

**A NEW CLASSIFICATION FOR THE PYLOCHELIDAE
(DECAPODA: ANOMURA: PAGUROIDEA)
AND DESCRIPTIONS OF NEW TAXA**

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ABSTRACT. – A new classification is presented based on the results of the recently completed cladistic analysis of the Pylochelidae. The subfamilies Pylochelinae and Pomatochelinae are retained, the latter with the genera *Pylocheles* and *Cheiroplatea*; however, the subgenera *Xylocheles* and *Bathycheles* are elevated to generic rank together with the nominal subgenus *Pylocheles*. In addition, one new species, *B. phenax*, is described in *Bathycheles* and *B. profundus* is shown to be conspecific with *B. integer*. The subfamilies Parapylochelinae, Canellochelinae, Trizochelinae, and Mixtopagurinae are reduced to ranks of tribes and included in the subfamily Trizochelinae. A new genus *Forestocheles* is proposed in the tribe Trizochelini. Within the genus *Trizocheles*, subspecific rank for *T. spinosus bathamae* is deemed unjustified and this taxon is placed in synonymy with the nominal subspecies *T. spinosus spinosus*. The correct identity of *Trizocheles balssi* is established and the species mistakenly thought to represent that taxon is described as *T. hoenssonae*, new species. *Trizocheles gracilis* is found to be conspecific with *T. boasi* and an additional new species, *T. mendanai*, is added to the genus. The superfamilial ranks of Cheiroplateoidea, Pomatocheloidea, Pylocheloidea, and Canellocheloidea proposed by Watabe (2007) are rejected, as is Birgusoidea.

KEY WORDS. – Decapoda, Anomura, Paguroidea, Pylochelidae, new classification, Pylochelinae, Pomatochelinae, Trizochelinae, tribes, new genus, new species.

INTRODUCTION

Although the first pylochelid genera and species were described in the late nineteenth century, because of the cryptic habitats of these unusual paguroids they were rarely collected and consequently known from very few specimens. Prior to the monographic review of Forest (1987a) only 19 species in five genera had been described. In contrast to the total of 60 specimens reported in all the previous literature accounts, Forest was able to examine more than 400 individuals collected from approximately 200 sites around the world. Despite his revisionary efforts, which included the establishment of six subfamilies, Forest recognized the heterogeneity that still existed within the Pylochelidae Bate, 1888, and suggested that future study might show that each subfamily should be afforded familial rank.

It has only been recently that the substantial amount of supplemental material gathered during subsequent

exploratory cruises undertaken by the Muséum national d'Histoire naturelle (MNHN) and the Office de la Recherche Scientifique et Technique Outre-Mer (ORSTOM), now the Institut de Recherche pour le Développement (IRD) has been examined. This increased abundance of study material, together with recent advances in cladistic methodology and computer generated phylogenetic analyses, made it possible for Lemaitre et al. (2009) to evaluate the interspecific and intergeneric relationships within the Pylochelidae. From those results and from detailed morphological investigations, we are able to propose a new classification, amplify some of the existing descriptions and describe new taxa.

Additionally, fossilized carapaces thought to be paguroids recently have been recovered from the reefal and yellow algal limestones, respectively, of the Felsenkalke Formation, which date back to the Jurassic Period (van Bakel et al., 2008). Of these, two are believed to represent new pylochelid genera, one each assigned to the tribes Trizochelini Forest, 1987a

and Mixtopagurini Bouvier, 1895 (as subfamilies). This is the first report of fossil pylochelids and the earliest evidence of paguroids in the fossil record, which lends support to the proposition that symmetry rather than the hypothesized asymmetry is the ancestral state of the Paguroidea.

MATERIALS AND METHODS

Specimens utilized in this reappraisal have come principally from the exceptionally large collections of the Muséum national d'Histoire naturelle, Paris, France, but these have been supplemented by specimens from the National Museum of Natural History, Smithsonian Institution, Washington, D.C., USA (USNM), the National Taiwan Ocean University, Keelung, Taiwan, Republic of China (NTOU), the Raffles Museum of Biodiversity Research, National University of Singapore, Republic of Singapore (ZRC), and the National Institute of Water and Atmospheric Research, Ltd. (NIWA) [formerly New Zealand Oceanographic Institute (NZOI)], Wellington, New Zealand. Type specimens housed in the Instituto de Oceanología de la Academia de Ciencias de Cuba, Havana, Cuba (IOACC), the Kitakyushu Museum of Natural History and Human History, Kitakyushu, Japan (ZLKU), the Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts, USA (MCZ), the National Institute of Water and Atmospheric Research; the Natural History Museum, London, United Kingdom (NHM), the South African Museum, Cape Town, South Africa (SAM), and the Zoological Museum University Copenhagen, Denmark (ZMUC), have been examined as well as those in the Muséum national d'Histoire naturelle and National Museum of Natural History. Additional identifying institutional abbreviations used in the text are IM, Indian Museum, Calcutta, India; NMCR, National Museum of the Philippines, Manila, Philippine Islands; NMNZ, National Museum of New Zealand (now Museum of New Zealand Te Papa Tongarewa), Wellington, New Zealand; ZSI, Zoological Survey of India. MUSORSTOM is the acronym for the joint expeditions of the MNHN and ORSTOM; EBISCO is the acronym for Exploration de la Biodiversité et Isolement en Mer du Corail; Panglao is the Philippine island around which certain expeditions surveyed. Specific collection gear used precedes the station number; gear abbreviations are: CC, otter trawl (shrimp); CP, beam trawl; DC, Charcot dredge; DW, Warén dredge; BS, benthic sample. Latitudes and longitudes are given only for the start of each gear deployment. Additional abbreviations used in the text are Stn. for station, R.V. for research vessel, coll. for collector, and ovig. for ovigerous. Data for the Royal Indian Marine Survey vessel INVESTIGATOR has been taken from Anonymous (1914). One measurement, shield length, measured from the midpoint of the rostrum, rostral lobe, or anterior margin of the carapace to the midpoint of the posterior margin of the shield or cervical groove provides an indication of animal size and is given in parentheses following the specimen sex. Ocular peduncle length has been measured on the lateral surface of the left peduncle from the distal margin of the cornea to the proximal margin of the ultimate peduncular segment; corneal diameter represents the maximum diameter

of the cornea measured across the dorsal surface. A number of morphological characters used by Lemaitre et al. (2009) in their cladistic matrix, but not considered by Forest (1987a) in his monograph, have been added to the generic diagnoses. In addition to the new classification and keys, abbreviated redescrptions are presented for previously well known species and more detailed redescrptions for those taxa where additional information is now available. When possible the species accounts are accompanied by photographs of living specimens. Complete descriptions and detailed illustrations are presented for the new species. Terminology for the descriptions follows that of McLaughlin (2003) and McLaughlin et al. (2007a). The arrangement in the text of subfamilies, tribes, genera and species follows the keys and is not meant to imply phylogenetic relationships.

CLASSIFICATION AND JUSTIFICATION

At the time of Forest's (1987a) review of the Pylochelidae, the family was still considered part of the superfamily Coenobitoidea, a subdivision of Forest's Section Paguridea. Martin & Davis (2001) rejected Forest's classification, accepting instead an earlier proposition (McLaughlin, 1983b) that paguroids formed a monophyletic taxon, thus they abandoned Coenobitoidea and combined all existing families in the superfamily Paguroidea. McLaughlin et al. (2007b) confirmed the monophyly of the Paguroidea but found, as had Richter & Scholtz (1994), that the Pylochelidae was paraphyletic according to the definition of paraphyly given by Hennig (1966), i.e., defined only by plesiomorphies. As may be seen from Lemaitre et al.'s (2009) strict consensus cladogram of relationships among the genera of the Pylochelidae, weighted against homoplasy, (Fig. 1), three distinct evolutionary branches are clearly distinguished, one representing the subfamily Pylochelinae Bate, 1888 (branch A), the second the subfamily Pomatochelinae Stebbing, 1914 (branch B), and the third including the remaining four other subfamilies (branch C), three of which are represented by single species. In Lemaitre et al.'s unweighted analysis (cladogram not shown), the Pylochelinae and Pomatochelinae received strong Bremer support, eight and 16, respectively, whereas the interfamilial relationships of the other subfamilies were only weakly supported, if at all. In the weighted analysis, five synapomorphies attest to the monophyly of the Pylochelinae: 1) reduction or loss of the rostrum; 2) the loss of the epipod from the second maxilliped; 3, 4) the cheliform terminations of the second and third maxillipeds; and 5) the prominent elevation of the dorsodistal facet of the carpus of each cheliped. Continuity of the linea transversalis is the only synapomorphy uniting the remaining major taxa. The Pomatochelinae are defined by the apomorphy, spinose second antennal segments, and share with the genera *Pylocheles* A. Milne-Edwards, 1880 and *Cheiroplatea* Bate, 1888 the synapomorphy of operculate chelae.

Although the data at present are very limited, McLaughlin & Lemaitre (2008) and Lemaitre et al. (2009) called attention to the distinctly different larval patterns of development seen in *Pylocheles mortensenii* Boas, 1926, *Pomatocheles jeffreysii*

Miers, 1879, and two species of *Trizocheles* Forest, 1987a. Their findings lend additional support to subfamilial status for the Pylochelinae, Pomatochelinae and Trizochelinae Forest, 1987a. Thus, while the Parapylochelinae Forest, 1987a, and Canellochelinae Forest, 1987a, are clearly sister taxa and they in turn sister to the Mixtopagurinae, subfamilial rank for each does not, at this time, seem justifiable. The Trizochelinae, currently represented only by the genus *Trizocheles*, is obviously not monophyletic. Of the 18 assigned species, four distinct clades are apparent and the relationships of four other species are unresolved, whereas

two species, *T. manningi* Forest, 1987a, and *T. perplexus* Forest, 1987a, are excluded from the genus. Although species were the terminal taxa in Lemaitre et al.'s (2009) analysis, the characters selected by the authors reflected major morphological attributes distributed throughout the family. Differentiation of taxa of *Trizocheles* at the specific level was not as comprehensive, which explains why two of the four clades may not be accurate representations of intrageneric relationships. This may also be the reason that *T. manningi* was excluded from the genus. The suggested relative closeness of this species with *T. perplexus* is not

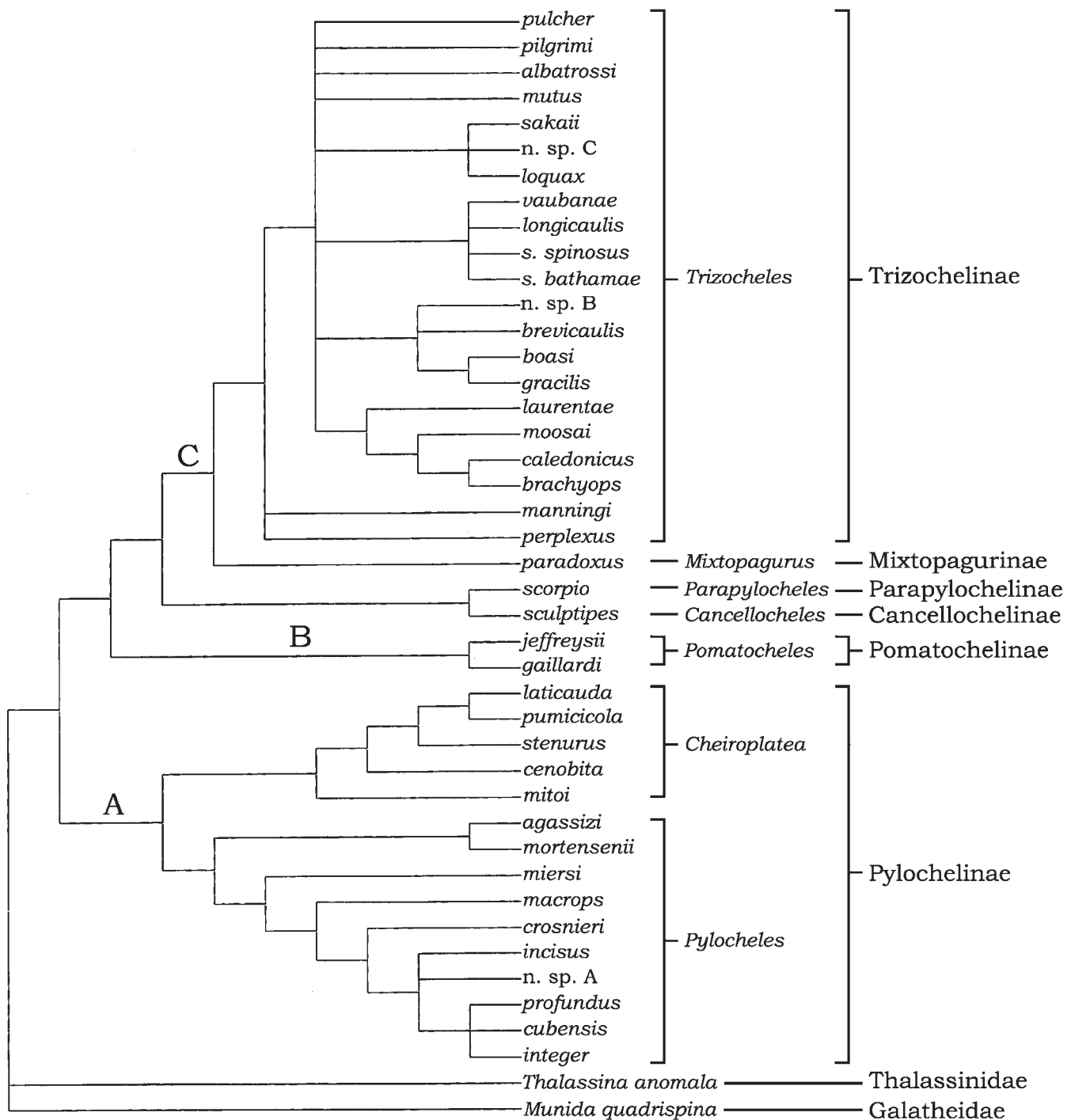


Fig. 1. Strict consensus cladogram of pylochelid inter- and intrageneric relationships (adapted from Lemaitre et al., 2009). [*Thalassinina anomala* (Thalassinidae) and *Munida quadrispina* (Galatheidae), are the outgroup. Abbreviations used: n. sp. A, *Bathyocheles phenax*, new species; n. sp. B, *Trizocheles hoenssonae*, new species; n. sp. C, *T. mendanai*, new species.

supported by their morphologies. The only character shared by the two species is the plesiomorphic absence of stridulatory rods and ridges on the carpi of the chelipeds and propodi and carpi of the second pereopods, and this is an absence also shared by *T. mutus* Forest, 1987a, as well. Development of these rods and ridges is a phenomenon that is not well understood, but appears to be, at least in part, correlated with growth. *Pomatocheles stridulans* Forest, 1987a, for example, is defined by the presence of these structures, while in the allied species *P. jeffreysii*, presumed stridulatory structures are present in small specimens, but disappear in larger individuals. A reversed situation has been observed in *Trizocheles caledonicus* Forest, 1987a, in which stridulatory rods and/or ridges are present in large specimens but absent in very small individuals.

In contrast, the exclusion *T. perplexus* from *Trizocheles* is completely justified. The species was described by Forest (1987a), based on a single badly damaged specimen. Despite the distinctly different structure of the telson of the holotype, the taxon was assigned to *Trizocheles* because of the similarities in the armatures of the remaining cheliped and pereopods with other members of that genus. Although supplementally collected material provided Forest & McLaughlin (2000) with sufficient information to present a more complete specific description, they apparently did not examine the mouthparts of any of their specimens. The present reexamination of that material has shown that this species differs in buccal character states, although primarily plesiomorphically, so markedly from species of *Trizocheles* that distinct generic reassignment is necessary. Specifically, species of *Trizocheles*, like *Mixtopagurus* A. Milne-Edwards, 1880, *Canellocheles* Forest, 1987a, and *Cheiroplatea* all have one or more exceptionally long setae on the proximal margin of the posterior lobe of the maxillary scaphognathite. These setae are absent in *Pylocheles*, *Pomatocheles* Miers, 1879, *Parapylocheles* Alcock, 1901, and *T. perplexus*. However, the first maxilliped lacks a flagellum only in *T. perplexus* and *Canellocheles sculptipes* (Miyake, 1978). In species of *Pylocheles*, *Cheiroplatea*, *Pomatocheles*, *Parapylocheles* and some *Trizocheles*, a one-segmented flagellum is present, whereas in other *Trizocheles* species and in *Mixtopagurus*, the flagellum is multiarticulated. The produced inner margin of the exopod of the second maxilliped seen in *T. perplexus*, also is found only in *Pomatocheles* species, and represented by a spine in *Canellocheles*. One or more accessory teeth are present on the crista dentata of the third maxilliped in species of *Parapylocheles*, *Canellocheles*, *Trizocheles* and *Mixtopagurus*, but absent in *Pylocheles*, *Cheiroplatea*, *Pomatocheles* and *T. perplexus*. The telson of *T. perplexus* is unlike those of any other pylochelid species, although in lacking subdivision into anterior and posterior portions, it approaches the condition seen in *C. sculptipes*.

Further phylogenetic assessment of relationships within *Trizocheles* is not possible at the present time, because five species are still only known from their holotypes. We have already observed that even the addition of one or two supplemental specimens can significantly alter the interpretation of a particular taxon. Consequently, although

the subfamily Pylochelinae still contains the two genera, *Pylocheles* and *Cheiroplatea*, and the Pomatochelinae three species in a single genus, Forest's (1987a) monotypic subfamilies Parapylochelinae, Canellochelinae, and Mixtopagurinae rather than being elevated to familial rankings, as suggested by Forest, are herein reduced to ranks of tribes and included in the subfamily Trizochelinae with the tribe Trizochelini containing the genera *Trizocheles* and *Forestocheles* new genus.

Watabe (2007), in his construction of an axiomatic system for the classification of the Decapoda, proposed superfamilial ranks for some genera and families of the Paguroidea, but not all, thus creating a completely unacceptable hierarchy. We find his proposed Cheiroplateoidea, Pomatocheloidea, Pylocheloidea, Canellocheloidea and Birgusoidea entirely without merit.

Pylochelidae Bate, 1888

"Paguriens" A. Milne-Edwards, 1880: 37 (in part).

Pylochelidae Bate, 1888: 10; Ortmann, 1898: 1144; Alcock, 1901: 209; Alcock, 1905: 13; Calman, 1909: 259; Calman, 1911: 94; Balss, 1912: 90; Balss, 1913: 34; Terao, 1913: 390; Yokoya, 1933: 70; Makarov, 1938:119; Balss, 1940: 41, 96; Walton, 1950: 188 (in part); Forest, 1954: 167; Makarov, 1962: 114; Dechancé, 1963: 495; Pilgrim, 1965: 549; Schembri & McLay, 1983: 28; Forest, 1987a: 25; Forest & McLaughlin, 2000: 31; McLaughlin, 2003: 113 (key); McLaughlin et al., 2007c: 19 (key); Lemaitre et al., 2009: 1.

Parapaguridae – Henderson, 1888: 85 (in part); Ortmann, 1892: 274 (in part).

"Paguriens" ou "Pagurides" – A. Milne-Edwards & Bouvier, 1893: 17 (in part).

Pomatochelidae Stebbing, 1914: 2; Balss, 1924: 753; Balss, 1927: 1012; Barnard, 1950: 413; Miyake, 1978: 3; McLaughlin, 1983a: 431; McLaughlin, 1983b: 609; Baba, 1986: 184.

Type genus. – *Pylocheles* A. Milne-Edwards, 1880.

Diagnosis. – Carapace usually well calcified, at least anteriorly; incompletely or completely divided into shield and posterior carapace by linea transversalis; cervical groove contiguous or not with linea transversalis. Rostrum present or absent. Ocular peduncles well developed or reduced; corneas well developed, reduced or absent. Antennular and antennal peduncles well developed. Usually 14 pairs of quadriserial phyllobranchiate gills, paired arthrobranches on third maxillipeds and pereopods 1–4, unpaired pleurobranches above pereopods 2–5; arthropods occasionally reduced on third maxillipeds.

Maxillule with or without external endopodal lobe developed. Maxilla with or without 1 or more exceptionally long setae on posterior margin of proximal lobe of scaphognathite. First maxilliped with epipod well developed; exopod with or without flagellum. Second maxilliped with or with epipod; exopod with or without spines. Third maxilliped with or without epipod; endopod with crista dentata developed on ischium, with or without 1 or more accessory teeth; maxillipeds basally approximate.

Chelipeds equal or not, usually symmetrical, together forming operculum or not. Ambulatory legs pediform. Fourth pereopods sub- or semichelate. Fifth pereopods subchelate or chelate. Propodal rasps each consisting of 1 to several rows of corneous scales.

Pleon with tergal plates moderately to well calcified, articulated; pleura moderately well developed or reduced; uropods usually symmetrical. Males with first and second pleopods paired and modified as gonopods; paired pleopods 3–5 unequally biramous or uniramous. Females with paired first pleopods modified; pleopods 2–5 paired, unequally biramous.

Remarks. – When he established the family Pylochelidae, Bate (1888) included the genera *Pomatocheles*, *Pylocheles* and his own *Cheiroplatea*. Although Bate did not specifically state that the type genus was *Pylocheles*, he implied as much by stating “The name is derived from that given to a genus by A. Milne-Edwards, and includes all those paguriform Anomura that are trichobranchiate.”

As may be seen from the synonymy, only limited supplemental information regarding the family in its entirety has been published since Forest’s (1987a) monograph. Although Forest provided etymologies for his new genera, he did not specify genders. Forest & McLaughlin (2000) cited the genders of both *Pylocheles* and *Trizochelies* incorrectly as masculine. The Greek noun *χηλή* (*chele*) is feminine (Bailly, 1928).

Key to the subfamilies and tribes of the Pylochelidae Bate, 1888

1. Linea transversalis interrupted, shield incompletely separated from posterior carapace; telson divided into anterior and posterior articulating plates Pylochelinae
 - Linea transversalis continuous; shield completely separated from posterior carapace; telson not divided into anterior and posterior articulating plates 2
2. Epipod of second maxilliped absent; chelipeds alone forming operculum Pomatochelinae
 - Epipod of second maxilliped present; chelipeds alone not forming operculum 3 Trizochelinae
3. Posterior carapace distinctly longer than anterior carapace; ocular peduncles spinose Parapylochelini
 - Posterior carapace equal to or shorter than anterior carapace; ocular peduncles not spinose 4
4. Rostrum with subrostral spine; terminal margin of telson entire Canellochelini
 - Rostrum without subrostral spine; terminal margin of telson with median concavity or cleft 5
5. Pleon symmetrical; telson with posterior lobes usually symmetrical Trizochelini
 - Pleon asymmetrical; telson with posterior lobes usually asymmetrical Mixtopagurini

Pylochelinae Bate, 1888

Type genus. – *Pylocheles* A. Milne-Edwards, 1880.

Diagnosis. – Shield incompletely separated from posterior carapace; linea transversalis not continuous medianly. Rostrum absent or developed as small median spinule or rounded lobe; antennular lobes present. Ocular peduncles well developed or reduced, corneas well developed or reduced, pigmented or not; ocular acicles plate-like or not readily apparent. Maxillule with external endopodal lobe obsolete. First maxilliped with well developed epipod. Second maxilliped without epipod. Third maxilliped without accessory tooth on crista dentata; terminally chelate or subchelate. Chelipeds equal, symmetrical, forming operculum or not. Telson divided into anterior and posterior portions by distinct transverse suture.

Remarks. – In the Pylochelinae, Lemaitre et al. (2009) recognized two clades representing the genera *Cheiroplatea* and *Pylocheles*, respectively. They are united by the distinctive synapomorphy of chelate or subchelate third maxillipeds. Within *Pylocheles*, the subgenus *Pylocheles* is sister to the remaining taxa. Several apomorphies set that subgenus apart, most notably the operculate and spinose chelae. Two synapomorphies attributable to the subgenus *Xylocheles* Forest, 1987a are the well developed lateral projections and the distinct presence of ocular acicles, which are shared with *Pylocheles*. In contrast, species of *Bathycheles* Forest, 1987a are set apart by their reduced ocular peduncles and corneas. The complete loss of the epipod on the third maxilliped is a synapomorphy that *Bathycheles* and *Xylocheles* share, but one that also occurs convergently in the Parapylochelini, Trizochelini and virtually all other non-pylochelid paguroids. The compelling distinctiveness of *Pylocheles* makes it impossible to classify *Xylocheles* and *Bathycheles* as subgenera of it. Therefore, although neither exhibits the apomorphies of *Pylocheles*, we believe there is ample morphological justification to elevate all three subgenera to full generic rank.

Forest (1987a, b) also considered habitat and depth distributions in his characterization of the three subgenera. While additional sampling has confirmed the xylocolous and petricolous habitats of *Bathycheles*, *Xylocheles* and *Pylocheles*, sponge occupancy also has been documented for *P. mortensenii*. Bathymetric distributions are no longer easily categorized. Species of *Pylocheles* have been collected from depths of 100 to 600 m, possibly 700 m. *Xylocheles* species have been encountered from 148 to 760 m, whereas species of *Bathycheles* have been found as shallowly as 283 m and as deep as 2,149 m, possibly even to 2,217 m.

Key to the genera of the subfamily Pylochelinae Bate, 1888

1. Shield approximately as broad as long; anterior margin of shield with median concavity, with or without median spinule; corneas variable in size but always hemispherical 2
 - Shield distinctly broader than long; anterior margin of shield with well developed, rounded rostral lobe; corneas reduced, conical *Cheiroplatea*
2. Chelipeds together forming circular or subcircular operculum; without cluster of tubercles on dorsomesial face of carpus

- distally; posterior portion of telson distinctly divided into 2 lobes *Pylocheles*
- Chelipeds not forming operculum; with cluster of tubercles on dorsomesial face of carpus distally; posterior portion of telson not distinctly divided into 2 lobes 3
- 3. Ocular peduncles moderately long, considerably more than half shield length; corneas large, distinctly pigmented *Xylocheles*
- Ocular peduncles short, not more than half shield length; corneas reduced, not distinctly pigmented *Bathycheles*

***Cheiroplatea* Bate, 1888**

Cheiroplatea Bate, 1888: 11; A. Milne-Edwards & Bouvier, 1893: 18; Stebbing, 1893: 170; Ortmann, 1898: 1144; Forest, 1987a: 87; Forest & McLaughlin, 2000: 35.

Cheiroplatea – Ortmann, 1892: 274; Alcock, 1905: 17; Balss, 1940: 144; Balss, 1956: 1387; Balss, 1957: 1584, 1745 (misspelling).

Cheiroplatea – MacGilchrist, 1905: 243; Stebbing, 1914: 2; Boas, 1926: 42 (misspelling).

Type species. – By monotypy, *Cheiroplatea cenobita* Bate, 1888; gender feminine.

Diagnosis. – Anterior margin with broad, weakly to well developed rostral lobe; lateral projections also moderately or well developed. Ocular peduncles reduced, corneas defined or not, non-pigmented if present; ocular acicles not clearly delineated, apparently fused with ultimate peduncular segments. Antennular and antennal peduncles considerably overreaching ocular peduncles, antennular peduncles appreciably longer than antennal peduncles. Antennal peduncles with supernumerary segmentation.

Mandible with calcified cutting edge; second segment of mandibular palp with produced, denticulate lobe. Maxillule with external lobe of endopod obsolete. First maxilliped with epipod; flagellum one-segmented. Second maxilliped without epipod; terminally semichelate. Third maxilliped with or without epipodal remnant; exopod unarmed; endopod with well developed crista dentata; no accessory tooth; merus with 2 or 3 ventral spines; terminally weakly chelate.

Chelipeds equal, symmetrical; carpi each with elevated anterodorsal facet overhanging posterior margin of chela; chelae together forming operculum.

Sixth pleonal tergite subrectangular to subquadrate. Telson divided into anterior and posterior portions by transverse suture; posterior portion undivided.

Male first pleopod with long, moderately slender basal segment and shorter subovate distal segment. Second pleopod with moderately long basal segment; distal segment with semi-articulated distal portion much shorter than proximal portion; exopod rudimentary or absent. Pleopods 3–5 with well developed exopods, endopods rudimentary or absent. Female first pleopods slender, one or incompletely two-segmented. Pleopods 2–5 with long, one-segmented exopods and quite short one-segmented endopods.

Remarks. – The ocular acicles were described by Forest (1987a) as being very reduced and little if at all visible. From one of the specimens of *C. laticauda* Boas, 1926 available for reexamination, another interpretation is possible. This specimen (USNM 1024162) is a molt which makes sutures somewhat easier to discern. The ocular peduncles of this species have been described (Forest 1987a: 92) as being weakly concave on the mesial side proximally, which is quite true; however, the ocular peduncles of this species, like all the others in the genus, are actually broadened on the mesial surface basally. The ocular peduncles of the molt show clear suture lines on these mesial surfaces suggestive of ocular acicles that have incompletely or completely fused with the basal portions of the ultimate peduncular segments.

Key to the species of *Cheiroplatea* Bate, 1888

1. Lateral projections of shield reduced; epistome with 1 or 2 small spines *C. laticauda* (Pacific)
- Lateral projections of shield prominently produced; epistome unarmed 2
2. Dorsal surfaces of propodi of second pereopods each with row of small spines 4
- Dorsal surfaces of propodi of second pereopods unarmed or with few tiny spinules 3
3. Meri of chelipeds with ventromesial margins unarmed, ventrolateral margins each with spinule at distal angle *C. cenobita* (Pacific)
- Meri of chelipeds each with ventromesial and ventrolateral marginal row of small spines increasing in size distally *C. mitoi* (Pacific)
4. Carpi of third pereopods with dorsal surfaces unarmed *C. stenurus* (Indian Ocean)
- Carpi of third pereopods each with row of small spines on dorsal surface 5
5. Ventral margins of meri of second pereopods each with few spines or spinules; dorsal surfaces unarmed *C. pumicicola* (Pacific)
- Ventral margins of meri of second pereopods unarmed; dorsal margins each with 2 spinules *C. scutata* (Atlantic)

***Pylocheles* A. Milne-Edwards, 1880 restricted**

Pylocheles A. Milne-Edwards, 1880: 38; Bate, 1888: 11; Agassiz, 1888: 40; Ortmann, 1892: 274; Ortmann, 1898: 1144; A. Milne-Edwards & Bouvier, 1893: 17; Stebbing, 1893: 169; Alcock, 1901: 210 (in part); Benedict, 1901: 771; Alcock, 1905: 14 (in part); Boas 1926: 34 (in part); Forest, 1954: 167; Miyake, 1978: 10; Ortiz & Gómez, 1986: 31 (in part) (key); Forest, 1987a: 41 (in part); Forest & McLaughlin, 2000: 32 (in part); McLaughlin et al., 2007c: 19 (in part).

Mixtopagurus – Yokoya, 1933: 70 (in part).

Pylocheles (*Pylocheles*) – Forest, 1987a: 48; Forest, 1987b: 316; Forest & McLaughlin, 2000: 33; McLaughlin et al., 2007c: 19 (key); Lemaitre et al., 2009: 9.

Type species. – By monotypy, *Pylocheles agassizii* A. Milne-Edwards, 1880; gender feminine.

Diagnosis. – Shield with subrostral groove; anterior margin with antennular lobes separated by shallow straight or weakly concave sinus from faintly rounded rostral projection, with

or without median spinule; lateral projections prominent. Ocular peduncles well developed, appreciably shorter than antennular peduncles; corneas slightly dilated, pigmented; ocular acicles developed as flattened plates. Antennal peduncles with supernumerary segmentation.

Mandible with calcified cutting edge; second segment of mandibular palp with produced, marginally denticulate lobe. Maxillule with external lobe of endopod obsolete. Scaphognathite of maxilla without very long setae on posterior lobe. First maxilliped with epipod; flagellum one-segmented. Second maxilliped without epipod; terminally chelate. Exopod of third maxillipeds unarmed; endopod with well developed crista dentata; no accessory tooth; merus with 2 or 3 ventral spines; terminally chelate.

Chelipeds equal, symmetrical; carpi each with elevated dorsodistal facet overhanging posterior margin of chela; chelae together forming operculum.

Sixth pleonal tergite subrectangular. Telson divided into anterior and posterior portions by transverse suture; posterior portion divided into distinct symmetrical lobes.

Male first pleopods short, two-segmented, distal segment somewhat spatulate; second pleopods also two-segmented but much longer than first, distal segment with cleft distally resulting in two very unequal lobes; pleopods 3–5 with endopods appreciably reduced. Females with first pleopods also modified, uniramous, two-segmented; pleopods 2–5 unequally biramous, with exopods elongate, endopods shorter.

Key to the species of *Pylocheles*

A. Milne-Edwards, 1880

1. Dorsal margins of carpi of second pereopods each with only dorsodistal spine *P. agassizii* (Atlantic)
- Dorsal margins of carpi of second pereopods each with 5 or 6 spines *P. mortensenii* (Indo-Pacific)

Xylocheles Forest, 1987a

Pylocheles – Alcock, 1899: 111 (in part); Alcock & Anderson, 1899a: 14 (in part); Boas, 1926: 34 (in part); Pérez, 1934: 25.

Pylocheles (Xylocheles) Forest, 1987a: 57; Forest, 1987b: 316; Lemaitre et al., 2009: 1.

Type species. – By original designation, *Pylocheles (Xylocheles) macrops* Forest, 1987a; gender feminine.

Diagnosis. – Shield without subrostral groove; rostrum absent; anterior margin with weakly developed antennular lobes separated by shallow straight or weakly concave sinus, without median spinule; lateral projections obsolete or absent. Ocular peduncles well developed, appreciably shorter than antennular peduncles; corneas slightly to prominently dilated,

pigmented; ocular acicles developed as flattened plates. Antennal peduncles with supernumerary segmentation.

Mandible with calcified cutting edge; second segment of mandibular palp with produced, marginally denticulate lobe. Maxillule with external lobe of endopod obsolete. Scaphognathite of maxilla without very long setae on proximal lobe. First maxilliped with epipod; flagellum one-segmented. Second maxilliped without epipod; terminally chelate. Third maxilliped without epipod; exopod unarmed; endopod with well developed crista dentata; no accessory tooth; merus with 1 ventral spine or spinule; terminally chelate.

Chelipeds equal, symmetrical; carpi each with elevated dorsodistal facet overhanging posterior margin of chela; chelae not forming operculum.

Sixth pleonal tergite subquadrate. Telson divided into anterior and posterior portions by transverse suture; posterior portion weakly divided into symmetrical lobes.

Male first pleopod with long, moderately slender basal segment and much shorter subovate distal segment. Second pleopod with moderately long basal segment; distal segment with semi-articulated, somewhat foliaceous terminal portion shorter than proximal portion; exopod rudimentary. Pleopods 3–5 with well developed exopods, endopods rudimentary or absent. Female first pleopods slender, incompletely two-segmented. Pleopods 2–5 with long, one-segmented exopods and shorter one-segmented endopods.

Key to species of *Xylocheles* Forest, 1987a

1. Ocular peduncles moderately short, corneas prominently dilated; terminal margin of sixth pleonal tergite with 2 median incisions separated by irregular concave marginal portion *X. miersi* (Pacific)
2. Ocular peduncles moderately long, corneas only slightly dilated; terminal margin of sixth pleonal tergite with 2 median incisions separated by prominently produced marginal portion *X. macrops* (Indo-Pacific)

Bathycheles Forest, 1987a

Pylocheles (Bathycheles) Forest, 1987a: 66; Forest, 1987b: 316; Lemaitre et al., 2009: 1.

Type species. – By original designation, *Pylocheles (Bathycheles) incisus* Forest, 1987a; gender feminine.

Diagnosis. – Anterior margin lacking rostrum; with moderate to well developed antennular lobes separated by shallow to deep, unarmed median concavity; lateral projections moderately well developed, usually rounded. Ocular peduncles reduced, greatly overreached by antennular peduncles; corneas small, usually non-pigmented; ocular acicles reduced, often fused to penultimate peduncular segments. Antennal peduncles with supernumerary segmentation.

Mandible with calcified cutting edge; second segment of mandibular palp with produced, marginally denticulate lobe. Maxillule with external lobe of endopod obsolete. Scaphognathite of maxilla without 1 or more very long setae on proximal lobe. First maxilliped with epipod; flagellum one-segmented. Second maxilliped without epipod; terminally chelate. Third maxilliped without epipod; exopod unarmed; endopod with well developed crista dentata; no accessory tooth; merus unarmed; terminally chelate. Epistome with or without spine.

Chelipeds equal, symmetrical; carpi each with elevated dorsodistal facet overhanging posterior margin of chela. Chelae not forming operculum.

Sixth pleonal tergite subrectangular. Telson divided into anterior and posterior portions by transverse suture; posterior portion undivided.

Male first pleopod with long, moderately slender basal segment and much shorter subovate distal segment. Second pleopod with moderately short basal segment; distal segment with semi-articulated distal portion foliaceous and shorter than proximal portion; exopod rudimentary. Pleopods 3–5 with well developed exopods, endopods rudimentary or absent. Female first pleopods slender, uniramous or incompletely two-segmented. Pleopods 2–5 with long, one-segmented or incompletely two-segmented non egg-bearing exopods and shorter one-segmented egg-bearing endopods.

Remarks. – In addition to a new species that is described in *Bathychelès*, *B. profundus* Forest, 1987a has been found to be conspecific with *B. integer* Forest, 1987a.

Key to species of *Bathychelès* Forest, 1987a

1. Terminal margin of sixth pleonal tergite with moderate to deep, broad median subquadrate to subrectangular concavity 2
 - Terminal margin of sixth pleonal tergite without moderate to deep, broad median subquadrate to subrectangular concavity 4
2. Anterior region of telson with ovate area of decalcification at each posterolateral angle *B. cubensis* (Atlantic)
 - Anterior area of telson without ovate area of decalcification at each posterolateral angle 3
3. Dorsal surfaces of palms of chelipeds each with marginal and median rows of simple and modified (thick, club-like) setae *B. incisus* (Pacific)
 - Dorsal surfaces of palms of chelipeds each without marginal and median rows of modified (thick, club-like) setae *B. phenax*, new species (Pacific)
4. Dorsal surfaces of palms of chelipeds each with median and lateral depressions separated by slightly sinuous longitudinal granular ridge *B. macgilchristi* (Indian Ocean)
 - Dorsal surfaces of palms of chelipeds each without slightly sinuous longitudinal granular ridge 5
5. Terminal margin of sixth pleonal tergite straight or slightly concave, with or without 1–3 very small incisions *B. integer* (Indo-Pacific)
 - Terminal margin of sixth pleonal tergite with median portion produced *B. crosnieri* (Indian Ocean)

Pomatochelinae Stebbing, 1914

Pomatochelinae – Forest, 1987a: 113.

Type genus. – By monotypy, *Pomatocheles* Miers, 1879.

Diagnosis. – Shield separated from posterior carapace by continuous linea transversalis; cervical groove weakly delineated and contiguous with linea transversalis only medianly. Rostrum broadly rounded or absent. Arthrobranchs of third maxilliped reduced. Epipod of second maxilliped absent. Epipod of third maxilliped rudimentary. Maxilla without 1 or more long setae on posterior margin of scaphognathite. Chelipeds symmetrical, forming operculum. Dactyls of ambulatory legs without ventral corneous spines. Telson longer than broad.

Remarks. – The phylogenetic analysis of Lemaitre et al. (2009) clearly delineated three evolutionary lineages in the family Pylochelidae; members of the subfamily Pylochelinae were the more basal of the three clades. Although the considerable diversity that exists among members of the latter clades requires hierarchical recognition, all are united by the synapomorphy, a continuous linea transversalis. However, the Bremer support received by the Pomatochelinae in the unweighted analysis has convinced us that retention of subfamilial rank for the clade is justified. The family is represented by only the type genus.

Pomatocheles Miers, 1879

Pomatocheles Miers, 1879: 49; Bate, 1888: 10; Henderson, 1888: 101; Alcock, 1899: 111; Alcock, 1905: 14; Stebbing, 1914: 3 (in part); Boas, 1926: 46; Balss, 1927: 1012; Balss, 1957: 1584 (in part); Miyake, 1978: 4 (in part); Baba, 1986: 29; Forest, 1987a: 112.

Mixtopagurus – Balss, 1913: 34 (in part); Yokoya, 1933: 70 (in part).

Diagnosis. – Anterior margin with rostral lobe usually produced, broadly rounded. Lateral projections also usually well developed. Ocular peduncles moderately short and stout; corneas well developed; ocular acicles plate-like. Antennular peduncles overreaching distal corneal margins. Antennal peduncles with supernumerary segmentation.

Mandibular palp with very prominent subrectangular, terminally spinulose, dorsomesial projection from second segment. Maxillule with external lobe of endopod elongate, articulated and recurved. First maxilliped with one-segmented flagellum. Second maxilliped with exopod unarmed or occasionally with small spine; endopod pseudo-semichelate. Exopod of third maxilliped with 1 or 2 spines on inner surface; endopod with well developed crista dentata on ischium and 1 very prominent ventral spine not equivalent to accessory tooth; merus with 1 prominent ventral spine; termination simple. Epistome unarmed.

Chelipeds each with dorsodistal facet of carpus prominently elevated or not. Ambulatory legs similar. Fourth pereopod

semichelate; propodal rasp consisting of 1–4 rows of corneous scales. Fifth pereopod weakly chelate; propodal rasp well developed.

Pleon with tergites calcified; tergite of pleomere 6 roundly subquadrate, with deep lateral incisions; terminal margin with or without spines. Uropods symmetrical; protopods produced posteriorly, terminally armed with corneous tubercle. Telson with prominent lateral indentations; posterior lobes separated by shallow median cleft, terminal margins rounded, unarmed.

Remarks. – Forest (1987a) added two additional taxa to this formerly monotypic genus, *P. gaillardi* Forest, 1987a, and *P. stridulans* Forest, 1987a. Both species are known from very few specimens, all of which are very small and smaller than the smallest specimens of *P. jeffreysii* personally examined. Forest (1987a) differentiated *P. gaillardi* from *P. jeffreysii* primarily on proportional differences and the absence of spines on the terminal margin of the sixth pleonal tergite of the former species. Although ratios of ocular peduncular length to shield length and corneal diameter are known to be influenced by animal size as are antennular peduncular lengths, the lack of tergal spination in *P. gaillardi* does appear to support its distinctiveness. Because the posterior portion of the pleon was missing in the only adult specimen of *P. stridulans* known, Forest cited the lack of rostral development and the presence of tubercles reminiscent of a stridulating mechanism on the mesial face of each chela as diagnostic for this taxon. Whereas small specimens of *P. jeffreysii* lacking a rostral lobe have not been observed, the Taiwan and non-type Japanese specimens from Tosa Bay, cited in the material examined for that species, each has a row of similar tubercles and arc as described for *P. stridulans*. A possible series of stridulatory tubercles was also observed in the paratype of *P. gaillardi*. Additionally, reexamination of the specimens of *P. jeffreysii* in the MNHN has shown that smaller specimens also have these tubercles developed but that they tend to become obscure with increasing animal size. While it is quite possible that the lack of rostral development in the holotype of *P. stridulans* is abnormal and this taxon is conspecific with *P. jeffreysii*, we refrain from putting it into synonymy, pending knowledge of the morphology of the sixth pleonal tergite, uropods and telson.

Key to the species of *Pomatocheles* Miers, 1879

1. Rostral lobe obsolete *P. stridulans* (Indian Ocean)
- Rostral lobe produced, broadly rounded 2
2. Rostrum without marginal spinules; first segment of antennal peduncle with few small spines on ventrolateral margin
..... *P. jeffreysii* (Pacific)
- Rostrum with 3 or 4 marginal spinules; first segment of antennal peduncles with long hooked spine on ventrolateral margin
..... *P. gaillardi* (Indo-Pacific)

Trizochelinae Forest, 1987a

Parapylochelinae Forest, 1987a: 135.
Cancellochelinae Forest, 1987a: 145.
Mixtopagurinae Bouvier, 1895: 208 (in part).
Trizochelinae Forest, 1987a: 155.

Type genus. – By original designation *Trizocheles* Forest, 1987a.

Diagnosis. – Rostrum triangular, moderately to prominently produced. Second maxilliped with epipod. Chelipeds symmetrical or not; chelae alone not forming operculum; carpi lacking elevated dorsodistal facets. Fourth pereopods with propodal rasps each consisting of numerous rows of corneous scales.

Parapylochelini Forest, 1987a

Parapylochelinae Forest, 1987a: 135.

Type genus. – By monotypy, *Parapylocheles* Alcock, 1901.

Diagnosis. – Posterior carapace considerably longer than shield. Rostrum moderately well developed, triangular. Ocular peduncles basally swollen and approximate, distinctly separated distally; corneas reduced; ocular acicles plate-like, calcified or not, sometimes fused. Arthrobranches of third maxilliped reduced.

Sternites of fourth and fifth pereopods each with median spiniform protuberance. Male and female pleopods 3–5 each with endopod well developed; exopod reduced.

Remarks. – Because Forest (1987a) could find no characters that suggested affinities with other genera of the Pylochelidae, he believed subfamilial rank was appropriate for the monotypic *Parapylocheles*. Despite its several unique apomorphies, the phylogenetic analyses of Lemaitre et al. (2009) consistently ranked *Parapylocheles* sister to *Cancellochelinae*. We consider the distinctive attributes of both genera justification for tribal rank, but not subfamilial.

Parapylocheles Alcock, 1901

Parapylocheles Alcock, 1901: 213; Alcock, 1905: 19; Balss, 1912: 90; Boas, 1926: 47; Balss, 1927: 1012; Balss, 1940: 96; Balss, 1956: 1386; Balss, 1957: 1585, 1744; Forest 1987a: 135.
Not *Parapylocheles* – Walton, 1950: 188 (= megalopa of *Dardanus*).

Type species. – By monotypy, *Parapylocheles scorpio* (Alcock, 1894); gender feminine; monotypic.

Diagnosis. – Anterior margin with rostrum triangular; lateral projections broadly triangular. Posterior carapace elongate. Antennular peduncles overreaching distal corneal margins. Antennal peduncles with supernumerary segmentation.

Mandible with broad corneous cutting edge; palp with dorsal portion of second segment broadened. Maxillule with external lobe of endopod obsolete. Maxilla with no long setae on proximal portion of posterior scaphognathal lobe. First maxilliped with large, triangular epipod; flagellum one-segmented. Second maxilliped with small epipod. Third maxilliped with 1 or more accessory teeth on crista dentata; 1 dorsal and 1 ventral spine on merus and on carpus; no epipod. Epistome with 2 spines.

Chelipeds subequal, right slightly larger; dorsodistal facets of carpi not elevated. Ambulatory legs similar; dactyls with ventral corneous spines. Fourth pereopods semichelate; sternite with small median tubercle. Fifth pereopods dimorphic; sternite with prominent median projection directed anteriorly.

Sixth pleonal tergite subquadrate. Telson unequally divided by faint indentations.

Male first pleopods short, simple, 2-segmented. Male second pleopods elongate, 2-segmented; terminal segment representing endopod broadened distally but not spatulate; exopod very reduced. Pleopods 3–5 each with 2-segmented endopod and short, reduced exopod. Female first pleopod 1-segmented, short, simple. Pleopods 2–5 with 2-segmented endopods, reduced exopods, similar to males but slightly larger.

Cancellochelini Forest, 1987a

Cancellochelinae Forest, 1987a: 145.

Type genus. – By monotypy, *Cancellocheles* Forest, 1987a.

Diagnosis. – Shield considerably broader than long; anterior margin with prominent triangular rostrum and subrostral spine. Corneas reduced; ocular acicles plate-like. Chelipeds equal and symmetrical, with second pereopods, forming operculum. Tergite of pleonal segment 1 broad. Telson without lateral incisions or sutures.

***Cancellocheles* Forest, 1987a**

Pomatocheles – Miyake 1978: 9 (in part).

Cancellocheles Forest, 1987a: 145; Forest, 1987b: 313, Fig. 2.

Type species. – By monotypy, *Pomatocheles sculptipes* Miyake, 1978; gender feminine; monotypic.

Diagnosis. – Lateral projections not well developed. Ocular peduncles short, broadened basally. Antennular peduncles considerably overreaching distal corneal margins. Antennal peduncles with supernumerary segmentation.

Mandible with corneous cutting edge; palp with the second segment somewhat expanded, rounded, but unarmed.

Maxillule with external lobe of endopod short, articulated but not recurved. Maxilla with several long setae posteriorly on proximal lobe of scaphognathite. First maxilliped without exopodal flagellum. Exopod of second maxilliped with multispinose expansion of mesial face. Third maxilliped with 1 or 2 spines on inner surface of exopod; endopod with well developed crista dentata and 3 accessory teeth; merus with 1 prominent ventral spine and 2 tiny spinules; termination simple. Epistome with spine.

Second and third pereopods dissimilar. Fourth pereopods semichelate; propodal rasps consisting of many rows of corneous scales. Fifth pereopods dimorphic; propodal rasps well developed.

Sixth pleonal tergite subcircular. Uropods with protopods not produced posteriorly. Telson entire.

Male first pleopods 2-segmented; distal segments ovate, with concave inner surfaces. Second pleopods with elongate 2-segmented endopods; proximal segment with distal half foliaceous, terminal segment slender, both with marginal fine setae; exopod rudimentary. Pleopods 3–5 biramous, exopod longer than 2-segmented endopod. Female first pleopods short, indistinctly 2-segmented. Pleopods 2–5 unequally biramous, exopods approximately twice lengths of endopods.

Trizochelini Forest, 1987a

Trizochelinae Forest, 1987a: 155.

Type genus. – By original designation, *Trizocheles* Forest, 1987a.

Diagnosis. – Shield usually longer than broad. Rostrum triangular, usually acute. Ocular acicles well developed, distally spinose. Chelipeds non-operculate, equal, subequal or unequal, usually similarly armed. Ambulatory legs similar or dissimilar. Fourth pereopods usually semichelate, with propodal rasps composed of several rows of corneous scales. Female pleopods 2–5 with exopods inserted laterally at bases of protopods. Telson usually longer than broad, terminal margin with median cleft.

Remarks. – In the strict consensus cladogram produced by Lemaitre et al. (2009: Fig. 3), Trizochelini was composed the genus *Trizocheles*, consisting of four clades and an additional four species, *T. pulcher* Forest, 1987a, *T. pilgrimi* Forest & McLaughlin, 2000, *T. albatrossi* Forest, 1987a and *T. mutus* Forest, 1987a, the relationships of which were unresolved. As indicated previously, two taxa, *T. perplexus* and *T. manningi* were excluded from the genus, but retained in the tribe. However, *T. manningi*'s suggested sister relationship with *T. perplexus* is disavowed by several significant morphological characters. As discussed earlier, so distinct is *T. perplexus* that the new genus, *Forestocheles* is proposed for it.

Key to the genera of Trizochelini Forest, 1987a

- 1. First maxilliped without exopodal flagellum; crista dentata without accessory tooth; telson not divided into anterior and posterior portions by lateral indentations *Forestocheles* new genus
- First maxilliped with exopodal flagellum; crista dentata with accessory tooth; telson divided into anterior and posterior portions by lateral indentations *Trizochel*

***Forestocheles*, new genus**

Trizochel Forest, 1987a: 155 (in part); Forest, 1987b: 315 (in part); Forest & McLaughlin, 2000: 40 (in part); Lemaitre et al., 2009: 10 (in part).

Type species. – By original designation, *Trizochel perplexus* Forest, 1987a; gender feminine; monotypic.

Etymology. – Dedicated to Jacques Forest in recognition of his extensive work with and knowledge of the Pylochelidae.

Diagnosis. – Shield as long as or longer than broad and longer than posterior carapace; no postrostral transverse groove. Cervical groove and linea transversalis confluent medianly. Rostrum broadly triangular. Lateral projections moderately well developed. Ocular acicles each with acute projection.

Mandibular palp (Fig. 2A) with prominent lobe-like dorsomesial projection from the second segment. Maxillule (Fig. 2B) with external lobe of endopod obsolete. Maxilla (Fig. 2C) with posterior lobe of scaphognathite lacking 1 or more exceptionally long setae. First maxilliped (Fig. 2D) without exopodal flagellum; epipod present. Exopod of second maxilliped (Fig. 2E) with pronounced protuberant inner margin at midlength; epipod present. Exopod of third maxilliped (Fig. 2F) unarmed; endopod with well developed crista dentata on ischium, without accessory tooth; termination simple; epipod present. Epistome unarmed.

Chelipeds subequal or unequal but armament symmetrical, not forming operculum. Ambulatory legs similar; dactyls each with few ventral corneous spines. Fourth pereopods

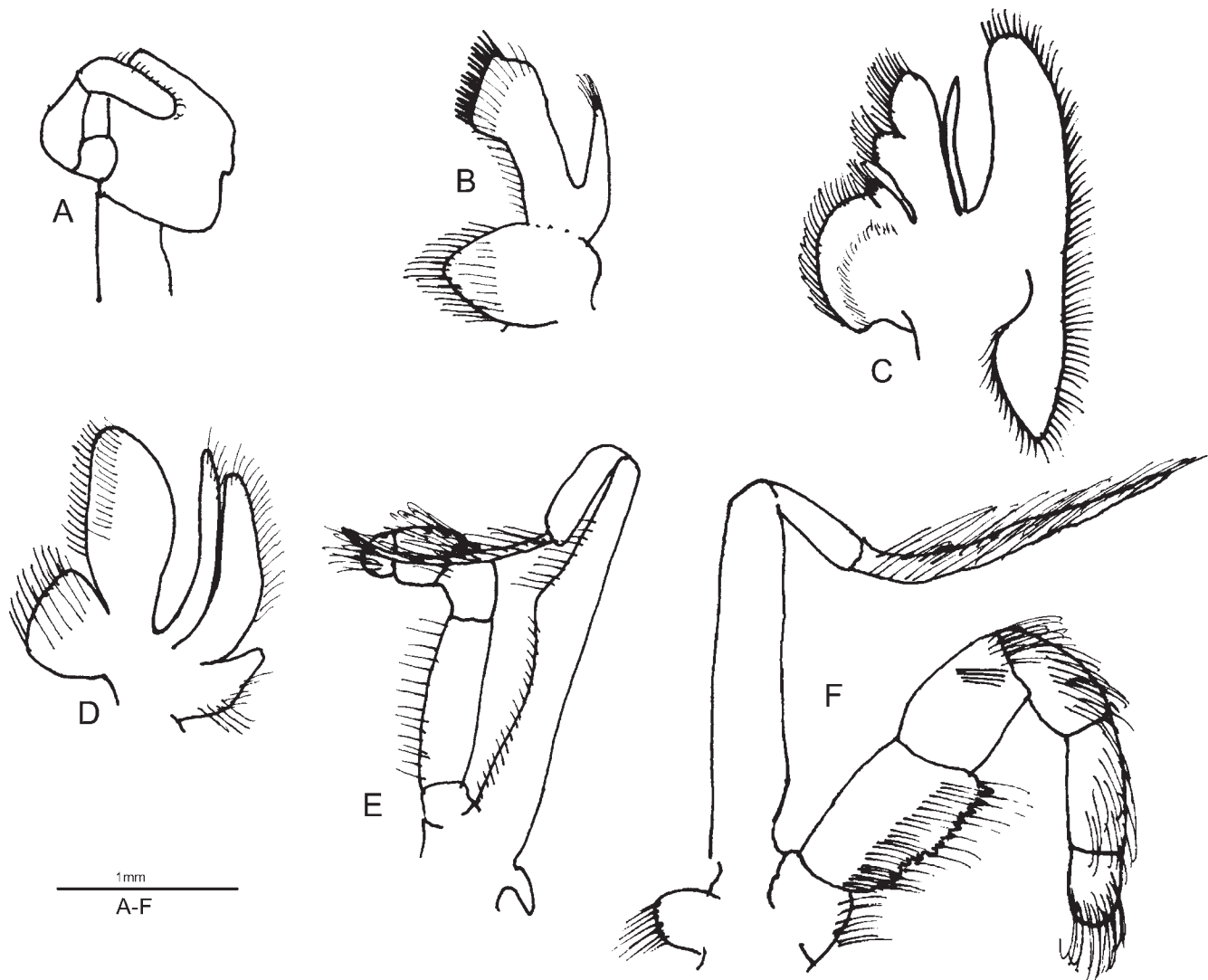


Fig. 2. Mouthparts of *Forestocheles* [*F. perplexus* (Forest, 1987a), male (3.0 mm) (MNHN-Pg 5835), NZOI Stn. K830], left, A–E, external view; F, internal view. A, mandible; B, maxillule; C, maxilla; D, first maxilliped; E, second maxilliped; F, third maxilliped.

semichelate; propodal rasps consisting of several rows of corneous scales. Fifth pereopods weakly chelate; propodal rasps well developed.

Pleon with tergites calcified, pleura weakly delineated, but covering acetabulae of pleopods; tergite of pleomere 6 subcircular, with deep lateral incisions; terminal margin entire, unarmed. Uropods symmetrical; protopods usually not produced posteriorly. Telson broader than long, without lateral indentations; terminal margin with small median cleft.

Male first pleopods with moderately elongate, slightly arched, subcylindrical basal segment and approximately equally long foliaceous, rolled distal segment. Second pleopods each with long basal segment; terminal segment broadening in distal half into depressed and rolled lobe with strongly convex mesial margin, posterior surface with thickening extending about as far as distal 0.8 and set apart from lobe by suture; short conical, exopod with terminal setae. Pleopods 3–5 with basal segment articulating with long exopod and shorter endopod. Female first pleopods set very close together, small, slender. Following pleopods much better developed, consisting of proximally enlarged basal segment, with long arched exopod and distally inserted, 2-segmented endopod.

***Trizocheles* Forest, 1987a**

- Pylocheles* Henderson, 1888: 100 (in part).
- Mixtopagurus* – A. Milne-Edwards & Bouvier, 1893: 23 (in part); Balss, 1913: 34; Boas, 1926: 34 (in part); Balss, 1941: 174; Forest, 1954: 167 (in part); Balss, 1957: 1585 (in part).
- Pomatocheles* – Stebbing, 1914: 3 (in part); Barnard, 1950: 423 (in part); Balss, 1957: 1548 (in part); Miyake, 1978: 4 (in part).
- Trizocheles* Forest, 1987a: 155 (in part); Forest & McLaughlin, 2000: 40 (in part); Lemaitre et al., 2009: 10 (in part).

Type species. – By original designation, *Pylocheles spinosus* Henderson, 1888; gender feminine.

Diagnosis. – Shield long as or longer than broad and longer than posterior carapace. Rostrum moderately well developed, triangular. Lateral projections also usually well developed. Ocular peduncles moderately long to moderately short; corneas well developed; ocular acicles each with spinose projection. Antennular peduncles overreaching distal corneal margins or not. Antennal peduncles with supernumerary segmentation.

Mandible with cutting edge calcified; palp with dorsomesial projection produced from the second segment. Endopod of maxillule with external lobe reduced or obsolete. Maxilla with 1 or more long setae posteriorly on proximal lobe. Flagellum of first maxilliped with one or more articles. Second maxilliped with epipod; exopod unarmed; endopod terminally simple. Exopod of third maxilliped unarmed; epipod absent; endopodal ischium with 1 or more accessory teeth on well developed crista dentata, prominent dorsodistal spine; merus with 1 or 2 spines on dorsodistal margin and 0–3 spines on ventral margin; termination simple. Epistome unarmed.

Chelipeds equal, subequal or unequal, usually symmetrical; carpi usually with stridulatory ridges or tubercles on lateral faces. Mesial faces of propodi and carpi of second pereopods usually with stridulatory ridges or tubercles; second and third otherwise similar or dissimilar. Fourth pereopods usually semichelate; propodal rasps each with several rows of scales. Fifth pereopod usually chelate; rasps well developed.

Sixth pleonal tergite usually roundly subquadrate. Telson longer than broad, with division into equal or unequal anterior and posterior portions indicated by slight indentations; terminal margin with distinct median cleft.

Male with paired first pleopods moderately short, uniramous, terminal segments each subovate, with row of fine setae on inner margin. Second pleopods elongate; exopods rudimentary, endopods subtriangular, somewhat spatulate, with fine setae on inner margins. Pleopods 3–5 each with exopod long, slender, with marginal fringe of fine setae; endopods rudimentary. Females with paired first pleopods uniramous, slender; pleopods 2–5 unequally biramous, all egg bearing. Eggs moderately large, 0.7–0.8 non-eyed, few in number.

Remarks. – Within *Trizocheles*, subspecific rank for *T. spinosus bathamae* Forest & de Saint Laurent, 1987, is deemed unjustified and this taxon is placed in synonymy with the nominal subspecies *T. spinosus spinosus*. The correct identity of *Trizocheles balssi* Stebbing, 1914, is established and the species mistakenly thought to represent that taxon is described as *T. hoenssonae*, new species. Supplemental material from the Philippine and Solomon Islands has shown that *Trizocheles gracilis* Forest, 1987a, is conspecific with *T. boasi* Forest, 1987a, and an additional new species is added to the genus.

Only a few species of *Trizocheles* are known from numerous specimens, but from those we are aware that variations in key characters can occur, particularly in those correlated with animal size, such as stridulatory rods and tubercles and appendage spination. Therefore, while a key to the species is presented, it should not be relied upon exclusively for specific identifications. The species' descriptions should be consulted for accurate taxon determinations.

Key to the species of *Trizocheles* Forest, 1987a

1. Chelipeds with stridulating rods or tubercles developed on lateral face of each carpus 2
 - Chelipeds without stridulating rods or tubercles developed on lateral face of each carpus 18
2. Propodi of second pereopods each with row of spines or tubercles on lateral face near dorsal margin
 - *T. mendanai*, new species (Pacific)
 - Propodi of second pereopods each without row of spines or tubercles on lateral face near dorsal margin 3
3. Propodi of second pereopods each with dorsal row(s) of spines 4
 - Propodi of second pereopods each without dorsal row(s) of spines 9

4. Propodi of second pereopods each with single dorsal row of spines 5
 - Propodi of second pereopods each with irregular double dorsal row of spines 6
5. Propodi of third pereopods each with row of spines
 - *T. spinosus* (Pacific)
 - Propodi of third pereopods each with only small dorsodistal spine *T. hoensonae*, new species (Indian Ocean)
6. Carpi of third pereopods each with dorsal row of spines 8
 - Carpi of third pereopods each unarmed or with only small dorsodistal spine 7
7. Carpi of chelipeds each with 4 outer marginal prominent spines; dactyls of second pereopods each with dorsal row of spinules or tubercles *T. pulcher* (Pacific)
 - Carpi of chelipeds each with 3 outer marginal prominent spines; dactyls of second pereopods each with unarmed dorsal margin *T. pilgrimi* (Pacific)
8. Shield longer than broad; ocular peduncles long and slender; antennular peduncles not overreaching distal corneal margins *T. longicaulis* (Indo-Pacific)
 - Shield broader than long; ocular peduncles moderately short and stout; antennular peduncles distinctly overreaching distal corneal margins *T. vaubanae* (Pacific)
9. Propodi of second pereopods each with prominent dorsodistal spine 10
 - Propodi of second pereopods each without prominent dorsodistal spine 12
10. Palms of chelae each with 1–4 rows of spines in addition to upper marginal row 11
 - Palms of chelae each usually without 1 or more rows of spines in addition to upper marginal row *T. brachyops* (Pacific)
11. Palms of chelae each with 1 row of moderate to small spines adjacent to upper marginal row, with or without additional row of small spines adjacent to rounded lower surface; dactyls of ambulatory legs slightly shorter to slightly longer than propodi *T. brevicaulis* (Indo-Pacific)
 - Palms of chelae each with 2–4 rows of moderate to large spines on outer surface; dactyls of ambulatory legs distinctly shorter than propodi *T. sakaii* (Pacific)
12. Palms of chelae with outer surfaces unarmed or at most with single proximal spine and few scattered spinules 13
 - Palms of chelae with outer surfaces armed with regular or irregular rows of spines, spinules or tubercles 14
13. Upper margins of chelae each with 7 prominent spines
 - *T. loquax* (Pacific)
 - Upper margins of chelae each with 5 prominent spines
 - *T. caledonicus* (Pacific)
14. Chelipeds markedly dissimilar in size and armature
 - *T. balssi* (Indian Ocean)
 - Chelipeds not markedly dissimilar in size and armature ... 15
15. Antennular peduncles overreaching distal corneal margins by entire lengths of ultimate peduncular segments 16
 - Antennular peduncles overreaching distal corneal margins by less than entire lengths of ultimate peduncular segments .. 17
16. Terminal margin of sixth pleonal tergite entire
 - *T. moosai* (Indo-Pacific)
 - Terminal margin of sixth pleonal tergite with broad median indentation *T. laurentae* (Pacific)
17. Corneal diameter 0.2 of ocular peduncular length
 - *T. albatrossi* (Pacific)
 - Corneal diameter 0.4–0.5 of ocular peduncular length
 - *T. boasi* (Indo-Pacific)
18. Propodi of second pereopods unarmed; carpi each with 3 or 4 spines dorsally *T. manningi* (Pacific)
 - Propodi of second pereopods each with dorsal row of spines; carpi each with 5 or 6 spines *T. mutus* (Indian Ocean)

Mixtopagurini Bouvier 1895

Mixtopaguriens Bouvier, 1895: 208; Bouvier, 1896: 3.
 Mixtopagurinae – A. Milne-Edwards & Bouvier, 1899: 52; Bouvier, 1922: 14; Bouvier, 1940: 114 (in part); Forest, 1987a: 215.
 Mixtopaguriae – A. Milne-Edwards & Bouvier, 1900: 165.

Type genus. – By monotypy, *Mixtopagurus* A. Milne Edwards, 1880.

Diagnosis. – Shield with linea transversalis continuous; rostrum triangular, acute. Ocular peduncles and corneas well developed; ocular acicles each with acute spinose projection. Antennal peduncles with supernumerary segmentation. Chelipeds subequal or unequal, similarly armed. Pleon and pleopods somewhat asymmetrical.

Mixtopagurus A. Milne-Edwards, 1880

Mixtopagurus A. Milne-Edwards, 1880: 39; A. Milne-Edwards & Bouvier, 1893: 23 (in part); Bouvier, 1895: 204; Bouvier, 1896: 37; Alcock, 1899: 111; Alcock, 1901: 213; Alcock, 1905: 153; Benedict, 1901: 771; Balss, 1913: 34 (in part); Stebbing, 1914: 2; Boas, 1926: 34 (in part); Makarov, 1938: 119 (in part); Balss, 1957: 1585 (in part); Makarov, 1962: 115 (in part); Forest, 1987a: 215; Forest, 1987b: 315, Fig. 4; McLaughlin, 2003: 113 (key).

Pomatocheles – Stebbing, 1914: 3 (in part); Miyake, 1978: 4 (in part); Pilgrim, 1965: 547 (in part); McLaughlin, 1983a: 433.

Type species. – By monotypy, *Mixtopagurus paradoxus* A. Milne-Edwards, 1880; gender masculine; monotypic.

Diagnosis. – Shield approximately as long as broad and longer than posterior carapace; postrostral transverse groove present. Cervical groove and linea transversalis distinct medianly. Rostrum roundly triangular. Lateral projections moderately well developed. Ocular acicles each with prominent spine.

Mandibular palp with prominent lobe-like dorsomesial projection on second segment. Maxillule with external lobe of endopod elongate, articulated and recurved. Maxilla with 3 long setae on proximal margin of posterior lobe of scaphognathite. First maxilliped with exopodal flagellum multiarticulate; epipod present. Exopod of second maxilliped unarmed; epipod present. Exopod of third maxilliped unarmed; endopod with well developed crista dentata on ischium and 3 or 4 accessory teeth; termination simple; epipod present. Epistome unarmed.

Chelipeds subequal or unequal but not forming operculum; armament symmetrical. Ambulatory legs dissimilar; dactyls each with row of ventral corneous spines. Fourth pereopods semichelate; propodal rasps each consisting of several rows of corneous scales. Fifth pereopods subchelate; propodal rasps well developed.

Pleon asymmetrical and somewhat twisted; tergites calcified; tergite of pleomere 6 subcircular, with deep lateral incisions; terminal margin entire, armed with small spines. Uropods

asymmetrical; protopods not produced posteriorly. Telson variable but usually longer than broad, and with lateral indentations; posterior lobes usually asymmetrical; terminal margin with small to prominent median concavity or cleft.

Male first pleopods with moderately elongate, slightly arched, subcylindrical basal segment and longer foliaceous, rolled and posteriorly thickened distal segment. Second pleopods with long, moderately setose basal segment; terminal segment unevenly broadening in distal 0.2–0.3, concave; short conical exopod with terminal setae. Pleopods 3–5 each with basal segment articulating with moderately short exopod and shorter endopod. Female first pleopods small, distally multiarticulate; pleopods 2–5 each with stout basal segment, moderately long, variably segmented exopod and 2-segmented endopod.

TAXONOMY

Pylochelidae Bate, 1888

Pylochelinae Bate, 1888

Cheiroplatea Bate, 1888

Cheiroplatea laticauda Boas, 1926

(Fig. 3)

Cheiroplatea laticauda Boas, 1926: 44, Figs. 2, 10B, 11C, 24, 25B; Balss, 1944: 657; Pilgrim, 1965: 556; Forest, 1987a: 93, Figs. 24f–i, 25a–d, 26, Pls. 2D, 3B; Forest, 1987b: 316, Fig. 3; Lemaitre et al., 2009: 5.

Type material examined. – Holotype, female (9.9 mm) (ZMUC CRU 260), Danish Kei Islands, Indonesia Expedition, Stn. 56, 05°30.20'S 132°51'E, 345 m, 10 May 1922.

Other material examined. – 1 male (moult now missing carapace) (USNM 1024162), ALBATROSS, Stn. 5623, 0°16.30'N 127°30.00'E, 497 m, 29 Nov.1909; 1 male (5.4 mm) (MNHN-Pg 7938), SALOMON 2, Stn. CP 2260, 08°03.5'E 156.54.5'E, 399–427 m, Nov.2004; 1 ovig. female (6.9 mm) (MNHN-Pg 7939), Stn. CP 2303, 09°07.9'S 158°22.5'E, 402–423 m, Nov.2004.

Redescription. – Shield (Fig. 3A) broader than long and longer than weakly calcified posterior carapace. Cervical groove delineated laterally by broad groove. Rostral lobe not reaching or reaching slightly beyond level of lateral projections and consisting of pair of very weakly to noticeably produced lateral prominences each armed with 1 or 2 tiny spinules and separated from median spinule by faint to moderately deep concavities (Fig. 3B). Lateral projections prominent, each terminally subacute, but with 1–3 tiny marginal spinules. Epistome with 1 or 2 small simple or bifid spines. Ocular peduncles 0.4 length of shield, mesial faces weakly concave proximally; corneas not or only faintly discernable; ocular acicles apparently fused mesially to ultimate peduncular segments. Antennular peduncles overreaching distal corneal margins by 0.5 lengths of basal segments; ultimate segment short, only approximately 0.5

length of penultimate segment, both unarmed; basal segment with very small to prominent spine on dorsolateral margin of statocyst lobe and quite small to moderately large ventrodistal spine. Antennal peduncles overreaching ocular peduncles by entire lengths of ultimate segments; fifth, fourth and third segments unarmed; second segment with dorsolateral distal angle elongate, terminating in small spine and with accessory spine on lateral surface, dorsomesial distal angle with small sharp spine; first segment with 4–6 small spines ventrolaterally. Antennal acicle reaching approximately to midlength of fifth peduncular segment, terminating in small spine, mesial margin with row of tiny spines, lateral margin with 2 or 3 spines. Antennal flagella (missing in holotype) slightly longer than carapace, articles each with 2–4 moderate to long setae, at least proximally.

Dactyl of each chela subtriangular in dorsal view, approximately 0.6 length of palm, with hiatus between dactyl and fixed finger; dorsal surface with covering of moderately widely-spaced small tubercles and tufts of short, stiff bristle-like setae forming transverse rows; dorsomesial

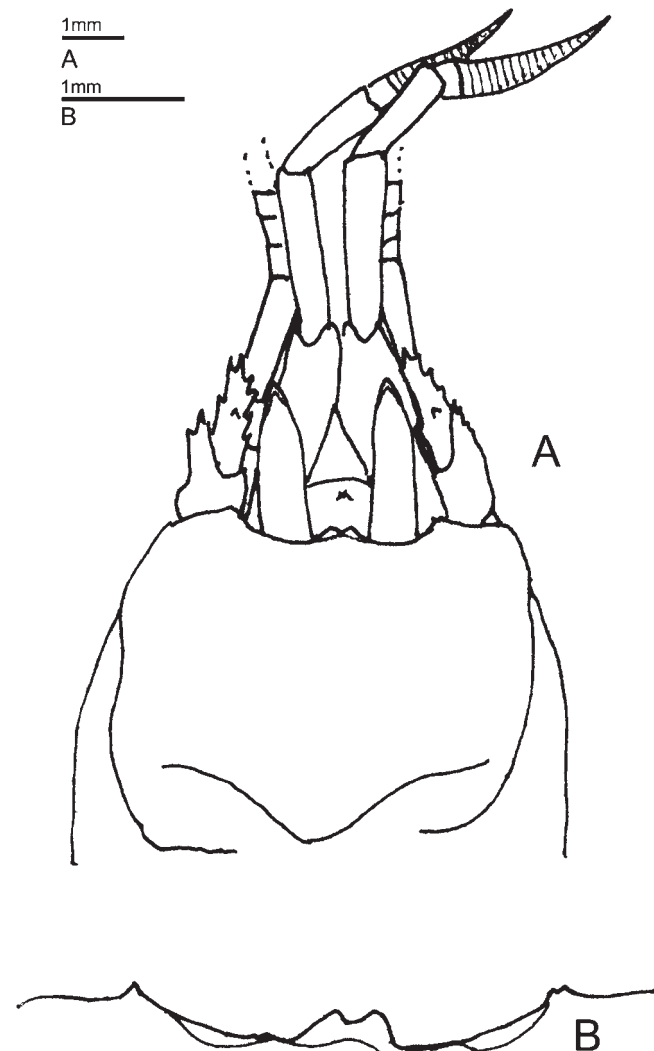


Fig. 3. *Cheiroplatea laticauda* Boas, 1926. Male (5.4 mm) (MNHN-Pg 9738), Salomon 2, Stn. CP 2260: A, shield and cephalic appendages (dorsal); B, anterior margin of shield and deflected rostrum (dorsal).

margin with row of tiny tubercles interspersed with tufts of short setae; cutting edge with row of very small, calcareous teeth, terminating in small calcareous claw; mesial face with 2 slightly oblique rows of tufts of stiff setae; ventromesial margin not delimited, ventral surface with few tufts of setae distally. Palm slightly longer than carpus; lateral surface convex, dorsal surface generally flattened; dorsomesial and dorsolateral margins each with row of small spines, more acute proximally and interspersed with tufts of sparse long setae, dorsal surface of palm and fixed finger with scattered, widely-spaced small tubercles and tufts of shorter setae; mesial and lateral faces each with rows of tufts of setae, most numerous and forming weak arcs on lateral face, (setae generally broken off on palms of holotype); ventral surface with few setal rows (indicated by setal pits in holotype). Carpus subtriangular; dorsodistal facet prominently elevated, dorsolateral margin with row of small tubercles, dorsodistal margin overhanging proximal margin of chela and divided subequally by shallow cleft, each with arcing marginal row of small to moderately large, subacute or acute spines, 1 much larger spine in lateral 0.3; anterior distal face with covering of not densely-packed, small tubercles or spinules and setal pits; dorsomesial margin with few moderately large, subacute or acute spines, mesial face with subdistal row of subacute spinulose protuberances, remainder of mesial face unarmed; dorsal surface with cluster of small spines mesially in proximal 0.5, short, transverse low, weakly spinulose or tuberculate ridges and sparse setae laterally; ventral surface unarmed. Merus subtriangular; dorsal margin with row of low protuberances; ventromesial margin also with row of low protuberances; ventrolateral margin with row of spinules in proximal 0.6, larger spines distally and sparse setae. Ischium unarmed.

Second and third pereopods with dactyls as long or slightly longer than propodi, dorsal surfaces each with few setae; lateral faces each with row of pits (holotype) or small bristles dorsally and second shorter row medianly; mesial faces each with 2 rows of widely-spaced stiff bristles; row of 4–7 small corneous spines and tufts of sparse setae on each mesial face at ventral margin. Propodi each with row of low protuberances, sometimes minutely spinulose, and moderately long setae on dorsal margin, ventral margins each with row of widely-spaced stiff setae, third also with median row of very widely-spaced setae on mesial face. Carpi each with row of small spines and sparse setae on second pereopods, third with only setae and dorsodistal spine. Meri and ischia unarmed but with few scattered setae. Fourth pereopods semichelate; each with propodal rasp consisting of 1 row of corneous scales, bordered above by distal series of transverse rows of short, stiff setae. Fifth pereopods weakly chelate; propodal rasp well developed.

Pleon with tergites 1–5 moderately well calcified; tergite of pleomere 6 subrectangular, with deep oblique lateral incisions clearly delineating upper triangular quadrants, shallower incisions delineating smaller, lower, more elongate areas and median longitudinal suture becoming inverted Y delineating median terminal portion (in holotype); terminal margin unarmed, but medianly with very shallow rectangular

concavity. Protopods of uropods each with horizontal posterior margin drawn-out at inner angle into small, prominent spine. Telson with transverse suture; anterior portion somewhat narrower, with anterior median portion set off by moderately deep lateral excavations; terminal margin with shallow median concavity or entire; margins unarmed but with fringe of fine setae.

Colouration. – Unknown.

Habitat. – Reportedly occupying cylindrical cavities in sponge and rock; the carcinoecia of the Solomon Islands specimens are not known.

Distribution. – Indonesia; Solomon Islands; 345–560 m.

Remarks. – Forest (1987a) referred to the anterior margin of the shield of *C. laticauda* as having two postocular lobes (antennular) separated by a depression and with a tiny rostral denticle. As previously indicated, Forest's illustrated specimen (USNM 1024162) is a molt that is now missing the carapace. However, in a second specimen (male, 5.4 mm) a broad, ventrally deflected, terminally bidentulate rostral lobe (Fig. 3A, B) is present. There is also a small postrostral protuberance in the midline on the surface that, when the animal is viewed dorsally, because of this rostral deflection, could be mistaken for a blunt marginal rostral spinule. It is suggested that while *C. laticauda* is clearly distinct, it is not set apart from the other members of the genus by a lack of development of a rostral lobe. It is present, but deflected, and not as evenly rounded as in the other species.

Cheiroplatea cenobita Bate, 1888

Cheiroplatea cenobita Bate, 1888: 12, Pl. 1, Fig. 1; Ortmann, 1892: 275; A. Milne-Edwards & Bouvier, 1893: 18; Stebbing, 1893: 170, Pl. 10, unlettered figs.; Boas, 1926: 45; Forest, 1987a: 101, Fig. 29a–d; Forest, 1987b: 316, Fig. 3; Lemaitre et al., 2009: 5.

Pylocheles (Cheiroplatea) cenobita – A. Milne-Edwards & Bouvier, 1893: 19, 22.

Chiroplatea cenobita – Alcock 1905: 14, 18, 153 (misspelling).

Type material examined. – Holotype female (4.4 mm) (NHM 88.22), CHALLENGER, Stn. 194, 04°34'S 129°57.30'E, 333 m, 29 Sep. 1874.

Other material examined. – None.

Abbreviated redescription. – Exoskeleton decalcified; shield considerably broader than long and longer than posterior carapace, with distinct groove postrostrally; cervical groove delineated laterally by slender groove; rounded rostral lobe not reaching beyond level of lateral projections, with tiny apical spinule; lateral projections broadly rounded, each with 1 or 2 terminal marginal spinules. Ocular peduncles slightly more than 0.5 of shield, faintly concave mesially; swollen basally and tapering to terminal point; corneas not apparent; ocular acicles not apparent. Antennular peduncles overreaching ocular peduncles by approximately 0.5 lengths

of basal segments; ultimate segment 0.5 length of penultimate; basal segment with lateral spine near midlength. Antennal peduncles overreaching ocular peduncles by approximately 0.5 lengths of ultimate segments; fifth, fourth and third segments unarmed; second segment with dorsolateral distal angle produced, terminating in small, simple or bifid spine, dorsolateral margin with few spinules; dorsomesial margin unarmed, but with small spinule on dorsal surface medianly; first segment with few spinules on ventrolateral and distal margins. Antennal acicle reaching midlength of fifth peduncular segment, terminating in small bifid spine and with few spinules on dorsolateral and dorsomesial margins. Antennal flagellum 1.5 length of shield.

Chelae each with row of quite small tubercles on dorsal surface of dactyl; palm with dorsal surface slightly elevated centrally, 0.6 of surface mesiad of midline shallowly concave, dorsomesial and dorsolateral margins each with row of small spines, more acute proximally; carpus with dorsodistal facet prominently elevated, distal margin dorsally, laterally and mesially with row of small, broad, subacute spines, dorsal margin divided subequally only by slightly broader space between spines; anterior distal faces each with covering of not densely-packed setal pits; remainder of carpus with dorsomesial and dorsolateral margins not delimited, lateral face slightly rugose; merus with row of very low protuberances and sparse short setae on dorsal margins; ventromesial margin unarmed; ventrolateral margin with spinule at distal angle.

Second and third pereopods generally same length as chelipeds. Dactyls without ventral corneous spines; propodi of second pereopods each with corneous spinule at ventrodistal margin; carpi of second each with dorsal row of very small spinules and sparse setae, third with only setae; meri and ischia unarmed but with sparse setae. Fourth pereopods missing. Fifth pereopods chelate, propodal rasp well developed.

Tergite of sixth pleomere irregularly subquadrate, lateral margins each with distinct oblique incision, dorsal surface with shallow median groove; posterior margin divided into three lobes by pair of very small incisions, median lobe slightly concave, unarmed. Uropods each with small spine on posterior margin of protopod. Telson with anterior portion trapezoidal, posterior portion slightly narrower, roundly subrectangular; terminal margin rounded, with slight median concavity, unarmed but with long fine setae.

Colouration. – Unknown.

Habitat. – Unknown.

Distribution. – Known only from the Indonesian type locality.

Remarks. – Forest (1987a: 102, Fig. 29d) described the ambulatory legs of the holotype and only specimen of *C. cenobita* known as being entirely unarmed except for the dorsal surfaces of the carpi of the second pereopods, which

each carried a row of tiny spinules. However, his figure of the distal three segments of the right second pereopod shows a few corneous spinules on the ventral margin of the dactyl. No spinules were observed on the dactyls when the holotype was reexamined during the present study.

The fourth pereopods are missing from the holotype, but because of the overall similarities of this taxon to *C. mitoi*, in their cladistic analysis, Lemaitre et al. (2009) scored the fourth pereopods the same for the two species.

***Cheiroplatea mitoi* Miyake, 1978**

(Fig. 4A)

Cheiroplatea mitoi Miyake, 1978: 13, Fig. 5a–f; Forest, 1987a: 105, Fig. 3a–e; Forest, 1987b: 316, Fig. 3; McLaughlin et al., 2007c: 30, 2 unnumbered figs; Lemaitre et al., 2009: 5.

Type material examined. – Holotype female (4.8 mm, with branchial bopyrid) (ZLKU 4070), Kyushu, Japan, 300 m, 20 Dec.1953.

Other material examined. – 1 male (~ 2.4 mm, shield and posterior carapace damaged) (NTOU), TAIWAN 2000, Stn. DW56, 24°29.8'N 122°12.6'E, 438–539 m, 4 Aug.2000; 1 ovig. female (not measured) (ZRC), PANGLAO 2005, Stn. CP 2384, 08°46.2'N 123°16.1'E, 623–647 m, 29 May 2005; 1 male (3.7 mm, with branchial bopyrid) (MNHN-Pg 7940), SALOMON 2, Stn. CP 2176, 09°09.40'S 158°59.20'E, 600–875 m, 21 Oct.2004; 1 female (4.3 mm) (MNHN-Pg 7941), Stn. CP 2296, 08°46.40'S 157°29.68'E, depth not recorded, 7 Nov.2004.

Redescription. – Shield broader than long and longer than weakly calcified posterior carapace. Cervical groove weakly to prominently delineated laterally by moderate to broad groove. Broadly rounded rostral lobe not reaching or reaching slightly beyond level of lateral projections, with or without terminal spinule. Obtusely triangular lateral projections prominent, each with 1 or pair of spinules. Posterior carapace with posterior median plate obscurely delineated or obsolete; sulci cardiobranchialis not apparent. Branchiostegites moderately well calcified in median dorsal 0.5 and armed with numerous small spines and/or spinules; dorsal margin with few tiny spinules anteriorly.

Ocular peduncles approximately 0.4–0.5 of shield length, corneas cone-shaped, pigment lacking, 0.1 of peduncular length; ocular acicles not apparent.

Antennular peduncles overreaching ocular peduncles by 0.5–0.6 length of basal segments; ultimate segment 0.5 or slightly less than length of penultimate segment; basal segment with prominent spine dorsally on anterior margin of statocyst lobe and equally prominent spine at ventrodistal angle.

Antennal peduncles overreaching distal corneal tips by 0.4–0.6 lengths of fifth segments. Fifth, fourth and third segments unarmed; second segment with dorsolateral distal angle produced, terminating in acute spine, mesial and/or lateral margins each with 3 or 4 small spines, dorsomesial distal angle usually with spinule; first segment with 2 or 3 slender spines on ventrolateral margin. Antennal acicle

overreaching tip of cornea, with terminal spine and 2–6 small spines on both dorsomesial and dorsolateral margins. Antennal flagella as long as or slightly longer than carapace; each article with 2 to several long setae.

Third maxilliped with remnant of epipod present. Epistome unarmed.

Chelipeds symmetrical, operculate; dactyl approximately 0.8 length of palm; dorsomesial margin with row of small spines and sparse, moderately long setae; dorsal surface generally flattened, with scattered small spines; cutting edge with row of small calcareous teeth, terminating in large calcareous claw and slightly overlapped by fixed finger; mesial face with 2 rows of small tubercles dorsally and row of short oblique ridges ventrally; ventral surface with scattered setae. Palm with mesial face straight, lateral face convex, dorsal surface with area laterad of midline somewhat concave, but concavity not continued onto fixed finger, dorsomesial and dorsolateral margins each with row of small acute spines accompanied by long fine setae, surfaces of palm and fixed finger both with scattered small spines; mesial face with 2 irregular rows of very small tubercles dorsally; lateral and ventral surfaces with scattered setae. Carpus with dorsodistal facet prominently elevated and armed marginally with row of large acute spines, interspersed with much smaller spines

and sparse setae, division of spinose crest into two subequal lobes indicated by broadened space between 2 spines; anterior surface of facet with scattered spinules; remainder of dorsal carpal surface with few spinulose protuberances and small spines, extending onto lateral face dorsally; ventrolateral distal margin with few spines. Merus with small spinule at dorsodistal margin, dorsal surface with row of very small spinules or spinulose protuberances and sparse setae; ventromesial and ventrolateral margins each with row of very small spines, increasing in size distally. Ischium unarmed.

Second (missing in holotype) and third pereopods slightly overreaching tips of chelipeds; generally similar. Dactyls equal to or slightly shorter than propodi; dorsal margins unarmed; mesial faces each with dorsal and ventral row of tufts of setae; lateral faces each with median row of sparse setae; ventral margins each with row of tufts of stiff setae and 5–7 corneous spines. Propodi each with tufts of sparse setae dorsally and ventrally, occasionally few spinules dorsally on second pereopods. Carpi each with sparse setae and row of small or quite small spines on dorsal surface, smallest on third pereopods. Meri each with few tufts of sparse setae dorsally and ventrally. Ischia unarmed. Fourth pereopods subchelate, propodal rasps each consisting of single row of corneous scales. Fifth pereopods chelate, propodal rasps well developed.

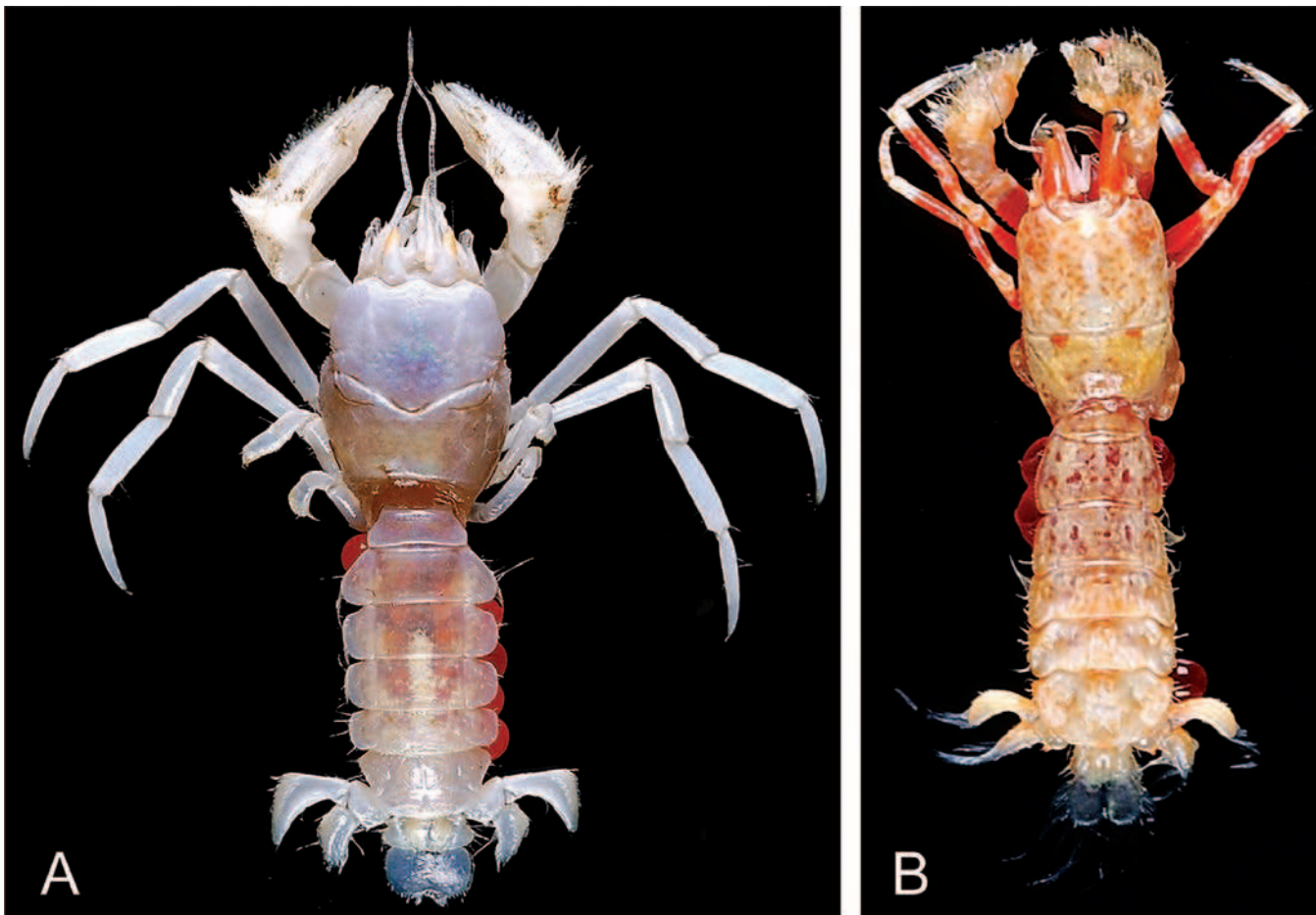


Fig. 4. A, *Cheiroplatea mitoi* Miyake, 1978, ovig. female (not measured) (ZRC), PANGLAO 2005, Stn. CP 2384; B, *Pomatocheles gaillardi* Forest, 1987, ovig. female (1.8 mm) (ZRC), PANGLAO 2005, Stn. DW 2402.

Tergite of pleomere 6 subrectangular, with deep oblique lateral incisions, terminal margin divided into 3 lobes by pair of small incisions; median portion straight or very weakly concave, unarmed. Telson with lateral margins of anterior portion weakly concave, posterior portion separated into weak lobes by shallow depression or V-shaped concavity, terminal margins unarmed but fringed with long setae.

Colouration. – In life, overall white or bluish-white; corneas light orange (Fig. 4A).

Habitat. – Cavities in pumice rock.

Distribution. – Kyushu, Japan, Taiwan, Philippine and Solomon Islands; 438–613 m, possibly to 875 m.

Remarks. – *Cheiroplatea mitoi* was redescribed by Forest (1987a) from the female holotype and only specimen known at the time. One male was subsequently reported from Taiwan (McLaughlin et al. 2007c) and the species has now also been found in both the Philippine and Solomon Islands.

***Cheiroplatea stenurus* Forest, 1987a**

Cheiroplatea stenurus Forest, 1987a: 99, Fig. 29; Forest, 1987b: 316, Fig. 3; Lemaitre et al., 2009: 5.

Type material examined. – Holotype male (1.8 mm) (MNHN-Pg 3490), BENTHEDI, Stn. DR 38, 12°54.8'S 45°15.6'E, 200–500 m, 26 Mar.1977.

Other material examined. – None.

Abbreviated redescription. – Shield broader than long, and longer than weakly calcified posterior carapace; cervical groove not clearly delineated laterally. Rostrum produced as broadly rounded lobe, unarmed, reaching slightly beyond level of lateral projections. Lateral projections well developed, each with marginal spinule. Neither posterior median plate nor sulci cardiobranchialis delineated, posterior carapace moderately well calcified. Ocular peduncles approximately 0.4 length of shield; corneas reduced; ocular acicular plate fused to ultimate segment. Antennular peduncles overreaching distal corneal margins by 0.5 lengths of basal segments; ultimate segment short, only approximately 0.5 length of penultimate segment; basal segment with small spine on dorsolateral margin of statocyst lobe and prominent ventrodiscal spine. Antennal peduncles overreaching ocular peduncles by approximately 0.8 length of ultimate segment; fifth, fourth and third segments unarmed, second segment with dorsolateral distal angle produced, terminating in long acute spine and with accessory spine on lateral surface, dorsomesial distal angle obsolete; first segment with 2 small spines ventrolaterally. Antennal acicle reaching approximately to midlength of fifth peduncular segment, terminating in bifid spine, mesial margin with row of tiny spines, lateral margin with 2 or 3 small spines. Antennal flagella longer than carapace, each article with 1 or 2 short setae, at least proximally.

Chelipeds symmetrical, subtriangular in shape, operculate. Dactyl slightly shorter than palm; dorsal surface with numerous, but relatively widely-spaced tufts of sparse setae, dorsomesial margin with row of tiny tubercles accompanied by sparse, long setae; mesial face with row of tubercles dorsally and row of larger tubercles proximally. Palm with dorsal surface flattened, dorsomesial and dorsolateral margins each with row of small spines accompanied by sparse long setae, dorsal surfaces of palm and fixed finger with irregular rows of widely-spaced, small, conical spines, largest on right chela. Carpus with dorsodistal margin prominently elevated and overhanging proximal margin of chela, with arcing row of prominent spines and sparse setae, anterior dorsodistal facet with few small tubercles or spinules; dorsomesial margin and dorsal surface mesially each with cluster of small spinulose tubercles; mesial, ventral and lateral faces unarmed. Merus with row of small spines on dorsal margin; mesial face with small spine at ventrodiscal angle; lateral face with 3 acute spines at ventrodiscal angle and row of tiny spinules on ventrolateral margin.

Second and third pereopods with dactyls as long or only slightly shorter than propodi, dorsal surfaces each with few setae; mesial faces each with row of small bristles dorsally; lateral faces each with row of widely-spaced setae; ventral margins each with 4 or 5 corneous spines and sparse setae. Propodi of second pereopods each with row of small spines on dorsal margin, third unarmed; other surfaces with few scattered setae. Carpi each with row of small spines and sparse setae on second pereopods, third with only setae and dorsodistal spine. Meri and ischia unarmed but with few scattered setae. Fourth pereopods semichelate, each with propodal rasp consisting of 1 row of corneous scales. Fifth pereopods weakly chelate; propodal rasps well developed.

Pleon with tergite 1 weakly calcified; tergites 2–5 primarily chitinous; tergite of pleomere 6 subquadrate, with deep lateral incisions; terminal margin weakly excavated medianly, unarmed. Uropods symmetrical; protopods produced posteriorly, each with prominent spine. Telson with transverse suture; anterior portion slightly longer; posterior lobes separated by slight median concavity; terminal margins rounded, unarmed but with fringe of fine setae.

Colouration. – Unknown

Habitat. – Cavity in very eroded fragment of bryozoan.

Distribution. – Known only from the type locality, Comoro Islands (Mayotte).

***Cheiroplatea pumicicola* Forest, 1987a**

Cheiroplatea pumicicola Forest, 1987a: 108, Figs. 3b, 5e, 23a–i, 24a–e, 31a–f, Pls. VI E, F, IX; Forest, 1987b: 316, Fig. 3; Forest & McLaughlin, 2000: 36, Figs. 6, 7; Lemaitre et al., 2009: 5.

Type material examined. – Holotype female (3.8 mm) (MNHN-Pg 3519), NZOI, Stn. K804, 29°14.8'S 177°49.6'W, 590–490 m, 22 Jul.1974.

Paratypes: 3 males, 4 females (not measured) (NIWA 4786); 1 male, 3 females (not measured) (MNHN-Pg 3521), same data as holotype.

Other material examined. – 1 male (4.2 mm) (MNHN-Pg 7942), BATHUS, Stn. DW 783, 23°57'S 169°47'E, 614–617 m, 25 Nov.1993; 1 male (4.2 mm) (MNHN-Pg 7943), Stn. DW 785, 23°56.10'S 165°45.70'E, 607–608 m, 25 Nov.1993; 1 ovig. female (4.3 mm) (MNHN-Pg 7944), Stn. DW 786, 23°54'S 169°49'E, 699–715 m, 25 Nov.1993; 1 ovig. female (4.8 mm) (MNHN-Pg 7945), Stn. DW 789, 23°51'S 169°49'E, 671–674 m, 25 Nov.1993; 2 males (2.9, 4.0 mm) (MNHN-Pg 7946), Stn. DW 790, 23°49'N 169°48'E, 685–715 m, 25 Nov.1993; 1 ovig. female (5.0 mm) (MNHN-Pg 7947), EBISCO, Stn. CP 2548, 21°60'S 158°35.0'E, 604–632 m, 11 Oct.2005; 1 male (2.9 mm) (MNHN-Pg 7948), Stn. CP 2551, 21°06.0'S 158°35.0'E, 650–637 m, 11 Oct.2005; 1 male (3.3 mm) (MNHN-Pg 7949), Stn. CP 2614, 19°39.0'S 158°47.0'E, depth not given, 19 Oct.2005; 2 females (2.7, 3.4 mm), 1 ovig. female (3.8 mm) (MNHN-Pg 7950), Stn. CP 2644, 20°54.0'S 160°59.0'E, 600–625 m, 22 Oct.2005; 1 male (4.0 mm), 1 ovig. female (4.5 mm) (MNHN-Pg 7951), Stn. CP 2645, 07°43.1'S 156°26.0'E, 582–609, Nov.2005; 2 ovig. females (2.6, 3.0 mm) (MNHN-Pg 7952), MUSORSTOM 10, Stn. DW 986, 19°20.57'S 169°31.48'E, 602–648, 23 Sep.1994; 1 ovig. female (4.5 mm) (MNHN-Pg 7953), SALOMON 2 Stn. CP 2244, 07°45.0'S 156° 26.7'E, 554–586 m, Nov.2004; 1 female (2.9 mm) (MNHN-Pg 7954), Stn. CP 2276, 08°41.48'S 157°38.17'E, depth not recorded, 5 Nov.2004; 1 specimen (not sexed or measured) (MNHN Pg 8054), CP 2245, 07°43.1'S, 156°26.0'E, 582–609, Nov.2004.

Abbreviated redescription. – Shield broader than long and longer than weakly calcified posterior carapace; cervical groove weakly delineated laterally by broad groove; broadly subtriangular or rounded rostral lobe not reaching beyond level of lateral projections; obtusely triangular lateral projections prominent, each with pair of spinules. Ocular peduncles approximately 0.5 of shield length, corneas cone-shaped, pigment lacking; ocular acicles not apparent. Antennular peduncles overreaching ocular peduncles by 0.4–0.5 lengths of basal segments; ultimate segment approximately 0.5 length of penultimate segment; basal segment with prominent spine dorsally on anterior margin of statocyst lobe and equally prominent spine at ventrodial angle. Antennal peduncles overreaching distal corneal tips by 0.7–0.8 lengths of fifth segments; fifth, fourth and third segments unarmed; second segment with dorsolateral distal angle produced, terminating in acute spine, lateral margin with 1 or 2 small spines, dorsomesial distal angle usually with spinule; first segment with 1–3 slender spines on ventrolateral margin. Antennal acicle overreaching tip of cornea, with terminal spine and 2–6 small spines on both dorsomesial and dorsolateral margins. Antennal flagella as long as or slightly longer than carapace; each article with 2 to several long setae.

Dactyl of chela with row of small spines and sparse, moderately long setae on dorsomesial; dorsal surface generally flattened, with scattered small spines; mesial face with 1 row of small tubercles dorsally and row of short oblique ridges ventrally. Dorsal surface of palm with area laterad of midline somewhat concave, but concavity not continued onto fixed finger, dorsomesial and dorsolateral margins each with row of small acute spines accompanied by long fine setae; surfaces of palm and fixed finger both usually with covering of

small, closely-spaced spines, occasionally only with scattered small spines; mesial face with 2 irregular rows of very small tubercles dorsally. Carpus with dorsodistal facet prominently elevated and armed marginally with row of large acute spines and sparse setae, division of spinose crest into two subequal lobes indicated only by slightly deeper interval between 2 spines or weak to faint groove; anterior surface of facet with scattered spinules; remainder of dorsal carpal surface with few spinulose protuberances and small spines proximally, lateral face spinulose or tuberculate; ventrolateral distal margin with few spines. Merus with small spinule at dorsodistal margin, dorsal surface with row of very small spinules or spinulose protuberances and sparse setae; ventrolateral margin with row of small spines, increasing in size distally; ventromesial margin with prominent spine at distal angle.

Second and third pereopods slightly overreaching tips of chelipeds; generally similar. Dactyls equal to or slightly shorter than propodi; dorsal margins unarmed; mesial faces each with dorsal, mesial and ventral row of tufts of setae; lateral faces each with median row of sparse setae; ventral margins each with row of tufts of stiff setae and 3 or 4 corneous spines. Propodi of second pereopods each with dorsal row of small spines, third unarmed or each with row of minute spinules; both pairs with tufts of sparse setae dorsally and ventrally. Carpi each with sparse setae and row of quite small spines on dorsal surface, smallest on third pereopods. Meri each usually with 1 or 2 tiny spinules at dorsodistal margin, few tufts of sparse setae dorsally and ventrally, and few spinules of ventral margins of each second pereopod. Fourth pereopods subchelate, propodal rasps each consisting of single row of corneous scales. Fifth pereopods chelate, propodal rasps well developed.

Tergite of pleomere 6 subrectangular, with deep lateral incisions, terminal margin divided into 3 lobes by pair of tiny clefts; median portion very weakly concave, unarmed or minutely denticulate. Telson divided into anterior and posterior portions by transverse suture; lateral margins of anterior portion weakly concave, posterior portion separated into weak lobes by shallow depression or concavity, terminal margins unarmed but fringed with long setae.

Colouration. – In alcohol, grayish white.

Habitat. – Usually found in pebbles of pumice.

Distribution. – Solomon Islands, Vanuatu, New Caledonia, New Zealand; 490–699 m, possibly to 715 m.

Cheiroplatea scutata Ortmann, 1892

Chiroplatea scutata Ortmann, 1892: 275, Pl. 12, Fig. 4; Alcock, 1905: 153.

Chiroplatea scutata – Boas, 1926: 45; Forest, 1987a: 96, Fig. 27a–f; Forest, 1987b: 316, Fig. 3.

Type material. – Holotype male (2.1 mm) (MZS), Gulf of Mexico, coll. L. Agassiz, 1878 (not seen).

Abbreviated description [after Forest (1987a)]. – Shield broader than long and longer than posterior carapace, with transverse groove postrostrally; cervical groove delineated laterally by slender groove; rounded rostral lobe reaching slightly beyond level of lateral projections, with 5 apical spinules; lateral projections triangular, each with 2 terminal marginal spines. Ocular peduncles slightly less than 0.5 of shield; swollen basally and tapering to terminal points; corneas distinct; ocular acicles not apparent. Antennular peduncles overreaching ocular peduncles by approximately 0.5 lengths of basal segments; ultimate segment 0.6 length of penultimate segment; basal segment with lateral spine near mid-length. Antennal peduncles overreaching ocular peduncles by approximately 0.9 lengths of ultimate segments; fifth, fourth and third segments unarmed; second segment with dorsolateral distal angle produced, terminating in bifid spine. Antennal acicle not reaching middle of last peduncular segment, terminating in small spine and with few spines on dorsolateral and dorsomesial margins. Antennal flagella twice length of shield.

Dorsal surface of dactyl of each chela with scattered spines; dorsomesial margin with row of larger spines. Dorsomesial and dorsolateral margins of palm each with row of spines, dorsal surface with scattered spines and median longitudinal row of larger spines. Carpus with prominently elevated, marginally bilobed dorsodistal facet; distal margin with row of acute spines slightly smaller laterally and mesially, surface of facet with numerous smaller spines; remainder of carpus with dorsomesial and dorsolateral margins not delimited, dorsal surface spinose.

Second and third pereopods slightly longer than chelipeds. Dactyls slightly longer than propodi; ventral margins each with few corneous spines. Propodi each with dorsal row of small spines, more prominent on second pereopods. Carpi each also with dorsal row of small spines, most prominent on second pereopods. Meri each with 2 small spines on dorsal margin. Ischia each with 2 small spines on ventral margin. Termination and rasps of fourth and fifth pereopods not described.

Sixth pleomere reportedly in poor condition; posterior margin divided into 3 lobes by pair of incisions, median lobe concave. Uropods each with prominent spine on posterior margin of protopod. Telson with anterior portion roundly rectangular, posterior portion slightly narrower, also roundly subrectangular; terminal margin rounded, with slight median concavity, unarmed but with long fine setae.

Colouration. – Unknown.

Habitat. – Reported to be sponge.

Distribution. – Known only from uncertain type locality in Gulf of Mexico.

***Pylocheles* A. Milne-Edwards, 1880**

***Pylocheles agassizii* A. Milne-Edwards, 1880**

Pylocheles Agassizii A. Milne-Edwards, 1880: 38; Agassiz, 1888: 40; Henderson, 1888: 101; A. Milne-Edwards & Bouvier, 1893: 20, Pl. 1; Stebbing, 1893: 169; Alcock & Anderson, 1899a: 14; Alcock, 1899: 112; Boas, 1926: 40.

Pylocheles agassizii – Bate, 1888: 18; Young, 1900: 388; Benedict, 1901: 776; Alcock, 1905: 153.

Pylocheles agassizi – Ortmann, 1892: 274, Pl. 12, Fig. 3; Ortiz & Gómez, 1986: 32.

Pylocheles partitus Benedict, 1901: 775, Figs. 5, 6; Boas, 1926: 41; Ortiz & Gómez, 1986: 32.

Pylocheles Agassizi – Rabaud, 1941: Fig. 23.

Pylocheles (Pylocheles) agassizii – Forest, 1987a: 48, Figs. 9e, 11a–d; Forest, 1987b: 311, Fig. 4; Lemaitre et al., 2009: 5.

Not *Pylocheles Agassizii* – Alcock, 1898: 140 = *Xylocheles miersi* (Alcock & Anderson, 1899a).

Type material examined. – Holotype of *Pylocheles agassizii*: male (7.5 mm) (MCZ 4010), BLAKE, Stn. 291, 13°12'N 59°41'W, 366 m, 9 Mar.1879. Holotype of *Pylocheles partitus*: male (5.6 mm) (USNM 9892), ALBATROSS, Stn. 2356, 20°19'N 87°03'W, 250–422 m, 29 Jan.1885.

Abbreviated redescription. – Shield broader than long and longer than moderately well calcified posterior carapace; anterior margin with pair of small but prominent antennular spines separated by horizontal margin with or without faintly developed median rostral lobe; lateral projections acute. Ocular peduncles 0.7 length of shield; corneas pigmented, maximum diameter 0.4 of peduncular length; ocular acicles as subquadrate flattened plates. Antennular peduncles overreaching distal margins of corneas by entire lengths of ultimate peduncular segments; penultimate segments longer. Antennal peduncles (right missing in holotype of *P. agassizii*) reaching slightly beyond basal margins of corneas; antennal flagella missing or broken.

Generally flattened dorsal surface of chela with numerous rows of small tubercles, more closely-spaced on dactyl and fixed finger, dorsomesial and dorsolateral margins each with row of acute or subacute, tuberculate spines, proximal marginal area somewhat elevated into rounded lobe with sparse scattering of small tubercles; setae on dorsal surface of chela generally broken off, but appearing to have consisted of numerous tufts of sparse setae. Carpus with anterior portion elevated into prominent dorsal crest, margin separated into unequal lobes by deep cleft, each lobe with row of acute or subacute marginal spines extending mesially and laterally; dorsal and lateral surfaces each with irregular short, transverse, pilose, often tuberculate ridges, including elevated portion, dorsomesial margin proximally with raised, rounded, weakly tubercular rim.

Second and third pereopods similar. Dactyls each with ventral short row of 8–11 corneous spines in distal 0.6–0.8. Propodi unarmed but with setae dorsally and ventrally. Carpi each with very small dorsodistal spinule (second) or unarmed (third). Fourth pereopods semichelate, propodal rasps each consisting of 1 row of corneous scales. Fifth pereopod

subchelate, propodal rasps each consisting of several rows of not densely packed corneous scales.

Pleonal pleura moderately distinct; sixth tergite subrectangular, clearly broader than long, lateral margins each cut by oblique sutures, margins concave anteriorly, posterior margin divided into 3 lobes by very short, shallow incisions, margin of median lobe weakly concave. Protopods of uropods each with prominent, posteriorly directed spine. Telson with posterior lobes generally circular, separated by median notch, terminal margins unarmed but with fringe of setae.

Colouration. – Not known.

Habitat. – Cavities in pumice rock.

Distribution. – Caribbean Sea from Barbados to Yucatan Peninsula, Mexico; 250–366 m, possibly to 422 m.

Pylocheles mortensenii Boas, 1926

Pylocheles Mortensenii Boas, 1926: 40, Figs. 1, 5, 6, 10A, 11B, 13, 14, 18, 25A.

Mixtopagurus rigidus Yokoya, 1933: 71, Fig. 31; Miyake, 1947: 741, Fig. 2144.

Pylocheles rigidus – Miyake, 1949: 740, Fig. 2125; Miyake, 1960: 94, Pl. 47, Fig. 6; Miyake, 1965: 640, Fig. 1064; Miyake, 1978: 11, Fig. 4; Miyake, 1982: 95, Pl. 32, Fig. 3; Takeda, 1982: 56, Fig. 166; Baba, 1986: 185, Fig. 132; Miyake, 1991: 95, Pl. 32, Fig. 3; Miyake, 1998: 95, Pl. 32, Fig. 3.

Pylocheles mortensenii – Pilgrim, 1965: 556.

Pylocheles (Pylocheles) mortensenii – Forest, 1987a: 51, Figs. 2a, 3a, 5a, b, 7a, 8a–i, 9a–d, 10a, b, 12a–d, 41a, Pl. 2C; Forest, 1987b: 311, Figs. 1a, 3; Forest & McLaughlin, 2000: 33, Fig. 5; McLaughlin et al., 2007c: 20, 5 unnumbered Figs. — McLaughlin & Lemaitre, 2008: 59; Lemaitre et al., 2009: 5.

Pylocheles mortensenii – Saito & Konishi, 2002: 623, Figs. 1–3.

Type material examined. – Lectotype [by subsequent selection by Forest (1987a)]: ovig. female (8.5 mm) (ZMUC CRU 7401), Danish Kei Islands Expedition, Stn. 62, 05°29.25'S 132°50.0'E, 290 m, 15 May 1922.

Paralectotypes 1 male (5.5 mm) (ZMUC CRU 257), 1 female (2.3 mm) (ZMUC CRU 7402), Indonesia, Danish Kei Islands Expedition, Stn. 46, 05°47.20'S 132°13.0'E, 250 m, 2 May 1922; 1 female (~5.3 mm, damaged) (ZMUC CRU 7404), Stn. 49, 05°37.10'S 132°23.0'E, 245 m, 3 May 1922; 1 male (4.4 mm, poor condition) (ZMUC CRU 4703), Stn. 50, 05°34.9'S 132°25.40'E, 233 m, 4 May 1922.

Other material examined. – 2 males (2.8, 4.1 mm) (MNHN-Pg 7644), 1 male (4.4 mm) (NTOU), TAIWAN 2000, Stn. CP 26, 22°13.4'N 120°23.1'E, 328–350 m, 30 Jul.2000; 2 males (2.8, 4.1 mm) (MNHN-Pg 7783), 1 male (2.4 mm) (NTOU), Stn. CP 34, 22°01.9'N 120°36.4'E, 246 m, 31 Jul.2000; 1 female (2.9 mm) (NTOU), Stn. CP 35, 22°01.8'N 120°36.5'E, 228–222 m, 31 Jul.2000; 2 males (2.4, 4.2 mm), 2 females (2.3, 4.6 mm) (NTOU), Stn. CP 58, 24°35.1'N 122°05.8'E, 221–254 m, 4 Aug.2000; 1 male (4.1 mm), 4 females (3.3–4.4 mm), 1 ovig. female (4.7 mm) (NTOU), TAIWAN 2003, Stn. CP 212, 24°34.60'N 122°05.84'E, 223–260 m, 26 Aug.2003; 2 males (3.5, 5.3 mm), 1 female (damaged), 4 ovig. females (4.0–4.4 mm) (NTOU), Stn. CP 216,

24°34.71'N 122°04.02'E, 209–280, 27 Aug.2003; 3 males (4.6–4.9 mm) (MNHN-Pg 7631), 3 ovig. females (4.7–6.2 mm) (NTOU), TAIWAN 2004, Stn. CP 269, 24°30.55'N 122°05.78'E, 399–397 m, 2 Sep.2004; 3 ovig. females (5.5–5.7 mm) (MNHN-Pg 7784), 2 males (4.3, 4.6 mm), 3 ovig. females (5.4–6.7 mm) (NTOU), Stn. CP 270, 24°32.21'N 122°01.12'E, 340–407 m, 2 Sep.2004; 1 female (4.7 mm) (MNHN-Pg 7785), MUSORSTOM 3, Stn. CP 133, 11°58'N 121°52'E, 334–390, 5 Jun.1985; 1 juvenile (~1.0 mm) (MNHN-Pg 7786), Stn. CP 139, 11°53'N 122°14'E, 240–267 m, 6 Jun.1985; 1 male (3.0 mm) (MNHN-Pg 7787), BORDAU 1, Stn. CP 1411, 16°05'S 179°28'W, 390–403 m, 26 Feb.1999; 1 male (3.3 mm), 2 females (3.1, 4.1 mm) (MNHN-Pg 7788), Stn. CP 1434, 17°11'S 178°41'W, 400–401 m, 2 Mar.1999; 2 males (3.0, 3.1 mm), 4 females (2.6–4.0 mm), 2 ovig. females (3.7, 4.0 mm) (MNHN-Pg 7789), Stn. CP 1476, 19°41'S 178°11'W, 310–420 m, 8 Mar.1999; 1 male (2.1 mm), 1 ovig. female (4.3 mm) (MNHN-Pg 7790), Stn. DW 1477, 20°58'S, 178°45'W, 390–405 m, 9 Mar.1999; 1 male (4.9 mm) (MNHN-Pg 7791), Stn. CP 1478, 20°59'S 178°44'W, 386–398 m, 9 Mar.1999; 4 males (3.4–4.5 mm), 2 ovig. females (3.4, 5.1 mm) (MNHN-Pg 7792), Stn. CP 1481, 20°57'S 178°45'W, 441–506 m, 9 Mar.1999; 1 male (2.4 mm) (MNHN-Pg 7793), Stn. DW 1492, 18°43'S 178°23'W, 430–350, 11 Mar.1999; 2 males (3.1, 3.7 mm), 1 female (4.5 mm), 1 ovig. female (5.1 mm) (MNHN-Pg 7794), Stn. DW 1493, 19°43'S 178°24'W, 429–440 m, 11 Mar.1999; 4 ovig. females (not measured) (MNHN-Pg 7795), Stn. DW 1496, 18°43'S 178°23'W, 392–407 m, 12 Mar.1999; 1 female (2.7 mm) (MNHN-Pg 7796), Stn. DW 1497, 18°44', 176°25'W, 335–350 m, 12 Mar.1999; 1 female (2.6 mm) (MNHN-Pg 7797), Stn. DW 1499, 18°40'S 178°27'W, 389–400 m, 12 Mar.1999; 2 males (2.8, 4.4 mm), 3 females (3.1–3.9 mm), 2 ovig. females (3.7, 3.8 mm) (MNHN-Pg 7798), Stn. CP 1500, 18°42'S 178°26'W, 366–389 m, 12 Mar.1999; 1 male (2.6 mm), 2 ovig. females (3.0, 3.2 mm) (MNHN-Pg 7799), Stn. CP 1501, 18°40'S 178°30'W, 350–357 m, 12 Mar.1999; 1 female (3.1 mm) (MNHN-Pg 7800), Stn. CP 1504, 18°13'S 178°34'W, 427–440 m, 13 Mar.1999; 1 male (2.8 mm), 2 females (2.7, 3.4 mm) (MNHN-Pg 7801), BORDAU 2 Stn. CP 1511, 21°08'S 175°22'W, 384–402 m, 31 May 2000; 1 female (2.4 mm) (MNHN-Pg 7802), Stn. CP 1525, 21°17'S 174°59'W, 349–351 m, 2 Jun.2000; 1 male (2.3 mm), 1 female (2.7 mm), 3 ovig. females (3.3–4.1 mm) (MNHN-Pg 7803), Stn. CP 1526, 21°16'S 174°59'W, 463–464 m, 2 Jun.2000; 1 male (3.1 mm) (MNHN-Pg 7804), Stn. CP 1528, 21°14'S 174°59'W, 587–592 m, 3 Jun.2000; 1 ovig. female (3.8 mm) (MNHN-Pg 7805), Stn. CP 1545, 21°17'S 175°17'W, 444–447 m, 5 Jun.2000; 2 males (2.4, 2.9 mm), 1 female (2.5 mm), 2 ovig. females (not measured) (MNHN-Pg 7806), Stn. CP 1562, 19°52'S 174°42'W, 417–424 m, 8 Jun.2000; 1 female (2.9 mm) (MNHN-Pg 7807), Stn. CP 1563, 19°52'S 174°39'W, 362–388, 8 Jun.2000; 3 females (2.8–3.2 mm) (MNHN-Pg 7808), Stn. CP 1572, 19°42'S 174°34'E, 391–402, 11 Jun.2000; 1 male (2.3 mm), 1 female (3.1 mm), 4 ovig. females (2.4–3.7 mm) (MNHN-Pg 7809), Stn. CP 1590, 19°12'S 174°13'E, 353–386, 14 Jun.2000; 1 male (2.7 mm) (MNHN-Pg 7810), Stn. CP 1591, 19°10'S 174°15'W, 351–360 m, 14 Jun.2000; 1 male (2.1 mm), 3 females (2.0–3.2 mm) (MNHN-Pg 7811), Stn. CP 1592, 19°08'S 174°17'E, 391–426, 14.2000; 1 male (2.1 mm) (MNHN-Pg 7812), Stn. CP 1593, 19°06', 174°18'W, 436–442 m, 14 Jun.2000; 2 females (3.4, 3.9 mm), 1 ovig. female (4.6 mm) (MNHN-Pg 7813), Stn. CH 1596, 19°06'S, 274°18'E, 371–437 m, 14 Jun.2000; 3 males (2.5–2.6 mm), 4 females (1.9–3.3 mm), 7 ovig. females (3.2–3.6 mm) (MNHN-Pg 7814); Stn. CH 1609, 22°11', 175°27'W, 385–405, 16 Jun.2000; 1 ovig. female (6.2 mm) (MNHN-Pg 7815), SALOMON 1, Stn. CP 1831, 10°12.1'S 161°19.2'E, 135–325 m, 5 Oct.2001; 1 ovig. female (5.7 mm) (MNHN-Pg 7816), SALOMON 2, Stn. DW 2301, 09°06.95'S, 158°20.57'E, depth not recorded, 8 Nov.2004; 1 female (3.3 mm) (MNHN-Pg 7817), MUSORSTOM 6, no further data; 1 ovig. female (3.9 mm) (MNHN-Pg 7818), Stn. DW 391, 20°47.35'S 167°05.70'E, 390 m, 13 Feb.1989; 1

juvenile (~1.0 mm) (MNHN-Pg 7819), Stn. DW 406, 20°40.65'S 167°06.80'E, 373 m, 15 Feb.1989; 1 female (4.0 mm) (MNHN-Pg 7820), Stn. DW 412, 20°40.60'S 167°03.75'E, 437 m, 15 Feb.1989; 1 female (2.8 mm) (MNHN-Pg 7821), Stn. DW 459, 21°01.39'S 167°31.47'E, 425 m, 20 Feb.1989; 1 male (2.2 mm) (MNHN-Pg 7822), Stn. DW 460, 21°01.72'S 167°31.45'E, 420 m, 20 Feb.1989; 1 male (4.0 mm) (MNHN-Pg 7823), 1 male (5.4 mm) (MNHN-Pg 7824), 2 males (3.1, 4.5 mm), 1 female (3.4 mm), 1 ovig. female (5.0 mm) (MNHN-Pg 7825), Stn. DW 464, 21°02.30'S 167°31.60'E, 430 m, 21 Feb.1989; 1 male (5.9 mm) (MNHN-Pg 7826), Stn. DW 465, 21°03.55'S 167°32.25'E, 480 m, 21 Feb.1989; 2 males (3.4, 4.1 mm) (MNHN-Pg 7827), BATHUS 2, Stn. CP 737, 23°03.4'S 167°00.0'E, 350–400 m, 13 May 1993; 1 male (4.0 mm) (MNHN-Pg 7828), BATHUS 3, Stn. DW 838, 23°01'S 166°56'E, 400–402 m, 30 Nov.1993; 1 male (2.4 mm) (MNHN-Pg 7829), EBISCO, Stn. DW 2549, 21°07'S 158°38'E, 331–330 m, 11 Oct.2005; 1 male (not measured) (MNHN-Pg 7830), Stn. DW 2620, 20°06'S 160°22'E, 532–623 m, 20 Oct.2005; 1 male (3.3 mm) (MNHN-Pg 7831), Stn. DW 2625, 20°05'S 160°19'E, 627–741 m, 20 Oct.2005; 1 female (3.8 mm) (MNHN-Pg 7832), Stn. DW 2638, 20°48'S 161°01.0'E, 418–421 m, 22 Oct.2005; 1 ovig. female (5.6 mm) (MNHN-Pg 7833), LIFOU, Stn. CP 1, Santal Bay, no further data; 1 female (carapace damaged), 1 ovig. female (5.5 mm) (MNHN-Pg 7834), Stn. CP 2, Santal Bay, no further data; 1 female (3.5 mm) (MNHN-Pg 7835), MUSORSTOM 10, Stn. CP 963, 20°20.10'S 169°49.08'E, 400–440 m, 21 Sep.1994; 1 male (2.6 mm), 2 females (2.5, 3.2 mm) (MNHN-Pg 7836), Stn. DW 978, 19°22.68'S 169°27.11'E, 413–408 m, 22 Sep.1994; 2 males (2.3, 2.4 mm) (MNHN-Pg 7837), Stn. CP 980, 19°21.02'S 169°25.22'E, 450–433 m, 22 Sep.1994; 1 male (2.7 mm) (MNHN-Pg 7838), Stn. CP 982, 19°21.80'S 169°26.47'E, 408–410 m, 23 Sep.1994; 1 female (4.3 mm) (MNHN-Pg 7839), Stn. CP 1091, 15°10.24'S 167°13.01'E, 344–350 m, 6 Oct.1994.

Abbreviated redescription. – Shield shorter than broad and usually longer than posterior carapace; anterior margin usually with pair of small antennular spines separated by weakly concave to weakly convex margin, with or without median spinule; lateral projections usually each with terminal spine or spinule. Ocular peduncles approximately 0.8 shield length; corneas dilated and pigmented; maximum diameter 0.3–0.4 of peduncular length; ocular acicles as subquadrate flattened plates. Antennular peduncles reaching beyond distal margins of corneas by 0.5 to full lengths of ultimate segments, penultimate segments longer. Antennal peduncles not quite or reaching to bases of corneas; antennal flagella shorter than to 1.5 times length of shield.

Dorsal surface of palm of chela and distal facet of carpus forming shallow concavity covered with spines or blunt to generally acute, conical tubercles, larger and marginally continuous. Pilosity usually consisting of quite dense setae of variable lengths, not concealing underlying integument; carpus with anterodorsal crest of prominent conical, acute or subacute spines delimiting distal triangular facet; transverse, pilose, somewhat tuberculate or spinulose ridges proximal to crest; 1 irregular row of several spines on proximal half of dorsal face.

Second and third pereopods each with ventral row of corneous spines on dactyl; propodi and meri of second each usually with row of spinules on dorsal margin; carpi each with dorsal row of sharp spines on second, dorsodistal spine on each third. Fourth pereopods weakly semichelate;

propodi each with 7–10 squamiform, corneous scales on ventrolateral face marginally. Fifth pereopods subchelate; rasp well developed.

Pleonal segments 2–5 each with broad rectangular tergal plates separated from marginally rounded pleural lobes by moderate to deep longitudinal depressions. Sixth pleonal tergite subrectangular, distinctly shorter than broad, with concave lateral margins each with weak oblique incision; posterior margin divided by shallow incisions into 3 straight or very weakly convex lobes, outer angles very obtuse. Protopods of uropods each with posteriorly directed spine. Telson with posterior lobes separated by median notch, margins with fringes with very fine setae.

Colouration. – Body uniformly rose to intense rose, chelae sometimes whitish (McLaughlin et al., 2007c).

Habitat. – Excavations in pumice, and occasionally in sponge and coral (McLaughlin et al., 2007c).

Distribution. – Japan, Taiwan, Philippine Islands, Indonesia, Australia, New Zealand, New Caledonia, Vanuatu, Solomon, Tonga, and Fiji Islands; 100–627 m, possibly to 700 m.

Variation. – Specimens from the central Pacific and small individuals tend to lack the median rostral spinule. Occasionally the spines on the propodi and carpi of the second pereopods are much smaller than typical or not yet developed in very small specimens. The posterior margin of the sixth pleomere may be slightly concave rather than convex.

Xylocheles Forest, 1987a

Xylocheles miersi (Alcock & Anderson, 1899a)

(Figs. 5A, B)

Pylocheles Agassizii – Alcock, 1898: 141; not *Pylocheles agassizii* A. Milne-Edwards, 1880.

Pylocheles Miersi Alcock & Anderson, 1899a: 14; Alcock & Anderson, 1899b: Pl. 43, Fig. 4, 4a, b; Alcock, 1899: 111; Lameere, 1933: 499, Fig. 460; Pérez, 1934: 25, Fig. 14.

Pylocheles miersi – Alcock, 1901: 212; Alcock, 1905: 16, Pl. 1, Fig. 2, 2a, b.

Pylocheles Miersii – Calman, 1909: 261, Fig. 151; Boas, 1926: 41.

Pylocheles miersii – Calman, 1911: 94, Fig. 37; Balss, 1924: 753, 760, Fig. 1; Russell, 1962: Fig. 16.

Pylocheles miersi – MacGinitie & MacGinitie, 1949: 295 (misspelling of *Pylocheles*).

Pylocheles (Xylocheles) miersi – Forest, 1987a: 57, Fig. 14a–d; Forest, 1987b: 316, Fig. 3; Lemaitre et al., 2009: 5.

Type material examined. – Lectotype [subsequent selection by Forest (1987a)]: male (5.1 mm) (NHM 1899.1.20.7), INVESTIGATOR, Stn. 233, 13°17.15'N 93°10.25'E, 338 m, 6 Dec.1897.

Paralectotypes: 2 males (4.0, 4.8 mm) (NHM 1903.4.6.3-4) [IM 2209/10, 2210/10], same data as lectotype.

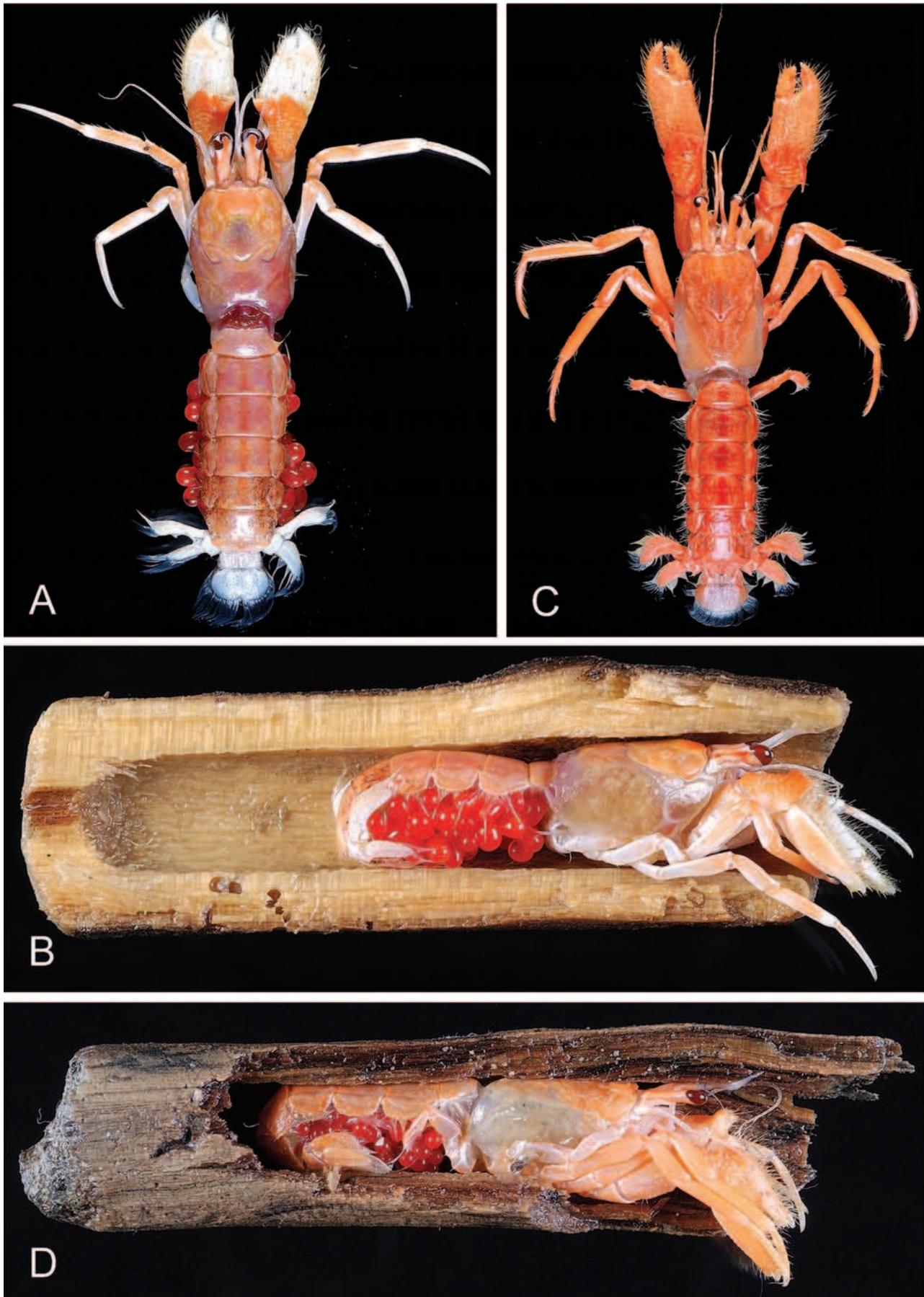


Fig. 5. A, B, *Xylocheles miersi* (Alcock & Anderson, 1898): A, ovig. female (not measured) (ZRC), PANGLAO 2005, Stn. CP 2341; B, ovig. female (not measured) in wood habitat partially removed (ZRC), PANGLAO 2005, Stn. CP 2341. C, D, *Xylocheles macrops* (Forest, 1987): C, male (10.7 mm) (NMCR), PANGLAO 2005, Stn. CP2344; D, ovig. female (5.8 mm) in wood habitat partially removed (MNHN-Pg 7850), PANGLAO 2005, Stn. CP 2331.

Other material examined. – 3 males (not measured), 4 females (4.3–6.1 mm) (MNHN-Pg 7840), MUSORSTOM 2, Stn. 44, 13°23'N 122°20'E, 760–820 m, 26 Nov.1980; 2 males (6.5, 7.5 mm) (MNHN-Pg 2721), Stn. 83, 13°55.2'N 120°30.5'E, 320–318 m, 2 Dec.1980; 1 male (4.3 mm) (ZRC), PANGLAO 2004, Balicasag, 09°31.1'N 123°41.5'E, ~ 100 m, 31 May 2004; 1 ovig. female (not measured) (ZRC), PANGLAO 2005, Stn. CP 2341, 09°24.5' N, 123°49.7'E, 712–888, 23 May 2005; 1 ovig. female (6.3 mm) (ZRC), Stn. CP 2343, 09°27.4'N 123°49.4'E, 273–302 m, 23 May 2005; 1 female (5.1 mm) (MNHN-Pg 7841), Stn. CP 2358, 08°52.1'N 123°37.1'E, 569–597 m, 26 May 2005; 1 female (6.0 mm) (NMCR), Stn. CP 2392, 09°29.0'N 123°41.1'E, 400–436 m, 30 May 2005; 1 female (2.7 mm) (MNHN-Pg 7842), BOA 1, Stn. CP 2479, 16°45.0'S 167°51.8'E, 350–358 m, 15 Sep.2005.

Abbreviated redescription. – Shield longer than broad and longer than weakly calcified posterior carapace; rostrum absent, antennular lobes each poorly developed, unarmed. Ocular peduncles 0.7–0.8 length of shield; corneal diameter approximately 0.5 of peduncular length. Antennular peduncles overreaching distal corneal margins by 0.2–0.5 lengths of penultimate segments, penultimate segments longest. Antennal peduncles reaching to or slightly beyond midlengths of corneas; antennal flagella approximately as long as carapace.

Chelipeds symmetrical, rectangular in shape. Dactyl with row of small tubercles on dorsomesial margin, row of flattened, tuberculate spines at ventromesial margin; palm with dorsal surface flattened or very weakly convex and with sparse rows of setae, dorsomesial and dorsolateral margins each with row of small tubercles; dorsodistal margin of carpus somewhat elevated and slightly overhanging proximal margin of chela, with row of row small spines or tubercle and fine long setae; dorsal surface of elevated anterior facet with numerous small tubercles extending onto lateral face, distolateral and distomesial margins each with row of small spines or tubercles.

Second and third pereopods each with row of 16–30 tiny corneous spinules on ventral margin of dactyl; propodi unarmed but each with dorsal and ventral rows of sparse setae; carpi each with dorsodistal spine and sparse setae, frequently row of minuscule spinules to small spines on dorsal margin, at least on second pereopods; Fourth pereopods subchelate; propodal rasps each consisting of 1 row of corneous scales. Fifth pereopods weakly chelate; propodal rasp well developed.

Pleon with tergite of pleomere 6 subcircular, with deep lateral incisions and shallow median sulcus; terminal margin with median area excavated, denticulate. Protopods of uropods each with posteriorly directed spine. Telson with prominent lateral indentations; anterior lobes weakly calcified; posterior lobes separated by shallow median cleft, terminal margins rounded, unarmed but with fringe of fine setae.

Colouration. – In life (Fig. 5A), shield light orange to brownish-orange; posterior carapace and pleon reddish-orange. Ocular peduncles light orange with patches of white mesially and laterally at bases of corneas; corneas dark

reddish-brown or black. Chelae of chelipeds whitish with faint orange tinge dorsally, light orange ventrally; carpi bright orange; meri light whitish-orange. Ambulatory legs light orange with distal band of white on each propodus; dactyls white in distal halves. Uropods whitish, tinged with very light orange; telson iridescent bluish-white.

Habitat. – Hollows in pieces of mangrove and bamboo (Fig. 5B).

Distribution. – Andaman Sea, Indonesia, Philippine Islands, Vanuatu; 240–760 m, possibly to 888 m.

Variation. – The ventral and posterior mesial and lateral faces of the carpi of the chelipeds each usually has a few to numerous transverse, often denticulate or spinulose ridges, but occasionally maybe entirely unarmed. Not infrequently the carpal posterior dorsal angle is elevated and armed with 2 or 3 spinules or small spines. Although the meri of ambulatory legs are usually unarmed, occasionally the dorsodistal margin is armed with 1–3 quite small spines and rarely 1 spine may occur subdistally as well.

Xylocheles macrops (Forest, 1987a)

(Figs. 5C, D)

Pylocheles (*Xylocheles*) *macrops* Forest, 1987a: 61, Figs. 2b, 9f–h, 10c, d, 13a–g, 15a–d, Pl. 1A, 3A, 4D, E, 6C, D; Forest, 1987b: 310, Figs. 1b, 3; Yu & Foo, 1991: 62, 1 unnumbered fig.; McLaughlin et al., 2007c: 24, 3 unnumbered figs; Lemaitre et al., 2009: 5.

Type material examined. – Holotype male (9.2 mm) (MNHN-Pg 2709), MUSORSTOM 1, Stn. 65, 14°00.0'N 120°19.2'E, 202–194 m, 27 Mar.1976.

Paratype: 1 ovig. female (7.8 mm) (USNM 228432), ALBATROSS, Stn. 5520, 08°41.15'N 123°14.30'E, 185 m, 10 Aug.1909.

Other material examined. – 1 male (5.5 mm) (MNHN-Pg 7843), MUSORSTOM 1, Stn. 34, 14°01.0'N 120°15.8'E, 188–191 m, 23 Mar.1985; 1 male (3.4 mm) (MNHN-Pg 7844), MUSORSTOM 3, Stn. 103, 14°00.4'N 102°18.15'E, 193–200 m, 1 Jun.1985; 1 female (~ 2.5 mm, newly molted) (MNHN-Pg 7845), Stn. CP 119, 11°59'N 121°13'E, 320–337 m, 3 Jun.1985; 1 male (not measured) (MNHN-Pg 7846), Stn. CP 120, 12°06'N 121°15'E, 219–220 m, 3 Jun.1985; 1 male (4.5 mm) (NMCR), PANGLAO 2004, Stn. T3, 09°31.5'N 123°46.8'E, 150 m, tangle nets of local fishermen, 31 May 2004; 3 males (5.8–10.6 mm) 1 (not measured) (MNHN-Pg 7847), 2 ovig. females (8.5, 8.9 mm) (MNHN-Pg 7848), Maribohoc Bay, Stn. P1, 09°36.1'N 123°45.0'E, 90–200 m, tangle nets of local fishermen, 30 May 2004; 1 male (6.1 mm) (ZRC), Maribohoc Bay, Stn. T-5, 100–300 m, tangle nets of local fishermen, 30 May 2004; 2 males (9.6, 10.3 mm) (MNHN-Pg 7849), Balicasag, 09°31.1'N 123°41.5'E, ~ 100 m, tangle nets of local fishermen, 31 May 2004; 1 ovig. female (5.8 mm) (MNHN-Pg 7850), PANGLAO 2005, Stn. CP 2331, 09°39.2'N 123°47.5'E, 256–263 m, 30 May 2005; 1 male (10.7 mm) (NMCR), Stn. CP 2344, 09°28.4'N 123°50.1'E, 128–155 m, 30 May 2005; 1 male (1.8 mm) (ZRC), Stn. CP 2393, 09°30.1'N 123°41.6'E, 396–414 m, 30 May 2005; 1 female (6.4 mm) (MNHN-Pg 7645), TAIWAN 2000, Stn. CP 49, 22°55.2'N 121°21.5'E, 266 m, 02 Aug.2000; 1 male (10.6 mm) (MNHN-Pg 7851), 1 female (5.2 mm) (MNHN-Pg 7852), TAIWAN 2001,

Stn. CP 90, 24°53.6'N 122°01.4'E, 300–330 m, 10 May 2001; 1 female (5.2 mm) (MNHN-Pg 7853), 1 ovig. female (9.1 mm) (MNHN-Pg 7854), Stn. CP 91, 24°50.6'N 122°01.4'E, 400 m, 10 May 2001; 1 female (6.4 mm) (MNHN-Pg 7855), Stn. CP 102, 24°48.4'N 122°08.0'E, 326–331 m, 19 May 2001; 1 ovig. female (9.1 mm) (MNHN-Pg 7856), 1 female (9.6 mm), 2 ovig. females (9.4, 9.6 mm) (MNHN-Pg 7857), TAIWAN 2002, Stn. CP 165, 22°24.1'N 120°13.0'E, 300 m, 26 May 2002; 1 female (9.6 mm), 2 ovig. females (9.4, 9.6 mm) (MNHN-Pg 7859), TAIWAN 2004, Stn. CH 258, 24°29.22'N 121°54.98'E, 173–225 m, 18 Aug.2004; 1 male (9.9 mm), 1 female (10.4 mm) (MNHN-Pg 7860), Stn. CH 260, 24°29.25'N 121°53.03'E, 148–207 m, 29 Aug.2004; 1 male (5.8 mm) (NTOU), Stn. CP 265, 24°28.44'N 121°55.31'E, 345–382, 11 Oct.2004; 1 male (11.0 mm), 1 female (7.3 mm), 1 ovig. female (8.2 mm) (NTOU), Dasi fishing port, NE Taiwan, commercial trawler, no date or depth; 9 males (4.7–9.0 mm), 3 ovig. females (8.3–11.8 mm) (NTOU), Taiwan, no specific locality, commercial trawler, 10 Nov.2004; 1 male (6.4 mm), 1 female (6.3 mm) (NTOU), Taiwan, no specific locality, commercial trawler, 10 Mar.2005; 1 ovig. female (7.6 mm) (MNHN-Pg 7861), SALOMON 1, Stn. CP 1803, 09°32.1'S 160°37.3'E, 308–347, 2 Oct.2001; 4 females (2.7–9.2 mm) (MNHN-Pg 7862), Stn. CP 1804, 09°32.0'S 160°37.4'E, 309–328 m, 2 Oct.2001; 3 males (4.7–9.2 mm), 1 female (not measured) (MNHN-Pg 7863), Stn. CP 1837, 10°12.8'S 161°28.6'E, 381–383, 5 Oct.2001; 1 ovig. female (9.3 mm) (MNHN-Pg 7864), Stn. CP 1851, 10°27.6'S 162°00.0'E, 297–350 m, 6 Oct.2001; 2 males (3.3, 3.4 mm), 2 ovig. females (6.8, 10.6 mm) (MNHN-Pg 7865), Stn. CP 1860, 09°22'S 160°31'E, 620 m, 7 Oct.2001; 1 male (9.4 mm) (MNHN-Pg 7866), SALOMON 2, Stn. CP 2199, 07°43.14'S 158°29.60'E, depth not recorded, 25 Oct.2004; 2 males (5.4 mm, 1 not measured) (MNHN-Pg 7867), Stn. CP 2210, 07°34.2'S 157°41.8'E, 240–305 m. 26 Oct.2004; 1 ovig. female (10.3 mm) (MNHN-Pg 7868), Stn. CP 2286, 08°40.92'S 157°24.30'E, depth not recorded, 6 Nov.2004; 3 males (5.0–6.9 mm), 2 females (2.7, 4.3 mm), 2 ovig. females (8.3, 8.6 mm) (MNHN-Pg 7869), Stn. CP 2287, 08°40.8'S 157°24.6'E, 253–255 m, 6 Nov.2004.

Abbreviated redescription. – Shield longer than broad and slightly longer than weakly calcified posterior carapace; rostrum absent, antennular lobes each with very small spinule. Ocular peduncles approximately 0.8 length of shield; corneas approximately 0.3 of peduncular length. Antennular peduncles overreaching distal corneal margins by 0.4–0.5 lengths of penultimate segments; ultimate segments little shorter than penultimate segments. Antennal peduncles reaching slightly beyond midlengths of corneas; antennal flagella longer than carapace.

Dactyl of each chela with row of small tubercles on dorsomesial margin and row of tuberculate spines at ventromesial margin. Dorsal surface of palm flattened or very weakly convex, with rows of tufts of sparse setae, dorsomesial and dorsolateral margins each with row of small tubercles. Carpus with dorsodistal margin somewhat elevated and slightly overhanging proximal margin of chela, armed with row small spines or tubercles and fine long setae; dorsal surface of elevated facet with numerous small tubercles extending onto lateral face, distolateral and distomesial margins each with row of spines.

Second and third pereopods similar. Dactyls each with row of 25–30 tiny corneous spinules on ventral margin; propodi unarmed but each with dorsal and ventral rows of sparse setae;

carpi each with dorsodistal spine and sparse setae. Fourth pereopods subchelate; each with propodal rasp consisting of 2 rows of corneous scales. Fifth pereopods weakly chelate; propodal rasps well developed.

Pleon with tergite of pleomere 6 subcircular, with deep lateral incisions and shallow median sulcus; terminal margin with median area produced, denticulate. Protopods of uropods each armed posteriorly with tiny corneous tubercle. Telson with prominent lateral indentations; anterior lobes weakly calcified; posterior lobes separated by shallow median cleft, terminal margins rounded, unarmed but with fringe of fine setae.

Colouration. – Carapace and pleon bright red to red-orange. Ocular peduncles red-orange; corneas black. Chelipeds red-orange, carpi darkest. Ambulatory legs light orange with tips of dactyls whitish. Posterior lobes of telson bluish (Fig. 5C).

Habitat. – HOLLOWED stems or branches weathered by long immersion and often covered with epifauna (Fig. 5D).

Distribution. – The Philippine Islands, Taiwan, Indonesia, Solomon Islands; 148–620 m.

Bathyeles Forest, 1987a

Bathyeles cubensis (Ortiz & Gómez, 1986)

Pylocheles cubensis Ortiz & Gómez, 1986: 31, Figs. 1–9.

Pylocheles (Bathyeles) chacei Forest, 1987a: 66, Fig. 17a–d; Forest, 1987b: 316, Fig. 4.

Pylocheles (Bathyeles) cubensis – McLaughlin et al., 2007a: 42, Fig. 1; Lemaître et al., 2009: 5

Type material examined. – Holotype of *Pylocheles cubensis*: male (~ 13.0 mm) (IOACC), Joint Soviet-Bulgarian-Cuban Expedition, Stn. 240-39, Gulf of Cazonos, 570 m, 25 Oct.1983. Holotype of *Pylocheles (Bathyeles) chacei*: female (~ 8.9 mm) (USNM 152529), R/V SILVER BAY, Stn. 5142, 19°52.00'N 71°58.50'W, 640 m, 12 Oct.1963.

Other material examined. – None.

Abbreviated redescription. – Shield slightly longer than broad and slightly longer than posterior carapace; dorsal surface with shallow transverse groove subrostrally; rostrum absent, antennular lobes bluntly triangular, unarmed; lateral projections broadly rounded, produced considerably beyond levels of antennular lobes. Ocular peduncles 0.4–0.5 length of shield; corneal diameter 0.3–0.4 of peduncular length; ocular acicles each as quite small, triangular plate. Antennular peduncles overreaching distal corneal margins by approximately 0.5 lengths of basal segments. Antennal peduncles overreaching distal corneal margins by 0.5–0.8 lengths of fifth peduncular segments.

Dactyl of each chela with row of closely-spaced tubercles on dorsomesial margin. Dorsomesial and dorsolateral margins of

palm each with row of tubercles not concealed by submarginal long setae, dorsal surface flat, unarmed, but with covering of sparse tufts of short setae generally forming longitudinal rows. Carpus with dorsodistal margin considerably elevated and overhanging proximal margin of chela; distal margin cut into 2 lobes by deep incision in mesial 0.3, armed with row of small tubercles laterally and small spines dorsally, neither concealed by tufts of long setae; dorsal surface with short, transverse, tuberculate ridges.

Second and third pereopods not overreaching tips of outstretched chelipeds. Dactyls with dorsal surfaces unarmed and generally glabrous, lateral and mesial surfaces each with row of moderately long and stiff; propodi, carpi, meri, and ischia unarmed but with sparse, fine setae on all surfaces.

Sixth pleonal tergite roundly subrectangular; terminal margin unarmed, but notched medianly by deep subquadrate concavity. Protopods of uropods each with prominent spine on posterior margin. Telson as long as broad, unequally divided by transverse suture; anterior portion with weak depression on either side of midline anteriorly and with ovate area of decalcification at each posterolateral angle; posterior portion with lateral margins rounded, terminal margin sometimes with very slight median indentation, and faint median concavity anteriorly, giving bilobed impression.

Colouration. – Unknown.

Habitat. – Unknown.

Distribution. – Gulf of Cazes, Cuba to Turks & Caicos Islands, Haiti; 570–640 m.

***Bathycheltes incisus* (Forest, 1987a)**
(Figs. 6A, B)

Pylocheles (*Bathycheltes*) *incisus* Forest, 1987a: 70, Figs. 16a–g, 18a–g, Pls. 4A–C, 6A, B; Forest, 1987b: 316; Fig. 3; Komai & Hung, 2000: 130, Figs. 1–3; McLaughlin et al., 2007c: 27, 3 unnumbered figs; Lemaitre et al., 2009: 5.

Type material examined. – Holotype male (6.0 mm) (MNHN-Pg 2722), MUSORSTOM 2, Stn. 50, 13°36.7'N 120°33.7'E, 810–820 m, 27 Nov.1980.

Paratypes: 5 males (4.7–8.8 mm), 2 females (5.5, 6.0 mm), 3 ovig. females (5.4–5.6 mm), + 9 in scaphopod shells and 5 in wooden hollows (not removed), (MNHN-Pg 2727), MUSORSTOM 1, Stn. 47, 13°40.7'N 120°30.0'E, 757–685 m, 25 Mar.1976.

Other material examined. – 2 ovig. females (4.5, 5.2 mm) (ZRC), PANGLAO 2005, Stn. CP 2386, 08°49.3'N 123°01.9'E, 2149–2,217 m, 29 May 2005; 1 male (8.9 mm) (NTOU), TAIWAN 2003, Stn. CP 214, 24°28.59'N 122°12.66'E, 490–1,027 m, 27 Aug.2003; 2 males (4.9, 9.0 mm) (NTOU), 25°54'N 122°03'E, 380–580 m, commercial trawler, 17 May 1998; 1 male (7.1 mm) (MNHN-Pg 7870), SALOMON 1, Stn. CP 1749, 09°20.9'S 159°56.2'E, 582–594, 25 Sep.2001; 1 male (7.1 mm) (MNHN-Pg 7871), Stn. CP 1750, 09°15.6'S 159°54.6'E, 696 m, 25 Sep.2001; 2 ovig. females (7.9, 8.2 mm) (MNHN-Pg 7872), Stn. CP 1751, 09°10.4'S 159°53'E,

749–799 m, 25 Sep.2001; 1 male (8.7 mm), 1 ovig. female (7.7 mm) (MNHN-Pg 7873), Stn. CP 1806, 09°37.9'S 160°49.7'E, 621–708 m, 2 Oct.2001; 3 ovig. females (3.7–8.7 mm) (MNHN-Pg 7874), SALOMON 2, Stn. CP 2176, 09°09.4'S 158°59.2'E, 600–875 m, 21 Oct.2004; 1 female (5.1 mm) (MNHN-Pg 8055), Stn. CP 2180, 08°47.6'S, 159°46.6'E, 708–828, 22 Oct.2004; 1 female (2.6 mm) (MNHN-Pg 7875), Stn. CP 2189, 08°19.6'E, 160°01.9'E, 660–854 m, Nov.2004; 1 male (8.2 mm) (MNHN-Pg 7876), Stn. CP 2213, 07°38.7'S 157°42.9'E, 495–650 m, Nov.2004; 1 female (7.4 mm) (MNHN-Pg 7677), Stn. CP 2215, 07°44.3'S 157°44.3'S 157°42.3'E, 718–880 m, 26 Oct.2004; 2 males (5.7, 9.2 mm) (MNHN-Pg 7878), Stn. CP 2218, 07°56.3'S 157°34.6'E, 582–864 m, 27 Oct.2004; 1 ovig. female (6.5 mm) (MNHN-Pg 7879), Stn. CP 2220, 07°58.1'S 157°33.9'E, 632 m, 27 Oct.2004; 1 ovig. female (7.8 mm) (MNHN-Pg 7880), Stn. CP 2244, 07°45.0'S 156°26.7'E, 554–586 m, 1 Nov.2004; 2 males (6.0, 9.0 mm), 1 ovig. female (7.9 mm) (MNHN-Pg 7881), Stn. CP 2246, 07°42.6'S 156°24.6'E, 664–682 m, 1 Nov.2004; 1 ovig. female (8.7 mm) (MNHN-Pg 7882), Stn. CP 2248, 07°42.5'S 155°64.8'E, 650–673 m, 1 Nov.2004; 4 males (3.9–6.5 mm) (MNHN-Pg 7883), Stn. CP 2267, 07°48.0'S 156°52.0'E, 590–600 m, 4 Nov.2004; 1 male (6.9 mm), 2 females (3.5, 6.5 mm), 1 ovig. female (5.4 mm) (MNHN-Pg 7884), Stn. CP 2268, 07°48.7'S 156°53.3'E, 632–640m, 4 Nov.2004; 1 male (5.6 mm), 1 female (6.5 mm), 2 ovig. females (7.2, 7.5 mm) (MNHN-Pg 7885), Stn. CP 2269, 07°45.1'S 156°56.3'E, 768–890 m, 4 Nov.2004; 2 females (3.9, 6.2 mm), 1 ovig. female (7.4 mm) (MNHN-Pg 7886), Stn. CP 2270, 07°39.89'S 156°58.84'E, depth not recorded, 4 Nov.2004; 3 males (3.7–5.7 mm), 1 female (4.2 mm), 2 ovig. females (5.3, 5.5 mm) (MNHN-Pg 7887), Stn. CP 2275, 08°40.2'S 157°42.5'E, 1,100 m, 5 Nov.2004; 3 males (3.6–6.2 mm), 8 females (2.4–4.6 mm), 5 ovig. females (5.1–6.2 mm) (MNHN-Pg 7888), Stn. CP 2276, 08°41.5'S 157°38.2'E, 824–980 m, 5 Nov.2004; 6 males (4.7–8.9 mm), 3 females (4.9–7.6 mm), 2 ovig. females (6.1, 8.4 mm) (MNHN-Pg 7889), MUSORSTOM 10, Stn. CP 1331, 17°02.4'S 178°01.8'E, 694–703 m, 8 Aug.1998; 1 female (5.3 mm) (MNHN-Pg 7890), BOA 1, Stn. CP 2451, 15°26.30'S 166°37.60'E, 500–492m, 11 Sep.2005; 1 male (5.7 mm) (MNHN-Pg 7891), Stn. CP 2462, 16°37.50'S 167°57.40'E, 618–641 m, 13 Sep.2005.

Abbreviated redescription. – Shield broader than long and longer than weakly calcified posterior carapace; dorsal surface without transverse groove subrostrally; rostrum absent, antennular lobes each moderately well developed, unarmed or with 1 or 2 tiny spinules; lateral projections obtusely triangular, each with 1 or 2 very small to tiny marginal or submarginal spinules. Ocular peduncles 0.3–0.4 length of shield; corneas slightly more to slightly less than 0.3 of peduncular length; plate-like ocular acicles clearly delineated. Antennular peduncles overreaching distal corneal margins by 0.6–0.7 lengths of basal segments. Antennal peduncles overreaching corneal margins by approximately 0.3–0.4 of fourth peduncular segments. Antennal flagella longer than carapace.

Dactyl of each chela with transverse rows of simple and modified setae on dorsal surface, dorsomesial margin with row of small tubercles concealed by long setae. Palm with dorsal surface flattened or very weakly convex, dorsomesial and dorsolateral margins each with row of small tubercles partially concealed by dense, long simple setae and short modified setae, dorsal surface of palm and fixed finger each with rows of short modified setae, 1 denser median row of distinctly longer, modified setae. Carpus with elevated dorsodistal margin distinctly overhanging proximal margin

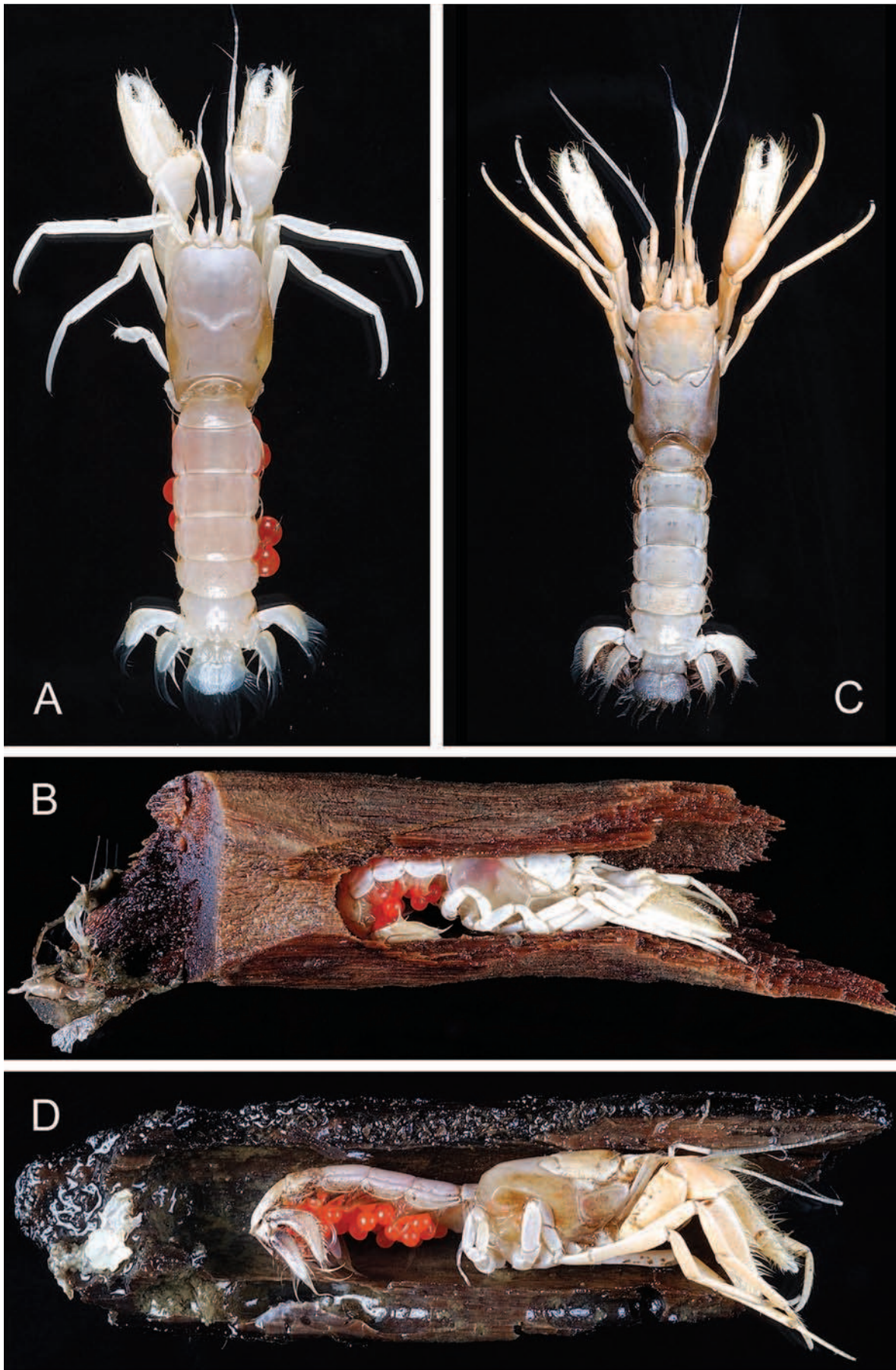


Fig. 6. A, B, *Bathyscheles incisus* (Forest, 1987): A, ovig. female (5.2 mm) (ZRC), PANGLAO 2005, Stn. CP 2386; B, ovig. female (5.2 mm) in wood habitat partially removed (ZRC), PANGLAO 2005, Stn. CP 2386. C, D, *Bathyscheles integer* (Forest, 1987): C, male (4.3 mm) (MNHN-Pg 7907), PANGLAO 2005, Stn. CP 2352; D, ovig. female (4.5 mm), in wood habitat partially removed (NMCR), PANGLAO 2005, Stn. 2336.

of chela and with median cleft dividing margin into rounded mesial and triangular lateral lobes, each with row of small spines or tubercles and long stiff setae.

Second and third pereopods slightly overreaching chelipeds. Dactyls each with row of 18–20 small corneous spines on ventral margin; propodi unarmed but each with dorsal and ventral rows of setae; carpi without dorsodistal spinules.

Tergite of pleomere 6 irregularly subquadrate, with deep lateral incisions and shallow median sulcus; terminal margin frequently denticulate, median region with 2 distinct clefts, moderately broad intervening margin excavated. Protopods produced posteriorly, each with terminal spine. Telson with prominent lateral sutures; anterior lobe subquadrate, with pair of shallow lateral depressions; posterior lobe with or without very shallow median concavity, terminal margin fringed with fine setae.

Colouration. – Overall grayish-white (McLaughlin et al. 2007c) to faintly pinkish-white; corneas very light yellowish-orange (Fig. 6A).

Habitat. – Hollows in wood (Fig. 6B) and often scaphopod (tusk) shells.

Distribution. – Taiwan, Philippine and Solomon Islands, Fiji, Vanuatu; 380–2,149 m, possibly to 2,217 m.

Remarks. – Forest (1987a) distinguished *B. incisus* as *Pylocheles (Bathycheles)* from the quite similar *P. (B.) integer* by the prominently excavated median region of the posterior margin of the tergite of the sixth pleomere. However, with the recognition of second species with a similarly excavated margin, the key recognition character of *B. incisus* is the club-like modified setae on the dorsal surfaces and margins of the chelae.

***Bathycheles phenax*, new species**

(Figs. 7, 8)

Pylocheles (Bathycheles) n. sp. A – Lemaitre et al., 2009: 5.

Type material examined. – Holotype: male (6.7 mm) (MNHN-Pg 7892), BORDAU 1, Stn. CP 1395, 16°45'S 179°59'E, 423–500 m, 23 Feb.1999.

Paratypes: 1 male (6.7 mm) (MNHN-Pg 7893), MUSORSTOM 10, Stn. CP 1330, 17°09.5'S 177°56.3'E, 567–699 m, 8 Aug.1998; 1 male (4.7 mm), 5 ovig. females (5.4–8.7 mm) (MNHN-Pg 7894), Stn. CP 1332, 16°56.2'S 178°07.9'E, 640–487 m, 8 Aug.1998; 1 male (6.7 mm) (MNHN-Pg 7895), Stn. CP 1336, 16°58.0'S 177°58.4'E, 797–799 m, 9 Aug.1998; 3 ovig. females (6.2–6.9 mm) (MNHN-Pg 7896), Stn. CP 1337, 17°03.4'S 177°47.2'E, 635–670 m, 9 Aug.1998; 1 female (4.7 mm) (MNHN-Pg 7897), BORDAU 1, Stn. CP 1392, 16°49'S 179°54'E, 545–651 m, 23 Feb.1999; 2 males (3.3, 7.1 mm) (MNHN-Pg 7898), Stn. CP 1396, 16°39'S 179°57'W, 591–596 m, 24 Feb.1999; 1 ovig. female (7.3 mm) (MNHN-Pg 7899), Stn. CP 1401, 16°35'S 179°41'W, 600–648 m, 25 Feb.1999; 3 males (3.0–4.7 mm), 1 female (3.2 mm) (MNHN-Pg 7900), Stn. CP 1407, 16°40'S 179°39'E, 499–527 m, 12 Feb.1999.

Other material examined. – 1 ovig. female (shield damaged) (MNHN-Pg 7901), BORDAU 1, Stn. CP 1447, 16°45'S 179°59'E, 420–513 m, 4 Mar.1999; 1 male (7.1 mm) (MNHN-Pg 7902), MUSORSTOM 8, Stn. CP 1054, 16°27.95'S 167°57.44'E, 522–527 m, 1 Oct.1994; 1 ovig. female (7.2 mm) (MNHN-Pg 7903), Stn. CP 1124, 15°01'S 166°56'E, 532–599 m, 9 Oct.1994; 1 male (7.7 mm), 1 ovig. female (8.6 mm) (MNHN-Pg 7904), BOA 0 Stn. CP 2322, 14°59.38'S 166°55.71'E, 509–622 m, 17 Nov.2004; 1 ovig. female (9.7 mm) (MNHN-Pg 7905), BOA 1, Stn. CP 2431, 15°02.1'S 166°55.0'E, 443–520 m, 8 Sep.2005; 1 male (9.9 mm) (MNHN-Pg 7906), SANTOS, Stn. AT 19, 15°40.8'S 167°00.5'E, 503–600 m, 21 Sep.2006; 1 female (5.7 mm) (MNHN-Pg 7049), BATHUS 4, Stn. CP 950, 20°31.93'S 164°56.11'E, 705–750 m, 10 Aug.1994.

Etymology. – The specific epithet, a noun in apposition, from the Greek *phenax* meaning imposter, is selected to call attention to the similarities between the new taxon and *B. incisus*, the species for which it is easily mistaken.

Description. – Shield (Fig. 7A) broader than long and longer than weakly calcified posterior carapace; dorsal surface without transverse groove subrostrally. Cervical groove obscure laterally. Rostrum absent, antennular lobes each moderately well developed, unarmed or with 1 or 2 tiny spinules. Lateral projections obtusely triangular, each with 1 or 2 very small to tiny terminal spinules. Posterior median plate not defined, cardiac sulci not apparent. Branchiostegites weakly calcified dorsally and anteriorly, microscopically spinulose dorsally, anterodistal angle with few spinules.

Ocular peduncles 0.3 length of shield, somewhat swollen basally; corneas slightly more than 0.3 of peduncular lengths. Ocular acicles frequently not calcified, faintly to clearly delineated adjacent to equally membranous or chitinous median interocular lobe.

Antennular peduncles overreaching distal corneal margins by 0.7–0.8 lengths of basal segments. Ultimate segment approximately 0.5 length of penultimate segment. Basal segment with minute spinule on ventrodistal margin; penultimate and ultimate segments unarmed.

Antennal peduncles overreaching corneal margins by approximately 0.5–0.6 of fourth peduncular segments. Fifth, fourth and third segments unarmed; second segment with dorsolateral distal angle produced, terminating in simple or bifid spine, mesial margin unarmed or with few tiny spinules, dorsomesial distal angle unarmed, but tiny spinule displaced laterally; first segment with 2 or 3 small spines on ventrolateral margin distally. Antennal acicle triangular, reaching to distal margin of fourth peduncular segment or slightly beyond proximal margin of fifth, dorsomesial and dorsolateral margins each with row of minute spinules, usually with bifid terminal spinule. Antennal flagella longer than carapace, with irregularly-set fringe of long and shorter setae. Epistome with spine.

Chelipeds (Fig. 7B) symmetrical, rectangular in shape. Dactyl approximately 0.7 length of palm, with moderately broad hiatus between dactyl and fixed finger; dorsal tufts of sparse setae forming quasi-irregular rows, dorsomesial margin with

row of small tubercles concealed by long setae; cutting edge with row of small, calcareous teeth, terminating in calcareous claw, overlapped by fixed finger; mesial face with row of tufts of long setae dorsally and more dense tufts distally; ventral surface with several of tufts of setae. Palm slightly longer than carpus; dorsal surface flattened or very weakly convex, dorsomesial and dorsolateral margins each with row of small tubercles partially concealed by long, dense setae, dorsal surface of palm and fixed finger with irregular rows of tufts of sparse, moderately long setae; mesial, ventrolateral and ventral faces each with transverse irregular rows of setal pits and very sparse short setae, not concealing integument. Carpus subtriangular; dorsodistal margin elevated and distinctly overhanging proximal margin of chela, with median cleft dividing margin into 2 lobes, each with row of small tubercles and fine long setae; dorsal surface of elevated facet with 5 or 6 rows of small tubercles, distolateral and distomesial margins each with row of tubercles; dorsomesial and dorsolateral margins of remainder of carpus not delimited, ventral, posterior mesial and lateral faces unarmed. Merus subtriangular; dorsodistal margin unarmed but with row of very small spinulose tubercles beginning subdistally; mesial

and lateral faces and margins unarmed or ventrolateral margin with row of very small, low tubercles. Ischium unarmed.

Second and third pereopods (Fig. 8A, B) slightly overreaching chelipeds. Dactyls slightly shorter than propodi; mesial faces each with shallow sulcus proximally, row of moderately stiff setae dorsally and ventrally, ventral row composed of slightly oblique, moderately short lines of setae; lateral surfaces each with dorsal, ventral and median rows of setae; ventral margins each with row of 8–22 small corneous spines. Propodi approximately 0.3 longer than carpi; unarmed but each with dorsal and ventral rows of setae, sparser ventrally. Carpi without dorsodistal spinules, but with sparse setae dorsally. Meri and ischia unarmed but each with few scattered setae dorsally and ventrally. Fourth pereopods (Fig. 8C) subchelate; each with propodal rasp consisting of 1 row of corneous scales, 1 adjacent row of sparse tufts of setae. Fifth pereopods chelate; propodal rasps well developed.

Pleon with tergite 1 calcified; tergites 2–5 similarly well calcified; tergite of pleomere 6 (Fig. 7C) irregularly subquadrate, with deep lateral incisions and shallow median

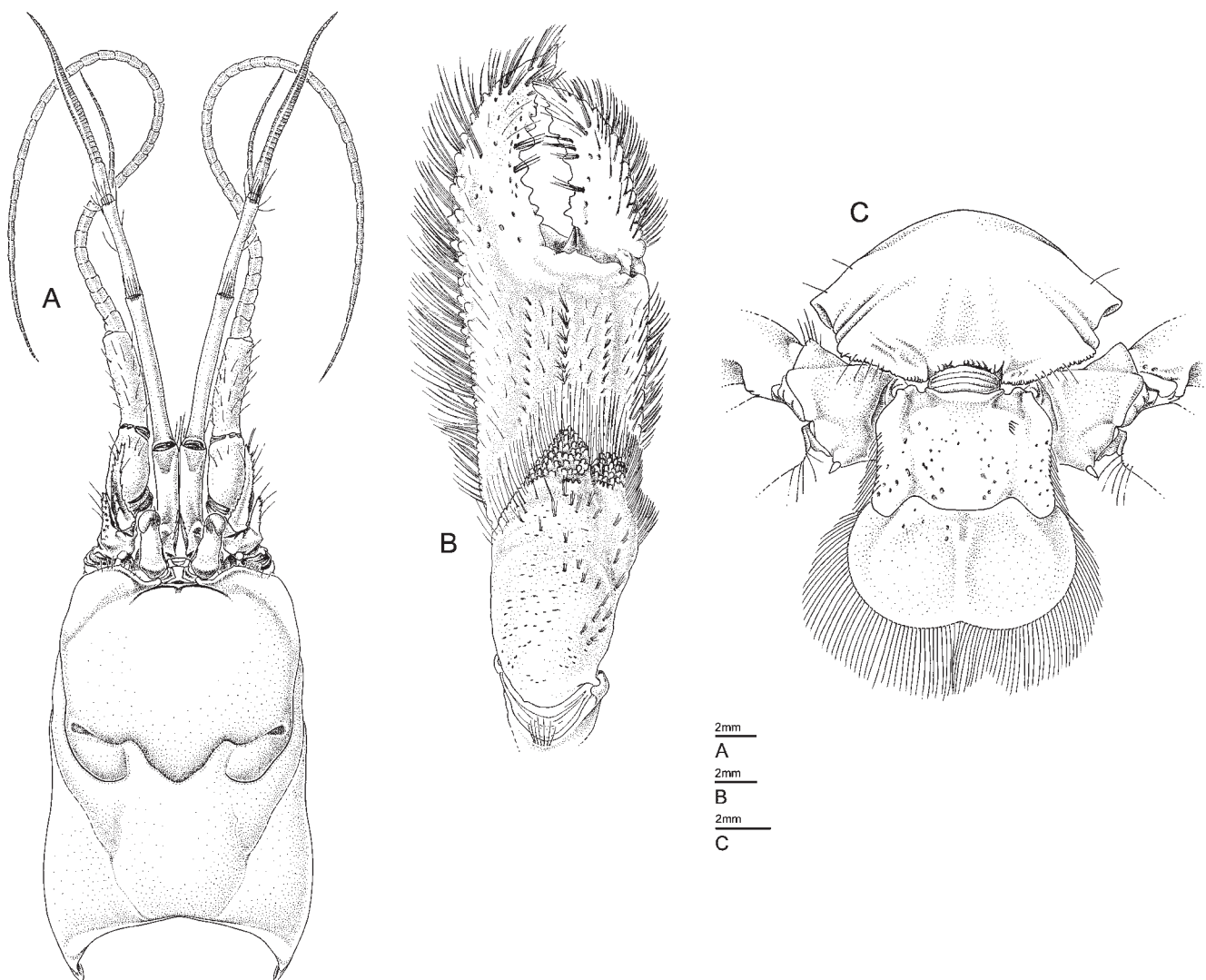


Fig. 7. *Bathychelès phenax*, new species. Holotype, male (6.7 mm) (MNHN-Pg 7892, BORDAU 1, Stn. CP 1395: A, shield and cephalic appendages; B, left cheliped (dorsal face); C, tergite of sixth pleonal segment and telson (dorsal face).

sulcus; terminal margin denticulate, median region with 2 shallow clefts, moderately broad intervening margin concave. Protopods produced posteriorly, and each with terminal spine. Telson (Fig. 7C) with prominent lateral sutures; anterior lobe subquadrate, with pair of lateral depressions; posterior lobe with or without very shallow median concavity, terminal margin fringed with fine setae.

Colouration. – Not known.

Habitat. – Hollows in wood.

Distribution. – Fiji Islands, Vanuatu, New Caledonia; 420–797 m.

Remarks. – *Bathycheles phenax*, new species, is most closely allied to *B. incisus*, sharing with that species the median concavity of the posterior margin of the sixth pleonal tergite. However, the new species is immediately distinguished from *B. incisus* by the lack of marginal and median rows of thick, club-like setae on the chelipeds dorsally. Although the setation and armature of the chelipeds are virtually identical in *B. phenax* new species and *B. integer*, the entire, terminal margin of the sixth pleonal tergite will immediately distinguish *B. integer*.

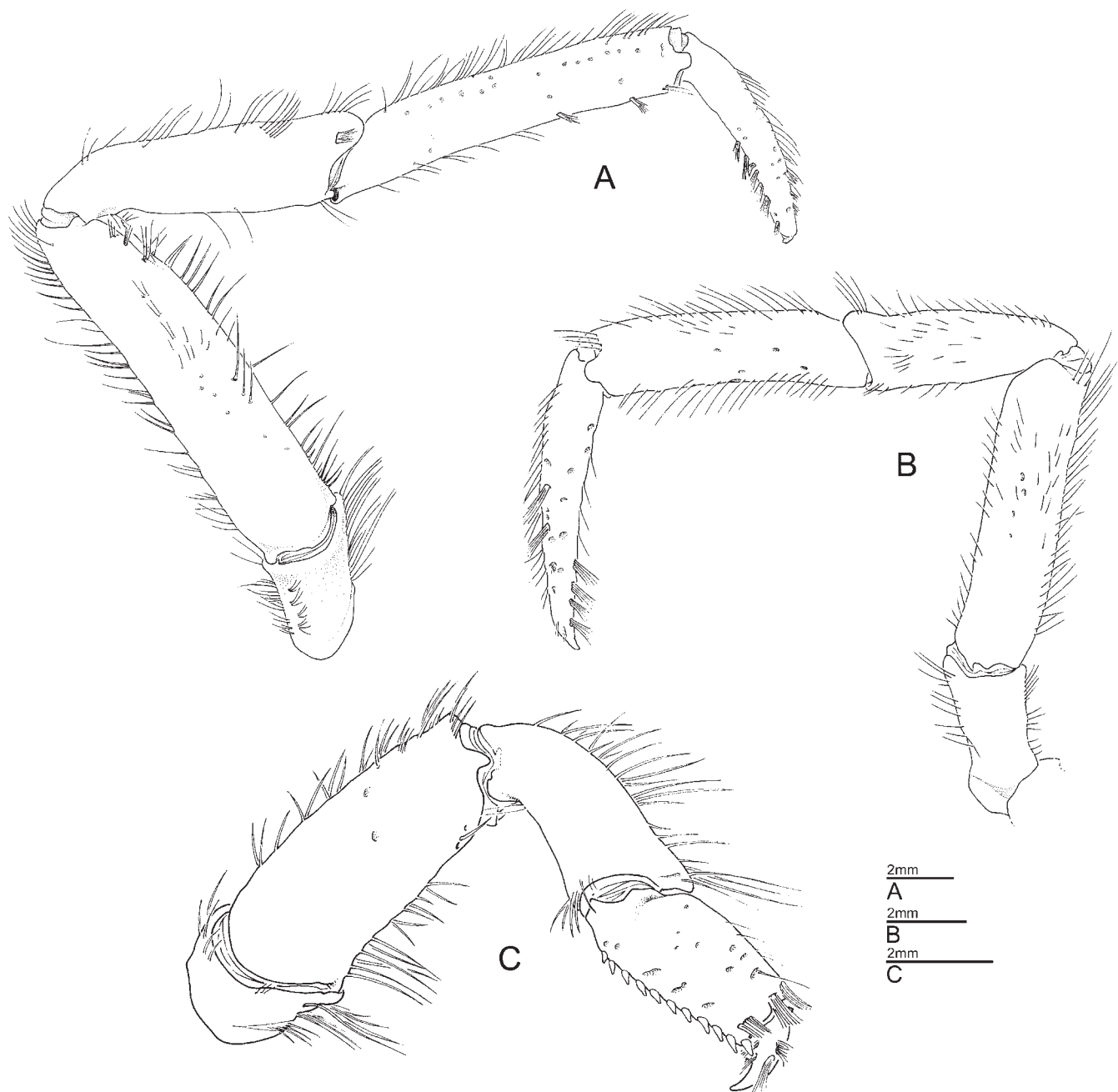


Fig. 8. *Bathycheles phenax*, new species. Holotype, male (6.7 mm) (MNHN-Pg 7892), BORDAU 1, Stn. CP 1395: A, right second pereopod (lateral view); B, left second pereopod (lateral view); C, right fourth pereopod (lateral view).

***Bathycheles macgilchristi* (Alcock, 1905)**

Cheiroplatea sp. – MacGilchrist, 1905: 243.
Chiroplatea Macgilchristi Alcock, 1905: 18, Pl. 1, Fig. 3, 3a.
Chiroplatea macgilchristi – Balss, 1924: 760.
Cheiroplatea Macgilchristi – Boas, 1926: 45.
Pylocheles (Bathycheles) macgilchristi – Forest, 1987a: 84, Fig. 22a–c; Forest, 1987b: 316, Fig. 3.

Type material. – Lectotype [subsequent selection by Forest (1987a)]: female (7.5 mm) (ZSI 4759-60/10), Gulf of Bengal, India, 766 m, (not seen).

Paralectotype: male (not measured), same data as lectotype (not seen).

Abbreviated redescription [after Alcock (1905) and Forest (1987a)]. – Shield nearly as long as broad and distinctly longer than posterior carapace; rostrum broad, truncate, reaching approximately to level of broadly triangular lateral projections. Ocular peduncles approximately 0.4 length of shield, ultimate segment swollen basally; corneas tapered, approximately 0.4 of peduncular length; ocular acicles apparently absent. Antennular peduncles overreaching distal corneal margins by 0.4–0.5 lengths of basal segments; penultimate segments longest. Antennal peduncles overreaching distal corneal margins by slightly more than lengths of fifth segments. Antennal flagella 1.5 length of carapace, lacking setae.

Dactyl of each chela short, approximately 0.5 length of palm, with prominent hiatus with fixed finger. Flattened or weakly concave dorsal surface of palm with 2 depressions separated by longitudinal granular ridge reaching to articulation of dactyl, dorsomesial and dorsolateral margins each with row of small tubercles or granules and setae. Carpus with dorsodistal margin elevated and distinctly overhanging proximal margin of chela, with median cleft dividing margin into weakly subtriangular lobes, each marginally crenulate and setose and with patch of small tubercles or granules dorsally.

Second and third pereopods overreaching chelipeds. Dactyls setose; propodi, carpi and meri smooth and unarmed. Fourth pereopods subchelate; each with propodal rasp consisting of 1 row of corneous scales. Fifth pereopods chelate; propodal rasps well developed.

Pleon with tergite 1 calcified; tergites 2–5 similarly well calcified; tergite of pleomere 6 subquadrate, with deep lateral incisions and shallow median sulcus; terminal margin with 2 small incisions. Telson with prominent lateral suture; anterior lobe smaller; posterior lobe with terminal margin weakly concave medianly, unarmed.

Colouration. – In preservative, pinkish-yellow with iridescent gastric region (after Alcock, 1905).

Habitat. – Sunken pieces of bamboo (Alcock, 1905).

Distribution. – Known only from the type locality; 766 m.

***Bathycheles integer* (Forest, 1987a)**

(Figs. 6C, D, 9)

Pylocheles (Bathycheles) profundus Forest, 1987a: 74, Figs. 9i, j, 10e, f, 19a–d; Forest, 1987b: 316, Fig. 3.
Pylocheles (Bathycheles) integer Forest, 1987a: 77, Fig. 20a–e; Forest, 1987b: 316, Fig. 3; Lemaitre et al., 2009: 5.

Type material examined. – Holotype of *P. (B.) profundus*: male (7.2 mm) (USNM 228434), ALBATROSS, Stn. 5492, 09°12.45'N 125°20.0'E, 1,344 m, 1 Aug.1909. Holotype of *P. (B.) integer*: male (5.4 mm) (MNHN-Pg 3431), CORINDON 2, Stn. 217, 0°38.2'N 117°59.6'E, 470–447 m, 1 Nov.1980.

Paratypes of *P. (B.) integer*: 1 female (4.7 mm) (MNHN-Pg 3432), CORINDON 2, Stn. 276, 01°54.6'S 119°13.8'E, 450–395 m, 8 Nov.1980; 1 male (7.7 mm) (MNHN-Pg 2737), COP 1, Stn. 1, 03°19.3'S 128°06.2'E, 562–525 m, 14 Apr.1981; 1 male (8.6 mm) (MNHN-Pg 2734), COP 2, Stn. 1, 03°18.0'S 128°16.0'E, 483–315 m, 14 Apr.1981.

Other material examined. – 1 ovig. female (4.5 mm) (NMCR), PANGLAO 2005, Stn. CP 2336, 09°32.4'N 123°39.3'E, 757–729 m, 22 May 2005; 1 male (4.3 mm) (MNHN-Pg 7907), Stn. CP 2352, 09°27.3'N 124°03.1'E, 1,260–1,761 m, 24 May 2005; 3 females (5.3–6.3 mm) (ZRC), Stn. CP 2355, 09°24.3'N 124°10.7'E, 1,764 m, 25 May 2005; 4 males (3.8–5.0 mm + 1 with damaged shield), 3 females (4.3–5.6 mm), 3 ovig. females (5.0–5.4 mm) (ZRC), Stn. CP 2356, 09°20.9'N 124°02.7'E, 1,756–1,764 m, 25 May 2005; 1 male (3.4 mm) (MNHN-Pg 7908), SALOMON 1, Stn. CP 1747, 09°21.8'S 159°58.7'E, 364–402m, 25 Sep.2001; 1 male (8.9 mm), 2 ovig. females (7.0, 8.1 mm) (MNHN-Pg 7909), Stn. CP 1748, 09°20.4'S 159°58.2'E, 509–522, 25 Sep.2001; 10 males (3.6–7.8 mm), 16 females (2.7–5.9 mm), 8 ovig. females (5.6–10.5 mm) (MNHN-Pg 7910), Stn. CP 1783, 08°32.8'S 160°41.7'E, 399–700 m, 29 Sep.2001; 1 male (8.0 mm) (MNHN-Pg 7911), Stn. CP 1786, 09°21.3'S 160°24.6'E, 387 m, 30 Sep.2001; 4 males (5.8–9.8 mm) (MNHN-Pg 7912), Stn. CP 1794, 09°16.1'S 160°07.7'E, 494–504 m, 30 Sep.2001; 2 males (4.6, 7.4 mm), 1 female (3.6 mm) (MNHN-Pg 7913), Stn. CP 1795, 09°18.8'S 160°22.9'E, 442–451 m, 1 Oct.2001; 1 ovig. female (6.9 mm) (MNHN-Pg 7914), Stn. CP 1796, 09°19.2'S 160°25.4'E, 469–481 m, 1 Oct.2001; 2 males (6.2, 7.0 mm) (MNHN-Pg 7915), Stn. CP 1798, 09°21.0'S 160°29.2'E, 513–564, 1 Oct.2001; 1 ovig. female (8.7 mm) (MNHN-Pg 7916), Stn. CP 1800, 09°21.4'S 160°29.9'E, 357–359 m, 1 Oct.2001; 1 female (5.5 mm), 2 ovig. females (6.7, 7.4 mm) (MNHN-Pg 7917), Stn. CP 1805, 09°35.0'S, 160°42.7'E, 367–500 m, 2 Oct.2001; 1 ovig. female (5.5 mm) (MNHN-Pg 7918), Stn. CP 1859, 09°32.6'S 160°37.3'E, 283–305 m, 7 Oct.2001; 2 males (4.5, 4.7 mm), 1 ovig. female (7.0 mm) (MNHN-Pg 7919), SALOMON 2, Stn. CP 2184, 08°16.9'S 159°59.7'E, 464–523 m, 23 Oct.2004; 1 female (5.1 mm), 1 ovig. female (6.3 mm) (MNHN-Pg 7920), Stn. CP 2186, 08°17.0'S 160°00.0'E, 487–541 m, 23 Oct.2004; 3 females (2.8–6.1 mm), 1 ovig. female (4.8 mm) (MNHN-Pg 7921), Stn. CP 2187, 08°17.5'S 159°59.8'E, 482–604 m, 23 Oct.2004; 3 males (4.0–7.5 mm), 3 females (3.9–6.1 mm), 1 ovig. female (4.8 mm) (MNHN-Pg 7922), Stn. CP 2193, 08°23.9'S 159°26.6'E, 362–432 m, 24 Oct.2004; 6 males (2.5–6.7 mm), 4 females (2.3–5.4 mm), 3 ovig. females (5.9–6.4 mm) (MNHN-Pg 7923), Stn. CP 2194, 08°24.8'S 159°26.7'E, 440–521 m, 24 Oct.2004; 3 males (1.9–6.0 mm), 3 females (4.0–4.9 mm) (MNHN-Pg 7924), Stn. CP 2195, 08°25.5'S 159°26.4'E, 543–593 m, 24 Oct.2004; 1 ovig. female (7.7 mm) (MNHN-Pg 7925), Stn. CP 2212, 07°37.8'S 157°41.7'E, 400–475 m, 26 Oct.2004; 1 male (3.8 mm), 1 ovig. female (6.5 mm) (MNHN-Pg 7926), Stn. CP 2214, 07°41.6'S, 157°43.8'E, 550–682 m, 26 Oct.2004; 2 males (5.4, 5.5 mm), 1 female (2.5 mm) (MNHN-

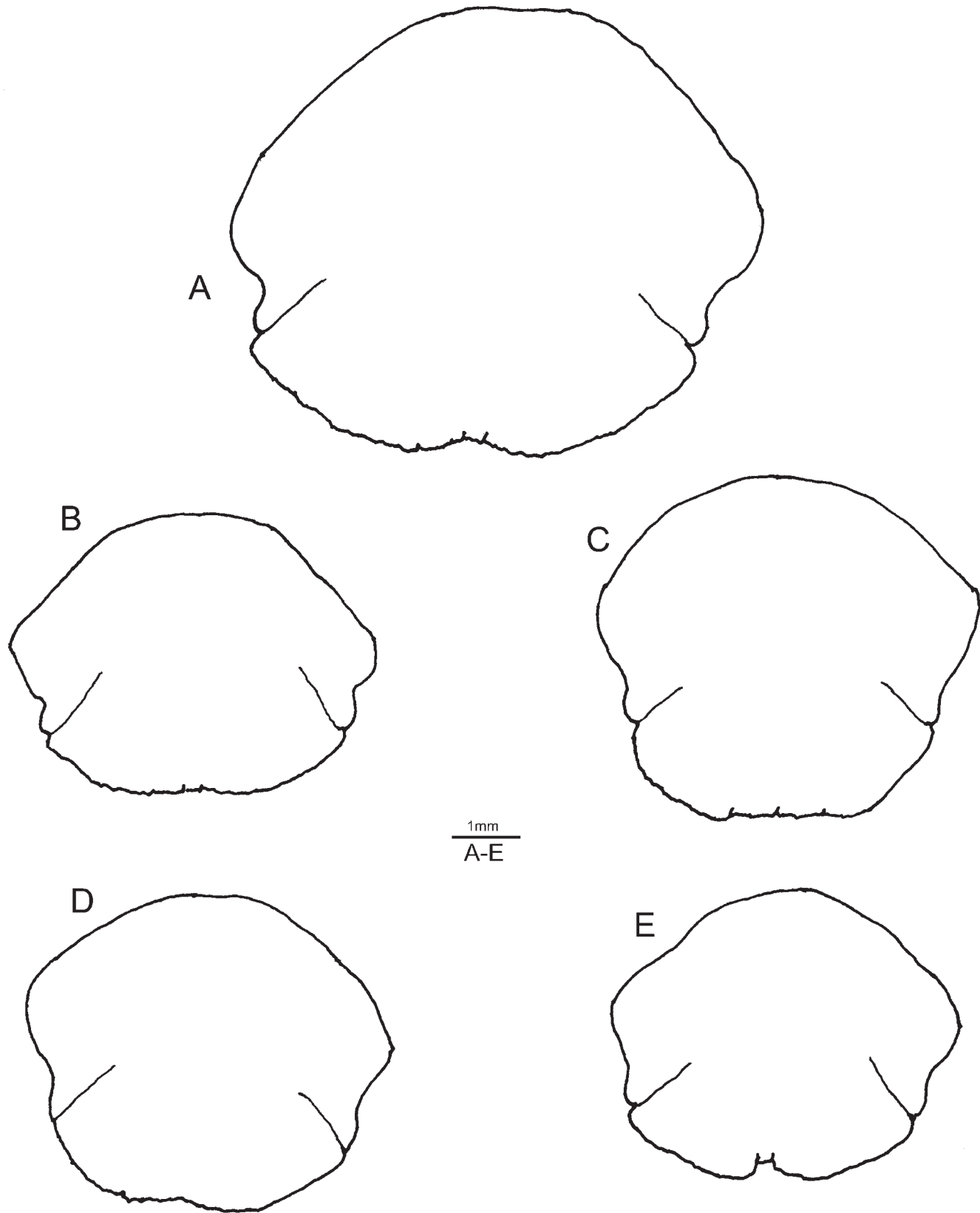


Fig. 9. *Bathyscheles integer* (Forest, 1987). Tergites of sixth pleonal segment. A, holotype of *P. (B.) profundus*, ALBATROSS Stn. 5492; B–E, *B. (P.) profundus*, PANGLAO 2005, Stn. CP 2356. A, male (7.2 mm) (USNM 228434); B, C, females (5.0, 5.4 mm) (ZRC); D, ovig. female (5.0 mm) (ZRC); E, male (4.9 mm) (ZRC).

Pg 7927), Stn. CP 2226, 06°39.0'S 156°14.3'E, 490–520 m, 28 Oct.2004; 2 ovig. females (5.7, 6.1 mm) (MNHN-Pg 7928), Stn. CP 2227, 06°37.21'S 156°12.74'E, depth not recorded, 28 Oct.2004; 1 male (8.6 mm), 1 female (4.9 mm) (MNHN-Pg 7929), Stn. CP 2229, 06°35.5'S 156°20.0'E, 315–418 m, 29 Oct.2004; 1 male (3.5 mm) (MNHN-Pg 7930), Stn. CP 2262, 07°56.43'S 156°51.18'E, depth not recorded, 3 Nov.2004; 1 male (5.8 mm), 3 females (3.3–5.7 mm) (MNHN-Pg 7930a), Stn. CP 2263, 07°54.83'S 156°51.27'E, depth not recorded, 3 Nov.2004; 1 female (4.0 mm) (MNHN-Pg 7931), Stn. CP 2264, 07°52.4'S 156°51.0'E, 515–520 m, 3 Nov.2004; 4 males (2.8–8.0 mm), 2 ovig. females (5.2, 6.5 mm) (MNHN-Pg 7932), Stn. CP 2272, 08°56.2'S 157°44.1'E, 380–537m, 5 Nov.2004; 2 males (4.3, 4.4 mm), 1 female (4.5 mm) (MNHN-Pg 7933), Stn. CP 2273, 08°31.8'S 157°42.8'E, 732–839 m, 5 Nov.2001; 1 ovig. female (6.7 mm) (MNHN-Pg 7934), Stn. CP 2288, 08°36.29'S 157°26.55'E, depth not recorded, 7 Nov.2004; 1 male (5.5 mm), 1 female (3.4 mm), 1 ovig. female (6.6 mm) (MNHN-Pg 7935), Stn. CP 2289, 08°35.7'S 157°28.5'E, 623–627 m, 7 Nov.2004; 1 female (4.4 mm), 1 ovig. female (4.9 mm) (MNHN-Pg 7936), Stn. CP 2290, 08°40.0'S 157°31.7'E, 384–418 m, 7 Nov.2004; 6 males (3.9–5.6 mm), 2 females (4.2, 4.4 mm), 4 ovig. females (5.3–7.7 mm) (MNHN-Pg 7937), Stn. CP 2291, 08°39.2'S 157°26.6'E, 408–470 m, 7 Nov.2004.

Redescription. – Shield broader than long and longer than weakly to moderately calcified posterior carapace; dorsal surface with faint to distinct transverse groove subrostrally. Cervical groove obscure laterally. Rostrum absent, antennular lobes each moderately well developed, unarmed or with 1 or 2 tiny spinules. Lateral projections obtusely triangular, each with 1 or 2 very small terminal or subterminal spinules. Branchiostegites only partially calcified dorsally and anteriorly, unarmed or microscopically spinulose dorsally, distal margin often with row of small spines.

Ocular peduncles 0.4 length of shield, somewhat swollen basally; corneas 0.2–0.4 of peduncular lengths. Plate-like ocular acicles weakly calcified, faintly to clearly delineated.

Antennular peduncles overreaching distal corneal margins by 0.6–0.8 lengths of basal segments. Ultimate segment approximately 0.7 length of penultimate segment, both unarmed. Basal segment unarmed or with very small spine or tiny spinule on ventrodistal margin.

Antennal peduncles overreaching corneal margins by 0.5–0.7 of fourth peduncular segments. Fifth, fourth and third segments unarmed; second segment with dorsolateral distal angle produced, terminating in bi- or trifold small spine, lateral margin with row of spinules, dorsomesial distal angle unarmed, but with tiny spinule or small spine displaced laterally; first segment with row of small spines on ventrolateral margin, largest usually distally. Antennal acicle triangular, reaching to nearly distal margin of fourth peduncular segment, dorsomesial margin with 3 or 4 widely-spaced spinules to row of small spines, dorsolateral margin with row of small spines increasing in size distally, with bifid terminal spinule. Antennal flagella longer than carapace, with irregularly-set fringe of long and shorter setae.

Chelipeds symmetrical [holotype of *B. profundus* missing right], rectangular in shape. Dactyl 0.6–0.8 length of palm, with moderately broad hiatus between dactyl and fixed finger; dorsal surface with few sparse tufts to median row of sparse setae, dorsomesial margin with row of small tubercles partially concealed by long setae; cutting edge with row of small, calcareous teeth, terminating in calcareous claw, prominently overlapped by fixed finger; mesial face with abundance of long setae, densest distally; ventral surface with numerous of tufts of setae. Palm slightly longer than carpus; dorsal surface very weakly convex, dorsomesial and dorsolateral margins each with row of small tubercles partially concealed by long setae, dorsal surfaces of palm and fixed finger each with irregular rows of sparse, moderately long setae; mesial, ventrolateral and ventral faces each with transverse irregular rows of setal pits and/or very sparse short setae, not concealing integument. Carpus subtriangular; dorsodistal margin prominently elevated, somewhat overhanging proximal margin of chela and with deep median cleft dividing margin into 2 unequal lobes, each with row of small spines and long fine setae; dorsal surfaces of elevated facets each with several irregular rows of small tubercles, distolateral and distomesial margins each with row of small spines or tubercles; dorsomesial and dorsolateral margins of remainder of carpus not delimited. Merus subtriangular; dorsal surface with distal margin unarmed, but with row of very small spinules or spinulose tubercles beginning subdistally in large specimens; mesial surface and margin unarmed; lateral surface with scattered tiny tubercles, sometimes forming few irregular rows; ventromesial margin not delimited, but rounded surface with numerous small tubercles. Ischium unarmed. Coxa with few tiny spinules or tubercles on ventrodistal margin.

Second and third pereopods slightly overreaching chelipeds [right third broken off at carpus in holotype of *B. profundus*]. Dactyls slightly shorter to slightly longer than propodi; mesial faces each with shallow sulcus proximally, row of moderately stiff, long setae dorsally and row of tufts of similar long, stiff setae ventrally; lateral surfaces each with median row of setae; ventral margins each with row of 18–28 tiny corneous spines or spinules. Propodi 1.1–1.4 length of carpi; unarmed but each with sparse dorsal and ventral rows of setae. Carpi without dorsodistal spinules, but sparse setae dorsally. Meri and ischia unarmed but each with few scattered setae dorsally and ventrally. Fourth pereopods semichelate; each with propodal rasp consisting of 1 row of corneous scales, 1 adjacent row of sparse tufts of setae; carpi each with dorsodistal spine. Fifth pereopods subchelate; propodal rasps well developed.

Pleon with tergite 1 calcified; tergites 2–5 similarly well calcified; tergite of pleomere 6 irregularly subquadrate, with deep oblique lateral incisions and shallow median longitudinal sulcus; terminal margin (Fig. 9A–E) unarmed or minutely denticulate, varying from entire, straight or slightly sinuous to median region slightly concave, most frequently with 2 very shallow clefts and very narrow intervening margin neither excavated nor produced, occasionally with shallow excavation. Protopods of uropods produced posteriorly, each

with terminal spine. Telson with prominent lateral sutures; anterior lobe subquadrate, with pair of shallow lateral depressions; posterior lobe with shallow median concavity, terminal margin fringed with fine setae.

Colouration. – In life, shield, cephalic appendages, chelipeds and ambulatory legs light red-orange; pleon bluish-white (Fig. 6C).

Habitat. – Sunken pieces of wood on substrates of sand and mud (Fig. 6D).

Distribution. – Philippine and Solomon Islands, Indonesia; 283–1,764 m.

Remarks. – Forest (1987a) considered *B. profundus* and *B. integer* [as *Pylocheles (Bathycheles)*] closely allied taxa, but easily distinguished by the shape of the terminal margin of the sixth pleonal tergite. Although both species were thought to be restricted to the same Indonesian-Philippine area (Forest 1987b), at the time of his study, *B. integer* was known only from depths between 355–558 m, while *B. profundus* was collected only between 750–1,570 m.

A 2004 MNHN survey of the deep submerged forests of the Solomon Islands provided a wealth of specimens of xylocolous pylochelids including 48 collected at depths between 315 and 732, possibly to 839 m that generally conformed to Forest's (1987a) description of the straight or slightly sinuous terminal margin of the sixth pleonal tergite of *P. (B.) integer*. However, six additional specimens from three stations exhibited tergites corresponding to Forest's (1987a: 76, Fig. 19b) description and illustration of the terminal margin of the holotype of *P. (B.) profundus*, which was said to be divided into two lobes by a concavity and very small median incision. These latter specimens were from depths of 458 to 750 m, possibly as deep as 841 m. Recent explorations in the Philippine Islands produced additional specimens collected in the depth range of *B. profundus* and agreeing with the general description of the species. However, as may be seen in figure (Fig. 9A–E), there is considerable variation in the terminal margin of the sixth pleonal tergite. A critical reexamination of specimens presumably assignable to both species failed to provide any reliable characters by which these taxa could be differentiated. Therefore, we must conclude that they are conspecific. Although *B. profundus* has page priority over *B. integer*, the epithet *profundus* no longer is indicative of the bathymetric distinctiveness of this species. *Bathycheles incisus* now also has been recorded at depths of 2,149 m and possible to 2,217 m. Therefore we have chosen to retain the specific name *integer* for the present taxon.

***Bathycheles crosnieri* (Forest, 1987a)**

Pylocheles (Bathycheles) crosnieri Forest, 1987a: 80, Figs. 9k–p, 10g, h, 21a–e; Forest, 1987b: 316, Fig. 3; Lemaitre et al., 2009: 5.

Type material examined. – Holotype male (7.1 mm) (MNHN-Pg 2741), VAUBAN, Stn. CH 46, 15°19.1'S 46°11.8'E, 400 m, 7 Nov.1972.

Paratypes: 1 male (6.0 mm), 1 female (8.6 mm) (MNHN-Pg 2740), VAUBAN, Stn. CH 96, 22°21.3'S 43°03.7'E, 480–500 m, 27 Nov.1972.

Other material examined. – None.

Abbreviated redescription. – Shield broader than long and longer than weakly calcified posterior carapace; dorsal surface without transverse groove subrostrally; rostrum absent, antennular lobes weakly developed, each with 1 or 2 tiny spinules; lateral projections broadly rounded, each with miniscule spinule. Ocular peduncles 0.4 length of shield; corneas slightly more than 0.3 of peduncular lengths; ocular acicles as subquadrate plates adjacent to small median, slightly raised interocular lobe. Antennular peduncles overreaching distal corneal margins by 0.4–0.5 lengths of basal segments; penultimate segments longest. Antennal peduncles overreaching distal corneal margins by approximately 0.2 of fourth peduncular segments. Antennal flagella thick, somewhat longer than carapace.

Dorsomesial margin of dactyl of each chela with row of small tubercles. Dorsal surface of palm flattened or very weakly convex, with rows of tufts of sparse, moderately long setae, dorsomesial and dorsolateral margins each with row of small tubercles partially concealed by long, dense setae. Carpus with dorsodistal margin elevated and distinctly overhanging proximal margin of chela, with median cleft dividing margin into mesial rounded and lateral subtriangular lobes, each with row of small spines or tubercles and fine long setae; dorsal surfaces of elevated facet portions each with 3 or 4 rows of small tubercles, distolateral and distomesial margins each with row of tubercles.

Second and third pereopods not overreaching chelipeds. Dactyls each with row of 9–11 minute corneous spinules on ventral margin; propodi, carpi and meri unarmed but each with dorsal and ventral rows of setae. Fourth pereopods subchelate; each with propodal rasp consisting of 1 row of corneous scales, 1 adjacent row of sparse tufts of setae. Fifth pereopods subchelate; propodal rasps well developed.

Pleon with tergite 1 calcified; tergites 2–5 similarly well calcified; tergite of pleomere 6 irregularly subquadrate, with deep lateral incisions and shallow median sulcus; terminal margin denticulate with median area produced. Uropods symmetrical; protopods produced posteriorly, each with terminal spine. Telson with prominent lateral suture; anterior lobe with pair of lateral depressions at anterior margin; posterior lobe with weakly concave terminal margin unarmed, but fringed of fine setae.

Colouration. – Not known.

Habitat. – Sunken pieces of rotting wood.

Distribution. – Known only from Madagascar; 400–480 m, possibly 500 m.

Pomatochelinae

***Pomatocheles* Miers, 1879**

***Pomatocheles stridulans* Forest, 1987a**

Pomatocheles stridulans Forest, 1987a: 127, Figs. 37a–d, 38a, b.

Type material examined. – Holotype ovig. female (2.2 mm) (MNHN-Pg 2899), BENTHEDI, Stn. F 49, 12°54.6'S 44.56.3'E, 300–450 m, 28 Mar.1977.

Other material examined. – None.

Abbreviated redescription. – Shield longer than broad and longer than weakly calcified posterior carapace; dorsal surface with short but deep transverse groove subrostrally; cervical groove moderately well defined posterolaterally. Rostrum absent, postantennular projections rounded, unarmed, not reaching to level of lateral projections; lateral projections moderately well developed, each with terminal spine. Ocular peduncles moderately short, approximately 0.7 length of shield, dorsolateral and ventral in position, somewhat laterally compressed, approximately 0.4 of peduncular lengths; ocular acicles as subquadrate plates. Antennular peduncles overreaching distal corneal margins by 0.3–0.6 lengths of penultimate segments; ultimate segment only 0.3 length of penultimate segment, unarmed; basal segment with small spine at ventrodistal angle. Antennal peduncles reaching 0.5–0.6 of ocular peduncles; fifth, fourth, and third segments unarmed; second segment with dorsolateral distal angle produced, terminating in simple or bifid spine and 1 or 2 accessory spinules, dorsomesial distal angle with small spine; first segment with spinule on lateral margin distally, ventrolateral distal margin with few small spines and 1 long, hooked spine terminally. Antennal acicles not reaching midlengths of ocular peduncles, each with bifid terminal spine and 2 or 3 small spines on mesial margin, 1 sometimes on lateral margin. Antennal flagella shorter than carapace; articles each with 1 or 2 moderately long, fine setae.

Dactyl of each chela with few relatively widely-spaced sparse setae on dorsal surface, dorsomesial margin with row of tiny tubercles. Palm with dorsal surface flattened and minutely granular, dorsomesial and dorsolateral margins each with row of quite small tubercles; mesial face with dorsal row of closely-spaced very small tubercles, left with second similar row forming incomplete arc from adjacent dorsal surface to mid-surface in distal 0.5 and 2 very short vertical rows of few tubercles distally, right with 3 short, oblique rows of tubercles; lateral faces of both each with row of moderately small tubercles dorsally. Carpus with dorsodistal facet somewhat elevated and slightly overhanging proximal margin of chela, distal margin with row of small spines or tubercles, extending mesially and laterally; dorsal surface of facet with row of very small spines extending from apex

posteriorly on dorsal crest; remainder of carpus with oblique row of 3 moderately prominent spines on dorsal surface and 1 larger spine proximally; few scattered setae; mesial, lateral and ventral surfaces unarmed, ventrodistal margin with few minute spinules. Merus with prominent spine on dorsodistal margin, dorsal margin with row of small spines; mesial, ventral and lateral faces unarmed, laterodistal margin with row of 3 or 4 acute spines distally.

Second and third pereopods with left second pereopod and dactyl and propodus of right second missing. Dactyls of third 0.2–0.3 longer than propodi; dorsal and ventral margins each with row of moderately stiff setae; mesial faces each also row of stiff setae medially and shallow longitudinal sulcus in proximal 0.2–0.3; lateral faces each with row of more widely-spaced sparse setae; propodi slightly longer than carpi, unarmed but each with dorsal and ventral rows of sparse setae; carpi each with dorsodistal spine and dorsal row of small spines, smallest on third pereopods and accompanied by sparse setae; meri each with small dorsodistal spine, dorsal surfaces each with row of spinules in proximal 0.7; ventral surfaces unarmed. Fourth pereopods semichelate; each with propodal rasp consisting of 1 row of corneous scales. Fifth pereopods weakly chelate; propodal rasps well developed.

Pleon with tergite 1 weakly calcified; tergites 2 and 3 also weakly calcified; pleomeres 4–6, uropods and telson missing.

Colouration. – Unknown.

Habitat. – Unknown.

Distribution. – Mayotte Island, SW Indian Ocean; 250–300 m, possibly to 450 m.

***Pomatocheles jeffreysii* Miers, 1879**

Pomatocheles jeffreysii Miers, 1879: 49, Pl. 3, Fig. 2, 2a–d; Terao, 1913: 390; Stebbing, 1914: 3; Kikuchi, 1932: 8; Miyake, 1960: 47, Pl. 47, Fig. 7; Miyake, 1962: 125; Miyake, 1978: 270, Pl. 112, Fig. 1; Kim & Choe 1976: 45, Fig. 2A–C; Miyake, 1978: 4, Fig. 1; Miyake, 1982: 95, Pl. 32, Fig. 1; Takeda, 1982: 55, fig. 165; Forest, 1987a: 119, Figs. 4a, 5ac, d, 7c, 32a–i, 33a–h, 34a–d, 35a–d, pls 1B, IIIC, VIIA, B; Forest, 1987b: 314, Fig. 2; Konishi & Imafuku, 2000: 66, Figs. 1, 2; McLaughlin et al., 2007c: 33, 2 unnumbered figs.; McLaughlin & Lemaitre 2008: 58; Lemaitre et al., 2009: 5.

Pomatocheles jeffreysi – Alcock, 1905: 14, 153.

Mixtopagurus jeffreysii – Balss, 1913: 35, Fig. 25, Pl. 1, Fig. 10, Pl. 2, Fig. 1; Yokoya, 1933: 71; Pérez, 1934: 25, Fig. 15; Makarov, 1938: 120, Fig. 42; Makarov, 1962: 115, Fig. 42.

Pomatocheles Jeffreysii – Boas, 1926: 46.

Pylocheles (Pomatocheles) jeffreysi – Balss, 1940: 96, Fig. 87.

Type material examined. – Lectotype [subsequent selection by Forest (1987a)] male (2.7 mm) (NHM 1878.29), 32°43'N 129°28'E, 106 m.

Paralectotypes: 2 males (2.5, 3.1 mm) (NHM 1878.29), 34°13'N 136°37'E, 88 m.

Other and material examined. – 4 males (3.8–5.9 mm), 1 ovig. females (5.4 mm) (MNHN-Pg 3491), Tosa Bay, Japan, 250–300 m, coll. K. Sakai, 3–14 Nov.1963; 5 males (2.3–5.3 mm), 2 females (2.0, 2.4 mm), 1 ovig. female (2.1 mm) (USNM 237335), ALBATROSS, Stn. 5071, 35°03.10'N 138°49.50'E, 104 m, 15 Oct.1906; 1 male (5.5 mm) (MNHN-Pg 7955), TAIWAN 2001, Stn. CP 101, 24°48.2'N 122°06.7'E, 248–257 m, 15 May 2001; 1 male (5.8 mm) (MNHN-Pg 7956), Stn. 102, 24°48.38'N 122°07.97'E, 326–331 m, 19 May 2001; 1 ovig. female (5.5 mm) (NTOU), TAIWAN 2003, Stn. CP 216, 24°34.71'N 122°04.02'E, 209–280 m 27 Aug.2003.

Abbreviated redescription. – Shield longer than broad and approximately equal to length of weakly calcified posterior carapace; dorsal surface with short but deep transverse groove subrostrally; cervical groove obscure laterally. Rostrum as bluntly subtriangular or rounded lobe, reaching to level of lateral projections; lateral projections moderately well developed, each with terminal spine. Ocular peduncles moderately short, approximately 0.7 length of shield, each partially circumscribed basally by low but distinct ridge, particularly prominent mesially; corneas dorsolateral and ventral in position, approximately 0.4 of peduncular lengths; ocular acicles as subquadrate plates. Antennular peduncles moderately short, overreaching distal corneal margins by 0.1–0.3 lengths of penultimate segments; ultimate segment very short, approximately 0.3 length of penultimate segment, unarmed; penultimate segment with 3 spines on ventral surface; basal segment with tiny spinule on statocyst lobe laterally, and small spine on ventrodistal margin. Antennal peduncles short, reaching 0.5–0.6 of ocular peduncles; fifth and fourth segments unarmed; third segment with small spine at ventrodistal margin; second segment with dorsolateral distal angle produced into multispinose lobe, dorsomesial distal angle with spinule and occasionally additional spinule on distal margin; first segment with spinule on distolateral margin ventrally, ventrolateral distal margin with few small spines. Antennal acicle short, not reaching midlength of ocular peduncle, triangular, mesial margin with row of tiny spines, 1 more prominent proximally, dorsal surface and lateral margin distally with several tiny spines or spinules. Antennal flagella shorter than carapace.

Dactyl of chela with numerous, but relatively widely-spaced tufts of sparse setae on dorsal surface, dorsomesial margin with row of tiny tubercles; ventromesial margin with row of low tubercles or protuberances. Palm with flattened or very weakly convex dorsal surface, dorsomesial and dorsolateral margins each with row of quite small tubercles, dorsal surfaces of palm and fixed finger with scattered tuft of sparse, moderately long setae; mesial face with dorsal row of closely-spaced very small tubercles and second similar row forming incomplete arc from adjacent dorsal surface to mid-surface in distal half, with upper row forming stridulatory apparatus in small specimens; lateral face with row of moderately small tubercles dorsally and few scattered tubercles ventrally. Carpus with dorsodistal margin somewhat elevated and slightly overhanging proximal margin of chela, armed with row small spines or tubercles accompanied by fine long setae; dorsomesial margin with row of 6–8 small spines, dorsal surface with few small spines or tubercles laterally,

dorsolateral margin not delimited; lateral, mesial and ventral surfaces of remainder of carpus with few scattered setae, ventral and mesial distal margins each with few tubercles or spinules. Merus with prominent spine on dorsodistal margin and row of very small spines or tubercles on dorsal margin proximally; laterodistal margin with row of 2 to several acute spines.

Second and third pereopods equaling or slightly overreaching chelipeds. Dactyls approximately 0.3 longer than propodi; dorsal and ventral margins each with row of moderately stiff setae, mesial faces each also row of tufts of stiff setae medially and shallow longitudinal sulcus in proximal 0.2–0.3, lateral faces each with row of more widely-spaced tufts of sparse setae; propodi unarmed but each with dorsal and ventral rows of tufts of sparse setae; carpi each with dorsal row of small spines, smallest on third pereopods and accompanied by tufts of sparse setae; meri with distal 0.2 often appreciably broadened, each varying from having dorsodistal spine and occasionally 1 additional small spine on dorsal surface in distal half of second pereopods to complete row following slight space from distal spine on both second and third pereopods. Fourth pereopods semichelate; each with propodal rasp consisting of 2–4 rows of corneous scales. Fifth pereopods weakly chelate; propodal rasps well developed.

Pleon with tergite 1 weakly calcified; tergites 2–5 well calcified; tergite of pleomere 6 roundly subquadrate, with deep lateral incisions and shallow median sulcus; terminal margin with 3 or 4 small subacute spines on either side of midline. Uropods with protopods produced posteriorly, but each terminally armed only with tiny corneous tubercle. Telson with prominent lateral indentations; anterior lobes with broad lateral thickenings; posterior lobes separated by shallow median cleft, terminal margins rounded, unarmed but with fringe of fine setae.

Colouration. – In life, body generally orangish-red. Ocular peduncles white or cream, each with mesial and lateral red stripe; chelipeds reddish-orange, finger tips lighter; ambulatory legs generally reddish-orange, sometimes banded reddish-orange on white or cream background (McLaughlin et al., 2007c).

Habitat. – Scaphopod shells.

Distribution. – Japan, Taiwan; 30–326 m, possibly to 331 m.

Remarks. – Forest (1987b) gave the bathymetric distribution of this species as between 30 and 200 m. The Taiwanese specimens were collected at depths ranging from 209 to 326 m.

Pomatocheles gaillardii Forest, 1987a
(Fig. 4B)

Pomatocheles gaillardii Forest, 1987a: 124, Fig. 36a–e; Lemaitre et al., 2009: 5.

Type material examined. – Holotype: male (1.4 mm) (ZMA), SIBOGA, Stn. 260, 05°36.5'S 132°55.2'E, 90 m [not seen].

Paratypes: 1 male (1.1 mm) (MNHN-Pg 4266), 1 female (1.1 mm), 1 ovig. female (1.4 mm) (ZMUC), Th. Mortensen 1922 Expedition, Stn. 53, 05°36'S 132°55'E, 85 m, 9 May 1922 [only male paratype seen].

Other material examined. – 1 ovig. female (1.8 mm) (ZRC), PANGLAO 2005, Stn. 2404, 09°30.8'N 123°41.5'E, 101–349 m, 31 May 2005.

Abbreviated redescription. – Shield as long as broad and approximately twice length of weakly calcified posterior carapace; dorsal surface with moderate to deep transverse subrostral groove; cervical groove weakly to well defined posteriorly. Rostrum produced, reaching to or slightly overreaching level of lateral projections, with 3 or 4 small spinules on bluntly rounded margin; lateral projections moderately well developed, each with terminal spine. Ocular peduncles moderately short, approximately 0.7 length of shield, each partially circumscribed basally by low but distinct ridge, particularly prominent mesially; corneas dorsolateral and ventral in position, approximately 0.4 of peduncular lengths; ocular acicles as roundly subquadrate plates. Antennular peduncles moderately short, overreaching distal corneal margins by 0.3–0.6 lengths of penultimate segments; ultimate segment unarmed and very short, approximately 0.3 length of penultimate segment; penultimate segment with 1 or 2 spines on ventral surface; basal segment with small spine on ventrodorsal margin. Antennal peduncles short, reaching 0.5–0.6 of ocular peduncles; fifth, fourth and third segments unarmed; second segment with dorsolateral distal angle produced, terminating in simple spine, with 1 or more spines laterally, dorsomesial distal angle with spine; first segment with spinule at lateral margin distally, ventrolateral distal margin with long hook-like spine. Antennal acicle short, not reaching midlength of ocular peduncle, somewhat flattened, with terminal spine and 3 or 4 adjacent small spines. Antennal flagella shorter than carapace, each article with 1 or 2 short to very short setae.

Chelipeds symmetrical or asymmetrical. Dactyl of cheliped slightly longer than palm, dorsal surface unarmed, dorsomesial margin with row of tiny tubercles or small spines. Palm with dorsal surface flattened, very weakly concave or convex, dorsomesial and dorsolateral margins each with row of very small tubercles or small spines, mesial face with dorsal row of closely-spaced, very small or tiny tubercles and second similar slightly oblique row possibly forming stridulatory apparatus in paratype, more scattered and only on left in PANGLAO female; lateral face with or without row of tiny tubercles adjacent to dorsolateral margin. Dorsodistal facet of carpus prominently elevated and slightly overhanging proximal margin of chela, with marginal row of small spines or tubercles, extending mesially and laterally; dorsal surface of facet with row of very small spines extending from apex posteriorly on dorsal crest; remainder of carpus with few moderately prominent spines on dorsal surface and 1 larger spine proximally; few scattered setae, mesial, lateral and ventral surfaces unarmed. Dorsodistal margin of merus with

spine, dorsal margin with row of spines, becoming obsolete posteriorly; ventrolateral margin with row of 3 or 4 acute spines distally.

Only two ambulatory legs present with paratype; virtually no distinction in length of ischia between second and left third pereopods. Dactyls slightly longer than propodi; dorsal and ventral margins each with few fine setae; propodi unarmed but each with dorsal and ventral sparse setae; carpi each usually with small dorsodistal spine, dorsal surfaces each with 1 or 2 small spines or minute spinules in proximal half, at least on second pereopods; meri each with 1 or 2 minute spinules on dorsal surface in proximal half or unarmed. Fourth pereopods semichelate; each with propodal rasp consisting of 1 or 2 rows of corneous scales. Fifth pereopods weakly chelate; propodal rasps well developed.

Pleon with tergite 1 weakly calcified; tergites 2–5 also weakly calcified; tergite of pleomere 6 roundly subquadrate, with shallow lateral incisions, median area marked by parallel slightly elevated, rounded ridges; terminal margin entire, unarmed. Uropods symmetrical; protopods produced posteriorly, each terminally armed small subacute spine. Telson with prominent lateral indentations; posterior lobes separated by moderately deep median cleft, terminal margins rounded, unarmed but with fringed with fine setae.

Colouration. – Shield mottled light orange and brown, with faint median longitudinal light cream stripe. Ocular peduncles brownish-orange; corneas black. Chelipeds with tips of dactyls and fixed fingers white, remainder, palms and carpi light orange; meri with distal 0.3 light orange, proximal 0.7 dark reddish-orange. Ambulatory legs with dactyls white, each with 2 faint orange bands; propodi white distally, reddish-orange proximally; carpi primarily reddish-orange; meri each light orange with whitish band in distal 0.3, dark red-orange proximally. Pleon mottled very light orange and cream; uropods very light whitish-orange; telson light orange proximally, translucent bluish distally (Fig. 4B).

Habitat. – Scaphopod (tusk) shells.

Distribution. – Kai Islands, Indonesia, Panglao, Philippine Islands; 85–101 m, possibly to 349 m.

Remarks. – The ovigerous female from Panglao is larger than any of the specimens reported by Forest (1987a: 127), having a carapace length of 1.8 mm, which may account for the differences observed between it and the male paratype examined. Most noticeable was the asymmetry of the chelipeds of the Panglao female. Although the right palm was slender with a flattened dorsal surface as in the paratype, the left was appreciably more swollen with a distinctly convex dorsal surface. Other differences included tubercles on the mesial face of only the left chela, an additional spinule on the rostral margin, only a single proximal spinule on the carpus of each second pereopod, completely unarmed meri of all ambulatory legs, and the presence of two rows of corneous spines in the propodal rasp of the right fourth pereopod (left was missing). However, both the paratype and the Panglao

specimen have the distinctive long hook-like spine on the ventrolateral margin of the first antennal segment. Although it is possible that the Panglao specimen represents a species distinct from *P. gaillardi*, we prefer to consider the Philippine specimen conspecific with that taxon, until additional material proves to the contrary. Growth related variations in spination and rows of scales in the propodal rasp have been documented for *P. jeffreysii*.

Trizochelinae

Parapylochelini

Parapylocheles Alcock, 1901

Parapylocheles scorpio (Alcock, 1894)

(Fig. 10)

Pylocheles scorpio Alcock, 1894: 244; Alcock & Anderson, 1895: Pl. 9, Fig. 7, 7a, b.

Parapylocheles scorpio – Alcock 1901: 214; Alcock, 1905: 20, Pl. 1, Fig. 1a, b; Balss, 1912: 89, Pl. 10, Figs. 1, 2, Pl. 11, Figs. 7, 8; Balss, 1924: 760; Boas, 1926: 47; Balss, 1927: 963; de Saint Laurent, 1972: 100; McLaughlin 1983a: 433; Forest, 1987a: 140, Figs. 4b, 6a, b, 7c, 39a–h, 40a–f, 41b, 42a–f, Pls. IC, IIIE, VIIC, D; Forest, 1987b: 314, Fig. 3; Lemaitre et al., 2009: 5.

Type material. – Holotype female (total length 28 mm) (ZSI), INVESTIGATOR, Stn. 116, 11°25.5'N 92°47.6'E, 740 m, 9 Dec.1890 (not seen).

Other material examined. – 1 male (8.7 mm) (MNHN-Pg 2733), MUSORSTOM 2, Stn. 40, 13°07.7'N 122°39.1'E, 440–280 m, 25 Nov.1980; 2 males (12.2, 14.7 mm) (MNHN-Pg 7957), PANGLAO 2004, Maribohoc Bay, 100–200 m, tangle nets of local fishermen, 30 May 2004; 1 male (12.1 mm), 1 female (9.8 mm) (MNHN-Pg 7958), 1 female (7.4 mm) (ZRC), Stn. P2, 9°39.0'N 123°43.8'E, 400 m, tangle nets of local fishermen, 30 May 2004; 1 female (10.6 mm) (ZRC), Balicasag, coll. P.K.L. Ng, 1–5 May 2004; 1 male (7.0 mm) (MNHN-Pg 7959), PANGLAO 2004, no data; 1 male (3.8 mm) (MNHN-Pg 7960), PANGLAO 2005, Stn. CP 2335, 09°34.3'N 123°37.8'E, 733–743 m, 22 May 2005; 1 female (8.7 mm) (MNHN-Pg 7961), Stn. CP 2343, 09°27.4'N 123°49.4'E, 273–302 m, 23 May 2005; 1 female (6.0 mm) (NMCR), Stn. CP 2350, 09°31.4'N 124°06.0'E, 738–797 m, 24 May 2005; 2 males (2.4, 3.7 mm), 1 female (7.0 mm) (MNHN-Pg 7962), Stn. CP 2358, 08°52.1'N 123°37.1'E, 569–597 m, 26 May 2005; 1 male (16.1 mm) (ZRC), Stn. CP 2360, 08°48.9'N 123°37.6'E, 357–364 m, 26 May 2005; 1 female (7.3 mm) (MNHN-Pg 7963), Stn. CP 2363, 09°06.0'N 123°25.0'E, 437–380 m, 26 May 2005; 1 female (10.4 mm) (ZRC), Stn. CP 2392, 09°30.1'N 123°41.6'E, 396–414 m, 30 May 2005.

Redescription. – Shield longer than broad, but appreciably shorter than posterior carapace; anterior margin broadened and set off laterally by short transverse grooves. Rostrum triangular, with terminal spine; lateral projections broadly triangular, each with 1 or more small spinules. Posterior carapace elongate, large central region well calcified, delimited laterally by subparallel lines; cardiac region marked by parallel line of decalcification.

Ocular peduncles 0.5–0.7 length of shield, basally swollen and approximate, distinctly separated distally and tapering to reduced corneas; corneal diameters 0.1–0.2 of peduncular lengths; dorsomesial peduncular surfaces each with few to irregular row of well calcified spines, often partially concealed by moderately short and dense setae, occasionally with 1–3 smaller spines on dorsal surface. Ocular acicles varying from contiguous, calcified, triangular and plate-like in small specimens to reduced, decalcified and partially fused in large individuals.

Antennular peduncles overreaching distal corneal margins by entire lengths of ultimate segments to 0.2–0.3 of penultimate segments; ultimate and penultimate segments unarmed; basal segment with prominent spine on distal margin of statocyst lobe, 1 or 2 spinules on ventral surface mesially.

Antennal peduncles overreaching distal corneal margins by 0.5–0.3 lengths of ultimate segments. Fifth and fourth segments unarmed but each abundantly setose; third segment with prominent ventrodorsal spine at least partially concealed by long setae; second segment with dorsolateral distal angle produced, moderately broad, somewhat flattened, with terminal margin somewhat rounded, armed with spinules extending down mesial margin, lateral margin with few spines, dorsomesial distal angle with prominent spine, occasionally 1 or 2 spinules on dorsal surface, all partially concealed by long setae; first segment with dorsolateral margin unarmed but with dense setae; ventrolateral distal margin with long, somewhat curved or hooked spine directed mesially. Antennal acicle overreaching distal corneal margin; lateral margin spinulose or spinose. Antennal flagella slightly shorter to slightly longer than carapace.

Chelipeds subequal, right slightly larger, at least in animals of shield lengths greater than 3.8 mm. Dactyl unarmed but with transverse rows of tufts of moderately long setae, densest dorsally. Palm with armature varying from row of tubercles to few widely-spaced quite small tubercles on dorsomesial margin, dorsolateral margin varying from unarmed and not delimited to row of small tubercles, dorsal surface with short transverse rows of moderate to long setae; mesial, lateral and ventral surfaces also with tufts of less dense setae. Carpus with prominent spine at dorsomesial distal angle, dorsomesial margin unarmed or with 2–4 small spinules, dorsodistal margin varying from unarmed to few quite small spinules, dorsolateral margin not delimited; surfaces all with tufts of moderate to long setae. Merus with prominent spine at dorsodistal margin and sometimes 1 or 2 spines or spinulose protuberances subdistally; ventromesial margin with row of prominent spines, surfaces all with numerous tufts of setae. Ischium also with row of spines on ventromesial margin. Armature of left cheliped usually better developed.

Ambulatory legs similar; dactyls approximately 0.6 length of propodi, each with mesial and lateral longitudinal sulcus, each also with dorsal, ventromesial and ventrolateral row of long dense setae and ventral row of 8 or 9 small to tiny corneous spinules in distal 0.3. Propodi, carpi, meri and ischia all with long setae on all surfaces, particularly dense

dorsally on propodi; carpi lacking dorsodistal spines. Meri and ischia of second pereopods each with ventral margin unarmed in small specimens, but with row of spines in larger specimens. Fourth pereopods semichelate; sternite with small median tubercle concealed by long setae. Fifth pereopods subchelate in males, chelate in females; sternite with prominent median projection directed anteriorly and obscured by long setae.

First pleonal tergite triangular and elongate anteriorly; pleura of pleomeres 2–5 reduced, not covering acetabulae of pleopods. Tergite of sixth pleomere roundly subrectangular, with oblique lateral incisions and longitudinal median

groove; surface with covering of short to moderately long setae; terminal margin varying from entire to cut by pair of submedian incisions separated by shallow concavity. Uropods each with small spine posteriorly on protopod; rasps of exopods each consisting of regular transverse rows of conical, spinulose scales; rasps of endopods less regular, but still consisting of conical, spinulose scales. Telson, appreciably longer than broad, with dorsal covering of short setae; unequally divided by faint lateral indentations, anterior portion nearly twice length of posterior, posterior lobes symmetrical; terminal margin with faint median indentation or incision concealed by long setae.



Fig. 10. *Parapylocheles scorpio* (Alcock, 1894): A, male (16.1 mm) (ZRC), PANGLAO 2005, Stn. CP 2360; B, male (3.8 mm) (MNHN-Pg 7960), PANGLAO 2005, Stn. CP 2335; C, male (3.8 mm), in wood habitat partially removed (MNHN-Pg 7960), PANGLAO 2005, Stn. CP 2335.

Colouration. – In life, overall pinkish-orange to bright orange or light red to deep rose (Fig. 10A, B).

Habitat. – Found in pieces of bamboo, fragments of wood (Fig. 10C), tusk shells and even a corn cob (Forest, 1987a, Pl. 1, Fig. C).

Distribution. – Andaman Sea, Philippine Islands; 200–925 m, possibly as shallow as 100 m.

Remarks. – Forest (1987a: 142) described *P. scorpio* as having no ocular acicles, but that at the base of each peduncle was a narrow arc partially fused with its homologue. It is uncertain if Forest's observation was based on the large, illustrated MUSORSTOM male with a total carapace length of 20 mm, or whether the smaller females from the ALBATROSS material also exhibited this condition. However, in the present PANGLAO specimens, growth influenced acicular development. In small specimens the acicles were represented by contiguous, calcified, triangular plates, but with increasing animal size they became smaller, decalcified and partially fused in both sexes.

Growth also influenced cheliped asymmetry and armature. Forest (1987a) described the right cheliped as slightly longer and broader than the left, at least in males. In males with shield lengths of 3.8 mm and less, the chelipeds were approximately equal; however, with increasing animal size, the right chelipeds became noticeably longer and broader than the left in both sexes. Similarly, the spines on the dorsomesial and dorsolateral margins of the palms increased in size and number with increasing body size, but the armature of the dorsomesial margins of the carpi decreased.

Forest (1987a: Fig. 7e) illustrated the fourth and fifth pereopods of *P. scorpio*, and his specific description reflects that illustration of the male fifth pereopod. Although he included three females in his material examined, he apparently did not notice the chelate structure of the female fifth pereopods. This difference clearly represents a dimorphic condition, as the fifth pereopods of even the smallest male (2.4 mm) are subchelate. These appendages of all the females examined are chelate.

The majority of the present material also differs from Forest's (1987a) description and illustration of the sixth pleonal tergite of *P. scorpio*. Only in the smallest males (2.4, 3.7 mm) is the terminal margin of this tergite entire. In larger specimens of both sexes, the margin is cut by a pair of small incisions; the intervening margin becomes increasingly concave with increasing body size; however, both the incisions and concavity are effectively concealed by long, moderately dense setae.

Cancellochelini

Cancellocheles Forest, 1987a

Cancellocheles sculptipes (Miyake, 1978)

Pomatocheles sculptipes Miyake, 1978: 9, Fig. 3.

Cancellocheles sculptipes – Forest, 1987a: 179, Figs. 4c, 5f, 7d, 43a–h, 44a–f, 45a–e, Pls. 1D, 3F, 7E, F; Forest, 1987b: 314, Fig. 2; Lemaitre et al., 2009: 5.

Type material examined. – Holotype male (12.4 mm) (ZLKU 9201), Tosa Bay, Japan, 200–250 m, coll. K. Sakai, 21 Jan. 1963.

Other material examined. – 1 female (11.0 mm) (MNHN-Pg 3436), off Mimase, Tosa Bay, coll. K. Sakai, 4 Feb. 1963.

Redescription. – Shield considerably broader than long, but still slightly longer than moderately well calcified posterior carapace; dorsal surface with very weak transverse groove subrostrally. Cervical groove well defined laterally. Rostrum very elongate, acutely triangular, reaching proximal 0.3 of ocular peduncles, terminating in corneous-tipped spine and with well developed, corneous-tipped subrostral spine. Lateral projections roundly triangular, not well developed, unarmed or with terminal spinule. Posterior median plate moderately broad, moderately calcified, sulci cardiobranchialis not delineated but area similarly calcified. Branchiostegites marginally calcified anteriorly; dorsal margins distally and anterior margins each with several spinules.

Ocular peduncles approximately 0.4 length of shield, corneas approximately 0.2 of peduncular lengths, surfaces with numerous tufts of setae. Ocular acicles as narrow, subrectangular plates; separated by breadth of rostrum.

Antennular peduncles overreaching distal corneal margins by 0.4–0.5 lengths of penultimate segments. Ultimate segment slightly longer than penultimate segment, both unarmed. Basal segment with spine on statocyst lobe laterally, and 2 spines on laterodistal margin.

Antennal peduncles overreaching ocular peduncles by 0.4–0.5 length of ultimate peduncular segments. Fifth and fourth segments unarmed; third segment with minute tubercle at ventrodistal margin; second segment with dorsolateral distal angle produced into multispinose lobe, dorsomesial distal angle with “fan” of several small spines; first segment with spinule at ventrolateral margin distally, ventrodistal margin with few spinules laterally. Antennal acicle short, reaching distal margin of fourth peduncular segment, broadly triangular, mesial margin with row of spines, terminating in trifold spine; dorsal surface with few minute tubercles; lateral margin unarmed. Antennal flagella broken, but remaining articles each with 2 or 3 short setae and 1 or 2 long setae every 4–6 articles.

Chelipeds equal and symmetrical, subtriangular in shape. Dactyl slightly shorter than palm, with moderately broad hiatus between dactyl and fixed finger; dorsal surface with numerous, small tuberculate spines and tufts of long setae,

dorsomesial margin with row of tuberculate, often corneous-tipped spines; cutting edge with 2 widely-spaced calcareous teeth, terminating in large corneous claw; mesial and ventral surfaces with tufts of sparse setae. Palm longer than carpus; dorsal surface flattened, dorsomesial margin with row of tuberculate, often corneous-tipped spines, partially concealed by long setae, dorsal surface with numerous small tubercles and tuberculate spines, decreasing in size on lateral face and partially obscured by long setae; dorsolateral margin not delimited; mesial face with few tiny tubercles near distal margin. Dorsodistal margin of carpus with row small tuberculate spines and long setae; dorsomesial margin with row of 4 or 5 corneous-tipped spines, dorsal surface with numerous small spines or tubercles, dorsolateral margin not delimited; lateral face with row of tubercles on distal margin and second subdistal row. Merus with small spine on dorsal margin distally and row of very small spinulose tubercles proximally; mesial and ventral surfaces unarmed; lateral face with scattered tiny tubercles, ventromesial and ventrolateral margins each with irregular row of small acute or subacute spines. Ischium with row of tubercles on ventromesial margin, ventral surface with several granules.

Second and third pereopods dissimilar. Second pereopods somewhat overreaching chelipeds, with distal segments modified to form operculum with chelipeds. Dactyls approximately equaling lengths of propodi, cylindrical, circumscribed by irregular rows of short, stiff setae and few scattered tubercles. Propodi roundly subrectangular; dorsal surfaces flattened, margins each with row of corneous-tipped, tuberculate spines, dorsal surfaces each with few scattered tubercles and numerous tufts of long, stiff setae, at least partially concealing surface integument; lateral faces each with median row of tufts of short setae; mesial and ventral surfaces unarmed and with only very sparse setae. Carpi similarly roundly subrectangular in shape; each with dorsomesial and dorsolateral row of corneous-tipped spines, dorsal surface with irregular rows of smaller corneous-tipped spines concealed by tufts of long setae; lateral faces each with shallow longitudinal sulcus lined with tufts of short setae; mesial and ventral surfaces only with very sparse setae. Meri broadened dorsally, dorsodistal margins each with 2 or 3 spines, sometimes corneous-tipped, dorsolateral margins weakly delimited by few spinulose tubercles proximally, dorsomesial margins rounded; ventromesial margins each with row of small spinulose tubercles, ventrolateral margins unarmed except for 1 or 2 small tubercles near proximal margin. Ischia each with row of spines on ventromesial margin. Third pereopods approximately equaling lengths of chelipeds. Dactyls cylindrical; surfaces circumscribed with few rows of tufts of sparse, short setae. Propodi somewhat laterally compressed; dorsal and ventral surfaces each with tufts of moderately long setae, densest dorsally; lateral faces each with longitudinal row of widely-spaced tufts of setae; mesial faces with few setae. Carpi each with row of tiny spinules and tufts of setae on dorsal surface; lateral faces each with weak longitudinal sulcus lined with sparse tufts of setae; mesial and ventral surfaces with sparse setae. Meri unarmed but with tufts of setae, particularly dorsally. Ischia unarmed. Fourth pereopods semichelate; each with propodal

rasp consisting of many rows of corneous scales. Fifth pereopods subchelate in male, chelate in female; propodal rasps well developed.

Pleon with tergite 1 broad, well calcified; tergites 2–5 also well calcified; tergite of pleomere 6 subcircular, with deep oblique lateral incisions and shallow median sulcus; terminal margin entire, unarmed. Uropods symmetrical; protopods unarmed. Telson with lateral margins entire, no division into anterior and posterior lobes; terminal margin entire, unarmed but with fringe of fine setae.

Colouration. – In life, uniformly light rose (after Miyake, 1978)

Habitat. – Unknown

Distribution. – Known only from Tosa Bay, Japan; 200–360 m.

Trizochelini

Forestocheles, new genus

Forestocheles perplexus (Forest, 1987a) new combination (Fig. 2)

Trizochelies perplexus Forest, 1987a: 208, Figs. 47f, 59e, 66f; Forest, 1987b: 315, Fig. 2; Forest & McLaughlin, 2000: 41, Figs. 8, 9; Lemaitre et al., 2009: 5.

Type material. – Holotype female (mutilated) (NIWA 7515), NZOI, Stn. K583, 41°10.4'S 173°10.0'E, depth unknown, 1 Oct.1972 (not seen).

Other material examined. – 1 female (3.6 mm) (NIWA), NZOI, Stn. K830, 29°11.5', 177°53.0'W, 545–590 m, 26–27 Jul.1974; 3 males (3.0–3.8 mm), 1 female (4.9 mm) (MNHN-Pg 5835), Stn. K840, 30°17.6'S 178°25.3'W, 398–412 m, 28 Jul.1974.

Redescription. – Shield slightly longer than broad to broader than long, considerably longer than poorly calcified posterior carapace; dorsal surface without transverse groove subrostrally; shield lateral margins without small spine in shallow indentation in proximal 0.5. Posterior median plate weakly delineated but relatively broad, very weakly calcified; sulci cardiobranchialis not apparent. Branchiostegites faintly calcified only at anterodistal angle; dorsal margin unarmed, few spinules on anterior margin. Rostrum triangular, with minute or tiny marginal spinule, usually overreaching level of lateral projections. Lateral projections well developed, each with small to moderately prominent marginal spine.

Ocular peduncles 0.6–0.7 of shield; corneal diameter 0.3 of peduncular length; ocular acicles small, terminally acute or with small terminal spine.

Antennular peduncles overreaching distal margins of corneas by 0.2 to nearly entire lengths of ultimate segments. Ultimate

and penultimate segments of approximately equal length; basal segment with prominent spine on statocyst lobe laterally and similar spine at ventrodistal angle.

Antennal peduncles not reaching to corneal bases to extending slightly beyond. Fifth segment unarmed; fourth segment with tiny spinule at dorsodistal margin; third segment with prominent spine at ventrodistal angle; second segment with dorsolateral distal angle produced, terminating in bifid spine, frequently with accessory spine laterally, dorsomesial distal angle with small spine; first segment with prominent spine on lateral surface distally; ventrodistal margin with 3 or 4 large spines. Antennal acicle long and slender, reaching at least to distal 0.2 of fifth peduncular segment, with simple or bifid tip, lateral margin with 1 or 2 spines.

Chelipeds subequal; propodal-carpal articulation rotated approximately 45°. Dactyl same length or little shorter than palm; dorsal margin with row of stout spines decreasing in size distally and tufts of stiff setae, dorsal surface with few protuberances and tufts of setae; cutting edge with row of calcareous teeth, terminating in prominent corneous claw. Palm with row of 6 corneous-tipped spines on upper margin, slightly decreasing in size distally; remainder of palm with only rows of tufts of setae and few low protuberances on outer surface of fixed finger; cutting edge with row of small calcareous teeth, terminal claw very well developed, occupying slightly more or slightly less than 0.3 of cutting edge. Carpus with 2 or 3 large corneous-tipped spines on upper margin, usually 1 small spine adjacent to distal margin on outer face, surface without stridulatory rods or tubercles. Merus with 1–4 widely-spaced tiny tubercles on ventromesial margin; ventrolateral margin unarmed or occasionally with 1 small tubercle. Ischium with 1 or 2 widely-spaced spines on ventral margin.

Second and third pereopods moderately long and slender. Dactyls shorter than or equal in length to propodi; surfaces all with few widely-spaced tufts of sparse setae; ventral margins each with 3 or 4 corneous spines. Propodi with few tufts of sparse setae dorsally and ventrally; no stridulatory tubercles on mesial faces of second pereopods. Carpi each with 3 or 4 widely-spaced small spines on dorsal margin, no stridulatory tubercles on mesial face; very small dorsodistal spine on each third pereopod. Meri and ischia unarmed but with sparse, scattered short setae.

Pleonal tergites all with weak calcification. Sixth tergite roundly subquadrate, with deep lateral incisions and shallow median groove; terminal margin straight, entire. Telson slightly to considerably broader than long and lacking division into anterior and posterior portions; terminal margin straight or with slight median indentation.

Colouration. – Unknown.

Habitat. – Unknown.

Distribution. – Apparently endemic to New Zealand; 398–540 m, possibly to 590.

***Trizocheles* Forest, 1987a**

***Trizocheles mendanai*, new species** (Figs. 11, 12)

Trizocheles n. sp. C. – Lemaitre et al., 2009: 5.

Type material examined. – Holotype: male (5.1 mm) (MNHN Pg 7964), SALOMON 2, Stn. CP 2260, 08°03.5'S 156°54.5'E, 399–427 m, 3 Nov.2004.

Paratypes: 1 male (4.2 mm), (MNHN Pg 8056), CP 2261, 08°01.9'S, 156°54.1'E, 433–470 m, 3 Nov.2004; 2 males (4.9, 5.3), 3 females (4.2–5.6 mm), 1 ovig. female (5.0 mm) (MNHN-Pg 7965), same data as holotype.

Etymology. – Named for the Spanish explorer Álvaro de Mendaña, discoverer, in 1568, of the Solomon Islands, the only locality presently known for the species.

Description. – Shield (Fig. 11A) broader than long, and longer than moderately calcified posterior carapace; dorsal surface with transverse groove subrostrally; lateral margins each with unarmed shallow indentation in proximal half; cervical groove clearly delineated laterally. Rostrum broadly triangular, with terminal spine, reaching or overreaching level of lateral projections. Lateral projections well developed, each with prominent marginal spine. Posterior median plate weakly delineated, relatively broad anteriorly and narrowing posteriorly, moderately calcified; sulci cardiobranchialis not apparent. Branchiostegites calcified only dorsally and at anterior margin; dorsal margin unarmed, 1 or 2 spinules usually at dorsodistal angle, few small spines occasionally on anterior margin.

Ocular peduncles 0.5–0.6 length of shield; corneas 0.4 of peduncular lengths. Ocular acicles small, triangular, each with prominent terminal spine; separated by more than basal width of one acicle.

Antennular peduncles overreaching distal corneal margins by 0.7–0.9 lengths of ultimate segments. Ultimate segment equal in length to penultimate segment; basal segment with spine on statocyst lobe laterally and prominent spine at ventrodistal margin.

Antennal peduncles reaching basal corneal margins to reaching midlengths of corneas. Fifth segment unarmed; fourth segment with spine at dorsodistal margin; third segment with spine at ventrodistal margin; second segment with dorsolateral distal angle produced, terminating in bifid spine, with or without 1 small spine on lateral face, dorsodistal margin with rounded protuberance, dorsomesial distal angle with small spine; first segment with spine on lateral margin distally, ventrolateral margin with 1 or 2 spines. Antennal acicle reaching to midlength of ocular peduncle, terminating in bifid spine, mesial and lateral margins each with or without spine, Antennal flagella shorter than carapace; each article with few long and short setae.

Chelipeds (Fig. 11B) generally equal and symmetrical; with propodal-carpal rotation of approximately 45°. Dactyl 0.7–0.8 length of palm, with very slight hiatus between dactyl and fixed finger; upper margin with row of spines decreasing in size distally and not extending to tip, accompanied by numerous long setae; outer face with similar row of spines and setae, also not extending to tip; cutting edge with row of calcareous teeth, sometimes somewhat fused, terminating in moderately large corneous claw; inner face with few low protuberances and tufts of setae. Palm 1.5–1.7 longer than carpus; outer surface convex, upper margin with row of prominent large spines, outer surface of palm with 3 rows of large to moderately small spines, accompanied by tufts of long setae, outermost row extending onto fixed finger and frequently increasing in size, occasionally few additional small spines adjacent to articulation of dactyl and fixed finger; inner and ventral faces each with few tufts of setae. Carpus subtrapezoidal; dorsomesial margin with 3 or 4 large spines, dorsal surface with 7–10 smaller spines; lateral face with rows of stridulatory tubercles; mesial surface smooth, ventral surface frequently with row of small spinules or tubercles on distal margin. Merus subtriangular; dorsal margin with small distal spine and frequently subdistal transverse row of spinules, remainder of dorsal surface with 1 or 2 rows of spinules or spinulose protuberances, becoming obsolete near proximal margin, ventral and lateral surfaces unarmed, ventromesial margin with row of small spines or tubercles

and occasionally additional adjacent row on mesial surface ventrally; ventrolateral margins with 1 or 2 small spines distally. Ischium with row of small spines on ventromesial margin.

Second and third pereopods (Fig. 12A–C) slightly overreaching chelipeds; dissimilar in armament. Dactyls approximately equal to lengths of propodi; dorsal surfaces each with row of tufts of long setae; mesial and lateral faces each also with 1 or 2 rows of much sparser setae; ventral margins each with 6 or 7 corneous spines and row of tufts of setae. Propodi 1.2–1.3 longer than carpi; dorsal margins each with short, transverse rows of tufts of moderately long setae, dorsodistal margins of second pereopods each with 1 small spine, third unarmed; mesial faces of second pereopods each with cluster of stridulatory tubercles centrally in proximal portion or longitudinal row in midline and single or double row of small spinules or tubercles adjacent to dorsal margin, third unarmed; ventral surfaces each with row of low protuberances and tufts of sparse setae and 1 corneous spinule near distal margin; lateral faces of second pereopods each with row of tubercles or small spine adjacent to upper margin, third unarmed. Carpi of second pereopods each with dorsal row of spines, not concealed by tufts of long setae, third usually with dorsodistal spine and tufts of setae, occasionally spine absent, mesial faces of second pereopods each with row of short stridulatory ridges. Meri with only dorsal and ventral

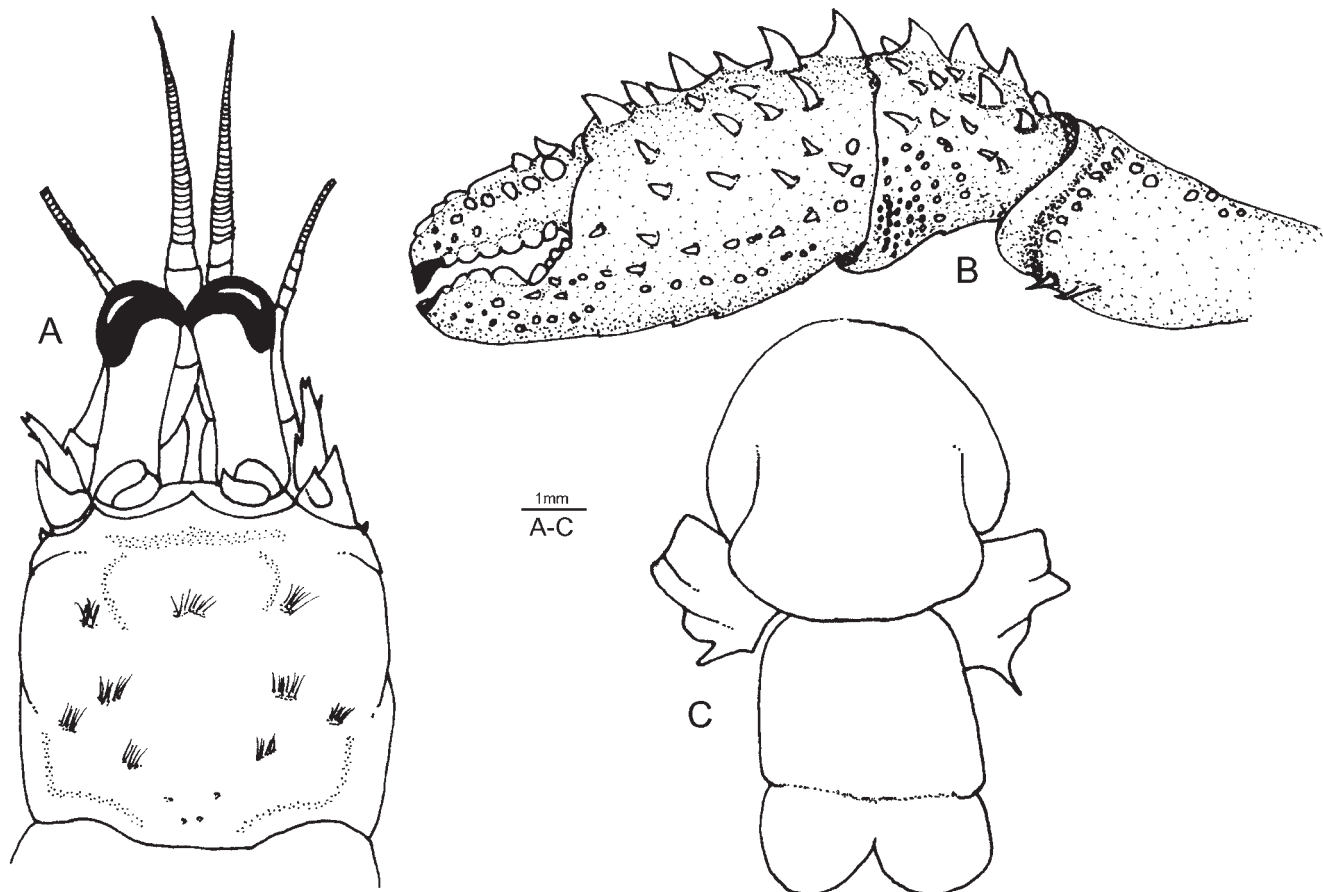


Fig. 11. *Trizocheles mendanai*, new species. Paratype, female (5.2 mm) (MNHN-Pg 7965), SALOMON 2, Stn. CP 2260: A, shield and cephalic appendages; B, left cheliped (outer face); C, tergite of sixth pleonal segment and telson (dorsal face, setae omitted).

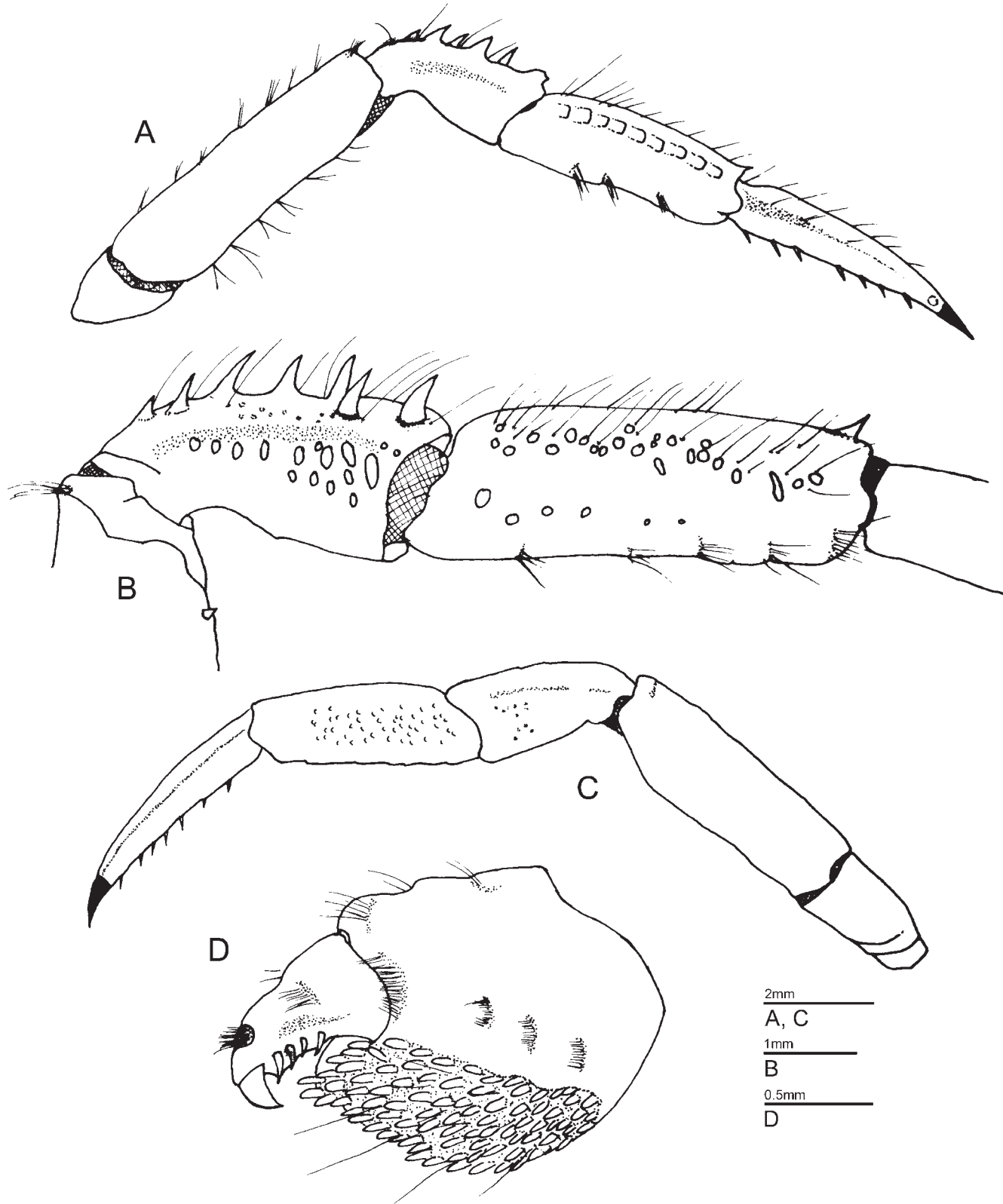


Fig. 12. *Trizocheles mendanai*, new species. Paratype, female (5.2 mm) (MNHN-Pg 7965), SALOMON 2, Stn. CP 2260: A, right second pereopod (lateral view); B, carpus and propodus of left second pereopod (mesial view); C, left third pereopod (lateral view, setae omitted); D, dactyl and propodus of left fourth pereopod (lateral view).

tufts of setae except for row of very small tubercles or spinules on ventral margin of each second pereopod. Fourth pereopods (Fig. 12D) semichelate; each with propodal rasp consisting of several rows of corneous scales. Fifth pereopods weakly chelate; propodal rasps well developed.

Pleon with tergite 1 moderately well calcified; tergites 2–5 chitinous or weakly calcified, pleura faintly delineated; tergite of pleomere 6 (Fig. 11C) roundly subquadrate, with deep lateral incisions and shallow median sulcus; terminal margin entire or with tiny lateral incisions, unarmed. All tergites and telson with covering of setae. Uropods symmetrical; protopods produced posteriorly, each with prominent spine. Telson (Fig. 11C) with faint lateral indentations dividing telson into unequal anterior and posterior portions; posterior lobes approximately 0.3 of anterior portion, separated by moderately deep median cleft, terminal margins rounded, unarmed but with fringe of fine setae.

Colouration. – Unknown.

Habitat. – Unknown.

Distribution. – Solomon Islands; 399 m, possibly to 427 m.

Remarks. – *Trizocheles mendanai*, new species, is set apart from all other members of the genus by the armature of the propodi of the second pereopods. Unlike other trizochelid species in which the dorsal surfaces of the propodi are armed with spines, these spines in *T. mendanai* are arranged in one or two irregular rows on the lateral faces near the dorsal margins.

Trizocheles spinosus (Henderson, 1888)

- Pylocheles spinosus* Henderson, 1888: 101, Pl. 11, Fig. 1; Stebbing, 1893: 1, Pl. 7.
Mixtopagurus (Pylocheles) spinosus – A. Milne-Edwards & Bouvier, 1893: 23.
Mixtopagurus spinosus – Ortmann, 1898, Pl. 118, Fig. 8; Alcock, 1905: 153; Boas, 1926: 39; Probert et al., 1979: 381.
Pomatocheles spinosus – Stebbing, 1914: 2.
Mixtopagurus n. sp. – Batham, 1970: 45, Fig. 1, Pl. 1; Schembri & McLay, 1983: 28, Fig. 3.
Mixtopagurus sp. nov. – Schembri, 1982: 863, Figs. 1, 2.
Trizocheles spinosus spinosus – Forest, 1987a: 202, Figs. 47d, 66g, 69c, 70; Forest, 1987b: 315, Fig. 2; Forest & McLaughlin, 2000: 44, Figs. 10b, 11, 12f–h, 13j, k; McLaughlin & Lemaitre, 2008: 53, Figs. 1, 2, 4H; Lemaitre et al., 2009: 5.
Trizocheles spinosus bathamae Forest & de Saint Laurent, 1987: 205, Figs. 4b, 6c, d, 47e, 66i, 69d, 71a, b, Pl. II A, III D, V C–E; Forest, 1987b: 315, Fig. 2; Forest & McLaughlin, 2000: 49, Figs. 10a, 12a–e, 13f–i, Pl. 1, Fig. 1.
 Not *Pylocheles spinosus* – Ortmann, 1892: 274; Terao 1913: 391 = *Trizocheles sakaii* Forest, 1987a.
 Not *Mixtopagurus spinosus* – Balss, 1913: 34; Yokoya, 1933: 70; Miyake, 1947: Fig. 2145 = *Trizocheles sakaii* Forest, 1987a.
 Not *Pomatocheles spinosus* – Miyake, 1965: 640, Fig. 1065; Miyake, 1978: 7, Fig. 2; Miyake, 1982: 95, Pl. 32, Fig. 2 = *Trizocheles sakaii* Forest, 1987a.

Type material examined. – Lectotype of *Trizocheles spinosus* [subsequent selection by Forest 1987a] male (4.3 mm) (NHM 1888: 33), CHALLENGER, Stn. 163A, Twofold Bay, 36°59'S 150°20'E, 274 m, 4 Apr. 1874. Holotype of *Trizocheles spinosus bathamae* ovig. female (5.8 mm) (NMNZ Cr 9557), Stn. MU 0-45, Papanui Canyon off Otago Peninsula, 490–540.

Paralectotypes of *Trizocheles spinosus*: 3 males (3.4–3.9 mm), 3 ovig. females (4.5–5.7 mm) (NHM 1888.33), same data as lectotype. Paratypes of *Trizocheles spinosus bathamae*: 2 ovig. females (5.1, 6.1 mm) (NIWA 9421), 3 males (5.1–5.8 mm) (MNHN-Pg 3492), same data as holotype.

Other material examined. – 1 ovig. female (4.4 mm) (MNHN-Pg 3685), R.V. NIMBUS, Stn. 55, 26°27'S 153°50'E, 270–272, coll. A.J. Bruce, 5 Aug. 1968; 1 ovig. female (3.8 mm) (NIWA), R.V. KAHAROA, Stn. Q24, 44°29.7'S 176°33.7'W, 300 m, 23 Mar. 1978; 1 female (3.8 mm) (NIWA), Stn. Y18, 46°01.7'S 165°38.7'E, 440 m, 13 Mar. 1997; 1 male (8.2 mm) (NIWA), Stn. Z9001, 37°27.89'S 177°09.1'E, 205–228 m, 20 Jan. 1998; 1 ovig. female (6.6 mm) (NIWA 43797), Stn. Z9852, 37°28.15'S 177°06.71'E, 250–310 m, 5 Jun. 1999; 1 female (5.7 mm) (MNHN-Pg 7966), SMIB 1, Stn. DW 2, 22°51.3'S 167°13'E, 415 m, 5 Feb. 1986; 1 female (2.1 mm) (MNHN-Pg 7967), SMIB 3, Stn. DW 3, 24°55.00'S 168°21.70'E, 513 m, 20 May 1987; 1 ovig. female (6.0 mm) (MNHN-Pg 7968), Stn. CP 4, 24°54.00'S 168°21.50'E, 530 m, 2 May 1987; 1 male (5.4 mm) (MNHN-Pg 7969), SMIB 4, Stn. DW 36, 24°55.6'S 168°21.7'E, 530 m, 7 Mar. 1989; 1 male (2.4 mm) (MNHN-Pg 7970), SMIB 8, Stn. DW 147, 24°54.9'S 168°21.8'E, 508–532 m, 27 Jan. 1993; 1 male (6.7 mm), 1 female (3.7 mm), 1 ovig. female (2.9 mm) (MNHN-Pg 7971), Stn. DW 150, 24°54'S 168°22'E, 519–530 m, 27 Jan. 1993; 1 male (2.9 mm) (MNHN-Pg 7972), Stn. DW 152, 24°54.3'S 168°22.2'E, 514–530 m, 27 Jan. 1993; 1 male (4.2 mm) (MNHN-Pg 7973), Stn. DW 154, 25°45.4'S 168°08.4'E, 235–252 m, 28 Jan. 1993; 1 ovig. female (4.9 mm) (MNHN-Pg 7974), BIOCAL, Stn. DW 8, 20°34'S 166°54'E, 435 m, 12 Aug. 1985; 1 male (4.5 mm), 1 ovig. female (5.7 mm) (MNHN-Pg-3514), Stn. CP 67, 24°55.4'S 168°21.5'E, 500–510 m, 3 Sep. 1985; 2 ovig. females (2.5, 2.9 mm) (MNHN-Pg 3513), Stn. DW 66, 24°55.4'S 168°21.7'E, 515–505 m, 3 Sep. 1985; 2 ovig. females (3.9, 4.1 mm) (MNHN-Pg 7975), CHALCAL 2, Stn. DW 72, 24°54.5'S 168.22.3'E, 527 m, 28 Oct. 1986; 1 male (3.2 mm), MNHN-Pg 7976), Stn. DW 73, 24°39.9'S 168°38.1'E, 573 m, 29 Oct. 1986; 1 male (3.0 mm), 1 ovig. female (4.8 mm) (MNHN-Pg 7977), Stn. DW 74, 24°40.36'S 168°38.38'E, 650 m, 29 Oct. 1986; 1 female (2.3 mm), 1 ovig. female (3.7 mm), (MNHN-Pg 7978), Stn. DW 75, 24°39.31'S 168°39.67'E, 600 m, 29 Oct. 1986; 1 male (2.6 mm), 1 ovig. female (2.9 mm) (MNHN-Pg 3515), MUSORSTOM 4, Stn. DW 197, 18°51.3'S 163°21.0'E, 550 m, 20 Sep. 1985; 1 ovig. female (4.1 mm) (MNHN-Pg 7979), MUSORSTOM 5, Stn. 338, 19°51.6'S 158°40.40'E, 540–580 m, 15 Oct. 1986; 1 ovig. female (2.6 mm) (MNHN-Pg 7980), MUSORSTOM 6, Stn. DW 406, 20°40.65'S 167°06.80'E, 373 m, 15 Feb. 1989; 1 female (3.1 mm), (MNHN-Pg 7981), BATHUS 3, Stn. DW 838, 23°01'S 166°56'E, 400–402 m, 30 Nov. 1993; 1 female (4.5 mm) (MNHN-Pg 7982), BATHUS 4, Stn. DW 903, 18°59.93'S 163°13.55'E, 386–400 m, 4 Aug. 1994; 1 male (4.5 mm) (MNHN-Pg 7858), 1 ovig. female (4.5 mm) (MNHN-Pg 7983), Stn. DW 923, 18°51.51'S 163°24.17'E, 502–470, 6 Aug. 1994; 1 ovig. female (4.3 mm) (MNHN-Pg 7984), HALIPRO 1, Stn. CP 877, 23°03'S 166°59'E, 464–480, 31 Mar. 1994.

Redescription. – Shield broader than long, and longer than moderately calcified posterior carapace; dorsal surface with long, deep transverse groove subrostrally; lateral margins each usually with small spine in proximal half; cervical groove usually moderately well delineated laterally. Rostrum

broadly and roundly triangular, usually with prominent terminal spine, reaching to or slightly overreaching level of lateral projections. Lateral projections well developed, each with prominent marginal spine. Posterior median plate moderately broad anteriorly, narrowing posteriorly, and moderately calcified; sulci cardiobranchialis not apparent. Branchiostegites weakly calcified only anteriorly and dorsally; dorsal margin with few spinules distally and 1 or 2 spinules on anterior margin.

Ocular peduncles 0.6–0.7 length of shield; corneas 0.3–0.4 of peduncular lengths; ocular acicles, triangular, terminally acute.

Antennular peduncles overreaching distal corneal margins by 0.2–0.5 lengths of ultimate peduncular segments; ultimate segment equal in length to penultimate segment; basal segment with spine on statocyst lobe laterally and at ventrodistal margin.

Antennal peduncles reaching to or nearly to bases of corneas. Fifth segment unarmed; fourth segment with prominent spine at dorsodistal margin; third segment with spine at ventrodistal margin; second segment with dorsolateral distal angle produced, with terminal bifid spine, 1 small spine on dorsal surface, dorsomesial distal angle with spine; first segment with small spine on dorsodistal margin laterally, ventrolateral margin with 2 small spinules distally. Antennal acicle reaching slightly beyond midlength of ocular peduncle, terminating in bifid spine, mesial margin unarmed or with 1 small spine, lateral margin with 1 spine in distal half. Antennal flagella slightly longer than carapace; usually 1 or 2 short or moderately long setae every 1–4 articles.

Chelipeds generally subequal and symmetrical; with propodal-carpal rotation of approximately 45°. Dactyl approximately 0.8 length of palm, with slight hiatus between dactyl and fixed finger; upper outer margin with row of tuberculate spines, decreasing in size distally; outer face with row of larger blunt spines or tubercles and tufts of setae; cutting edge with 2 or 3 broad calcareous teeth, terminating in large corneous claw; inner face with 1 tubercle proximally and few tufts of setae. Palm approximately 2.0 longer than carpus; outer surface convex, upper margin with row of large spines, outer surface of palm with 2 rows of large spines alternating with 2 rows of much smaller spines, irregular row of small tubercles proximally, becoming irregular single or double row of much larger tubercles on fixed finger, latter also with few tufts of moderately stiff setae; inner surface with few tubercles dorsally; ventral surface unarmed. Carpus subtrapezoidal; dorsomesial margin with 2 large and 1 (rarely 2) smaller spines, dorsal surface with 3 or 4 smaller spines and several spinulose tubercles; lateral face with covering of stridulatory ridges and rods; mesial face with few tubercles; ventral surface smooth. Merus subtriangular; dorsal margin with prominent spine distally and subdistal row of spinulose protuberances, decreasing in size proximally; mesial and ventral faces unarmed; lateral face somewhat granular, also with subdistal transverse row of small tubercles; ventrolateral margin with short row of

small, often subacute, spines distally; ventromesial margin with row of small spines. Ischium with row of prominent spines on ventromesial margin.

Second and third pereopods usually equaling length of chelipeds. Dactyls approximately same length as propodi; dorsal surfaces each with short transverse rows of moderately long setae; ventral margins each with 5 or 6 corneous spines; mesial and lateral faces each with 1 or 2 rows of tufts of setae. Propodi approximately as long as carpi; dorsal margins each with row of acute large spines, only slight smaller on third pereopods; mesial faces each with irregular rows of short stridulatory ridges or tubercles in proximal halves (second pereopods) or unarmed (third); ventral surfaces each with row of low protuberances and setae, occasionally corneous spine at distal margin; lateral faces unarmed. Carpi each with dorsal row of spines, prominent on second pereopods, smaller and fewer in number on third and sparse setae; mesial faces of second pereopods each with row of short stridulatory ridges. Meri with few setae on dorsal margins, third with or without dorsodistal spine; ventral margins each with row of small spinules (second pereopods) or low protuberances (third). Ischia each with row of spinules (second) or low protuberances (third) on ventromesial margin. Fourth pereopods semichelate; each with propodal rasp consisting of several rows of corneous scales; propodi and carpi each with dorsodistal spine. Fifth pereopods chelate; propodal rasps well developed.

Pleon with tergite 1 moderately well calcified; tergites 2–5 weakly calcified, pleura faintly delineated; tergite of pleomere 6 subcircular, with deep oblique lateral incisions, terminal margin with long, shallow strip of decalcification, unarmed. All tergites and telson with covering of short setae. Uropods symmetrical; protopods produced posteriorly, each with prominent spine. Telson with faint lateral indentations dividing telson into unequal anterior and posterior portions; posterior lobes approximately 0.3 length of anterior portion, separated by deep median cleft, terminal margins rounded, unarmed but with fringe of fine setae.

Colouration. – In life, predominantly orange, with chelipeds and ambulatory legs mottled and barred white and orange. Ocular peduncles light orange and corneas brown. Antennules and antennae translucent and iridescent yellow-orange. Carapace whitish with diffuse orange blotches; pleon whitish with pair or orange spots anteriorly on each tergite; uropods pearly white; telson pearly white anteriorly, translucent posteriorly (after Batham, 1970).

Habitat. – Sometimes gastropod shells; frequently sponges and occasionally serpulid worm tubes (Forest, 1987a, Forest & McLaughlin, 2000, personal observations).

Distribution. – Australia, New Zealand, New Caledonia; 205–650 m.

Remarks. – Although first identified by Forest in correspondence with the late E.J. Batham as a new species of *Mixtopagurus* (Batham, 1970), its similarity to Henderson's

(1888) *Pylocheles spinosus* was soon recognized and the taxon subsequently was described by Forest & de Saint Laurent (in Forest, 1987a) as *Trizocheles spinosus bathamae*. These latter authors distinguished *T. s. bathamae* from the nominal subspecies by the proportions of the ocular peduncles and corneas, the smaller terminal spinule on the rostrum, the denser setation on the dorsal surfaces of the chelipeds and the more slender spines on the carpi and propodi of the second and third pereopods. Although Forest & de Saint Laurent examined 44 specimens from New Zealand, and an additional five from New Caledonia also identified as *T. s. bathamae*, they had only the five syntypes and one supplemental specimen of *T. s. spinosus* for comparison. Those specimens were all collected in Australian waters. Forest & McLaughlin (2000) found one specimen identifiable as *T. s. spinosus* in New Zealand's Bay of Plenty and numerous specimens agreeing with *T. s. bathamae* in eastern New Zealand's waters from East Cape in the north to Puysegur Point in the south and in the Chatham Islands. Forest & McLaughlin reported variation in slenderness of the spines in *T. s. bathamae*, but still considered the reduction in the size of the rostral spinule, enlargement of the corneas and pilosity of the chelipeds diagnostic for the subspecies.

We have examined one additional specimen from the Bay of Plenty, and 31 from 22 stations in New Caledonia. A few agreed with the description of *T. s. bathamae* in having a markedly reduced rostral spinule and abundant setae on the chelipeds; two were found occupying gastropod shells. However, the majority of specimens were identifiable as *T. s. spinosus*. Shield lengths (equaling approximately 65% of total carapace lengths) ranged from 2.4 to 6.0 mm and corneal diameters varied between 0.3 and 0.4 of the peduncular length. Females were ovigerous as small as 2.9 mm in shield length and as large as 6.0 mm. Among these 32 specimens (10 males, 6 females and 15 ovigerous females) no morphological, bathymetric or geographic data were found that would unequivocally distinguish these two subspecies. Therefore, we must conclude that recognition of two distinct taxa cannot be justified.

One male (3.2 mm) was observed to have the vasa deferentia protruded from both gonopores; spermatophores were apparent. This condition is viewed as an artifact caused by preservation shock, rather than indicative of sexual tube development, which has not been documented for any pylochelid species.

***Trizocheles hoensonae*, new species**
(Figs. 13, 14)

Trizocheles balssi – Forest, 1987a: 196 (in part), Figs. 47c, 66a, 67a, b, 69a, b; 1987b: 315, Fig. 2 (in part).
Trizocheles n. sp. B – Lemaitre et al., 2009: 5.

Type material examined. – Holotype: male (4.9 mm) (MNHN-Pg 3758), BENTHEDI, Stn. DR 41, 13°05'S 45°05.5'E, 500–300 m, 27 Mar.1977.

Paratypes: 1 male (4.6 mm) (MNHN-Pg 8053), Stn. 54F, 13°01'S 44°55.3'E, 530 m, 28 Mar.1977; 1 male (3.8 mm) (MNHN-Pg 3760), Stn. DS 120, 11°30'S 42°24.7'E, 335–390 m, 12 Apr.1977; 1 male (4.3 mm), 1 ovig. female (4.2 mm) (MNHN-Pg 3759), Stn. F 98, 11°35.5'S 47°16.5'E, 280–460 m, 7 Apr.1977.

Etymology. – This species is dedicated to Elizabeth Hoenson, Invertebrates Collection Manager for the South African Museum, whose cooperation and personal efforts made it possible for the authors to examine the holotype of *Pomatocheles balssi* Stebbing, 1914.

Description. – Shield (Fig. 13A) slightly longer than broad to broader than long, and longer than weakly calcified posterior carapace; dorsal surface with moderately long, deep transverse groove subrostrally; lateral margins occasionally with slight protuberance to small spine in proximal half; cervical groove clearly delineated laterally. Rostrum broadly triangular, with prominent marginal spine or broadly rounded with spine superimposed, overreaching level of lateral projections or not. Lateral projections well developed, each with marginal, often prominent, spine. Posterior median plate weakly delineated but moderately broad and weakly calcified; sulci cardiobranchialis not apparent. Branchiostegites calcified only at anterior margin; dorsal margin unarmed, few spinules on anterior margin.

Ocular peduncles 0.5–0.8 length of shield; corneas 0.3–0.4 of peduncular length; ocular acicles small, triangular; separated by 1.7–2.0 basal width of one acicle.

Antennular peduncles moderately short, overreaching distal corneal margins by 0.5–0.8 lengths of ultimate segments. Ultimate segment equal in length to penultimate segment or slightly longer; basal segment with spinule on statocyst lobe laterally and smaller spinule at ventrodistal margin.

Antennal peduncles usually reaching to bases of corneas. Fifth segment unarmed; fourth segment with prominent spine at dorsodistal margin; third segment with spine at ventrodistal margin; second segment with dorsolateral distal angle produced, with terminal bifid spine, usually 1 small spine or spinule on lateral face; dorsomesial distal angle with spine; first segment with small spine or spinule on dorsodistal margin laterally; ventrolateral margin with few small spines distally. Antennal acicle short, not reaching midlength of ocular peduncle, terminating in bifid spine, mesial margin with 1 spine proximally, lateral margin with 1 or 2 spines in distal half. Antennal flagella as long or slightly longer than carapace; occasionally 1 short, but usually 1 or 2 long setae every 2 or 3 articles.

Chelipeds (Fig. 13B, C) generally subequal and symmetrical; with propodal-carpal rotation of approximately 45°. Dactyl shorter than palm, with moderately broad hiatus between dactyl and fixed finger; upper margin with row of spines, decreasing in size distally; outer face with 1 or 2 large proximal spines and scattered smaller spines or tubercles and few tufts of setae; cutting edge with row of small, calcareous teeth, terminating in large corneous claw; inner

face with few tufts of setae. Palm 1.5–2.0 longer than carpus; outer surface convex, upper margin with row of prominent large spines, outer surface with 2–4 rows of smaller spines becoming irregular single or double row on fixed finger, latter also with few tufts of moderately stiff setae; inner face usually unarmed, occasionally with few tubercles. Carpus subtrapezoidal; dorsomesial margin with 2 large spines, dorsal surface with 3–5 smaller spines; lateral face

with covering of stridulatory ridges and rods; mesial and ventral surfaces usually smooth, occasionally with 1 or 2 tubercles. Merus subtriangular; dorsal margin with prominent spine at distal margin and row of spines, decreasing in size proximally or just tubercles proximally, mesial, ventral and lateral faces unarmed, laterodistal margin sometimes with row of several acute spines; ventromesial margin with row of prominent spines; ventrolateral margin with 2 or 3 spines

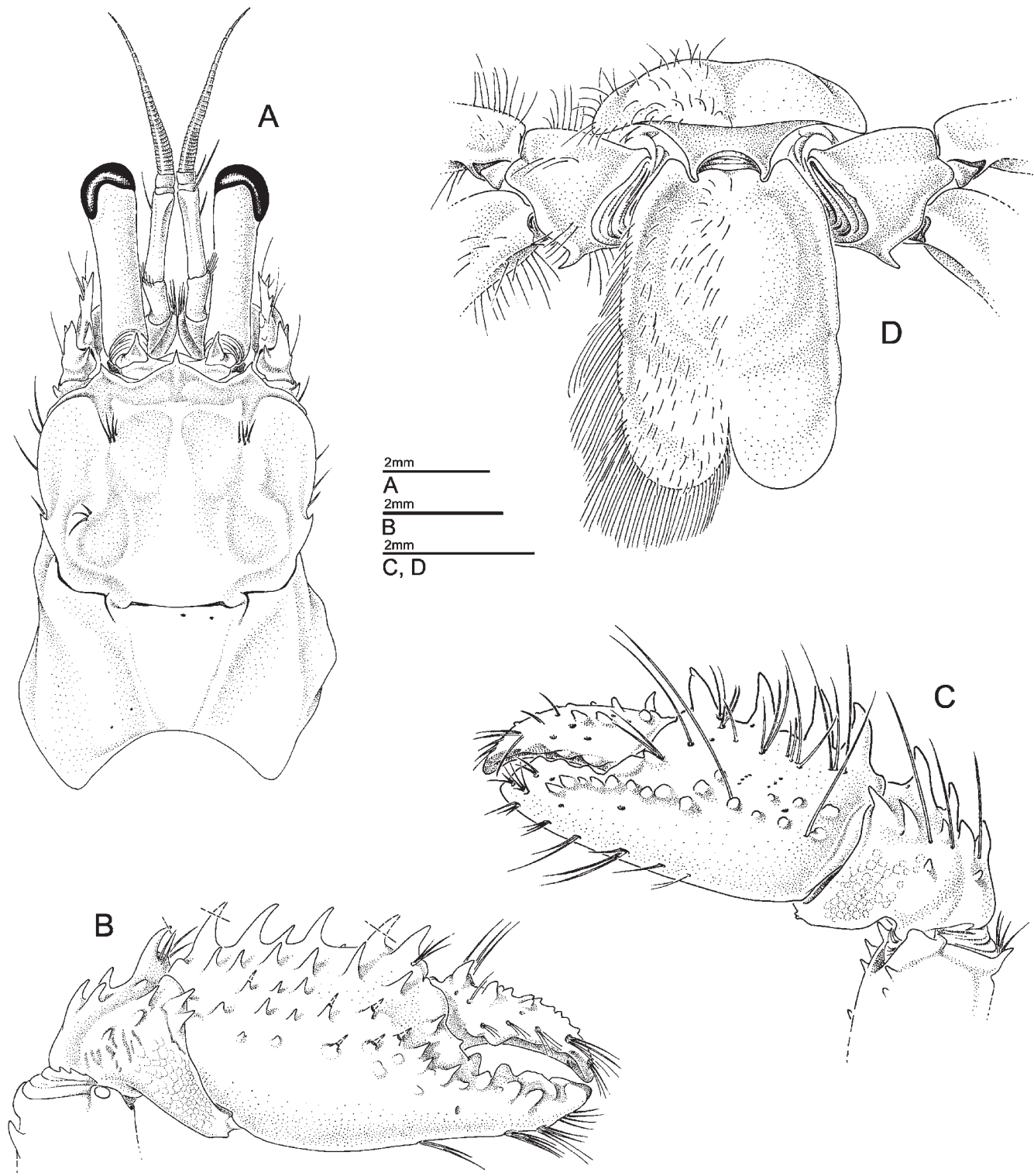


Fig. 13. *Trizocheles hoensonae*, new species. Holotype male (4.9 mm) (MNHN-Pg 3758), BENTHEDI, Stn. DR 41: A, shield and cephalic appendages; B, right cheliped (outer face); C, left cheliped (outer face); D, tergite of sixth pleonal segment and telson (dorsal face).

or low or tubercles. Ischium with row of prominent spines on ventromesial margin.

Second (Fig. 14A, B) and third (Fig. 14C) pereopods slightly overreaching chelipeds, dissimilar in armature. Dactyls 0.5–0.7 length of propodi; surfaces each with scattered setae; ventral margins each with 5–8 corneous spines. Propodi approximately 0.3 longer than carpi; dorsal margins each with row of acute large spines (second) or only scattered setae (third); mesial faces each with irregular row of short

stridulatory ridges or tubercles (second pereopods) or unarmed (third); ventral surfaces with few scattered setae, occasionally also corneous spinule at ventrodistal margin; lateral faces unarmed. Carpi each with dorsal row of prominent spines (second pereopods) or only small dorsodistal spine (third), and tufts of sparse setae; mesial faces of second pereopods each with few short stridulatory ridges. Meri unarmed except for spinule at dorsodistal margin of each third pereopod and row of widely-spaced spinules or tubercles on ventral margin of each second pereopod. Fourth pereopods (Fig. 14D)

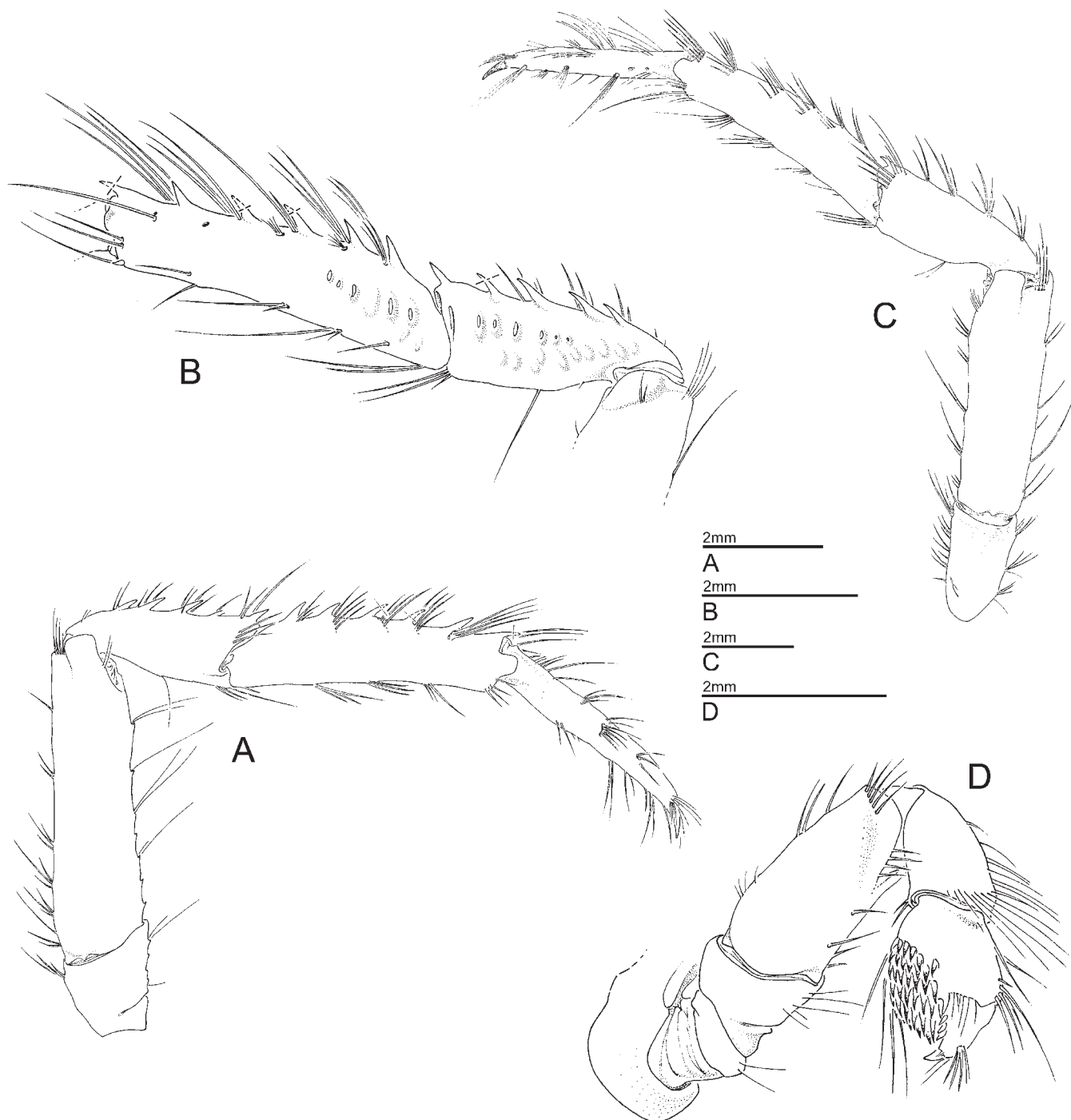


Fig. 14. *Trizocheles hoensona*, new species. Holotype male (4.9 mm) (MNHN-Pg 3758), BENTHEDI, Stn. DR 41: A, right second pereopod (lateral view); B, carpus and propodus of same (mesial view); C, left third pereopod (lateral view); D, right fourth pereopod (lateral view).

semichelate; each with propodal rasp consisting of several rows of corneous scales. Fifth pereopods weakly chelate; propodal rasps well developed.

Pleon with tergite 1 moderately well calcified; tergites 2–5 weakly calcified, pleura faintly delineated; tergite of pleomere 6 subcircular, with deep lateral incisions and shallow median sulcus; terminal margin unarmed. All tergites and telson with covering of short setae. Uropods symmetrical; protopods produced posteriorly, each with prominent spine. Telson (Fig. 13D) with faint lateral indentations dividing telson into approximately equal anterior and posterior portions; posterior lobes separated by deep median cleft, terminal margins rounded, unarmed but with fringe of fine setae.

Colouration. – Unknown.

Habitat. – Unknown.

Distribution. – Known only from the Comoro Islands and Réunion; 280–530 m.

Remarks. – As noted previously, the reexamination of the holotype of Stebbing's (1914) *Pomatocheles balssi* has shown that Forest (1987a) was incorrect in his belief that the specimens from the Comoro Islands and Réunion represented Stebbing's South African taxon. *Trizocheles hoenssonae*, new species, as indicated by Forest as *T. balssi*, is most closely allied to *T. spinosus*, but is distinguished from that species by the absence of a row of spines on each propodus of the third pereopods.

Trizocheles pulcher Forest, 1987a

Trizocheles pulcher Forest, 1987a: 199, Figs. 50a, 66h, 68; Forest, 1987b: 315, Fig. 2; Lemaitre et al., 2009: 5.

Type material examined. – Holotype: female (4.1 mm) (MNHN-Pg 3493), MUSORSTOM 4, Stn. DW 210, 22°42.7'S 167°09.3'E, 340–345 m, 28 Sep.1985.

Paratypes: 1 ovig. female (3.6 mm) (MNHN-Pg 3494), MUSORSTOM 4, Stn. CP 213, 22°51.3'S 167°12.0'E, 405–430 m, 28 Sep.1985; 1 ovig. female (3.0 mm) (MNHN-Pg 3495), Stn. DW 234, 22°15.4'S 167°08.3'E, 350–365 m, 2 Oct.1985.

Other material examined. – 1 ovig. female (3.0 mm) (MNHN-Pg 7985), SMIB 5, Stn. DW 87, 22°18.70'S 168°41.30'E, 370 m, 11 Sep.1989; 1 male (2.2 mm) (MNHN-Pg 7986), SMIB 8, Stn. DW 184, 23°18.3'S, 168°04.8'E, 305–320 m, 31 Jan.1993; 1 ovig. female (3.3 mm) (MNHN-Pg 7987), Stn. DW 197, 22°51.3'S 168°12.5'E, 414–436 m, 10 Feb.1993; 1 male (3.0), 1 female (2.8 mm), 2 ovig. females (3.1, 3.5 mm) (MNHN-Pg 7988), Stn. DW 198, 22°51.6'S 167°12.4'E, 414–430 m, 10 Feb.1993; 1 male (3.0 mm), 1 ovig. female (3.1 mm) (MNHN-Pg 7989), Stn. DW 199, 22°51.6'S 168°12.22'E, 408–410 m, 1 Feb.1993; 1 male (2.2 mm) (MNHN-Pg 7990), BATHUS 1 Stn. DW 688, 20°33.2'S 165°00.4'E, 270–282 m, 16 Mar.1993; 1 male (2.5 mm) (MNHN-Pg 7991), BATHUS 2, Stn. DW 719, 22°47.57'S 167°14.58'E, 444–455 m, 11 May 1993; 2 males (2.4, 2.5 mm) (MNHN-Pg 7992), BATHUS 3, Stn. CP 811, 23°41'S 168°15'E, 383–408 m, 28 Nov.1993; 1 male (3.0 mm), 1 female (3.5 mm) (MNHN-Pg 7993), Stn. DW

818, 23°44'S 168°16'E, 394–401 m, 28 Sep.1993; 1 male (2.5 mm) (MNHN-Pg 7994), Stn. DW 830, 23°19.75'S 168°01.75'E, 361–365 m, 29 Nov.1993; 1 female (2.4 mm) (MNHN-Pg 7995), NORFOLK 2, Stn. CP 2096, 24°44'S 168° 09'E, 230–240 m, 29 Oct.2003; 1 male (3.0 mm) (MNHN-Pg 7996), Stn. CP 2152, 22°45'S 167°14'E, 380–390 m, 5 Nov.2003.

Abbreviated redescription. – Shield broader than long, and longer than weakly calcified posterior carapace; dorsal surface with moderately long, deep transverse groove subrostrally, lateral margins each with slight indentation to small spine in proximal 0.5; cervical groove clearly delineated laterally. Rostrum broadly triangular, not reaching level of lateral projections, with very small marginal spinule or with spinule associated with small rostral keel; lateral projections well developed, each with marginal spinule. Ocular peduncles 0.6–0.8 length of shield, shortest in smaller specimens; corneas 0.3–0.4 of peduncular lengths; ocular acicles small, triangular. Antennular peduncles short, reaching from bases of corneas to slightly beyond, but not overreaching distal corneal margins; ultimate segment equal in length to penultimate segment or slightly shorter; basal segment with spinule on statocyst lobe laterally and smaller spinule at ventrodistal margin. Antennal peduncles reaching from midlength of ocular peduncles to bases of corneas; fifth segment unarmed; fourth segment with spine at dorsodistal margin; third segment with spine at ventrodistal margin; second segment with dorsolateral distal angle produced, with terminal bifid spine, dorsomesial distal angle with small spine; first segment with 1–3 small spines on ventrolateral margin. Antennal acicle short, not reaching beyond midlength of ocular peduncle, terminating in bifid spine, mesial margin unarmed but usually small spine on dorsal surface proximally, lateral margin with 1 spine in distal half. Antennal flagella as short as or shorter than carapace; most articles each with 2 or 3 short to moderately long setae.

Chelipeds generally subequal and symmetrical; with propodal-carpal rotation of approximately 45°. Dactyl with row of spines on upper margin, decreasing in size distally; outer face with 1–3 moderately large proximal spines, and scattered smaller spines or tubercles and few tufts of setae. Palm with sparse covering of moderate to long setae, upper margin with row of prominent large spines, outer surface with 2–4 rows of smaller spines becoming irregular single or double row on fixed finger. Carpus with 2 large spines on dorsomesial margin, dorsal surface with 4–6 smaller spines; lateral face with covering of stridulatory ridges and/or rods.

Second and third pereopods equaling or slightly overreaching chelipeds. Dactyls 0.1–0.3 longer than propodi; surfaces all with scattered setae; dorsal surfaces, at least of second pereopods, each usually with short row of small spines; ventral margins each usually with 5, rarely with 6 or 7, corneous spines. Propodi each with scattered long setae, irregular double row of acute large spines on dorsal margin (second) or only row of tufts of setae (third); mesial faces each with longitudinal row of short stridulatory ridges not reaching to distal margin (second pereopods) or unarmed (third); ventral surfaces with few scattered setae, 1 corneous

spinule at ventrodiscal margin and occasionally second in distal 0.3 of ventral surface; lateral faces unarmed. Carpi each with dorsal row of prominent spines and tufts of moderately long setae (second pereopods) or only small dorsodistal spine (occasionally absent) and setae (third); mesial faces of second pereopods each with few stridulatory ridges. Meri unarmed except for occasional spinule at dorsodistal margin of third pereopod and sometimes row of widely-spaced tiny spinules or tubercles on ventral margin of each second pereopod. Fourth pereopods semichelate; each with propodal rasp consisting of several rows of corneous scales. Fifth pereopods weakly chelate; propodal rasps well developed.

Pleon with tergite 1 moderately well calcified; tergites 2–5 weakly calcified; tergite of pleomere 6 roundly subquadrate, with deep lateral incisions and shallow median sulcus; terminal margin entire, unarmed. All tergites and telson with covering of short setae. Uropods symmetrical; protopods produced posteriorly, each with spine. Telson with faint lateral indentations dividing telson into slightly unequal anterior and posterior portions; posterior lobes somewhat shorter, separated by deep median cleft, terminal margins rounded, unarmed but with fringe of fine setae.

Colouration. – In preservative two weeks, carapace iridescent grayish-white, with a patch of red on the anterior part of the gastric and cardiac region; pleon dark to light brown. Ocular peduncle light orange. Chelipeds with palms red, each with a white ring spotted with red posterior to dactyl and fixed finger. Dactyls of second and third pereopods orange, but colorless distally; propodi bright vermilion red, each with white distal ring (after Forest, 1987a).

Habitat. – Usually cylindrical cavities in sponges.

Distribution. – New Caledonia; 230–444 m, possibly to 455 m.

Remarks. – Four species of *Trizocheles* now are characterized by an irregular double row of dorsal spines on the propodus of each second pereopod; two also have spines on the dorsal margins of the propodi of the third. Of these four, *T. pulcher* is most closely allied to *T. pilgrimi* in lacking spines on these segments of the third pereopods. But the former species is readily distinguished, not only from *T. pilgrimi*, but from all other species in the genus except *T. longicaulis* (Boas, 1926), in having a row of small spines on the dorsal margin of the dactyl of each second pereopod.

***Trizocheles pilgrimi* Forest & McLaughlin, 2000**

Trizocheles pilgrimi Forest & McLaughlin, 2000: 54, Fig. 15; Lemaitre et al., 2009: 5.

Type material examined. – Holotype: male (7.4 mm) (NIWA 7519), NZOI, Stn. K830, 29°11.5'S 177°53.05'W, 549–590 m, 26–27 Aug.1974.

Paratypes: 2 males (4.5, 7.6 mm), 4 females (3.2–6.2 mm) (NIWA 4985); 1 male (9.0, newly molted), 2 females (5.1, 6.2 mm) (MNHN-

Pg 5837), same data as holotype; 1 female (6.0 mm) (MNHN-Pg 5811), MUSORSTOM 6, Stn. CC 470, 21°04.4'S 167°33.2'E, 560 m, 21 Feb.1989.

Other material examined. – 1 ovig. female (8.7 mm) (MNHN-Pg 7997), MUSORSTOM 6, Stn. CP 467, 21°05.13'S 167°32.11'E, 575 m, 21 Feb.1989; 1 male (4.5 mm) (MNHN-Pg 7998), EBISCO, Stn. CP 2579, 20°21'S 158°40'E, 440–455 m, 1 Oct.2005; 1 female (4.2 mm) (MNHN-Pg 7999), MUSORSTOM 8, Stn. CP 974, 19°21.51'S 169°28.26'E, 492–520 m, 22 Sep.1994; 1 male (6.0 mm) (MNHN-Pg 8000), Stn. CP 1047, 16°53'S 168°10'E, 486–494, 1 Oct.1994; 1 ovig. female (10.1 mm) (MNHN-Pg 8001), Stn. CP 1088, 15°09.25'S 167°15.13'E, 425–455 m, 6 Oct.1994; 1 male (~5.9, carapace damaged) (MNHN-Pg 8002), BORDAU 2, Stn. CH 1596, 19°06'S, 274°18'E, 371–437 m, 14 Jun.2000.

Abbreviated redescription. – Shield broader than long, but much longer than weakly calcified posterior carapace; dorsal surface with deep subrostral transverse groove; shield lateral margins each with small spine in shallow indentation in proximal 0.5; cervical groove weakly delineated laterally. Rostrum obtusely triangular, overreaching level of lateral projections, with acute apical spine; lateral projections well developed, triangular, each with prominent terminal spine. Ocular peduncles moderately short, 0.5–0.6 shield length; corneal diameters 0.7 of peduncular lengths; ocular acicles small, triangular, each terminally acute or with small marginal spine. Antennular peduncles overreaching distal margins of corneas by 0.3–0.5 lengths of ultimate segments; ultimate and penultimate segments of approximately equal lengths; basal segment with small spine on statocyst lobe laterally and small spine on ventrodiscal margin. Antennal peduncles not reaching to or extending slightly beyond distal corneal margins; fifth segment unarmed; fourth segment with spine at dorsodistal margin; third segment with prominent ventrodiscal spine; second segment with dorsolateral distal angle produced, terminating in bifid spine, dorsomesial distal angle with small spine; first segment with spine on lateral face distally and 1 or 2 small spines on ventrolateral margin. Antennal acicle reaching approximately to midlength of fifth peduncular segment, terminating in bifid spine, with 1 spine on mesial face. Antennal flagella not overreaching tips of chelipeds; 1 or 2 moderately short setae every 1–4 articles.

Chelipeds subequal; propodal carpal articulation rotated approximately 30°. Dactyl with row of spines on dorsomesial margin, decreasing in size distally and often not extending to tip; dorsal surface with numerous long setae not concealing 1 or 2 rows of small spines. Palm with 6–8 acute or subacute spines, usually 5 prominent, interspersed with 1–3 shorter spines on dorsal margin, outer face with 3 or 4 irregular longitudinal rows of spines and numerous long setae; mesial and ventral surfaces with few scattered setae; lateral face with several very weak ridges proximally. Carpus with 3 spines on dorsomesial margin; dorsal surface with several much shorter spines and scattered setae; lower lateral face with numerous small conical stridulatory tubercles with rounded corneous summits.

Second and third pereopods with dactyls varying from approximately equal to 0.3 longer than propodi; dorsal

surfaces each with row of low, setose protuberances; mesial and lateral faces each with 1 or 2 rows of setae; ventral margins each with row of 7 or 8 corneous spines. Propodi of second pereopods each with 7 or 8 unequally-sized spines on dorsal margin, 4 or 5 largest aligned along and slanted toward inner margin; mesial faces each with or without 1 or 2 rows of stridulatory ridges or tubercles, third with only dorsodistal spine. Carpi of second pereopods each with 6 (rarely 5) large spines on dorsal margin; mesial faces each with 8 or 9 stridulatory tubercles or short ridges forming transverse parallel rows of variable length in large specimens; smallest specimens with number of carpal tubercles reduced to 4 or 5, propodal tubercles missing; third pereopods each with dorsodistal spine and occasionally 1 small spine on dorsal surface at midlength. Meri each with or without row of very small spines on ventral margin of second pereopods, third pereopods each with dorsodistal spine. Fourth pereopods semichelate; propodal rasps each consisting of several rows of small corneous scales. Fifth pereopods chelate; rasps well developed.

Pleon with tergite of first pleomere well calcified, remainder only weakly calcified; tergite of pleomere 6 roundly subquadrate, with deep lateral incisions and shallow median sulcus; terminal margin with pair of faint notches or incisions, intervening region straight or very slight excavated. All tergites and telson with moderately long setae. Uropods symmetrical; protopods produced posteriorly, each with prominent spine. Telson with faint lateral indentations dividing telson into unequal anterior and posterior portions; posterior lobes approximately 0.3 of anterior lobes, separated by deep median cleft, terminal margins rounded, unarmed but with fringe of fine setae.

Colouration. – Unknown.

Habitat. – Unknown.

Distribution. – New Zealand, New Caledonia, Vanuatu, Tonga; 425–575 m, possibly to 590 m.

Remarks. – The collection of *T. pilgrimi* in Vanuatu and Tonga considerably extends the geographic range of this species, heretofore known only from the Kermadec Islands of New Zealand and the Loyalty Islands of New Caledonia.

***Trizocheles longicaulis* (Boas, 1926)**

Mixtopaguus longicaulis Boas, 1926: 37, Figs. 7, 9, 11A, 12A, B, 15A, 17, 19, 20, 22, 23A; Pilgrim, 1965: 556.

Trizocheles longicaulis – Forest, 1987a: 165, Figs. 49, 50b, 51d; Forest, 1987b: 315, Fig. 2; Lemaitre et al., 2009: 5.

Type material examined. – Lectotype [subsequent selection by Forest (1987a)]: female (10.5 mm) (ZMUC CRU 7101), Danish Kei Islands Expedition, Stn. 46, 05°47.20'S 132°13'E, 250 m, coll. Th. Mortensen, 2 May 1922.

Paralectotype: 1 female (~ 8.9 mm) (ZMUC CRU 262), same date as lectotype.

Abbreviated redescription. – Shield longer than broad and longer than moderately well calcified posterior carapace; dorsal surface with moderately long, deep transverse groove subrostrally, lateral margins each with indentation and tiny spinule to prominent spine in proximal 0.5; cervical groove poorly delineated laterally. Rostrum narrowly triangular, considerably overreaching level of lateral projections and nearly reaching to apices of ocular acicles. Lateral projections well developed, terminally acute. Ocular peduncles 0.8 length of shield; corneal diameter 0.2 of peduncular length; ocular acicles small, apices narrowly triangular, terminally acute. Antennular peduncles short, reaching only to basal corneal margins in lectotype but shorter in paralectotype; ultimate segment slightly longer than penultimate segment; basal segment with spinule on statocyst lobe laterally, with or without spine at ventrodiscal margin. Antennal peduncles reaching slightly beyond midlength of ocular peduncles; fifth and fourth segments unarmed; third segment with small spine at ventrodiscal margin; second segment with dorsolateral distal angle produced, with terminal bifid spine, 1 or 2 small spines or spinules on lateral face, dorsomesial distal angle with spine; first segment with small spine on dorsodistal margin laterally, ventrolateral margin unarmed. Antennal acicle reaching midlength of ocular peduncle, terminating in bifid spine, mesial margin with 1 spine proximally, lateral margin with 3 or 4 spines. Antennal flagella slightly longer than carapace.

Chelipeds subequal and symmetrical, right slightly longer; with propodal-carpal rotation of approximately 30°. Dactyl with irregular row of spines on upper margin, decreasing in size distally and not extending to tip; outer face with 2 irregular rows of often corneous-tipped spines, partially concealed by tufts of long setae. Palm with row of prominent large spines on upper margin, outer surface with 4 or 5 rows of smaller spines partially obscured by tufts of long setae, spines becoming irregular single row on fixed finger. Carpus with 2 or 3 large, usually corneous-tipped spines on dorsomesial margin, dorsal surface with 3–5 smaller spines; lateral face with covering of stridulatory ridges and rods.

Second and third pereopods slightly overreaching chelipeds. Dactyls 0.7–0.8 length of propodi; dorsal surfaces each with row of short, corneous-tipped spines in proximal 0.5 and tufts of long setae; mesial and lateral faces each with 1 or 2 rows of widely-spaced tufts of setae; ventral margins each with tufts of setae concealing row of 6–8 corneous spines. Propodi slightly longer than carpi; dorsal margins each with 2 irregular rows of large, corneous-tipped spines, partially concealed by tufts of long setae; mesial faces of second pereopods each with 1 or 2 short stridulatory ridges proximally, third unarmed. Carpi each with dorsal row of prominent, corneous-tipped spines, slightly shorter on third pereopods, and tufts of long setae; mesial faces of second pereopods each with row of short stridulatory ridges dorsally. Meri each with dorsodistal spine; dorsal and ventral margins each with row of tufts of long setae. Fourth pereopods semichelate; each with propodal rasp consisting of numerous rows of corneous scales. Fifth pereopods chelate; propodal rasps well developed.

Pleon with tergites 1–5 weakly calcified; tergite of pleomere 6 roundly subquadrate, with deep lateral incisions and shallow median sulcus; terminal margin weakly sinuous, unarmed. All tergites and telson with covering of moderately long setae. Uropods symmetrical; protopods produced posteriorly, each with prominent spine. Telson with faint lateral indentations dividing telson into somewhat longer anterior and shorter posterior portions; posterior lobes now missing but according to Boas' illustration (1926: Fig. 15A), symmetrical and separated by prominent median cleft.

Colouration. – Unknown.

Habitat. – Unknown.

Distribution. – Known only from the type locality.

Remarks. – *Trizacheles longicaulis* is one of only two species in the genus with the dorsal margins of the dactyls of the second pereopods each armed with a row of spines. This species is readily distinguished from the second, *T. pulcher*, by the shield that is distinctly longer than broad and the much longer and slenderer ocular peduncles with corneal diameters only 0.2 of the peduncular length. Additionally, but perhaps more subject to variation is the usually larger number of corneous spines on the ventral margins of the ambulatory dactyls, and smaller and more numerous spines on the dorsal surfaces of the propodi and carpi of these appendages.

Trizacheles vaubanae McLaughlin & Lemaitre, 2008

Trizacheles vaubanae McLaughlin & Lemaitre, 2008: 62, Figs. 5, 6; Lemaitre et al., 2009: 5.

Type material examined. – Holotype: ovig. female (7.8 mm) (MNHN-Pg 7766), NORFOLK 2, Stn. CP 2050, 23°42'S 168°16'E, 377 m, 24 Oct.2003.

Paratypes: 1 ovig. female (2.4 mm) (MNHN Pg 7767), BIOCAL, Stn. DW 66, 24°55.43'S 168°21.67'E, 505–515 m, 3 Sep.1985; 1 male (2.2 mm) (MNHN-Pg 7768), SMIB 3, Stn. CP 1, 22°53.0'S 167°12.0'E, 437 m, 5 Feb.1986; 2 males (2.7, 2.9 mm) (MNHN-Pg 7769), CHALCAL 2, Stn. DW 72, 24°54.5'S 168°22.3'E, 527 m, 28 Oct.1986; 1 male (4.3 mm) (MNHN-Pg 7770), BERYX 2, Stn. DW 38, 23°38'S 167°39'E, 550–690 m, 19 Oct.1992; 1 female (2.4 mm) (MNHN-Pg 7771), NORFOLK 2, Stn. DW 2147, 22°50'S 167°16'E, 496 m, 4 Nov.2003; 1 male (2.7 mm) (MNHN-Pg 7772), Stn. 2050, same data as holotype; 2 males (2.6, 2.8 mm), 1 ovig. female (3.6 mm) (MNHN-Pg 7773), Stn. DW 2057, 24°40'S 168°39'E, 555–565 m, 25 Oct.2003; 1 ovig. female (3.4 mm) (MNHN-Pg 7774), Stn. CP 2061, 24°37'S 168°40'E, 620–1,040 m, 25 Oct.2003; 1 male (2.3 mm), 1 female (2.4 mm), 3 ovig. females (2.4–3.3 mm) (MNHN Pg 7775), Stn. DW 2081, 25°54'S 168°22'E, 500–505 m, 28 Oct.2003; 1 male (5.1 mm) (USNM 1114242), Stn. DW 2087, 24°56'S 168°22'E, 518–586 m, 28 Oct.2003; 1 ovig. female (7.2 mm) (USNM 1114243), EBISCO, Stn. DW 2584, 19°38.0'S 158°44.0'E, depth not recorded, 15 Oct.2005; 1 ovig. female (4.2 mm, with prematurely hatched larvae) (MNHN-Pg 7776), Stn. DW 2606, 19°36.0'S 158°42'.E, 442–443 m, 18 Oct.2005; 1 female (4.8 mm) (MNHN-Pg 7778), SALOMON 2, Stn. CP 2261, 08°01.9'S 156°54.1'E, 433–470 m, Nov.2004.

Other material examined. – 1 male (4.2 mm) (MNHN Pg 8003), MUSORSTOM 4, Stn. 177, 18°54.6'S, 163°10.0'E, 540–600 m, 18 Sep.1985; 1 ovig. female (2.0 mm) (MNHN-Pg 7777), SMIB 4, Stn. DW 55, 23°24.1'S 168°04.5'E, 260 m, 9 Mar.1989; 1 ovig. female (4.7 mm) (MNHN-Pg 8004), BATHUS 4, Stn. DW 929, 18°51.55'S 163°23.27'E, 502–516 m, 7 Aug.1994.

Abbreviated redescription. – Shield distinctly broader than long, and longer than calcified posterior carapace; dorsal surface with moderately long, deep transverse groove subrostrally, lateral margins each with slight indentation to small spine in proximal 0.5; cervical groove clearly delineated laterally. Rostrum typically broadly triangular, with or without small marginal spinule, usually reaching level of lateral projections, occasionally obsolete. Lateral projections well developed, each with marginal spine. Ocular peduncles 0.5–0.8 length of shield; corneas 0.3–0.5 of peduncular lengths; ocular acicles small, acutely triangular. Antennular peduncles overreaching distal corneal margins by 0.5–0.7 lengths of ultimate segments; ultimate segment approximately equal in length to penultimate segment or slightly shorter; basal segment with spine on statocyst lobe laterally and spinule at ventrodial margin. Antennal peduncles reaching midlength of corneas; fifth segment unarmed; fourth segment with spine at dorsodial margin; third segment with spine at ventrodial margin; second segment with dorsolateral distal angle produced, with terminal bifid spine, dorsomesial distal angle with small spine; first segment with 2 or 3 small spines on ventrolateral margin. Antennal acicle short, not reaching beyond midlength of ocular peduncle, usually terminating in bifid spine, rarely simple, mesial margin with 1 or 2 spines, lateral margin unarmed or with 1 spine in distal 0.5. Antennal flagella as short as carapace; most articles each with 2–4 short to moderately long setae.

Chelipeds subequal and symmetrical; propodal-carpal rotation of approximately 45°; chelae and carpi each with moderate covering of long setae on upper and outer surfaces not concealing armature. Dactyl with 1 or 2 large, corneous-tipped spines proximally and row of much smaller spines on upper margin; outer face also with large corneous-tipped proximal spine and row of smaller spines extending to tip. Palm with row of prominent large spines on upper margin, outer surface with 4 rows of smaller spines, lower outer surface with scattered small tubercles; fixed finger with distinct row of subacute marginal spines and adjacent row of small tubercles. Carpus with 2 large and 1 or 2 somewhat smaller spines on upper margin, outer surface with 3 or 4 spines; outer lower face with covering of stridulatory tubercles. Ventromesial and ventrolateral margins of merus each with row of small tubercles or spines; ventral surface with 1 or 2 small tubercles proximally.

Second and third pereopods with dactyls slightly longer than propodi; dorsal and mesial faces each with tufts of stiff setae; ventral margins each usually with 5–7 corneous spines and tufts of setae. Dorsal margins of propodi of second pereopods each with tufts of long setae and irregular, often incomplete double row of acute large spines, single or incomplete double, also irregular, row on third, often fewer in number; mesial faces of second pereopods each with longitudinal row of

short stridulatory ridges, sometimes double proximally, third unarmed or with row of quite small, widely-spaced tubercles. Carpi of both second and third pereopods each with dorsal row of prominent spines and tufts of moderately long setae in large individuals, third often with only 1–3 spines in small specimens; mesial faces of second pereopods each with row of prominent stridulatory ridges. Meri of second pereopods each row of small spinules or tubercles on ventral margin, third only with few tufts of setae. Fourth pereopods semichelate; each with propodal rasp consisting of several rows of corneous scales. Fifth pereopods chelate; propodal rasps well developed.

Pleon with tergite 1 moderately well calcified; tergites 2–5 weakly calcified; tergite of pleomere 6 roundly subquadrate, with deep lateral incisions and shallow median longitudinal sulcus; terminal margin straight, slightly sinuous, or with shallow to moderately deep, broad, median concavity, unarmed. All tergites and telson usually with covering of short setae. Uropods symmetrical; protopods each with posteriorly directed spine. Telson with faint lateral indentations dividing telson into unequal anterior and posterior portions; posterior lobes considerably shorter, separated by deep median cleft, terminal margins rounded, unarmed but with fringe of fine setae.

Colouration. – Unknown.

Habitat. – Carcinoecia usually missing; one specimen found occupying a gastropod shell and another lodged in the lumen of a piece of a dead stony coral (McLaughlin & Lemaitre, 2008).

Distribution. – New Caledonia, Solomon Islands; 260–620 m, possibly to 1,040 m.

Remarks. – As noted by McLaughlin & Lemaitre (2008), *T. vaubanae* is most closely allied to *T. spinosus* in having spines on the dorsal margins of the propodi and carpi of both the second and third pereopods as well as prominently developed stridulatory rods on the mesial faces of the second pair. However, like *T. pulcher*, the propodal spines of *T. vaubanae* form one or two usually incomplete, irregular rows rather than the single regular row seen in *T. spinosus*. *Trizocheles vaubanae* is immediately distinguished from *T. pulcher* by lacking dorsal spines on the ambulatory dactyls and having an irregular double row of spines on the propodi of both the second and third pereopods. The dactyls, at least of the second pereopods, each has a row of small spines on the dorsal surface and the propodi of the third pereopods are unarmed or have only a small dorsodistal spine in *T. pulcher*.

***Trizocheles brachyops* Forest & de Saint Laurent, 1987**
(Fig. 15)

Trizocheles brachyops Forest & de Saint Laurent, 1987, in Forest, 1987a: 186, Figs. 47b, 61b, 62, 63a; Forest & McLaughlin, 2000: 52, Figs. 13a–e, 14; Lemaitre et al., 2009: 5.

Type material examined. – Holotype ovig. female (5.2 mm) (NIWA 7518), NZOI, Stn. E719, 38°46'S 178°48'E, 913–750 m, 23 Apr.1967 (not seen).

Paratypes: 2 males (5.5, 5.6 mm), 1 female (6.0 mm), 2 ovig. females (5.8, 6.1 mm) (NIWA 4784); 1 female (not measured) (MNHN-Pg 3522), same data as holotype.

Other material examined. – 1 male (4.5 mm) (NIWA 29583), TAN0604, Stn. 3, 42°45.58'S 179°59.37'E, 765–845 m, 28 May 2006; 1 male (4.3 mm) (NIWA 29602), Stn. 16, 42°45.90'S 179°59.26'E, 993–1,090 m, 29 May 2006; 1 male (4.8 mm) (NIWA 29346), TAN0616, Stn. 7, 40°02.36'S 178°08.62'E, 766–764 m, 4 Nov.2006; 1 male (5.3 mm), 1 female (5.1 mm) (NIWA 29347), Stn. 12, 40°02.42'S 178°08.67'E, 749–787 m, 4 Nov.2006.

Redescription. – Shield as long as broad or broader but longer than posterior carapace; dorsal surface with transverse groove subrostrally; lateral margins each with indentation usually armed with spinule or small spine in posterior 0.5; cervical groove weakly delineated laterally. Branchiostegites each with weakly calcified anterior and distal margins, latter with 3–5 spines. Posterior median plate weakly calcified, only slightly delineated; sulci cardiobranchialis not apparent. Rostrum usually prominent, often considerably overreaching lateral projections, triangular, with terminal spine or spinule, rarely unarmed; lateral projections triangular, each with terminal frequently prominent spine, occasionally with accessory spinule.

Ocular peduncles 0.4–0.5 length of shield; corneal diameter 0.3–0.5 of peduncular length; ocular acicles moderately small, triangular, each prominently drawnout into acute spine.

Antennular peduncles overreaching corneas by entire lengths of ultimate segments to 0.7 of penultimate segments; penultimate segments slightly shorter to slightly longer; basal segments each with spine on statocyst lobe laterally and spinule or prominent spine at ventrodistal margin.

Antennal peduncles reaching to or slightly overreaching distal corneal margins; fifth segment unarmed; fourth segment with small dorsodistal spine; third segment with prominent ventrodistal spine; second segment with dorsolateral distal angle produced, terminating with bifid spine, lateral surface usually with prominent spine, dorsomesial distal angle with small spine; first segment usually with spinule or small spine on distolateral margin and 1 or 2 small spines on ventrolateral margin. Antennal acicle reaching or overreaching midlength of fifth segment, with terminal simple or bifid spine, 1 spine on lateral margin. Antennal flagella more than twice length of shield, each article with 1–3 long, fine setae.

Chelipeds subequal and symmetrical; with propodal-carpal rotation of approximately 45°; chelae and carpi each with moderate covering of long, fine setae on upper and outer surfaces not concealing armature. Dactyl with 1 or 2 large and few smaller spines or tubercles on upper margin; outer and inner surfaces unarmed; cutting edge with row of 4 or 5 large calcareous teeth, terminating in moderately large corneous claw. Palm (Fig. 15A) with row of 5–7 prominent

spines on upper margin; outer face usually with 1 moderately small spine medianly near proximal margin and few spinules distally, extending onto fixed finger as irregular row of larger spines, proximal spine occasionally absent, but larger male paratype (Fig. 15B) with 2 additional large spines adjacent to upper margin and median row of small spines; cutting edge with row of moderately large calcareous teeth, terminating in corneous claw; inner and lower surfaces unarmed or occasionally 1 or 2 small spinules or tubercles on inner face dorsally. Carpus with 2 or 3 prominent spines on dorsomesial margin, proximal-most usually somewhat smaller, dorsal surface with 3–5 smaller spines; lateral surface with covering of stridulatory tubercles or rods. Merus with small spine on dorsodistal margin and second spine or short transverse, spinulose ridge subdistally, remainder of dorsal surface with row of very small spinules or spinulose

protuberances; ventromesial margin with prominent spine distally and 2 smaller spines proximally, occasionally 1–4 very small spinules between; ventrolateral margin with 1 or 2 small spines distally. Ischium with row of prominent spines on ventromesial margin.

Second and third pereopods dissimilar; dactyls equal in length to propodi or slightly longer; dorsal surfaces each with tufts of moderately long setae; mesial and lateral faces each with 2 rows of tufts of sparse setae; ventral margins each with 5–7 corneous spines. Propodi of both second and third pereopods each with dorsal and ventral rows of tufts of long setae, second each also with 1 or pair of prominent dorsodistal spines and occasionally also subdistal spine; sometimes 1 or 2 corneous spinules on ventral margin distally; third usually without dorsodistal spines, ventral margins each also unarmed or

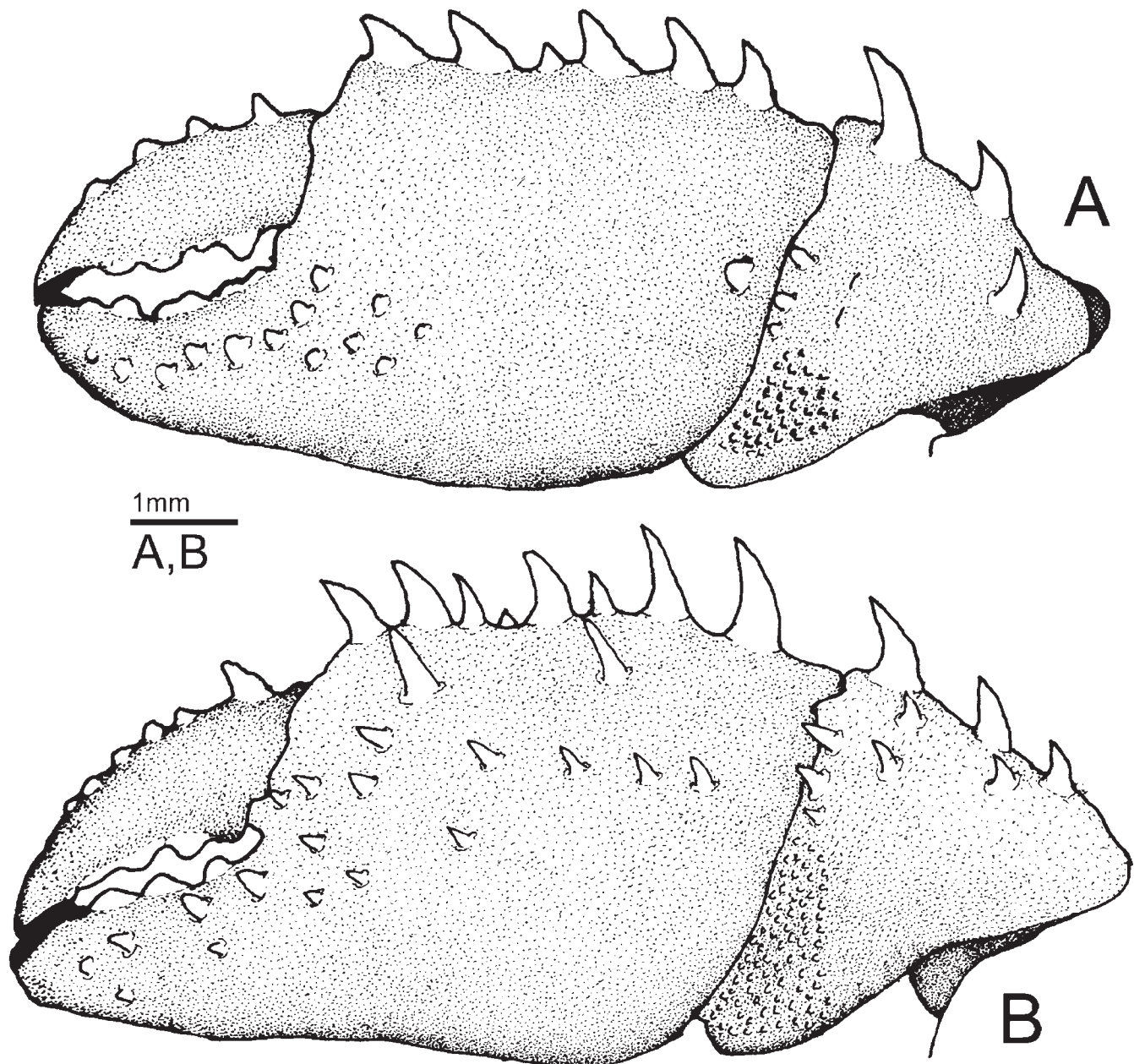


Fig. 15. *Trizocheles brachyops* Forest, 1987. Carpus and chela of left cheliped: A, male paratype (5.5 mm); B, male paratype (5.6 mm) (NIWA 4784), NZOI, Stn. E719. (Setae omitted).

with 1–3 corneous spinules; mesial faces of both pereopods unarmed. Carpi of second pereopods each with row of 2–4 prominent spines on dorsal surface and row of stridulatory rods or tubercles on mesial face, at least in distal half; third with 1 or pair of dorsodistal spines and frequently additional smaller spine on dorsal surface proximally. Meri and ischia with setae dorsally and ventrally, second pereopods also each with few spinules on ventral margins; third unarmed. Fourth pereopods semichelate; rasps of squamiform scales covering approximately half or slightly less of lateral faces of propodi. Fifth pereopods chelate, with well developed rasps.

First and sixth pleonal tergites well calcified, tergites 2–5 calcified only in vicinity of lateral margins. Sixth tergite roundly subquadrate, with lateral oblique incisions and median longitudinal sulcus. Left uropod usually slightly larger than right; protopods each with prominent posterior spine. Telson longer than broad, with pair of lateral indentations; posterior lobes somewhat asymmetrical, left or right usually slightly longer.

Colouration. – Specimens preserved in alcohol no longer have any trace of color. The calcified regions are yellowish-white with iridescence notably on the shield and the first pleonal tergite (after Forest & McLaughlin 2000).

Habitat. – Found in hollows in pumice rock.

Distribution. – New Zealand; 565–993 m, possibly to 1,090 m.

Remarks. – Although the holotype was not reexamined, five specimens indicated as paratypes were. In their material of *T. brachyops*, Forest & de Saint Laurent (in Forest, 1987a: 186) reported nine specimens, four males, three non-ovigerous females and two ovigerous females, all collected at NZOI station E719. Of these, they specified the holotype as an ovigerous female, and paratypes consisting of one male and two females; the three paratypes were assigned the MNHN catalog number 3522. Forest & McLaughlin (2000: 52) again reported on the material of *T. brachyops* from the same NZOI station. Their material consisted of the holotype, four paratypes, six specimens (two males, two females and two ovigerous females) listed as type material but not specified as paratypes, plus one additional male and one damaged female from station E719, as well as one male, two non-ovigerous and three ovigerous females from three other NZOI stations. Three of the paratypes were identified with the NZOI catalog number P-1158; the fourth, a female was cataloged as MNHN Pg 3522. The present paratypic material, as indicated above, with new NIWA catalog number 4784, consists of two males, one female and two ovigerous females, all with labels in Forest's handwriting indicating paratypes; the sixth paratype remains in the MNHN collection. Not only are there discrepancies in number and sexes of the paratypes, there are discrepancies between the male paratype illustrated by Forest & de Saint Laurent (in Forest, 1987a: Figs. 61d, 63a) and by Forest & McLaughlin (2000, Fig. 14b, c) and the two male paratypes just reexamined. The illustration of the right cheliped is the same in both publications, but does not

appear to be of either of the males in the present paratypic lot, although there also are major differences between these two specimens themselves. Additionally, Forest & de Saint Laurent (in Forest, 1987a: Fig. 63a) figured a mesial view of the second left pereopod in which a dorsodistal spine and a smaller subdistal spine were shown on the propodus. The second left pereopod of the present paratype (5.5 mm) with a right cheliped most closely agreeing with the illustrated specimen lacks both dorsodistal and subdistal spines on the propodus. Conversely, Forest & de Saint Laurent's figure of the pereopod could be of the second male paratype (5.6 mm), but as can be seen in Figure 15B, the cheliped of that male is markedly unlike the chela shown by either Forest & de Saint Laurent or Forest & McLaughlin (2000). In contrast, the right second pereopod illustrated by Forest & McLaughlin (2000) agrees with that appendage of the smaller paratype, but not that of the larger. Clearly, while the illustrated cheliped is from the same specimen, the figures of the second pereopods in the two descriptions of *T. brachyops* were drawn from two different males, perhaps the two paratypes still present in the NIWA collections. If that is the case, artistic licence might account for the differences between the illustrated chela and the actual appendage of the smaller paratype. But that does not account for the lack of comment about the differences seen in the chela of the larger paratype in view of the surprising differences between the two. In fact, the differences seen between these two male paratypes might suggest that two distinct species are represented, and the morphology of the three supplemental males from more recent sampling tends to support that proposition. However, variation appears to be common in *T. brachyops*, albeit not as pronounced in the other specimens. For example, in all other specimens examined, the identifying single spine on the outer proximal surface of the palm of each cheliped has been found to vary from being virtually absent to being represented by two spines. The characteristic dorsodistal spine on the propodus of each second pereopod has been found to occasionally not develop at all or be represented by a pair of spines; a subdistal dorsal spine is also sometimes present. In the atypical male paratype, a dorsodistal propodal spine is also present on the right third pereopod, but not the left. The left posterior lobe of the telson was illustrated and/or described by Forest & de Saint Laurent (in Forest, 1987a) and Forest & McLaughlin (2000) as always slightly larger than the right; however, we have found that either the right or the left can be slightly larger.

Only two other species, *T. sakai* Forest, 1987a and *T. brevicaulis* (Boas, 1926), routinely have a single dorsodistal spine on the propodus of each second pereopod. Although both have spines on the palms of the chelae, variability is unknown. *Trizocheles sakai* is known only from only three female specimens, the distributions of which are restricted to Japan. *Trizocheles brevicaulis* has been reported from Indonesia and Taiwan, but only three males and one female are known for the taxon. Both species apparently have stridulatory rods or tubercles present on the mesial faces of the propodi of the second pereopods, structures that are absent in all *T. brachyops*. At least until additional materials of all three species are available, we prefer to consider the

larger of the two male paratypes simply aberrant rather than representing a new taxon. Nonetheless, such variability, if substantiated, will cast suspicion on the validity of the five related species that are known only from their holotypes.

Forest & McLaughlin (2000) reported *T. brachyops* from three widely separated areas of New Zealand, the northern Tasman Sea, southeast coast of the North Island and just west of the Kermadec Islands. The more recent collections also have come from southeast of the North Island, but from more specialized areas; cruise TAN06064 was to the regional seamounts, and TAN0619 to investigate the chemosynthetic habitats in the area.

***Trizocheles brevicaulis* (Boas, 1926)**

Mixtopagurus brevicaulis Boas, 1926: 37 (in part), Figs. 12C–E, 15B, 23B [not Fig. 4B, C = *Trizocheles boasi* Forest, 1987a]; Balss, 1941: Fig. 242.

Trizocheles brevicaulis – Forest 1987a: 192, Figs. 63b, c, 65a, b, 66b, c; Forest, 1987b: 315, Fig. 2; Lemaitre et al., 2009: 5.

Type material examined. – Lectotype [subsequent selection by Forest (1987a)] male (7.7 mm) (ZMUC CRU 5893), Danish Kei Islands Expedition, Stn. 44, 05°39'S 132°13'E, 268 m, 30 Apr. 1922.

Paralectotype: 1 male (3.5 mm) (ZMUC CRU 5894), Danish Kei Islands Expedition, Stn. 59, 05°28'S 131°36'E, 385 m, 12 May 1922.

Other material examined. – 1 male (4.3 mm), 1 female (4.4 mm) (MNHN-Pg 8005), TAIWAN 2000, Stn. DW 56, 24°29.8'N 122°112.6'E, 438 m, 4 Aug. 2000.

Abbreviated redescription. – Shield slightly longer than broad to broader than long, and longer than weakly calcified posterior carapace; dorsal surface with moderately long, deep transverse groove subrostrally; lateral margins each with indentation and small spinule in proximal 0.5; cervical groove moderately well delineated laterally. Rostrum broadly triangular, with prominent marginal spine overreaching level of lateral projections, but shorter in smaller paratype; lateral projections well developed, each with marginal, often prominent spine. Ocular peduncles 0.5–0.6 length of shield; corneas 0.3–0.4 of peduncular length; ocular acicles small, triangular. Antennular peduncles overreaching distal corneal margins by 0.6–0.7 lengths of ultimate segments. Ultimate segment equal in length to penultimate segment or slightly longer; basal segment with small spine on statocyst lobe laterally and similar spine at ventrodistal margin. Antennal peduncles not quite reaching to bases of corneas; fifth segment unarmed; fourth segment with spine at dorsodistal margin; third segment with spine at ventrodistal margin; second segment with dorsolateral distal angle produced, with terminal bifid spine, dorsomesial distal angle with spine; first segment with 1 small spine on dorsodistal margin laterally, ventrolateral margin with 2 small spines. Antennal acicle reaching beyond proximal margin of fifth peduncular segment, terminating in bifid spine, mesial margin unarmed or with 1 spine proximally, lateral margins unarmed. Antennal

flagella longer than carapace; occasionally 1 or 2 very short setae every article and 1 or 2 longer every several articles, at least proximally.

Chelipeds generally subequal and symmetrical, propodal-carpal clockwise rotation of approximately 30°. Dactyl shorter than palm, with slender hiatus between dactyl and fixed finger; upper margin with row of spines, decreasing in size distally and not extending to tip; outer face with few spines in proximal half and scattered tufts of setae. Palm 1.3–1.7 longer than carpus; upper margin with row of 5–7 prominent large spines not obscured by accompanying long setae, outer surface with 3 or 4 irregular or incomplete rows of smaller spines and sparse long setae, becoming single marginal row on fixed finger. Carpus with 2 or 3 large spines on dorsomesial margin, dorsal surface with 3–6 smaller spines; lateral face with covering of stridulatory ridges and rods. Merus with spine at dorsodistal margin, 1 subdistal spine and row of low protuberances or spinules on dorsal margin; ventrolateral margin with 1 small spine subdistally, ventromesial margin with short row of spines distally and proximally, separated by broad, unarmed area.

Second and third pereopods reaching to tips of chelae. Dactyls slightly shorter to slightly longer than propodi; dorsal and ventral surfaces each with row of tufts of moderately long setae; lateral and mesial faces each with 2 rows of widely-spaced tufts of sparse setae; ventral margins also with row of 5–8 corneous spines. Propodi approximately 0.3 longer than carpi; dorsal margins each with row of low protuberances and tufts of setae, dorsodistal margins each with spine; mesial faces of second pereopods each with scattered short stridulatory ridges, sometimes forming quasi rows, third unarmed; ventral surfaces each with row of widely-spaced tufts of sparse setae, and sometimes small corneous spine at ventrodistal angle. Carpi of second pereopods each with row of prominent spines on dorsal surface, mesial face with row of short stridulatory ridges medianly, third with only small dorsodistal spine and unarmed mesial face, both with tufts of sparse setae dorsally. Meri and ischia of second pereopods each with row of minute spinules on ventral margins, third unarmed. Fourth pereopods semichelate; each with propodal rasp consisting of several rows of corneous scales. Fifth pereopods chelate; propodal rasps well developed.

Pleon with tergite 1 moderately well calcified; tergites 2–5 weakly calcified; tergite of pleomere 6 subquadrate, with deep lateral incisions and shallow median sulcus; terminal margin with faint median rectangular uncalcified indentation, unarmed. All tergites and telson with covering of moderately short setae. Uropods symmetrical; protopods produced posteriorly, each with prominent spine. Telson with faint lateral indentations dividing telson into approximately equal anterior and posterior portions; posterior lobes separated by deep median cleft, terminal margins rounded, unarmed but with fringe of fine setae.

Colouration. – Unknown.

Habitat. – Unknown.

Distribution. – Indonesia, Taiwan; 268–438 m.

***Trizocheles sakaii* Forest, 1987a**

Pylocheles spinosus – Ortmann, 1892: 274; Terao, 1913: 391 (list), not *Pylocheles spinosus* Henderson, 1888.

Mixtopagurus spinosus – Balss, 1913: 34; Yokoya, 1933: 70; Miyake, 1947, Fig. 2145, not *Pylocheles spinosus* Henderson, 1888.

Pomatocheles spinosus – Miyake, 1965: 640, Fig. 1065; Miyake, 1978: 7, Fig. 2; Miyake, 1982: 95, Pl. 32, Fig. 2, not *Pylocheles spinosus* Henderson, 1888.

Trizocheles sakaii Forest, 1987a: 189, Figs. 46a–h, 48d, e, 61b, 63d, 64, Pls. 5A, B, F, G, 8A, B; Forest, 1987b: 315, Fig. 2; McLaughlin et al., 2007c: 36, 2 unnumbered figs.; Lemaitre et al., 2009: 5.

Type material examined. – Holotype: ovig. female (5.9 mm) (MNHN-Pg 3486), Tosa Bay, Japan, 250–300 m, coll. K. Sakai, 3–14 Nov. 1963.

Paratypes: 2 ovig. females (4.7, 5.1 mm) (MNHN-Pg 3487), same data as holotype.

Other material examined. – 1 female (4.5 mm) (USNM 1024160), ALBATROSS, Stn. 3752, 34°58'N 139°45'E, 100–180 m, 19 May 1900.

Abbreviated redescription. – Shield broader than long, and longer than moderately calcified posterior carapace; dorsal surface with transverse groove subrostrally; lateral margins with often with tiny or small spine in shallow indentation in proximal 0.5; cervical groove not clearly delineated laterally. Rostrum broadly triangular, with marginal spine or spinule, equaling or overreaching level of lateral projections; lateral projections well developed, each with prominent, marginal spine. Ocular peduncles 0.5–0.6 length of shield; corneas 0.4 of peduncular lengths; ocular acicles small, triangular, terminally acute or subacute. Antennular peduncles overreaching distal corneal margins by 0.7 to entire lengths of ultimate segments; ultimate segment equal in length to penultimate segment; basal segment with small spine on statocyst lobe laterally and similar spine at ventrodistal margin. Antennal peduncles not quite reaching basal corneal margins to reaching midlengths of corneas; fifth segment unarmed; fourth segment with spine at dorsodistal margin; third segment with spine at ventrodistal margin; second segment with dorsolateral distal angle produced, with terminal bi- or trifid spine, usually 1 small spine on lateral face, dorsomesial distal angle with spine; first segment sometimes with small spine on lateral margin distally, ventrolateral margin with 1 or 2 spinules. Antennal acicle reaching to midlength of ocular peduncle, terminating in simple or bifid spine, mesial and lateral margins each with or without spine. Antennal flagella shorter than carapace; each article with few long and short setae.

Chelipeds generally equal and symmetrical; with propodal-carpal rotation of approximately 45°. Dactyl 0.7 to approximately equal to length of palm, with moderately broad hiatus between dactyls and fixed fingers; upper margin with

1 or 2 spines proximally and 1 or 2 small spines or tubercles distally, accompanied by tufts of sparse setae, outer faces each with 2 rows of protuberances or small spines and sparse tufts of setae. Palm with row of prominent large spines on upper margin, outer surface with 2–4 rows of very small to moderately large spines, accompanied by tufts of long or moderately long setae, outer surface of fixed finger with 1 or 2 irregular rows of low tubercles and tufts of setae. Carpus with 2 or 3 large spines on dorsomesial margin, dorsal surface with 4–7 smaller spines; lateral face with few to covering of stridulatory tubercles. Merus with small spine or spinule at dorsodistal margin and row of spinules or spinulose protuberances on remaining dorsal surface, becoming obsolete proximally; ventromesial margin with small tubercles or spinules, occasionally additional adjacent row on ventromesial surface; ventrolateral margin with 1 or 2 small spines distally.

Second and third pereopods usually not overreaching chelipeds; somewhat dissimilar in armament. Dactyls 0.7–0.8 length of propodi; dorsal surfaces each with row of long setae; mesial and lateral faces with few scattered setae; ventral margins each with 7–9 corneous spines. Propodi 1.2–1.3 length of carpi; dorsal margins each with short, transverse rows of tufts of moderately long setae, dorsodistal margins each sometimes with 1 prominent spine, sometimes with only very small spine; mesial faces each with stridulatory ridges (second pereopods) varying from proximal cluster to irregular triple longitudinal rows, or unarmed (third); ventral surfaces each with row of low protuberances and tufts of sparse setae. Carpi each with dorsal row of spines, not concealed by tufts of long setae (second pereopods) or only dorsodistal spine and tufts of setae (third), mesial faces of second pereopods each with numerous short stridulatory ridges. Meri with only dorsal and ventral tufts of setae except for row of very small tubercles or spinules on ventral margin of each second pereopod. Fourth pereopods semichelate; each with propodal rasp consisting of several rows of corneous scales. Fifth pereopods weakly chelate; propodal rasps well developed.

Pleon with tergite 1 moderately well calcified; tergites 2–5 chitinous or weakly calcified; tergite of pleomere 6 roundly subquadrate, with deep lateral incisions and shallow median sulcus; terminal margin entire or with tiny to moderately prominent median cleft or concavity, unarmed. All tergites and telson with covering of short setae. Uropods symmetrical; protopods produced posteriorly, each with prominent spine. Telson with faint lateral indentations dividing telson into unequal anterior and posterior portions; posterior lobes approximately 0.3 of anterior lobes, separated by moderately deep median cleft, terminal margins rounded, unarmed but with fringe of fine setae.

Colouration. – In life, uniformly intense red (Miyake, 1978).

Habitat. – Scaphopod and gastropod shells and serpulid worm tubes (Forest, 1987a).

Distribution. – Known only from Japan; 100–250 m, possibly to 300 m.

Remarks. – Forest (1987a) incorrectly cited Miyake's (1965) reference to *Pomatocheles spinosus* as 1963.

***Trizoeles loquax* Forest, 1987a**

Trizoeles loquax, Forest, 1987a: 169, Figs. 51e, 52, 54a; Forest, 1987b: 315, Fig. 2; Lemaitre et al., 2009: 5.

Type material examined. – Holotype: male (4.5 mm) (ZMUC CRU 7145), Misaki, Japan, 460 m, 10 Jun. 1914.

Abbreviated redescription. – Shield broader than long, and longer than weakly calcified posterior carapace; dorsal surface with transverse rounded ridge subrostrally; lateral margins each with shallow indentation in proximal 0.5; cervical groove moderately well delineated laterally. Rostrum broadly rounded, with prominent marginal spine, slightly overreaching level of lateral projections; lateral projections prominently produced, each with very small, terminal spine. Ocular peduncles slightly more than 0.5 length of shield; corneal diameter 0.4 of peduncular length; ocular acicles acutely triangular, each with terminal spinule. Antennular peduncles overreaching distal corneal margins by entire lengths of ultimate segments. Ultimate segment equal in length to penultimate segment; basal segment with spine on statocyst lobe laterally and similar spine at ventrodistal margin. Antennal peduncles reaching beyond bases of corneas, but not to distal margins; fifth and fourth segments unarmed; third segment with spine at ventrodistal margin; second segment with dorsolateral distal angle produced, with terminal bifid spine, dorsomesial distal angle with spine; first segment with 1 or 2 small spines on lateral margin distally, ventrolateral margin with 2 or 3 spinules on ventrolateral margin. Antennal acicle reaching to midlength of fifth segment, terminating in bifid spine, mesial margin with 1 spine proximally, lateral margin with 2. Antennal flagella missing.

Chelipeds generally subequal and symmetrical; with propodal-carpal rotation of approximately 30°. Dactyl approximately 0.8 length of palm, without hiatus between dactyl and fixed finger; upper margin with 1 or 2 spines proximally and row of tufts of sparse setae, outer face with numerous short transverse rows of stiff setae and few small subacute spines. Upper margin of left palm with row of 7 prominent large spines, right with 5, outer surface generally with only numerous long setae not concealing surface integument, but left and/or right with 1 small spine proximally, and less frequently 1 median spine adjacent to dorsomesial margin, outer surface of fixed finger with 2 or 3 irregular rows of small spines. Dorsomesial margin of right carpus with 2, left with 3, large spines, dorsal surface with 4 or 5 smaller spines and few spinulose protuberances; lateral face with covering of stridulatory tubercles in distal half; mesial and ventral surfaces smooth. Merus with spinule at dorsodistal

margin and row of spinulose protuberances on remaining dorsal surface; ventromesial margin with row of small spines; ventrolateral margin not delimited.

Second and third pereopods disarticulated. Dactyls somewhat shorter than propodi; dorsal surfaces each with irregular rows of tufts of long setae; mesial faces each with 2 rows of widely-spaced tufts of sparse setae; lateral faces with occasional seta; ventral margins each with 7 corneous spines. Propodi each with row of tufts long setae on dorsal margin; mesial faces of second pereopods each with numerous short, stridulatory ridges in proximal half, third unarmed; ventral surfaces each with row of widely-spaced fine setae, 1 corneous spine at ventrodistal margin and second submarginally; lateral faces unarmed. Carpi each with dorsal row of spines and tufts of sparse setae on second pereopods, third only with dorsodistal spine and few setae; mesial faces of second pereopods each with transverse rows of short stridulatory ridges covering nearly entire surface. Meri each with tuft of setae at dorsodistal margin of second pereopod, third with tiny spinule, dorsal surfaces with few setae; ventral margins of second pereopods each with row of very small spines particularly in proximal half, third with only few setae. Fourth pereopods semichelate; propodal rasps consisting of several rows of corneous scales. Fifth pereopods weakly chelate; propodal rasps well developed.

Pleon with tergite 1 moderately well calcified; tergites 2–5 weakly calcified; tergite of pleomere 6 roundly subquadrate, with deep lateral incisions and shallow median sulcus; terminal margin very weakly divided into three lobes, unarmed but setose. All tergites and telson with covering of short setae. Uropods symmetrical; protopods produced posteriorly, each with prominent spine. Telson with very faint lateral indentions dividing telson into unequal anterior and posterior portions; posterior lobes approximately 0.3 of anterior lobes, separated by deep median cleft, terminal margins rounded, unarmed but with fringe of fine setae.

Colouration. – Unknown.

Habitat. – Found in a piece of sponge of the genus *Eurete*, family Hexactinellidae (Forest, 1987a).

Distribution. – Known only from the type locality, Misaki, Japan; 460 m.

Remarks. – Because of the generally unarmed outer surfaces of the palms of the chelipeds, Forest (1987a) considered *T. loquax* closely allied with *T. brachyops* and *T. caledonicus*. Both *T. loquax* and *T. brachyops* are distinguished from *T. caledonicus* by the presence of a median proximal spine on the outer surface of each palm that is absent in *P. caledonicus*; however, *T. loquax* lacks the dorsodistal spine often seen on the propodus of each second pereopod in *T. brachyops*. However, as discussed above, this spination is variable in *T. brachyops*.

***Trizocheles caledonicus* Forest, 1987a**

Trizocheles caledonicus Forest, 1987a: 171, Figs. 53, 54b, 61c; Forest, 1987b: 315, Fig. 2; Lemaitre et al., 2009: 5.

Type material examined. – Holotype ovig. female (4.5 mm) (MNHN-Pg 3499), BIOCAL, Stn. DW 33, 23°09.7'S 167°10.3'E, 675 m, 29 Aug.1985.

Paratypes: 2 males (4.0, 5.5 mm), 1 ovig. female (5.6 mm) (MNHN-Pg 3498), BIOCAL, Stn. DW 51, 23°05.3'S 167°44.9'E, 700–680 m, 31 Aug.1985.

Other material examined. – 1 female (1.8 mm) (MNHN-Pg 8057), same data as holotype; 1 male (2.7 mm) (MNHN-Pg 3497), BIOCAL, Stn. DW 51, 23°05.3'S 167°44.9'E, 700–680 m, 31 Aug.1985; 2 females (4.8, 5.9 mm) (MNHN-Pg 8006), BATHUS 3, Stn. DW 776, 24°44.24'S 170°08.10'E, 770–830 m, 24 Nov.1993; 1 male (4.4 mm) (MNHN-Pg 8007), Stn. DW 794, 23°48.35'S 169°49.10'E, 751–755 m, 26 Nov.1993; 1 ovig. female (4.7 mm) (MNHN-Pg 8008), Stn. DW 809, 23°39.39'S 167°58.94'E, 650–730 m, 27 Nov.1993; 1 female (2.8 mm) (MNHN-Pg 8009), NOFOLK 2, Stn. DW 2058, 24°40'S 168°40'E, 501–1,032 m, 25 Oct.2003; 1 male (3.9 mm) (MNHN-Pg 8010), Stn. DW 2060, 24°39.84'S 168°38.50'E, 582–600 m, 25 Oct.2003; 1 female (4.2 mm) (MNHN-Pg 8011), Stn. DW 2065, 25°16'S 168°56'E, 750–800 m, 26 Oct.1993; 1 female (2.9 mm) (MNHN-Pg 8012), Stn. DW 2068, 25°20'S 168°57'E, 680–980, 26 Oct.2003; 1 male (2.8 mm), 1 female (3.0 m) (MNHN-Pg 8013), Stn. DW 2070, 25°23'S 168°57'E, 630–1,100 m, 26 Oct.2003; 1 male (3.9 mm) (MNHN-Pg 8014), Stn. DW 2074, 25°24.10'S 168°19.96'E, 623–691 m, 27 Oct.2003; 1 male (5.4 mm), 2 females (3.4, 5.0 mm), 1 ovig. female (3.6 mm) (MNHN-Pg 8015), Stn. DW 2075, 25°23'S 168°20'E, 650–1,000 m, 27 Oct.2003; 2 males (4.1, 4.7 mm) (MNHN-Pg 8016), Stn. DW 2077, 25°21'S 168°19'E, 666–1,000 m, 27 Oct.2003; 2 male (3.3, 4.4 mm), 1 female (3.7 mm), 1 mutilated ex. (MNHN-Pg 8017), Stn. DW 2078, 25°21'S 168°19'E, 654–877 m, 27 Oct.2003; 1 male (3.0 mm) (MNHN-Pg 8018), Stn. DW 2160, 22°42'S 167°10'E, 313–315, 6 Nov.2003; 1 ovig. female (3.3 mm) (MNHN-Pg 8019), EBISCO Stn. DW 2625, 20°05'S 160°19'E, 627–741 m, 20 Oct.2005.

Redescription. – Shield broader than long, and longer than weakly calcified posterior carapace; dorsal surface with transverse groove subrostrally; lateral margins often with tiny or small spine in shallow indentation in proximal 0.5; cervical groove not clearly delineated laterally. Posterior median plate weakly delineated, relatively broad anteriorly and narrowing posteriorly, weakly to moderately calcified; sulci cardiobranchialis not apparent. Branchiostegites calcified only dorsally and at anterior margin; dorsal margin unarmed, very few minute spinules on anterior margin. Rostrum broadly triangular, usually with prominent marginal spine, occasionally only small spinule, equaling or overreaching level of lateral projections. Lateral projections well developed, each with prominent, marginal spine.

Ocular peduncles 0.4 length of shield; corneas 0.4 of peduncular lengths. Ocular acicles small, triangular, terminally acute or subacute.

Antennular peduncles overreaching distal corneal margins by 0.3–0.5 lengths of penultimate segments. Ultimate segment equal in length to penultimate segment. Basal segment with

small spine on statocyst lobe laterally and similar spine at ventrodistal margin.

Antennal peduncles reaching to or slightly overreaching distal margins of corneas. Fifth segment unarmed; fourth segment with spine or spinule at dorsodistal margin; third segment with spine at ventrodistal margin; second segment with dorsolateral distal angle produced, with terminal bifid spine, occasionally 1 small spine on lateral face, dorsomesial distal angle with spine; first segment sometimes with small spine on lateral margin distally, 1 or 2 spinules on ventrolateral margin. Antennal acicle reaching to midlength of cornea, terminating in simple or bifid spine, mesial and lateral margins each with or without spine. Antennal flagella longer than carapace; each article with several long, not regularly paired setae, decreasing in length and number distally.

Chelipeds generally subequal (left slightly larger) and symmetrical; with propodal-carpal rotation of approximately 45°. Dactyl 0.7–0.8 length of palm, with moderately broad hiatus between dactyl and fixed finger; upper margin with 1 or 2 spines proximally and row of tufts of sparse setae, outer face with 2 rows of low protuberances and sparse tufts of setae, occasionally also few tubercles; cutting edge with 3 or 4 low, broad calcareous teeth, terminating in moderately large corneous claw; inner face with few low protuberances and tufts of setae. Palm 1.6–1.8 longer than carpus; outer surface convex, upper margin with row of prominent large spines, outer surface of palm unarmed, outer surface of fixed finger with 1 or 2 irregular rows of low tubercles and few tufts of setae; inner face with few setae. Carpus subtrapezoidal; dorsomesial margin with 2 or 3 large spines, dorsal surface with 4–7 smaller spines; lateral face usually with few to covering of stridulatory tubercles (apparently function of size); mesial and ventral surfaces smooth. Merus subtriangular; with small spine or spinule at dorsodistal margin and row of spinules or spinulose protuberances on remaining dorsal surface, becoming obsolete proximally, ventral, lateral and mesial faces unarmed, ventromesial margin usually with row of very small tubercles or spinules; ventrolateral margin unarmed or with few small tubercles or spinules. Ischium with row of prominent spines on ventromesial margin.

Second and third pereopods usually not overreaching chelipeds. Dactyls approximately 0.7 length of propodi; dorsal surfaces each with irregular rows of long setae; mesial and lateral faces with few scattered setae; ventral margins each with 6–8 corneous spines. Propodi slightly longer than carpi; dorsal margins each with row of tufts of moderately long setae; mesial faces each unarmed, or rarely with 1 or 2 small stridulatory ridges (second pereopods) or always unarmed (third); ventral surfaces each with row of tufts of sparse setae, usually also corneous spinule at ventrodistal margin and sometimes additional spinule in distal 0.3; lateral faces unarmed. Carpi each with dorsal row of spines, not concealed by tufts of long setae (second pereopods) or only dorsodistal spine and tufts of setae (third), mesial faces of second pereopods sometimes each with few short stridulatory

ridges. Meri with only dorsal and ventral tufts of setae except for row of very small tubercles or protuberances on ventral margin of each second pereopod. Fourth pereopods semichelate; each with propodal rasp consisting of several rows of corneous scales. Fifth pereopods weakly chelate; propodal rasps well developed.

Pleon with tergite 1 moderately well calcified; tergites 2–5 weakly calcified; tergite of pleomere 6 roundly subquadrate, with deep lateral incisions and shallow median sulcus; terminal margin entire, unarmed. All tergites and telson with covering of short setae. Uropods symmetrical; protopods produced posteriorly, each with prominent spine. Telson with faint lateral indentations dividing telson into unequal anterior and posterior portions; posterior lobes approximately 0.3 of anterior lobes, separated by deep median cleft, terminal margins rounded, unarmed but with fringe of fine setae.

Colouration. – In life, generally tinted deep creamy-white. Shield light red-orange anteriorly, pleonal tergites also red-orange. Antennular and ocular peduncles red-orange except colorless at bases of corneas (after Forest, 1987a).

Habitat. – Hexannelid sponges.

Distribution. – New Caledonia; 313–800 m, possibly to 1,100 m.

Remarks. – There is no development of stridulatory rods or ridges in the very small female from BIOCAL station DW 33, the type locality, demonstrating that the presence and density of these structures are most probably size related in this species. One male (4.4 mm) was observed to have the vas deferens containing spermatophores protruded from the right gonopore. It is probable that this was a result of preservation shock, as similarly was seen in one male of *T. spinosus*.

***Trizocheles balssi* (Stebbing, 1914)**
(Fig. 16)

Pomatocheles balssi Stebbing, 1914: 3, Pl. 65; Barnard, 1950: 414.

Trizocheles balssi – Forest, 1987a: 196 (in part), [not Figs. 47c, 66a, 67a, b, 69a, b = *T. hoensonae*, new species]; Forest, 1987b: 315, Fig. 2 (in part).

Type material examined. – Holotype male (3.0 mm) (SAM A1571), Cove Rock, near East London, South Africa, 146–240 m.

Redescription. – Shield (Fig. 16A) longer than broad and considerably longer than weakly calcified posterior carapace; dorsal surface with moderately long, deep transverse groove subrostrally and scattered tufts of moderately long setae; shield lateral margins (left side damaged) apparently unarmed; cervical groove weakly delineated laterally. Posterior median plate weakly delineated but moderately broad and poorly calcified; sulci cardiobranchialis not apparent. Rostrum with prominent marginal spine, overreaching level of lateral

projections. Triangular lateral projections each with small submarginal spine.

Ocular peduncles 0.8 lengths of shield; corneas 0.3 of peduncular lengths. Ocular acicles triangular, terminally acute.

Antennular peduncles short, not reaching bases of corneas. Ultimate segment slightly longer than penultimate segment. Basal segment with spine on statocyst lobe marginally and slightly smaller spine at ventrodiscal margin.

Antennal peduncle not reaching to base of cornea. Fifth segment unarmed; fourth segment with prominent spine at dorsodistal margin; third segment with spine at ventrodiscal margin; second segment with dorsolateral distal angle produced, with terminal bifid spine, dorsomesial distal angle with spine; first segment with dorsodistal margin unarmed. Antennal acicle reaching approximately to midlength of ocular peduncle (including cornea), terminating in bifid spine, mesial margin unarmed, lateral margin with 1 spine in distal half. Antennal flagella missing.

Chelipeds (Fig. 16B–E) unequal and dissimilar, left considerably larger. Left cheliped (Fig. 24B) with dactyl shorter than palm, moderately slender hiatus between dactyl and fixed finger; upper margin with 1 tuberculate spine near proximal margin; outer face with scattered tufts of setae, 1 small spine proximally and 1 smaller spine at midlength; cutting edge with 4 large calcareous teeth, terminal claw worn down; inner face with few tufts of setae. Palm approximately 3 times longer than carpus; outer surface convex, upper margin with row of prominent large spines, outer surface of palm with 2 smaller spines proximally near upper margin and 2 still smaller spines proximally near midline; fixed finger with row of tuberculate spines and tufts of setae; cutting edge with row of calcareous teeth, terminal corneous claw worn. Carpus (Fig. 16D) subtrapezoidal; dorsomesial margin with 1 large and 2 appreciably smaller spines, sloping dorsal surface with 1 small spine proximally and 1 slightly larger spine on distal margin; lateral face with covering of stridulatory tubercles; mesial and ventral surfaces smooth. Merus subtriangular; 1 prominent spine at dorsodistal margin and row tufts of setae on dorsal surface, mesial, ventral and lateral faces unarmed, ventrolateral margin with 2 tiny spinules distally; ventromesial margin with row of prominent spines. Ischium with row of prominent spines on ventromesial margin.

Right cheliped (Fig. 16C) with dactyl only slightly shorter than palm; upper margin with 2 spines near proximal margin and tufts of setae; outer face with irregular short row of small spines in proximal half; inner surface unarmed; cutting edge with row of moderately small calcareous teeth, terminating in small corneous claw. Palm approximately twice length of carpus; upper margin with row of 5 prominent spines; outer surface with 3 rows of smaller spines, ventral-most extending onto fixed finger as irregular row of slightly larger spines; cutting edge with row of calcareous teeth, terminating in pointed corneous claw; inner and ventral surfaces unarmed.

Carpus (Fig. 16E) with 3 large spines on dorsal margin and 4 additional large spines on dorsal surface; lateral face with few blister-like protuberances near distal margin, but no stridulatory rods or ridges. Merus with prominent spine at dorsodistal margin, dorsal surface with row of quite small spines and tufts of setae; ventrolateral margin unarmed; ventromesial margin with row of prominent spines. Ischium with row of large spines on ventromesial margin.

Second and third right pereopods missing. Dactyl of left third (Fig. 16F) approximately equal to length of propodus; surfaces all with scattered setae primarily dorsally and ventrally; ventral margin with 6 corneous spines. Propodus approximately equal to length of carpus; dorsal and ventral margins each with row of tufts of setae. Carpus and merus unarmed; carpus with tufts of setae on dorsal surface, merus with dorsal and ventral tufts setae. Left fourth pereopod missing; right (Fig. 16G) subchelate, dactyl very short, claw prominent; propodal rasp with 6 rows of scales. Fifth pereopods missing.

Pleon with tergite 1 missing; tergites 2–5 weakly calcified; pleomere 6, uropods and telson missing; tergites 2–5 with covering of short setae. Male paired first pleopods now missing; second left pleopod elongate; endopod 2-segmented, distal segment subtriangular, somewhat spatulate.

Colouration. – Unknown.

Habitat. – Unknown.

Distribution. – Known only from the type locality; off New London, South Africa; 146 m, possibly to 240 m.

Remarks. – The holotype is dry and in poor condition; the dissected antennule, antenna, mouthparts, fifth pereopod, gonopods, uropods and telson are no longer with the holotype. Nonetheless, it is possible to provide a general description of the species and correct some of Stebbing's (1914) errors and Forest's (1987a) misinterpretation. Stebbing (1914) described the antennule (as first antenna) as "perhaps scarcely as long as the eyes", and with apical and subapical spines, apparently not realizing that his illustrated antennule (Stebbing 1914: Pl. 65, "a s") showed the ventral surface uppermost. The spines are, as described herein, on the lateral surface of the statocyst lobe and at the ventrodistal margin. Because of the dry condition of the holotype, the remaining antennule can not be extended, but measurements of each of its three segments indicate that in the extended position, the peduncle would not reach to the base of the cornea.

Stebbing (1914) illustrated both chelipeds, but presented views of the inner surface of the left and outer surface of the right, neither depicting the armature very accurately. He also illustrated the only ambulatory leg accompanying the specimen, and although he labeled it pereopod 2, in his figure legend Stebbing commented that the appendage was disarticulated when he received the specimen and thus he could not be sure whether it was a second or third pereopod. Forest (1987a) remarked that since the appendage illustrated by Stebbing (1914: Pl.65, "prp 2") lacked the propodal and carpal spines on the second pereopod that were present in the

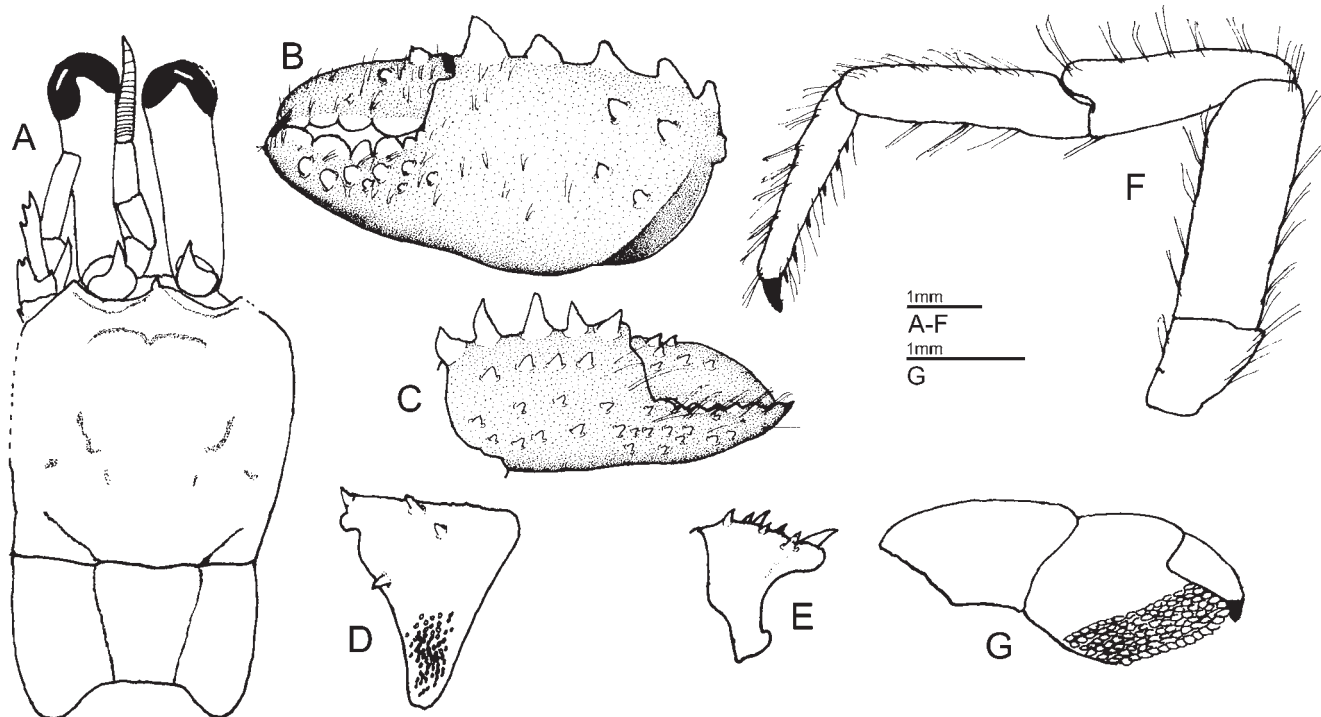


Fig. 16. *Trizocheles balssi* (Stebbing, 1914). Holotype, male (3.1 mm) (SAM 1571), Cove Rock, South Africa: A, shield and cephalic appendages; B, left chela (outer face); C, right chela (outer face); D, carpus of left cheliped (lateral view); E, carpus of right cheliped (outer face); F, left third pereopod (lateral view); G, dactyl, propodus and carpus of right fourth pereopod (lateral view). (Setae omitted).

specimens he attributed to Stebbing's species, it was possible that Stebbing actually had drawn a third pereopod. In fact, had Stebbing not just partially illustrated the ischium of that appendage, Forest most probably would have known with certainty that it was indeed a third pereopod. The length of the ischium and other attributes of the pereopod remaining with the holotype of *T. balssi* confirm that it is the left third.

Stebbing (1914: 4, Pl. 65, "prp 5") described and illustrated what he called the fifth pereopod, and his illustration suggests that this was the case. However, the only appendage remaining with the holotype, in addition to the chelipeds and left third pereopod, is the right fourth pereopod.

Forest (1987a: 198) considered that the asymmetry noted by Stebbing (1914) for the chelipeds of *T. balssi* might be the result of regeneration or instability in the relative dimensions of the two appendages. Because Stebbing did not actually describe the armature of the chelae, Forest was unaware that not only were the chelipeds asymmetrical in size, they were dissimilar in armature. As may be seen from the description and figures given here for the holotype, the right chela is much more prominently armed with spines than the left, but the cutting edges of the dactyl and fixed finger are more weakly toothed. Even more importantly, the stridulatory mechanism found on the lateral face of the carpus of the left cheliped is not present on the right. A detailed comparison between Forest's (1987a) specimens from the BENTHEDI expedition to the Comoro (Mayotte) Islands and Réunion (Glorieuses) north of Madagascar and Stebbing's (1914) holotype has shown that the two taxa are not conspecific. *Trizocheles balssi* sensu Forest 1987a is herein redescribed and renamed *Trizocheles hoensonae* n. sp.

***Trizocheles moosai* Forest, 1987a**

Trizocheles moosai Forest, 1987a: 181, Figs. 7b, 47a, 48a–c, 51h, 58, 59d; 1987b: 315, Fig. 2; Lemaitre et al., 2009: 5.

Type material examined. – Holotype: male (8.7 mm) (MNHN-Pg 3520), CORINDON 2, Stn. 229, 0°02.2'N 119°49.8'E, 445–411 m, 4 Nov. 1980.

Abbreviated redescription. – Shield broader than long, and longer than moderately calcified posterior carapace; dorsal surface with transverse groove subrostrally; lateral margins each with small spine in shallow indentation in proximal 0.5 and 1 adjacent accessory spinule; cervical groove clearly delineated laterally. Rostrum broadly triangular, with prominent marginal spine, equaling or not reaching level of lateral projections; lateral projections well developed, each with marginal spine. Ocular peduncles 0.5 length of shield; corneas 0.4 of peduncular lengths; ocular acicles small, each with long, slender spinose projection. Antennular peduncles overreaching distal corneal margins by entire lengths of ultimate segments; ultimate segment equal in length to penultimate segment; basal segment with small spine on statocyst lobe laterally and similar spine at ventrodistal margin. Antennal peduncles reaching midlengths or distal

margins of corneas; fifth segment unarmed; fourth segment with spine at dorsodistal margin; third segment with spine at ventrodistal margin; second segment with dorsolateral distal angle produced, with terminal bifid spine, usually 1 small spine on lateral face, dorsomesial distal angle with spine on elevated protuberance and second spine on mesial margin; first segment with large, simple or bifid spine on lateral margin distally, ventrolateral margin with short row of small spines. Antennal acicle reaching base of cornea, terminating in bifid spine, mesial margin with 1 spine proximally, lateral margin with 1 spine in distal half. Antennal flagella as long as or slightly longer than carapace; each article with few long setae, decreasing in length and number distally.

Chelipeds generally subequal (left slightly larger) and symmetrical; with propodal-carpal rotation of approximately 45°. Dactyl 0.7–0.8 length of palm, with moderately broad hiatus between dactyl and fixed finger; upper margin with row of spines, decreasing in size distally; outer face with 1 or 2 large proximal spines, and 2 irregular rows of smaller spines or tubercles and few tufts of setae. Palm 1.5–1.8 longer than carpus; upper margin with row of prominent large spines, outer surface with 3 or 4 rows of smaller spines becoming irregular single or double row on fixed finger. Carpus with 3 large spines on dorsomesial margin, dorsal surface with 4–7 smaller spines; lateral face with covering of stridulatory tubercles. Merus with small spine on dorsodistal margin and row of spinulose protuberances on remaining dorsal surface, decreasing in size proximally; lateral faces weakly tuberculate; laterodistal margins each with 1 subacute spine; ventromesial margins each with row of small spines.

Second and third pereopods not overreaching chelipeds. Dactyls approximately 0.7 length of propodi; dorsal surfaces each with short, transverse rows of long, moderately stiff setae; mesial faces each with 2 rows of tufts of setae; lateral faces each with few scattered tufts of setae; ventral margins each with 7–9 corneous spines. Propodi with short, transverse rows of stiff, long setae on dorsal margins; mesial faces each with several stridulatory tubercles in proximal 0.5 (second pereopods) or unarmed (third); ventral surfaces each with row of tufts of sparse setae, usually also corneous spinule at ventrodistal margin; lateral faces unarmed. Carpi each with dorsal row of prominent spines, not concealed by tufts of long setae (second pereopods) or only dorsodistal spine and tufts of setae (third), mesial faces of second pereopods each with 1–2 rows of short stridulatory ridges. Meri with only dorsal and ventral tufts of setae except for few tubercles or protuberances on ventral margin of each second pereopod. Fourth pereopods semichelate; each with propodal rasp consisting of several rows of corneous scales. Fifth pereopods weakly chelate; propodal rasps well developed.

Pleon with tergite 1 moderately well calcified; tergites 2–5 weakly calcified; tergite of pleomere 6 subcircular, with deep lateral incisions and shallow median sulcus; terminal margin shallowly excavated over much of length and with few tiny spinules. All tergites and telson with moderately long setae. Uropods symmetrical; protopods produced posteriorly, each with prominent spine. Telson with faint lateral indentations

dividing telson into unequal anterior and posterior portions; posterior lobes approximately 0.3 of anterior lobes, separated by deep median cleft, terminal margins rounded, unarmed but with fringe of fine setae.

Colouration. – Unknown.

Habitat. – Unknown.

Distribution. – Known only from the type locality, Macassar Strait, Indonesia; 411 m, possibly to 445 m.

***Trizocheles laurentae* Forest, 1987a**

Trizocheles laurentae Forest, 1987a: 184, Figs. 59a, 60, 61a; Forest, 1987b: 315, Fig. 2; Lemaitre et al., 2009: 5.

Type material examined. – Holotype female (6.6 mm) (MNHN-Pg 3488), MUSORSTOM 1, Stn. 44, 13°46.9'N 120°29.5'E, 592–610 m, 24 Mar.1976.

Other material examined. – 1 male (6.6 mm), 1 ovig. female (8.6 mm) (MNHN-Pg 8020), SALOMON 2, Stn. 2186, 08°17'S 160°00'E, 487–541 m, 23 Oct.2004.

Redescription. – Shield slightly broader than long, and longer than partially calcified posterior carapace; dorsal surface with prominent transverse groove subrostrally; lateral margins each with slight indentation in proximal 0.5 and minute spinule; cervical groove faintly delineated laterally. Posterior median plate weakly delineated, broad distally, narrowing posteriorly and moderately calcified; sulci cardiobranchialis faintly visible, cardiac sulci moderately delineated. Branchiostegites with weak marginal calcification in anterior half; dorsal and anterior margins unarmed. Rostrum delineated by weakly produced small median keel and small, but prominent spine, not quite reaching level of lateral projections. Lateral projections well developed, each with prominent marginal spine.

Ocular peduncles 0.4 length of shield; corneal diameter 0.4 of peduncular length. Ocular acicles small, acutely triangular; separated by 1.5 basal width of one acicle.

Antennular peduncles short but overreaching distal corneal margins by entire lengths of ultimate segments. Ultimate segment slightly shorter than penultimate segment. Basal segment with spinule on statocyst lobe laterally and smaller spinule at ventrodiscal margin.

Antennal peduncles reaching to midlengths of corneas. Fifth segment unarmed; fourth segment with tiny spinule at dorsodistal margin; third segment with spine at ventrodiscal margin; second segment with dorsolateral distal angle produced, with terminal bifid spine, dorsomesial distal angle with small spine; first segment with spine at laterodistal margin, 4 tiny spinules on ventrolateral margin. Antennal acicle reaching nearly or to base of cornea, terminating in simple or bifid spine, mesial margin with small spine proximally, lateral margin unarmed. Antennal flagella as

long as carapace; each article with 2 to several moderate to long setae, decreasing in length distally.

Chelipeds generally unequal, left considerably larger, but similar in armament; propodal-carpal rotation of approximately 45°. Dactyl approximately 0.8 length of palm, with moderately wide hiatus between dactyl and fixed finger; upper margin with row of spines, decreasing in size distally; outer face with 1–3 moderately large proximal spines, and 2 irregular rows of much smaller spinules or tubercles and few tufts of setae; cutting edge with row of low, moderately broad, calcareous teeth, terminating in small corneous claw; inner face with few small protuberances or tubercles and tufts of setae. Palm 1.5–1.7 longer than carpus; outer surface convex and with moderately sparse covering of long setae, upper margin with row of prominent large spines, outer surface with 2 or 3 rows of small spines and spinules, irregular single or double row on fixed finger, mesial face usually with 1 or 2 rows of small tubercles dorsally. Carpus subtrapezoidal; dorsomesial margin with 3 large spines, dorsal surface with 3–5 smaller spines; lateral face with covering of stridulatory ridges and rods; mesial and ventral surfaces smooth or with few tiny tubercles. Merus subtriangular; with moderately small spine at dorsodistal margin and row of low protuberances, decreasing in size proximally on remainder of dorsal margin, mesial and ventral surfaces unarmed, lateral face with scattered minute tubercles; ventromesial margin with 2 to row of spinules or small subacute spines; ventrolateral margin with few, to row of very small spinules, 1 larger blunt spine distally. Ischia each with row of small spines on ventromesial margin.

Second and third pereopod overreaching chelipeds. Dactyls equal to or slightly shorter than propodi; dorsal surfaces each with short, transverse rows of moderately dense long setae, lateral faces with scattered setae; mesial faces each with dorsal and ventral rows of tufts of moderately short setae; ventral margins each with 7–9 corneous spines. Propodi 0.2–0.3 longer than carpi; dorsal margins each with short, transverse rows of long setae; mesial faces each with several short stridulatory ridges in proximal 0.5 (second pereopods) or few tufts of sparse setae (third); ventral surfaces with few scattered setae, 1 or 2 corneous spinules at ventrodiscal margin and occasionally 1 additional in distal 0.3 of ventral surface; lateral faces unarmed. Carpi of second pereopods each with row of spines, most prominent distally, and tufts of moderately long setae, third with only small dorsodistal spine; mesial faces of second pereopods each with row of several stridulatory ridges. Meri unarmed or with tiny spinule at dorsodistal margin of each third pereopod; 1 or 2 minute spinules or tubercles on ventral margin of each second pereopod. Fourth pereopods semichelate; with propodal rasps each consisting of several rows of corneous scales. Fifth pereopods weakly chelate; propodal rasps well developed.

Pleon with tergite 1 moderately well calcified; tergites 2–5 weakly calcified; tergite of pleomere 6 roundly subquadrate, with deep lateral incisions and shallow median sulcus; terminal margin with broad median indentation and few small denticles. All tergites and telson with sparse short setae.

Uropods symmetrical; protopods produced posteriorly, each with spine. Telson with faint lateral indentations dividing telson into slightly unequal anterior and posterior portions; posterior lobes separated by deep median cleft, terminal margins rounded, unarmed but with fringe of fine setae.

Colouration. – Nor known.

Habitat. – Not known.

Distribution. – Philippine and Solomon Islands; 487–592 m, possibly 610 m.

Remarks. – In his description of the unique holotype of *T. laurentae*, Forest (1987a) noted the asymmetry of the chelipeds, but also called attention to several other characters that he felt distinguished this species from the others of the genus. The capture of a pair of specimens of *T. laurentae* in the Solomon Islands represents a significant range extension for the species, and equally as important, knowledge of the male. The asymmetry of the chelipeds reflected in their size dissimilarities is reminiscent of the asymmetry seen in *T. balssi*; however, in the latter species, both size and armament differ from left to right.

***Trizoecheles albatrossi* Forest, 1987a**

Trizoecheles albatrossi Forest, 1987a: 174, Figs. 51f, 54c, 55; Forest, 1987b: 215, Fig. 2; Lemaitre et al., 2009: 5.

Type material examined. – Holotype male (5.8 mm, molt) (USNM 228437), Japan, ALBATROSS, Stn. 5095, 35°05.34'N 139°38.36'E, 106 m, 26 Oct. 1906.

Abbreviated redescription. – Shield broader than long, and longer than calcified posterior carapace; dorsal surface with moderately long, deep transverse groove subrostrally; lateral margins each with small spine in proximal 0.5; cervical groove clearly delineated laterally. Rostrum broadly triangular, with prominent marginal spine, overreaching level of lateral projections; lateral projections well developed, each with prominent marginal spine. Ocular peduncles 0.6 length of shield; corneas 0.2 of peduncular lengths; ocular acicles small, triangular, widely separated. Antennular peduncles moderately short, overreaching distal corneal margins by approximately 0.5 lengths of ultimate segments; ultimate segment considerably longer than penultimate segment; basal segment with small spine on statocyst lobe laterally, ventrodistal margin narrowly and bluntly produced. Antennal peduncles reaching to midlengths of corneas; fifth segment unarmed; fourth segment with prominent spine at dorsodistal margin; third segment with large spine at ventrodistal margin; second segment with dorsolateral distal angle produced, with terminal bifid spine, 1 small spine on lateral face, dorsomesial distal angle with prominent spine; first segment with spine on dorsodistal margin laterally, ventrolateral margin with 3 spines distally. Antennal acicle short, reaching midlength of ocular peduncle, terminating in bifid spine, mesial margin

with 1 spine proximally, lateral margin with 1 spine at midlength. Antennal flagella missing.

Chelipeds generally subequal and symmetrical, with propodal-carpal rotation of approximately 30°. Dactyl with upper margin not distinctly delimited; outer face with 3 or 4 large proximal tubercles, and few scattered smaller tubercles and several tufts of long setae. Palm with row of prominent large spines on upper margin, outer surface with 3 rows of much smaller spines becoming irregular row of large, spiniform tubercles on fixed fingers, latter also with few tufts of moderately stiff setae. Carpus with 3 large spines on dorsomesial margin, dorsal surface with 4 or 5 smaller tubercles (left) or spines (right); lateral faces each with covering of stridulatory rods and small tubercles. Merus with prominent spine at dorsodistal margin and 1 subdistal slightly smaller spine, remaining dorsal margin with few low protuberances proximally; ventromesial margin with row of prominent spines; ventrolateral margin with 2 or 3 spines distally.

Second and third pereopods very slightly overreaching chelipeds. Dactyls approximately equal to lengths of propodi; dorsal surfaces each with row of low protuberances and tufts of long setae; mesial surfaces each with 2 rows of widely-spaced tufts of setae; ventral margins each with 5–7 corneous spines. Dorsal margins of propodi each with row of low protuberances and tufts of long setae; mesial faces each with few short stridulatory ridges or tubercles distally (second pereopods) or unarmed (third); ventral surfaces each with row of widely-spaced tufts of setae; lateral faces unarmed. Carpi each with dorsal row of 4 or 5 prominent spines (second pereopods) or only small dorsodistal spine (third), and tufts of long setae; mesial faces of second pereopods each with row of widely-spaced, short stridulatory ridges. Meri unarmed except for with spinule at dorsodistal margin of third pereopod and row of widely-spaced spinules and tufts of long setae on ventral margin of each second pereopod. Fourth pereopods semichelate; each with propodal rasp consisting of several rows of corneous scales. Fifth pereopods weakly chelate; propodal rasps well developed.

Pleon with tergite 1 moderately well calcified; tergites 2–5 weakly calcified; tergite of pleomere 6 subcircular, with deep lateral incisions; terminal margin entire but slightly irregular. Uropods symmetrical; protopods each with prominent posteriorly directed spine. Telson with faint lateral indentations dividing telson into very unequal anterior and posterior portions; much short posterior lobes separated by deep median cleft, terminal margins rounded, unarmed but with fringe of fine setae.

Colouration. – Unknown.

Habitat. – Unknown.

Distribution. – Presently known only from the type locality.

***Trizocheles boasi* Forest, 1987a**
(Figs. 17, 18)

Mixtopagurus brevicaulis Boas, 1926: 37 (in part), Fig. 4B, C.
Trizocheles boasi Forest, 1987a: 176, Figs. 51a–c, 54d, e, 56a, b;
Forest, 1987b: 315, Fig. 2; Lemaitre et al., 2009: 5.
Trizocheles gracilis Forest, 1987a: 179, Figs. 51g, 57, 59b; Forest,
1987b: 315, Fig. 2; Lemaitre et al., 2009: 5.

Type material examined. – Holotype of *Trizocheles boasi* male (6.0 mm) (ZMUC CRU 5846), Danish Kei Expedition, Stn. 59, 05°28'S 132°36'E, 385 m, 12 May 1922. Holotype of *Trizocheles gracilis* male (5.0 mm, entire animal very poorly calcified and appearing as though molt eminent at time of capture) (USNM 228438), ALBATROSS, Stn. 5172, 06°03.15'N 120° 35.5'E, 580 m, 5 Mar.1908.

Paratype of *Trizocheles boasi*: ovig. female (3.4 mm) (ZMUC 5847), same date as holotype.

Other material examined. – 1 male (8.6 mm) (ZRC), PANGLAO 2004, Balicacagi, depth unknown, 1–5 Mar.2004; 1 male (8.0 mm) (NMCR), PANGLAO 2005, Stn. CP 2395, 09°36.2'N 123°43.8'E, 434–532 m, 31 May 2005; 1 female (5.4 mm) (MNHN-Pg 8021), SALOMON 2, Stn. CP 2184, 08°16.9'S 159°59.7'E, 464–523, 23 Oct.2004; 2 males (4.8, 6.4 mm) (MNHN-Pg 8022), Stn. CP 2186, 08°17.0'S 160°00.0'E, 487–581, 23 Oct.2004; 1 male (7.7 mm), 1 female (8.6 mm), 1 ovig. female (8.7 mm) (MNHN-Pg 8023), Stn. CP 2187, 08°17.5'S 159°59.8'E, 482–604 m, 23 Oct.2004.

Redescription. – Shield slightly longer than broad to broader than long, and longer than weakly calcified posterior carapace;



Fig. 17. *Trizocheles boasi* Forest, 1987a, male (8.0 mm) (NMCR), PANGLAO 2005, Stn. CP 2395.

dorsal surface with moderately long, deep transverse groove subrostrally; lateral margins each with small to minute indentation in proximal 0.5; cervical groove obsolete to clearly delineated laterally. Posterior median plate faintly to clearly delineated, moderately broad and weakly calcified; sulci cardiobranchialis not apparent. Branchiostegites weakly calcified only dorsally and at anterior margin; dorsal margin unarmed or with 1 or 2 spines, few spinules on anterior margin dorsally. Rostrum broadly triangular to broadly rounded, armature varying from tiny spinule to prominent marginal spine overreaching level of lateral projections. Lateral projections well developed, each with marginal, often prominent, spine.

Ocular peduncles 0.5–0.7 length of shield; corneas 0.4–0.5 of peduncular lengths. Ocular acicles small, triangular.

Antennular peduncles varying from reaching to distal corneal margins to overreaching distal corneal margins by 0.6 lengths of ultimate segments; ultimate segment equal in length to penultimate segment or slightly longer; basal segment with small spine on statocyst lobe laterally and similar spine at ventrodistal margin.

Antennal peduncles reaching to or beyond bases of corneas, but not to distal corneal margins. Fifth segment unarmed; fourth segment with spine at dorsodistal margin; third segment with spine at ventrodistal margin; second segment with dorsolateral distal angle produced, with terminal bifid spine and frequently with 1 additional spine on lateral margin, dorsomesial distal angle with spine; first segment with 1 or 2 spines on dorsodistal margin, ventrolateral margin with 1 or 2 small spines. Antennal acicle reaching beyond proximal margin of fifth peduncular segment, terminating in bifid spine, mesial and lateral margins with or without spine. Antennal flagella longer than carapace; occasionally 1–3 short setae every article and 1 or 2 longer every several articles.

Chelipeds generally subequal and symmetrical, right or left largest; propodal-carpal rotation of 30–45°. Dactyl shorter than palm, with slender hiatus between dactyl and fixed finger; upper margin with row of spines, decreasing in size distally



Fig. 18. *Trizocheles boasi* Forest, 1978a, male (8.0 mm), in sponge habitat partially removed (NMCR), PANGLAO 2005, Stn. CP 2395.

but not extending to tip and not concealed by accompanying long setae; outer face with irregular row of spines in proximal half and scattered tufts of setae; cutting edge with row of small, calcareous teeth, terminating in large corneous claw; inner face with few tufts of setae. Palm 1.3–2.0 longer than carpi; upper margin with row of 5 or 6 prominent large spines not obscured by accompanying long setae, outer surface of palm with 3 or 4 irregular or incomplete rows of smaller spines and sparse long setae becoming single marginal row on fixed finger, latter also with few tufts of moderately stiff setae; inner and lower faces each unarmed. Carpus subtrapezoidal; dorsomesial margin with 2 or 3 large spines, dorsal surface with 3–6 smaller spines; lateral face with at least partial covering of stridulatory rods and/or tubercles; mesial and ventral surfaces smooth. Merus subtriangular; with spine or spinule at dorsodistal margin and row of very low protuberances on remaining dorsal margin; ventral and lateral faces unarmed; ventrolateral margin unarmed, ventromesial margin with single or irregular short double row of small spines near proximal margin and pair of spines at distal angle. Ischium with row of prominent spines on ventromesial margin.

Second and third pereopods slightly overreaching or just reaching tips of chelae. Dactyls slightly shorter than propodi; dorsal and ventral surfaces each with row of tufts of moderately long setae; lateral and mesial faces each with 2 rows of widely-spaced tufts of sparse setae; ventral margins each also with row of 4–9 corneous spines. Propodi 0.2–0.5 longer than carpi; dorsal margins each with row of low transverse protuberances and tufts of setae; mesial faces of second pereopods each with or without row of low, transverse stridulatory rods, third unarmed; lateral faces of both unarmed; ventral surfaces each with row of widely-spaced tufts of sparse setae and frequently 1 or more small corneous spines. Carpi of second pereopods each with row of prominent spines on dorsal surface, mesial faces each with row of short stridulatory rods or ridges dorsally, third with only small dorsodistal spine and unarmed mesial face, both with tufts of sparse setae dorsally. Meri and ischia each with tufts of sparse setae dorsally and ventrally. Fourth pereopods semichelate; each with propodal rasp consisting of several rows of corneous scales. Fifth pereopods chelate; propodal rasps well developed.

Pleon with tergite 1 moderately well calcified; tergites 2–5 weakly calcified; tergite of pleomere 6 subcircular, with deep lateral incisions and shallow broad median sulcus in posterior half; terminal margin with faint median rectangular uncalcified indentation, unarmed. All tergites and telson with covering of short to moderately long setae. Uropods symmetrical; protopods produced posteriorly, each with prominent spine. Telson (weakly calcified) with faint lateral indentations dividing telson into unequal anterior (0.7) and posterior (0.3) portions; posterior lobes separated by deep median cleft, terminal margins rounded, unarmed but fringed with fine setae.

Colouration. – In life, ocular peduncles light orange; cephalothorax, pleon and appendages overall mottled reddish-

orange, with darker reddish spot on posterior carapace median plate and red splotches on mesial margins of meri and carpi of chelipeds (Fig. 17).

Habitat. – Typically inhabiting sponges of the family Hexactinellidae (Fig. 18).

Distribution. – Indonesia, Philippine and Solomon Islands; 385–581 m, possibly to 604 m.

Remarks. – Forest (1987a) considered *T. boasi* and *T. gracilis* very similar morphologically, but found what he believed to be significant differences between the holotypes of the two taxa. Most noteworthy was the absence of stridulatory rods or tubercles on the mesial faces of the propodi of the second pereopods in *T. boasi*. In addition to being able to reexamine these two type specimens, we have had the added advantage of having supplemental material from the Philippine PANGLAO 2004 and 2005 expeditions and the Solomon Islands expedition. In the absence or presence of stridulatory tubercles on the mesial faces of the second pereopod, the two males from the Philippines are identifiable as *T. boasi*, whereas the small female specimen from the Solomons must be considered *T. gracilis*. However, as pointed out by Forest (1987a: 181) the similarities between the two taxa are sufficiently numerous that additional material would be needed to confirm their distinctiveness. With the added material at hand that provided a broader size range, we could find no suite of characters that would separate them and therefore must conclude that *T. boasi* and *T. gracilis* are conspecific. We have chosen to retain the specific name *boasi* for this species. In addition to well developed male gonopores, the two PANGLAO males each had a well developed right female gonopore.

Trizocheles manningi Forest, 1987a

Trizocheles manningi Forest, 1987a: 210, Figs. 59c, 66d, 72; Forest, 1987b: 315, Fig. 2; Lemaitre et al., 2009: 5.

Type material examined. – Holotype female (3.9 mm) (USNM 228439), ALBATROSS Stn. 5543, 08°47.15'N 123°35.00'E, 296 m, 20 Aug. 1909.

Other material examined. – 1 female (5.2 mm) (ZRC), PANGLAO 2004, no data.

Redescription. – Shield broader than long, and longer than moderately calcified posterior carapace; dorsal surface with distinct transverse groove subrostrally and scattered tufts of sparse setae. Cervical groove weakly to clearly delineated laterally. Shield lateral margins each with or without small spine and shallow indentation in proximal 0.5. Posterior median plate delineated, relatively broad anteriorly and narrowing slightly posteriorly, weakly to moderately well calcified; sulci cardiobranchialis not apparent. Branchiostegites largely uncalcified; dorsal margins each with 1 or 2 small spines, anterior margins each with 3 or 4 small spines. Rostral lobe broadly triangular, with prominent marginal spine, equaling level of lateral projections. Lateral

projections well developed, each also with prominent marginal spine.

Ocular peduncles 0.6 length of shield; corneal diameter 0.3 of peduncular length; ocular acicles small, triangular, terminally acute.

Antennular peduncles overreaching distal corneal margins by 0.3–0.5 lengths of ultimate segments. Ultimate segment slightly longer than penultimate segment. Basal segment with spine on statocyst lobe laterally and spine at ventrodistal margin.

Antennal peduncles reaching lateral basal margins of corneas. Fifth segment unarmed; fourth segment with spine at dorsodistal margin; third segment with prominent spine at ventrodistal margin; second segment with dorsolateral distal angle produced, with terminal simple or prominently bifid spine and small spine on lateral face, dorsomesial distal angle with large spine; first segment with 1 or 2 spines on lateral margin distally, 2 or 3 small spines on ventrolateral margin. Antennal acicle not quite reaching to slightly overreaching midlength of fifth segment, terminating in bifid spine, lateral margin with or without spine, mesial margin with 1 spine in proximal half. Antennal flagella slightly longer than carapace; proximal few articles each naked or with tiny bristle, more distal articles with few moderately long to long setae.

Chelipeds approximately equal in holotype, right somewhat larger in Panglao female, armament similar; both with approximately 30° propodal-carpal rotation. Dactyl approximately 0.8 length of palm, with little if any hiatus between dactyl and fixed finger; dorsomesial margin with 1 prominent and 1 smaller spine proximally, low protuberances and tufts of long setae distally, dorsal surface with few tufts of long setae; cutting edge with row of small calcareous teeth, terminating in moderately large corneous claw. Palm nearly 2.0 length of carpus; dorsomesial margin with row of prominent large spines, dorsal surface with covering of long setae not concealing integument, dorsolateral surface distally with irregular row of low protuberances, continuing onto fixed finger and row of small spinules; palm of Panglao specimen also with small spine on dorsal face proximally. Carpus subtrapezoidal; dorsomesial margin with 2 large spines, dorsal surface with 4 somewhat smaller spines laterally; no stridulatory rods or ridges; mesial and ventral surfaces with few setae distally. Merus subtriangular; dorsal margin with spine on dorsodistal margin, 1 smaller spine or spinulose protuberance subdistally and row of spinules or spinulose tubercles on remaining dorsal margin; ventral, lateral and mesial faces unarmed, ventromesial margin with regular or irregular row of small spines, distalmost 1 or 2 largest; ventrolateral margin with 2 spinulose protuberances distally or unarmed. Ischium with row of prominent spines on ventromesial margin.

Second and third pereopods only slightly overreaching chelipeds. Dactyls 0.6 length of propodi; dorsal surfaces each with row of tufts of long setae; mesial and lateral faces each with dorsal and ventral row of very widely-spaced tufts of

sparse setae; ventral margins each with 6 prominent corneous spines. Propodi approximately 1.2 length of carpi; dorsal margins each with transverse rows of low protuberances and tufts of long setae partially obscuring integument; mesial and lateral faces each with few tufts of long setae dorsally; ventral surfaces each with row of widely-spaced tufts of sparse setae. Carpi each with dorsal row of 2–4 widely-spaced spines, partially concealed by tufts of long setae (second pereopods) or only dorsodistal spine and tufts of setae (third); lateral faces each with tufts of long setae. Meri each with dorsal and ventral tufts of setae, third also each with very small dorsodistal or dorsolateral distal spine. Ischia each with few setae on ventral margin. Fourth pereopods semichelate; each with propodal rasp consisting of several rows of corneous scales. Fifth pereopods weakly chelate; propodal rasps well developed.

Pleon with tergite 1 moderately well calcified; tergites 2–5 weakly to moderately calcified; tergite of pleomere 6 roundly subquadrate, with lateral incisions and very shallow median groove; terminal margin entire or faintly sinuous, unarmed, but with row of fine setae. All tergal surfaces, margins and telson with covering of moderate to long setae. Uropods symmetrical; protopods each with prominent spine. Telson with faint lateral indentations dividing telson into subequal anterior and posterior portions; posterior lobes separated by deep median cleft, terminal margins rounded, unarmed but fringed with fine setae.

Colouration. – Unknown.

Habitat. – Unknown.

Distribution. – Known only from the Philippine Islands; 296 m.

Remarks. – The tergite of the sixth pleomere of the holotype has a decalcified terminal margin which gives the margin the appearance of having a shallow, rectangular indentation. The margin is entire or only slightly sinuous in the only two specimens known, both females. In both specimens no stridulatory rods or ridges were observed and given the differences in animal size, it may be reasonable to assume that this absence is not growth related.

***Trizocheles mutus* Forest, 1987a**

Trizocheles mutus Forest, 1987a: 212, Figs. 66e, 69e, 73; Forest, 1987b: 315, Fig. 2; Lemaitre et al., 2009: 5.

Type material examined. – Holotype female (6.0 mm) (ZMUC CRU 7463), Th. Mortensen South Africa Expedition, Stn. 15, 07°29'S 114°49'E, 240 m, 10 Apr. 1929.

Abbreviated Redescription. – Shield broader than long, and longer than weakly calcified posterior carapace; dorsal surface with prominent transverse groove subrostrally; lateral margins each with tiny or small spine and shallow indentation in proximal 0.5; cervical groove weakly delineated laterally. Rostral lobe broadly triangular, with prominent marginal

spine, approximately equaling level of lateral projections; lateral projections well developed, each with prominent marginal spine.

Ocular peduncles 0.6 length of shield; corneal diameter 0.4 of peduncular length; ocular acicles small, triangular, terminally acute. Antennular peduncles overreaching distal corneal margins by 0.5 lengths of ultimate segments; ultimate segment equal in length to penultimate segment; basal segment with spine on statocyst lobe laterally, no spine at ventrodistal margin. Antennal peduncles reaching to slightly overreaching basal margins of corneas, but not reaching distal margins; fifth segment unarmed; fourth segment with spine at dorsodistal margin; third segment with spine at ventrodistal margin; second segment with dorsolateral distal angle produced, with terminal bifid spine and small spine on lateral face, dorsomesial distal angle with spine; first segment with 2 small spines on lateral margin distally, ventrolateral margin with 4 small spines on ventrolateral margin. Antennal acicle reaching to midlength of fifth segment, terminating in bifid spine, mesial and lateral margins each with 1 or 2 spines. Antennal flagella as long as or longer than carapace; each article with several long, not regularly paired setae, decreasing in length and number distally.

Chelipeds approximately equal and symmetrical; with little if any propodal-carpal rotation. Dactyl with moderately slender hiatus between dactyl and fixed finger; dorsomesial margin with row of prominent spines and tufts of long setae, dorsal surface with few scattered smaller spines partially concealed by tufts of long setae. Palm with row of prominent large spines on dorsomesial margin, dorsal surface with several rows of small spines partially concealed by tufts of long setae, decreasing in size laterally and extending length of fixed finger. Carpus with 3 large spines on dorsomesial margin, dorsal surface with 2 or 3 somewhat smaller spines; lateral faces each with few very short setose ridges, no stridulatory rods or ridges. Merus with spine dorsodistal margin and row of setae on remaining dorsal surface; ventromesial and ventrolateral margins each with row of small spines and few setae.

Second and third pereopods overreaching chelipeds. Dactyls as long or slightly longer than propodi; dorsal surfaces each with row of long setae; mesial and lateral faces each with row of widely-spaced tufts of sparse tufts of setae; ventral margins each with 7 or 8 corneous spines. Dorsal margins of propodi of second pereopods each with transverse rows of tufts of long setae partially obscuring a row of long spines, third with similar of transverse rows of long setae and prominent dorsodistal spine; mesial and lateral faces each with few tufts of long setae dorsally; ventral surfaces each with row of widely-spaced low protuberances and tufts of sparse setae. Carpi each with dorsal row of spines, partially concealed by tufts of long setae (second pereopods) or only dorsodistal spine and tufts of setae (third). Meri each with dorsal and ventral tufts of setae, third also each with very small dorsodistal spine. Fourth pereopods semichelate; each with propodal rasp consisting of several rows of corneous

scales. Fifth pereopods weakly chelate; propodal rasps well developed.

Pleon with tergite 1 moderately well calcified; tergites 2–5 weakly calcified; tergite of pleomere 6 roundly subquadrate, with lateral incisions and very shallow median sulcus; terminal margin with 3 weak incisions giving margin scalloped appearance, unarmed, but with row of fine setae. All tergal surfaces, margins and telson with covering of moderate to long setae. Uropods symmetrical; protopods produced posteriorly, each with prominent spine. Telson with faint lateral indentations dividing telson into unequal anterior and posterior portions; posterior lobes approximately 0.3 of anterior lobes, separated by deep median cleft, terminal margins rounded, unarmed but fringed with fine setae.

Colouration. – Unknown.

Habitat. – Unknown.

Distribution. – Known only from the type locality.

Remarks. – As previously indicated, *T. mutus* was one of four taxa whose relationship with other members of the genus was unresolved in Lemaitre et al.'s (2009) analysis. Like *T. manningi*, *T. mutus* is characterized by the absence of stridulatory rods and ridges on the lateral faces of the carpi of the chelipeds, but until additional material is available, it cannot be determined whether this absence is growth related or a true plesiomorphic condition.

Mixtopagurini

Mixtopagurus A. Milne-Edwards, 1880

Mixtopagurus paradoxus A. Milne-Edwards, 1880

Mixtopagurus paradoxus A. Milne Edwards, 1880: 39; Agassiz, 1888: 41; A. Milne-Edwards & Bouvier, 1893: 24, Pl. 2, Figs. 1–19; Benedict, 1901: 778; Alcock, 1905: 153; Boas, 1926: 38; Rabaud, 1941: 268, Fig. 24; Pilgrim 1965: 554; McLaughlin, 1983a: 435; Forest, 1987a: 220, Figs. 4e, 6e, f, 7f, 74a–h, 75a–g, 76a–e, 77a–j, Pl. 2B, 3G, H, 8C, D; Forest, 1987b: 315, Fig. 4; McLaughlin et al., 2005: 246 (list), 306; Lemaitre et al., 2009: 5.

Mixtopagurus gilli Benedict, 1901: 777, Fig. 7; Alcock, 1905: 153.

Pomatocheles paradoxus – Stebbing, 1914: 2.

Mixtopagurus Gilli – Boas, 1926: 39; Bouvier, 1940: 117.

Type material. – Holotype male (5.6 mm) (MCZ 4076), BLAKE, Stn. 291, 13°12'N 59°41'W, 365 m, 9 Mar.1879 (not seen).

Other material examined. – 1 male (9.9 mm), 1 female (10.6 mm) (USNM 102718), FISH HAWK, Stn. 7282, 24°21.15'N 81°52.15'W, 199 m, 18 Feb.1902; 1 male (9.4 mm), 1 ovig. female (11.3 mm) (USNM 103396), R.V. OREGON, Stn. 1989, 09°45'N 59°45'W, depth not given, 4 Nov.1957.

Abbreviated redescription. – Shield length equal to or slightly longer than width, longer than weakly calcified posterior

carapace; dorsal surface with shallow transverse groove subrostrally; shield lateral margins without small spines or shallow indentations in proximal 0.5. Posterior median plate delineated, relatively broad anteriorly, narrowing posteriorly, moderately well calcified; sulci cardiobranchialis distinct anteriorly. Branchiostegites weakly calcified in dorsal 0.5; dorsal margin with row of spines anteriorly, anterior margin with few spinules. Rostrum broadly rounded to moderately broadly triangular, with or without tiny terminal spinule, usually reaching level of lateral projections. Lateral projections triangular, each with small terminal spine. Ocular peduncles 0.7–0.8 length of shield; corneal diameter 0.2 of peduncular length; ocular acicles moderately small, each with long slender spine. Antennular peduncles not quite reaching to overreaching distal corneal margins by 0.1–0.2 lengths of ultimate segments; basal segment with prominent spine laterally on statocyst lobe and slightly smaller spine at ventrodistal angle. Antennal peduncles not reaching to bases of corneas; fifth segment with spine on dorsal surface proximally; fourth segment with dorsodistal spine; third segment with spine at ventrodistal margin; second segment with dorsolateral distal angle produced, with terminal bifid spine, occasionally accessory spine on lateral margin, dorsomesial distal angle with small spine; first segment with 1 or 2 small spines at laterodistal margin, ventrolateral margin with 1–5 spines. Antennal acicle reaching to distal 0.2–0.3 of fifth peduncular segment, terminating in simple or bifid spine, mesial margin with row of prominent spines, lateral margin with 1 or 2 spines. Antennal flagella slightly longer than carapace.

Chelipeds equal or slightly subequal, similar; without noticeable propodal-carpal rotation. Dorsal margin of dactyl with few proximal spines to row of spines extending nearly to tip and accompanied by tufts of stiff setae; dorsal surface with few protuberances or blunt spines and tufts of setae; mesial face with 1 or 2 rows of protuberances and tufts of setae. Palm with row of 5 or 6 prominent spines on dorsomesial margin, dorsal surface with 4–6 row of spines and tufts of setae, 1 or 2 extending onto fixed finger; lateral face of palm and fixed finger with irregular rows of spinulose protuberances and tufts of setae. Carpus with row on prominent spines on dorsomesial margin, dorsal surface spinose and with tufts of stiff setae, dorsodistal margin with row of spines. Merus with 4 or 5 spines on dorsodistal margin; ventromesial and ventrolateral margins each with row of small spines.

Second and third pereopods slightly overreaching chelipeds; dissimilar. Dactyls of second pereopods each with row of small spines and tufts of long, stiff setae on dorsal surface; dactyls of third each with low protuberances and similar tufts of setae; ventral margins of both each with row of 9–12 corneous spines and adjacent row of tufts of stiff setae. Propodi of second pereopods each with row of small spines partially concealed by tufts of setae; propodi of third each with low protuberances and tufts of setae. Carpi each with row of spines and tufts of setae on dorsal surface, spines

appreciably larger on second pereopods. Meri of second pereopods each with row of small spines on ventromesial margin, 1 or 2 small distal spines on ventrolateral margin; third unarmed. Fourth pereopods semichelate; propodal rasps each consisting of several rows of corneous scales. Fifth pereopods chelate; propodal rasps well developed.

Tergite of pleomere 6 roundly subquadrate with lateral incisions and very shallow median groove; terminal margin with row of blunt or subacute spines. Uropods usually asymmetrical, protopods not produced posteriorly, unarmed. Telson distinctly or indistinctly divided into anterior and posterior portions; posterior lobes separated by weak to prominent median cleft, usually asymmetrical with left largest.

Colouration. – Unknown.

Habitat. – Presumably gastropod shells.

Distribution. – Caribbean Sea and western Atlantic Ocean, from Barbados to North Carolina, 196–371 m, possibly to 567 m.

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