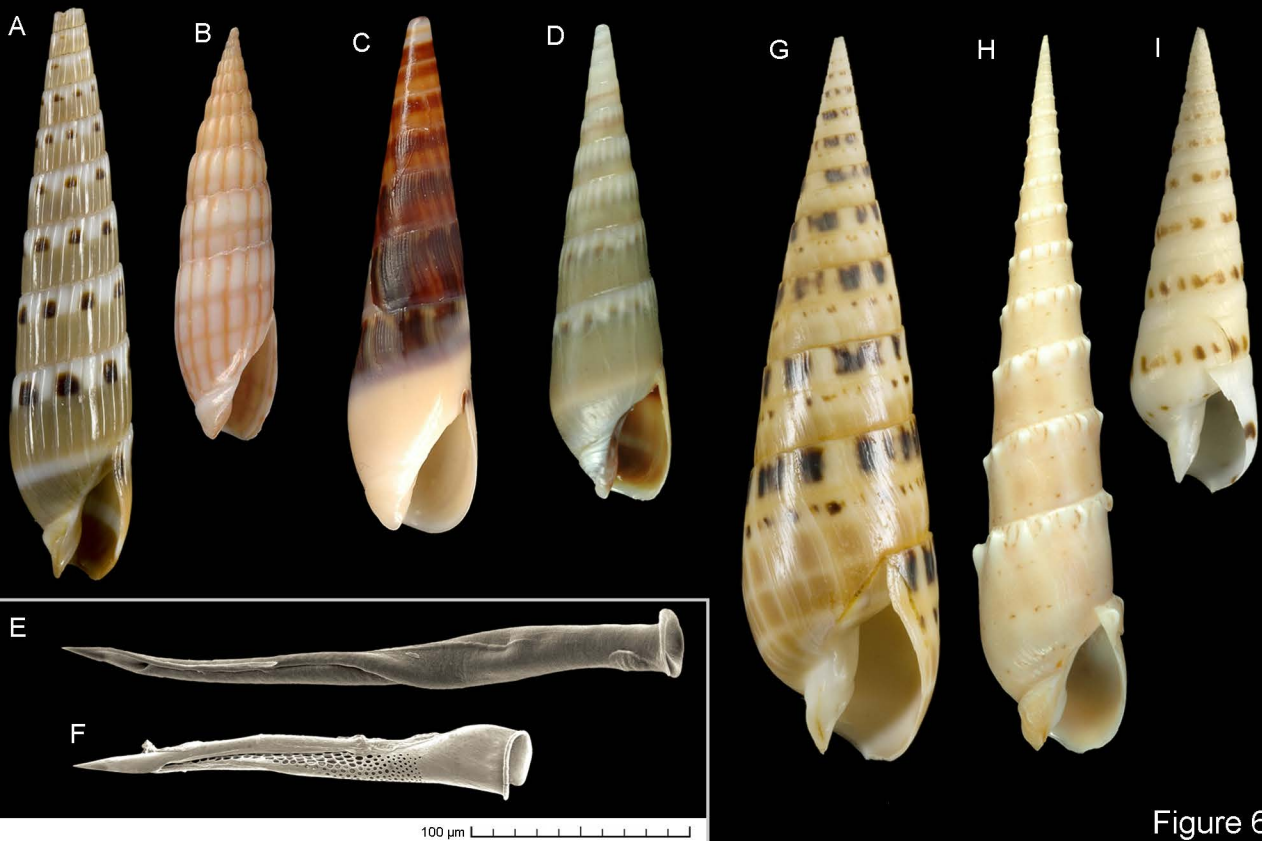
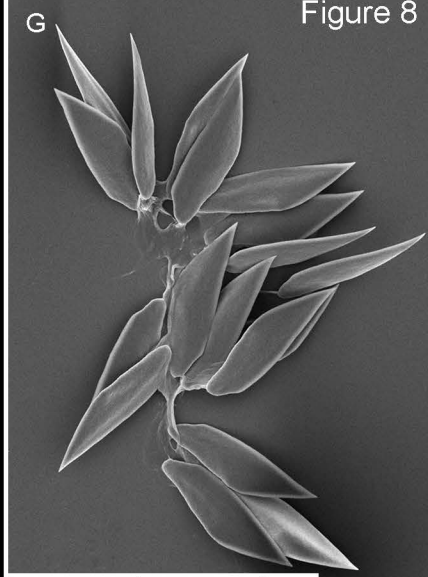
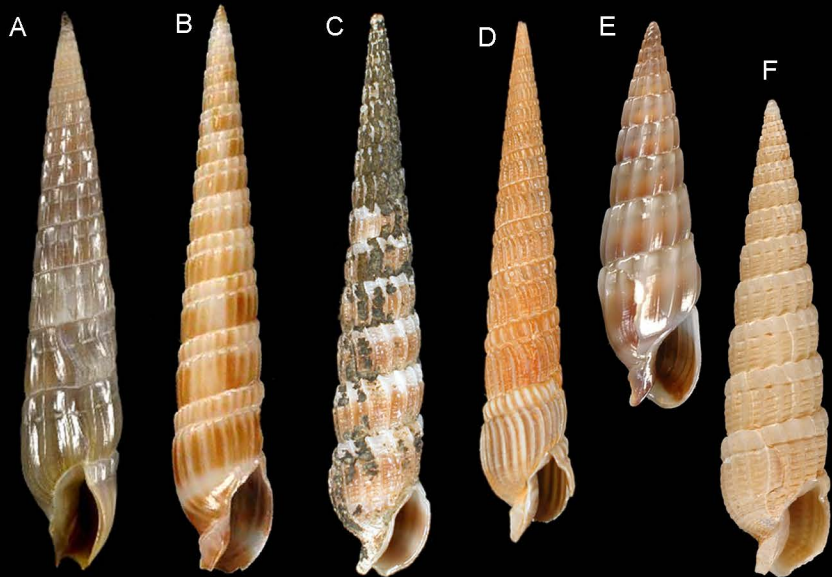


Figure 6

Figure 7



Figure 8



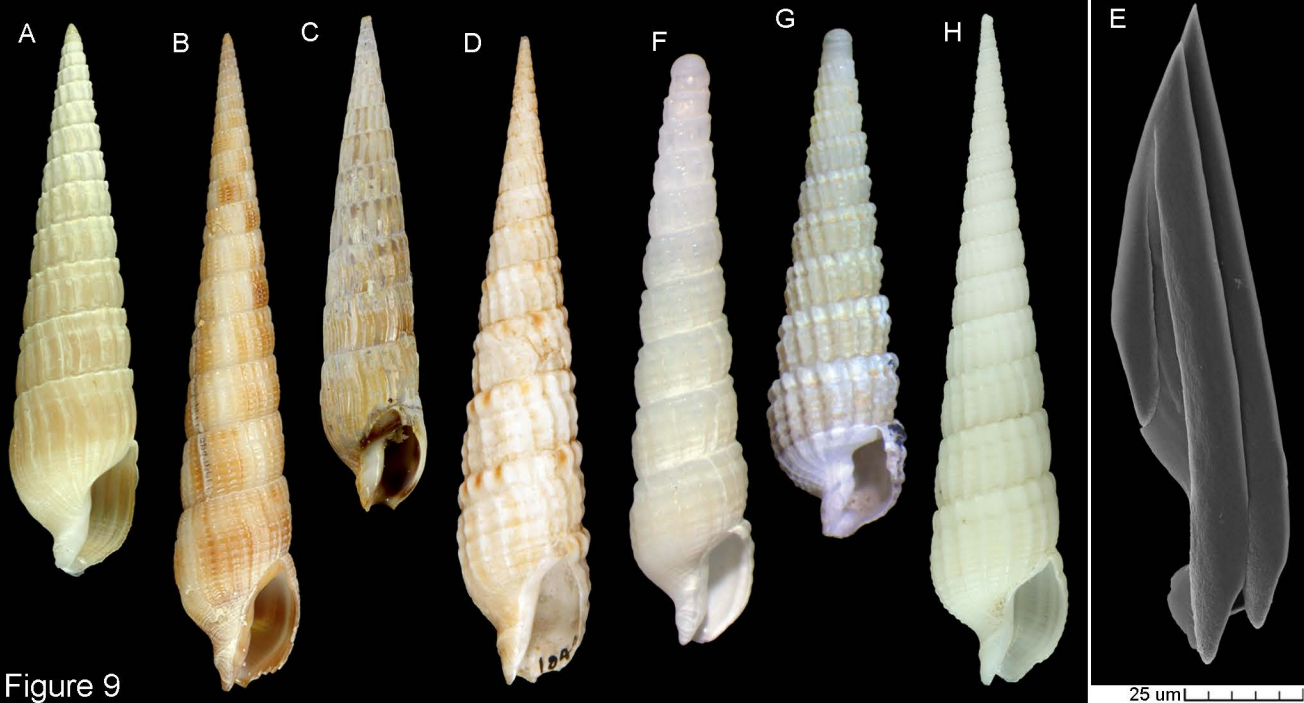


Figure 9

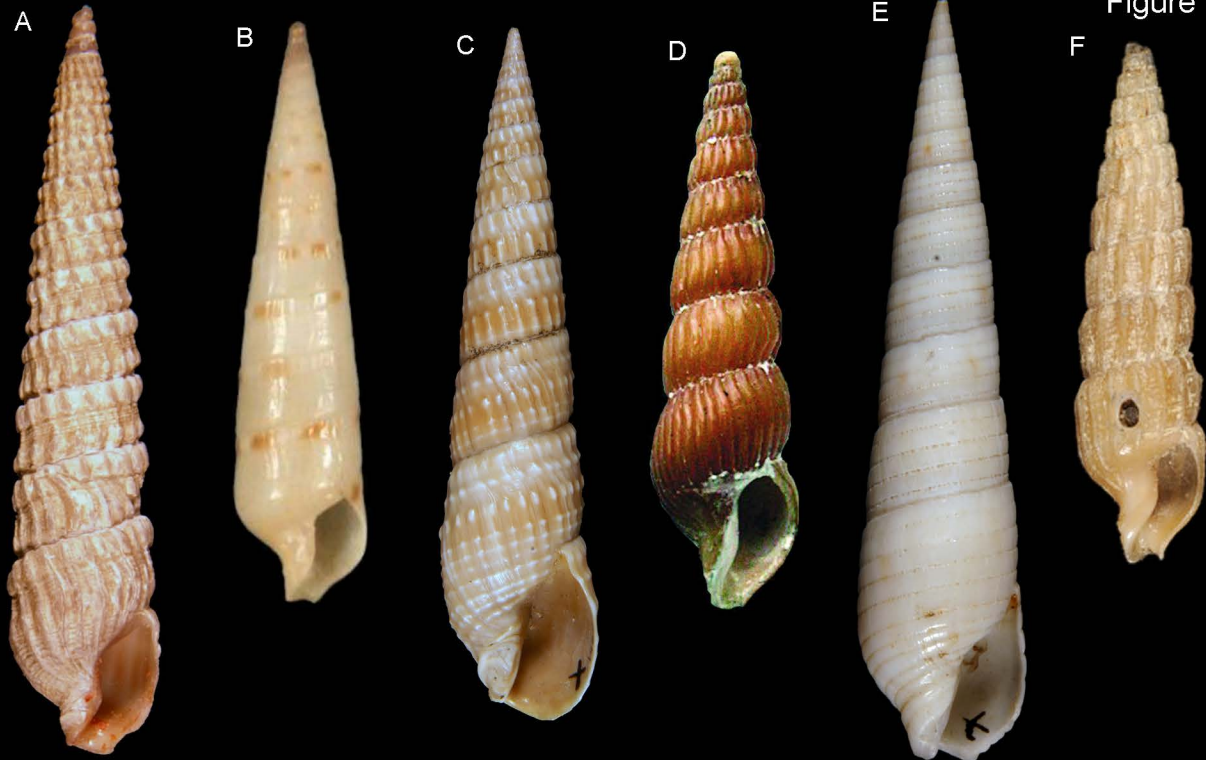


Figure 11

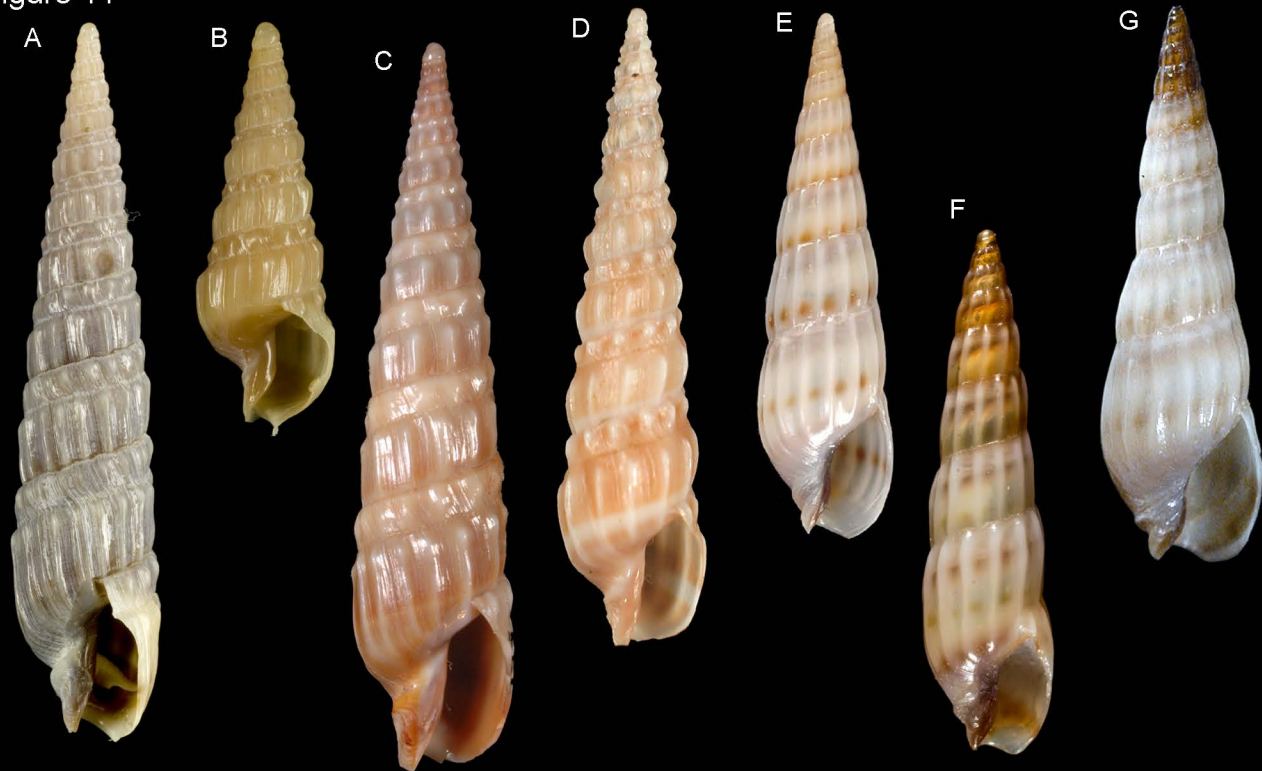


Figure 12

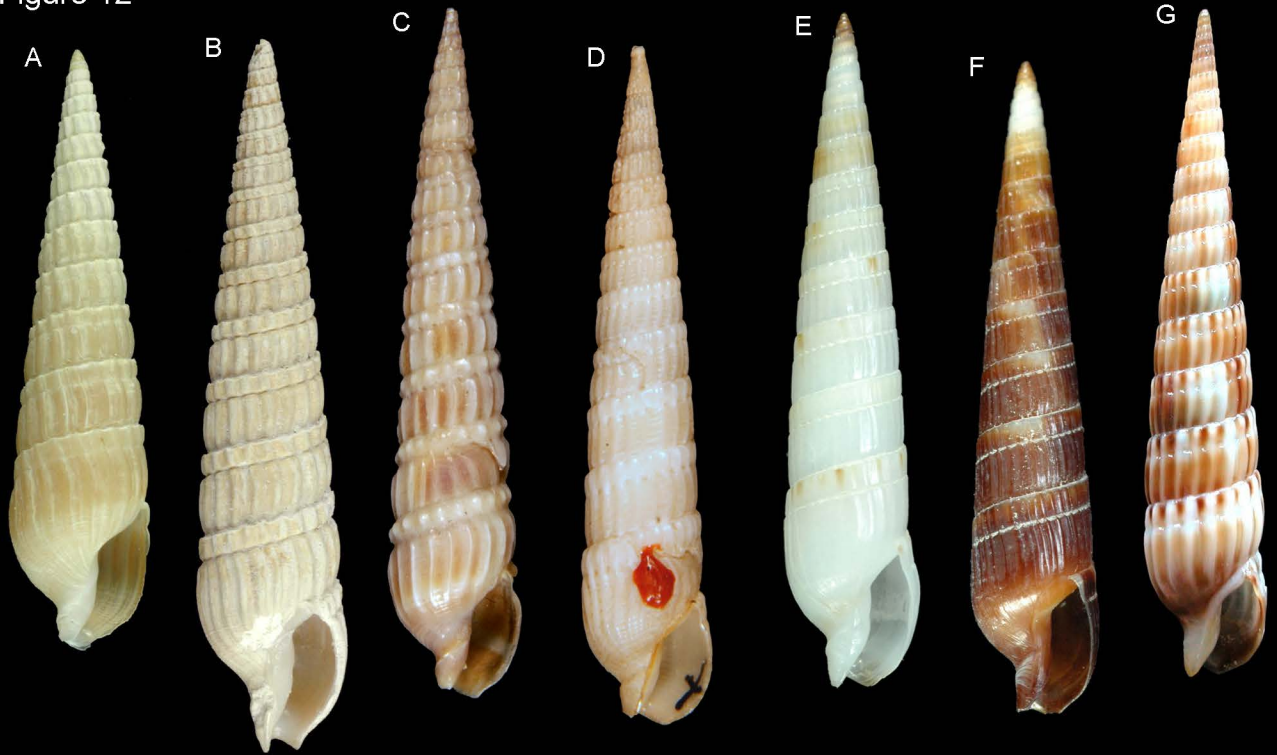


Figure 13

