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Atlas of Australasian hormurid scorpions. I. The genus *Hormurus* Thorell, 1876 in Papua New Guinea. Exceptional morphological diversity in male and female copulatory structures suggests genital coevolution

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Abstract: New Guinea is the largest Pacific island, and the world's second largest, with a land area of about 785,000 km². Located north of Australia, the island was gradually shaped since the Eocene by the geologically recent sequential accretion of several island arc systems onto the northern part of the Australian Craton. This complex geological history has resulted in a tremendous biological diversity with high rates of endemism. On the other hand, the rugged mountainous landscape and lack of infrastructure has hampered scientific research in the country and for the most part Papuan biotas remain thus far only superficially known. This is the case for scorpions of the genus *Hormurus* Thorell, 1876 (Hormuridae Laurie, 1896; Scorpiones C. L. Koch, 1837). Although they are the dominant scorpion group in Wallacea and Melanesia, only two species are currently recognized from New Guinea and its adjacent islands. A thorough revisionary study of the *Hormurus* material present in the scientific collections of various museums and of a large series of specimens more recently collected led to the discovery of 16 new species, i.e. *Hormurus ancylolobus* Monod & Prendini, sp. nov.; *Hormurus araiaspathe* Monod & Prendini, sp. nov.; *Hormurus barai* Monod, Iova & Prendini, sp. nov.; *Hormurus cameroni* Monod, Austin & Prendini, sp. nov.; *Hormurus hypseloscolus* Monod & Prendini, sp. nov.; *Hormurus krausi* Monod & Prendini, sp. nov.; *Hormurus maiwa* Monod & Prendini, sp. nov.; *Hormurus menapi* Monod & Prendini, sp. nov.; *Hormurus muyua* Monod & Prendini, sp. nov.; *Hormurus oyatabu* Monod & Prendini, sp. nov.; *Hormurus oyawaka* Monod & Prendini, sp. nov.; *Hormurus sibonai* Monod & Prendini, sp. nov.; *Hormurus slapcinskyi* Monod & Prendini, sp. nov.; *Hormurus sporacanthophorus* Monod & Prendini, sp. nov.; *Hormurus tagula* Monod & Prendini, sp. nov.; *Hormurus yela* Monod & Prendini, sp. nov. Fully illustrated descriptions of these new taxa are presented in the present contribution, as well as a redescription of *Hormurus papuanus* Kraepelin, 1914. *Hormurus* species are characterized by relatively few diagnostic external characters which hampers species differentiation. However, the unusual interspecific diversity of hemispermatophores observed in Papuan taxa partially alleviate this issue and enable reliable species discrimination. The position of the laminar hook is particularly variable and is correlated with the elongation of the female genital operculum which also shows an atypical diversity for the genus. This interdependence strongly suggests genital coevolution driven by a lock-and-key mechanism. This would be the first such case reported for the order Scorpiones Koch, 1837. Multivariate and geometric morphometric analyses were carried out to visually emphasize subtle interspecific differences in external morphology and hemispermatophore morphology. Additionally, the correlation between hemispermatophore laminar hook position and shape of the female genital operculum was assessed statistically and comments are provided concerning potential mechanisms underlying the coevolutionary process.

Keywords: Melanesia - endemism - hemispermatophore - genital coevolution - structural lock-and-key mechanism - multivariate morphometrics - geometric morphometrics.

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INTRODUCTION

New Guinea biodiversity and scorpion fauna: With an area of 785,753 km^2, New Guinea is the world's largest tropical island. It is located in Melanesia in the southwestern Pacific Ocean, about 150 km north of Australia, and was classified as one of the three major tropical humid wilderness areas (together with Amazonia and the Congo Basin) by Mittermeir *et al.* (1998, 2003). By definition, these are high-biodiversity ecoregions that are still largely intact (≥70 % of original pristine vegetation remaining), have low human population density (<5 people per km^2) and high rates of endemism (≥0.5 % of the world's plants as endemics). New Guinea ecosystems are among the least disturbed on the planet and comprise a wide range of habitats, i.e. mangroves, lowland and montane rainforests, swamp forests, savannas and sub-alpine grasslands. These are home to an astonishing biodiversity with a vast array of endemic plant and animal taxa. The New Guinea flora is actually considered the most diverse on the planet, with a remarkably high rate of endemism, unmatched in the Asia-Pacific Region (Cámara-Leret *et al.*, 2020). Faunistically, the island is equally diverse and unique, with about 8 % of the world's vertebrate and 4 % of the world's butterfly species (Allison, 2007).

This extraordinary assemblage of unique biotas is considered to be for the most part the consequence of a tumultuous geological history that involved the formation of several island arc systems during the last 40 My, their sequential accretion to the northern part of the Australian craton and the resulting orogenic events (Pigram & Davis, 1987; Hall, 1998, 2002; Hill & Hall, 2003; Van Ufford & Cloos, 2005; Baldwin *et al.*, 2012). Two patterns of diversification currently emerge from published biogeographic studies. On one hand, ancient biotas that started diversifiying on the nascent oceanic island arcs before their accretion and show extant distribution patterns correlated to geological terranes (Gressit, 1982; De Boer & Duffels, 1996; Polhemus, 1996; Jønsson *et al.*, 2011; Deiner *et al.,* 2011; Unmack *et al.*, 2013; Aggerbeck *et al.*, 2014; Georges *et al.*, 2014; Kalkman *et al.*, 2013, 2017; Strickland *et al.*, 2016; Rivera *et al.*, 2017; Oliver *et al.*, 2018; Tallowin *et al.*, 2018, 2020), and on the other hand, biota that colonized Proto-New Guinea after the accretion of the major island arcs and the distributions of which are not related to geology (Toussaint *et al.*, 2014; Moyle *et al.*, 2016).

Although its biological richness is indisputably acknowledged, the biota of New Guinea remains for the most part virtually unknown, as the discovery of hundreds of species during the last two decades can attest. Between 1998 and 2008, 1060 taxa were officialy described from New Guinea (Thompson, 2011). Significant increases in taxonomic knowledge with the description of numerous new taxa are particularly noteworthy in several poorly known amphibian and invertebrate groups, e.g. mycrohylid frogs (Zweifel *et al.*, 2005; Kraus & Allison, 2006; Günther & Richards, 2011; Kraus, 2011, 2013a, b, 2014, 2015, 2016, 2017a, b, 2018, 2019a, b; Günther *et al.*, 2014), charopid land snails of the genus *Paryphantopsis* Thiele, 1928 (Slapcinsky, 2005, 2006, 2009; Slapcinsky & Lasley, 2007), tetrigid pygmy grasshoppers of the genus *Ophiotettix* Walker, 1871 (Tumbrinck & Skejo, 2017) and salticid spiders (Maddison, 2009, 2016; Zhang & Maddison, 2012; Maddison & Szűts, 2019). Most notably, megadiverse radiations were revealed in several genera of beetles, i.e. Anthicidae Latreille, 1819: *Macratria* Newman, 1838 (Telnov, 2011), Curculionidae Latreille, 1802: *Trigonopterus* Fauvel, 1862 (Riedel *et al.*, 2010, 2013; Van Dam *et al.*, 2016), Dytiscidae Leach, 1815: *Exocelina* Broun, 1886 (Shaverdo & Balke, 2014, 2019; Shaverdo *et al.*, 2012, 2013, 2014, 2016a, b, c, 2017, 2018, 2019, 2020) and Hydraenidae Mulsant, 1844: *Hydraena* Kugelann, 1794 (Perkins, 2011).

On the other hand, only four scorpion genera belonging to two families are currently recorded from New Guinea (Fet *et al.*, 2000): *Hormurus* Thorell, 1876 (3 spp.) and *Liocheles* Sundevall, 1833 (1 sp.) in the Hormuridae Laurie, 1896 and *Isometrus* Ehrenberg, 1828 (2 spp.) and *Lychas* C. L. Koch, 1845 (3 spp.) in the Buthidae C. L. Koch, 1837. Except for the genus *Liocheles*, the low number of species per genus is probably not representative of their true diversity, but rather due to the lack of scientific effort. New Guinea scorpions hitherto remain understudied, with only two new taxa described recently (Lourenço & Qi, 2007; Lourenço, 2011). However, trends observed in other arthropod groups suggest that the scorpion fauna is most probably extremely rich and species numbers are expected to soar pending thorough taxonomic studies. The first systematic revision of the genus *Hormurus* from Papua New Guinea (PNG), the eastern half of the island, presented here confirms this assumption. The thorough study of an extensive material present in the scientific collections of various museums, and of a large series of specimens more recently collected led to the discovery of 16 new species. The known specific diversity in *Hormurus* is hereby more than doubled and PNG now becomes the most species-rich region for *Hormurus*.

As pointed out by Maddison & Zhang (2009) for salticid spiders, the currently recognized species number is probably a gross underestimate of the total *Hormurus* diversity, and much remains to be discovered. Rugged mountainous terrains and lack of infrastructure have greatly hindered scientific collecting in New Guinea. The interior of the island remains for the most part extremely difficult to reach due to the absence of an efficient road network. As a result, the material presented here comes from only a minuscule part of the territory of PNG, mostly from coastal regions.

Systematics of *Hormurus* from New Guinea: Only three *Hormurus* species, currently recognized as valid, are reported from New Guinea, i.e. *Hormurus karschii* Keyserling, 1885, *Hormurus papuanus*, recently removed from synonymy (Monod, 2000; Monod *et al.*, 2019), and *Hormurus waigiensis* (Gervais, 1843). The genus possesses a very conserved external morphology with few diagnostic features, which makes species differentiation difficult. Most of the external interspecific differences are morphometric and mainly restricted to pedipalps of males. Such homogeneity compels the use of mathematical methods together with the search for alternative, maybe less obvious diagnostic traits to reliably resolve taxonomy. Therefore, in addition to the examination of discrete external characters, multivariate morphometric analyses of measurements and geometric morphometric analyses of hemispermatophores were conducted to define the different species.

Moreover, the study revealed that two character systems previously neglected for hormurids, i.e. ventral setation of the metasoma segments and position of the laminar hook on the hemispermatophore stalk, are reliable taxonomic characters for Papuan *Hormurus* and permit unambiguous identification in most cases. Metasoma setation remains thus far widely unexplored in scorpion systematics. It has only been applied for genus and species diagnoses in a few families, i.e. Hadruridae Stahnke, 1974 (Williams, 1970), Vaejovidae Thorell, 1876 (Sissom & González-Santillán, 2004; Sissom & Hendrixon, 2005; González-Santillán & Prendini, 2013, 2015, 2016; Sissom *et al.*, 2012, 2016), Bothriuridae Simon, 1880 (Mattoni & Acosta, 2005; Ochoa *et al.*, 2011) and Euscorpiidae Laurie, 1896 (González-Santillán & Alvarez Padilla, 2015; González-Santillán *et al.*, 2017). The present work demonstrates that it is also taxonomically informative at the species level in hormurids. Assessment of the variabiliy of setation patterns among Papuan *Hormurus* allow the elaboration of the first hypothesis for positional homology of macrosetae across segments and across taxa, as well as the proposal of a new nomenclature implementing this postulate.

Hemispermatophores are widely recognized as an important structure for taxonomic differentiation throughout the whole order (Vachon, 1952; San Martin, 1969; Koch, 1977; Lamoral, 1979; Maury, 1980; Francke & Soleglad, 1981; Francke, 1982; Lourenço, 1987, 1989; Stockwell, 1989; Williams & Savary, 1991; Soleglad & Sissom, 2001; Monod & Lourenço, 2005; see Monod *et al.*, 2017 for a more detailed review). However, although the morphology of the male copulatory apparatus is usually reliable to distinguish genera, interspecific variability is not universal (Monod *et al.*, 2017). In many genera hemispermatophores of closely related species show only minuscule differences if at all (Stockwell, 1989; Jacob *et al.*, 2004b; Santibáñez-López & Francke, 2013; Monod, unpublished data). In that regard the variability of laminar hook positions exhibited by Melanesian *Hormurus*, atypical for the genus, is particularly noteworthy. Unlike in non-Melanesian *Hormurus*, the laminar hook is not restricted to the basal third of the hemispermatophore stalk but can be located almost anywhere along its entire length, depending on the species. Thus far the occurence of similar significant interspecific heterogeneities was only reported in *Bothriurus* Peters, 1861 (Maury, 1980) and *Orobothriurus* Maury, 1975 (Ochoa *et al.*, 2011).

Interestingly the shape of the female genital operculum is also unusually diverse in *Hormurus* and appears to be directly correlated to the position of the hemispermatophore laminar hook. The species with more distally located hooks are also those with the more elongated female genital opercula, strongly suggesting genital coevolution driven by a lock-and-key mechanism. The correlation between these two characters was therefore statistically assessed and the potential mechanisms underlying this unusual coevolutionary process are discussed.

Ultimately the combined use of alpha taxonomy and morphometric statistics enables to reliably identify the vast majority of specimens studied. Enough evidence is thus provided for the distinction of 17 species, 16 of which were undescribed. Fully illustrated descriptions for these new taxa, as well as a redescription of *Hormurus papuanus* are provided.

MATERIAL AND METHODS

Georeferencing and mapping: Only coarse data of geographical coordinates of collecting localities, rounded to the nearest 0.01 degree, are provided following the recommendations of Chapman & Grafton (2008) for ethical management of sensitive primary species occurrence data. The method for a medium level of generalization (category 3) (Chapman, 2020) was applied.

Several new taxa described here are based on old unstudied collections gathered during the XIXth and early XXth centuries. Geographical coordinates for locality records of this material were retrieved from gazetteers and the Geonet Names server (https://geonames.nga.mil/gns/html/) and are then given in square brackets. However, it was not always possible to trace GPS data solely by reference to these ressources for the following reasons: (1) collecting was often carried out from field camps and not from populated places; (2) names of the villages visited were sometimes improperly spelled or can have several spellings (records were made phonetically); (3) some villages have been destroyed or displaced by landslides, earthquakes, migration or tribal wars.

Fortunately, earlier taxonomists who worked on the Papuan fauna or flora have already made an important effort in tracing these obscure localities. Reviews of the exploration history of the island (Gilliard, 1969; Frodin & Gressit, 1982), as well as the website "Cyclopaedia of Malesian Collectors" (http://www.nationaalherbarium.nl/FMCollectors/home.htm) were used as a working base for searching historical localities. Most of the old material was gathered during large colonial expeditions that were duly documented, and usually detailed publications with travel report and mapped itinerary can be found. When available, such maps were scanned and georeferenced in ArcGIS version 9.3 (Environmental Systems Research Institute, Redlands, CA, U.S.A.); coordinates reported from the software are given between brackets. Original publications from which such data were extracted are referenced in the remarks on the relevant taxon. The aim is to facilitate future taxonomic work on old museum collections from New Guinea.

Distribution maps were produced using ArcGIS version 9.3 (Environmental Systems Research Institute, Redlands, CA, U.S.A.) by superimposing point locality records on a SRTM 90 m (3 arc-second) digital elevation model (Jarvis *et al*., 2008) and on a SRTM 1 km (30 arc-second) global bathymetry dataset (Becker *et al*., 2009).

Repositories of material examined: Collections containing material examined in the present study are abbreviated as follows: AMNH, American Museum of Natural History (New York, NY, U.S.A.); CAS, Californian Academy of Sciences (San Fransisco, CA, U.S.A.); LSUM, Lousiana State University Museum of Natural Sciences (Baton Rouge, LA, U.S.A.); MHNG, Muséum d'histoire naturelle (Geneva, Switzerland); UMMZ, University of Michigan Museum of Zoology (Ann Harbor, MI, U.S.A.); ZMB, Zoological Museum Berlin (now Museum für Naturkunde, Berlin, Germany); ZMH, Zoological Museum Hamburg (now Centrum für Naturkunde, Hamburg, Germany). DNA tissue samples were taken from specimens deposited in the AMNH and UMMZ collections and are stored in the Ambrose Monell Cryocollection at the AMNH. Registration numbers for these samples are given in square brackets. When available, the field codes of John Slapcinsky (JS) are given in brackets.

Examination and dissection: Specimens were examined with a Zeiss Stemi SV8 stereomicroscope. Hemispermatophores were dissected from adult male specimens using microsurgical scissors and forceps. Paraxial organ tissue was then removed manually with forceps.

Morphological terminology and mensuration: Morphological terminology follows Prendini (2000) for carapace sutures and leg spination, Vachon (1956, 1963) for chelicera dentition, Stahnke (1970) for pedipalp segmentation and pectines, Monod *et al.* (2013) for morphoscultptures of pedipalp chela finger dentate margins, Vachon (1974) for trichobothria patterns, Couzijn (1976) for leg segmentation, González-Santillán & Prendini (2013) for metasoma carination, and Alexander (1956) and Monod *et al.* (2017) for hemispermatophore morphology. Terminology for pedipalp carinae (see Figs 1-3) is from Prendini (2016). A new nomenclature for metasoma setation, in which macrosetae are named according to their position on the segment and not only according to the carinae on which they are located, is proposed (see chapter "Results" for details). Measurements follow Stahnke (1970) and were recorded in millimetres using an ocular micrometer or a Perel 3472B digital caliper. For consistency and ease of comparison, descriptions follow the structure of previous taxonomic publications on *Hormurus* and *Hormiops* Fage, 1933 by the first author (Monod *et al.*, 2013; Monod, 2015).

Photographs and illustrations: High resolution images of diagnostic characters were taken under long-wave UV and visible light with a Microptics system at the AMNH and with a custom-built stacking system at the MHNG. Zerene Stacker (Zerene Systems, Richland, WA, U.S.A.) was used to fuse images taken at different focal planes into a single image with a greater depth of field. Photographs were edited (background removal and contrast adjustment) in Adobe Photoshop CS5 and plates were prepared with Adobe illustrator CS5 (both from Adobe Systems, San Jose, CA, U.S.A.). Images of several hemispermatophores are provided for some taxa in order to illustrate intraspecific morphological consistency and variability. Habitus drawings were produced digitally on the basis of high quality photographs of preserved specimens.

Multivariate morphometric analyses: Multivariate statistical analyses were conducted following the methodological approach of log-ratios proposed by Mosimann (1970). In multivariate analyses standardization of data aims at minimizing the effects of size variation, thus putting more emphasis on the assessment of body proportions and shape. In the present work standardization was achieved by using shape ratios rather than raw measurements. These ratios were obtained by dividing each measurement (31 for males and 33 for females) by the prosoma length (PL) which is a good proxy for overall specimen size. Ratios were subsequently log-transformed in order to conform the data to normality.

Discriminant Analyses of Principal Components (DAPC: Jombart *et al.*, 2010) were carried out on the log-ratios of males and females using the *adegenet* package (Jombart, 2008) developed for the *R environment* (R Development Core Team, 2011). DAPC aims to describe and identify clusters of morphologically similar individuals by providing a visual assessment of the between-group discrimination. DAPC is performed in two steps. Suitability of variables for the Discrimant Analysis (DA) (Fischer, 1936; Lachenbruch & Goldstein, 1979) is achieved by data transformation using an initial Principal Components Analysis (PCA) (Pearson, 1901; Hotelling, 1933a, b).

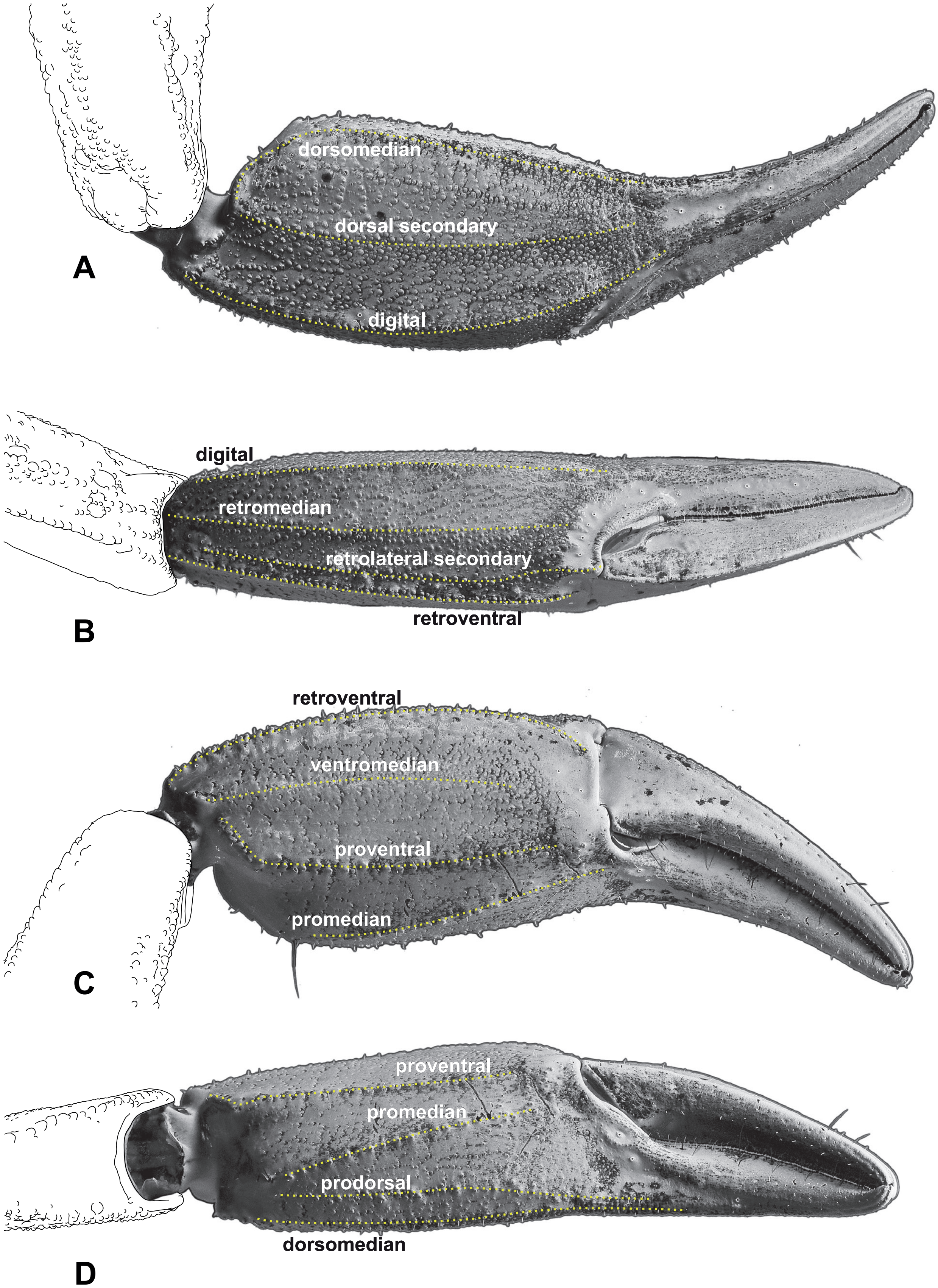

Fig. 1. *Hormurus ancylolobus* sp. nov., female (AMNH [LP 4339]); carinal pattern of right pedipalp chela, according to the terminology proposed by Prendini (2016). (A) Dorsal aspect. (B) Retrolateral aspect. (C) Ventral aspect. (D) Prolateral aspect.

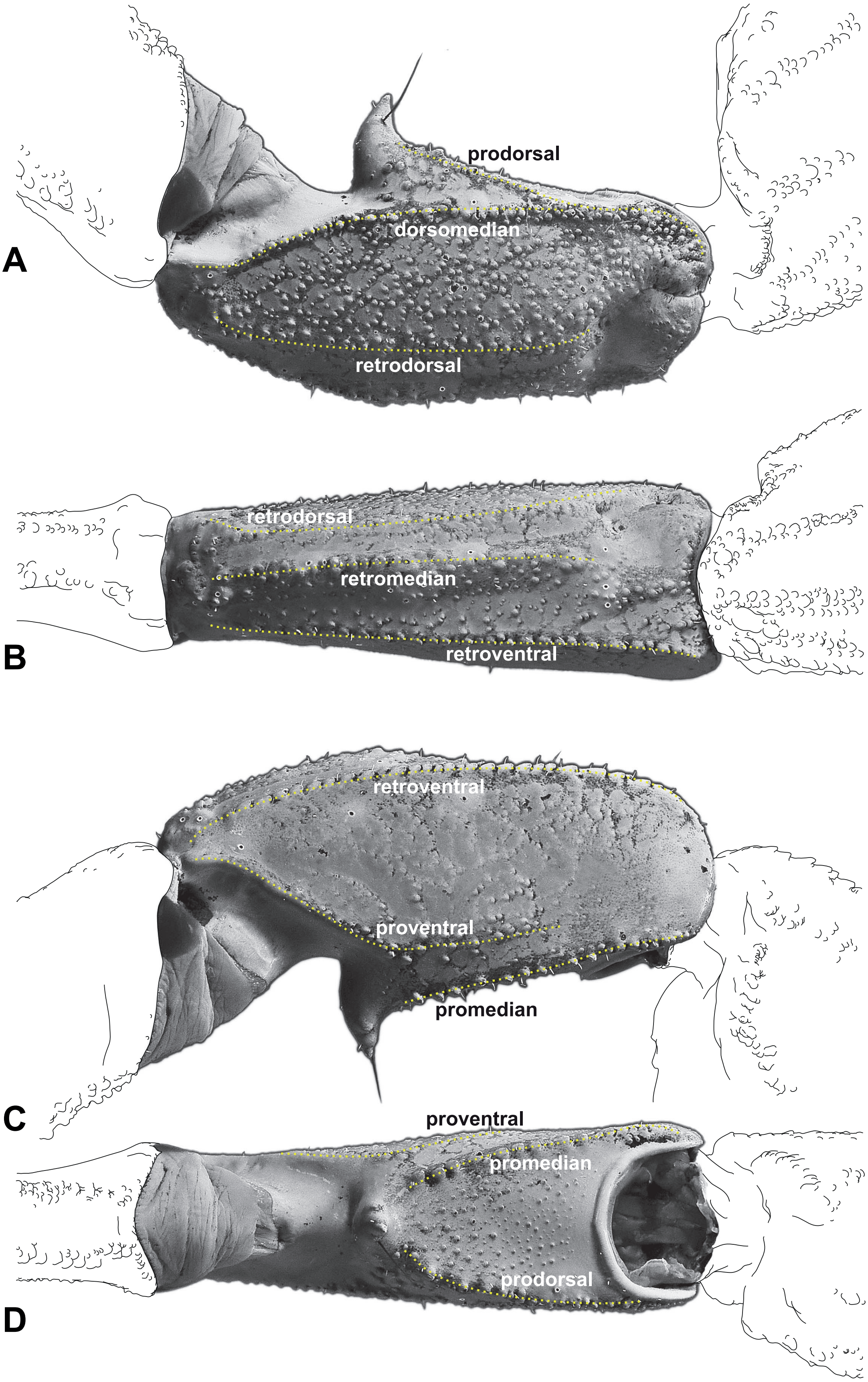

Fig. 2. *Hormurus ancylolobus* sp. nov., female (AMNH [LP 4339]); carinal pattern of right pedipalp patella, according to the terminology proposed by Prendini (2016). (A) Dorsal aspect. (B) Retrolateral aspect. (C) Ventral aspect. (D) Prolateral aspect.

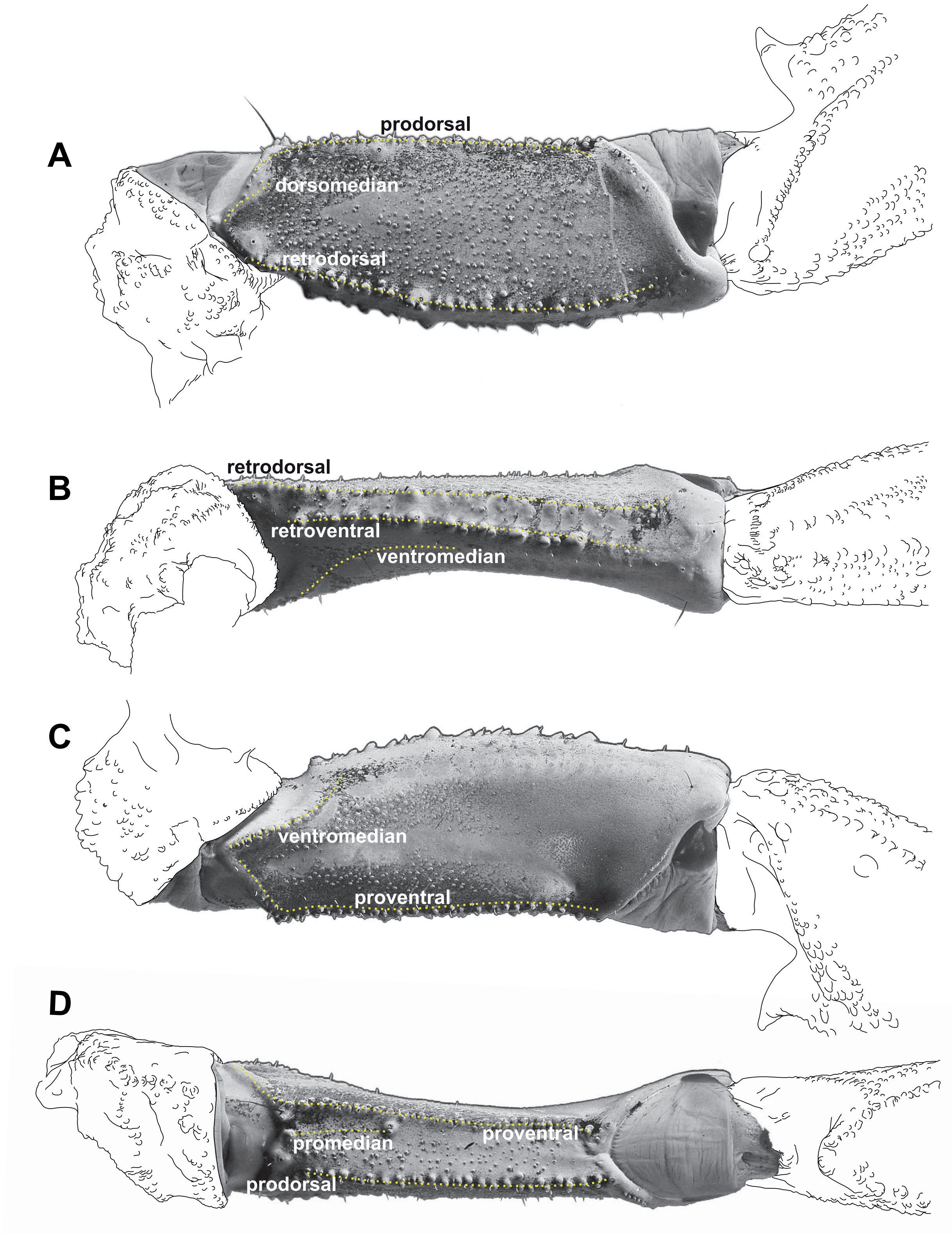

Fig. 3. *Hormurus ancylolobus* sp. nov., female (AMNH [LP 4339]); carinal pattern of right pedipalp femur, according to the terminology proposed by Prendini (2016). (A) Dorsal aspect. (B) Retrolateral aspect. (C) Ventral aspect. (D) Prolateral aspect.

PCA is a statistical method of dimensionality reduction used to extract the important information contained in very large multivariate datasets and to summarize it into a smaller set of new synthetic variables called Principal Components (PAs). PAs are linear combinations of the original quantitative variables that maximize the variance of the projected data. The proportion of variance explained by each PA is removed from the dataset before computation of the next one. The second and following PAs are then iteratively calculated from subsets of the data until all the variability has been extracted. Because PCA focuses on the overall variation among individuals, which includes between-group and within-group divergences, the method is likely to overlook differences between groups and is thus inappropriate for reliable assessment and discrimination of clusters.

On the other hand, DA seeks the principal components that maximize between-group variance, while neglecting within-group variance. The method therefore determines which combinations of variables best discriminate individuals into pre-defined clusters. Unfortunately, it requires the number of variables to be lower than the number of individuals and it is strongly affected by data correlation. In a DAPC framework the primary PCA overcomes these limitations by ensuring that the synthetic variables submitted to the DA are perfectly uncorrelated and that their number is lower than that of the specimens. The number of PCs retained from the initial PCA step is critical to ensure that the DAPC is stable and that it discriminates significantly between clusters. While too few dimensions will induce a loss of information and thus have an insufficient discrimination power, too many dimensions can lead to over-fitting. Indeed, excessive numbers of PCs will result in discriminant functions that could virtually model any structure and differentiate any set of random clusters. The *a*-score, which measures the trade-off between power of discrimination and over-fitting, was used in the present work as a criterion to determine the optimal number of components.

The *a*-score is computed as the difference between the proportion of successful re-assignment of individuals in the original space (observed discrimination) and as the proportion of successful re-assignments using randomized clusters (artificial discrimination). Optimally, it should tend toward one (high probability of re-assignments to true clusters and low probability of artificial re-assignments); *a*-scores close to zero indicate weak discrimination or instability of the results. For each set of PCs in a pre-defined range the function *optim.a.score* iteratively computes the *a*-scores for each cluster, as well as the average *a*-score over all clusters. It subsequently interpolates the results using splines and predicts an approximate optimal number of PCs based on the highest mean *a*-score.

Finally, characters that contributed the most to the discrimination between groups were assessed using the command *loadingplot*().

Geometric morphometric analysis: Geometric morphometrics (Rohlf & Marcus, 1993; Adams *et al*., 2004) is a set of analytical methods to mathematically measure morphological similarity and difference using geometrics coordinates instead of measurements. Each object is described as a series of points called landmarks, which are defined by coordinates and can be mapped as a single point into a geometric space. All objects are depicted by the same set of landmarks and can thus be compared on the basis of topological homology (Bookstein, 1991, 1996, 1998).

Landmarks are established based on structural configurations which are invariant across the sample of specimens that allow the observer to topologically define a single point, i.e. extremum or merging point of boundary outlines. Semi-landmarks, on the other hand, are points located along outline curves of specimens. Despite having a higher spatial freedom than landmarks, they are constrained to remain on the contour they are meant to capture and to "slide" along this path for maximizing positional homology between specimens (Green, 1996; Bookstein, 1997).

The morphometric analysis was restricted to the hemispermatophore stalk, because its partial sclerotization ensures shape integrity in fixed specimens, whereas the stem comprises soft tissues and can be heavily distorted. For each male specimen, photographs of both dissected hemispermatophores were taken in order to account for potential asymmetry. The structures were consistently oriented so that the stalks lie in a horizontal plane.

Landmarks and semilandmarks were digitized on these images using the *Tps* software series (Rohlf, 2015). Initial capture of the point coordinates was carried out using the curve-tracing function in *TpsDig2* version 2.31 (Rohlf, 2006). Then two input files for subsequent superimposition computation were generated with *TpsUtil* version 1.76 (Rolf, 2004), i.e. a tps file with point coordinates and a csv file indicating which points should be considered as semilandmarks and slid between fixed landmarks. Errors in the csv file were corrected manually with a text editor.

A Generalized Procrustes Analysis (GPA) (Gower, 1975; Rohlf & Slice, 1990) was performed on the dataset using the *gpagen()* function implemented in the R package *Geomorph* version 3.2.1 (Adams *et al*., 2020). GPA is a statistical method which assesses the similarities and differences in shape across a set of configurations based on the superimposition of landmarks/semi-landmarks. It generates shape variables using an estimated optimal "mean shape" as the reference for superimposition.

Optimal superimposition of raw landmark coordinates was conducted in three steps: (1) translation: centroids of all specimens were aligned on the origin of the coordinate system; (2) uniform scaling: specimens were scaled to a unit centroid size; (3) rotation: specimens were rotated until the least-squares distances between coordinates of corresponding points was minimized. The positions of semi-landmarks were further optimized by sliding along the contours until the differences among the positions of corresponding points along an outline in a reference configuration were minimized (Bookstein, 1997; Adams *et al.*, 2004).

The resulting shape space (the geometrical representation of all possible shapes), from which the aligned Procrustes coordinates were inferred, was curved and multidimentional (Kendall, 1984; Klingenberg, 2020). Because computations in this non-linear non-Euclidean space are too ponderous, variables must be projected onto a "flat", linear tangent space named Kendall's tangent space. This local approximation of the original space yields Euclidean coordinates (Dryden & Mardia, 1993; Rohlf, 1999) that can be exploited in subsequent statistical analyses.

In order to visually assess the morphological discrimination between clusters, the Kendall's tangent space coordinates obtained from the GPA were submitted to a DAPC following the procedure described above.

Statistical correlation assessment: The ratio between the length of the basal part of the stalk (distance from base of stalk to base of hook) and the length of the distal lamina (distance from base of hook to laminar apex) was calculated for each hemispermatophore based on the photographs. A boxplot graph showing the ratio values for each species was produced with the *boxplot()* function in *Base R* (R Development Core Team, 2011). This was also done for the length/width ratio of the female genital operculum.

The *boxplot()* command also permitted the median to be computed for each group. These variables were used to perform a correlation test between the lamellar hook position ratio and the female genital operculum ratio. Species for which hemispermatophores or female genital opercula are unknown were omitted. A Shapiro-Wilk test (Shapiro & Wilk, 1965) was carried out with the *shapiro.test()* function in order to determine if the data were normaly distributed. Based on the results, a Kendall rank correlation test (Kendall, 1938) was executed with the command *cor.test(x, y, method = "kendall")*. The Kendall rank correlation is a non-parametric test that measures the concordance between paired samples. It is considered a better alternative to the Spearman correlation when the sample size is small (Puth *et al.*, 2015).

RESULTS

Ventral setation of metasoma segments: Previous nomenclatural systems of metasoma setation (Williams, 1970; Sissom & González-Santillán, 2004; Sissom & Hendrixon, 2005; Mattoni & Acosta, 2005; Ochoa *et al.*, 2011; Sissom *et al*., 2012, 2016; González-Santillán & Prendini, 2013, 2015, 2016; González-Santillán & Alvarez Padilla, 2015; González-Santillán *et al.*, 2017) did not take into account the position of the macrosetae in relation to the length of the segments, only their occurence on a particular carina. However, a characterization of the longitudinal arrangement of each group of ventral macrosetae appears to be necessary to propose reliable hypotheses of homology and a character system usable for taxa discrimination.

In many specimens most of the macrosetae had fallen off. Setal positions were thus determined in large part by the presence of basal cup-shaped sockets/areolas, which are the points of insertion of setae into the cuticle. Although the number and position of macrosetae sometimes differ between species, short microsetae were always present on areas where macroseta were identified in at least one taxon. This suggests that setae do not randomly occur on the cuticle and that they can only be expressed in a limited number of fixed spots, either as macro- or microsetae. Pedipalp trichobothria patterns are established by a similar regulatory process in which stable "placeholders" can be activated either as trichobothria, macro- or microsetae (Prendini *et al.*, 2010). This "placeholder" concept is applied here to determine metasoma setal configuration and homology.

All metasoma segments are serially homologous. A basic bauplan of ventral setation should therefore be recognizable across all segments and all species, even when accessory macrosetae are present. The pattern with the lowest number of macrosetae is regarded as the primary configuration from which all other setal configurations were derived. It is composed of eight macrosetae, i.e. three pairs of macrosetae (anterior, median and posterior) on the ventrosubmedian carinae and one pair (anterior) on the ventrolateral carinae, indicated in yellow in Fig. 4.

Of all taxa studied here *Hormurus barai* sp. nov. possesses the lowest number of macrosetae on the ventral side of its metasoma segments (Fig. 4A). In this species the first four segments exhibit the basic pattern of eight macrosetae. Setation of the fifth segment was slightly different, with two groups of additional macrosetae for a total of twelve: (1) an extra pair, present in the posterior group on the ventrolateral carinae, was considered part of the basic pattern for segment V and is marked in yellow; (2) two additional supramedian macrosetae on the ventrolateral carinae, situated between the median and posterior groups, are considered as primary accessory setae and are indicated in green in Fig. 4A.

The number of these supramedian macrosetae on metasoma segment V varies from two (Fig. 4B, D-E) to four (Fig. 4A, C, F). Supramedian macrosetae were also observed on the ventrolateral carinae of segments II-IV in all taxa except *H. barai* sp. nov. (Fig. 4B-F) and on the ventrolateral carinae of segment I in some species (Fig. 4E-F). There the total number of macrosetae present on one segment is ten.

Few species possessed four extra subposterior macrosetae

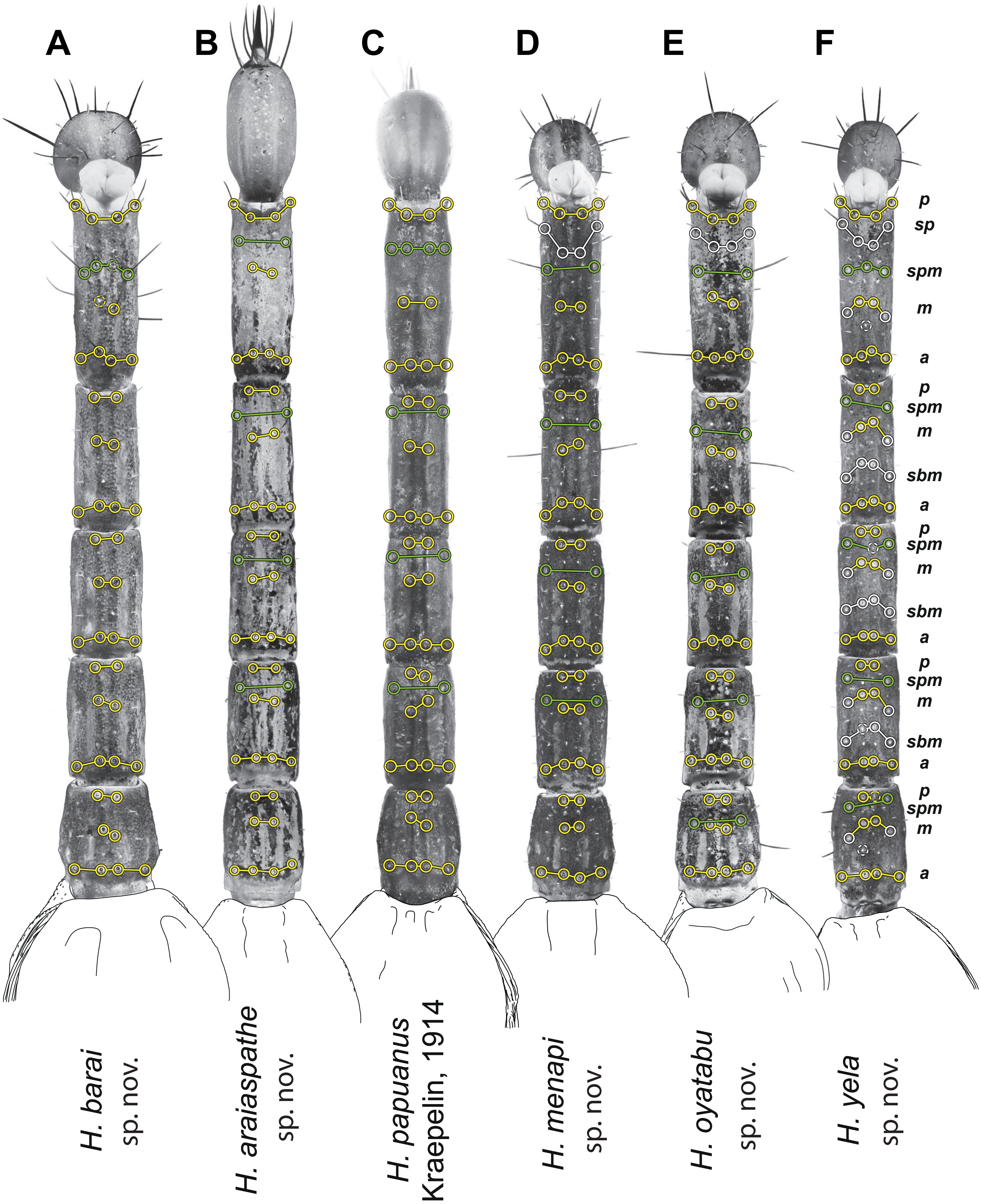

Fig. 4. Ventral setation of metasoma in species of *Hormurus* Thorell, 1876 from Papua-New Guinea. Macrosetae comprising basic pattern (see text) are indicated in yellow, primary accessory macrosetae in green and secondary accessory macrosetae in white. Abbreviations: a (anterior), m (median), p (posterior), sbm (submedian), sp (subposterior), spm (supramedian). Dashed circles in the same color as the corresponding cluster indicate missing macrosetae relative to the basic pattern whereas white dashed circles indicate supernumerary macroseate.

(two on the ventrosubmedian carinae and two on the ventrolateral carinae) between the supramedian and posterior group on segment V (indicated in white in Fig. 4D-F). Finally, *Hormurus yela* sp. nov., the species with the highest count of ventral macrosetae, possesses two extra sets also marked in white in Fig. 4F: (1) an additional pair in the median group on the ventrolateral carinae of all segments; (2) four additional submedian macrosetae (two on the ventrosubmedian carinae and two on ventrolateral carinae) situated between the anterior and median groups of segments II-IV. All these macrosetae are considered as secondary accessory setae.

The setation patterns presented here are constant within species. The intraspecific variability observed was negligible and mostly limited to the occurence of abnormal configurations (one or two additional or missing macrosetae) usually only observed on one segment, whereas the regular pattern was expressed in the others. Only four species, i.e. *Hormurus cameroni* sp. nov., *Hormurus maiwa* sp. nov., *Hormurus menapi* sp. nov. (Fig. 4D) and *Hormurus muyua* sp. nov., display a variable setation on segment I. Two patterns (eight or ten macrosetae) were observed among the specimens of each of these taxa, without the prevalence of one or the other.

In the present contribution metasoma setation is sucessfully used as a diagnostic character for species in the genus *Hormurus*, and the first terminology for setal homology across segments and taxa is presented. Moreover, a preliminary assessment of a wider range of taxa suggests that this character system is also informative in other groups of scorpions at various taxonomic levels.

Species groups defined on the basis of hemispermatophore morphology: The position of the laminar hook on the hemispermatophore stalk was identified as a very important diagnostic character for Papuan *Hormurus*. It can be mathematically expressed as the length of the basal part of the stalk (distance from base of stalk to base of hook) divided by the length of the distal lamina (distance from base of hook to laminar apex). For each species this ratio is directly correlated with the length/width ratio of the female genital operculum (see relevant geometric morphometric and statistical analyses below). These two quantifiable and correlated characters allow five artificial (not based on phylogenetic evidence) groups of species to be identified. In the "Systematics" section the sequence of species presented follows this grouping:

- Species with basal laminar hook (situated in basal third of stalk; basal part/distal lamina ratio < 0.5; Fig. 5A) and with distinctly wider than long female genital operculum (length/width ratio < 0.85):
  Hormurus araiaspathe sp. nov.
  Hormurus barai sp. nov.
  Hormurus oyawaka sp. nov.
  Hormurus oyatabu sp. nov.
- Species with submedian laminar hook (situated between 1/3 and 3/7 of hemispermatophore stalk length from base of stalk; basal part/distal lamina ratio > 0.5 and < 0.75; Fig. 5B) and female genital operculum distinctly wider than long (length/width ratio < 0.85):
  Hormurus muyua sp. nov.
  Hormurus slapcinskyi sp. nov.
  Hormurus ancylolobus sp. nov.
- Species with submedian laminar hook (situated between 1/3 and 3/7 of hemispermatophore stalk length from base of stalk; basal part/distal lamina ratio > 0.5 and < 0.75; Fig. 5B) and female genital operculum as wide as long or nearly so (length/width ratio > 0.85 and < 1):
  Hormurus cameroni sp. nov.
  Hormurus yela sp. nov.
  Hormurus maiwa sp. nov.
- Species with median laminar hook (situated between 3/7 and 1/2 of hemispermatophore stalk length from base of stalk; basal part/distal lamina ratio > 0.75 and < 1; Fig. 5C) and female genital operculum as wide as long or nearly so (length/width ratio > 0.85 and < 1):
  Hormurus papuanus Kraepelin, 1914
  Hormurus sporacanthophorus sp. nov.
  Hormurus menapi sp. nov.
- Species with distal laminar hook (situated in distal half of stalk; basal part/distal lamina ratio > 1; Fig. 5D) and female genital operculum longer than wide (length/width ratio > 1):
  Hormurus tagula sp. nov.
  Hormurus sibonai sp. nov.
  Hormurus krausi sp. nov.
  Hormurus hypseloscolus sp. nov.

Multivariate morphometric analyses of measurements: The optimal *a*-scores computed for DAPC of male and female measurements were both obtained by retaining the first four PCs that respectively represent 81.6 % and 82.8 % of the total variance. Four discriminant functions were saved for each discriminant analyses.

The results of the DAPC of male measurements (Fig. 6A) showed that *Hormurus araiaspathe* sp. nov., *H. sporacanthophorus* sp. nov., *H. barai* sp. nov., *H. hypseloscolus* sp. nov., *H. krausi* sp. nov., *H. papuanus* and *H. yela* sp. nov. are clearly separated from their congeners. *Hormurus oyatabu* sp. nov./*H. oyawaka* sp. nov., *H. maiwa* sp. nov./*H. muyua* sp. nov. and *H. sibonai* sp. nov./*H. tagula* sp. nov. form three additional morphologically distinct groups. On the other hand, *H. cameroni* sp. nov., *H. menapi* sp. nov. and *H. slapcinskyi* sp. nov. overlap in morphospace, suggesting that these species are very similar morphologically. Although *H. yela* sp. nov. and *H. maiwa* sp. nov./*H. muyua* sp. nov. do not overlap with the preceding cluster, they are not significantly distant from it.

Results of the DAPC on females measurements (Fig. 6B) retrieved most of the group discrimination computed by the DAPC on male measurements, e.g. *H. sporacanthophorus* sp. nov., *H. barai* sp. nov., *H. krausi* sp. nov., *H. papuanus*, *H. yela* sp. nov. and the clusters *H. oyatabu* sp. nov./*H. oyawaka* sp. nov. and *H. cameroni* sp. nov./*H. menapi* sp. nov. However, clusters and species are generally closer to each other, suggesting that morphological divergence is less significant than in males. Differences from the male DAPC are as follows: *H. tagula* sp. nov. is placed together with *H. hypseloscolus* sp. nov. rather than far apart, *H. slapcinskyi* sp. nov. clusters with *H. muyua* sp. nov. rather than with *H. cameroni* sp. nov./*H. menapi* sp. nov., and *H. maiwa* sp. nov. is separated from *H. muyua* sp. nov.

The following characters contributed the most to the discrimination between species (they are listed from the most to the least important): (1) in males (Fig. 7A): femur length, chela height, patella length, chela length, patella height, femur height, width of metasoma segments I and II; (2) in females (Fig. 7B): genital operculum length, chela height, width of metasoma segment I, height of metasoma segment I, height of telson, genital operculum width, femur length and femur width.

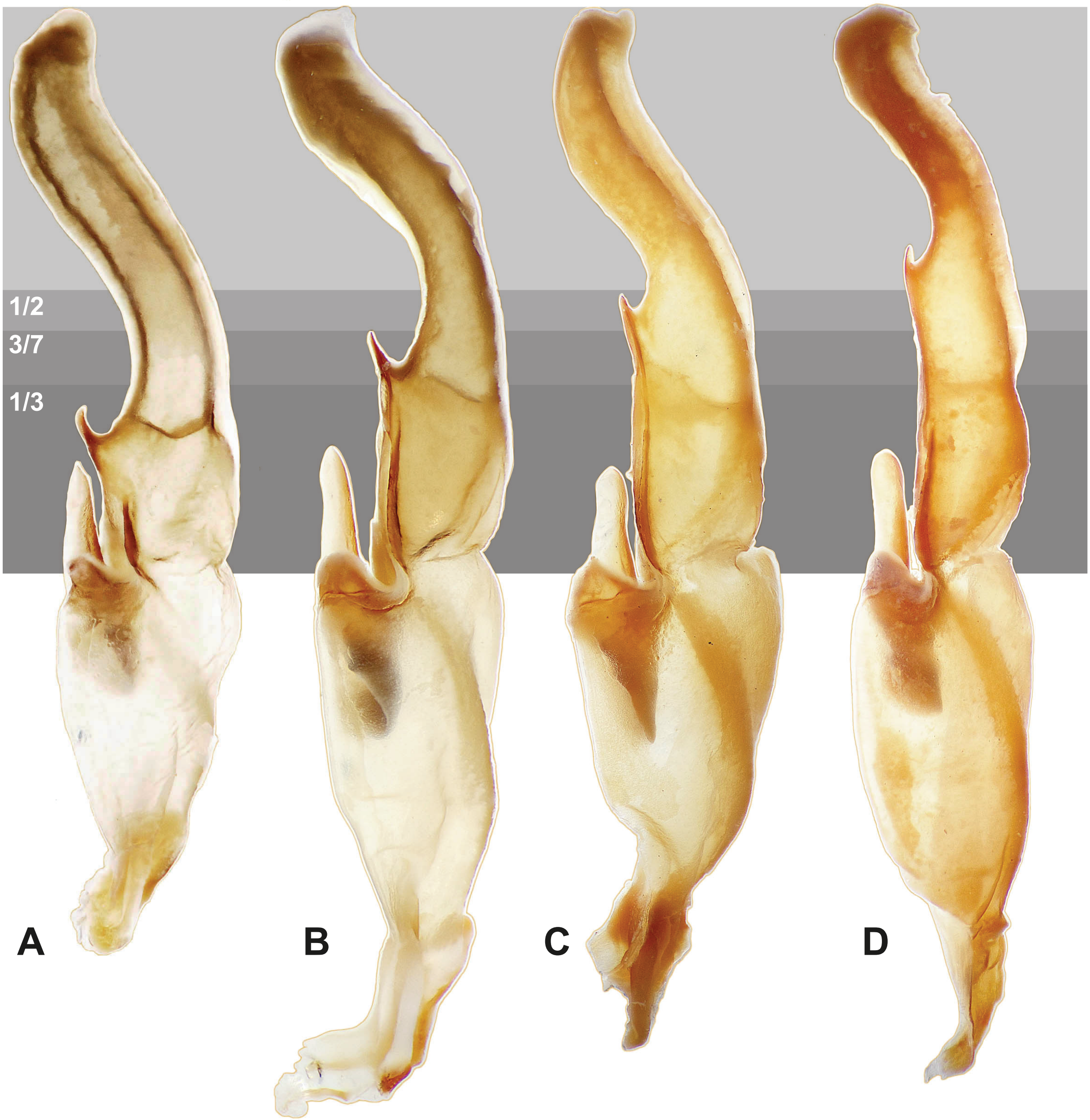

Fig. 5. Variability in the position of the lamellar hook on the hemispermatophore stalk in Papuan *Hormurus* Thorell, 1876. The stalk is on a grey background, and different shades indicate four defined positions (basal, submedian, median and distal) and areas of the stalk (proportions of the stalk for each mark are also given). (A) *H. barai* sp. nov. (B) *H. slapcinskyi* sp. nov. (C) *H. menapi* sp. nov. (D) *H. sibonai* sp. nov.

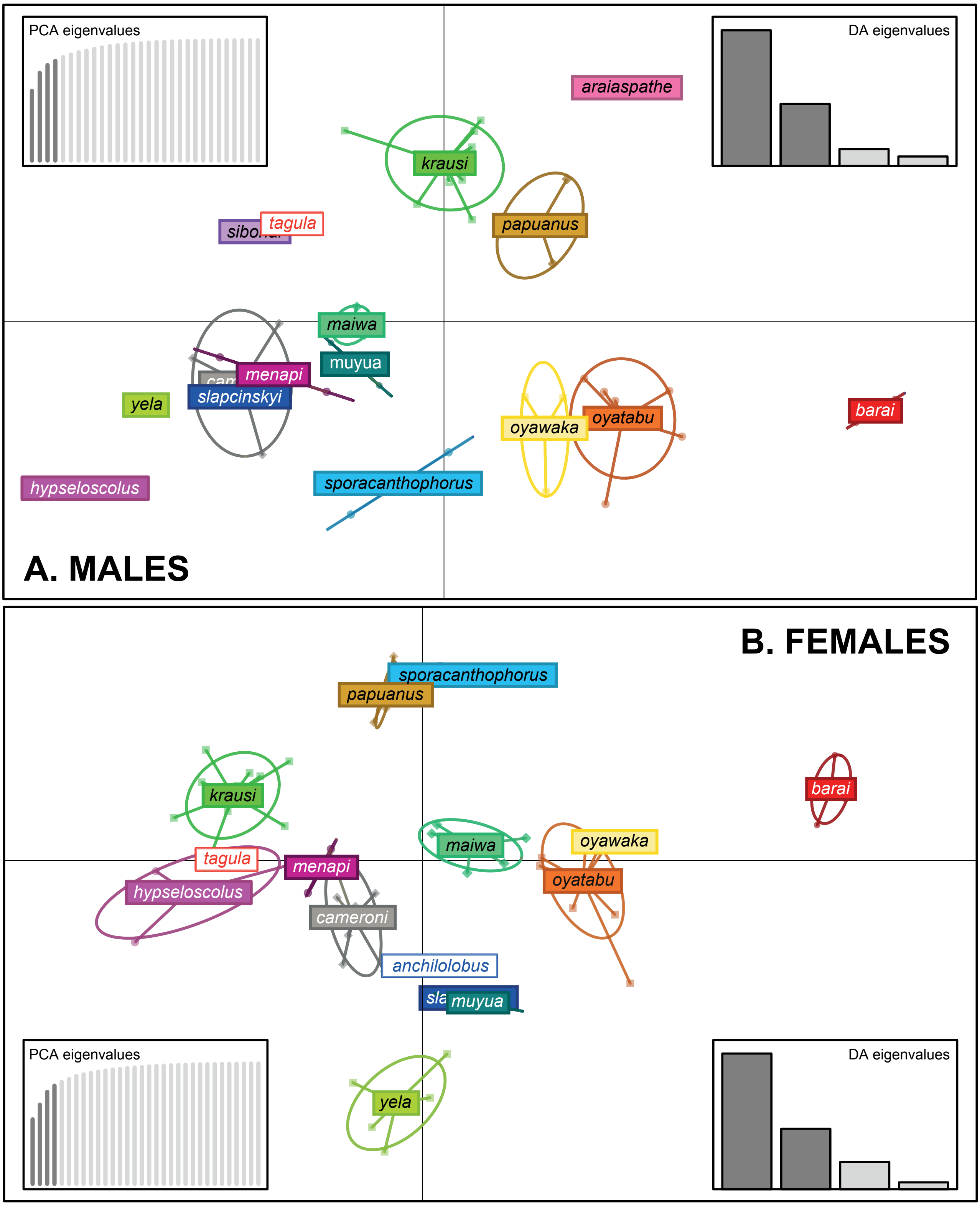

Fig. 6. Multivariate morphometric analysis of Papuan species of *Hormurus* Thorell, 1876. Scatterplots of Discriminant Analysis of Principal Components (DAPC). (A) Males. (B) Females. For each analysis the left graph displays the cumulative variance explained by eigenvalues of the Principal Components Analysis (PCA), whereas the right graph displays Discriminant analysis (DA) eigenvalues and their respective contributions to variance. Darker bars in the PCA inset represent principal components retained for the analyses, and discriminant functions in the DA inset.

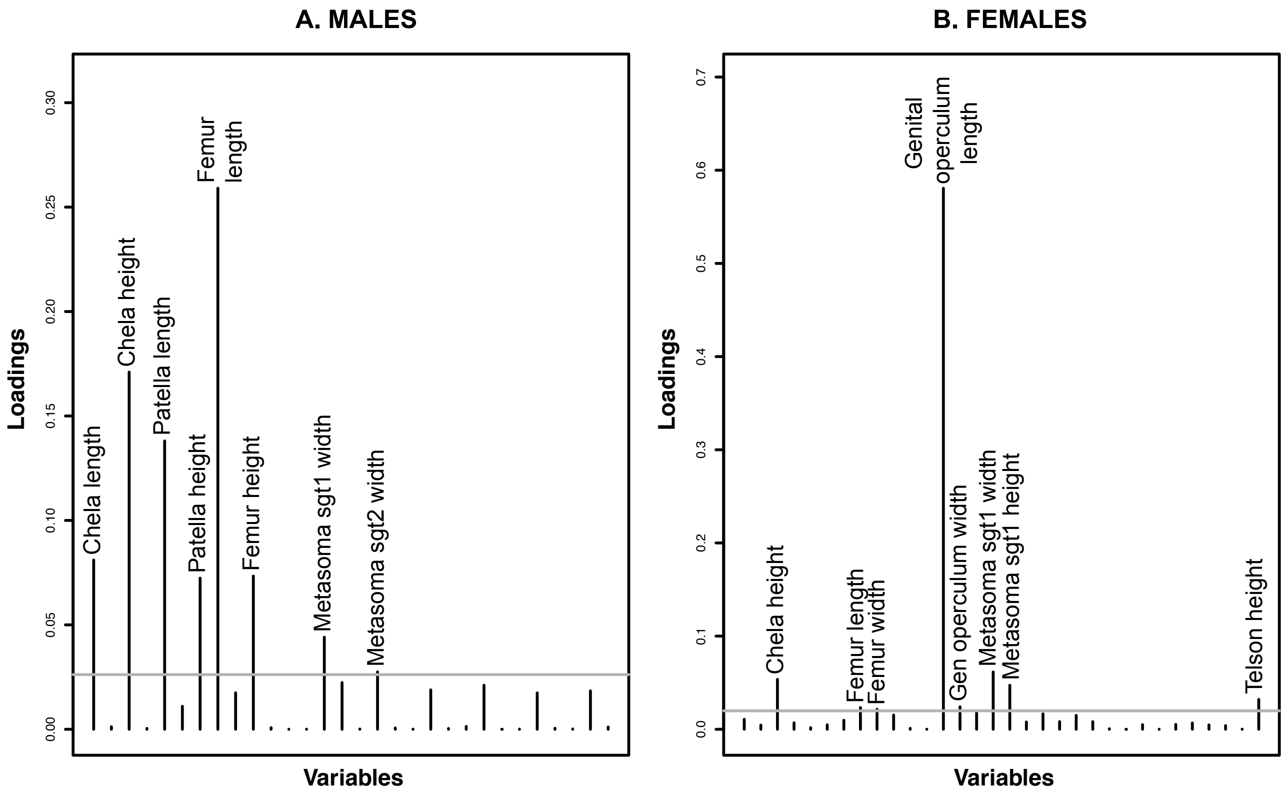

Fig. 7. Multivariate morphometric analysis of Papuan species of *Hormurus* Thorell, 1876. Variable contributions to the discrimination of species according to the Discriminant Analysis of Principal Components (DAPC). (A) Males. (B) Females.

Geometric morphometric analysis of hemispermatophore stalks: The optimal *a*-score computed for a DAPC performed on the Kendall's tangent space coordinates of hemispermatophore stalks obtained from the GPA was reached when the first six PCs were retained. These components represent 81.2 % of the total variance. Six discriminant functions were saved for the DA.

Most species are clearly separated from each other in the DAPC scatter plot (Fig. 8B). As in the multivariate morphometric analysis of measurements (Fig. 6A), *H. araiaspathe* sp. nov., *H. barai* sp. nov., *H. hypseloscolus* sp. nov., *H. krausi* sp. nov., *H. sibonai* sp. nov., *H. yela* sp. nov., and the clusters *H. oyatabu* sp. nov./*H.* oyawaka sp. nov. and *H. maiwa* sp. nov./*H. muyua* sp. nov. are clearly separated from each other. Moreover, there is a distinct separation between *Hormurus cameroni* sp. nov., *H. menapi* sp. nov. and *H. slapcinskyi* sp. nov., three species that group together in the previous analysis. On the other hand, *H. sporacanthophorus* sp. nov. and *H. papuanus* sp. nov., which differ markedly in their body measurements, cannot be separated by the morphology of their hemispermatophores. *Hormurus muyua* sp. nov. and *H. slapcinskyi* sp. nov. also form a cluster, unlike in the analysis of measurements.

Statistical assessment of the correlation between laminar hook and female genital operculum: The position of the lamellar hook on the hemispermatophore stalk, expressed here as the basal part/distal lamina ratio, varies markedly among Papuan *Hormurus* (Fig. 9A). The dimensions of the female genital operculum, expressed as the width/length ratio, follows a similar pattern (Fig. 9B). Interestingly, the two ratios are correlated: the species with the most distal laminar hooks are also those in which the females possess the most elongated genital opercula and, conversely, the species with the most basal laminar hooks are those with the shortest female genital opercula.

The Shapiro-Wilk tests performed on the median values before the correlation test show that the hemispermatophore data are not normally distributed (W = 0.80231, p-value = 0.007262), whereas the female genital operculum data are (W = 0.97265, p-value = 0.9238). The use of the non-parametric Kendall rank correlation test is therefore justified.

The correlation coefficient between the basal part/distal lamina ratio of the hemispermatophore stalk and the width/length ratio of the female genital operculum (Kendall's rank correlation tau = 0.8205128, T = 71, p-value = 1.347e-05) indicate that the two variables are significantly correlated. Examination of the graph (Fig. 10) shows a non-linear monotonic correlation.

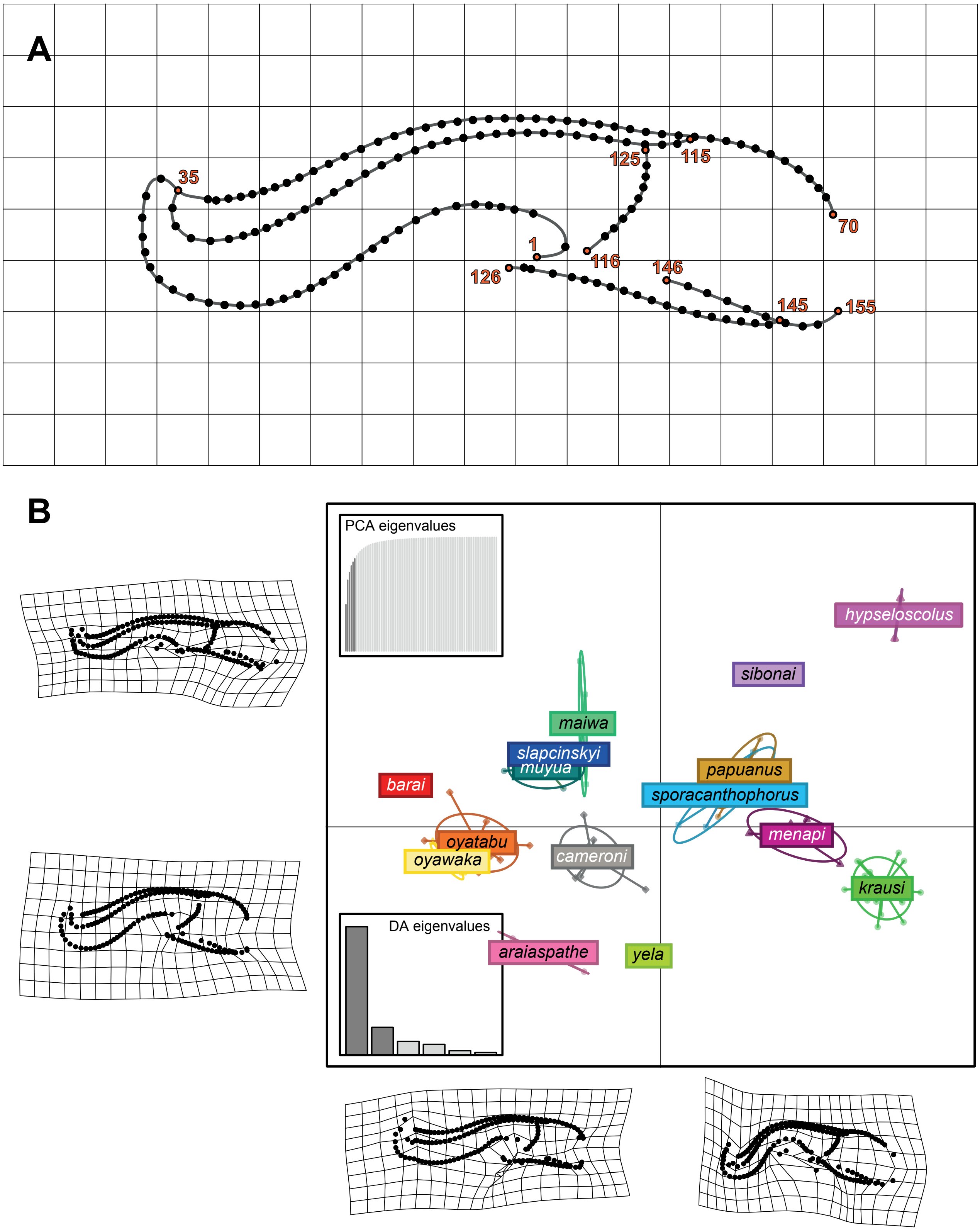

Fig. 8. Geometric morphometric analysis of hemispermatophore stalks of Papuan species of *Hormurus* Thorell, 1876. (A) Landmarks (red dots) and semilandmarks (black dots). (B) Discriminant Analysis of Principal Components (DAPC) scatterplot of aligned procrustes coordinates projected in Kendall's space. The upper graph displays cumulative variance explained by eigenvalues of the Principal Components Analysis (PCA), whereas the lower graph displays Discriminant analysis (DA) eigenvalues and their respective contributions to variance. Darker bars in the PCA inset represent principal components retained, and discriminant functions in the DA inset. The deformation grids on the left and bottom are showing the shape differences between the reference (A) and the minimum and maximum values of the two PC axes.

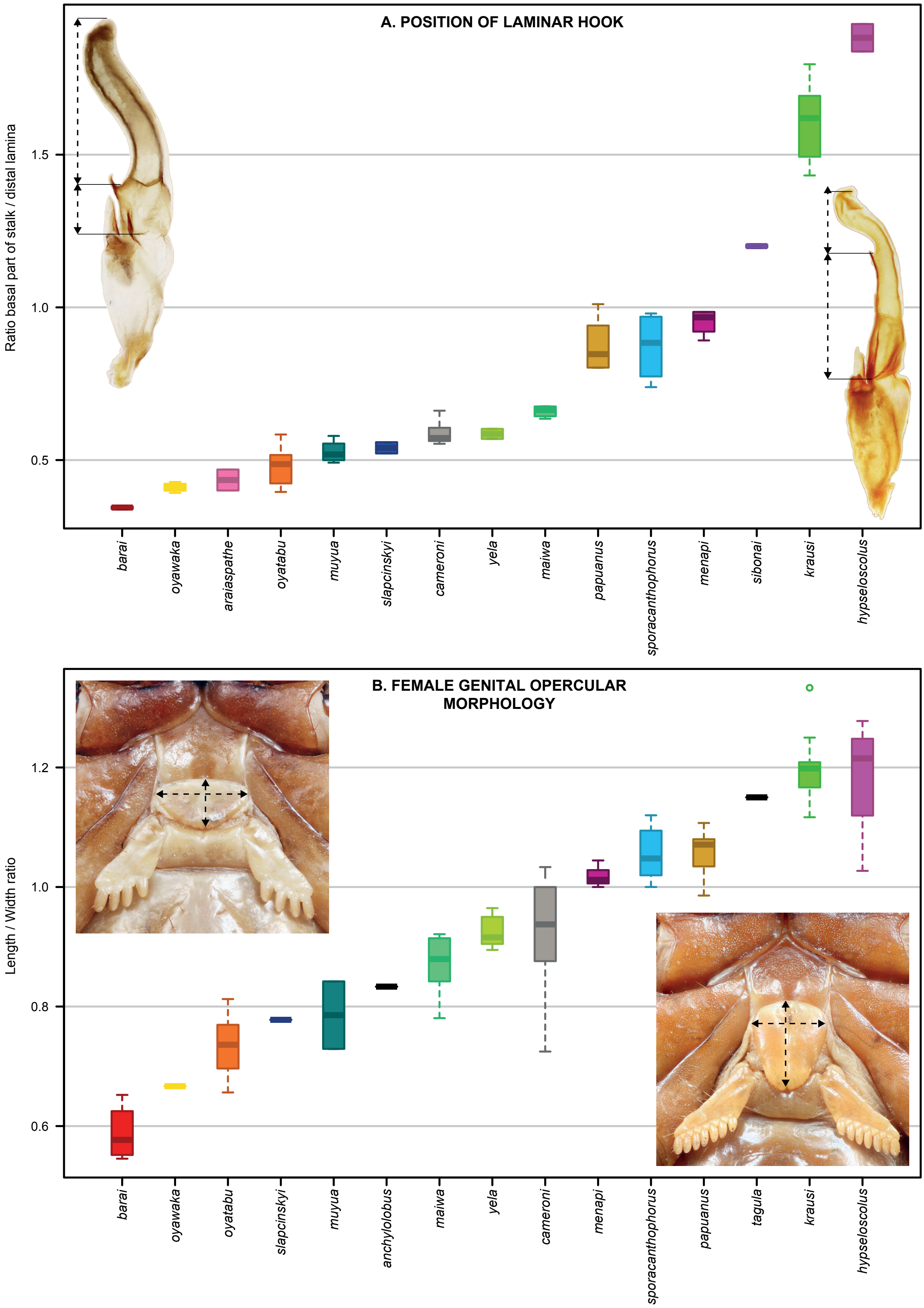

Fig. 9. Boxplot graphs for characters of Papuan species of *Hormurus* Thorell, 1876. (A) Boxplot graph for basal part/distal lamina ratios of the hemispermatophore stalk. (B) Boxplot graph for width/length ratios of female genital operculum.

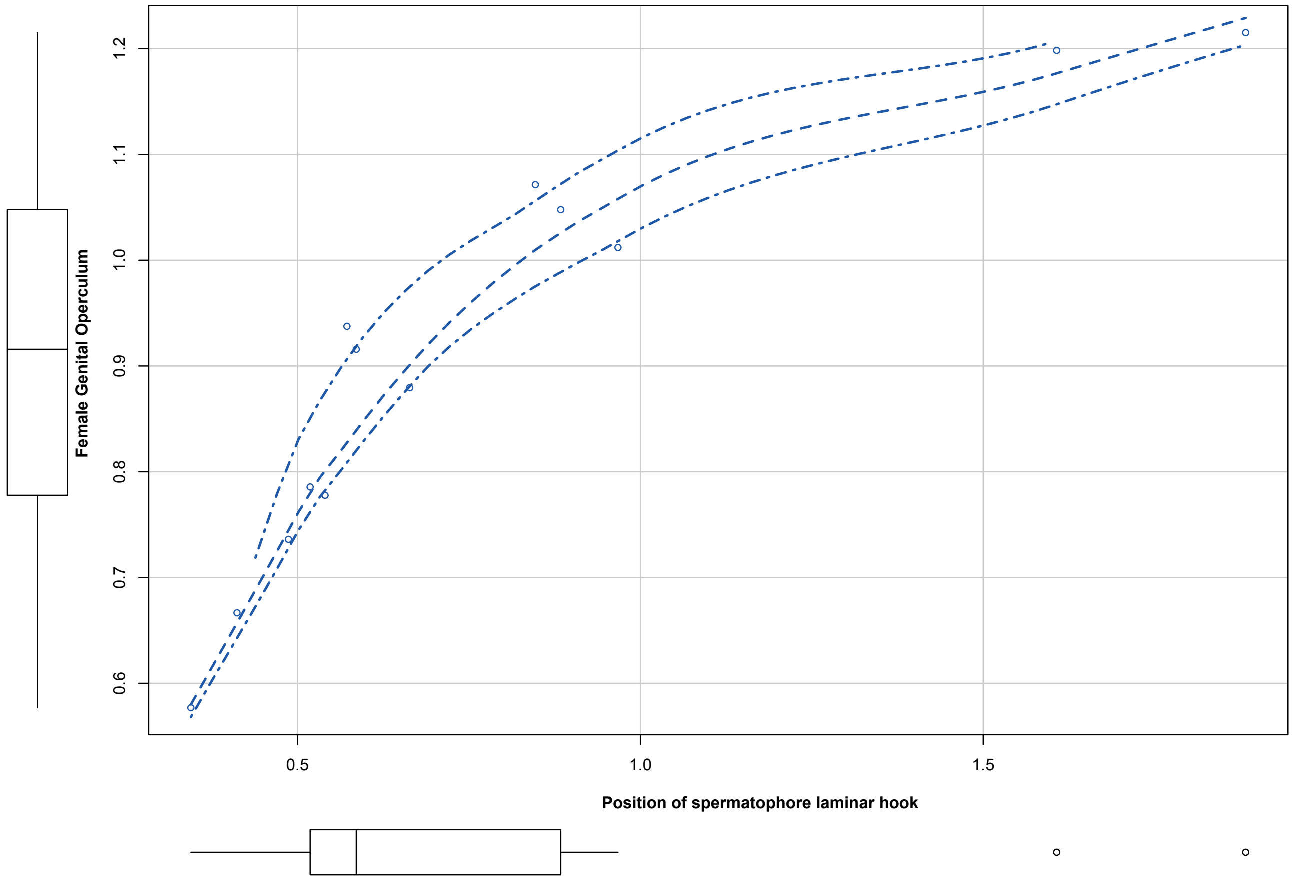

Fig. 10. Graph showing the non-linear monotonic correlation between basal part/distal lamina ratios of hemispermatophore stalks and width/length ratios of female genital opercula (Kendall's rank correlation tau = 0.8205128, T = 71, *p*-value = 1.347e-05) in Papuan species of *Hormurus* Thorell, 1876.

DISCUSSION

Combined morphological-morphometrical approach to taxonomy of Papuan *Hormurus*: The morphological similarity between many Papuan *Hormurus* make their identification relatively difficult. However, multivariate morphometrics analyses provide an efficient tool to reveal and quantify small differences in body proportions that are very difficult, if not impossible, to assess by visual examination alone. This method can significantly facilitate taxonomic assessment and provide additional evidence for delineating morphospecies. Additionally, the morphology of hemispermatophores is another character that proved to be very reliable for differentiating Papuan *Hormurus*, more so than for non-Papuan representatives of the genus (Monod, unpublished data). Although three species described in the present paper are very difficult to distinguish based on external morphology alone, they can be unambiguously separated by the shape of the male genital apparatus. These three species are *H. cameroni* sp. nov., *H. menapi* sp. nov. and *H. slapcinskyi* sp. nov. However, the converse is also true: two species (i.e. *H. sporacanthophorus* sp. nov. and *H. papuanus*) with conspicuous differences in external morphology have very similar hemispermatophores.

Therefore an approach that incorporates a more mathematical perspective to the traditional examination of morphology, both external and internal, is needed when conducting taxonomic work on *Hormurus*. Only one character system, whether it is external morphology, hemispermatophore shape or morphometric evaluation, could not be applied consistently to successfully identify all species within the genus.

Hemispermatophore and female genital operculum coevolution: The lock-and-key hypothesis, first proposed by Dufour (1844), suggests that morphological incompatibilities between genitalia of different species prevent or at least reduce the success of copulation and/or insemination, eventually resulting in reproductive isolation. Although it has been documented in many taxa (Mikkola, 1992; Sota & Kubota, 1998; Arnqvist & Rowe, 2002; Simmons, 2014 for a review), the idea of speciation by mechanical fit of sexual structures steered intense controversy as contradicting evidence was also gathered in several groups (Shapiro & Porter, 1989; Masly, 2012 for a review).

The original structural lock-and-key hypothesis implies a strict coevolution of male and female sexual structures. However, such correlated changes in male and female genital morphology among sibling taxa appear to be quite uncommon (Masly, 2012). In most cases, although males of closely related species present significant genitalic diversity, variations of the female reproductive apparatus among these species remain quite limited, if they are present at all.

A second lock-and-key mechanism involving sensory rather than structural isolation was then proposed to account for the sexual asymmetry in the degree of genital variability (De Wilde, 1964; Eberhard, 1992). This new postulate suggests that morphological differences in male genitalia can trigger negative behavioural or physiological stimuli in one or both sexes during mating attempts, eventually leading to the disruption of copulation and/or a reduction of postcopulatory reproductive fitness.

However, female genitalia are not as morphologically constant as they appear to be in some taxa. Interspecific differences are often present, usually less conspicuous than those observed in males and in most cases inadequately studied. The occurence of species-specific traits in the female reproductive apparatus and matching divergence patterns with male sexual features have been recently reported in several taxa with seemingly invariable female genitalia (Kamimura & Mitsumoto, 2012; Yassin & Orgogozo, 2013; Ribeiro *et al.*, 2019; Masly, 2012; see Simmons, 2014 for more examples).

Although, in many cases, structural lock-and-key mechanisms are not the sole cause of genitalic diversity and reproductive isolation, they remain nonetheless a very important factor for the establishment of prezygotic barriers to gene flow and therefore should not be completely dismissed when assessing speciation processes (Anderson & Langerhans, 2015; Brennan & Prum, 2015; Barnard *et al.*, 2017).

In Papuan *Hormurus* interspecific morphological divergence of hemispermatophores and of female genital opercula are present and both appear to be almost perfectly correlated. The more distal the laminar hook is situated, the more elongated is the female operculum. This is the first time male-female genital coevolution is documented in scorpions. In all taxa previously investigated female sexual morphology is relatively uniform, while male spermatophores exhibit significant interspecific variability (Peretti, 2010).

The genitalia coevolution presented here is hypothesised to be the result of limitations imposed on insemination success by structural constraints. In a resting position the female genital operculum completely covers the female gonopore. During copulation the hemispermatophore laminar hook grips the posterior margin of the female genital plate, allowing the hemispermatophore stalk to act as a lever for the plate, thus exposing the gonopore and enabling intromission of the holosolenos (Monod *et al.*, 2017). Accordingly, when the length of the basal part of the hemispermatophore stalk corresponds to the length of the female genital operculum, the intromittent holosolenos will be directly facing the female gonopore, and its evertion into the female genital tract can then be carried out flawlessly. However, a size mismatch between the two structures will result in the non-alignment between the holosolenos and the female gonopore. Although such an incompatibility will certainly not completely prevent hybridization, it will significantly reduce the reproductive success of heterospecific matings by lowering insemination success.

Monandry and reinforcement in Papuan *Hormurus*: Sexual selection is considered to be the main driving force of male genital diversification (Simmons, 2014). As a result, male genital morphology is generally more diverse in polyandrous than in monandrous taxa, because sexual selection is arguably more intense when females mate with several males (Eberhard, 1985; Roig-Alsina, 1993; Robinson & Novak, 1997; Arnqvist, 1998; Simmons, 2001). By extension, sexual selection usually also triggers a higher speciation rate in polyandrous than monandrous clades (Arnqvist *et al.*, 2000). In these cases post-mating sexual conflict is considered the key factor for genital evolution and speciation (Holland & Rice, 1999; Eberhard, 1996; Arnqvist, 1998; Arnqvist *et al.*, 2000).

On the other hand, reinforcement (selection against hybridization) may also act as a determinant factor for genital and species diversity (Parker & Partridge, 1998; Coyne & Orr, 1998). When two populations that have developed partial postzygotic reproductive isolation in allopatry subsequently come into secondary contact, sympatry will eventually promote a reinforcement of the preexisting mating barriers. While polyandrous females are likely to mate with both conspecific and heterospecific males and thus have conspecific and hybrid offspring, monandrous females will either produce only conspecific offspring or only hybrids. The selection against hybridization is thus expected to be more intense and consequently the species richness higher under monandry than under polyandry (Arnqvist *et al.*, 2000).

Many species belonging to the genera *Hormiops*, *Hormurus* and *Liocheles* appear to be monandrous (Monod, unpublished data). Once mated, females refuse to copulate again until they give birth. Moreover, the presence of gel-like mating plugs, reported here for the first time in three species of Papuan *Hormurus*, appear to confirm the occurence of monandry (Fig. 11). This trait can probably be generalized for the entire genus, but that remains to be confirmed. As expected to monandrous taxa under sexual selection, the morphological diversity of genitalia is quite limited in *Hormiops*, *Hormurus* and *Liocheles* (Monod, 2000, 2011a, b, 2015, unpublished data; Monod & Volschenk, 2004; Monod *et al.*, 2013). A

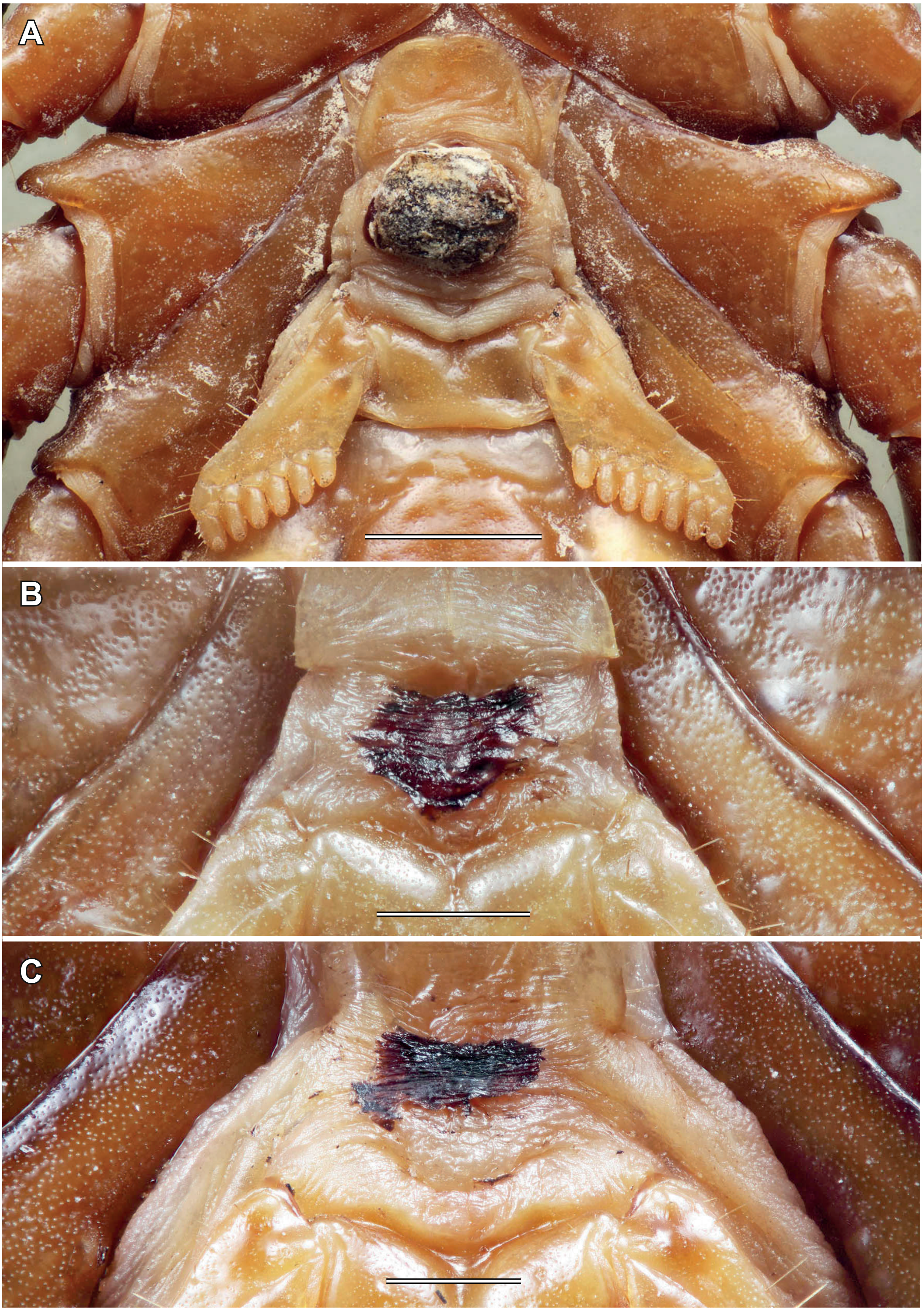

Fig. 11. Mating plugs in Papuan species of *Hormurus* Thorell, 1876. (A) *H. krausi* sp. nov. (ZMB 7603, Astrolabe Bay). (B) *H. menapi* sp. nov. (AMNH). (C) *H. maiwa* sp. nov. (AMNH, Peria Creek). Scale lines: 2 mm (A), 1 mm (B-C).

similar pattern involving monandry, low genital diversity and gel-like mating plugs has already been reported for the genus *Euscorpius* Thorell, 1876 (Euscorpiidae) (Angermann, 1957; Jacob *et al.*, 2004a, b; Althaus *et al.*, 2010).

However, as demonstrated above, Papuan *Hormurus* exhibit an unusual diversity in the male and in the female genital apparatus, suggesting that reinforcement is here more prevalent than sexual selection. Pre-insemination hybridization avoidance would be congruent with the lock-and-key mechanism presented above as the prefered hypothesis. Given the tumultuous geology of the region, it is plausible that the current diversity of autochthonous taxa in Melanesia, and in New Guinea especially, resulted from a sequence of multiple allopatric cladogenesis events followed by secondary contacts between partially divergent lineages. On the other hand, geological stability and a prevalence of allopatric speciation with limited secondary sympatry would then explain the lower genital diversity observed in hormurid taxa of Australia and mainland Southeast Asia.

SYSTEMATICS

Family Hormuridae Laurie, 1896
Genus *Hormurus* Thorell, 1876

Hormurus araiaspathe Monod & Prendini, sp. nov.

Figs 4B, 12-20, Tab. 1

This species was treated under the manuscript name "Hormurus eukteanospatha" in Monod (2011a: 285, 532, 537).

Material: AMNH [LP4340]; ♂ holotype; Papua New Guinea, East New Britain Province, Wowo, 11 km NW of Marmar village, on old logging road to Pakia, about 850 m, 5.45°S, 151.46°E; 23.II.2005; leg. J.D. Slapcinsky & K. Netchy (JS 769).

Etymology: The name *araiaspathe* is derived from the ancient Greek words "ἀραιός, ἀραιά, ἀραιόν" [thin, narrow, slight, slender] and "σπάθη" [broad blade]. The epithet is an invariable feminine noun in apposition and refers to the unusually slender distal lamina of the hemispermatophore.

Diagnosis: *Hormurus araiaspathe* sp. nov. differs from other Papuan *Hormurus* by the following combination of characters. The male holotype has a distinct proximal gap between the suprabasal lobe of the fixed finger and a corresponding notch on the fixed finger (Fig. 15A), as in males of *H. barai* sp. nov. (Fig. 25A), *H. oyatabu* sp. nov. (Fig. 43A), *Hormurus oyawaka* sp. nov. (Fig. 34A) and *H. krausi* sp. nov. (Fig. 152A), whereas in other species the fingers are contiguous; *H. araiaspathe* sp. nov. also possesses a very weak patellar process without a medially located apex (Figs 12, 14E, G), like *H. barai* sp. nov. (Figs 22, 24F-G, I), whereas all other Papuan species have a more strongly developed patellar process with a medially located pointed apex; telotarsi I-III have one to two small ventromedian spinules (Fig. 17A-C), whereas other species have no such spinules; one to three retroventral spinules are located proximally on the telotarsi

Table 1. *Hormurus araiaspathe* sp. nov., measurements (in mm), repository and inventory number of the adult male holotype.

	Holotype
Sex	♂
Repository	AMNH
Inventory number	LP4340
Locality	Wowo
Total length	47.00
Carapace, length	7.44
Carapace, anterior width	5.12
Carapace, posterior width	8.05
Pedipalp femur, length	7.19
Pedipalp femur, width	3.17
Pedipalp femur, height	1.67
Pedipalp patella, length	7.50
Pedipalp patella, width	3.41
Pedipalp patella, height	2.90
Pedipalp chela, length	14.88
Pedipalp chela, width	5.36
Pedipalp chela, height	3.62
Chela movable finger, length	7.58
Metasoma segment I, length	2.80
Metasoma segment I, width	1.95
Metasoma segment I, height	1.71
Metasoma segment II, length	3.17
Metasoma segment II, width	1.74
Metasoma segment II, height	1.56
Metasoma segment III, length	3.35
Metasoma segment III, width	1.58
Metasoma segment III, height	1.58
Metasoma segment IV, length	3.84
Metasoma segment IV, width	1.46
Metasoma segment IV, height	1.50
Metasoma segment V, length	4.33
Metasoma segment V, width	1.46
Metasoma segment V, height	1.49
Telson, length	5.30
Telson, width	1.68
Telson, height	1.79

(Fig. 17), whereas other species are equipped with only one proximal spinule; the anal arch of metasoma segment V has few weak spinules (Fig. 18C), whereas it is crenulate or with conical teeth in other species; metasoma segment V bears 12 ventral macrosetae, i.e. three pairs (anterior, median and posterior) on the ventrosubmedian carinae and three pairs (anterior, median and posterior) on the lateral carinae (Figs 4B, 18B), whereas this segment bears 14 or more macrosetae in the other species; the distal lamina of the hemispermatophore is unusually slender, narrower than the basal part of the stalk (Fig. 19), whereas distal lamina and stalk base are similar in width in all other species.

Description of adult male: *Colouration* (Fig. 12): Dorsal surface of chelicera manus dark orange, anterior part with darker infuscation; fingers dark brown. Carapace reddish brown, median ocular region black. Tergites reddish brown. Pedipalps reddish dark brown to black; carinae and fingers black. Legs slightly paler than tergites, pale brown with brown infuscation dorsally, orange to reddish brown ventrally, prolateral carina of femora black. Coxapophyses I-II dark reddish brown; leg coxae and sternum orange with dark brown infuscation; sternites light to dark brown, posterior half of sternite V pale yellow; genital operculum and pectines pale yellow. Metasoma dark brown to black; telson slightly paler than metasoma, dark reddish brown, aculeus black.

Cuticle: Nongranular surfaces of carapace, pedipalps, legs, mesosoma and metasoma finely punctate.

Carapace (Fig. 13A-B): Anterior margin with median notch moderately excavated. Anterior furcated sutures distinct. Median ocular tubercle slightly raised; median ocelli at least twice the size of lateral ocelli, separated from each other by approximately the diameter of a median ocellus. Three pairs of lateral ocelli, equal in size, equidistant and adjacent to each other. Surfaces minutely and sparsely granular, except for smooth anterior areas of frontal lobes and median ocular area.

Chelicerae: Basal and median teeth of fixed finger fused into bicusp. Dorsal margin of movable finger with four

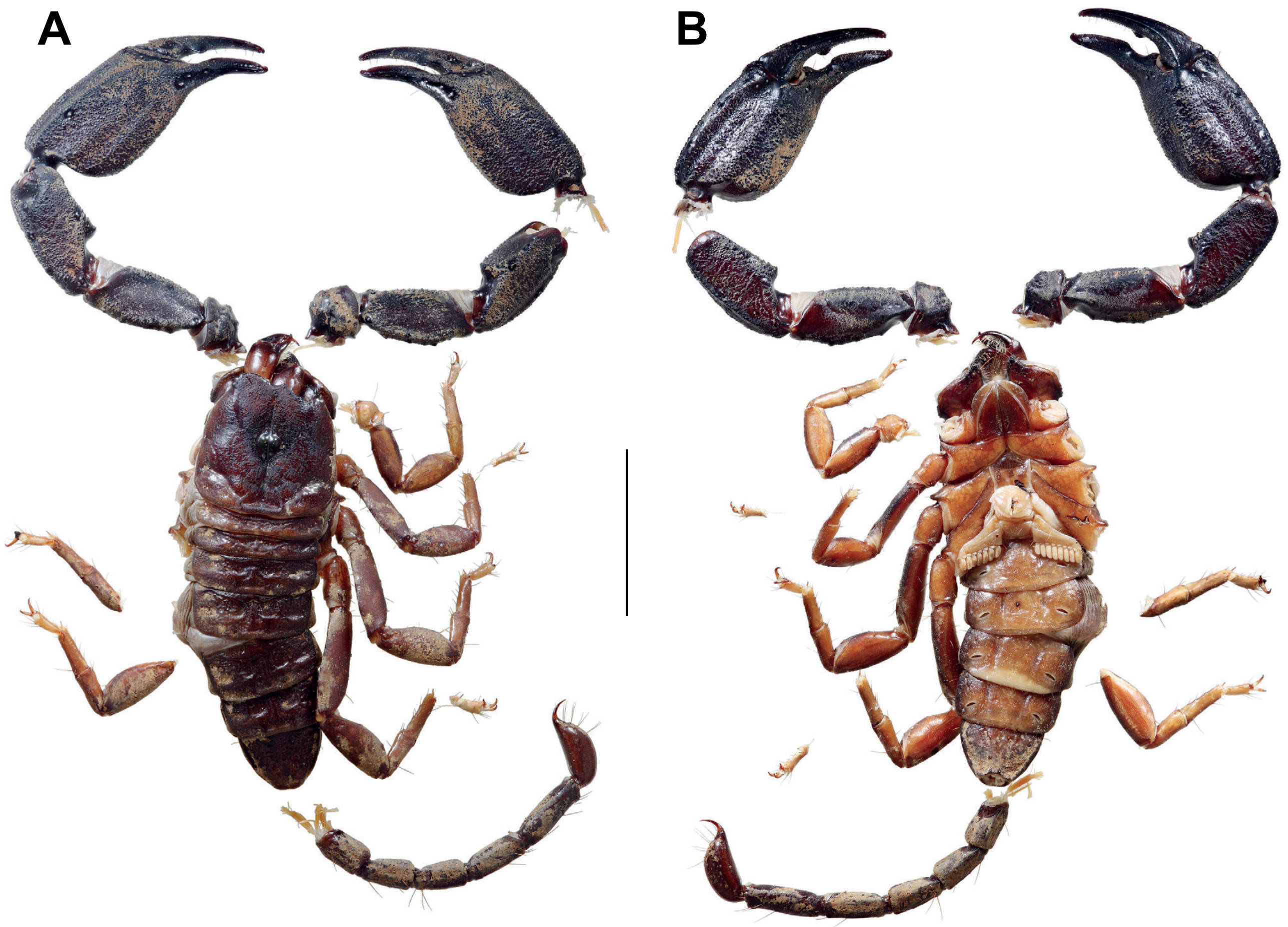

Fig. 12. *Hormurus araiaspathe* sp. nov., male holotype (AMNH [LP4340]). (A) Habitus, dorsal view. (B) Habitus, ventral view. Scale line: 10 mm.

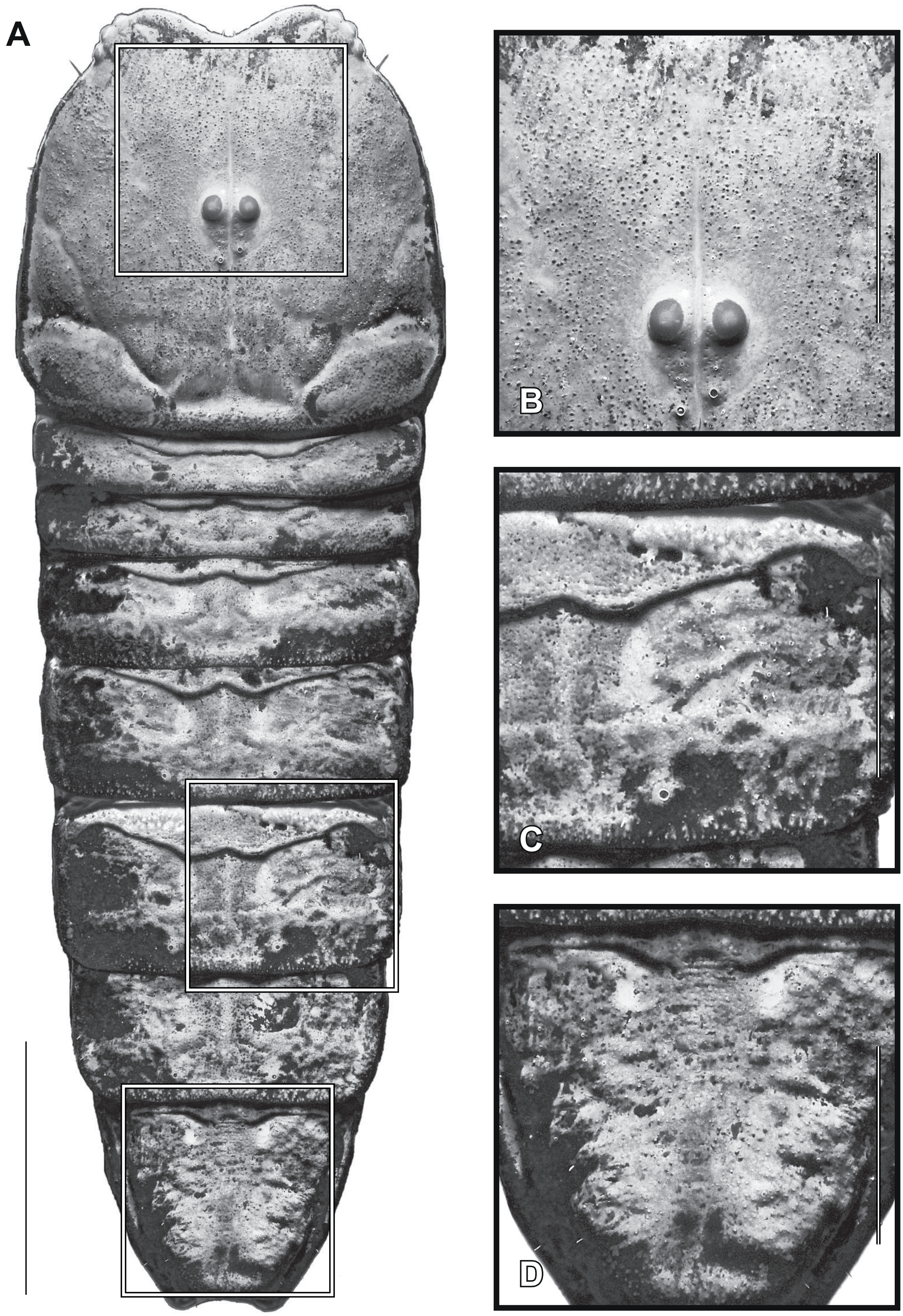

Fig. 13. *Hormurus araiaspathe* sp. nov., male holotype (AMNH [LP4340]), dorsal view. (A) Carapace and mesosomal tergites showing ornamentation and macrosculpture of cuticle. (B) Detailed view of carapace. (C) Detailed view of tergite V. (D) Detailed view of tergite VII. Scale lines: 5 mm (A), 2 mm (B-D).

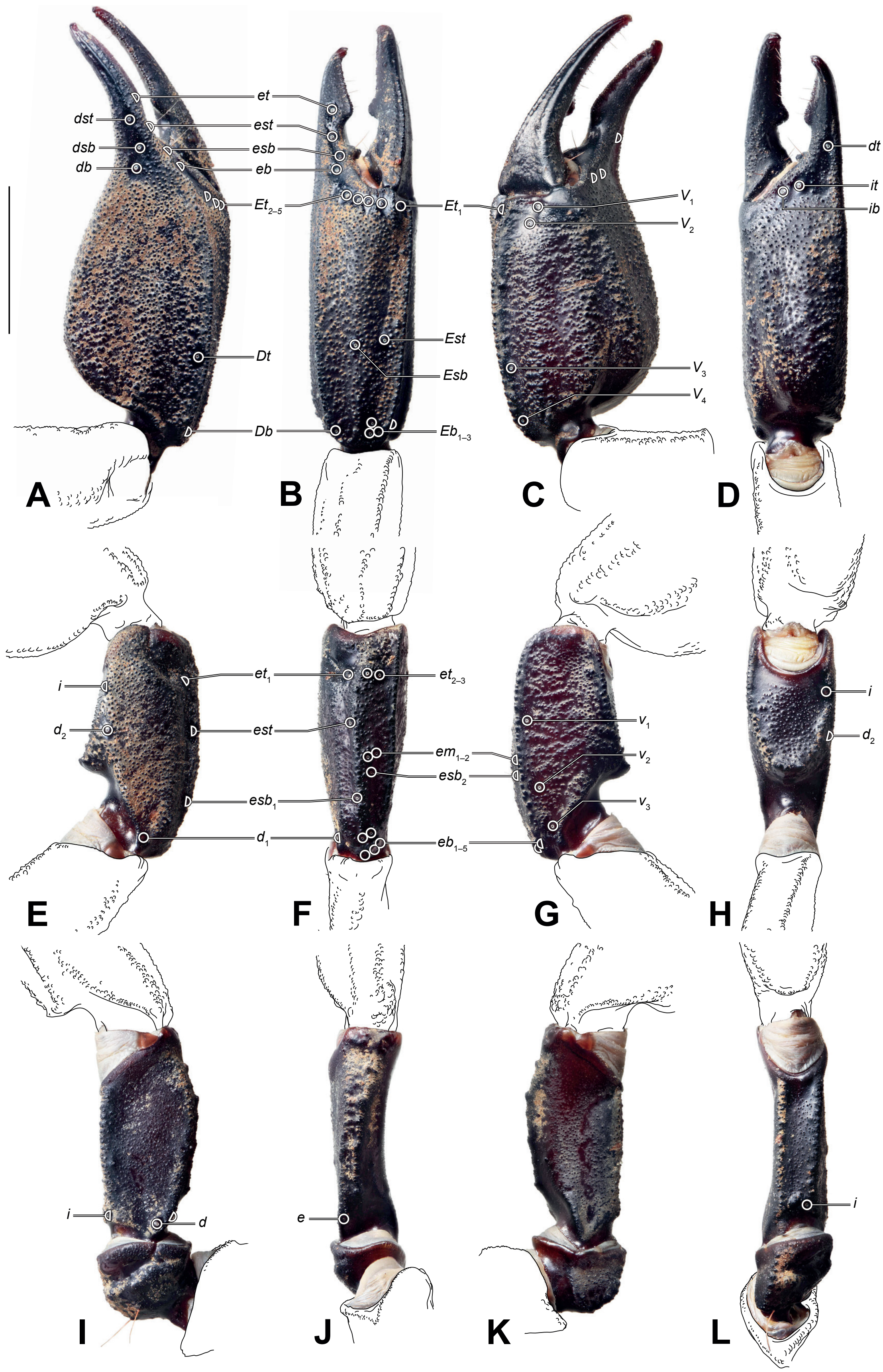

Fig. 14. *Hormurus araiaspathe* sp. nov., male holotype (AMNH [LP4340]), pedipalp chela (A-D), patella (E-H), femur and trochanter (I-L). Dorsal (A, E, I), retrolateral (B, F, J), ventral (C, G, K) and prolateral (D, H, L) aspects showing trichobothria pattern. Scale line: 5 mm.

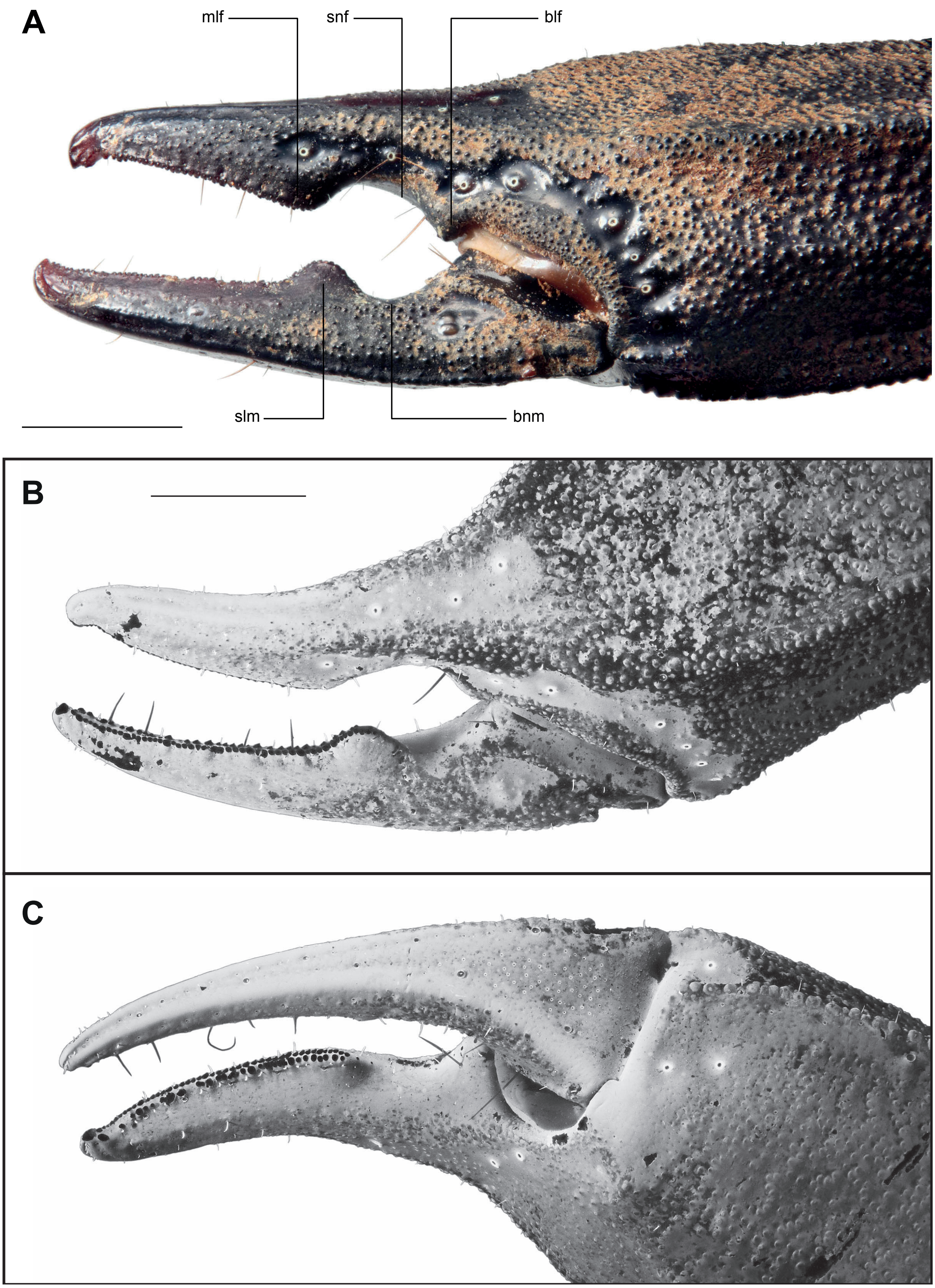

Fig. 15. *Hormurus araiaspathe* sp. nov., male holotype (AMNH [LP4340]), left pedipalp chela. (A) Retrolateral aspect showing dentate margin of chela fingers. (B) Dorsal aspect showing dentate margin of movable finger. (C) Ventral aspect showing dentate margin of fixed finger. Abbreviations: blf (basal lobe of fixed finger), bnm (basal notch of movable finger), mlf (median lobe of fixed finger), slm (suprabasal lobe of movable finger), snf (suprabasal notch of fixed finger). Scale lines: 2 mm.

teeth (one basal, one median, one subdistal and one distal); dorsal distal tooth smaller than ventral distal tooth; ventral margin smooth.

Pedipalps (Figs 12, 14): Segments rather short and stout, with femur length approximately equal to that of carapace. Chela almost asetose.

Chela fingers (Fig. 15): Fixed finger: basal lobe present and conical; suprabasal notch distinct and deep; basal lobe small; dentate margins distally (from tip of finger to median lobe) with two rows of primary denticles bearing large inner accessory denticles; denticles absent on suprabasal notch; few sparse denticles on basal lobe. Movable finger: basal lobe absent; suprabasal lobe well developed but markedly wider than high, gently rounded dorsally and lacking a sharp conical tooth, not overlapping with fixed finger; suprabasal lobe and corresponding notch on fixed finger with distinct proximal gap; dentate margins distally (from tip of finger to suprabasal lobe) with two rows of primary denticles bearing large inner accessory denticles; denticles on basal notch absent; few sparse denticles basally.

Pedipalp carinae: Femur (Fig. 14I-L): proventral carina visible as a ridge of medium-sized spiniform granules; promedian carinae absent; prodorsal carina visible as a ridge of medium-sized spiniform granules, similarly developed as proventral carina; retrodorsal carina visible as a ridge of medium-sized spiniform granules, more distinct in proximal third, less strongly developed than prodorsal carina; retroventral carina visible as a ridge of medium to large spiniform granules, slightly more developed than retrodorsal carina; ventromedian carina obsolete, only distinct proximally as a costate-granular ridge. Patella (Fig. 14E-H): proventral carina visible as a costate-granular ridge proximally, obsolete distally; promedian and prodorsal carinae visible as ridges with medium to large spiniform granules, equally developed, fused medially into low spiniform process without medially located apex; dorsomedian carina only visible proximally as a ridge of small spiniform granules; retrodorsal carina obsolete, only expressed proximally as a ridge of small spiniform granules; paired retromedian carinae fused and visible as a ridge of medium-sized spiniform granules; retroventral carina crenulate (comprising medium to large granules). Chela manus (Fig. 14A-D): proventral and promedian carinae visible as faint ridges with medium-sized spiniform

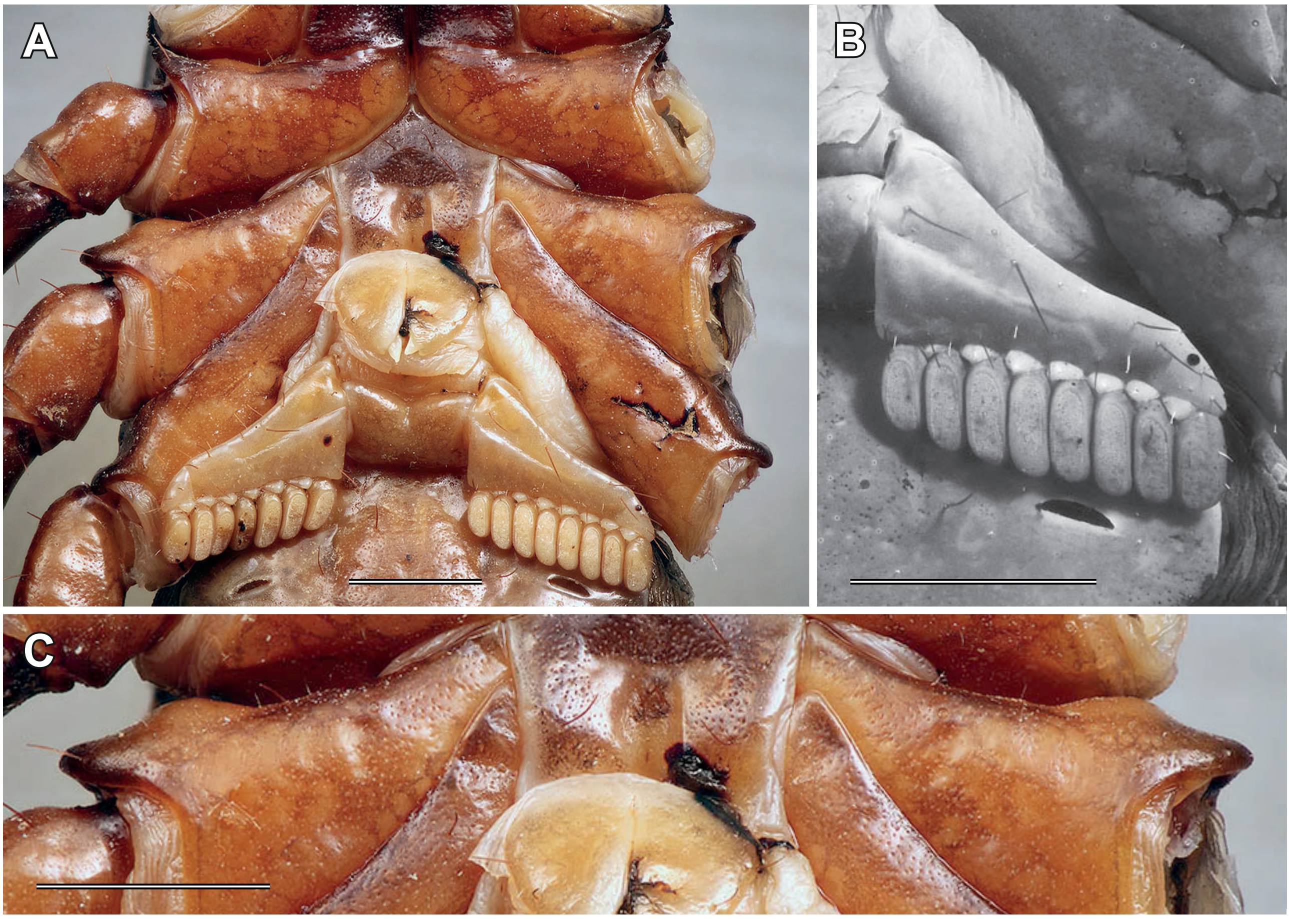

Fig. 16. *Hormurus araiaspathe* sp. nov., male holotype (AMNH [LP4340]), ventral view. (A) Coxae II-IV, sternum, genital operculum and pectines. (B) Left pecten under UV light. (C) Anterior margin of coxae III. Scale lines: 2 mm.

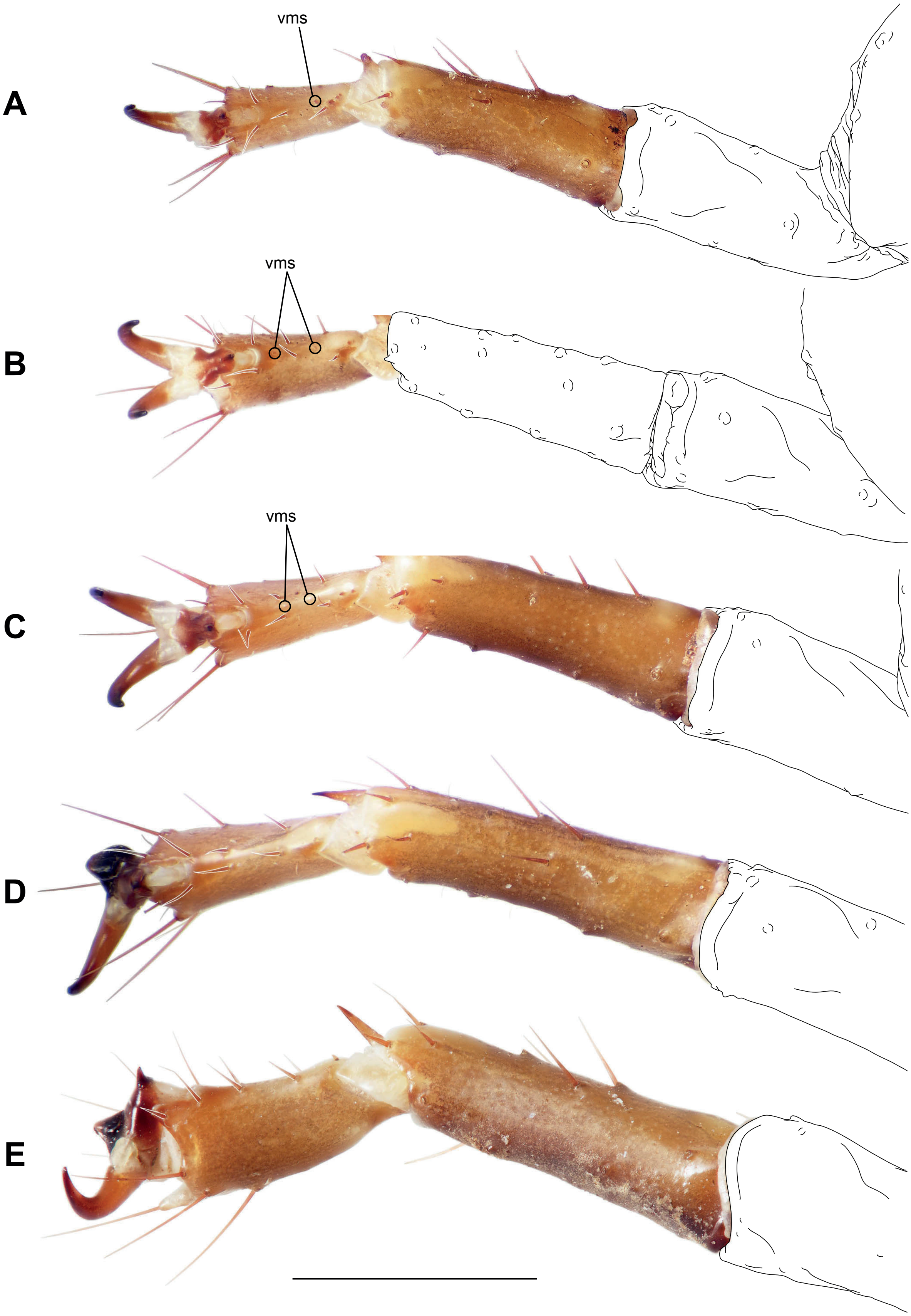

Fig. 17. *Hormurus araiaspathe* sp. nov., male holotype (AMNH [LP4340]), right tarsi, ventral (A-D) and retrolateral (E) aspects. (A) Tarsus I. (B) Tarsus II. (C) Tarsus III. (D-E) Tarsus IV. Abbreviation: vms (ventromedian spinules). Scale line: 2 mm.

granules, equally developed; prodorsal carina obsolete; dorsomedian carina only visible proximally as a ridge of medium-sized spiniform granules, more strongly developed than prodorsal carina; dorsal secondary carina obsolete; digital carina visible as a ridge of small spiniform granules, less distinct in distal area, more developed than retromedian carina; fused retromedian carinae obsolete, visible as a faint ridge of medium-sized spiniform granules proximally; retrolateral secondary carina vestigial, only distinct proximal to condyle of movable finger, expressed as a ridge of small spiniform granules; retroventral carina crenulate (medium to large granules); ventromedian carina obsolete, only expressed proximally as a faint ridge of medium-sized spiniform granules.

Pedipalp macrosculpture: Femur (Fig. 14I-L): prolateral intercarinal surface densely covered with small spiniform granules; dorsal intercarinal surface densely covered with small spiniform granules, distal area smooth; retrolateral dorsal intercarinal surface sparsely covered with small spiniform granules; retrolateral ventral intercarinal surface smooth or nearly so, with few small spiniform granules scattered distally; ventral intercarinal surface densely covered with small spiniform granules proximally, smooth distally. Patella (Fig. 14E-H): prolateral intercarinal surface densely covered with medium-sized spiniform granules, smooth distally; dorsal intercarinal surface densely covered with medium-sized spiniform granules; retrolateral intercarinal surface with dense reticulate network of medium-sized spiniform granules, smooth distally; ventral intercarinal surface sparsely covered with medium-sized spiniform granules, distal area smooth. Chela manus (Fig. 14A-D): prolateral intercarinal surface densely covered with medium to large spiniform granules, smooth proximally; dorsal, retrolateral and ventral intercarinal surfaces densely covered with medium-sized spiniform granules. Chela fingers densely covered with small spiniform granules in proximal half, smooth or nearly so distally, ventral surface smooth; trichobothria *dst*, *dsb* and *db* together in a single large smooth depression.

Trichobothria: Pedipalp orthobothriotaxic, accessory trichobothria absent. Patella (Fig. 14E-H): d_2 trichobothrium distal to patellar process; five *eb* trichobothria arranged in two groups (eb_1+eb_{4-5} and eb_{2-3}); two *esb*, two *em* and one *est* trichobothria arranged in three groups, i.e. esb_1, esb_2+em_{1-2} and *est* (esb_2 closer to em_{1-2} than to esb_1); three *et* trichobothria; three *v* trichobothria. Chela manus (Fig. 14A-D): *Dt* situated in proximal third of manus; Eb_3 close to Eb_{1-2}; *Esb* aligned with *Est*; *Est* situated near midpoint of manus; four *V* trichobothria, V_3 distant from V_4. Fixed chela finger with *db* situated on dorsal surface; *esb* closer to *eb* than to *est*; *eb* situated at base of finger, proximal to point of articulation between fixed and movable fingers; two *i* trichobothria.

Coxosternum (Fig. 16A, C): Coxa III elongated anterodistally, without anterodistal process. Sternum equilateral pentagonal (anterior width slightly greater than posterior width), slightly wider than long.

Legs (Fig. 17): Femora I-IV with ventral surfaces bicarinate, proventral and retroventral carinae granular. Retrolateral margins of tibiae I-II without setiform macrosetae. Basitarsi I-IV: proventral and retroventral rows each with 4/3, 4/4, 4/4 and 3/4 setiform macrosetae. Telotarsi I-IV: proventral and retroventral rows each with 3/4, 4/4, 4/4, 4/4 setiform macrosetae, respectively; retroventral row with 1-3 proximal spinules. Telotarsi I-III: 1-2 ventromedian spinules. Ungues curved, half of telotarsus length or less.

Genital operculum (Fig. 16A): Composed of two subtriangular sclerites.

Pectines (Fig. 16A-B): Moderately elongate, distal edge reaching but not extending beyond distal edge of coxa IV; fulcra and three marginal lamellae present. Pectinal teeth count 7-8; teeth straight, entirely covered with sensory papillae.

Mesosoma (Figs 12, 13A, C-D): Pre-tergites I-VII and posterior margins of pre-tergites smooth. Post-tergites: posterior margins of tergites I-VI sublinear, without distinct projection; lateral transversal sulcus present; intercarinal surfaces of I-VII smooth or nearly so medially, sparsely covered with minute granules laterally, posterior third more densely granular; intercarinal surface of VII sparsely covered with minute granules; intercarinal surfaces of III-VII with distinct reticulate network of ridges and dimples. Respiratory stigmata (spiracles) of sternites IV-VI short, their length less than third of sternite width, and distinctly crescent shaped. Sternite VII acarinate.

Metasoma (Fig. 18): Not markedly compressed laterally; sparsely and minutely granular, posterior segments less so; dorsal intercarinal surface of V smooth and shiny medially; distinct dorsomedian sulcus on segments I-IV, much less pronounced on segment V (usually only faintly expressed anteriorly).

Metasoma carinae: Segments I-IV: dorsolateral carinae obsolete on all segments; lateral median carinae weakly developed (as faint ridges); lateral inframedian carinae distinct anteriorly and expressed as a faint ridge on segment I, absent on other segments; ventrolateral carinae weakly developed (as faint ridges); pair of ventrosubmedian carinae distinct but weakly developed as low ridges. Segment V: dorsolateral and lateral median carinae obsolete; ventrolateral carinae only expressed as faint ridges; ventrosubmedian carinae fused, only expressed as a faint ridge in anterior two-thirds.

Metasoma spination: Segments I-II: dorsomedian posterior and dorsolateral posterior spiniform granules absent; ventrolateral and ventrosubmedian carinae without large spiniform granules. Segments III-IV: dorsolateral posterior spiniform granules absent; ventrolateral and ventrosubmedian carinae without large spiniform granules. Segment V: ventrolateral and ventromedian carinae without distinct granules or spines; anal arch faintly crenulate (with sparse and minute granules).

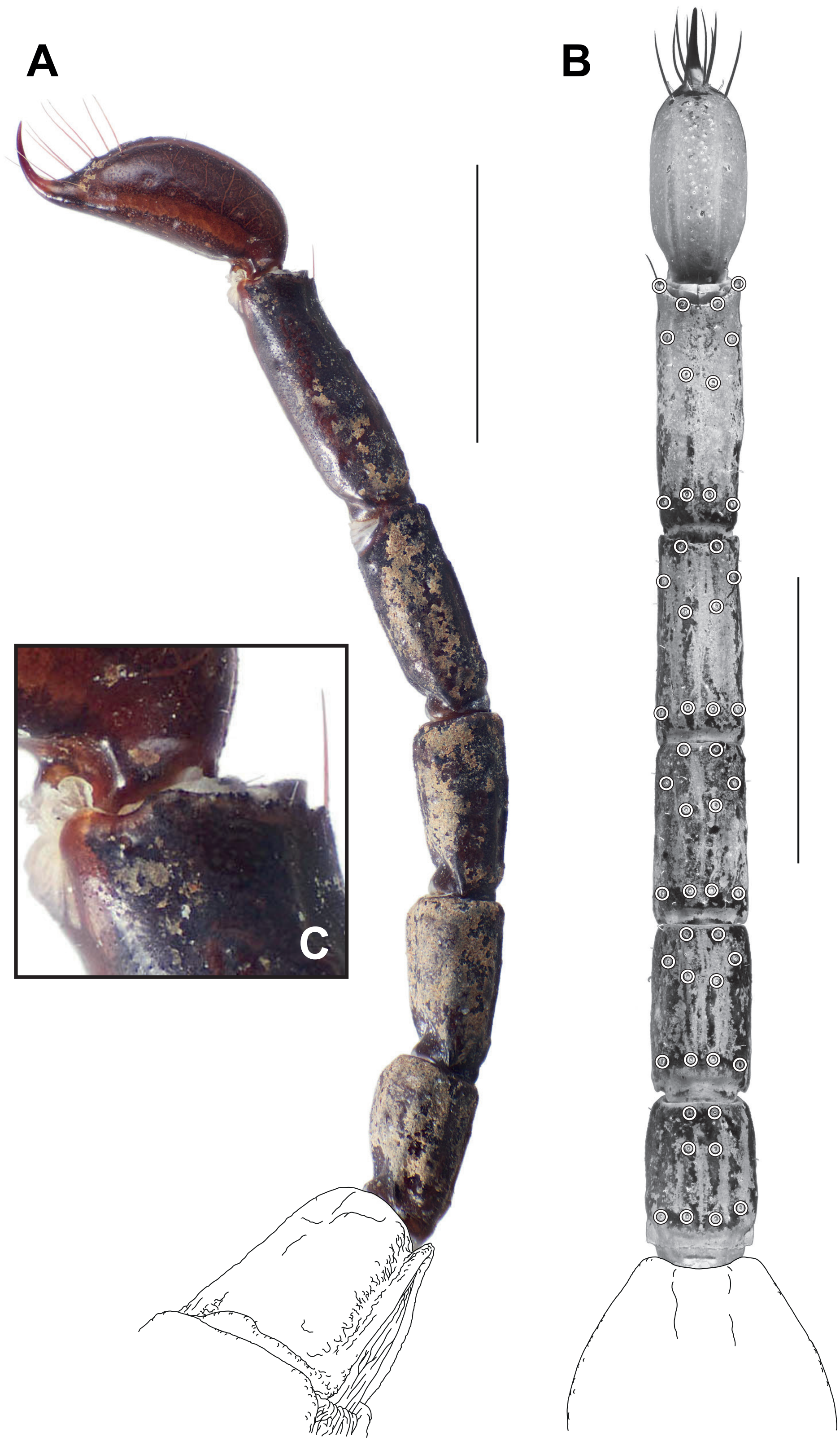

Fig. 18. *Hormurus araiaspathe* sp. nov., male holotype (AMNH [LP4340]). (A) Metasoma and telson, lateral aspect. (B) Same, ventral aspect. (C) Lateral view of posterior part of segment V showing weak spinules on anal arch. Scale lines: 5 mm (A-B; C not to scale).

Ventral metasoma setation: Segment I with eight macrosetae, i.e. three pairs (anterior, median and posterior) on ventrosubmedian carinae and one pair (anterior) on ventrolateral carinae; segments II-IV each with ten macrosetae, i.e. three pairs (anterior, median and posterior) on ventrosubmedian carinae and two pairs (anterior and supramedian) on ventrolateral carinae; segment V with 12 macrosetae, i.e. three pairs (anterior, median and posterior) on ventrosubmedian carinae and three pairs (anterior, supramedian and posterior) on ventrolateral carinae.

Telson (Fig. 18A): Slightly longer than metasoma segment V; vesicle smooth, without granules; aculeus short (less than half of vesicle length), sharply curved.

Hemispermatophore (Fig. 19): Stalk slightly longer than stem. Distal lamina curved, without distal crest on anterior margin, markedly narrower than basal part of stalk; single laminar hook situated in basal third of stalk (basal part/distal lamina ratio = 0.4-0.47, median = 0.43); transverse ridge distinct, approximately aligned with base of laminar hook, merging with anterior margin more distally than base of laminar hook. Capsule: hemisolenos thin, folded on itself only proximally and unfolding to flattened distal tip distally (tip and base approximately of same width), without lateral longitudinal carina, laterodistal accessory hook and medioposterior accessory apophysis; tip of hemisolenos more proximal than base of laminar hook, more distal than tip of clasper. Clasper well developed, forming distinct hump, not hook-like, with small lateral knob-like accessory process. Subex well developed, spoon-shaped, merging anteriorly with base of clasper; posterior edge forming obtuse angle (>90°) with hemisolenos; anterior edge forming right angle (90º) with hemisolenos.

Description of adult female: Female unknown.

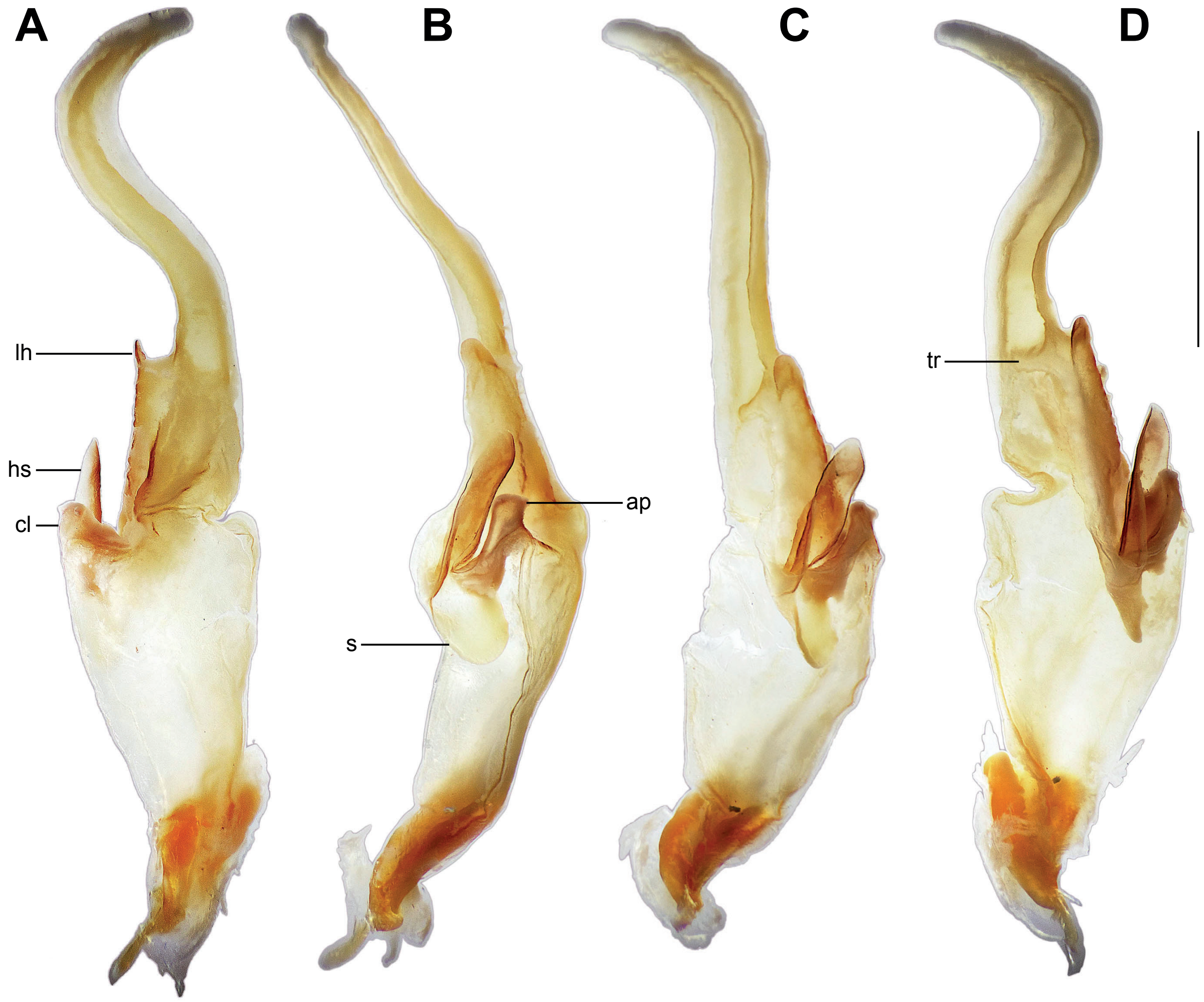

Fig. 19. *Hormurus araiaspathe* sp. nov., male holotype (AMNH [LP4340]), left hemispermatophore. (A) Lateral aspect. (B) Anterior aspect. (C) Rotated approximately 45° counter-clockwise from anterior aspect. (D) Contralateral aspect. Abbreviations: ap (accessory process), cl (clasper), hs (hemisolenos), lh (laminar hook), tr (transverse ridge), s (subex). Scale line: 2 mm.

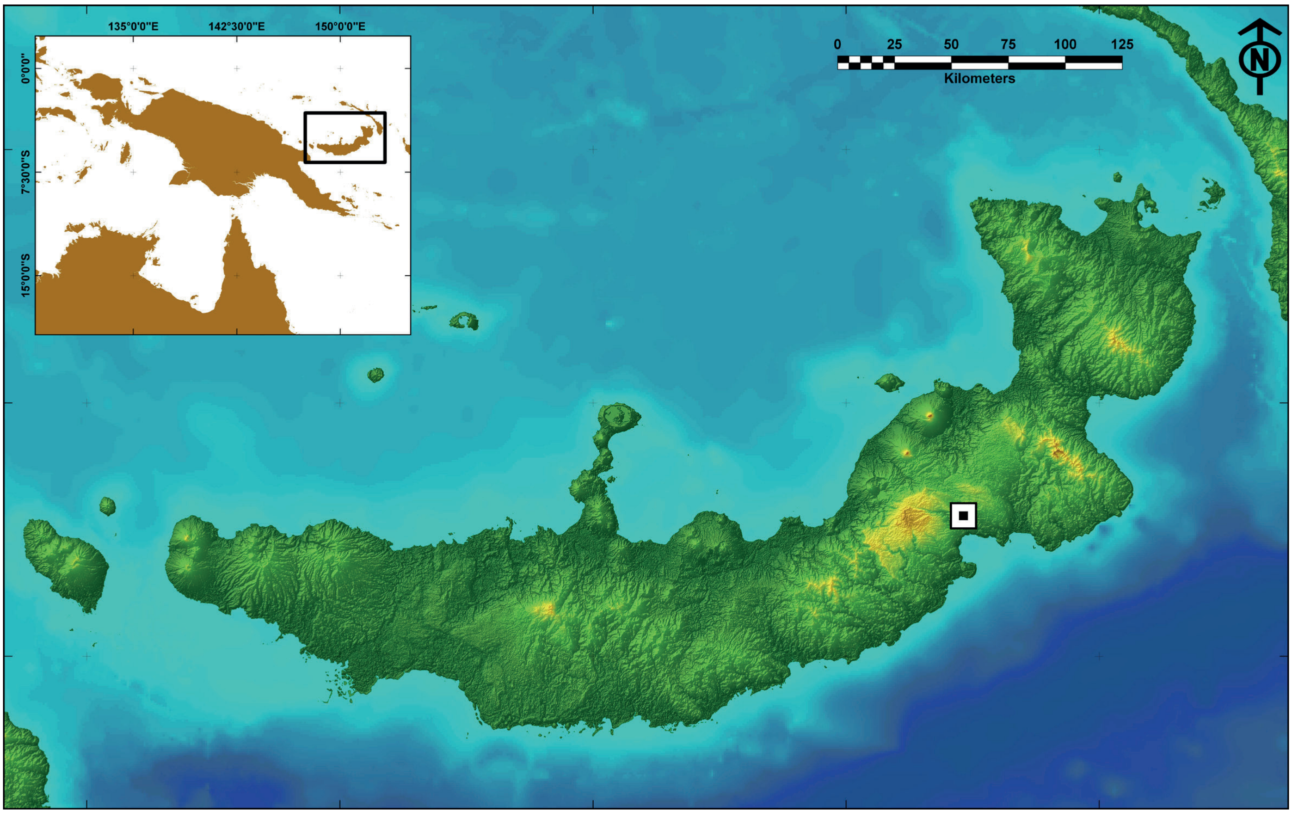

Fig. 20. Known locality of *Hormurus araiaspathe* sp. nov. in the eastern part of New Britain Island, Bismarck Archipelago, off the northeastern coast of New Guinea. Color gradient indicates topography and bathymetry.

Distribution: *Hormurus araiaspathe* sp. nov. is known from only one locality in the eastern part of New Britain Island, Bismarck Archipelago, off the northeastern coast of New Guinea (Fig. 20).

***Hormurus barai* Monod, Iova & Prendini, sp. nov.**
Figs 4A, 5A, 21-30, 113C, Tab. 2

This species was treated under the manuscript name "Hormurus aethes" in Monod, 2011a (280, 531, 536, figs 15D, 29D, 35C, 38D).

Material: AMNH [LP 3001]; ♂ holotype; Papua New Guinea, Central Province, Mount Obree, slope S of camp 1, 1600 m; 3.II.2004; leg. J.D. Slapcinsky & F. Kraus – UMMZ [LP 3001]; 1 ♂ paratype; same data as for holotype. – AMNH [LP 2999]; 1 ♂ paratype; Mt Obree, W slope, Fenu 2, 1560 m; 31.I.2004; leg. F. Kraus – AMNH [LP 3000]; 1 ♂ paratype; Papua New Guinea, Central Province, Mt Obree, W slope, Fenu 2, 1560 m; 3.II.2004; leg. F. Kraus – AMNH [LP 3002]; 3 ♀ paratypes; same data as for holotype; 6.II.2004, leg. J.D. Slapcinsky & F. Kraus – AMNH [LP 3003]; 1 ♀ paratype; same data as for holotype; 31.I.2004; leg. J.D. Slapcinsky & F. Kraus – AMNH [LP 3004]; 1 ♀ paratype; Mt Obree, ridge W of camp 1, 1550-1640 m; 4.II.2004; leg. J.D. Slapcinsky & F. Kraus – UMMZ [LP 3005]; 1 ♀, 2 juvenile paratypes; Mt Obree, pond about 200 m S of camp 2; 7.II.2004; leg. F. Kraus & J.D. Slapcinsky – MHNG-ARTO-26552; 1 ♀ paratype; Mt Obree, 1870 m, under logs, 9.45°S, 148.00°E; VIII.2019; leg. B. Iova.

Etymology: The Barai are Papuan people living on the north-western slopes of Mount Obree where the type specimens were collected. The Barai are part of the larger Koiari tribe (Dutton, 1969, 1973). The epithet is an invariable name in apposition.

Diagnosis: *Hormurus barai* sp. nov. differs from other Papuan *Hormurus* by the following combination of characters. The species lacks a basal lobe on the fixed chela finger of males (Fig. 25A) which is present in all other species; the dorsal intercarinal surfaces of the patella and chela are covered with much smaller granules (Fig. 24A-B, F-G) than in other species; *H. barai* sp. nov. also possesses a very weak patellar process without a medially located apex (Figs 21-22, 24F-G, I), like in *H. araiaspathe* sp. nov. (Figs 12, 14E, G) and *H. oyatabu* sp. nov. (Figs 40, 42F-G, I), whereas all other Papuan species have a more strongly developed patellar process with a medially located pointed apex. The *Esb* trichobothrium on the pedipalp chela is located midway between the *Eb*

Table 2. *Hormurus barai* sp. nov., measurements (in mm), repositories and inventory numbers of adult males and females.

	Holotype	Paratype	Paratype	Paratype	Paratype	Paratype	Paratype
Sex	♂	♂	♀	♀	♀	♀	♀
Repository	AMNH	AMNH	AMNH	AMNH	AMNH	AMNH	MHNG
Inventory number	LP3001	LP3001	LP3003	LP3004	LP3002	LP3002	ARTO-26552
Locality	Mt Obree	Mt Obree	Mt Obree	Mt Obree	Mt Obree	Mt Obree	Mt Obree
Total length	38.00	33.00	43.00	41.00	42.00	35.00	40.00
Carapace, length	4.92	4.61	6.15	5.70	6.07	5.66	5.55
Carapace, anterior width	3.24	3.11	4.06	3.65	3.93	3.77	3.54
Carapace, posterior width	5.45	5.24	7.05	6.60	6.72	6.64	6.06
Pedipalp femur, length	5.41	5.08	5.86	5.43	5.45	5.49	5.02
Pedipalp femur, width	2.01	1.77	2.46	2.25	2.29	2.29	1.95
Pedipalp femur, height	1.31	1.16	1.72	1.56	1.68	1.72	1.56
Pedipalp patella, length	5.78	5.00	6.15	5.98	5.98	5.98	5.30
Pedipalp patella, width	2.29	2.07	2.91	2.66	2.70	2.66	2.34
Pedipalp patella, height	2.17	2.05	2.87	2.54	2.75	2.70	2.32
Pedipalp chela, length	10.91	10.00	11.95	11.34	11.34	11.34	10.73
Pedipalp chela, width	3.77	3.54	4.71	4.34	4.34	4.34	4.08
Pedipalp chela, height	2.79	2.68	3.48	3.20	3.36	3.24	2.99
Chela movable finger, length	5.82	5.16	6.56	6.15	6.19	6.23	6.16
Genital operculum length, female	NA	NA	1.31	1.23	1.23	1.23	1.10
Genital operculum width, female	NA	NA	2.38	1.89	2.13	2.05	2.01
Metasoma segment I, length	2.05	1.89	2.62	2.34	2.34	2.42	2.19
Metasoma segment I, width	1.76	1.56	2.21	2.01	2.13	1.93	1.85
Metasoma segment I, height	1.52	1.37	1.93	1.76	1.71	1.72	1.58
Metasoma segment II, length	2.25	2.26	2.79	2.66	2.46	2.46	2.38
Metasoma segment II, width	1.35	1.31	1.72	1.58	1.64	1.56	1.49
Metasoma segment II, height	1.39	1.27	1.76	1.68	1.64	1.64	1.46
Metasoma segment III, length	2.29	2.29	2.70	2.79	2.66	2.79	2.50
Metasoma segment III, width	1.27	1.16	1.56	1.48	1.53	1.43	1.34
Metasoma segment III, height	1.35	1.23	1.72	1.64	1.59	1.56	1.43
Metasoma segment IV, length	2.66	2.62	2.99	2.75	2.94	3.07	2.62
Metasoma segment IV, width	1.15	1.06	1.43	1.31	1.31	1.31	1.16
Metasoma segment IV, height	1.23	1.16	1.64	1.48	1.48	1.48	1.34
Metasoma segment V, length	3.16	3.03	3.77	3.52	3.32	3.61	3.11
Metasoma segment V, width	1.11	1.06	1.43	1.25	1.31	1.31	1.19
Metasoma segment V, height	1.16	1.13	1.48	1.31	1.39	1.31	1.24
Telson, length	4.06	3.77	4.47	4.10	4.18	4.18	3.98
Telson, width	1.39	1.44	1.64	1.48	1.48	1.43	1.32
Telson, height	1.38	1.34	1.54	1.39	1.43	1.39	1.32

group and *Est* (Fig. 24C), whereas it is closer to *Est* in the other species; the anterior margin of coxa III in males (Fig. 26A, C) is not as elongated distally as in the other species; pectines have two marginal lamellae (Fig. 26A-B, D-E), compared to three in other taxa; respiratory stigmata (spiracles) of sternites IV-VI are round/oval (Fig. 22B, D), whereas they are distinctly crescent-shaped in the other species; the ventrolateral and ventromedian carinae of metasoma segment V bear few strong spiniform granules (Fig. 28), whereas they bear no or only minutes granules in the other taxa; the anal arch of metasoma segment V is equiped with strong conical teeth (Fig. 28), whereas it is crenulate with less developed teeth in other species; metasoma

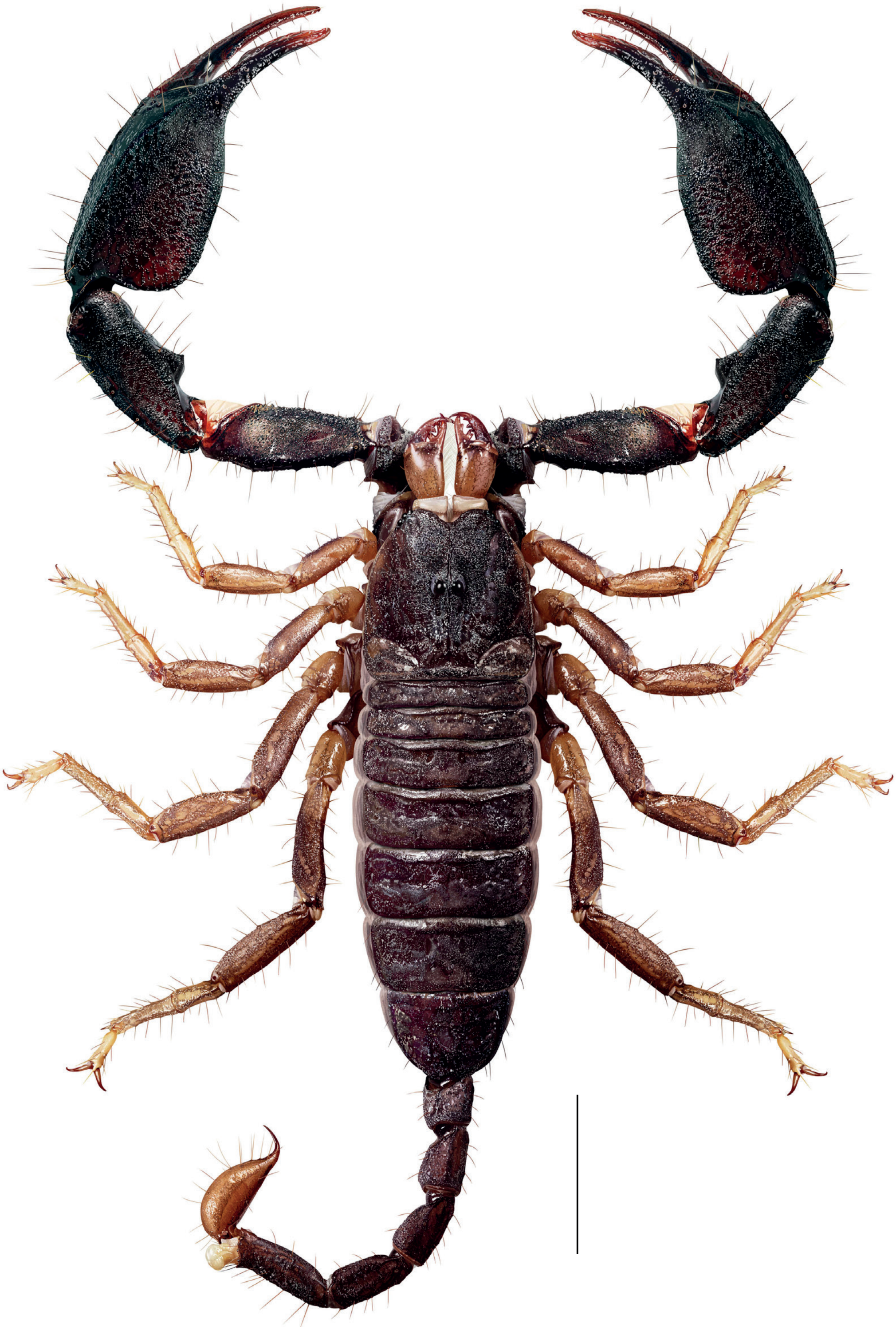

Fig. 21. *Hormurus barai* sp. nov., habitus of male, dorsal aspect; reconstruction based on photographs. Scale line: 5 mm.

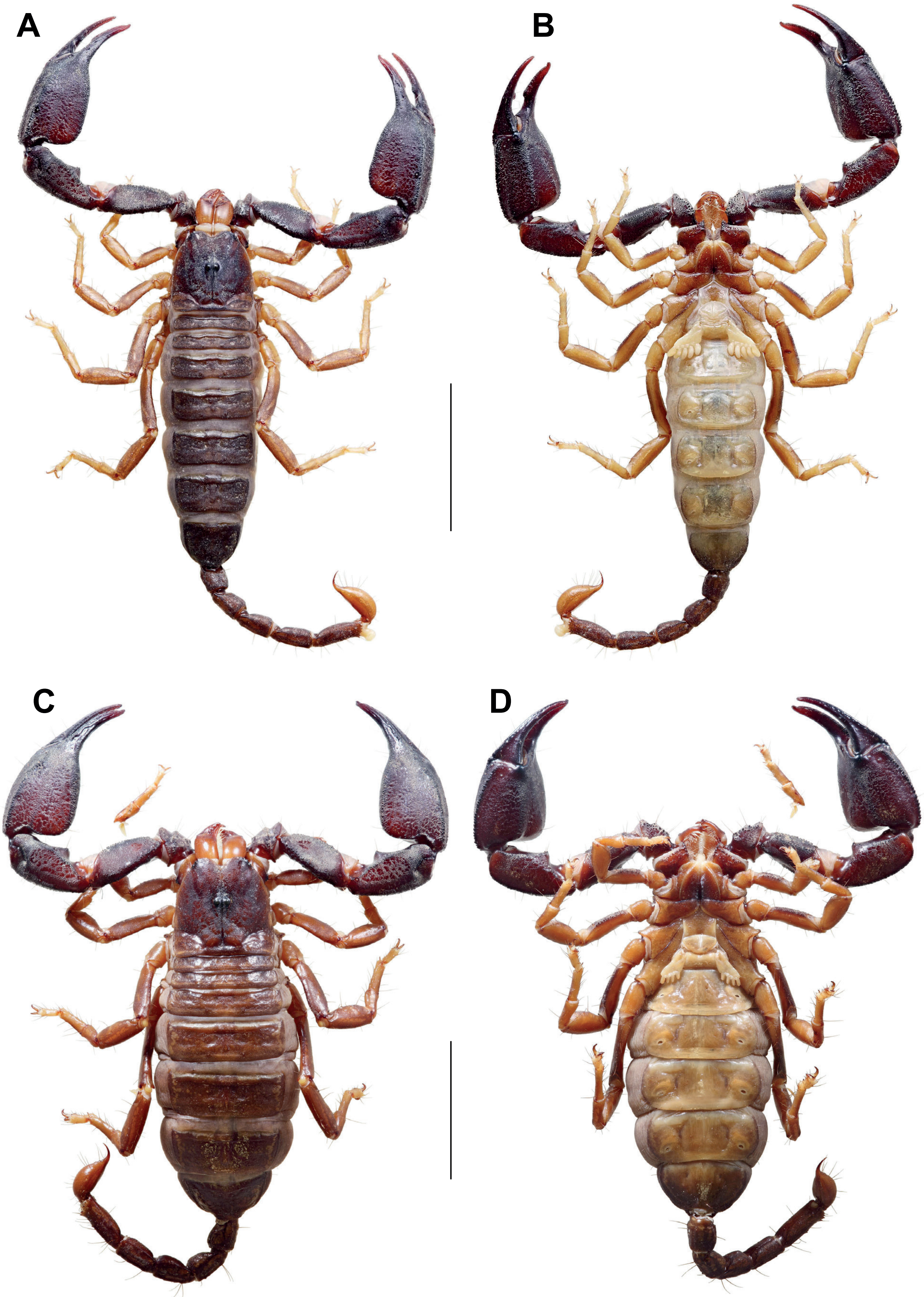

Fig. 22. *Hormurus barai* sp. nov., habitus, dorsal (A, C) and ventral (B, D) aspects. (A-B) Male holotype (AMNH [LP3001]). (C-D) Female paratype (AMNH [LP3003]). Scale lines: 10 mm.

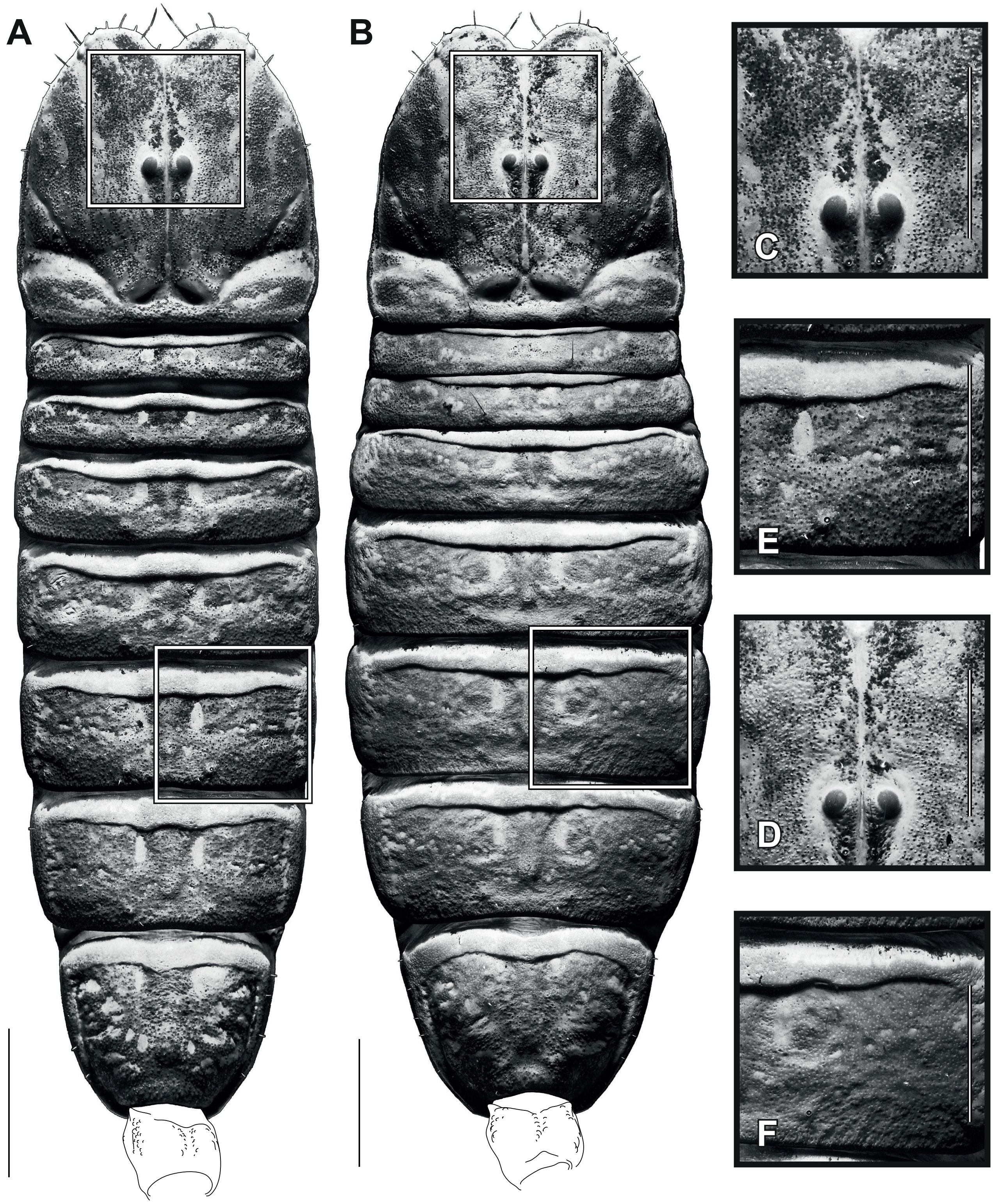

Fig. 23. *Hormurus barai* sp. nov., carapace and mesosomal tergites showing ornamentation and macrosculpture of cuticle (A-B), detailed views of carapace (C-D) and of tergite V (E-F), dorsal aspect. (A, C, E) Male holotype (AMNH [LP3001]). (B, D, F) Female paratype (AMNH [LP3003]). Scale lines: 3 mm (A-B), 2 mm (C-F).

segments II-IV have eight ventral macrosetae, i.e. three pairs (anterior, median and posterior) on the ventrosubmedian carinae and one pair (anterior) on the lateral carinae (Fig. 28C), whereas they possess ten or more macrosetae in the other species.

Description of adult male (holotype): *Colouration* (Figs 21, 22A-B): Dorsal surface of chelicera manus yellow to orange with darker infuscation, more pronounced anteriorly; fingers light brown. Carapace reddish brown, median ocular region black. Tergites brown. Pedipalps reddish brown; carinae and fingers black. Legs paler than tergites, orange to yellow, distal segments (tibiae, basitarsi and telotarsi) paler; dorsal surface with brown infuscation, more pronounced proximally, absent on telotarsi; prolateral carina of femora dark brown. Coxapophyses and coxae I-II orange to brown; coxae III-IV yellow with black anterior margin; sternum yellow to light brown; genital operculum and pectines pale yellow. Sternite III pale yellow; sternites IV-VI yellow with brown lateral margins, these dark areas becoming more distinct and covering more surface on most posterior segments; posterior half of sternite V markedly paler than anterior half; sternite VII dark brown with lighter spots anteriorly. Metasoma light reddish brown with darker infuscation; telson paler than metasoma, vesicle orange, aculeus reddish brown.

Cuticle: Nongranular surfaces of carapace, pedipalps, legs, mesosoma and metasoma finely punctate.

Carapace (Fig. 23A, C): Anterior margin with median notch moderately excavated. Anterior furcated sutures distinct. Median ocular tubercle slightly raised; median ocelli present, at least twice the size of lateral ocelli, separated from each other by more than their diameter. Three pairs of lateral ocelli, equal in size, equidistant and adjacent to each other. Surfaces minutely and densely granular, except for smooth anterior areas of frontal lobes and median ocular area.

Chelicerae: Basal and median teeth of fixed finger fused into bicusp. Dorsal margin of movable finger with four teeth (one basal, one median, one subdistal and one distal); dorsal distal tooth smaller than ventral distal tooth; ventral margin smooth.

Pedipalps (Figs 21, 22A-B, 24B-E, G-J, L-O): Segments rather short and stout, with femur length approximately equal to that of carapace. Chela almost asetose.

Chela fingers (Fig. 25A, C-D): Fixed finger: basal lobe absent; suprabasal notch distinct and deep; dentate margins distally (from tip of finger to median lobe) with two rows of primary denticles bearing large inner accessory denticles; denticles absent on suprabasal notch and basally. Movable finger: basal lobe absent; suprabasal lobe well developed, conical, gently rounded dorsally and lacking sharp conical tooth, not overlapping with fixed finger; suprabasal lobe and corresponding notch on fixed finger with distinct proximal gap; dentate margins distally (from tip of finger to suprabasal lobe) with two rows of primary denticles bearing large inner accessory denticles; denticles absent on basal notch; few sparse denticles basally.

Pedipalp carinae: Femur (Fig. 24L-O): proventral carina visible as a ridge of medium-sized spiniform granules; promedian carinae absent; prodorsal carina visible as a ridge of medium-sized spiniform granules, similarly developed as proventral carina; retrodorsal carina visible as a ridge of medium-sized spiniform granules, similarly developed as prodorsal carina; retroventral carina visible as a ridge of medium to large spiniform granules, similarly developed as retrodorsal carina; ventromedian carina obsolete, only expressed proximally as a ridge of medium-sized spiniform granules. Patella (Fig. 24G-J): proventral carina visible as costate-granular ridge proximally, obsolete distally; promedian and prodorsal carinae visible as ridges with medium to large spiniform granules, equally developed, fused medially into low spiniform process without medially located apex; dorsomedian carina only visible proximally as a ridge of medium-sized spiniform granules; retrodorsal carina obsolete, only expressed proximally as a faint ridge of small to medium-sized spiniform granules; paired retromedian carinae fused and visible as a faint ridge of medium-sized spiniform granules; retroventral carina crenulate (composed of large granules). Chela manus (Fig. 24B-E): proventral carina visible as a faint ridge of medium-sized spiniform granules, more strongly developed than promedian carina; promedian carina obsolete, only expressed proximally as a faint ridge of small granules; prodorsal carina obsolete; dorsomedian carina visible as a faint ridge of medium-sized spiniform granules, more strongly developed than prodorsal carina; dorsal secondary carina absent; digital carina visible as a ridge of small to medium-sized spiniform granules, less distinct in distal area, more developed than retromedian carina; fused retromedian carinae obsolete, visible as a faint ridge of medium-sized spiniform granules proximally; retrolateral secondary carina vestigial, only discernible proximal to condyle of movable finger as a ridge of medium-sized spiniform granules; retroventral carina crenulate (composed of large granules); ventromedian carina obsolete, only expressed proximally as a faint ridge of medium-sized spiniform granules.

Pedipalp macrosculpture: Femur (Fig. 24L-O): prolateral intercarinal surface densely covered with small spiniform granules; dorsal intercarinal surface densely covered with small spiniform granules, distal area smooth; retrolateral dorsal intercarinal surface sparsely covered with small to medium-sized spiniform granules; retrolateral ventral intercarinal surface smooth or nearly so, with few small spiniform granules scattered distally; ventral intercarinal surface densely covered with small spiniform granules, distal area smooth. Patella (Fig. 24G-J): prolateral intercarinal surface densely covered with small spiniform granules; dorsal and retrolateral intercarinal surfaces

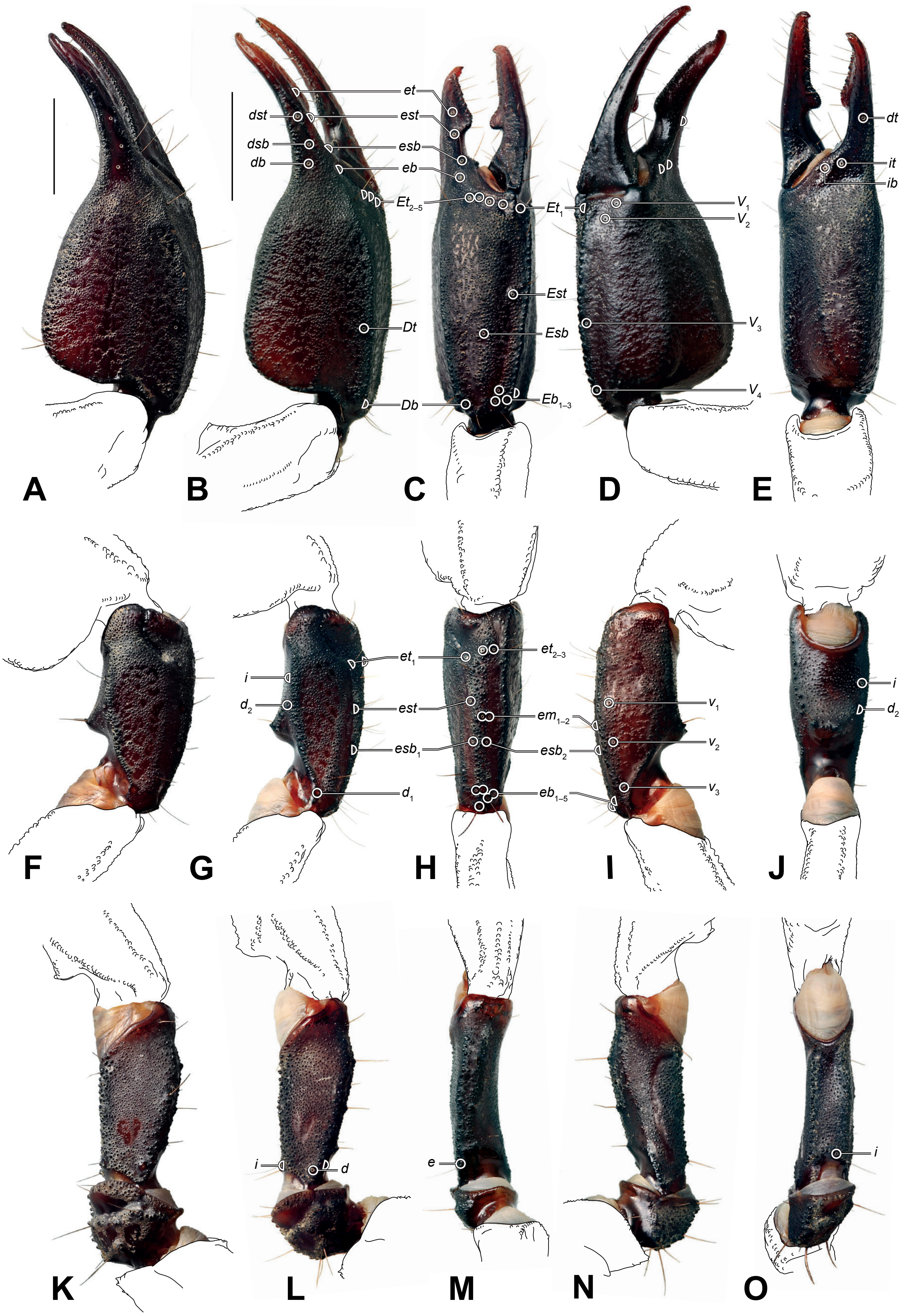

Fig. 24. *Hormurus barai* sp. nov., pedipalp chela (A-E), patella (F-J), femur and trochanter (K-O), dorsal (A-B, F-G, K-L), retrolateral (C, H, M), ventral (D, I, N) and prolateral (E, J, O) aspects showing trichobothria pattern. (A, F, K) Female paratype (AMNH [LP3003]). (B-E, G-J, L-O) Male holotype (AMNH [LP3001]). Scale lines: 3 mm.

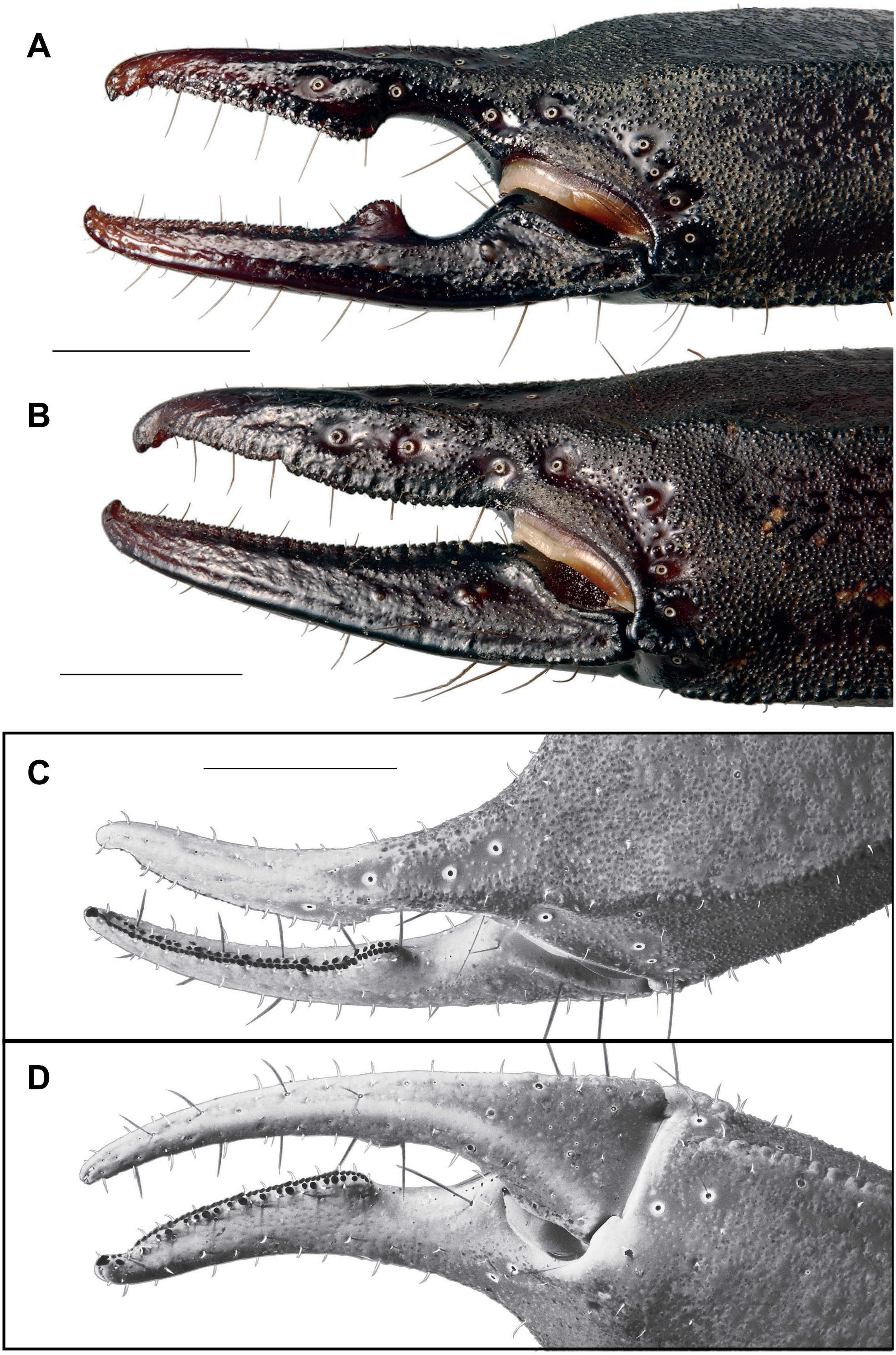

Fig. 25. *Hormurus barai* sp. nov., left pedipalp chelae, retrolateral aspect showing dentate margin of chela fingers (A-B), dorsal aspect showing dentate margin of movable finger (C), ventral aspect showing dentate margin of fixed finger (D). (A, C-D) Male holotype (AMNH [LP3001]). (B) Female paratype (AMNH [LP3003]). Scale lines: 2 mm.

Fig. 26. *Hormurus barai* sp. nov., coxae II-IV, sternum, genital operculum and pectines, ventral aspect (A, D), left pecten under UV light (B, E), anterior margins of coxae III (C, F). (A-C) Male holotype (AMNH [LP3001]). (D-F) Female paratype (AMNH [LP3003]). Scale lines: 2 mm (A, C-D, F), 1 mm (B, E).

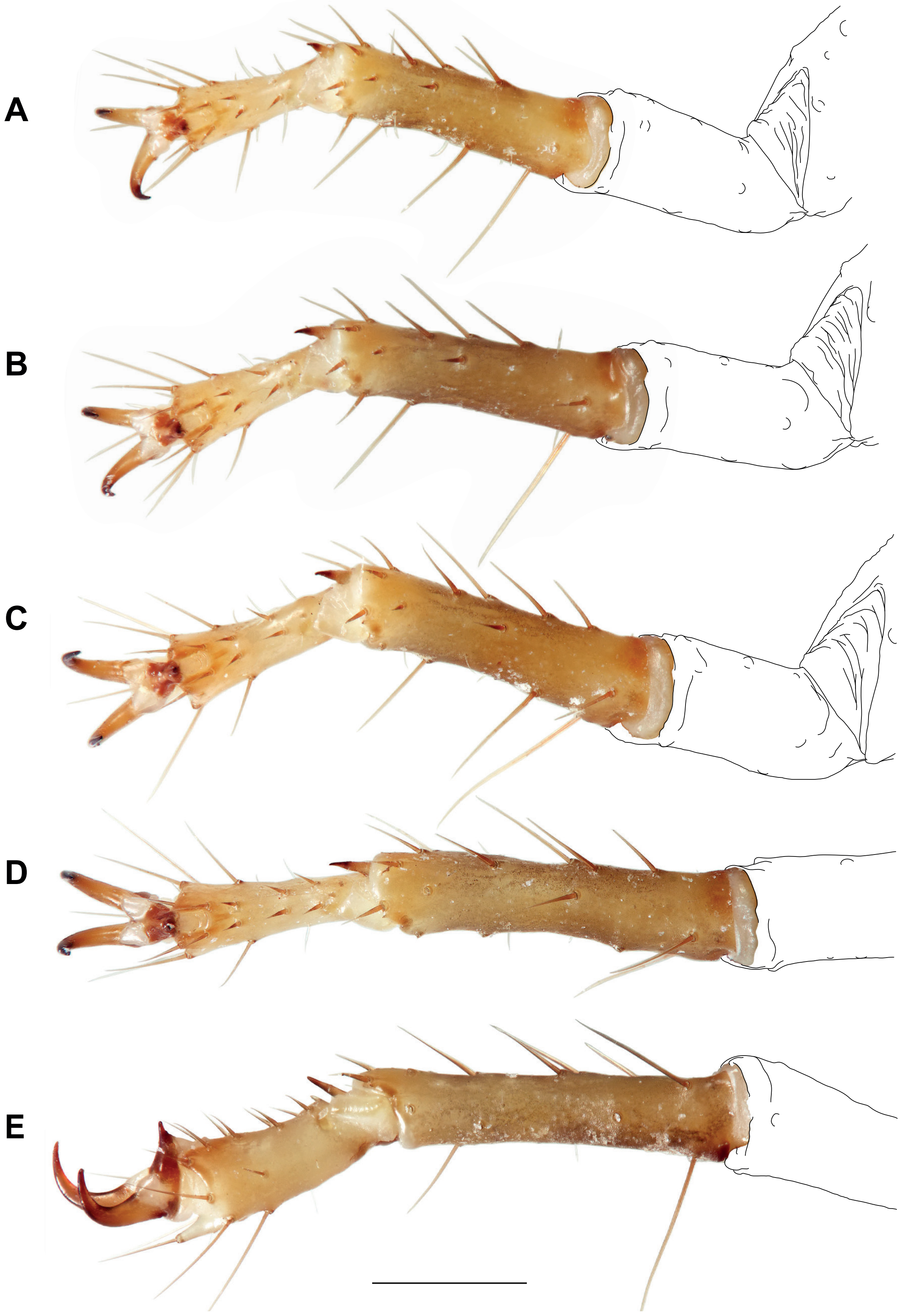

Fig. 27. *Hormurus barai* sp. nov., male holotype (AMNH [LP3001]), right tarsi, ventral (A-D) and retrolateral (E) aspects. (A) Tarsus I. (B) Tarsus II. (C) Tarsus III. (D-E) Tarsus IV. Scale line: 1 mm.

covered with dense reticulate network of small spiniform granules, distal area smooth; ventral intercarinal surface covered with sparse reticulate network of small spiniform granules, distal area smooth. Chela manus (Fig. 24B-E): prolateral intercarinal surface covered with dense reticulate network of small spiniform granules, smooth proximally; dorsal and retrolateral intercarinal surfaces covered with dense reticulate network of small spiniform granules; ventral intercarinal surface covered with large anastomosed granules and sparse small spiniform granules, distal area smooth. Chela fingers densely covered with small spiniform granules in proximal half, smooth or nearly so distally, ventral surface smooth; trichobothria *dst*, *dsb* and *db* separated from each other, each in a small smooth depression.

Trichobothria: Pedipalp orthobothriotaxic, accessory trichobothria absent. Patella (Fig. 24G-J): d_2 trichobothrium distal to patellar process; five *eb* trichobothria arranged in two groups (eb_1+eb_{4-5} and eb_{2-3}); two *esb*, two *em* and one *est* trichobotria arranged in three groups, i.e. esb_{1-2}, em_{1-2} and *est* (esb_2 closer to esb_1 than to em_{1-2}); three *et* trichobothria; three *v* trichobothria. Chela manus (Fig. 24B-E): *Dt* situated in proximal third of manus; Eb_3 close to Eb_{1-2}; *Esb* midway between *Eb* group and *Est*; *Est* situated near midpoint of manus; four *V* trichobothria, V_3 distant from V_4. Fixed chela finger with *db* situated on dorsal surface; *esb* closer to *eb* than to *est*; *eb* situated at base of finger, proximal to point of articulation between fixed and movable fingers; two *i* trichobothria.

Coxosternum (Fig. 26A, C): Coxa III not elongated anterodistally, without anterodistal process. Sternum equilateral pentagonal (anterior width slightly greater than posterior width), wider than long.

Legs (Fig. 27): Femora I-IV with ventral surfaces bicarinate, proventral and retroventral carinae granular. Retrolateral margins of tibiae I-II without setiform macrosetae. Basitarsi I-IV: proventral and retroventral rows each with 3/4, 3/4, 4/4 and 4/4 setiform macrosetae, respectively. Telotarsi I-IV: proventral and retroventral rows each with 3-4/4, 3-4/4, 4-5/4-5 and 5/5 setiform macrosetae, respectively; retroventral row with one proximal spinule; ventromedian spinules absent. Ungues curved, half of telotarsus length or less.

Genital operculum (Fig. 26A): Composed of two subtriangular sclerites.

Pectines (Fig. 26A-B): Moderately elongate, distal edge reaching but not extending beyond distal edge of coxa IV; fulcrae and two marginal lamellae present. Pectinal teeth count 5-5; teeth straight, entirely covered with sensory papillae.

Mesosoma (Figs 21, 22A-B, 23A, E): Pre-tergites I-VII and posterior margins of pre-tergites smooth. Post-tergites: posterior margins of tergites I-VI sublinear, without distinct projection; lateral transversal sulcus present; intercarinal surfaces of I-VII sparsely covered with minute granules; reticulate network of ridges and dimples indistinct on tergites I-VI, faint on tergite VII. Respiratory stigmata (spiracles) of sternites IV-VI short, their length less than third of sternite width, and round/oval. Sternite VII acarinate.

Metasoma (Fig. 28B-C): Not markedly compressed laterally; sparsely and minutely granular, posterior segments less so (segment V almost smooth); dorsal intercarinal surface of V smooth and shiny medially; distinct dorsomedian sulcus on segments I-IV, much less pronounced on segment V (usually only faintly expressed anteriorly).

Metasoma carinae: Segments I-IV: dorsolateral carinae obsolete on all segments; lateral median carinae weakly developed (as faint ridges); lateral inframedian carinae developed anteriorly as a faint ridge on segment I, absent on other segments; ventrolateral carinae weakly developed (as faint ridges); paired ventrosubmedian carinae distinct but weakly developed as low ridges. Segment V: dorsolateral and lateral median carinae obsolete; ventrolateral carinae only expressed as faint ridges; ventrosubmedian carinae fused, only expressed as a faint ridge in anterior two-thirds.

Metasoma spination: Segment I: dorsomedian posterior and dorsolateral posterior spiniform granules absent; ventrolateral and ventrosubmedian carinae without large spiniform granules. Segment II: dorsomedian posterior and dorsolateral posterior spiniform granules absent; ventrolateral and ventrosubmedian carinae essentially without large spiniform granules (one weak subposterior spiniform granule sometimes present on one of the ventrosubmedian carinae). Segments III-IV: dorsolateral posterior spiniform granules absent; ventrolateral and ventrosubmedian carinae without large spiniform granules. Segment V: ventrolateral and ventromedian carinae with few large spines in posterior half; anal arch with scattered large spines.

Ventral metasoma setation: Segments I-IV each with eight macrosetae, i.e. three pairs (anterior, median and posterior) on ventrosubmedian carinae and one pair (anterior) on ventrolateral carinae; segment V with 12 macrosetae, i.e. three pairs (anterior, median/supramedian and posterior) on ventrosubmedian carinae and three pairs (anterior, supramedian and posterior) on ventrolateral carinae.

Telson (Fig. 28B): Slightly longer than metasoma segment V; vesicle smooth, without granules; aculeus short (less than half of vesicle length), sharply curved.

Hemispermatophore (Fig. 29): Stalk longer than stem. Distal lamina curved, without distal crest on anterior margin; single laminar hook situated in basal third of stalk (basal part/distal lamina ratio = 0.34-0.35, median = 0.34); transverse ridge distinct, approximately aligned with base of laminar hook, merging with anterior margin more distally than base of laminar hook. Capsule: hemisolenos thin, folded on itself only proximally and unfolding to flattened distal tip distally (tip and base approximately of same width), without lateral longitudinal carina, laterodistal accessory hook or medioposterior accessory

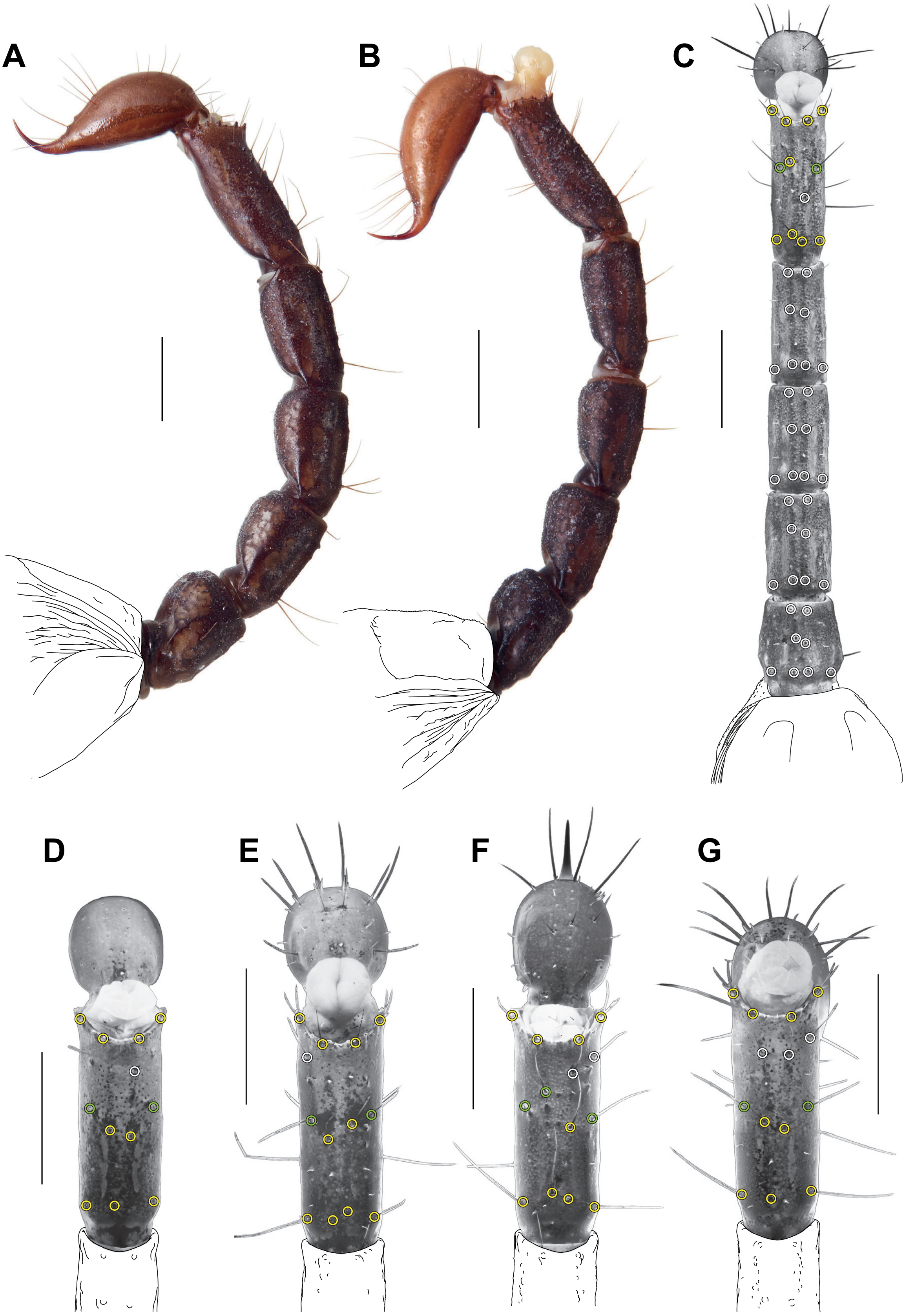

Fig. 28. *Hormurus barai* sp. nov., metasoma and telson, lateral (A-B) and ventral (C) aspect, metasoma segment V, ventral aspect (D-G). (A, F) Female paratype (AMNH [LP3003]). (B-C) Male holotype (AMNH [LP3001]). (D) Female paratype (MHNG-ARTO-26552). (E) Female paratype (AMNH [LP3004]). (G) Female paratype (AMNH [LP3002]). Additional subposterior macrosetae present in females indicated in white in D-G. Scale lines: 2 mm.

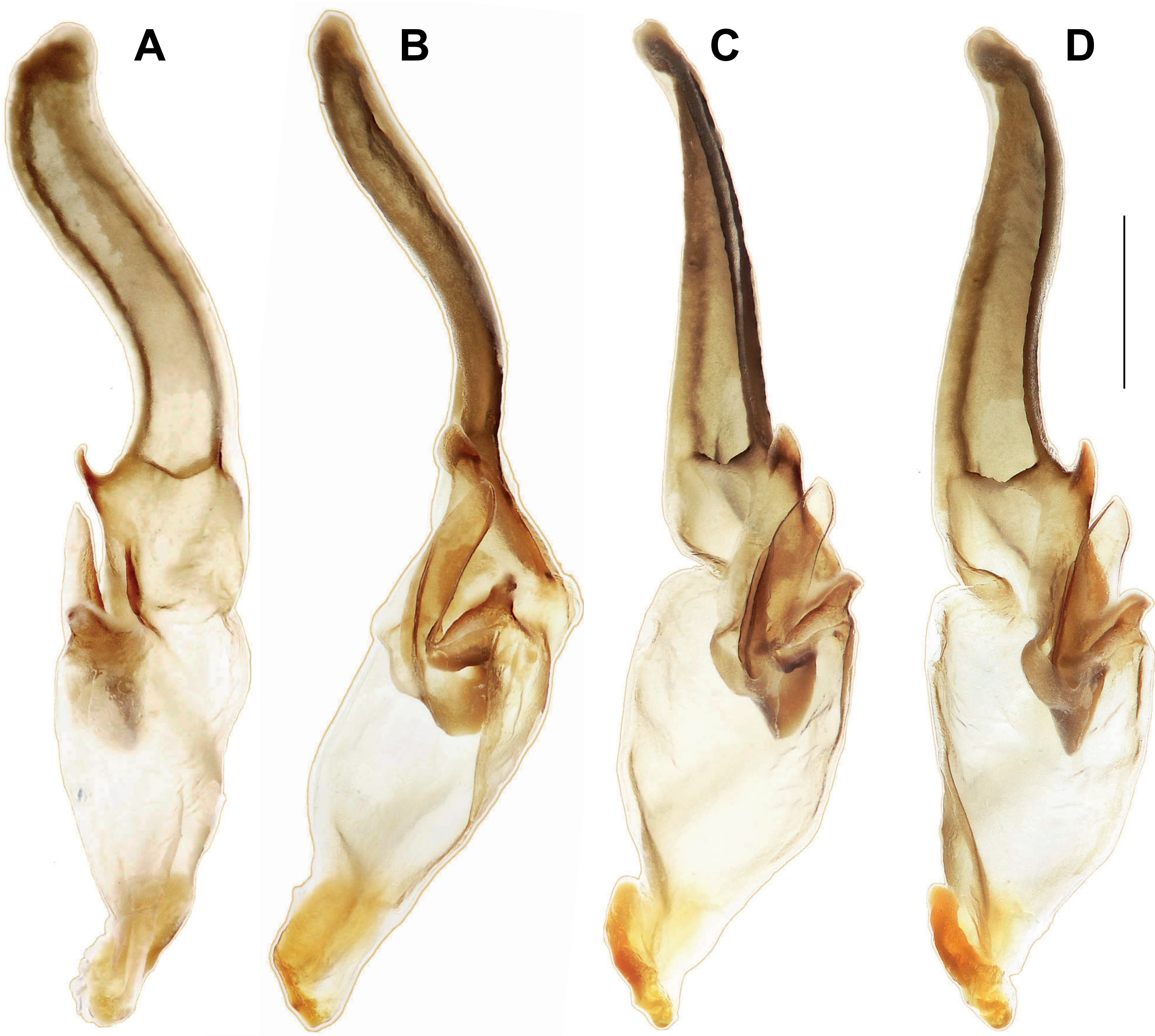

Fig. 29. *Hormurus barai* sp. nov., male holotype (AMNH [LP3001]), left hemispermatophore. (A) Lateral aspect. (B) Anterior aspect. (C) Rotated approximately 45° counter-clockwise from anterior aspect. (D) Contralateral aspect. Scale line: 1 mm.

apophysis; tip of hemisolenos more proximal than base of laminar hook, more distal than tip of clasper. Clasper well developed, forming distinct hump, not hook-like, with small anterior knob-like accessory process. Subex well developed, spoon-shaped, anteriorly merging with base of clasper; posterior edge forming obtuse angle (>90°) with hemisolenos; anterior edge forming right angle (90º) with hemisolenos.

Description of adult female: Same characters as in male except as follows. *Colouration* (Fig. 22C-D): Legs and telson slightly darker than in male.
Pedipalps (Figs 22C-D, 24A, F, K): Segments not markedly shorter than in male, but patella and chela slightly more robust.
Chela fingers (Fig. 25B): Dentate margins linear or nearly so, without pronounced lobe and notch, with two rows of primary denticles extending from tip to base of fingers and bearing large inner accessory denticles.
Carapace (Fig. 23B, D): Posteromedian margin smooth.
Coxosternum (Fig. 26D, F): Anterior margin of coxa III slightly elongated anterodistally.
Genital operculum (Fig. 26D): Oval to semi-oval, distinctly wider than long (length/width ratio = 0.54-0.62, median = 0.58); opercular sclerites fused, with distinct median suture; posterior notch present, at least weakly developed.
Pectines (Fig. 26D-E): Short, distal edge not reaching distal edge of coxa IV. Pectinal teeth count 4-4; teeth short and straight, sensory papillae covering only distal third.
Mesosoma (Figs 22C-D, 23B, F): Anterior half of

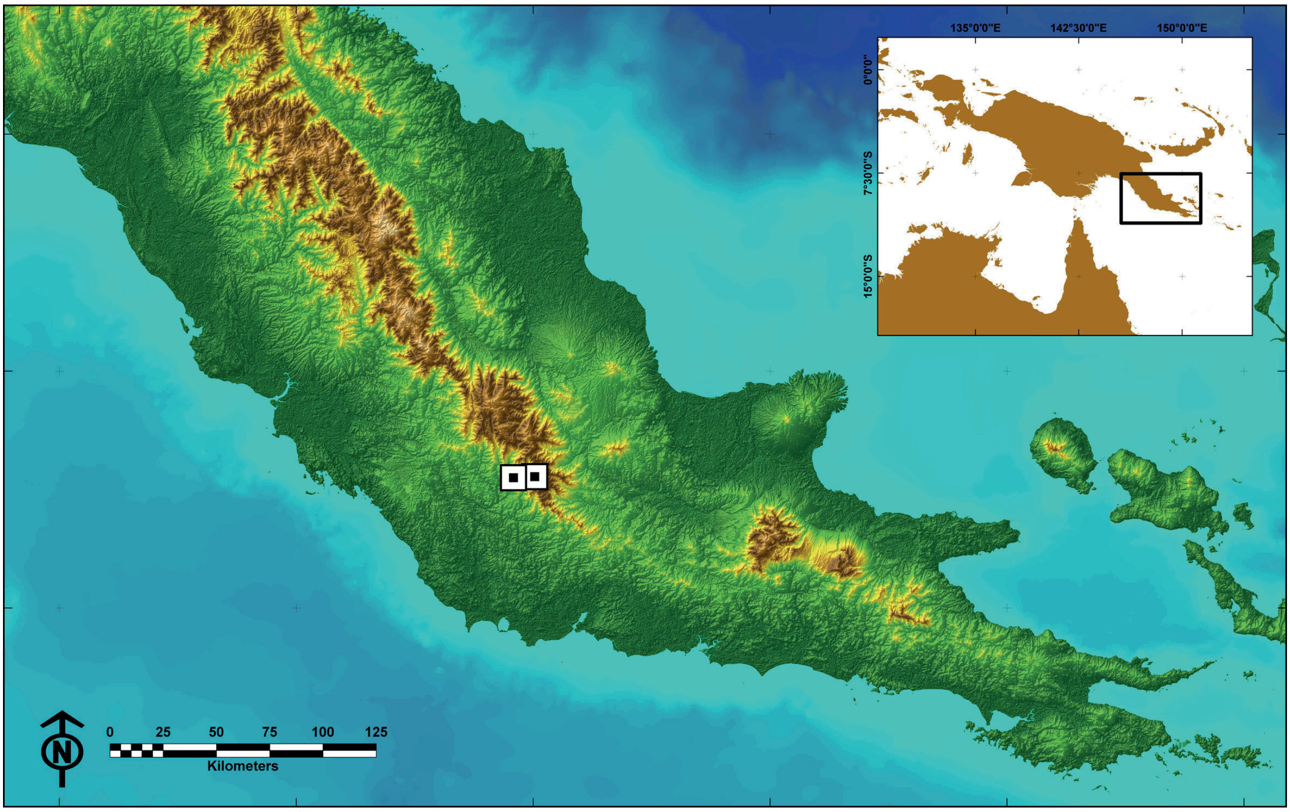

Fig. 30. Known localities of *Hormurus barai* sp. nov. in the Owen Stanley Range, in the southeastern part of the central mountain chain of Papua New Guinea, Central Province. Color gradient indicates topography and bathymetry.

intercarinal surfaces of post-tergites I-VII smooth, posterior half sparsely covered with minute granules.

Metasoma (Fig. 28A, D-G): Notably thicker and slightly less granular than in male. Ventrosubmedian carinae of metasoma segment II with 0-1 pairs of strong, subposterior spiniform granules.

Intraspecific variation: *Pedipalp trichobothria*: Trichobothria *esb*, *em* and *est* on the retrolateral surface of the patella are exceptionally arranged into four groups (esb_1, esb_2, em_{1-2} and *est*), rather than into three (esb_2 apart from esb_1).

Leg spination: The number of setiform macrosetae varies from three to four proventrally on telotarsi I-II, and from four to five proventrally and retroventrally on telotarsi III.

Female genital operculum: The length/width ratio varies between 0.54 and 0.62 (median = 0.58).

Pectines: The pectinal teeth count varies from four to five in females.

Metasoma: Spination: A subposterior spiniform granule may be expressed on one ventrosubmedian carina of segments I-II in males, and on one or both ventrosubmedian carinae of metasoma segment II in females. An additional supramedian macroseta is expressed on a ventrolateral carina of metasoma segment III in one specimen. Setation appears to be more variable on metasoma segment V than on the other segments.

Ventral metasoma setation: The number of macrosetae varies from 12 to 14, with the presence of one to three additional subposterior macrosetae in some specimens (Fig. 28D-G).

Hemispermatophore: The basal part/distal lamina ratio varies from 0.34 to 0.35 (median = 0.34).

Distribution and ecology: *Hormurus barai* sp. nov. is only known from, and probably endemic to, the mid-northwestern slopes of Mount Obree (Fig. 30). This mountain is part of the Owen Stanley Range, it culminates at 3080 m and it is known as Ghost Mountain or as Suwemalla in the local dialect. Specimens were collected from under rocks and logs in a primary forest with very large emergent *Agathis* trees, with an open understorey and with large amounts of leaf litter and deep duff (F. Kraus, pers. comm.).

Hormurus oyawaka Monod & Prendini, sp. nov.

Figs 31-39, Tab. 3

This species was treated under the manuscript name "Hormurus kilkerranicus" (in part) in Monod (2011a: 287, 532, 542).

Material: AMNH [LP 2 728]; ♂ holotype; Papua New Guinea, Milne Bay Province, D'Entrecasteaux Islands, Fergusson Island, S slope of Oya Waka, 1100 m, 9.46°S, 150.56°E; 12.VIII.2002; leg. F. Kraus (JS-0641). – AMNH [LP 2728]; 1 ♂, 1 ♀ paratypes; same data as for holotype. – UMMZ [LP 2728]; 1 ♂ paratype; same data as for holotype.

Etymology: Oya Waka is the local name of Mount Maybole (1665 m), the second highest peak on Fergusson Island, where the new species was found and to which it is probably endemic. The epithet is an invariable name in apposition.

Diagnosis: *Hormurus oyawaka* sp. nov., *H. barai* sp. nov. and *H. oyatabu* sp. nov. share a unique set of characters that differentiate them from other Papuan *Hormurus*. They possess small pectines with a low number of teeth (5-7 in male and 4-6 in females) (Figs 26A-B, D-E, 35A-B, D-E, 44A-B, D-E), whereas

Table 3. *Hormurus oyawaka* sp. nov., measurements (in mm), repository and inventory number of adult males and one female.

	Holotype	Paratype	Paratype	Paratype
Sex	♂	♂	♂	♀
Repository	AMNH	AMNH	AMNH	AMNH
Inventory number	LP2728	LP2728	LP2728	LP2728
Locality	Oya Waka	Oya Waka	Oya Waka	Oya Waka
Total length	43.00	36.00	40.00	44.00
Carapace, length	6.58	5.49	6.52	6.46
Carapace, anterior width	4.55	4.08	4.33	4.39
Carapace, posterior width	7.62	6.70	7.44	7.56
Pedipalp femur, length	8.47	7.37	8.05	6.83
Pedipalp femur, width	3.05	2.56	2.80	2.74
Pedipalp femur, height	1.77	1.34	1.65	1.71
Pedipalp patella, length	8.78	7.56	8.41	7.07
Pedipalp patella, width	3.05	2.68	2.86	2.86
Pedipalp patella, height	2.80	2.26	2.56	2.56
Pedipalp chela, length	16.87	14.28	15.75	14.64
Pedipalp chela, width	5.32	4.14	5.00	5.06
Pedipalp chela, height	3.23	2.93	3.17	3.17
Chela movable finger, length	7.68	6.52	7.34	7.13
Genital operculum length, female	NA	NA	NA	1.46
Genital operculum width, female	NA	NA	NA	2.19
Metasoma segment I, length	2.68	2.38	2.68	2.56
Metasoma segment I, width	1.95	1.71	1.95	1.95
Metasoma segment I, height	1.71	1.58	1.68	1.77
Metasoma segment II, length	2.93	2.62	2.99	2.74
Metasoma segment II, width	1.71	1.52	1.68	1.71
Metasoma segment II, height	1.71	1.52	1.71	1.77
Metasoma segment III, length	3.05	2.80	3.11	2.86
Metasoma segment III, width	1.71	1.37	1.49	1.58
Metasoma segment III, height	1.71	1.46	1.65	1.71
Metasoma segment IV, length	3.60	3.11	3.41	3.29
Metasoma segment IV, width	1.40	1.22	1.34	1.46
Metasoma segment IV, height	1.65	1.40	1.58	1.58
Metasoma segment V, length	4.39	3.78	4.39	4.21
Metasoma segment V, width	1.56	1.34	1.40	1.46
Metasoma segment V, height	1.58	1.34	1.58	1.56
Telson, length	5.36	4.57	5.18	4.88
Telson, width	2.19	1.58	1.77	1.89
Telson, height	2.07	1.71	1.83	1.83

other Papuan species have larger pectines with at least seven teeth in males and at least six in females. A faint reticulate network of ridges and dimples is visible only on the last four mesosomal post-tergites of females of *H. oyawaka* sp. nov. (Fig. 32B, F), *H. barai* sp. nov. (Fig. 23B, F) and *H. oyatabu* sp. nov. (Fig. 41B, F), whereas in females of the other Papuan species this macrosculpture is more pronounced and usually visible on all segments.

Hormurus oyawaka sp. nov. and *H. oyatabu* sp. nov. are very closely related and differ from *H. barai* sp. nov. by the following combination of characters: (1) a basal lobe is present on the fixed finger of the pedipalp chela of males (Figs 34A, 43A) instead of no basal lobe in *H. barai* sp. nov. (Fig. 25A); (2) the retrodorsal carina of the pedipalp femur is less developed than the prodorsal and retroventral carinae (Figs 33K-M, 42K-M) as opposed to similarly developed as the prodorsal and retroventral carinae in *H. barai* sp. nov. (Fig. 24K-M); (3) the ventral intercarinal surface of the pedipalp chela manus is covered by spiniform granules (Figs 33D, 42D) rather than by anastomosed granules in *H. barai* sp. nov. (Fig. 24D); (4) the proventral rows of basitarsi I-II bear four macrosetae (Figs 36A-B, 45A-B) instead of three in *H. barai* sp. nov. (Fig. 27A-B); (5) the retroventral rows on basitarsi I-IV bear five macrosetae (Figs 36, 45) instead of four macrosetae in *H. barai* sp. nov. (Fig. 27); (6) the hemispermatophore clasper lacks an anterior accessory process (Figs 38, 47) rather than possessing a small knob-like process in *H. barai* sp. nov. (Fig. 29).

Moreover, *H. oyawaka* sp. nov. differs from *H. barai* sp. nov. and *H. oyatabu* sp. nov. in the strong development of its prolateral patellar process (Figs 31, 33F-G, I), whereas in the other two species the patellar process is less strongly developed (Figs 21, 22, 24F-G, I, 40, 42F-G, I). A list of additional characters distinguishing *H. oyawaka* sp. nov. and *H. oyatabu* sp. nov. is provided in the diagnosis of the latter.

Description of adult male (holotype): *Colouration* (Fig. 31A-B): Dorsal surface of chelicera manus orange with darker infuscation, more pronounced anteriorly; fingers dark brown. Carapace reddish brown, median ocular region black. Tergites brown. Pedipalps reddish brown; carinae and fingers black. Legs paler than tergites, dorsal surface pale brown with darker infuscation except on telotarsi; ventral surface brown to yellow, distal segments (tibiae, basitarsi and telotarsi) paler than proximal ones; prolateral carina of femora black. Coxapophyses I-II dark brown, anterior tip pale yellow; leg coxae brown with orange spots and black anterior margin; sternum dark brown, slightly paler posteriorly; genital operculum and pectines pale yellow. Sternites III-VI dark brown, paler medially; posterior margin of sternite V pale yellow; sternite VII dark brown. Metasoma reddish brown with darker infuscation; telson paler than metasoma, vesicle dark orange, aculeus reddish brown.

Cuticle: Nongranular surfaces of carapace, pedipalps, legs, mesosoma and metasoma finely punctate.

Carapace (Fig. 32A, C): Anterior margin with median notch moderately excavated. Anterior furcated sutures distinct. Median ocular tubercle slightly raised; median ocelli present, at least twice the size of lateral ocelli, separated from each other by more than the diameter of a median ocellus. Three pairs of lateral ocelli, equal in size, equidistant and adjacent to each other. Surfaces minutely and densely granular, except for smooth anterior areas of frontal lobes and median ocular area.

Chelicerae: Basal and median teeth of fixed finger fused into bicusp. Dorsal margin of movable finger with four teeth (one basal, one median, one subdistal and one distal); dorsal distal tooth smaller than ventral distal tooth; ventral margin smooth.

Pedipalps (Figs 31A-B, 33B-E, G-J, L-O): Segments moderately elongated, with femur slightly longer than carapace. Chela almost asetose.

Chela fingers (Fig. 34A, C-D): Fixed finger: basal lobe present and conical; suprabasal notch distinct and deep; dentate margins distally (from tip of finger to median lobe) with two rows of primary denticles bearing large inner accessory denticles; denticles absent on suprabasal notch; few sparse denticles on basal lobe. Movable finger: basal lobe absent; suprabasal lobe well developed, conical, gently rounded dorsally and lacking sharp conical tooth, not overlapping with fixed finger; suprabasal lobe and corresponding notch on fixed finger with distinct proximal gap; dentate margins distally (from tip of finger to suprabasal lobe) with two rows of primary denticles bearing large inner accessory denticles; denticles absent on basal notch; few sparse denticles basally.

Pedipalp carinae: Femur (Fig. 33L-O): proventral carina visible as a ridge of medium-sized spiniform granules; promedian carinae absent; prodorsal carina visible as a ridge of medium-sized spiniform granules, these similarly developed as proventral carina; retrodorsal carina visible as a ridge of medium-sized spiniform granules, slightly less strongly developed than prodorsal carina, more distinct in proximal third of segment; retroventral carina visible as a ridge of medium to large spiniform granules, more developed than retrodorsal carina; ventromedian carina obsolete, only distinct proximally as a ridge of medium-sized spiniform granules. Patella (Fig. 33G-J): proventral carina discernible as costate-granular ridge proximally, obsolete distally; promedian and prodorsal carinae visible as ridges with medium to large spiniform granules, equally developed, fused medially and forming prominent spiniform process with medially located pointed apex; dorsomedian carina only visible proximally as a ridge of small to medium-sized spiniform granules; retrodorsal carina obsolete, only expressed proximally as a faint ridge of medium-sized spiniform granules; paired retromedian carinae fused and visible as a faint ridge of medium-sized spiniform granules; retroventral carina crenulate (composed of medium-sized granules). Chela

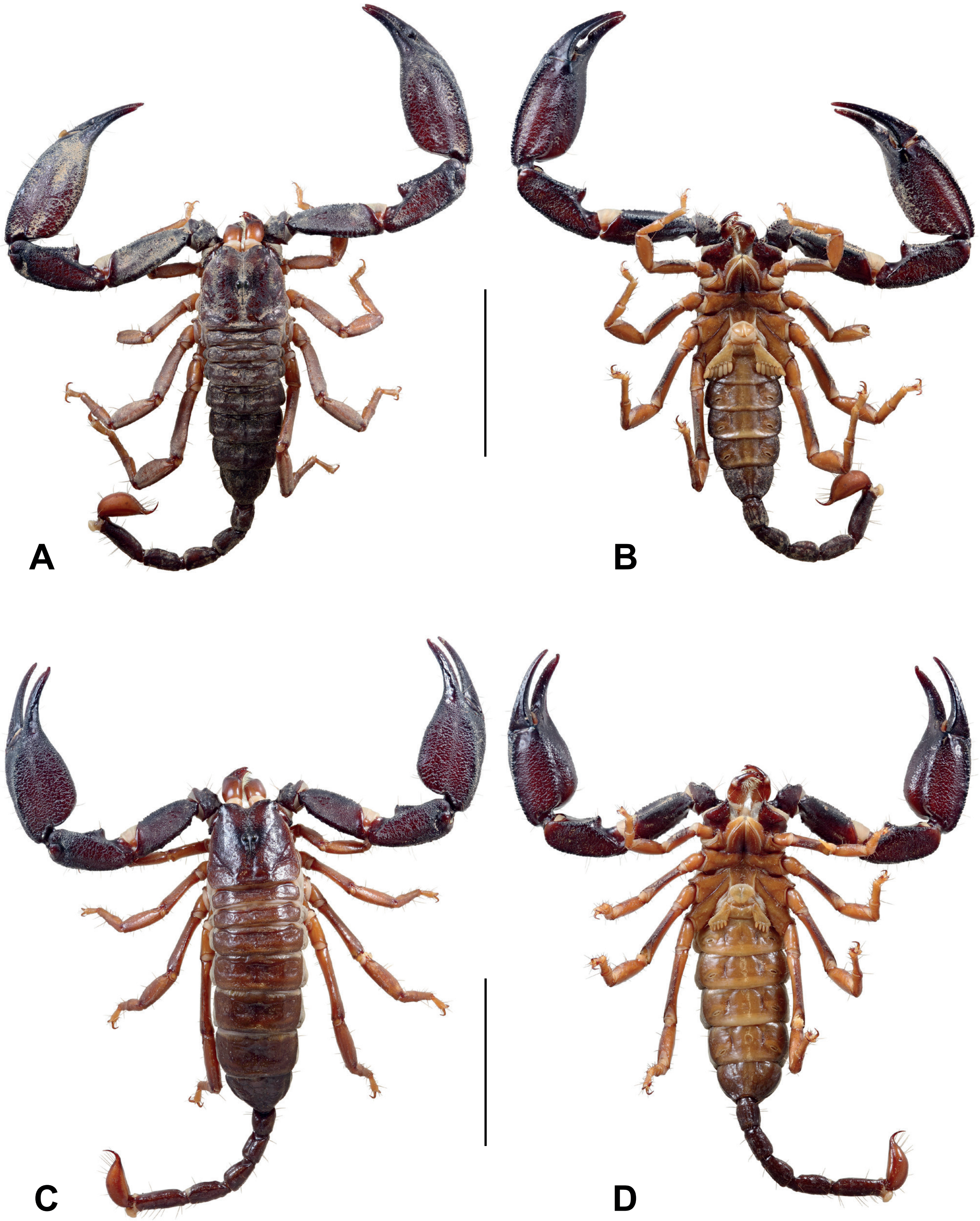

Fig. 31. *Hormurus oyawaka* sp. nov., habitus, dorsal (A, C) and ventral (B, D) aspects. (A-B) Male holotype (AMNH [LP2728]). (C-D) Female paratype (AMNH [LP2728]). Scale lines: 10 mm.

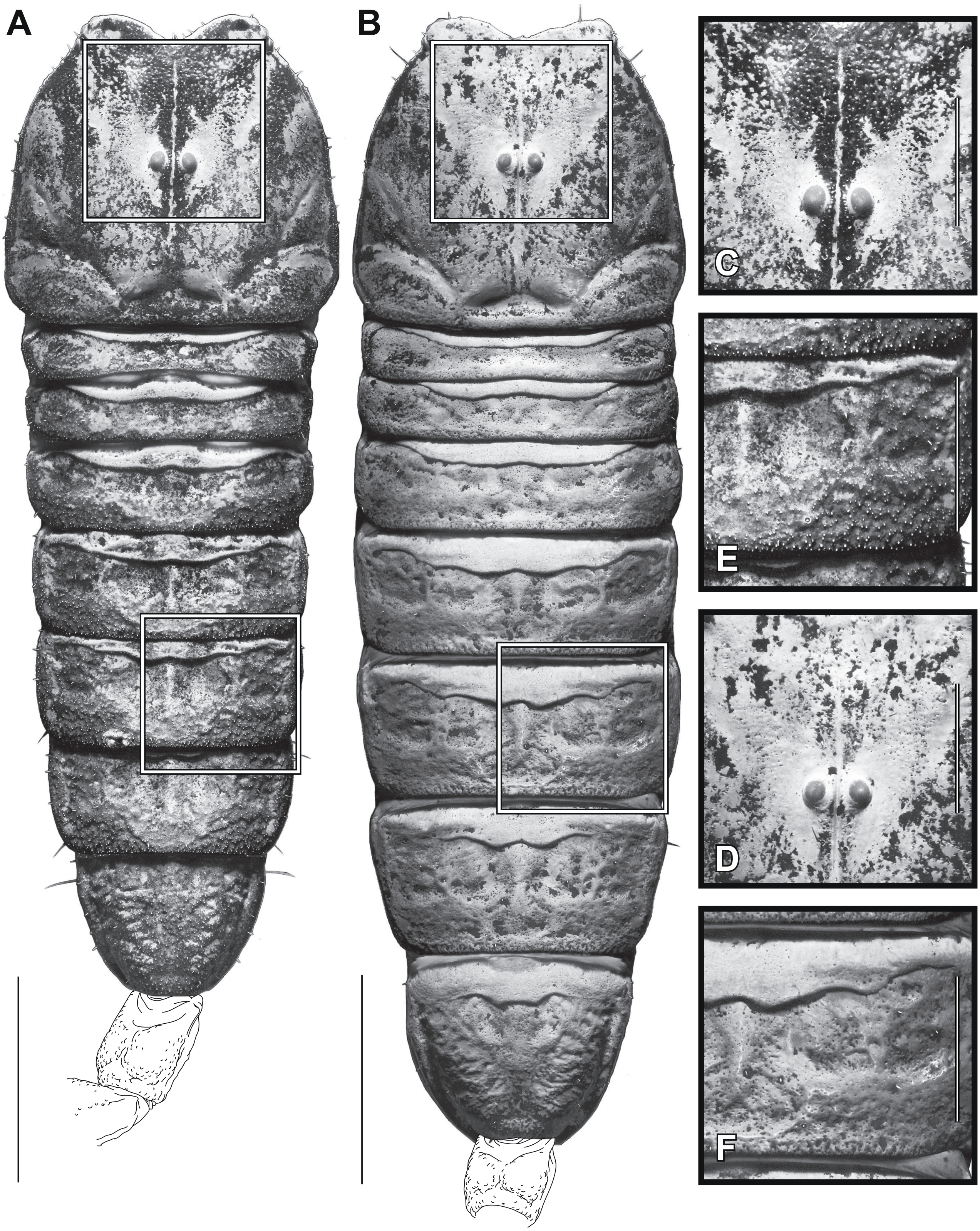

Fig. 32. *Hormurus oyawaka* sp. nov., carapace and mesosomal tergites showing ornamentation and macrosculpture of cuticle (A-B), detailed views of carapace (C-D) and tergite V (E-F), dorsal aspects. (A, C, E) Male holotype (AMNH [LP2728]). (B, D, F) Female paratype (AMNH [LP2728]). Scale lines: 5 mm (A-B), 2 mm (C-F).

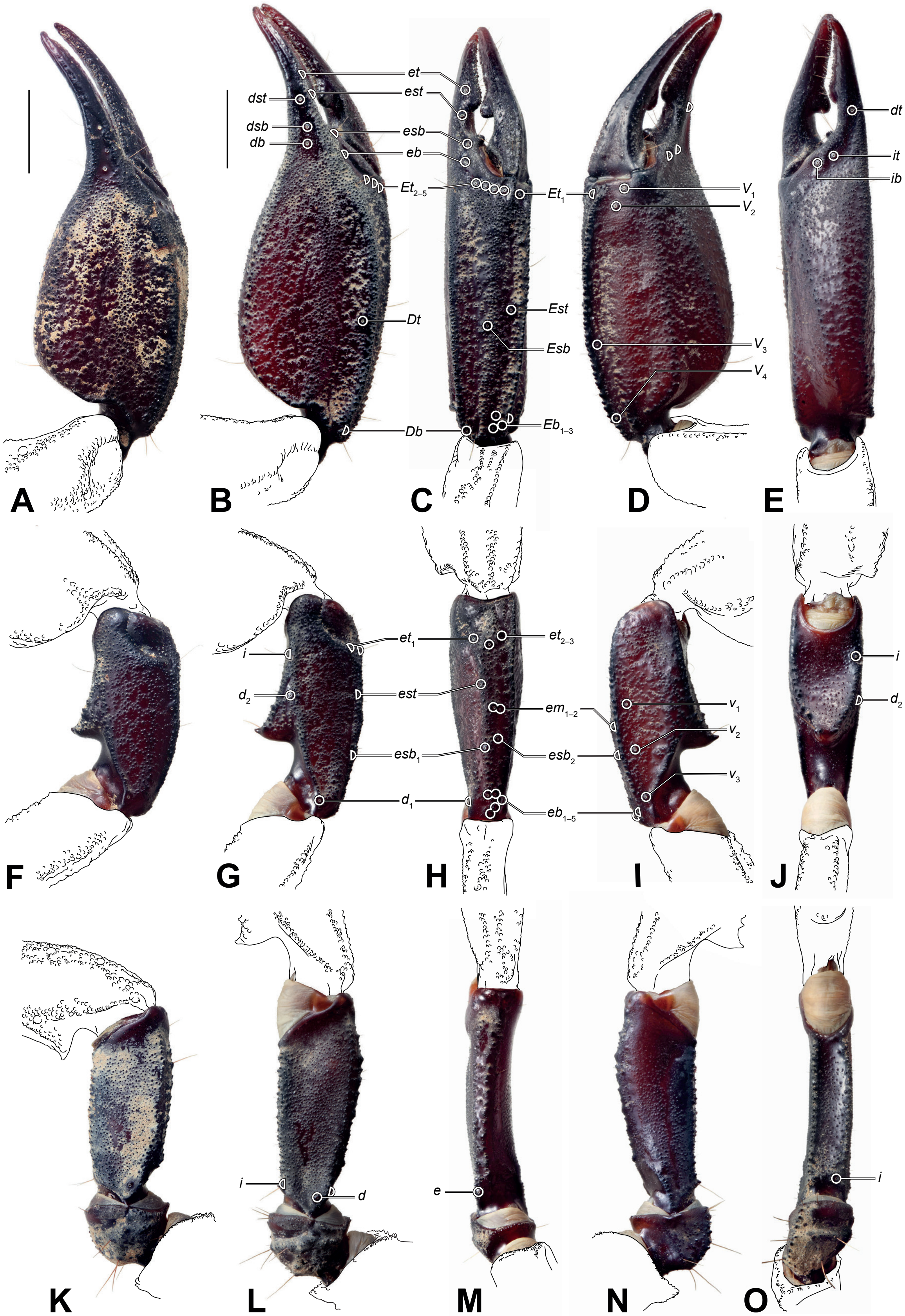

Fig. 33. *Hormurus oyawaka* sp. nov., pedipalp chela (A-E), patella (F-J), femur and trochanter (K-O), dorsal (A-B, F-G, K-L), retrolateral (C, H, M), ventral (D, I, N) and prolateral (E, J, O) aspects showing trichobothria pattern. (A, F, K) Female paratype (AMNH [LP2728]). (B-E, G-J, L-O) Male holotype (AMNH [LP2728]). Scale lines: 3 mm.

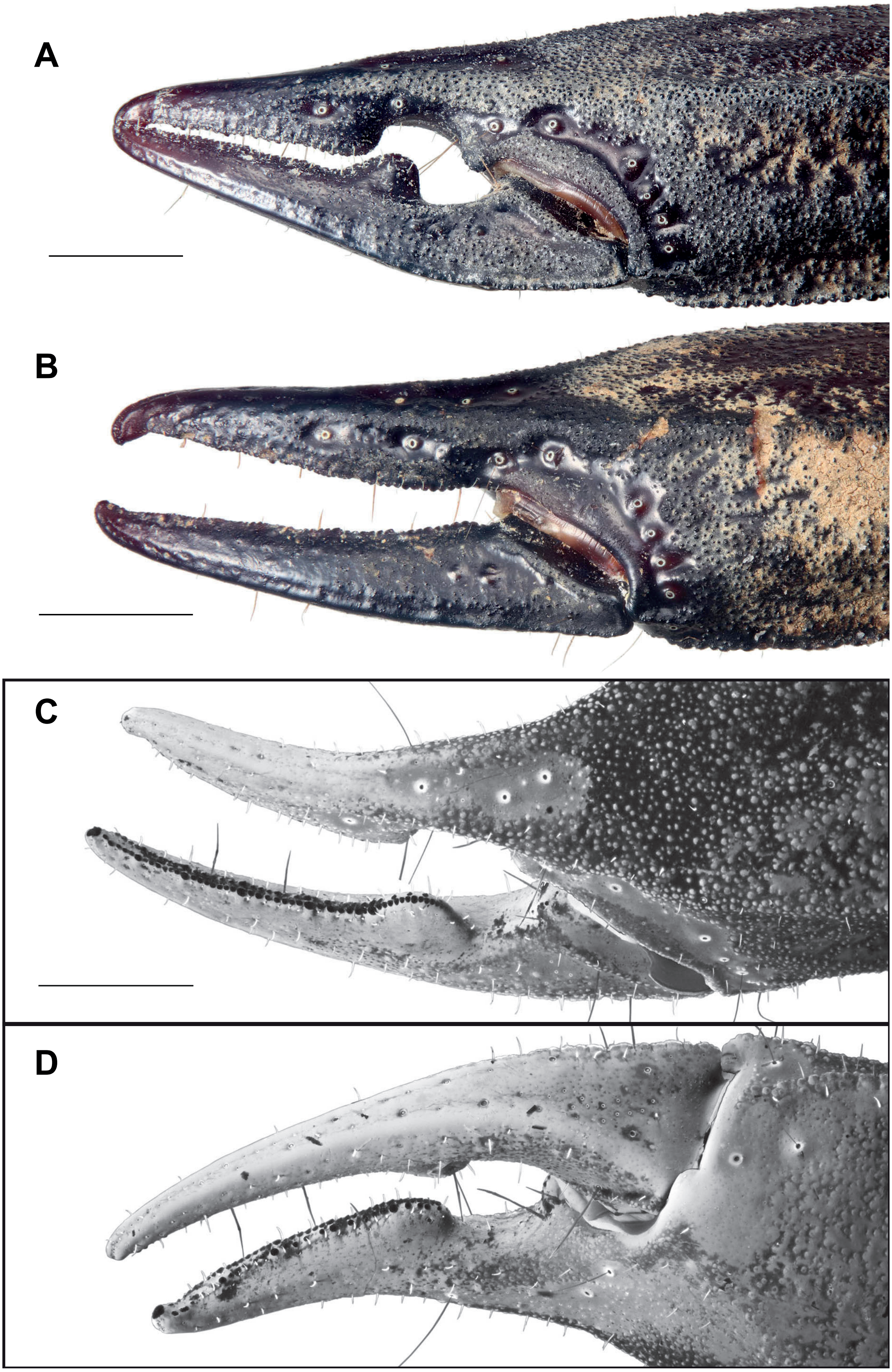

Fig. 34. *Hormurus oyawaka* sp. nov., left pedipalp chelae, retrolateral aspect showing dentate margin of chela fingers (A-B), dorsal aspect showing dentate margin of movable finger (C), ventral aspect showing dentate margin of fixed finger (D). (A, C-D) Male holotype (AMNH [LP2728]). (B) Female paratype (AMNH [LP2728]). Scale lines: 2 mm.

manus (Fig. 33B-E): proventral and promedian carinae visible as faint ridges with medium-sized spiniform granules, equally developed; prodorsal carina obsolete; dorsomedian carina visible as a faint ridge of medium-sized spiniform granules, more strongly developed than prodorsal carina; dorsal secondary carina obsolete; digital carina visible as a ridge of small spiniform granules, less distinct in distal area, more developed than retromedian carina; fused retromedian carinae obsolete, visible as a faint ridge of medium-sized spiniform granules proximally; retrolateral secondary carina vestigial, only distinct proximal to condyle of movable finger, expressed as a ridge of small spiniform granules; retroventral carina crenulate (composed of medium to large granules); ventromedian carina obsolete, only expressed proximally as a faint ridge of medium-sized spiniform granules.

Pedipalp macrosculpture: Femur (Fig. 33L-O): prolateral intercarinal surface densely covered with small spiniform granules; dorsal intercarinal surface densely covered with small spiniform granules, distal area smooth; retrolateral intercarinal surface sparsely covered with small spiniform granules, smooth proximally; ventral intercarinal surface densely covered with small to medium-sized spiniform granules, smooth distally. Patella (Fig. 33G-J): prolateral intercarinal surface sparsely covered with small to medium-sized spiniform granules, distal half smooth; dorsal intercarinal surface covered with dense reticulate network of medium-sized spiniform granules, distal area smooth; retrolateral intercarinal surface with dense reticulate network of medium-sized spiniform granules; ventral intercarinal surface covered with sparse reticulate network of medium-sized spiniform granules, distal area smooth. Chela manus (Fig. 33B-E): prolateral intercarinal surface covered with dense reticulate network of small to medium-sized spiniform granules, smooth proximally; dorsal and retrolateral intercarinal surfaces covered with dense reticulate network of medium-sized spiniform granules; ventral intercarinal surface covered with sparse reticulate network of medium-sized spiniform granules, distal area smooth. Chela fingers densely covered with small spiniform granules in proximal half, smooth or nearly so distally, ventral surface smooth; trichobothria *dst*, *dsb* and *db* each in a small smooth depression.

Trichobothria: Pedipalp orthobothriotaxic, accessory trichobothria absent. Patella (Fig. 33G-J): d_2 trichobothrium distal to patellar process; five *eb* trichobothria arranged in two groups (eb_1+eb_{4-5} and eb_{2-3}); two *esb*, two *em* and one *est* trichobotria arranged in three groups, i.e. esb_{1-2}, em_{1-2} and *est* (esb_2 closer to esb_1 than to em_{1-2}); three *et* trichobothria; three *v* trichobothria. Chela manus (Fig. 33B-E): *Dt* situated near midpoint of chela manus; Eb_3 close to Eb_{1-2}; *Esb* closer to *Est* than to *Eb* group; *Est* situated near midpoint; four *V* trichobothria, V_3 distant from V_4. Fixed chela finger with *db* situated on dorsal surface; *esb* closer to *eb* than to *est*; *eb* situated at base of finger, proximal to point of articulation between fixed and movable fingers; two *i* trichobothria.

Coxosternum (Fig. 35A, C): Coxa III elongated anterodistally, without anterodistal process. Sternum equilateral pentagonal (anterior width slightly greater than posterior width), wider than long.

Legs (Fig. 36): Femora I-IV with ventral surfaces bicarinate, pro- and retroventral carinae granular. Retrolateral margins of tibiae I-II without setiform macrosetae. Basitarsi I-IV: pro- and retroventral rows each with 4/5, 4/5, 4/5 and 4/5 setiform macrosetae, respectively. Telotarsi I-IV: pro- and retroventral rows each with 4/4, 4/4, 5/5 and 5/5 setiform macrosetae, respectively; retroventral row with one proximal spinule; ventromedian spinules absent. Ungues curved, half the length of the telotarsus or less.

Genital operculum (Fig. 35A, C): Composed of two subtriangular sclerites.

Pectines (Fig. 35A-B): Moderately elongated, distal edge reaching but not extending beyond distal edge of coxa IV; fulcrae and three marginal lamellae present. Pectinal teeth count 6-6; teeth straight, entirely covered with sensory papillae.

Mesosoma (Figs 31A-B, 32A, E): Pre-tergites I-VII and posterior margins of pre-tergites smooth. Post-tergites: posterior margins of tergites I-VI sublinear, without distinct projection; lateral transversal sulcus present; intercarinal surfaces of I-VII densely covered with small spiniform granules, less so anteromedially; intercarinal surfaces of III-VII with distinct but faint reticulate network of ridges and dimples. Respiratory stigmata (spiracles) of sternites IV-VI short, their length less than third of sternite width, and distinctly crescent shaped. Sternite VII acarinate.

Metasoma (Fig. 37B-C): Not markedly compressed laterally; sparsely and minutely granular, posterior segments less so (segment V smooth in some specimens); dorsal intercarinal surface of V smooth and shiny medially; distinct dorsomedian sulcus on segments I-IV, much less pronounced on segment V (usually only faintly expressed anteriorly).

Metasoma carinae: Segments I-IV: dorsolateral carinae obsolete on all segments; lateral median carinae weakly developed (as faint ridges); lateral inframedian carinae expressed anteriorly as a faint ridge on segment I, absent on other segments; ventrolateral carinae weakly developed (as faint ridges); paired ventrosubmedian carinae weakly developed (as low ridges). Segment V: dorsolateral and lateral median carinae obsolete; ventrolateral carinae only expressed as faint ridges; ventrosubmedian carinae fused, only expressed as a faint ridge in anterior two-thirds.

Metasoma spination: Segment I: dorsomedian posterior and dorsolateral posterior spiniform granules absent; ventrolateral carinae without large spiniform granules; ventrosubmedian carinae with one pair of subposterior spiniform granules. Segment II: dorsomedian posterior and dorsolateral posterior spiniform granules absent;

Fig. 35. *Hormurus oyawaka* sp. nov., coxae II-IV, sternum, genital operculum and pectines, ventral aspect (A, D), left pecten under UV light (B, E), anterior margin of coxae III (C, F). (A-C) Male holotype (AMNH [LP2728]). (D-F) Female paratype (AMNH [LP2728]). Scale lines: 2 mm (A, D), 1 mm (B-C, E-F).

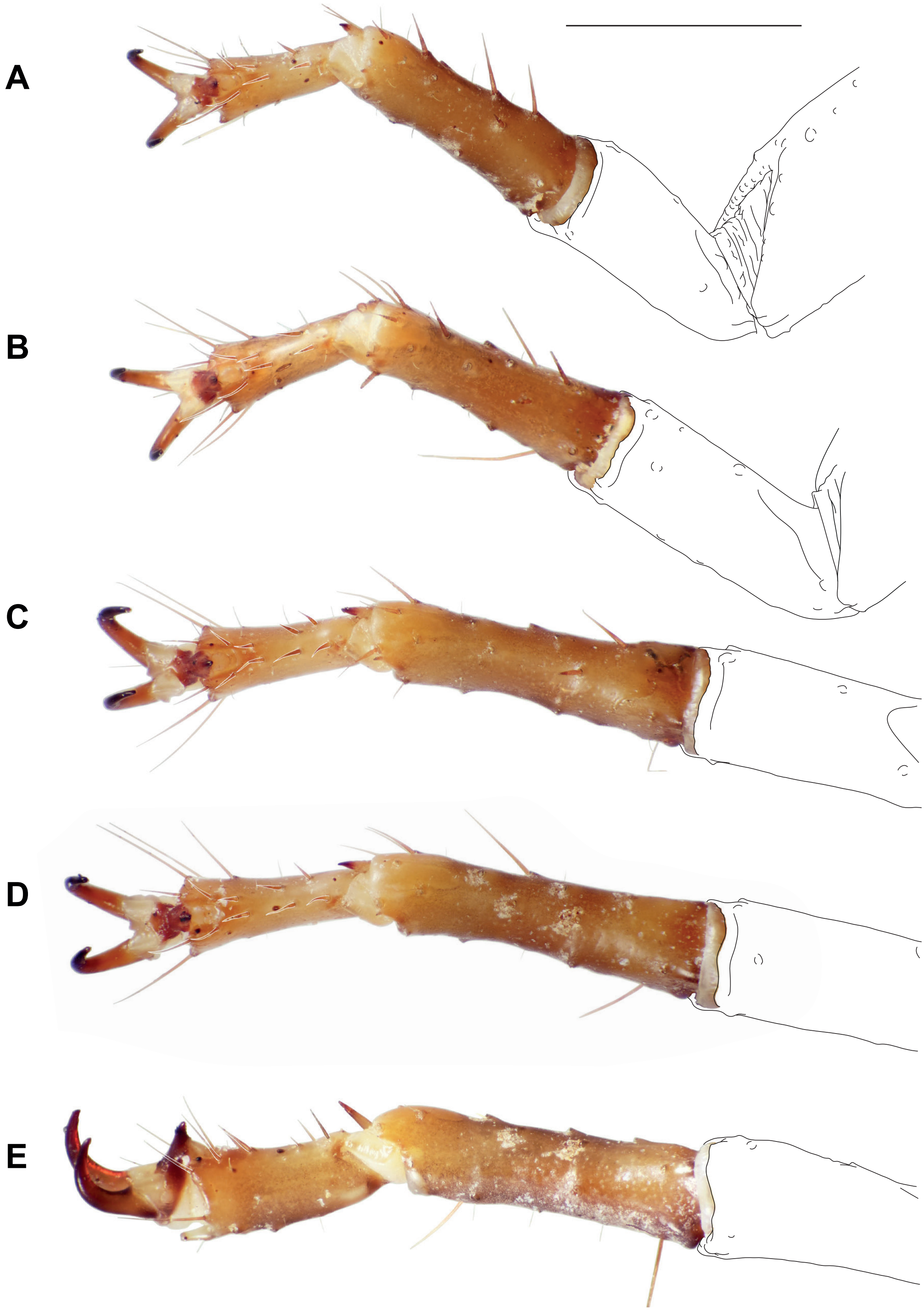

Fig. 36. *Hormurus oyawaka* sp. nov., male holotype (AMNH [LP2728]), right tarsi, ventral (A-D) and retrolateral (E) aspects. (A) Tarsus I. (B) Tarsus II. (C) Tarsus III. (D-E) Tarsus IV. Scale line: 2 mm.

ventrolateral carinae without large posterior spiniform granules; ventrosubmedian carinae with two pairs of subposterior spiniform granules and one pair of median spiniform granules. Segment III-IV: dorsolateral posterior spiniform granules absent; ventrolateral and ventrosubmedian carinae without large spiniform granules. Segment V: ventrolateral and ventromedian carinae without distinct granules or spines; anal arch crenulate.
Ventral metasoma setation: Segment I-IV each with ten macrosetae, i.e. three pairs (anterior, median and posterior) on ventrosubmedian carinae and two pairs (anterior and supramedian) on ventrolateral carinae; segment V with 16 macrosetae, i.e. four pairs (anterior, median, subposterior and posterior) on ventrosubmedian carinae and four pairs (anterior, supramedian, subposterior and posterior) on ventrolateral carinae.

Telson (Fig. 37B): Slightly longer than metasoma segment V; vesicle smooth, without granules; aculeus short (less than half of vesicle length), sharply curved.
Hemispermatophore (Fig. 38): Stalk and stem approximately equal in size. Distal lamina curved, without distal crest on anterior margin; single laminar hook situated in basal third of stalk (basal part/distal lamina ratio = 0.39-0.43, median = 0.41); transverse ridge distinct, approximately aligned with base of laminar hook, merging with anterior margin more distally than base of laminar hook. Capsule: hemisolenos thin, folded on itself only proximally, distally unfolded towards flattened distal tip (tip and base approximately of same width), without lateral longitudinal carina, laterodistal accessory hook or medioposterior accessory apophysis; tip of hemisolenos more proximal than base of laminar

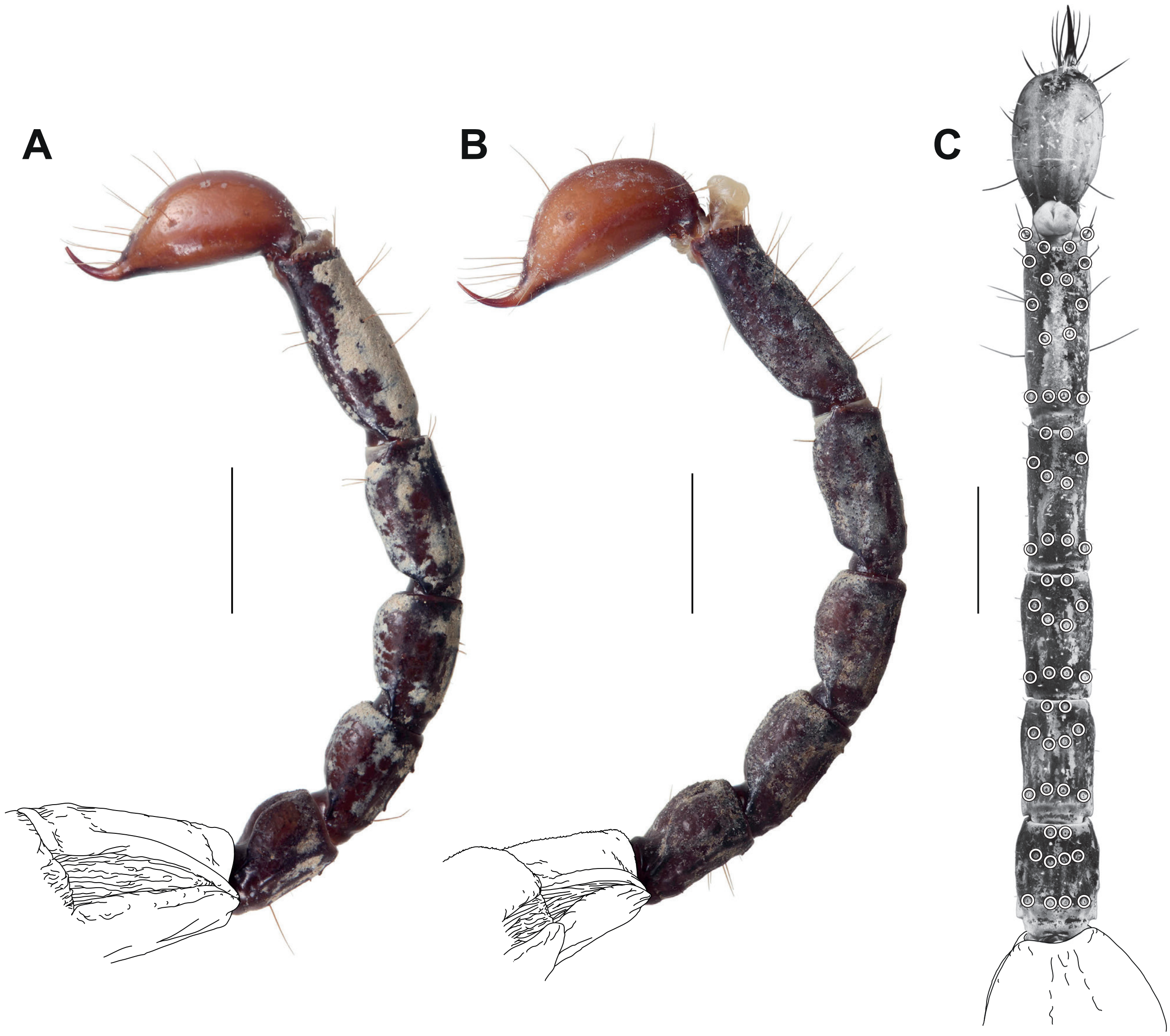

Fig. 37. *Hormurus oyawaka* sp. nov., metasoma and telson, lateral (A-B) and ventral (C) aspects. (A) Female paratype (AMNH [LP2728]). (B-C) Male holotype (AMNH [LP2728]). Scale lines: 3 mm.

hook, more distal than tip of clasper. Clasper well developed as a distinct hump, not hook-like, without anterior accessory process. Subex well developed, spoon-shaped, merging anteriorly with base of clasper; posterior edge forming obtuse angle (>90°) with hemisolenos; anterior edge forming right angle (90º) with hemisolenos.

Description of adult female: Same characters as in male except as follows. *Pedipalps* (Figs 31C-D, 33A, F, K): Segments slightly shorter or more robust than in male. Prolateral patellar process slightly less developed than in male.

Chela fingers (Fig. 34B): Dentate margins linear or nearly so, without pronounced lobe and notch, with two rows of primary denticles extending from tip to base of fingers and bearing large inner accessory denticles.

Carapace (Fig. 32B, D): Anteromedian surface and frontal lobes smooth, only faintly granular along median longitudinal sulci and anterior furcated sulci; posteromedian margin smooth; other surfaces less granular than in male.

Genital operculum (Fig. 35D): Oval to semi-oval, distinctly wider than long (length/width ratio = 0.67); opercular sclerites partly fused, with distinct median suture; posterior notch present, at least weakly developed.

Pectines (Fig. 35D-E): Short, distal edge not reaching distal edge of coxa IV. Pectinal teeth count 4-5; teeth short and straight, sensory papillae covering only distal half.

Mesosoma (Figs 31C-D, 32B, F): Post-tergites: intercarinal surfaces of I-III smooth, faintly granular laterally; intercarinal surfaces of IV-VI entirely smooth; intercarinal surfaces of VII smooth, posterior half sparsely granular.

Intraspecific variation: *Pedipalp trichobothria*: On the retrolateral side of the patella trichobothrium esb_2 may be located midway between esb_1 and $em_{1\text{-}2}$ rather than grouping with esb_1. This results in four (esb_1, esb_2, $em_{1\text{-}2}$

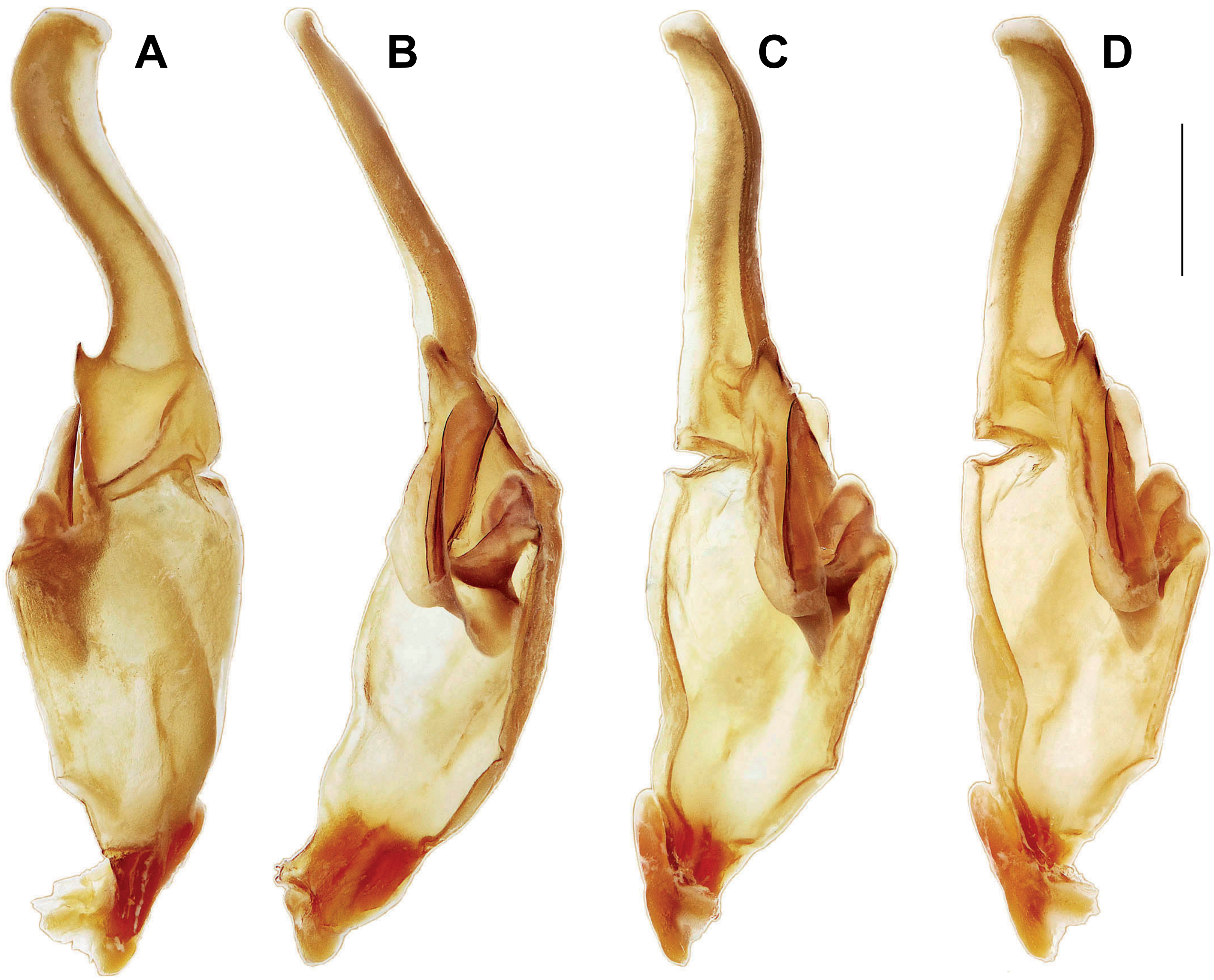

Fig. 38. *Hormurus oyawaka* sp. nov., male holotype (AMNH [LP2728]), left hemispermatophore. (A) Lateral aspect. (B) Anterior aspect. (C) Rotated approximately 45° counter-clockwise from anterior aspect. (D) Contralateral aspect. Scale line: 1 mm.

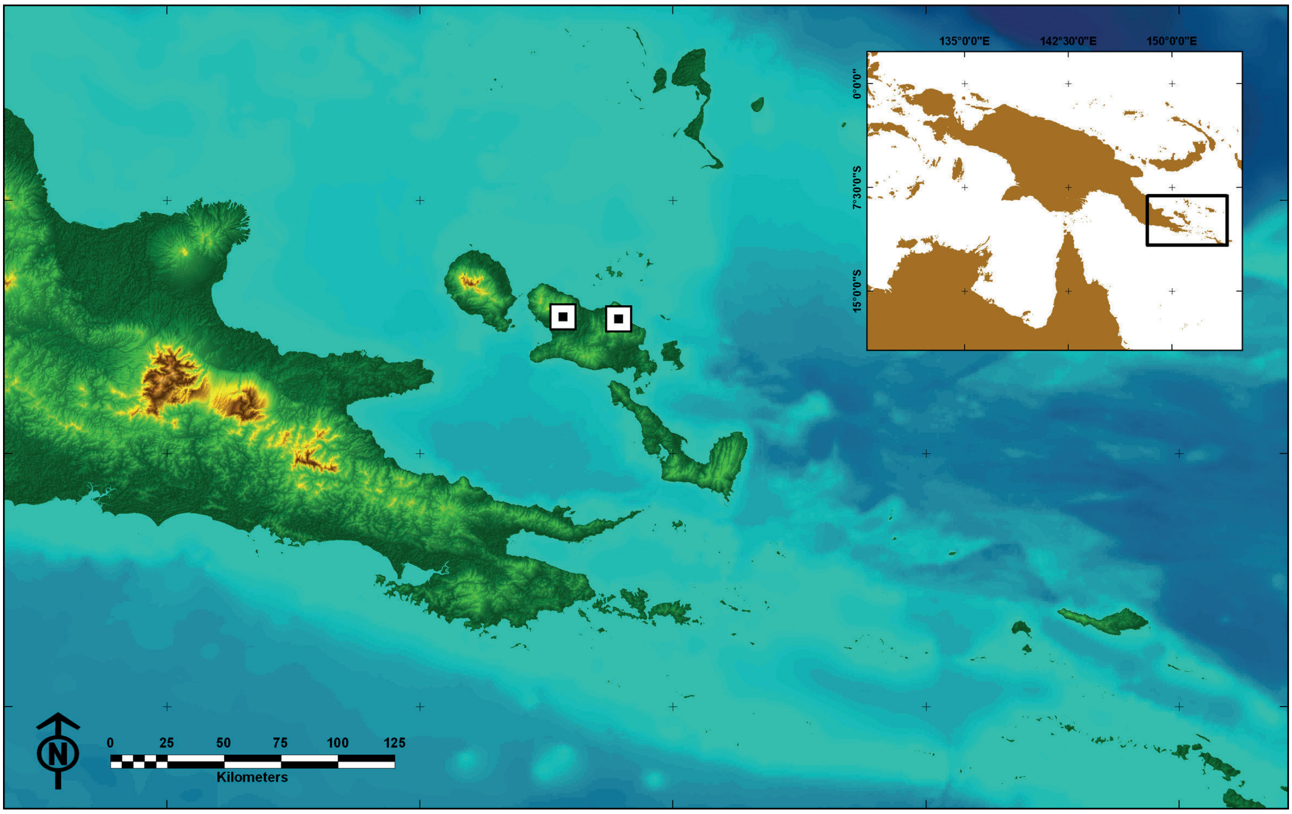

Fig. 39. Known localities of *Hormurus oyawaka* sp. nov. on Fergusson Island, D'Entrecasteaux Archipelago, off the northeastern tip of New Guinea, Milne Bay Province. Color gradient indicates topography and bathymetry.

and *est*) rather than three (*esb*$_{1-2}$, *em*$_{1-2}$ and *est*) groups. On the retrolateral side of the chela manus *Esb* may be more distal, aligning with *Est*.
Pectines: The pectinal teeth count varies from four to five in females.
Metasoma: Spination: one of the ventrosubmedian carinae of segment I may exceptionally contain an additional subposterior spiniform granule, whereas the ventrosubmedian carina of segment II in some specimens possesses one subposterior spiniform granule less than normal (three instead of four subposterior granules on ventrosubmedian carinae in total).
Hemispermatophore: The basal part/distal lamina ratio varies from 0.39 to 0.43 (median = 0.41).

Distribution and ecology: *Hormurus oyawaka* sp. nov. was only collected on Fergusson Island, D'Entrecasteaux Archipelago, off the northeastern tip of New Guinea, Milne Bay Province (Fig. 39). The species is probably endemic to Mount Maybole (locally known as Oya Waka), a mountain culminating at 1141 m, as indicated by the presence of *H. oyatabu* sp. nov., a distinct, closely related species, on Mount Kilkerran, the other peak of Fergusson island, located only 25 km to the east. Both species appear to occur only above 1000 m, whereas *H. hypseloscolus* sp. nov. is only found below 900 m in altitude.

The specimens examined were collected in a small-crowned lowland hill forest (Paijmans, 1975a, b, 1976) on steep terrain, under rocks in a dry streambed. The site receives little direct sunlight because of surrounding ridges and frequent clouds. Although the region had endured a month-long drought when the scorpions were collected, moisture was still present under logs and some rocks (F. Kraus, pers. comm.).

Hormurus oyatabu Monod & Prendini, sp. nov.
Figs 4E, 40-48, Tab. 4

This species was treated under the manuscript name "Hormurus kilkerranicus" (part) in Monod (2011a: 287, 532, 542).

Material: AMNH [LP 2719]; ♂ holotype; Papua New Guinea, Milne Bay Province, D'Entrecasteaux Islands, Fergusson Island, NE slope of Mount Kilkerran, 1100 m, 9.46°S, 150.78E; 21.VIII.2002; leg. F. Kraus. – AMNH [LP 2719]; 7 ♂ paratypes; same data as for holotype. – AMNH [LP 2720]; 8 ♀ paratypes; same data as for holotype; 19.VIII.2002; leg. F. Kraus. – UMMZ [LP 2722]; 3 subadult ♂, 3 subadult ♀ paratypes ; same data as for holotype; 19.VIII.2002; leg. F. Kraus. – AMNH [LP 2723]; 3 juvenile ♀ paratypes; same data as for holotype but at 1000 m; 21.VIII.2002; leg. F. Kraus.

– AMNH [LP 2732]; 6 ♀ paratypes; same data as for holotype; 19.VIII.2002; leg. F. Kraus.

Etymology: Oya Tabu is the local name of the Kilkerran Massif, which includes the highest peak on Fergusson Island (1947 m). The epithet is an invariable name in apposition.

Diagnosis: *Hormurus oyatabu* sp. nov. is closely related to *H. oyawaka* sp. nov. but differs in the following combination of characters: the patellar process is less strongly developed (Figs 40, 42F-G, I) than in *H. oyawaka* sp. nov. (Figs 31, 33F-G, I); the prolateral outline of the male pedipalp chela has two distinct angles (Fig. 42B) instead of forming a regular curve (Fig. 33B); the basal lobe of the fixed chela finger of males is weaker (Fig. 43A) than in *H. oyawaka* sp. nov. (Fig. 34A); the telson is slightly more slender and elongated (Fig. 46A-B) than in *H. oyawaka* sp. nov. (Fig. 37A-B).

Description of adult male (holotype): *Colouration* (Fig. 40A-B): Dorsal surface of chelicera manus orange with darker infuscation, more pronounced anteriorly; fingers dark brown. Carapace reddish brown, median ocular region black. Tergites brown. Pedipalps reddish brown; carinae and fingers black. Legs paler than tergites, dorsal surface pale brown to orange with darker infuscation except on telotarsi; ventral surface brown to yellow, distal segments (tibiae, basitarsi and telotarsi) paler than basal ones; prolateral carina of femora black. Coxapophyses I-II dark brown, anterior tip pale yellow; leg coxae brown with orange spots and black anterior margin; sternum dark brown, slightly paler posteriorly than anteriorly; genital operculum and pectines pale yellow. Sternites III-V brown, their posterior half pale yellow; sternite VI darker than other sternites, posterior half slightly paler than anterior half; sternite VII dark brown. Metasoma reddish brown with darker infuscation; telson paler than metasoma, vesicle dark orange, aculeus reddish brown.

Cuticle: Nongranular surfaces of carapace, pedipalps, legs, mesosoma and metasoma finely punctate.

Carapace (Fig. 41A, C): Anterior margin with median notch moderately excavated. Anterior furcated sutures distinct. Median ocular tubercle slightly raised; median ocelli present, at least twice the size of lateral ocelli, separated from each other by more than the diameter of a median ocellus. Three pairs of lateral ocelli, equal in size, equidistant and adjacent to each other. Surfaces minutely and densely granular, except for smooth anterior areas of frontal lobes and median ocular area.

Chelicerae: Basal and median teeth of fixed finger fused into bicusp. Dorsal margin of movable finger with four teeth (one basal, one median, one subdistal and one distal); dorsal distal tooth smaller than ventral distal tooth; ventral margin smooth.

Pedipalps (Figs 40A-B, 42B-E, G-J, L-O): Segments moderately elongated, with femur slightly longer than carapace. Chela almost asetose.

Chela fingers (Fig. 43A, C-D): Fixed finger: basal lobe present but weakly developed; suprabasal notch distinct and deep; dentate margins distally (from tip of finger to median lobe) with two rows of primary denticles bearing large inner accessory denticles; denticles absent on suprabasal notch; single row of sparse denticles on basal lobe. Movable finger: basal lobe absent; suprabasal lobe well developed, conical, gently rounded dorsally and lacking sharp conical tooth, not overlapping with fixed finger; suprabasal lobe and corresponding notch on fixed finger with distinct proximal gap; dentate margins distally (from tip of finger to suprabasal lobe) with two rows of primary denticles bearing large inner accessory denticles; denticles absent on basal notch; few sparse denticles basally.

Pedipalp carinae: Femur (Fig. 42L-O): proventral carina visible as a ridge of medium-sized spiniform granules; promedian carinae absent; prodorsal carina visible as a ridge of medium-sized spiniform granules, similarly developed as proventral carina; retrodorsal carina visible as a ridge of medium-sized spiniform granules, slightly less developed than prodorsal carina, more distinct in proximal third of segment; retroventral carina visible as a ridge of medium to large spiniform granules, more developed than retrodorsal carina; ventromedian carina obsolete, only discernible proximally as a ridge of medium-sized spiniform granules. Patella (Fig. 42G-J): proventral carina discernible as costate-granular ridge proximally, obsolete distally; promedian and prodorsal carinae visible as ridges with medium to large spiniform granules, equally developed, fused medially into low spiniform process lacking medially located pointed apex; dorsomedian carina only visible proximally as a ridge of small to medium-sized spiniform granules; retrodorsal carina obsolete, only expressed proximally as a faint ridge of medium-sized spiniform granules; paired retromedian carinae fused and visible as a faint ridge of medium-sized spiniform granules; retroventral carina crenulate (composed of medium-sized granules). Chela manus (Fig. 42B-E): proventral and promedian carinae visible as faint ridges with medium-sized spiniform granules, equally developed; prodorsal carina obsolete; dorsomedian carina visible as a faint ridge of medium-sized spiniform granules, more strongly developed than prodorsal carina; dorsal secondary carina obsolete; digital carina visible as a ridge of small spiniform granules, less distinct in distal area, more developed than retromedian carina; fused retromedian carinae obsolete, visible as a faint ridge of medium-sized spiniform granules proximally; retrolateral secondary carina vestigial, only discernible proximal to condyle of movable finger as a ridge of small spiniform granules; retroventral carina crenulate (composed of medium to large granules); ventromedian carina obsolete, only expressed proximally as a faint ridge of medium-sized spiniform granules.

Table 4. *Hormurus oyatabu* sp. nov., measurements (in mm), repository and inventory numbers of adult males and females.

	Holotype	Paratype	Paratype	Paratype	Paratype	Paratype	Paratype
Sex	♂	♂	♂	♂	♂	♂	♂
Repository	AMNH	AMNH	AMNH	AMNH	AMNH	AMNH	AMNH
Inventory number	LP2719	LP2719	LP2719	LP2719	LP2719	LP2719	LP2719
Locality	Mt Kilkerran	Mt Kilkerran	Mt Kilkerran	Mt Kilkerran	Mt Kilkerran	Mt Kilkerran	Mt Kilkerran
Total length	47.00	42.00	42.00	47.00	39.00	42.00	43.00
Carapace, length	6.46	6.34	6.22	6.49	5.61	6.10	5.97
Carapace, anterior width	4.51	4.51	4.39	4.51	3.90	4.27	4.27
Carapace, posterior width	7.44	7.31	7.19	7.19	6.19	6.70	7.07
Pedipalp femur, length	8.23	7.74	7.74	7.62	6.28	7.50	7.50
Pedipalp femur, width	2.80	2.80	2.74	2.80	2.39	2.68	2.68
Pedipalp femur, height	1.77	1.65	1.65	1.71	1.46	1.65	1.46
Pedipalp patella, length	8.29	7.92	7.92	7.92	6.56	7.68	7.68
Pedipalp patella, width	3.05	2.93	2.93	3.05	2.50	2.86	2.86
Pedipalp patella, height	2.63	2.62	2.56	2.74	2.26	2.62	2.62
Pedipalp chela, length	15.92	15.40	15.35	15.38	12.83	15.08	14.88
Pedipalp chela, width	4.88	4.69	4.63	4.88	3.72	4.88	4.63
Pedipalp chela, height	3.29	3.23	3.29	3.41	2.68	3.33	3.11
Chela movable finger, length	7.68	7.56	7.19	7.56	6.22	7.13	6.70
Metasoma segment I, length	2.80	2.68	2.66	2.56	2.17	2.68	2.50
Metasoma segment I, width	2.01	1.95	1.83	2.13	1.58	2.01	1.83
Metasoma segment I, height	1.71	1.58	1.58	1.65	1.46	1.71	1.58
Metasoma segment II, length	3.23	2.80	2.74	2.99	2.44	2.93	2.80
Metasoma segment II, width	1.66	1.58	1.58	1.61	1.34	1.58	1.55
Metasoma segment II, height	1.65	1.52	1.55	1.58	1.40	1.65	1.52
Metasoma segment III, length	3.29	3.29	2.93	3.17	2.62	3.05	2.99
Metasoma segment III, width	1.58	1.49	1.44	1.56	1.28	1.46	1.46
Metasoma segment III, height	1.71	1.58	1.58	1.52	1.46	1.71	1.58
Metasoma segment IV, length	3.66	3.41	3.05	3.41	2.99	3.41	3.29
Metasoma segment IV, width	1.40	1.37	1.26	1.40	1.16	1.34	1.28
Metasoma segment IV, height	1.71	1.52	1.52	1.52	1.34	1.68	1.58
Metasoma segment V, length	4.75	4.33	4.02	4.27	3.72	4.14	3.90
Metasoma segment V, width	1.58	1.52	1.52	1.58	1.34	1.46	1.49
Metasoma segment V, height	1.58	1.52	1.46	1.46	1.28	1.56	1.49
Telson, length	5.55	5.49	5.00	5.18	4.39	5.00	5.06
Telson, width	1.95	1.89	1.83	1.89	1.52	1.79	1.89
Telson, height	1.89	1.83	1.65	1.83	1.52	1.83	1.91

Table 4 (continued). *Hormurus oyatabu* sp. nov., measurements (in mm) of adult females.

	Paratype	Paratype	Paratype	Paratype	Paratype	Paratype	Paratype
Sex	♀	♀	♀	♀	♀	♀	♀
Repository	AMNH	AMNH	AMNH	AMNH	AMNH	AMNH	AMNH
Inventory number	LP2732	LP2732	LP2732	LP2732	LP2720	LP2720	LP2720
Locality	Mt Kilkerran	Mt Kilkerran	Mt Kilkerran	Mt Kilkerran	Mt Kilkerran	Mt Kilkerran	Mt Kilkerran
Total length	48.00	48.00	44.00	43.00	42.00	44.00	47.00
Carapace, length	6.83	6.64	6.70	6.70	6.22	5.97	6.46
Carapace, anterior width	4.97	4.63	4.63	4.51	4.27	4.27	4.39
Carapace, posterior width	7.92	7.68	7.37	7.56	6.89	6.83	7.19
Pedipalp femur, length	7.19	7.07	7.01	6.70	6.64	6.22	6.70
Pedipalp femur, width	2.80	2.93	2.68	2.73	2.65	2.50	2.80
Pedipalp femur, height	1.71	1.83	1.77	1.83	1.65	1.65	1.77
Pedipalp patella, length	7.44	7.56	7.31	6.77	6.89	6.52	7.07
Pedipalp patella, width	3.05	3.17	2.80	2.93	2.80	2.80	2.93
Pedipalp patella, height	2.80	2.80	2.62	2.68	2.62	2.44	2.62
Pedipalp chela, length	15.28	14.74	14.80	14.15	14.01	13.44	14.31
Pedipalp chela, width	5.30	5.12	4.73	4.94	4.63	4.33	5.00
Pedipalp chela, height	3.33	3.29	3.29	3.05	3.17	3.05	3.05
Chela movable finger, length	7.56	7.44	7.31	7.07	7.07	6.77	7.28
Genital operculum length, female	1.71	1.58	1.58	1.58	1.46	1.28	1.46
Genital operculum width, female	2.19	2.32	2.10	2.19	2.07	1.95	2.07
Metasoma segment I, length	2.56	2.50	2.44	2.44	2.44	2.28	2.44
Metasoma segment I, width	2.07	1.95	1.85	1.95	1.89	1.71	1.95
Metasoma segment I, height	1.83	1.77	1.71	1.68	1.65	1.58	1.77
Metasoma segment II, length	2.93	2.86	2.80	2.86	2.68	2.41	2.93
Metasoma segment II, width	1.71	1.71	1.58	1.58	1.58	1.44	1.58
Metasoma segment II, height	1.71	1.77	1.58	1.58	1.58	1.46	1.71
Metasoma segment III, length	3.11	2.93	2.86	2.93	2.72	2.62	2.93
Metasoma segment III, width	1.58	1.58	1.46	1.46	1.46	1.22	1.46
Metasoma segment III, height	1.71	1.71	1.65	1.58	1.52	1.34	1.58
Metasoma segment IV, length	3.41	3.17	3.29	3.11	2.93	2.80	3.11
Metasoma segment IV, width	1.46	1.40	1.34	1.34	1.34	1.19	1.34
Metasoma segment IV, height	1.71	1.65	1.65	1.46	1.46	1.34	1.46
Metasoma segment V, length	4.21	4.14	3.90	3.84	3.78	3.60	3.90
Metasoma segment V, width	1.58	1.58	1.46	1.40	1.44	1.28	1.46
Metasoma segment V, height	1.52	1.55	1.49	1.46	1.46	1.24	1.46
Telson, length	5.49	5.06	4.69	4.63	4.51	4.25	4.75
Telson, width	1.71	1.71	1.71	1.58	1.58	1.46	1.58
Telson, height	1.83	1.71	1.71	1.58	1.71	1.46	1.58

Table 4 (continued). *Hormurus oyatabu* sp. nov., measurements (in mm) of adult females.

	Paratype	Paratype	Paratype	Paratype	Paratype
Sex	♀	♀	♀	♀	♀
Repository	AMNH	AMNH	AMNH	AMNH	AMNH
Inventory number	LP2720	LP2720	LP2720	LP2720	LP2720
Locality	Mt Kilkerran	Mt Kilkerran	Mt Kilkerran	Mt Kilkerran	Mt Kilkerran
Total length	47.00	41.00	45.00	39.00	49.00
Carapace, length	6.40	6.22	6.46	5.97	6.58
Carapace, anterior width	4.67	4.39	4.39	4.08	4.57
Carapace, posterior width	7.31	6.95	7.31	6.70	7.80
Pedipalp femur, length	6.70	6.34	6.83	6.28	6.89
Pedipalp femur, width	2.74	2.56	2.68	2.32	2.68
Pedipalp femur, height	1.71	1.58	1.83	1.58	1.83
Pedipalp patella, length	6.86	6.52	7.07	6.52	7.13
Pedipalp patella, width	2.86	2.80	2.93	2.74	3.05
Pedipalp patella, height	2.62	2.44	2.68	2.34	2.80
Pedipalp chela, length	14.26	13.72	14.24	12.85	14.45
Pedipalp chela, width	4.49	4.51	4.82	4.39	4.46
Pedipalp chela, height	3.17	3.17	3.23	3.11	3.54
Chela movable finger, length	7.29	6.22	7.25	6.46	7.25
Genital operculum length, female	1.58	1.46	1.52	1.46	1.58
Genital operculum width, female	2.07	1.95	2.22	1.89	1.95
Metasoma segment I, length	2.44	2.44	2.26	2.32	2.56
Metasoma segment I, width	1.85	1.95	1.95	1.77	1.95
Metasoma segment I, height	1.71	1.71	1.71	1.46	1.71
Metasoma segment II, length	2.56	2.68	2.62	2.50	2.80
Metasoma segment II, width	1.58	1.58	1.71	1.46	1.58
Metasoma segment II, height	1.65	1.58	1.65	1.44	1.65
Metasoma segment III, length	2.93	2.86	2.68	2.62	2.93
Metasoma segment III, width	1.40	1.46	1.58	1.40	1.52
Metasoma segment III, height	1.52	1.52	1.58	1.40	1.58
Metasoma segment IV, length	3.05	3.05	2.93	2.80	3.17
Metasoma segment IV, width	1.34	1.34	1.40	1.22	1.34
Metasoma segment IV, height	1.46	1.46	1.49	1.34	1.52
Metasoma segment V, length	3.78	3.90	3.72	3.75	3.84
Metasoma segment V, width	1.46	1.34	1.40	1.34	1.46
Metasoma segment V, height	1.34	1.37	1.37	1.32	1.46
Telson, length	4.63	4.45	4.63	4.36	4.63
Telson, width	1.46	1.58	1.65	1.34	1.83
Telson, height	1.46	1.60	1.71	1.40	1.71

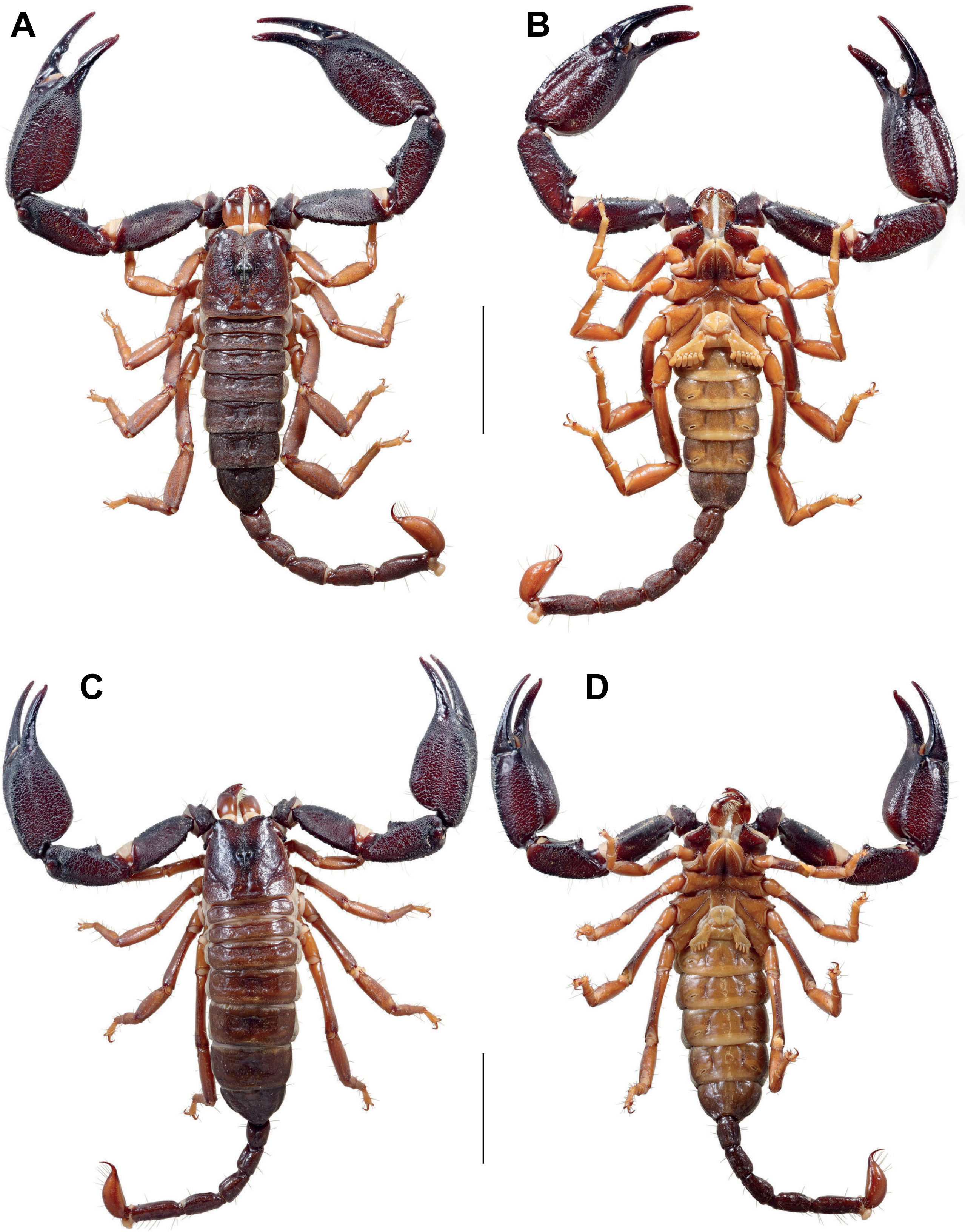

Fig. 40. *Hormurus oyatabu* sp. nov., habitus, dorsal (A, C) and ventral (B, D) aspects. (A-B) Male paratype (AMNH [LP2719]). (C-D) Female paratype (AMNH [LP2732]). Scale lines: 10 mm.

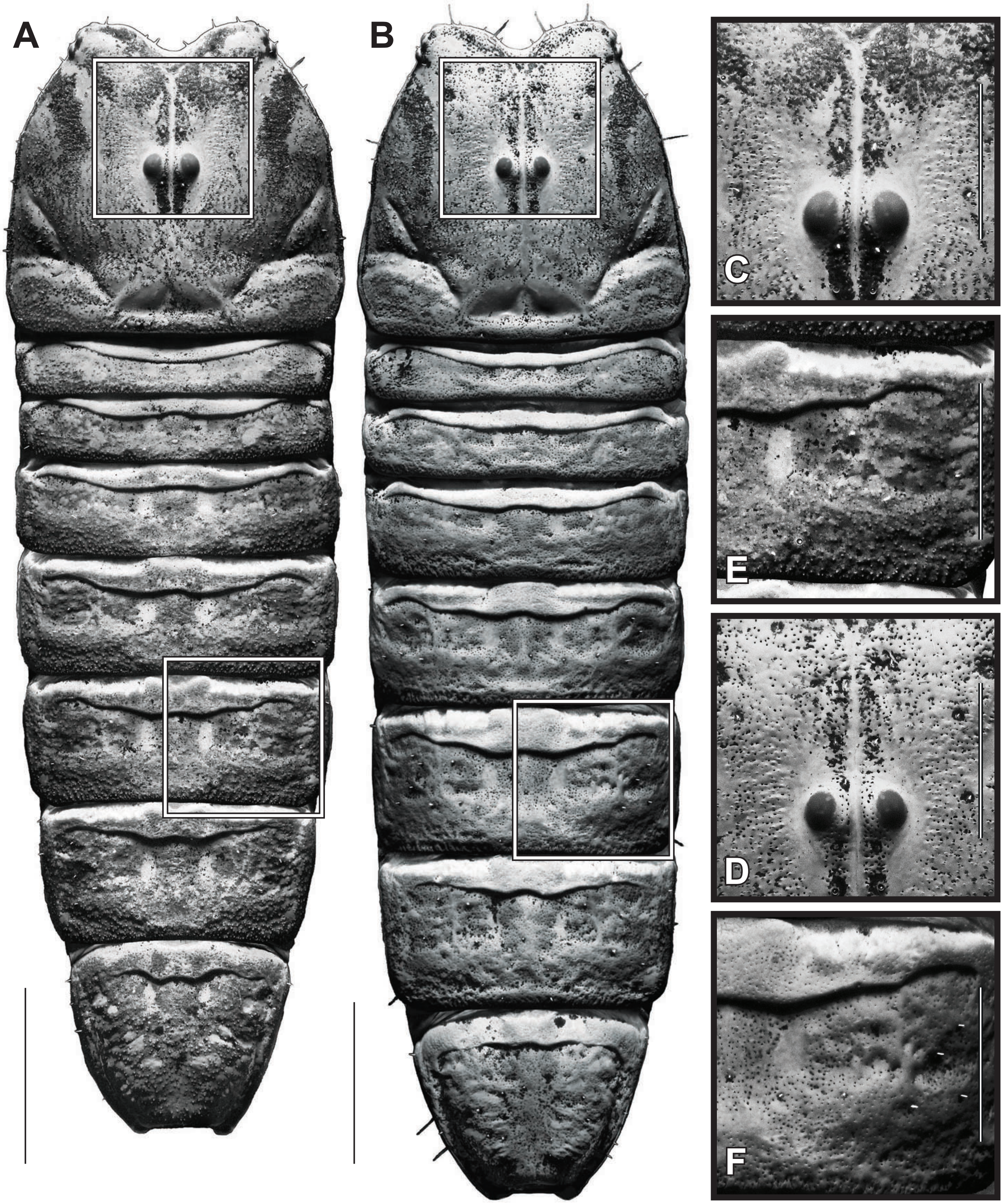

Fig. 41. *Hormurus oyatabu* sp. nov., carapace and mesosomal tergites showing ornamentation and macrosculpture of cuticle (A-B), detailed views of carapace (C-D) and of tergite V (E-F), dorsal aspect. (A, C, E) Male holotype (AMNH [LP2719]). (B, D, F) Female paratype (AMNH [LP2732]). Scale lines: 4 mm (A-B), 2 mm (C-F).

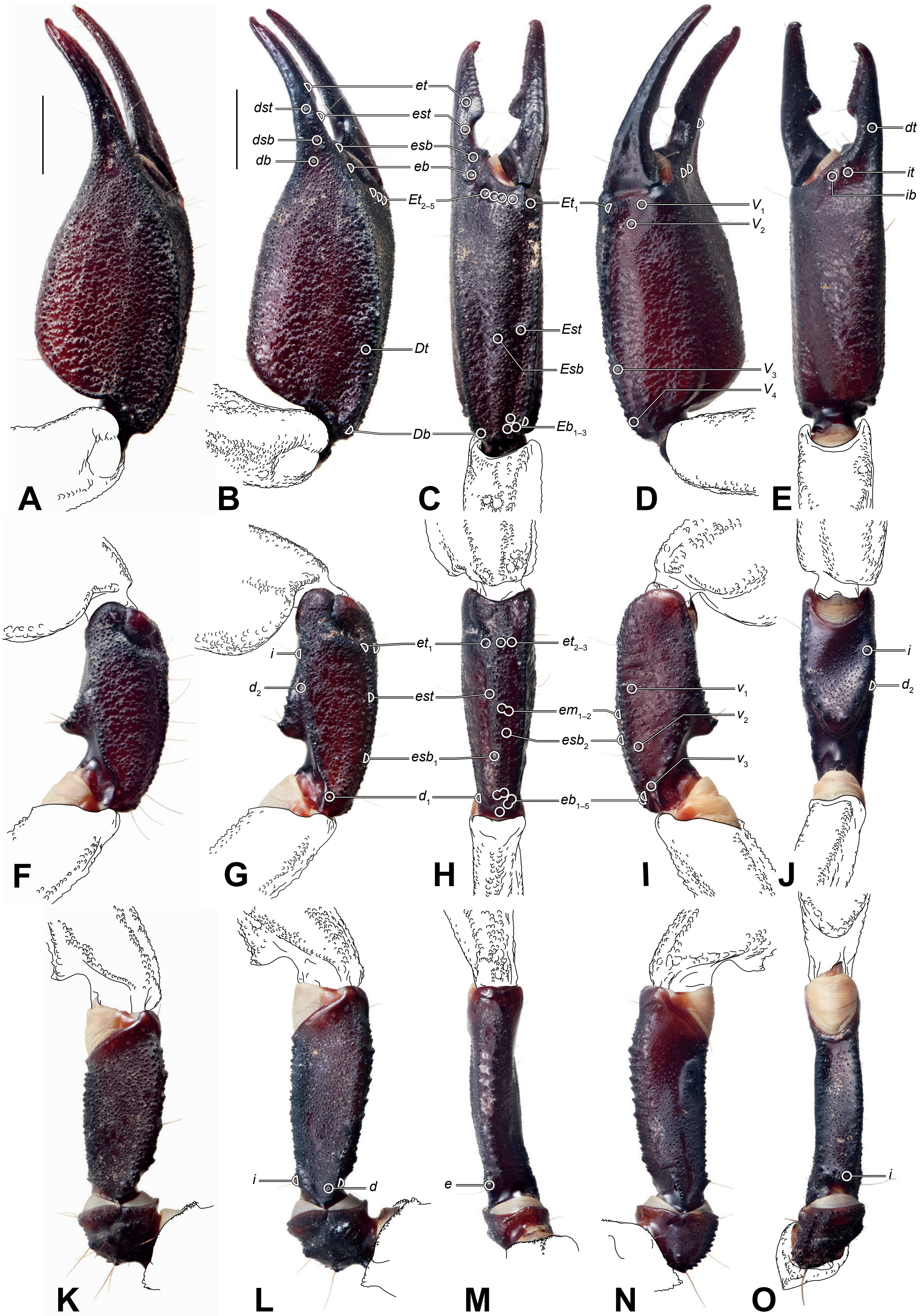

Fig. 42. *Hormurus oyatabu* sp. nov., pedipalp chela (A-E), patella (F-J), femur and trochanter (K-O), dorsal (A-B, F-G, K-L), retrolateral (C, H, M), ventral (D, I, N) and prolateral (E, J, O) aspects showing trichobothria pattern. (A, F, K) Female paratype (AMNH [LP2732]). (B-E, G-J, L-O) Male holotype (AMNH [LP2719]). Scale lines: 3 mm.

Pedipalp macrosculpture: Femur (Fig. 42L-O): prolateral intercarinal surface densely covered with small spiniform granules; dorsal intercarinal surface densely covered with small spiniform granules, distal area smooth; retrolateral intercarinal surface sparsely covered with small spiniform granules, smooth proximally; ventral intercarinal surface densely covered with small to medium-sized spiniform granules, smooth distally. Patella (Fig. 42G-J): prolateral intercarinal surface sparsely covered with small spiniform granules, distal half smooth; dorsal intercarinal surface covered with dense reticulate network of medium-sized spiniform granules, distal area smooth; retrolateral intercarinal surface with dense reticulate network of medium-sized spiniform granules; ventral intercarinal surface covered with sparse reticulate network of medium-sized spiniform granules, distal area smooth. Chela manus (Fig. 42B-E): prolateral intercarinal surface covered with dense reticulate network of small to medium-sized spiniform granules, smooth proximally; dorsal and retrolateral intercarinal surfaces covered with dense reticulate network of medium-sized spiniform granules; ventral intercarinal surface covered with sparse reticulate network of medium-sized spiniform granules, distal area smooth. Chela fingers densely covered with small spiniform granules in proximal half, smooth or nearly so distally, ventral surface smooth; trichobothria *dst*, *dsb* and *db* each in a small smooth depression.

Trichobothria: Pedipalp orthobothriotaxic, accessory trichobothria absent. Patella (Fig. 42G-J): d_2 trichobothrium distal to patellar process; five *eb* trichobothria arranged in two groups (eb_1+eb_{4-5} and eb_{2-3}); two *esb*, two *em* and one *est* trichobothria arranged in four groups (esb_1, esb_2, em_{1-2} and *est*); three *et* trichobothria; three *v* trichobothria. Chela manus (Fig. 42B-E): *Dt* situated in proximal third of manus; Eb_3 close to Eb_{1-2}; *Esb* closer to *Est* than to *Eb* group; *Est* situated near midpoint of manus; four *V* trichobothria, V_3 distant from V_4. Fixed chela finger with *db* situated on dorsal surface; *esb* closer to *eb* than to *est*; *eb* situated at base of finger, proximal to point of articulation between fixed and movable fingers; two *i* trichobothria.

Coxosternum (Fig. 44A, C): Coxa III elongated anterodistally, without anterodistal process. Sternum equilateral pentagonal (anterior width slightly greater than posterior width), wider than long.

Legs (Fig. 45): Femora I-IV with ventral surfaces bicarinate, pro- and retroventral carinae granular. Retrolateral margins of tibiae I-II without setiform macrosetae. Basitarsi I-IV: pro- and retroventral rows each with 4/5, 4/5, 4/5 and 4/5 setiform macrosetae, respectively. Telotarsi I-IV: pro- and retroventral row each with 4/4, 4/4, 5/5 and 5/5 setiform macrosetae, respectively; retroventral row with one proximal spinule; ventromedian spinules absent. Ungues curved, shorter than telotarsus, half its length or less.

Genital operculum (Fig. 44A): Composed of two subtriangular sclerites.

Pectines (Fig. 44A-B): Moderately elongated, distal edge reaching but not extending beyond distal edge of coxa IV; fulcrae and three marginal lamellae present. Pectinal teeth count 6-7; teeth straight, entirely covered with sensory papillae.

Mesosoma (Figs 40A-B, 41A, E): Pre-tergites I-VII and posterior margins smooth. Post-tergites: posterior margins of tergites I-VI sublinear, without distinct projection; lateral transversal sulcus present; intercarinal surfaces of I-VII densely covered with small spiniform granules, less so anteromedially; intercarinal surfaces of III-VII with distinct but faint reticulate network of ridges and dimples. Respiratory stigmata (spiracles) of sternites IV-VI short, their length less than third of sternite width, and distinctly crescent shaped. Sternite VII acarinate.

Metasoma (Fig. 46B-C): Not markedly compressed laterally; sparsely and minutely granular, posterior segments less so (segment V smooth in some specimens); dorsal intercarinal surface of segment V smooth and shiny medially; distinct dorsomedian sulcus on segments I-IV, much less pronounced on segment V than on other segments (usually only faintly expressed anteriorly).

Metasoma carinae: Segments I-IV: dorsolateral carinae obsolete on all segments; lateral median carinae weakly developed (as faint ridges); lateral inframedian carinae anteriorly discernible as a faint ridge on segment I, absent on other segments; ventrolateral carinae weakly developed (as faint ridges); paired ventrosubmedian carinae weakly developed (as low ridges). Segment V: dorsolateral and lateral median carinae obsolete; ventrolateral carinae only expressed as faint ridges; ventrosubmedian carinae fused, only expressed as a faint ridge in anterior two-thirds.

Metasoma spination: Segment I: dorsomedian posterior and dorsolateral posterior spiniform granules absent; ventrolateral carinae without large spiniform granules; ventrosubmedian carinae with 1-2 pairs of subposterior spiniform granules and rarely one pair of median spiniform granules. Segment II: dorsomedian posterior and dorsolateral posterior spiniform granules absent; ventrolateral carinae without large posterior spiniform granules; ventrosubmedian carinae with 1-3 pairs of posterior spiniform granules and 0-2 pairs of median spiniform granules. Segments III-IV: dorsolateral posterior spiniform granules absent; ventrolateral and ventrosubmedian carinae without large spiniform granules. Segment V: ventrolateral and ventromedian carinae without distinct granules or spines; anal arch crenulate.

Ventral metasoma setation: Segments I-IV each with ten macrosetae, i.e. three pairs (anterior, median and posterior) on ventrosubmedian carinae and two pairs (anterior and supramedian) on ventrolateral carinae; segment V with 16 macrosetae, i.e. four pairs (anterior, median, subposterior and posterior) on ventrosubmedian carinae and four pairs (anterior, supramedian, subposterior and posterior) on ventrolateral carinae.

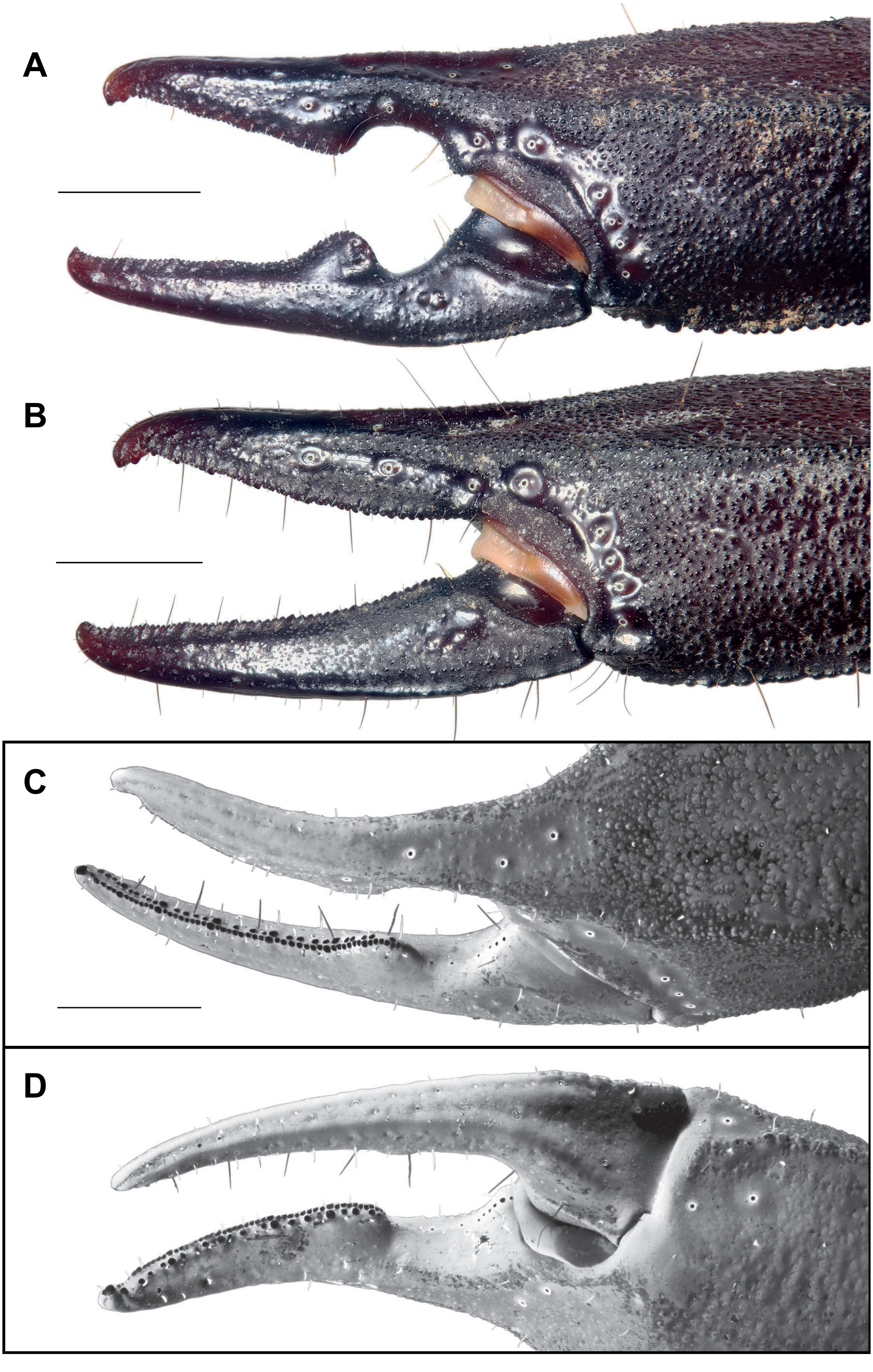

Fig. 43. *Hormurus oyatabu* sp. nov., left pedipalp chelae, retrolateral aspect showing dentate margin of chela fingers (A-B), dorsal aspect showing dentate margin of movable finger (C), ventral aspect showing dentate margin of fixed finger (D). (A, C-D) Male holotype (AMNH [LP2719]). (B) Female paratype (AMNH [LP2732]). Scale lines: 2 mm.

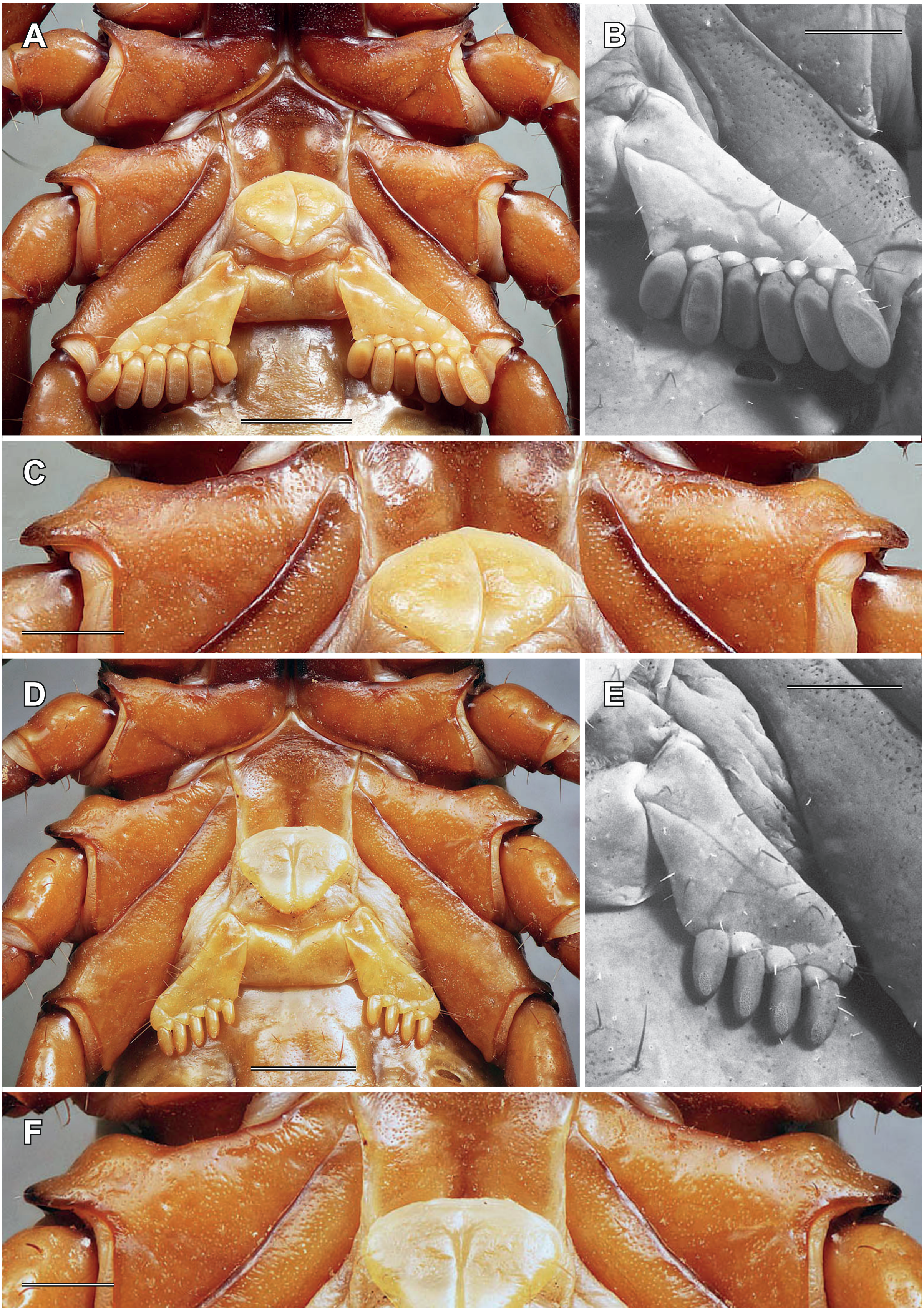

Fig. 44. *Hormurus oyatabu* sp. nov., coxae II-IV, sternum, genital operculum and pectines, ventral aspect (A, D), left pecten under UV light (B, E), anterior margin of coxae III (C, F). (A-C) Male holotype (AMNH [LP2719]). (D-F) Female paratype (AMNH [LP2732]). Scale lines: 2 mm (A, D), 1 mm (B-C, E-F).

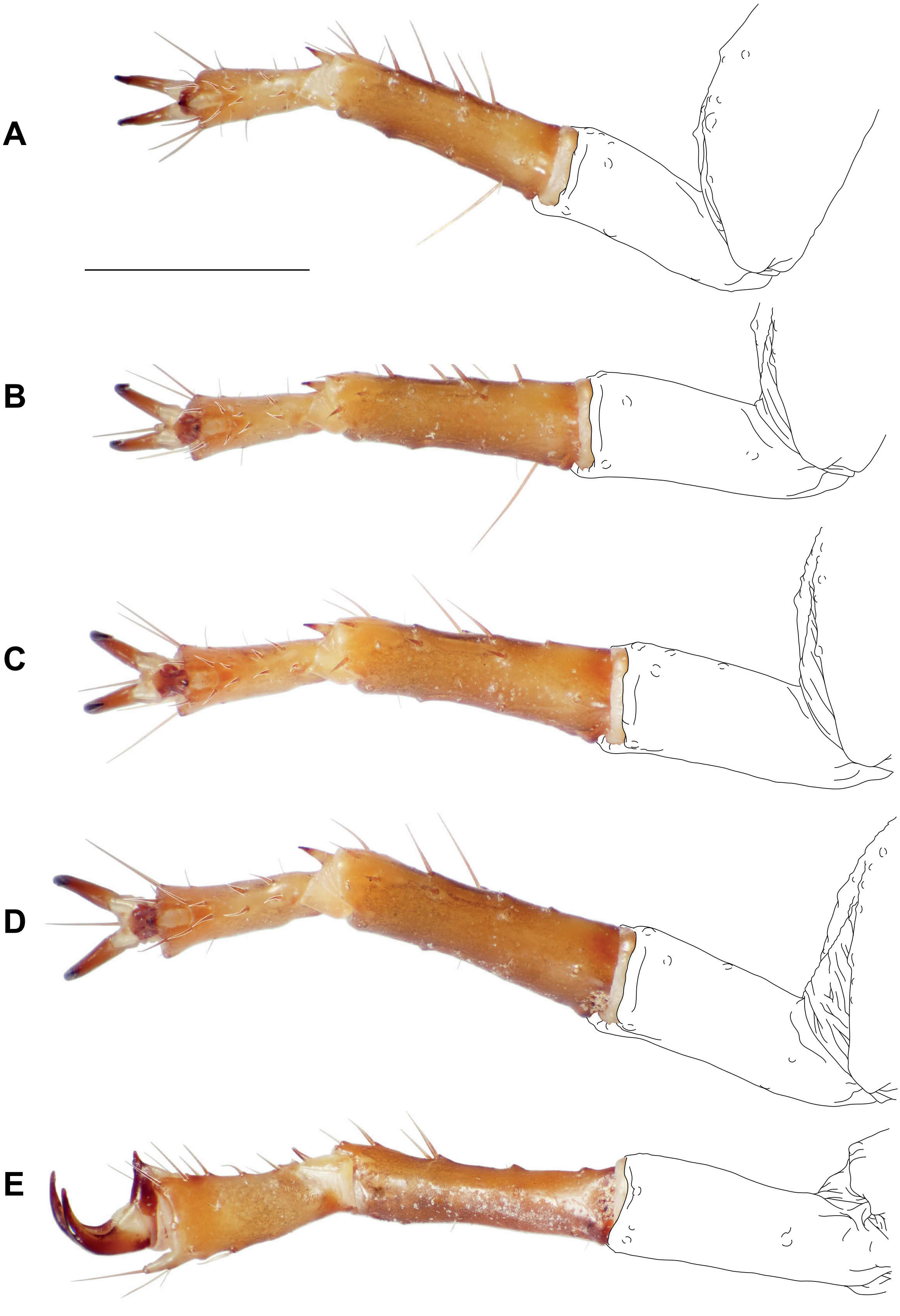

Fig. 45. *Hormurus oyatabu* sp. nov., male holotype (AMNH [LP2719]), right tarsi, ventral (A-D) and retrolateral (E) aspects. (A) Tarsus I. (B) Tarsus II. (C) Tarsus III. (D-E) Tarsus IV. Scale line: 2 mm.

Telson (Fig. 46B): Slightly longer than metasoma segment V; vesicle smooth, without granules; aculeus short (less than half of vesicle length), sharply curved.

Hemispermatophore (Fig. 47): Stalk and stem approximately equal in size. Distal lamina curved, without distal crest on anterior margin; single laminar hook situated in basal third of stalk (basal part/distal lamina ratio = 0.39-0.58, median = 0.49); transverse ridge distinct, approximately aligned with base of laminar hook, merging with anterior margin more distally than base of laminar hook. Capsule: hemisolenos thin, folded on itself only proximally, above that unfolded to a flattened distal area (tip and base approximately of same width), without lateral longitudinal carina, laterodistal accessory hook or medioposterior accessory apophysis; tip of hemisolenos more proximal than base of laminar hook, more distal than tip of clasper. Clasper well developed, forming distinct hump, not hook-like, without anterior accessory process. Subex well developed, spoon-shaped, merging anteriorly with base of clasper; posterior edge forming obtuse angle (>90°) with hemisolenos; anterior edge forming right angle (90º) with hemisolenos.

Description of adult female: Same characters as for male except as follows. *Pedipalps* (Figs 40C-D, 42A, F, K): Segments slightly shorter or more robust than in male.

Chela fingers (Fig. 43B): Dentate margins linear or nearly so, without pronounced lobe and notch, with two rows of primary denticles extending from tip to base of fingers and bearing large inner accessory denticles.

Carapace (Fig. 41B, D): Anteromedian surface and frontal lobes smooth, only faintly granular along median longitudinal sulci and anterior furcated sulci; posteromedian margin smooth; other surfaces less granular than in male.

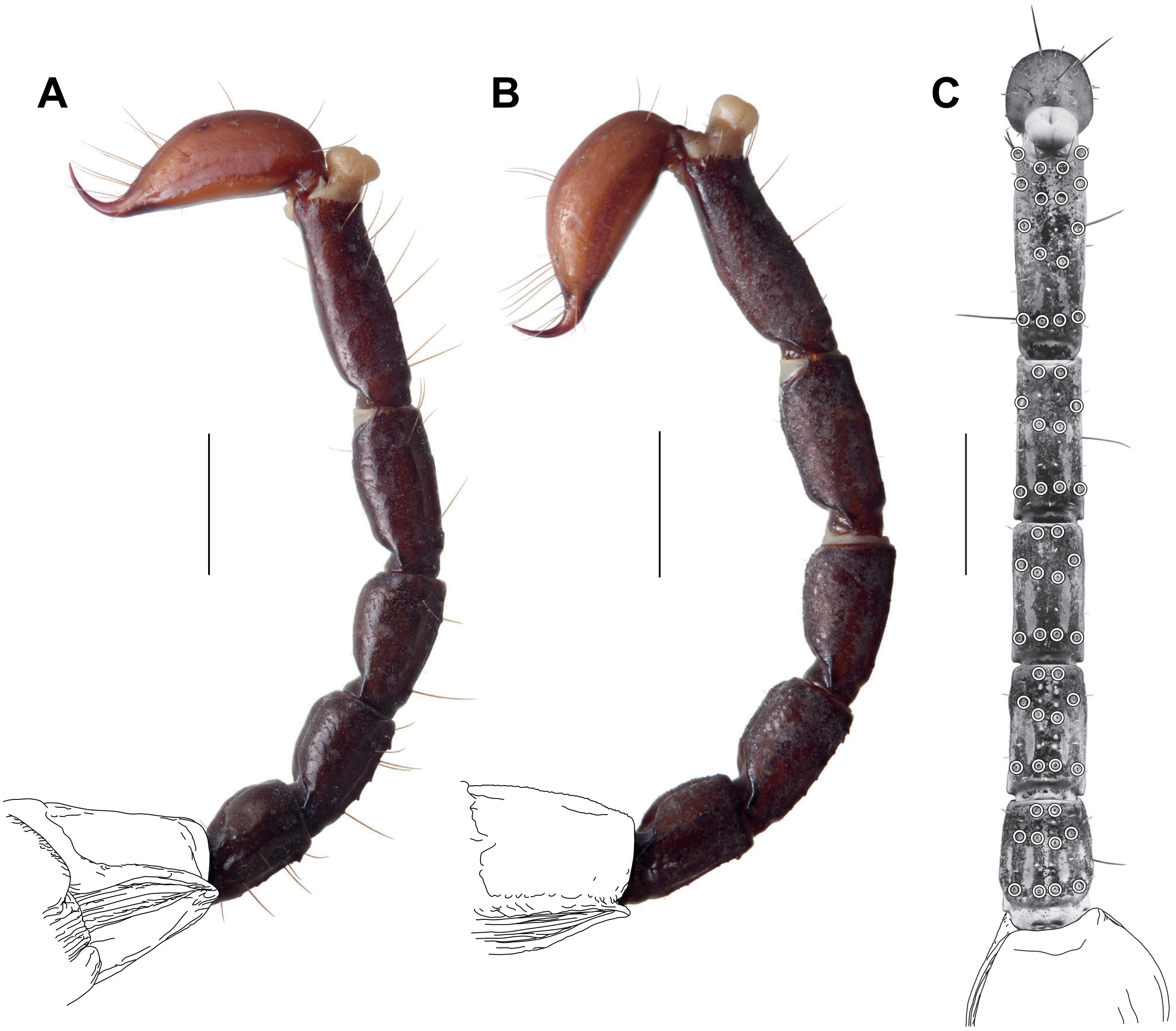

Fig. 46. *Hormurus oyatabu* sp. nov., metasoma and telson, lateral (A-B) and ventral (C) aspects. (A) Female paratype (AMNH [LP2732]). (B-C) Male holotype (AMNH [LP2719]). Scale lines: 3 mm.

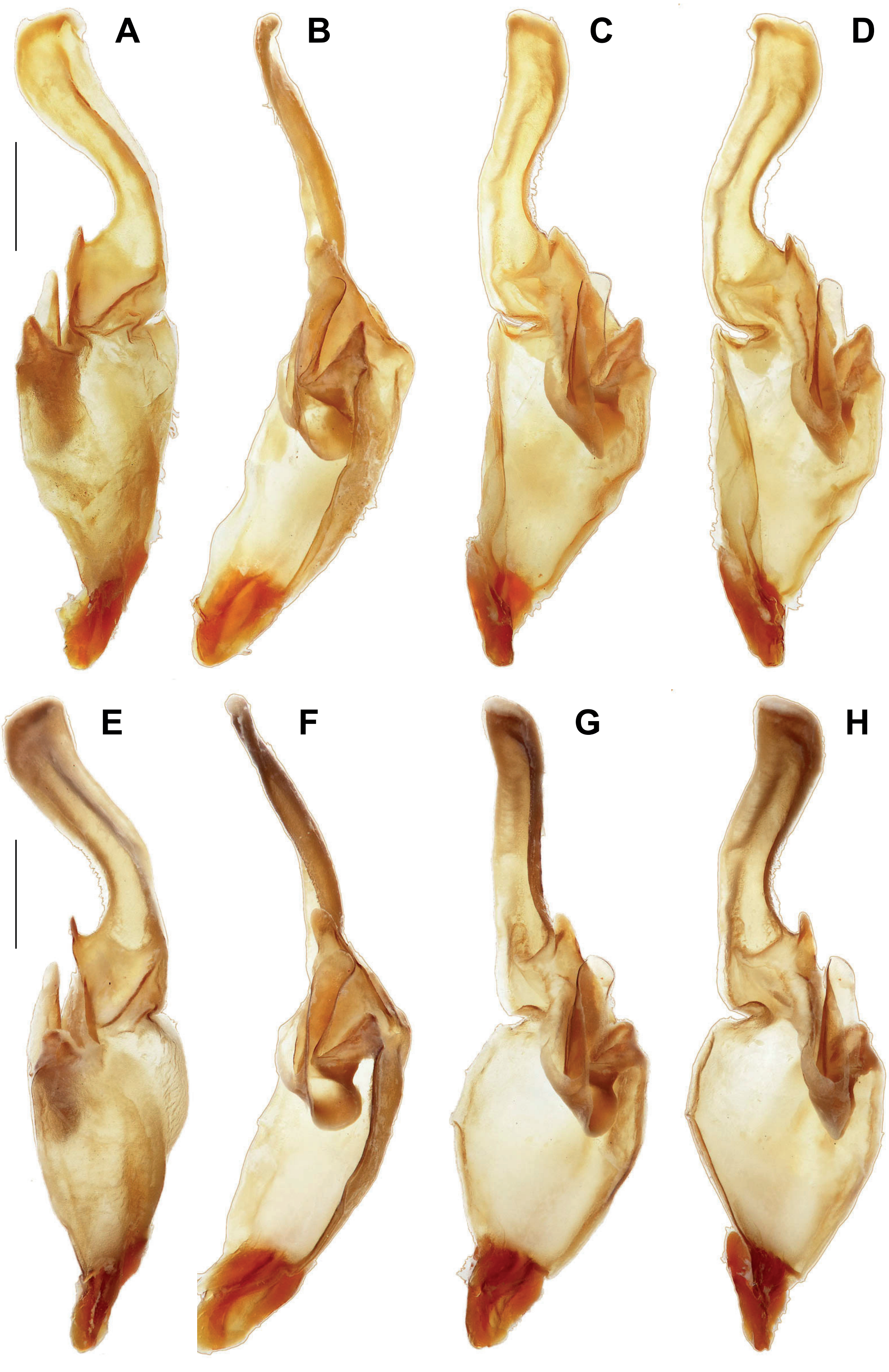

Fig. 47. *Hormurus oyatabu* sp. nov., left hemispermatophore of male holotype (AMNH [LP2719]) (A-D) and of male paratype (AMNH [LP2719]) (E-H). (A, E) Lateral aspect. (B, F) Anterior aspect. (C, G) Rotated approximately 45° counter-clockwise from anterior aspect. (D, H) Contralateral aspect. Scale lines: 1 mm.

Genital operculum (Fig. 44D): Oval to semi-oval, distinctly wider than long (length/width ratio = 0.66-0.81, median = 0.74); opercular sclerites partly fused, with distinct median suture; posterior notch present, at least weakly developed.
Pectines (Fig. 44D-E): Short, distal edge not reaching distal edge of coxa IV. Pectinal teeth count 4-6; teeth short and straight, sensory papillae covering only distal half.
Mesosoma (Fig. 40C-D, 41B, F): Post-tergites: intercarinal surfaces of I-III smooth, faintly granular laterally; intercarinal surfaces of IV-VI entirely smooth; intercarinal surfaces of VII smooth, posterior half with sparse granules laterally.

Intraspecific variation: *Pedipalp trichobothria*: On the retrolateral side of the patella trichobotria *esb*, *em* and *est* may be arranged in three groups instead of four, i.e. $esb_{1\text{-}2}$, $em_{1\text{-}2}$ and *est* (esb_1 closer to esb_2). On the retrolateral side of the pedipalp chela of some specimens *Esb* is more distal than in others, aligning with *Est*.
Leg spination: The number of setiform macrosetae varies from three to four in the proventral rows of telotarsi II-III, and from four to five in the retroventral row of telotarsi III-IV.
Female genital operculum: The length/width ratio varies from 0.66 to 0.81 (median = 0.74).
Pectines: The pectinal teeth count varies from five to seven in males and from four to six in females.
Metasoma: Spination: 1-2 pairs of subposterior spiniform granules and 0-1 pair of median spiniform granules are present on the ventrosubmedian carinae of segment I. Similarly, the ventrosubmedian carinae of segment II possess 1-3 pairs of posterior spiniform granules and 0-2 pairs of median spiniform granules. For each segment one granule more or one granule less may be expressed in each group of granules.
Ventral metasoma setation: Segments I-IV may bear eight or nine macrosetae instead of ten, and segment V 15 instead of 16 due to the non-expression of one or two macrosetae.
Hemispermatophore: The basal part/distal lamina ratio varies from 0.39 to 0.58 (median = 0.49).

Distribution and ecology: *Hormurus oyatabu* sp. nov. is probably endemic to Mount Kilkerran, the highest peak of Fergusson island, D'Entrecasteaux Archipelago, off the northeastern tip of New Guinea, Milne Bay Province (Fig. 48; see description of *H. oyawaka* sp. nov. for details). The specimens were collected in a habitat very similar to that of *H. oyawaka* sp. nov., i.e. under the rocks of a dry streambed (with moisture still present under logs and rocks) in a small-crowned lowland hill forest (Paijmans, 1975a, b, 1976) on steep terrain (F. Kraus, pers. comm.).

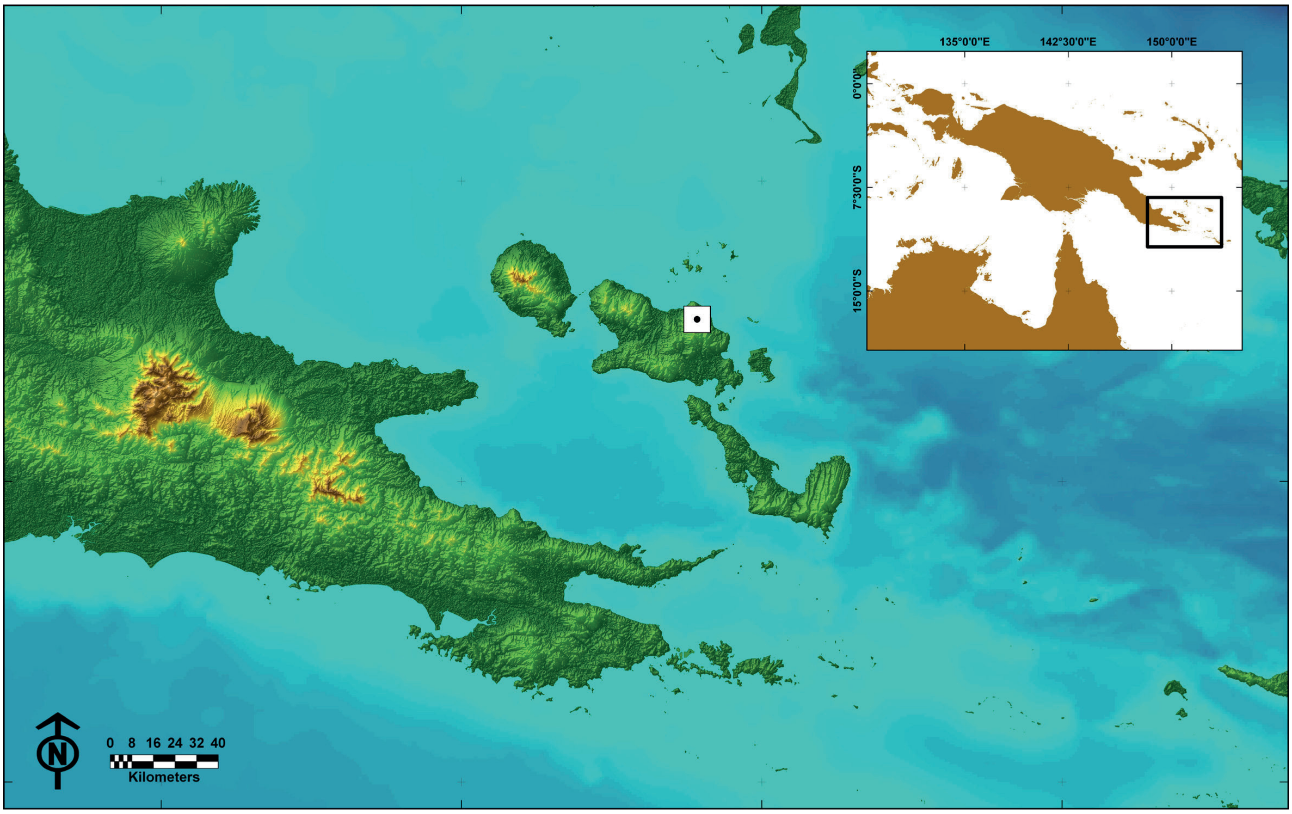

Fig. 48. Known locality of *Hormurus oyatabu* sp. nov. on Fergusson Island, D'Entrecasteaux Archipelago, off the northeastern tip of New Guinea, Milne Bay Province. Color gradient indicates topography and bathymetry.

Hormurus muyua Monod & Prendini, sp. nov.

Figs 49-58, Tab. 5

Material: AMNH [LP 4741]; ♂ holotype; Papua New Guinea, Milne Bay Province, Woodlark Island, 1 km N of Guasopa, 30 m, disturbed rainforest on limestone, 9.21°S, 152.94°E; 24.I.2003; leg. J.D. Slapcinsky (JS-0591). – AMNH [LP 4741]; 1 ♂, 2 ♀ paratypes; same data as for holotype. – UMMZ [LP 4741]; 1 subadult ♂, 1 juvenile ♂, 1 juvenile ♀ paratypes; same data as for holotype.

Etymology: In the regional dialect, Muyua is the name of Woodlark Island where the type specimens were collected. The epithet is an invariable name in apposition.

Diagnosis: *Hormurus muyua* sp. nov. and *H. slapcinskyi* sp. nov. can be distinguished from the other Papuan congeners by the position of the hemispermatophore lamellar hook and the shape of the female genital operculum. Among the species with a subdistal hemispermatophore lamellar hook (situated between 1/3 and 3/7 from the base of the stalk; basal part/distal lamina ratio > 0.5 and < 0.75), *H. muyua* sp. nov. and *H. slapcinskyi* sp. nov. are the only species in which the female genital operculum is distinctly wider than long (length/width ratio < 0.85).

Hormurus muyua sp. nov. differs from *H. slapcinskyi* sp. nov. in the following characters: (1) the carapace and tergite surfaces in *H. muyua* sp. nov. (Fig. 51) are slightly less granular than in *H. slapcinskyi* sp. nov. (Fig. 60); (2) the pedipalp segments in *H. muyua* sp. nov. (Fig. 52) are higher and less elongated than in *H. slapcinskyi* sp. nov. (Fig. 61); (3) the retrodorsal carina of the pedipalp femur is slightly less developed than the prodorsal and retroventral carinae in *H. muyua* sp. nov. (Fig. 52K-M), whereas it is markedly less developed than the prodorsal and retroventral carinae in *H. slapcinskyi* sp. nov. (Fig. 61K-M); (4) metasoma segment I bears eight macrosetae in males of *H. muyua* sp. nov. (Fig. 56C) instead of ten in the male of *H. slapcinskyi* sp. nov. (Fig. 65C); (5) the hemispermatophore distal lamina in *H. muyua* sp. nov. (Fig. 57) is less curved (almost straight) than in *H. slapcinskyi* sp. nov. (Fig. 66).

Description of adult male (holotype): *Colouration* (Figs 49, 50A-B): Dorsal surface of chelicera manus dark orange with brown infuscation, more pronounced anteriorly; fingers dark brown to black. Carapace reddish brown, median ocular region black. Tergites brown. Pedipalps reddish brown; carinae and fingers black. Legs paler than tergites, dorsal surface orange to yellow distally; ventral surface dark orange to yellow (tibiae, telotarsi and basitarsi paler than other segments); prolateral carina of femora black. Coxapophyses I-II dark brown, their anterior tips pale yellow; leg coxae orange; sternum orange, posteriorly slightly paler than anteriorly; genital operculum and pectines pale yellow. Sternites III-V brown, their posterior halves pale yellow; sternites VI-VII dark brown. Metasoma reddish brown with darker infuscation; telson paler than metasoma, vesicle dark orange, aculeus reddish brown.

Cuticle: Nongranular surfaces of carapace, pedipalps, legs, mesosoma and metasoma finely punctate.

Carapace (Fig. 51A, C): Anterior margin with median notch moderately excavated. Anterior furcated sutures distinct. Median ocular tubercle slightly raised; median ocelli present, at least twice the size of lateral ocelli, separated from each other by approximately the diameter of a median ocellus. Three pairs of lateral ocelli, equal in size, equidistant and adjacent to each other. Surfaces minutely and sparsely granular, except for smooth anterior areas of frontal lobes, median ocular area and posteromedian margin.

Chelicerae: Basal and median teeth of fixed finger fused into bicusp. Dorsal margin of movable finger with four teeth (one basal, one median, one subdistal and one distal); dorsal distal tooth smaller than ventral distal tooth; ventral margin smooth.

Pedipalps (Figs 49, 50A-B, 52B-E, G-J, L-O): Segments distinctly elongated, femur longer than carapace. Chela almost asetose.

Chela fingers (Fig. 53A, C-D): Fixed finger: basal lobe well developed and conical; suprabasal notch distinct and deep; dentate margins distally (from tip of finger to median lobe) with two rows of primary denticles bearing large inner accessory denticles; few sparse denticles on suprabasal notch; single row of denticles on basal lobe. Movable finger: basal lobe absent; suprabasal lobe well developed, conical, gently rounded dorsally and lacking sharp conical tooth, not overlapping with fixed finger; suprabasal lobe and corresponding notch on fixed finger contiguous, no proximal gap or at most a reduced gap evident only when fingers closed; dentate margins distally (from tip of finger to suprabasal lobe) with two rows of primary denticles bearing large inner accessory denticles; denticles absent on basal notch; single row of sparse denticles basally.

Pedipalp carinae: Femur (Fig. 52L-O): proventral carina expressed as a ridge of medium-sized spiniform granules; promedian carinae absent; prodorsal carina visible as a ridge of medium-sized spiniform granules, similarly developed as proventral carina; retrodorsal carina expressed as a ridge of medium-sized spiniform granules, similarly developed as prodorsal carina, more distinct in proximal third of segment; retroventral carina visible as a ridge of medium to large spiniform granules, more developed than retrodorsal carina; ventromedian carina obsolete, only discernible proximally as a ridge of medium-sized spiniform granules. Patella (Fig. 52G-J): proventral carina discernible as a costate-granular ridge proximally, obsolete distally; promedian and prodorsal carinae visible as ridges with medium to large spiniform granules, equally developed, fused medially into prominent spiniform process with medially located

Table 5. *Hormurus muyua* sp. nov., measurements (in mm), repository and inventory number of adult males and females.

	Holotye	Paratype	Paratype	Paratype
Sex	♂	♂	♀	♀
Repository	AMNH	AMNH	AMNH	AMNH
Inventory number	LP4741	LP4741	LP4741	LP4741
Locality	Guasopa	Guasopa	Guasopa	Guasopa
Total length	50.00	48.00	62.00	56.00
Carapace, length	7.31	7.07	8.23	7.92
Carapace, anterior width	5.12	4.88	5.73	5.67
Carapace, posterior width	7.92	7.68	9.20	8.90
Pedipalp femur, length	9.51	9.33	8.84	8.78
Pedipalp femur, width	3.17	3.05	3.54	3.39
Pedipalp femur, height	1.61	1.58	1.95	1.83
Pedipalp patella, length	9.20	8.78	8.72	8.59
Pedipalp patella, width	3.41	3.35	3.78	3.84
Pedipalp patella, height	2.80	2.62	3.12	2.93
Pedipalp chela, length	17.56	16.86	17.95	17.77
Pedipalp chela, width	5.24	5.12	6.58	6.28
Pedipalp chela, height	3.23	3.17	3.78	3.66
Chela movable finger, length	7.98	7.56	8.65	8.65
Genital operculum length, female	NA	NA	1.95	1.71
Genital operculum width, female	NA	NA	2.32	2.34
Metasoma segment I, length	2.93	2.80	3.02	2.86
Metasoma segment I, width	2.07	1.95	2.21	2.19
Metasoma segment I, height	1.83	1.68	1.95	1.95
Metasoma segment II, length	3.35	3.29	3.54	3.29
Metasoma segment II, width	1.71	1.58	1.83	1.83
Metasoma segment II, height	1.77	1.71	1.89	1.83
Metasoma segment III, length	3.60	3.35	3.66	3.35
Metasoma segment III, width	1.58	1.52	1.68	1.71
Metasoma segment III, height	1.71	1.71	1.89	1.83
Metasoma segment IV, length	4.02	3.78	4.02	3.90
Metasoma segment IV, width	1.46	1.34	1.44	1.52
Metasoma segment IV, height	1.71	1.65	1.89	1.83
Metasoma segment V, length	4.63	4.57	4.88	4.69
Metasoma segment V, width	1.58	1.40	1.61	1.58
Metasoma segment V, height	1.58	1.46	1.65	1.65
Telson, length	5.51	5.49	5.90	5.79
Telson, width	1.93	1.71	1.83	1.83
Telson, height	1.95	1.83	2.01	2.07

Fig. 49. *Hormurus muyua* sp. nov., habitus of male, dorsal aspect, reconstruction based on photographs. Scale line: 5 mm.

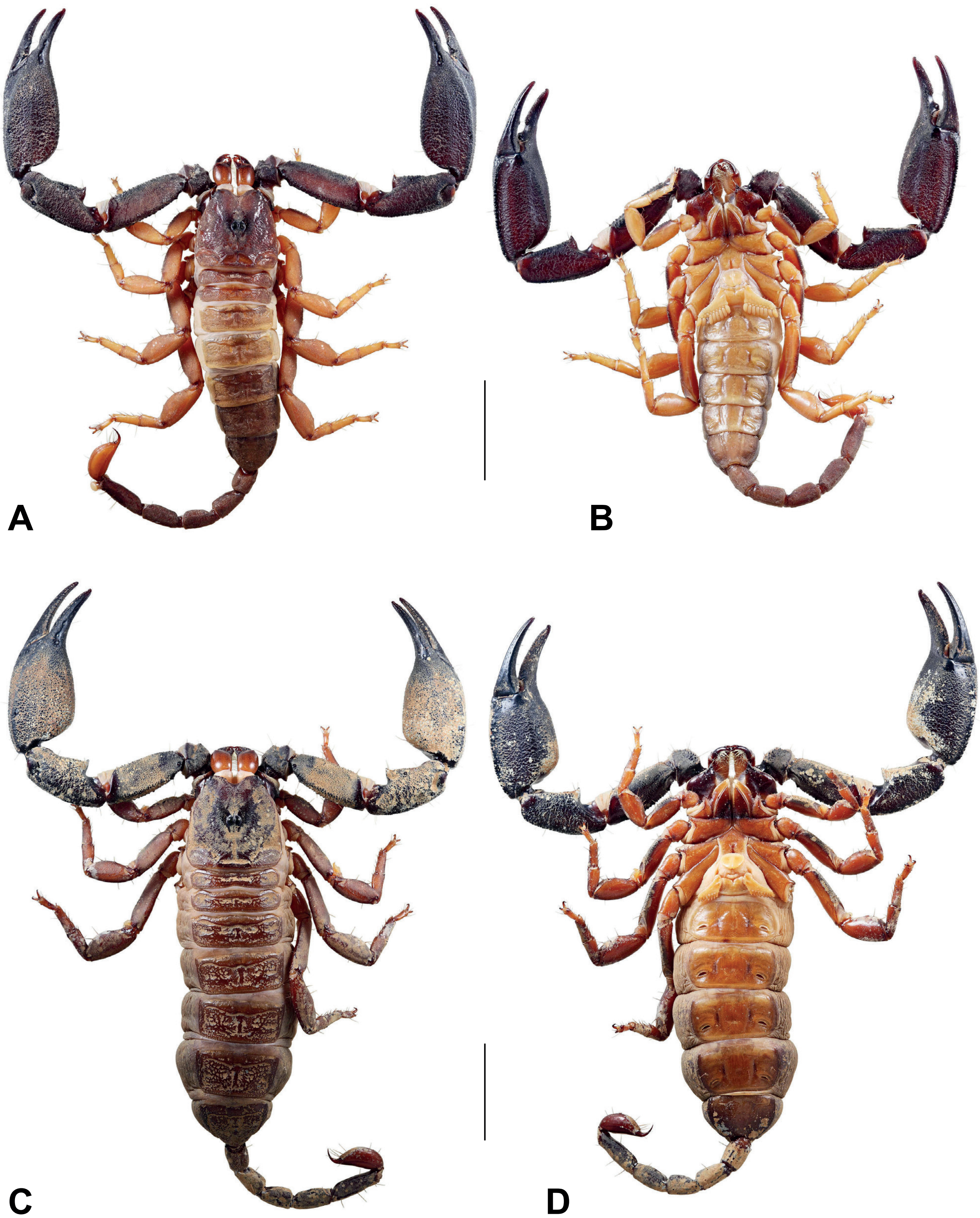

Fig. 50. *Hormurus muyua* sp. nov., habitus, dorsal (A, C) and ventral (B, D) aspects. (A-B) Male holotype (AMNH [LP4741]). (C-D) Female paratype (AMNH [LP4741]). Scale lines: 10 mm.

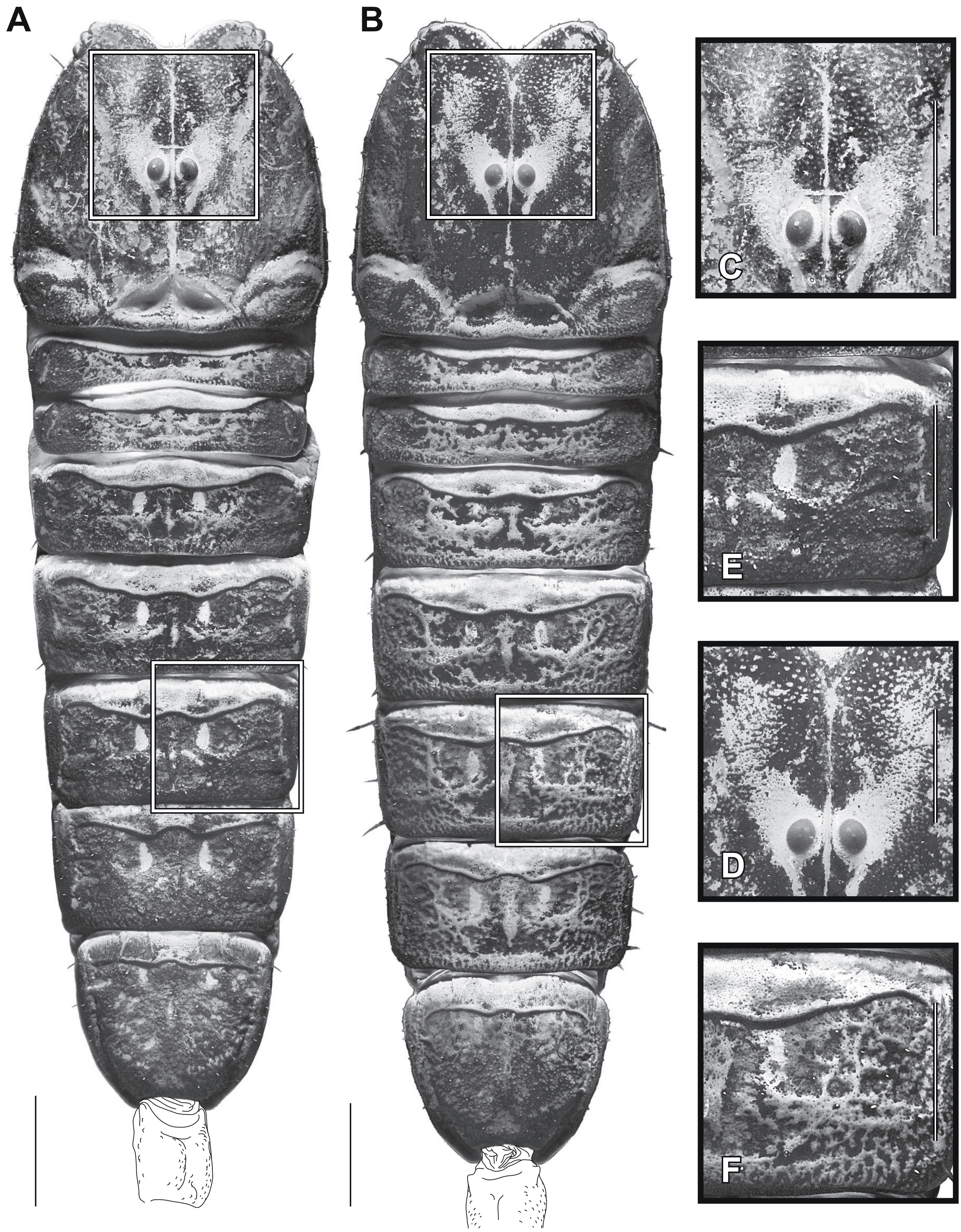

Fig. 51. *Hormurus muyua* sp. nov., carapace and mesosomal tergites showing ornamentation and macrosculpture of cuticle (A-B), detailed views of carapace (C-D) and of tergite V (E-F), dorsal aspect. (A, C, E) Male holotype (AMNH [LP4741]). (B, D, F) Female paratype (AMNH [LP4741]). Scale lines: 3 mm (A-B), 2 mm (C-F).

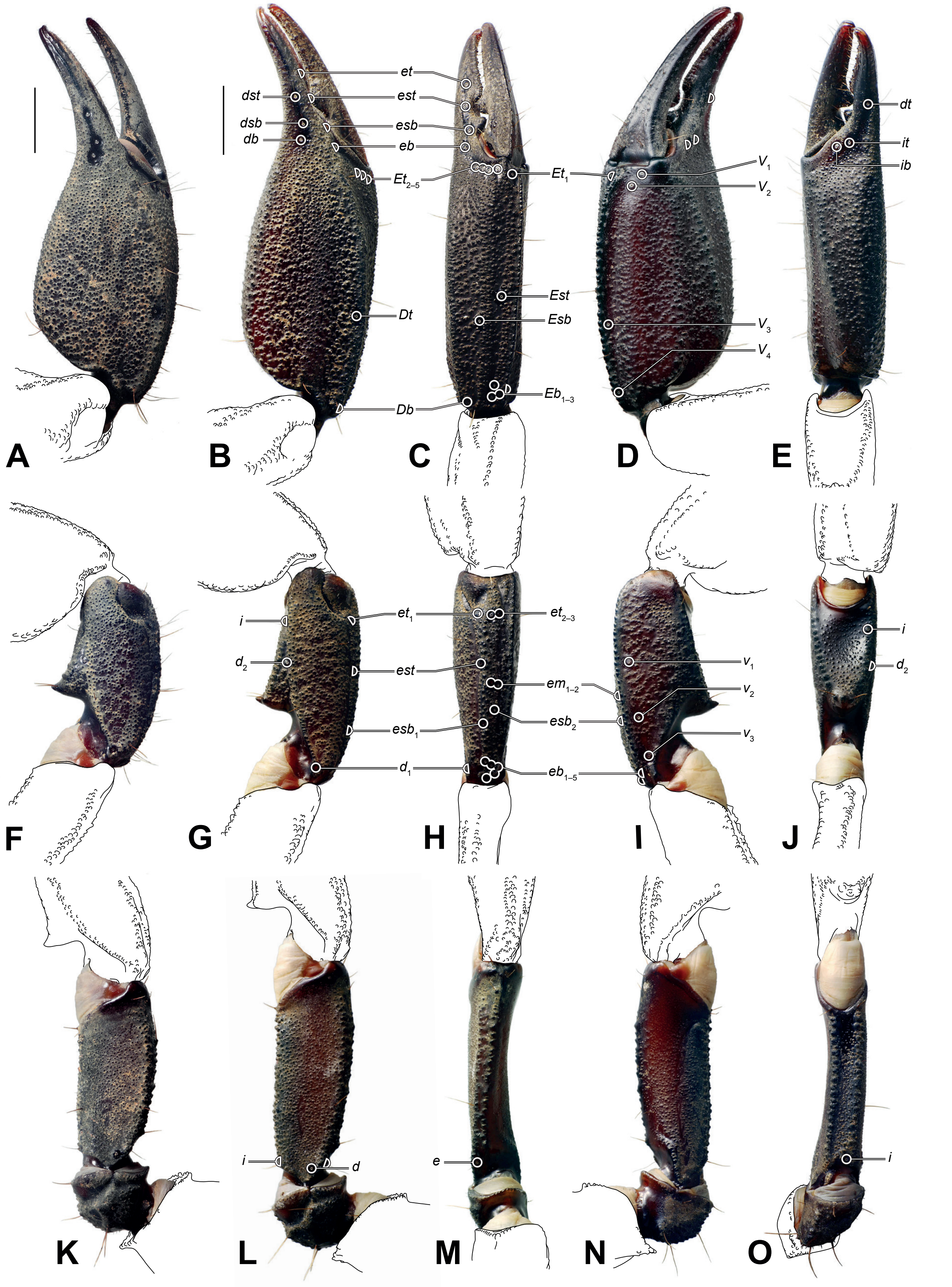

Fig. 52. *Hormurus muyua* sp. nov., pedipalp chela (A-E), patella (F-J), femur and trochanter (K-O), dorsal (A-B, F-G, K-L), retrolateral (C, H, M), ventral (D, I, N) and prolateral (E, J, O) aspects showing trichobothria pattern. (A, F, K) Female paratype (AMNH [LP4741]). (B-E, G-J, L-O) Male holotype (AMNH [LP4741]). Scale lines: 3 mm.

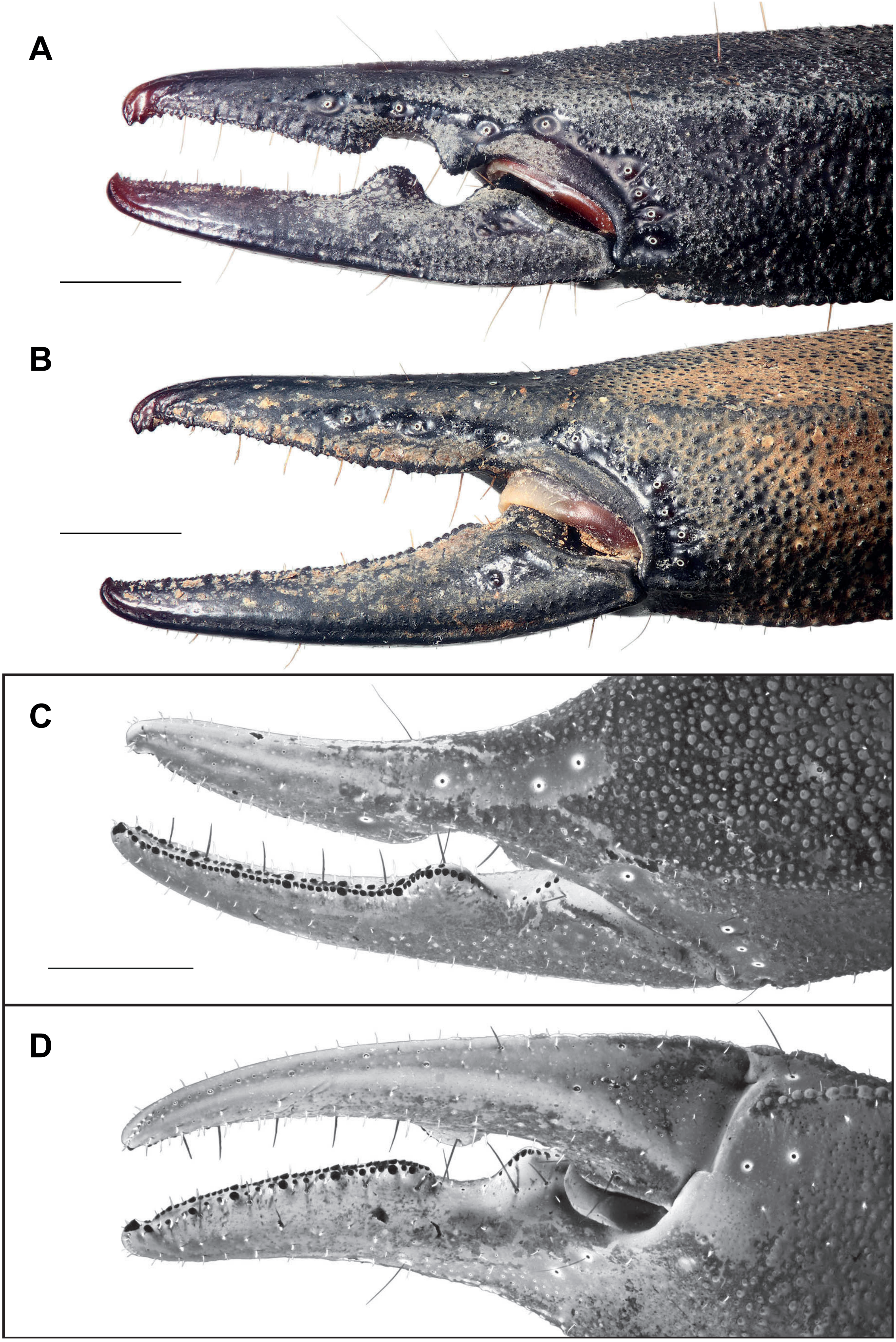

Fig. 53. *Hormurus muyua* sp. nov., left pedipalp chelae, retrolateral aspect showing dentate margin of chela fingers (A-B), dorsal aspect showing dentate margin of movable finger (C), ventral aspect showing dentate margin of fixed finger (D). (A, C-D) Male holotype (AMNH [LP4741]). (B) Female paratype (AMNH [LP4741]). Scale lines: 2 mm.

pointed apex; dorsomedian carina only visible proximally as a ridge of medium-sized spiniform granules; retrodorsal carina obsolete, only expressed proximally as a faint ridge of medium-sized spiniform granules; paired retromedian carinae fused and visible as a faint ridge of medium-sized spiniform granules; retroventral carina crenulate (composed of medium-sized granules). Chela manus (Fig. 52B-E): proventral and promedian carinae visible as faint ridges with medium-sized spiniform granules, equally developed; prodorsal carina obsolete, visible as a very faint ridge of medium-sized spiniform granules; dorsomedian carina visible as a faint ridge of medium-sized spiniform granules, more strongly developed than prodorsal carina; dorsal secondary carina obsolete; digital carina visible as a ridge of small spiniform granules, less distinct in distal area, more developed than retromedian carina; fused retromedian carinae obsolete, visible as a faint ridge of medium-sized spiniform granules proximally; retrolateral secondary carina vestigial, only distinct proximal to condyle of movable finger, visible as a ridge of small spiniform granules; retroventral carina crenulate (composed of medium to large granules); ventromedian carina obsolete, only expressed proximally as a faint ridge of medium-sized spiniform granules.

Pedipalp macrosculpture: Femur (Fig. 52L-O): prolateral intercarinal surface densely covered with small spiniform granules; dorsal intercarinal surface densely covered with small spiniform granules, distal area smooth; retrolateral dorsal intercarinal surface sparsely covered with small to medium-sized spiniform granules; retrolateral ventral intercarinal surface smooth or nearly so, with few small spiniform granules scattered distally; ventral intercarinal surface densely covered with small to medium-sized spiniform granules, smooth distally. Patella (Fig. 52G-J): prolateral intercarinal surface densely covered with medium-sized spiniform granules, smooth distally; dorsal intercarinal surface covered with dense reticulate network of medium-sized spiniform granules, distal area smooth; retrolateral intercarinal surface with dense reticulate network of medium-sized spiniform granules; ventral intercarinal surface covered with sparse reticulate network of medium-sized spiniform granules, distal area smooth. Chela manus (Fig. 52B-E): prolateral intercarinal surface covered with dense reticulate network of small to medium-sized spiniform granules, smooth proximally; dorsal and retrolateral intercarinal surfaces covered with dense reticulate network of medium-sized spiniform granules; ventral intercarinal surface covered with sparse reticulate network of medium-sized spiniform granules, distal area smooth. Chela fingers densely covered with small spiniform granules in proximal half, smooth or nearly so distally, ventral surface smooth; trichobothria *dst*, *dsb* and *db* together in a single large smooth depression.

Trichobothria: Pedipalp orthobothriotaxic, accessory trichobothria absent. Patella (Fig. 52G-J): d_2 trichobothrium distal to patellar process; five *eb* trichobothria arranged in two groups (eb_1+eb_{4-5} and eb_{2-3}); two *esb*, two *em* and one *est* trichobotria arranged in three groups (esb_{1-2}, em_{1-2} and *est*); three *et* trichobothria; three *v* trichobothria. Chela manus (Fig. 52B-E): *Dt* situated in proximal third of manus; Eb_3 close to Eb_{1-2}; *Esb* closer to *Est* than to *Eb* group; *Est* situated near midpoint; four *V* trichobothria, V_3 distant from V_4. Fixed chela finger with *db* situated on dorsal surface; *esb* closer to *eb* than to *est*; *eb* situated at base of finger, proximal to point of articulation between fixed and movable fingers; two *i* trichobothria.

Coxosternum (Fig. 54A, C): Coxa III elongated anterodistally, without anterodistal process. Sternum equilateral pentagonal (anterior width slightly greater than posterior width), wider than long.

Legs (Fig. 55): Femora I-IV with ventral surfaces bicarinate, pro- and retroventral carinae granular. Retrolateral margins of tibiae I-II without setiform macrosetae. Basitarsi I-IV: pro- and retroventral rows each with 4/4, 4/4, 4/5 and 4/5 setiform macrosetae, respectively. Telotarsi I-IV: pro- and retroventral row each with 3/4, 4/4, 4/4 and 4-5/4-5 setiform macrosetae, respectively; retroventral row with one proximal spinule; ventromedian spinules absent. Ungues curved, shorter than telotarsus, half its length or less.

Genital operculum (Fig. 54A): Composed of two subtriangular sclerites.

Pectines (Fig. 54A-B): Moderately elongated, distal edge reaching but not extending beyond distal edge of coxa IV; fulcrae and three marginal lamellae present. Pectinal teeth count 8-9; teeth straight, entirely covered with sensory papillae.

Mesosoma (Figs 50A-B, 51A, E): Pre-tergites I-VII and posterior margins of pre-tergites smooth. Post-tergites: posterior margins of tergites I-VI sublinear, without distinct projection; lateral transversal sulcus present; intercarinal surfaces of I-VII densely covered with small spiniform granules, less so anteromedially on segments I-IV; intercarinal surfaces of III-VII with distinct but faint reticulate network of ridges and dimples. Respiratory stigmata (spiracles) of sternites IV-VI short, their length less than third of sternite width, and distinctly crescent-shaped. Sternite VII acarinate.

Metasoma (Fig. 56B-C): Not markedly compressed laterally; intercarinal surfaces sparsely and minutely granular, posterior segments less so; dorsal intercarinal surface of V smooth and shiny medially; distinct dorsomedian sulcus on segments I-IV, much less pronounced on segment V (usually only faintly expressed anteriorly).

Metasoma carinae: Segments I-IV: dorsolateral carinae obsolete on all segments; lateral median carinae weakly developed (as faint ridges); lateral inframedian carinae discernible anteriorly as a faint ridge on segment I, absent on other segments; ventrolateral carinae weakly developed (as faint ridges); paired ventrosubmedian carinae weakly developed (as low ridges). Segment

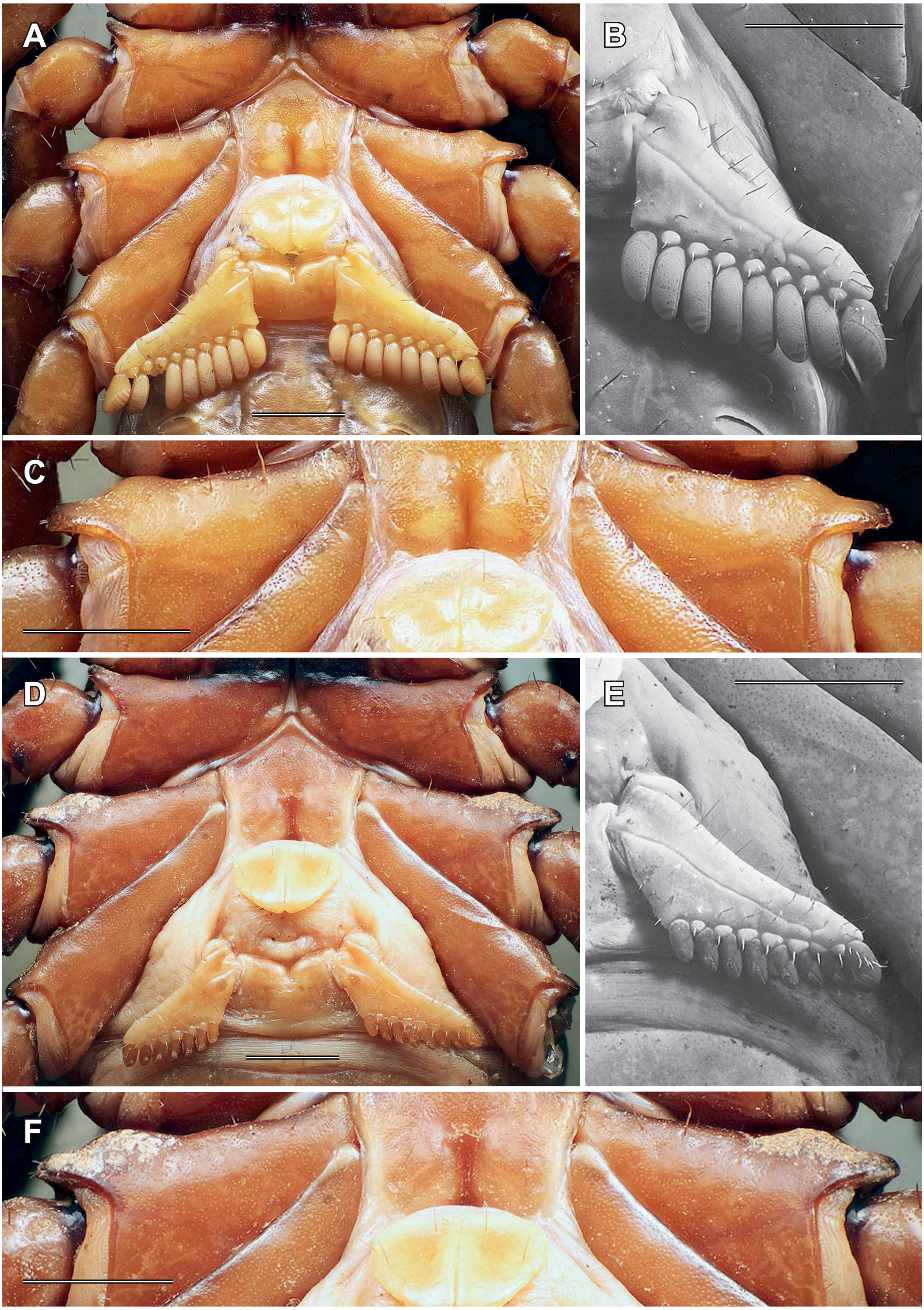

Fig. 54. *Hormurus muyua* sp. nov., coxae II-IV, sternum, genital operculum and pectines, ventral aspect (A, D), left pecten under UV light (B, E), anterior margin of coxae III (C, F). (A-C) Male holotype (AMNH [LP4741]). (D-F) Female paratype (AMNH [LP4741]). Scale lines: 2 mm.

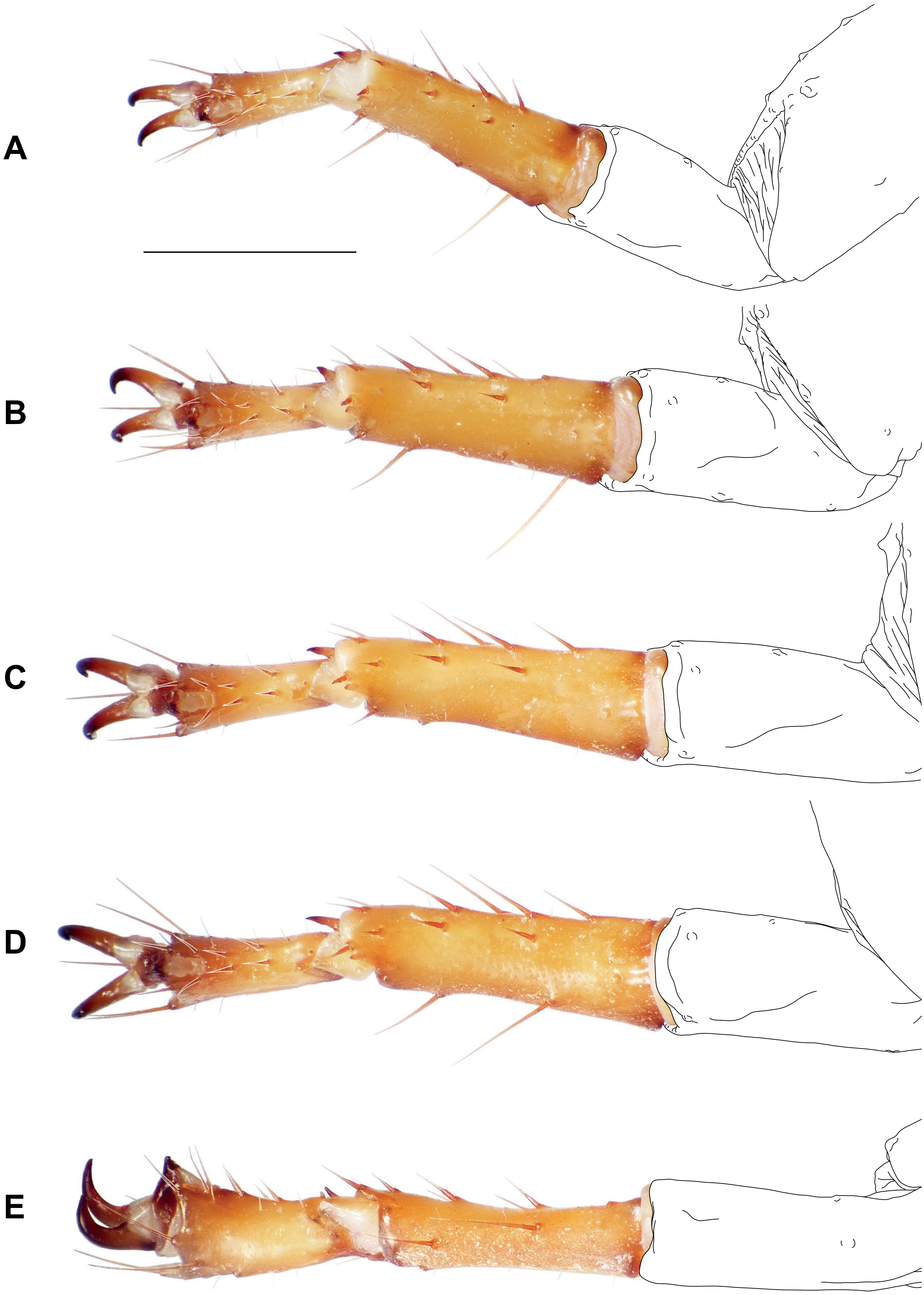

Fig. 55. *Hormurus muyua* sp. nov., male holotype (AMNH [LP4741]), right tarsi, ventral (A-D) and retrolateral (E) aspects. (A) Tarsus I. (B) Tarsus II. (C) Tarsus III. (D-E) Tarsus IV. Scale line: 2 mm.

V: dorsolateral and lateral median carinae obsolete; ventrolateral carinae only expressed as faint ridges; ventrosubmedian carinae fused, only expressed as a faint ridge in anterior two thirds.

Metasoma spination: Segment I: dorsomedian posterior and dorsolateral posterior spiniform granules absent; ventrolateral carinae without large spiniform granules; ventrosubmedian carinae with one pair of subposterior spiniform granules. Segment II: dorsomedian posterior and dorsolateral posterior spiniform granules absent; ventrolateral carinae without large spiniform granules; ventrosubmedian carinae with one pair of subposterior and 0-1 pair of median spiniform granules. Segments III-IV: dorsolateral posterior spiniform granules absent; ventrolateral and ventrosubmedian carina without large spiniform granules. Segment V: ventrolateral and ventromedian carinae without distinct granules or spines; anal arch crenulate.

Ventral metasoma setation: segment I with eight macrosetae, i.e. three pairs (anterior, median and posterior) on ventrosubmedian carinae and one pair (anterior) on ventrolateral carinae; segments II-IV each with ten macrosetae, i.e. three pairs (anterior, median and posterior) on ventrosubmedian carinae and two pairs (anterior and supramedian) on ventrolateral carinae; segment V with 16 macrosetae, i.e. four pairs (anterior, median, subposterior and posterior) on ventrosubmedian carinae and four pairs (anterior, supramedian, subposterior and posterior) on ventrolateral carinae.

Telson (Fig. 56B): Slightly longer than metasoma segment V; vesicle smooth, without granules; aculeus short (less than half of vesicle length), sharply curved.

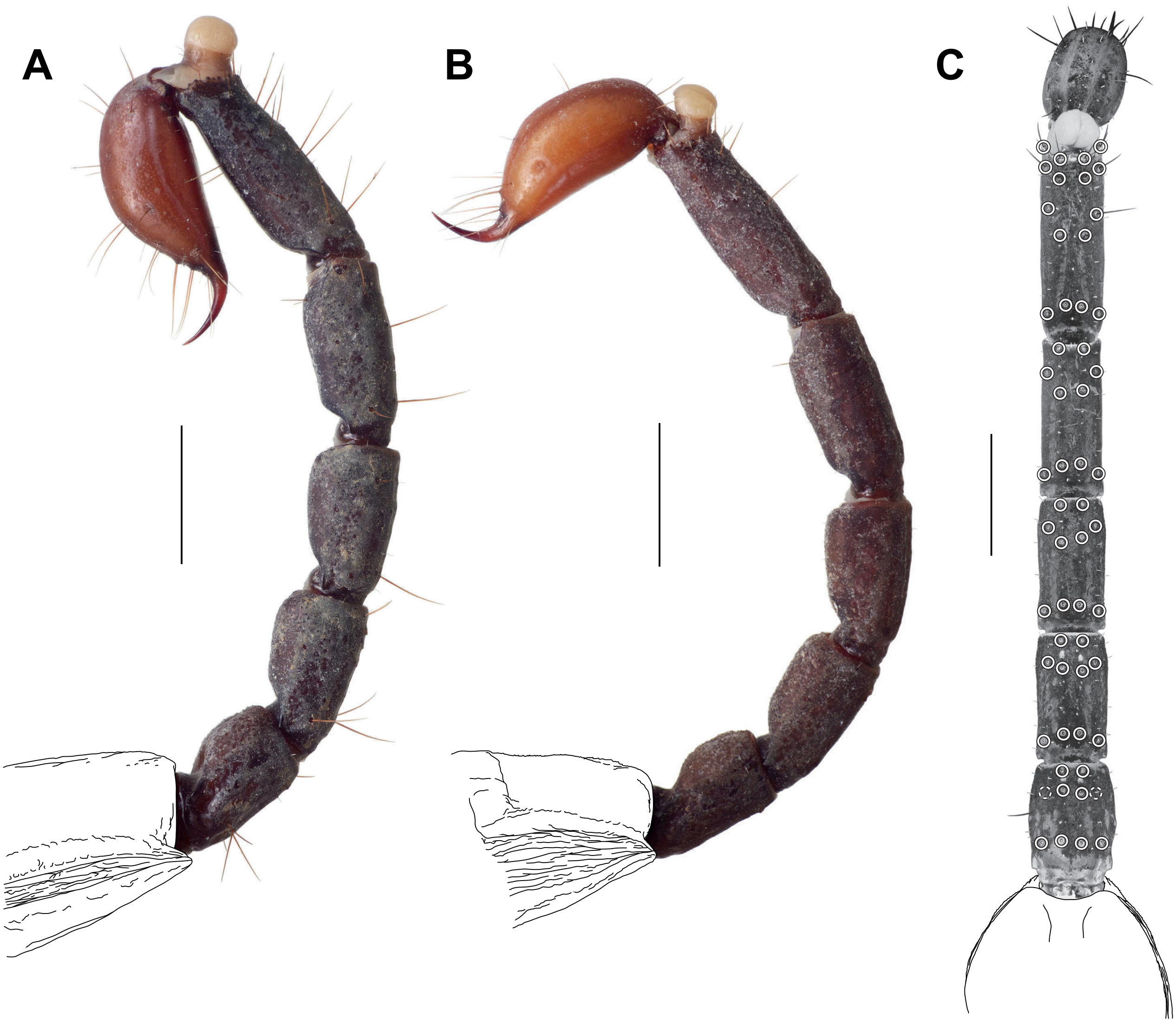

Fig. 56. *Hormurus muyua* sp. nov., metasoma and telson, lateral (A-B) and ventral (C) aspects. (A) Female paratype (AMNH [LP4741]). (B-C) Male holotype (AMNH [LP4741]). Dotted circles in C indicate additional macrosetae expressed in some specimens. Scale lines: 3 mm.

Hemispermatophore (Fig. 57): Stalk and stem approximately equal in size. Distal lamina very slightly curved, almost straight, without distal crest on anterior margin; a single laminar hook, submedian, situated between 1/3 and 3/7 from base of stalk (basal part/distal lamina ratio = 0.49-0.58, median = 0.52); transverse ridge distinct, more proximal than base of laminar hook, merging with anterior margin more distally than base of laminar hook. Capsule: hemisolenos thin, folded on itself only proximally, above that unfolded to flattened distal tip (tip and base approximately of the same width), without lateral longitudinal carina, laterodistal accessory hook or medioposterior accessory apophysis; tip of hemisolenos more proximal than base of laminar hook, more distal than tip of clasper. Clasper well developed, forming a distinct hump, not hook-like, without anterior accessory process. Subex well developed, spoon-shaped, merging anteriorly with base of clasper; posterior edge forming obtuse angle (>90°) with hemisolenos; anterior edge forming right angle (90º) with hemisolenos.

Description of adult female: Same characters as for male except as follows. *Colouration* (Fig. 50C-D): Legs, telson, coxapophyses, sternum and sternites slightly darker than in male.

Pedipalps (Figs 50C-D, 52A, F, K): Segments distinctly shorter or more robust than in male.

Chela fingers (Fig. 53B): Dentate margins linear or nearly so, without pronounced lobe and notch, with two rows of

Fig. 57. *Hormurus muyua* sp. nov., male holotype (AMNH [LP4741]), left hemispermatophore. (A) Lateral aspect. (B) Anterior aspect. (C) Rotated approximately 45° counter-clockwise from anterior aspect. (D) Contralateral aspect. Scale line: 1 mm.

primary denticles extending from tip to base of fingers and bearing large inner accessory denticles.

Carapace (Fig. 51B, D): Anteromedian surface and frontal lobes smooth, only faintly granular along median longitudinal sulci and anterior furcated sulci.

Genital operculum (Fig. 54D): Oval to semi-oval, distinctly wider than long (length/width ratio = 0.73-0.84, median = 0.78); opercular sclerites partly fused, with distinct median suture; posterior notch present, at least weakly developed.

Pectines (Fig. 54D-E): Short, distal edge not reaching distal edge of coxa IV. Pectinal teeth count 6-8; teeth short and straight, sensory papillae only covering distal half.

Mesosoma (Figs 50C-D, 51B, F): Post-tergites: reticulate network of ridges and dimples on segments III-VI more distinct than on other segments; intercarinal surfaces of I-III medially smooth, laterally granular; intercarinal surfaces of IV-VI almost totally smooth, faintly granular along lateral margins; intercarinal surfaces of VII densely granular, its proximal third smooth.

Metasoma (Fig. 56A): Ventral metasoma setation: segment I with ten macrosetae, i.e. three pairs (anterior, median and posterior) on ventrosubmedian carinae and two pairs (anterior and supramedian) on ventrolateral carinae.

Intraspecific variation: *Pedipalp trichobothria*: In some specimens trichobotria *esb*, *em* and *est* on the retrolateral side of the patella are arranged in four groups instead of three, i.e. esb_1, esb_2, $em_{1\text{-}2}$ and *est* (esb_1 apart from esb_2). On the retrolateral side of the pedipalp chela *Esb* may be more distal, aligning with *Est*.

Leg spination: The number of setiform macrosetae varies from three to four in the proventral rows of telotarsi I-II and in the retroventral row of telotarsi I, and from four to five in the proventral rows of telotarsi III-IV and in the retroventral row of telotarsi IV.

Female genital operculum: The length/width ratio varies from 0.73 to 0.84 (median = 0.78).

Pectines: The pectinal teeth count varies from eight to nine in males and from six to eight in females.

Metasoma: Spination: An additional subposterior spiniform granule may be expressed on one of the ventrosubmedian carinae of segment I. The ventrosubmedian carinae of segment II possess 0-1 pair of median spiniform granules, and one granule less may be expressed in the subposterior pair.

Ventral metasoma setation: In males an additional supramedian macroseta may be expressed on one of the ventrolateral carinae of segment I, making it a total of nine macrosetae instead of the usual eight.

Hemispermatophores: The basal part/distal lamina ratio varies from 0.49 to 0.58 (median = 0.52).

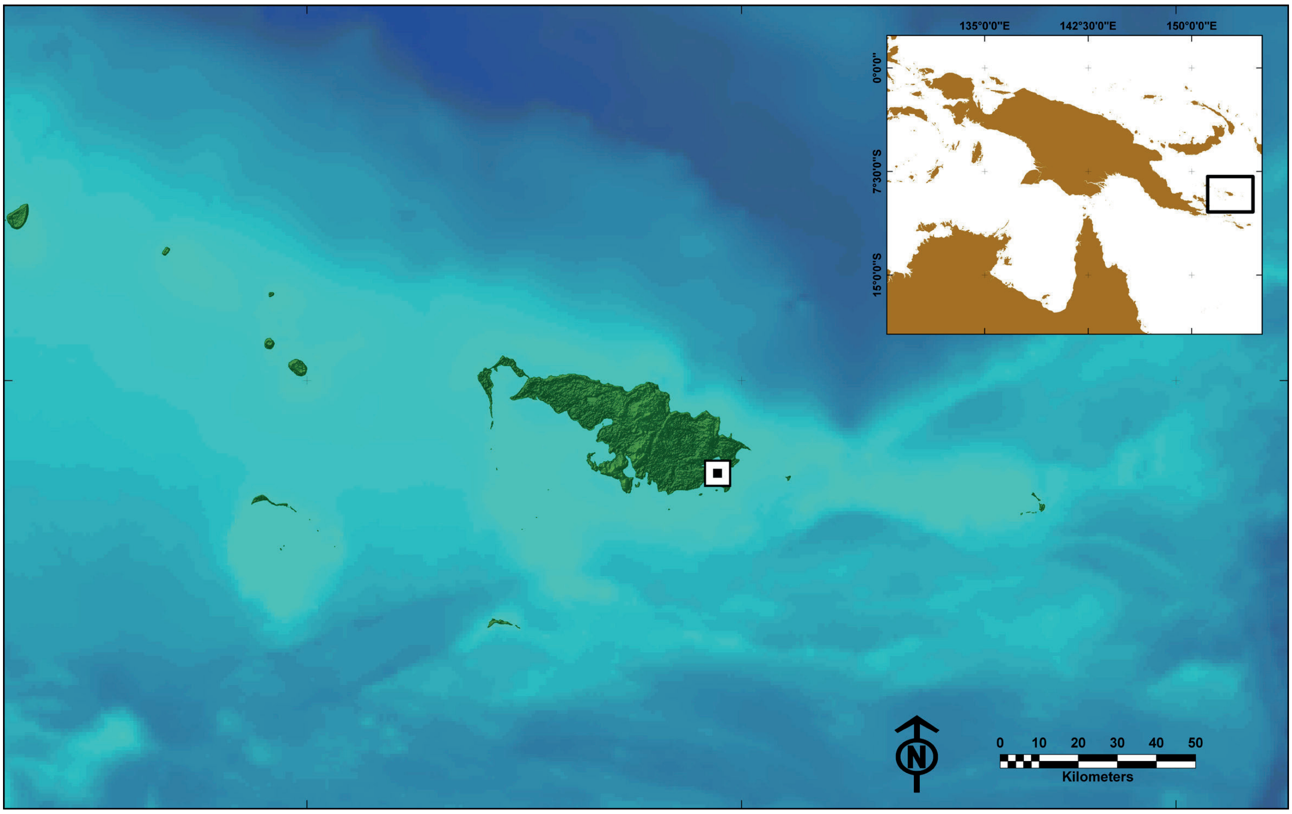

Fig. 58. Known locality of *Hormurus muyua* sp. nov. and *Hormurus slapcinskyi* sp. nov. on Woodlark Island, off the eastern tip of New Guinea, Milne Bay Province. Color gradient indicates topography and bathymetry.

Distribution: *Hormurus muyua* sp. nov. is probably endemic to Woodlark Island, off the eastern tip of New Guinea, Milne Bay Province (Fig. 58).

Conservation status: Since 2007 the forests of Woodlark Island have been threatened by several agroforestry, logging and mining projects (Hance, 2008, 2014; Kraus, 2017b, 2021; Cerullo, 2019, 2020). These projects from various extractive industries, if carried out, would have disastrous consequences on the endemic fauna of Woodlark Island, probably driving many representatives of the endemic biota of the island, including scorpions, to extinction (Kraus, 2021).

In 2007 Carter Holdings Limited, formerly Vitroplant Limited, acquired a lease to develop a large-scale biofuel project on the island. The company was planning to clear 70 % of the island forests to establish a monoculture oil palm plantation. Following a large public campaign against the project, the lease was temporarily put on hold by the Papua New Guinea government. However, in 2019 the customary landownership of the islanders was revoked by the Waigani National Court in favor of Carter Holdings Limited (Robby, 2020), and 60,400 hectares of forests were then returned as agricultural lease to the company.

Moreover, in 2014, Kulawood Limited, a Malaysian logging company, submitted a forest clearance application concerning 30,000 hectares of forests (around 40 % of the island surface) to the Papua New Guinean Forest Authority. Today, the status of the application remains unknown. In 2019, the Australian mining company Geopacific Resources Limited that is running exploratory operations on the island started to expand its infrastructure in preparation for an open-pit gold mine with deep-sea mine tailings disposal, an undertaking which involves the relocation of a complete village. The company faces strong opposition from the local community and discussions between the two parties and the Mineral Resources Authority (MRA) of Papua New Guinea are currently ongoing to solve the dispute.

***Hormurus slapcinskyi* Monod & Prendini, sp. nov.**

Figs 5B, 59-66, Tab. 6

Material: AMNH [LP 4741]; ♂ holotype; Papua New Guinea, Milne Bay Province, Woodlark Island, 1 km N of Guasopa, 30 m, disturbed rainforest on limestone, 9.21°S, 152.94°E; 24.I.2003; leg. J.D. Slapcinsky (JS-0591). – AMNH [LP 4741]; 1 ♀ paratype; same data as for holotype.

Etymology: The species is named after John Slapcinsky, a prominent limnologist from the Florida Museum of Natural History, who conducted several invertebrate surveys in Papua New Guinea, and who collected a large part of the material studied in this paper, including the type specimens of this species. The epithet is an invariable name in apposition.

Diagnosis: *Hormurus slapcinskyi* sp. nov. differs from *H. muyua* sp. nov. in the following characters: (1) the carapace surface and tergite surfaces in *H. slapcinskyi* sp. nov. (Fig. 60) are slightly more granular than in *H. muyua* sp. nov. (Fig. 51); (2) the pedipalp segments in *H. slapcinskyi* sp. nov. (Fig. 61) are not as high and more elongated than in *H. muyua* sp. nov. (Fig. 52); (3) the retrodorsal carina of the pedipalp femur is markedly less developed than the prodorsal and retroventral carinae in *H. slapcinskyi* sp. nov. (Fig. 61K-M), whereas it is slighlty less developed than the prodorsal and retroventral carinae in *H. muyua* sp. nov. (Fig. 52K-M); (4) metasoma segment I bears ten macrosetae in the male of *H. slapcinskyi* sp. nov. (Fig. 65C) instead of eight in the males of *H. muyua* sp. nov. (Fig. 56C); (5) the distal lamina of the hemispermatophore in *H. slapcinskyi* sp. nov. (Fig. 66) is distinclty more curved than in *H. slapcinskyi* sp. nov. (Fig. 57).

Description of adult male: *Colouration* (Fig. 59A-B): Dorsal surface of chelicera manus dark orange with brown infuscation, more pronounced anteriorly; fingers dark brown to black. Carapace reddish brown, median ocular region black. Tergites brown. Pedipalps reddish brown; carinae and fingers black. Legs paler than tergites, dorsal surface pale brown to yellow distally; ventral surface dark orange to yellow (tibiae, telotarsi and basitarsi paler); prolateral carina of femora black. Coxapophyses I-II dark brown, their anterior tips pale yellow; leg coxae and sternum brown; genital operculum and pectines yellow. Sternites III-V brown to dark brown, their posterior margins paler than the remaining surfaces; sternites VI-VII dark brown. Metasoma reddish brown with darker infuscation; telson paler than metasoma, vesicle orange, aculeus reddish brown.

Cuticle: Nongranular surfaces of carapace, pedipalps, legs, mesosoma and metasoma finely punctate.

Carapace (Fig. 60A, C): Anterior margin with median notch moderately excavated. Anterior furcated sutures distinct. Median ocular tubercle slightly raised; median ocelli present, at least twice the size of lateral ocelli, separated from each other by approximately the diameter of a median ocellus. Three pairs of lateral ocelli, equal in size, equidistant and adjacent to each other. Surfaces minutely and densely granular, except for smooth anterior areas of frontal lobes and median ocular area.

Chelicerae: Basal and median teeth of fixed finger fused into bicusp. Dorsal margin of movable finger with four teeth (one basal, one median, one subdistal and one distal); dorsal distal tooth smaller than ventral distal tooth; ventral margin smooth.

Pedipalps (Figs 59A-B, 61B-E, G-J, L-O): Segments distinctly elongated, femur longer than carapace. Chela almost asetose.

Chela fingers (Fig. 62A, C-D): Fixed finger: basal lobe well developed and conical; suprabasal notch distinct and deep; dentate margins distally (from tip of finger to

Table 6. *Hormurus slapcinskyi* sp. nov., measurements (in mm), repository and inventory number of adult male holotype and adult female paratype.

	Holotype	Paratype
Sex	♂	♀
Repository	AMNH	AMNH
Inventory number	LP4741	LP4741
Locality	Guasopa	Guasopa
Total length	49.00	57.00
Carapace, length	6.95	7.44
Carapace, anterior width	4.51	5.24
Carapace, posterior width	6.95	8.20
Pedipalp femur, length	9.14	7.92
Pedipalp femur, width	2.80	2.93
Pedipalp femur, height	1.46	1.71
Pedipalp patella, length	8.47	7.86
Pedipalp patella, width	2.99	3.41
Pedipalp patella, height	2.44	2.68
Pedipalp chela, length	16.52	16.27
Pedipalp chela, width	4.45	5.55
Pedipalp chela, height	2.80	3.35
Chela movable finger, length	7.68	7.98
Genital operculum length, female	NA	1.71
Genital operculum width, female	NA	2.19
Metasoma segment I, length	2.68	2.74
Metasoma segment I, width	1.83	1.95
Metasoma segment I, height	1.58	1.77
Metasoma segment II, length	3.05	3.05
Metasoma segment II, width	1.52	1.56
Metasoma segment II, height	1.58	1.71
Metasoma segment III, length	3.17	3.23
Metasoma segment III, width	1.34	1.46
Metasoma segment III, height	1.58	1.73
Metasoma segment IV, length	3.54	3.60
Metasoma segment IV, width	1.28	1.34
Metasoma segment IV, height	1.58	1.65
Metasoma segment V, length	4.27	4.39
Metasoma segment V, width	1.34	1.46
Metasoma segment V, height	1.46	1.46
Telson, length	5.12	5.18
Telson, width	1.68	1.71
Telson, height	1.76	1.79

median lobe) with two rows of primary denticles bearing large inner accessory denticles; few scattered denticles on suprabasal notch; a single row of denticles on basal lobe. Movable finger: basal lobe absent; suprabasal lobe well developed, conical, gently rounded dorsally and lacking sharp conical tooth, not overlapping with fixed finger; suprabasal lobe and corresponding notch on fixed finger contiguous, no proximal gap or at most a reduced gap evident only when fingers closed; dentate margins distally (from tip of finger to suprabasal lobe) with two rows of primary denticles bearing large inner accessory denticles; single row of sparse denticles basally.

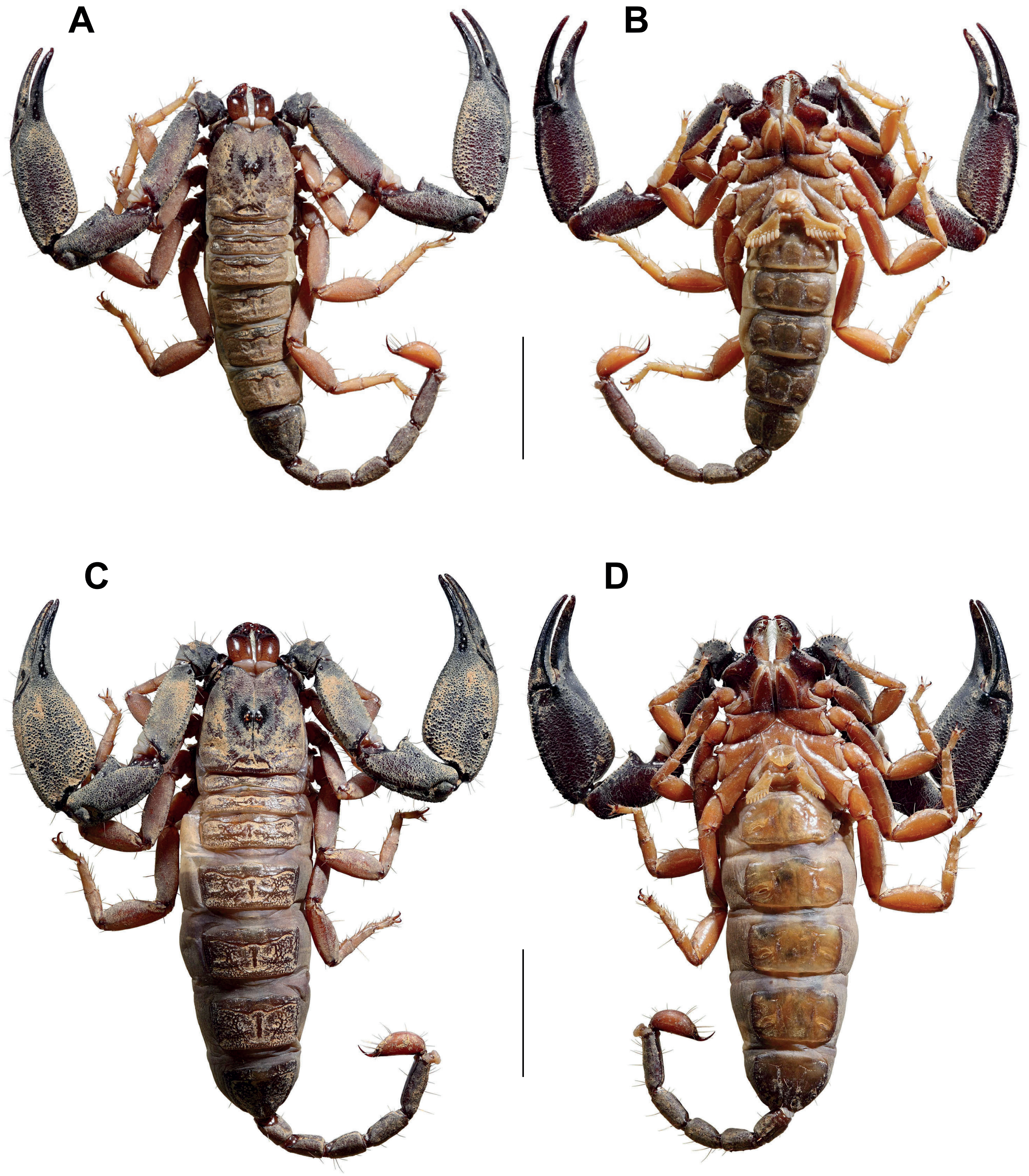

Fig. 59. *Hormurus slapcinskyi* sp. nov., habitus, dorsal (A, C) and ventral (B, D) aspects. (A-B) Male holotype (AMNH [LP4741]). (C-D) Female paratype (AMNH [LP4741]). Scale lines: 10 mm.

Fig. 60. *Hormurus slapcinskyi* sp. nov., carapace and mesosomal tergites showing ornamentation and macrosculpture of cuticle (A-B), detailed views of carapace (C-D) and of tergite V (E-F), dorsal aspect. (A, C, E) Male holotype (AMNH [LP4741]). (B, D, F) Female paratype (AMNH [LP4741]). Scale lines: 3 mm (A-B), 2 mm (C-F).

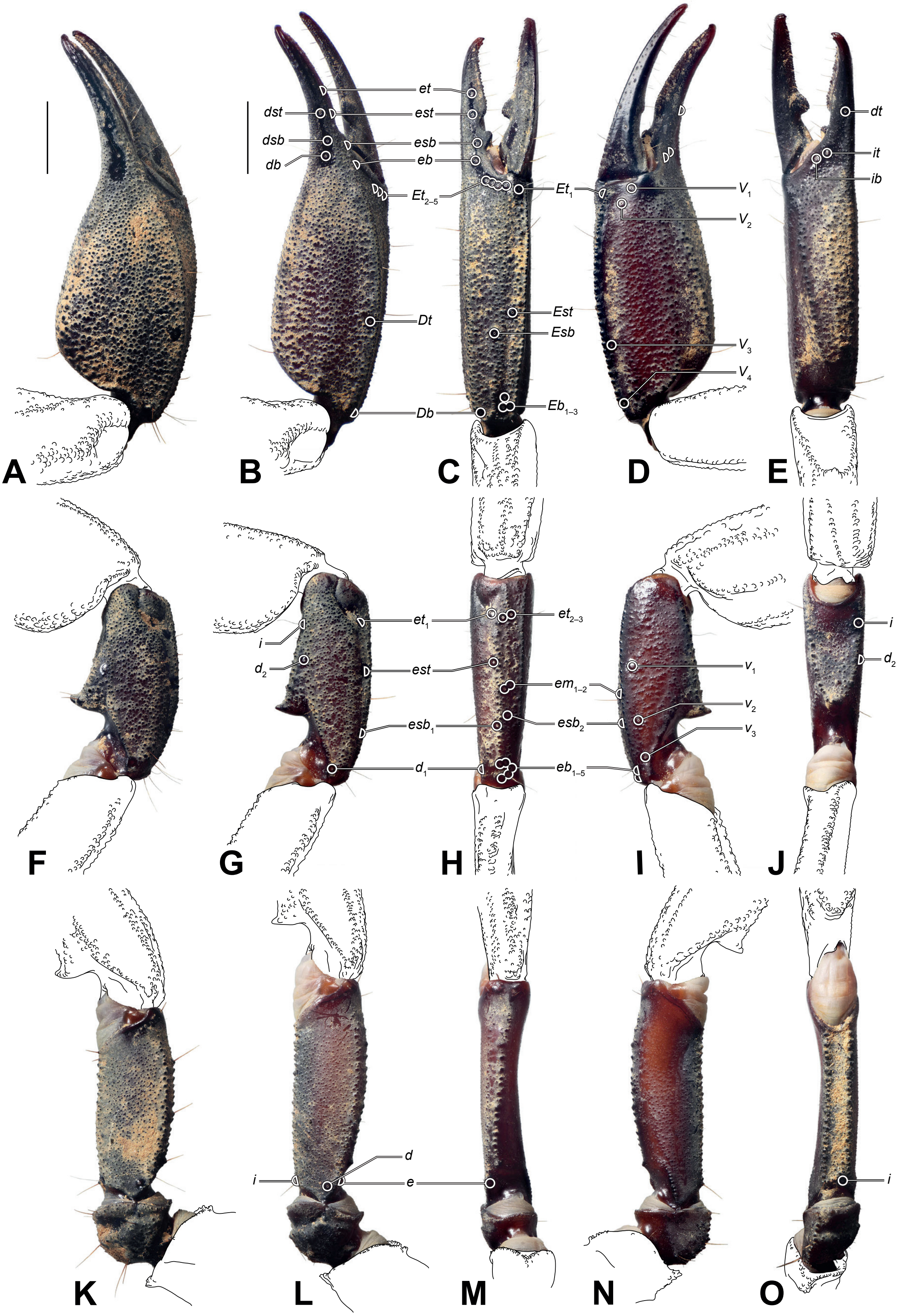

Fig. 61. *Hormurus slapcinskyi* sp. nov., pedipalp chela (A-E), patella (F-J), femur and trochanter (K-O), dorsal (A-B, F-G, K-L), retrolateral (C, H, M), ventral (D, I, N) and prolateral (E, J, O) aspects showing trichobothria pattern. (A, F, K) Female paratype (AMNH [LP4741]). (B-E, G-J, L-O) Male holotype (AMNH [LP4741]). Scale lines: 3 mm.

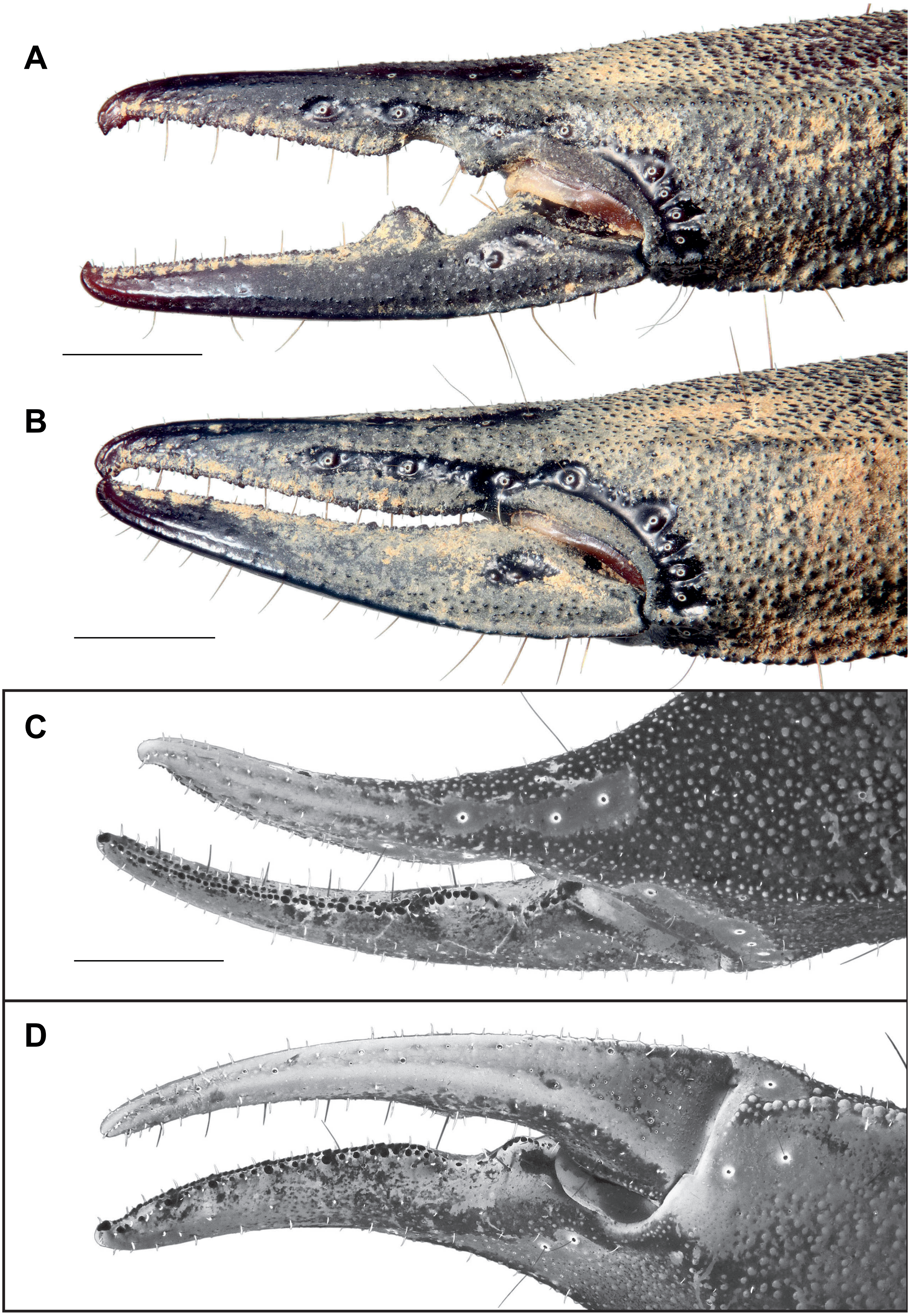

Fig. 62. *Hormurus slapcinskyi* sp. nov., left pedipalp chelae, retrolateral aspect showing dentate margin of chela fingers (A-B), dorsal aspect showing dentate margin of movable finger (C), ventral aspect showing dentate margin of fixed finger (D). (A, C-D) Male holotype (AMNH [LP4741]). (B) Female paratype (AMNH [LP4741]). Scale lines: 2 mm.

Pedipalp carinae: Femur (Fig. 61L-O): proventral carina visible as a ridge of medium-sized spiniform granules; promedian carinae absent; prodorsal carina visible as a ridge of medium-sized spiniform granules, similarly developed as proventral carina; retrodorsal carina visible as a ridge of medium-sized spiniform granules, less strongly developed than prodorsal carina, more distinct in proximal third of segment; retroventral carina visible as a ridge of medium to large spiniform granules, distinctly more developed than retrodorsal carina; ventromedian carina obsolete, only discernible proximally as a ridge of medium-sized spiniform granules. Patella (Fig. 61G-J): proventral carina discernible as costate-granular ridge proximally, obsolete distally; promedian and prodorsal carinae visible as ridges with medium-sized spiniform granules, equally developed, fused medially into prominent spiniform process with pointed medially located apex; dorsomedian carina only visible proximally as a ridge of medium-sized spiniform granules; retrodorsal carina obsolete, only expressed proximally as a faint ridge of medium-sized spiniform granules; paired retromedian carinae fused and visible as a faint ridge of medium-sized spiniform granules; retroventral carina crenulate (composed of medium-sized granules). Chela manus (Fig. 61B-E): proventral and promedian carinae visible as faint ridges with medium-sized spiniform granules, equally developed; prodorsal carina obsolete, visible as a very faint ridge of medium-sized spiniform granules; dorsomedian carina visible as a faint ridge of medium-sized spiniform granules, more strongly developed than prodorsal carina; dorsal secondary carina obsolete; digital carina visible as a ridge of small spiniform granules, less distinct in distal area, more developed than retromedian carina; fused retromedian carinae obsolete, visible as a faint ridge of medium-sized spiniform granules proximally; retrolateral secondary carina vestigial, only discernible proximal to condyle of movable finger as a ridge of small spiniform granules; retroventral carina crenulate (composed of medium to large granules); ventromedian carina obsolete, only expressed proximally as a faint ridge of medium-sized spiniform granules.

Pedipalp macrosculpture: Femur (Fig. 61L-O): prolateral intercarinal surface sparsely covered with minute spiniform granules; dorsal intercarinal surface densely covered with small spiniform granules, distal area smooth; retrolateral intercarinal surface sparsely covered with small spiniform granules, proximally smooth; ventral intercarinal surface densely covered with small to medium-sized spiniform granules, smooth distally. Patella (Fig. 61G-J): prolateral intercarinal surface sparsely covered with small to medium-sized spiniform granules, smooth distally; dorsal intercarinal surface covered with dense reticulate network of medium-sized spiniform granules, distal area smooth; retrolateral intercarinal surface with dense reticulate network of medium-sized spiniform granules; ventral intercarinal surface covered with sparse reticulate network of medium-sized spiniform granules, distal area smooth. Chela manus (Fig. 61B-E): prolateral intercarinal surface covered with dense reticulate network of small to medium-sized spiniform granules, smooth proximally; dorsal and retrolateral intercarinal surfaces covered with dense reticulate network of medium-sized spiniform granules; ventral intercarinal surface covered with sparse reticulate network of medium-sized spiniform granules, distal area smooth. Chela fingers densely covered with small spiniform granules in proximal half, smooth or nearly so distally, ventral surface smooth; trichobothria *dst*, *dsb* and *db* together in a single large smooth depression.

Trichobothria: Pedipalp orthobothriotaxic, accessory trichobothria absent. Patella (Fig. 61G-J): d_2 trichobothria distal to patellar process; five *eb* trichobothria arranged in two groups (eb_1+eb_{4-5} and eb_{2-3}); two *esb*, two *em* and one *est* trichobotria arranged in three groups (esb_{1-2}, em_{1-2} and *est*); three *et* trichobothria; three *v* trichobothria. Chela manus (Fig. 61B-E): *Dt* situated in proximal third of manus; Eb_3 close to Eb_{1-2}; *Esb* closer to *Est* than to *Eb* group; *Est* situated near midpoint; four *V* trichobothria, V_3 distant from V_4. Fixed chela finger with *db* situated on dorsal surface; *esb* only slightly closer to *eb* than to *est*; *eb* situated at base of finger, proximal to point of articulation between fixed and movable fingers; two *i* trichobothria.

Coxosternum (Fig. 63A, C): Coxa III elongated anterodistally, without anterodistal process. Sternum equilateral pentagonal (anterior width slightly greater than posterior width), wider than long.

Legs (Fig. 64): Femora I-IV with ventral surfaces bicarinate, pro- and retroventral carinae granular. Retrolateral margins of tibiae I-II without setiform macrosetae. Basitarsi I-IV: pro- and retroventral rows each with 4/4, 4/5, 4/5 and 4/5 setiform macrosetae, respectively. Telotarsi I-IV: pro- and retroventral row each with 3/4, 4/4, 4/4 and 5/5 setiform macrosetae, respectively; retroventral row with one proximal spinule; ventromedian spinules absent. Ungues curved, shorter than telotarsus, half its length or less.

Genital operculum (Fig. 63A, C): Composed of two subtriangular sclerites.

Pectines (Fig. 63A-B): Moderately elongated, distal edge reaching but not extending beyond distal edge of coxa IV; fulcrae and three marginal lamellae present. Pectinal teeth count 8-9; teeth straight, entirely covered with sensory papillae.

Mesosoma (Figs 59A-B, 60A, E): Pre-tergites I-VII and posterior margins of pre-tergites smooth. Post-tergites: posterior margins of tergites I-VI sublinear, without distinct projection; lateral transversal sulcus present; intercarinal surfaces of I-VII densely covered with small spiniform granules; intercarinal surfaces of III-VII with distinct but faint reticulate network of ridges and dimples. Respiratory stigmata (spiracles) of sternites IV-

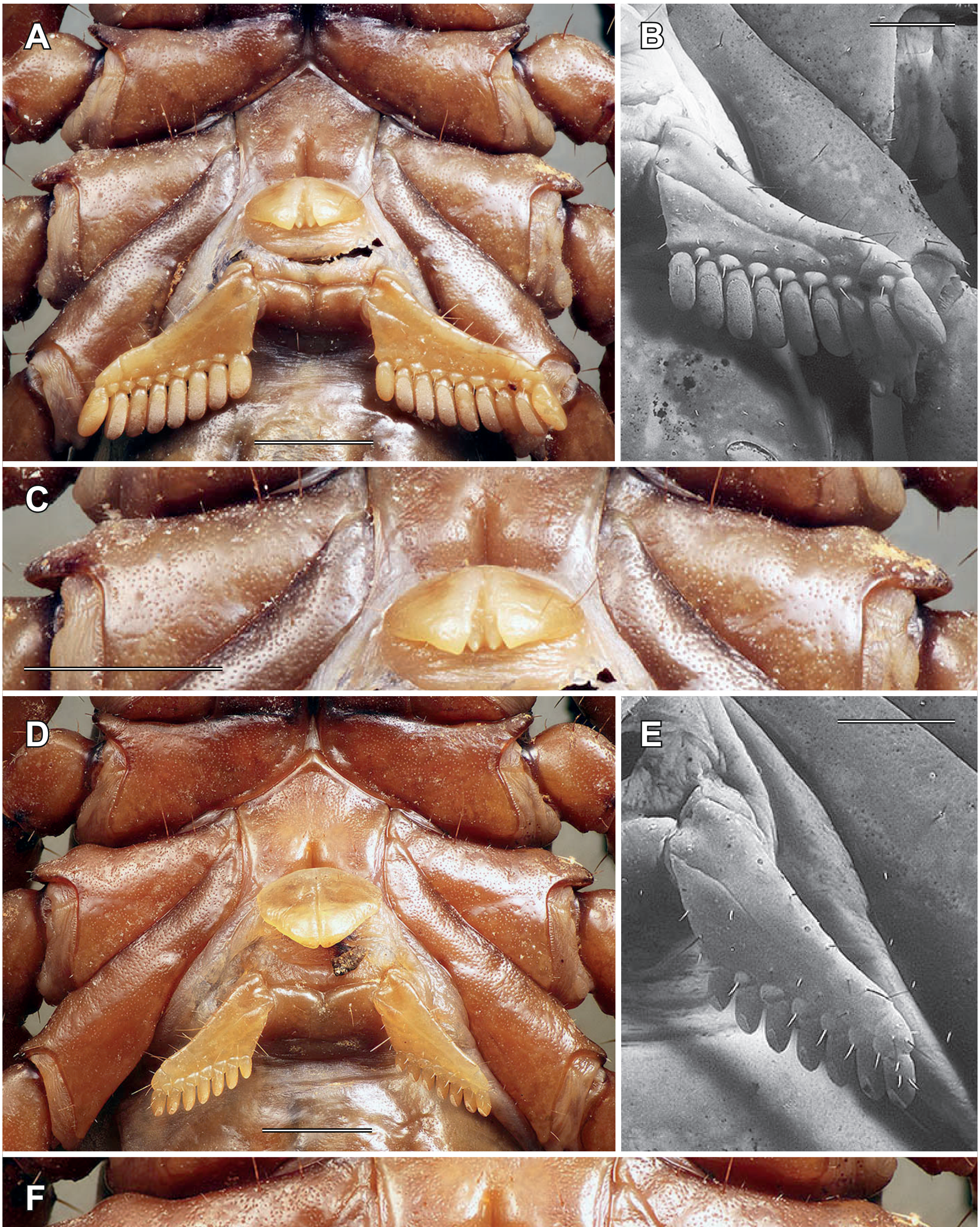

Fig. 63. *Hormurus slapcinskyi* sp. nov., coxae II-IV, sternum, genital operculum and pectines, ventral aspect (A, D), left pecten under UV light (B, E), anterior margin of coxae III (C, F). (A-C) Male holotype (AMNH [LP4741]). (D-F) Female paratype (AMNH [LP4741]). Scale lines: 2 mm (A, C-D, F), 1 mm (B, E).

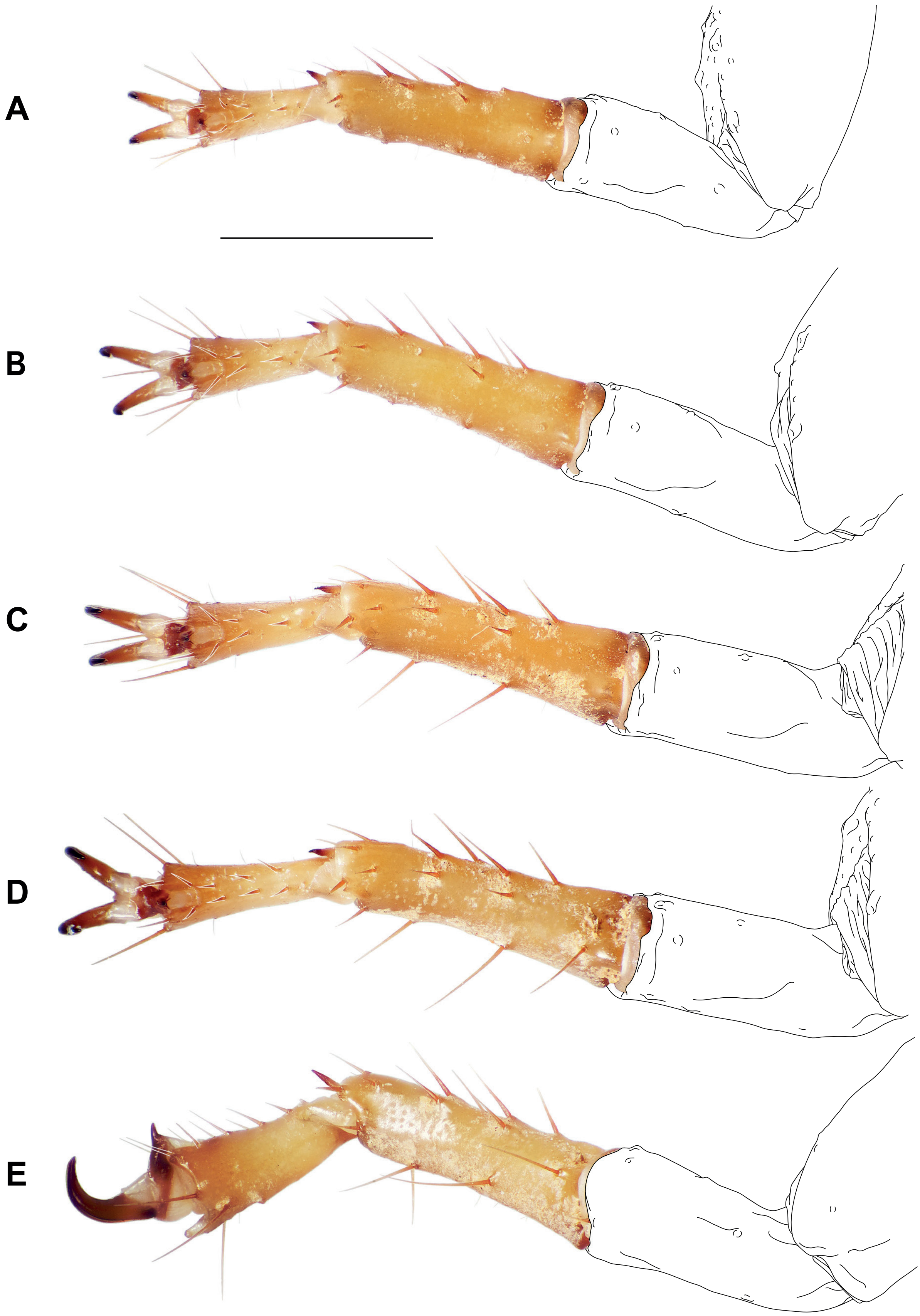

Fig. 64. *Hormurus slapcinskyi* sp. nov., male holotype (AMNH [LP4741]), right tarsi, ventral (A-D) and retrolateral (E) aspects. (A) Tarsus I. (B) Tarsus II. (C) Tarsus III. (D-E) Tarsus IV. Scale line: 2 mm.

VI short, their length less than third of sternite width, and distinctly crescent shaped. Sternite VII acarinate.

Metasoma (Fig. 65B-C): Not markedly compressed laterally; intercarinal surfaces sparsely and minutely granular, posterior segments less so; dorsal intercarinal surface of V smooth and shiny medially; distinct dorsomedian sulcus on segments I-IV, much less pronounced on segment V (usually only faintly expressed anteriorly).

Metasoma carinae: Segments I-IV: dorsolateral carinae obsolete on all segments; lateral median carinae weakly developed (as faint ridges); lateral inframedian carinae visible anteriorly as a faint ridge on segment I, absent on other segments; ventrolateral carinae weakly developed (as faint ridges); paired ventrosubmedian carinae weakly developed (as low ridges). Segment V: dorsolateral and lateral median carinae obsolete; ventrolateral carinae only expressed as faint ridges; ventrosubmedian carinae fused, only expressed as a faint ridge in anterior two-thirds.

Metasoma spination: Segment I: dorsomedian posterior and dorsolateral posterior spiniform granules absent; ventrolateral carinae without large spiniform granules; ventrosubmedian carinae with one pair of subposterior spiniform granules. Segment II: dorsomedian posterior and dorsolateral posterior spiniform granules absent; ventrolateral carinae without large spiniform granules; ventrosubmedian carinae with one pair of subposterior spiniform granules and one pair of median spiniform granules. Segments III-IV: dorsolateral posterior spiniform granules absent; ventrolateral and ventrosubmedian carinae without large spiniform granules. Segment V:

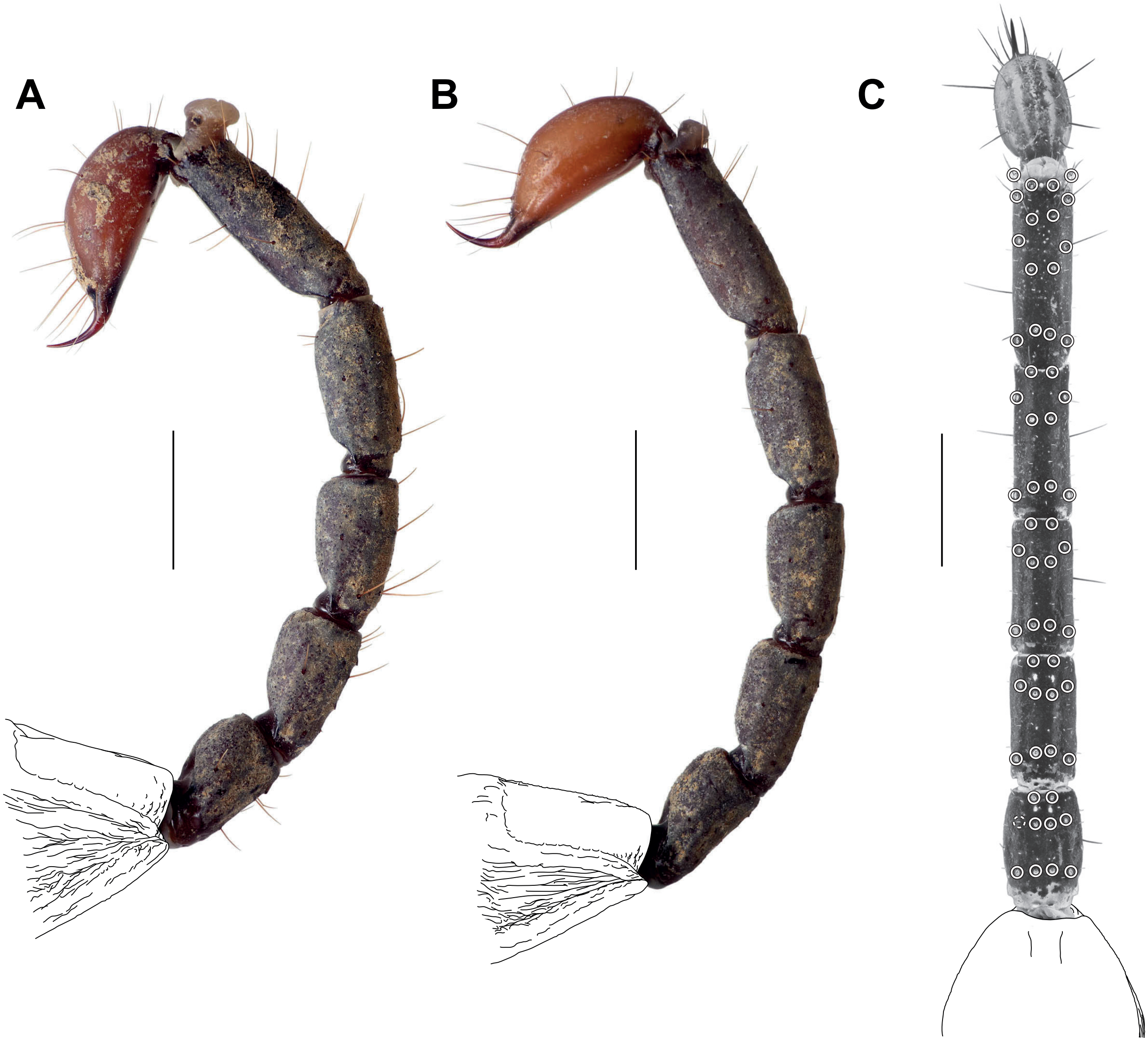

Fig. 65. *Hormurus slapcinskyi* sp. nov., metasoma and telson, lateral (A-B) and ventral (C) aspects. (A) Female paratype (AMNH [LP4741]). (B-C) Male holotype (AMNH [LP4741]). The dotted circle in C indicates the additional macroseta expressed in the female paratype. Scale lines: 3 mm.

ventrolateral and ventromedian carinae without distinct granules or spines; anal arch crenulate.

Ventral metasoma setation: Segments I-IV each with ten macrosetae, i.e. three pairs (anterior, median and posterior) on ventrosubmedian carinae and two pairs (anterior and supramedian) on ventrolateral carinae; segment V with 16 macrosetae, i.e. four pairs (anterior, median, subposterior and posterior) on ventrosubmedian carinae and four pairs (anterior, supramedian, subposterior and posterior) on ventrolateral carinae.

Telson (Fig. 65B): Slightly longer than metasoma segment V; vesicle smooth, without granules; aculeus short (less than half of vesicle length), sharply curved.

Hemispermatophore (Fig. 66): Stalk and stem approximately equal in size. Distal lamina curved, almost straight, without distal crest on anterior margin; a single laminar hook, submedian, situated between 1/3 and 3/7 from base of stalk (basal part/distal lamina ratio = 0.52-0.56, median = 0.54); transverse ridge distinct, more proximal than base of laminar hook, merging with anterior margin more distally than base of laminar hook. Capsule: hemisolenos thin, folded on itself only

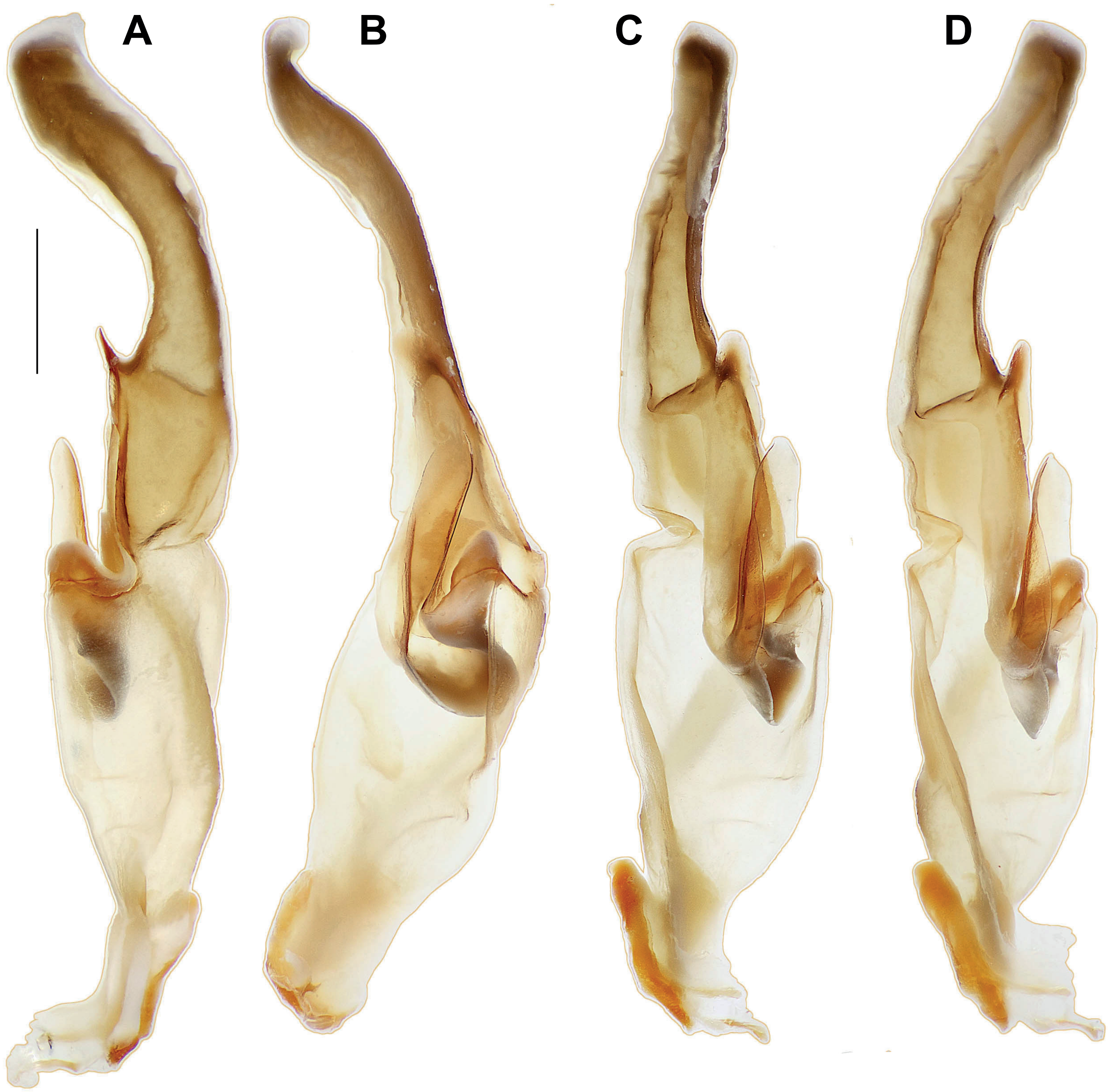

Fig. 66. *Hormurus slapcinskyi* sp. nov., male holotype (AMNH [LP4741]), left hemispermatophore. (A) Lateral aspect. (B) Anterior aspects. (C) Rotated approximately 45° counter-clockwise from anterior aspect. (D) Contralateral aspect. Scale line: 1 mm.

proximally, above that unfolded to flattened distal tip (tip and base approximately of same width), without lateral longitudinal carina, laterodistal accessory hook or medioposterior accessory apophysis; tip of hemisolenos more proximal than base of laminar hook, more distal than tip of clasper. Clasper well developed as a distinct hump, not hook-like, without anterior accessory process. Subex well developed, spoon-shaped, merging anteriorly with base of clasper; posterior edge forming obtuse angle (>90°) with hemisolenos; anterior edge forming right angle (90º) with hemisolenos.

Description of adult female: Same characters as for male except as follows. *Colouration* (Fig. 59C-D): Legs and telson slightly darker than in male.
Pedipalps (Figs 59C-D, 61A, F, K): Segments noticeably shorter or more robust than in male.
Chela fingers (Fig. 62B): Dentate margins linear or nearly so, without pronounced lobe and notch, with two rows of primary denticles extending from tip to base of fingers and bearing large inner accessory denticles.
Carapace (Fig. 60B, D): Posteromedian margin smooth.
Genital operculum (Fig. 63D, F): Oval to semi-oval, distinctly wider than long (length/width ratio = 0.78); opercular sclerites partly fused, with distinct median suture; posterior notch present, at least weakly developed.
Pectines (Fig. 63D-E): Short, distal edge not reaching distal edge of coxa IV. Pectinal teeth count 7; teeth short and straight, sensory papillae covering only distal half.
Mesosoma (Figs 59C-D, 60B, F): Post-tergites: reticulate network of ridges and dimples on segments III-VII more distinct than in male; intercarinal surfaces of I-III medially smooth, laterally granular; intercarinal surfaces of IV-VI almost completely smooth, faintly granular along lateral margins; intercarinal surfaces of VII densely granular, proximal third smooth.

Intraspecific variation: *Pedipalp trichobothria*: In some specimens trichobotria *esb*, *em* and *est* on the retrolateral side of the patella are arranged in four groups instead of three, i.e. esb_1, esb_2, em_{1-2} and *est* (esb_1 apart from esb_2). On the retrolateral side of the pedipalp chela *Esb* may be more distal, aligning with *Est*.
Leg spination: The number of setiform macrosetae varies from three to four in the proventral row on telotarsi II and from four to five in the proventral row on telotarsi IV.
Pectines: The pectinal teeth count varies from eight to nine in males.
Metasoma: Spination: One less granule may be expressed in the median group of granules of the ventrosubmedian carinae on segment I.
Ventral metasoma setation: Segment I may bear nine macrosetae instead of ten because one of the supramedian macrosetae of the ventrolateral carinae is not expressed in some specimens.
Hemispermatophores: The basal part/distal lamina ratio varies from 0.52 to 0.56 (median = 0.54).

Distribution: *Hormurus slapcinskyi* sp. nov. is probably endemic to Woodlark Island, off the eastern tip of New Guinea, Milne Bay Province (Fig. 58).

Hormurus ancylolobus Monod & Prendini, sp. nov.

Figs 1-3, 67-73, Tab. 7

This species was treated under the manuscript name "Hormurus ankistros" in Monod (2011a: 281, 532, 536, figs 17A-B, 18, 26-28).

Material: AMNH [LP 4339]; ♀ holotype; Papua New Guinea, Sandaun Province, Sindik, 0.3 km NW of Parkop village, 3 km NW of Sibilanga Mission, 426 m, broadleaf tropical hill forest, 3.42°S, 142.52°E; 12.V.2005; leg. J.D. Slapcinsky, S. Nimbisan & K. Netchy (JS 793). – AMNH [LP 4339]; 1 subadult ♀ paratype; same data as for holotype.

Etymology: The species name *ancylolobus* is the Latinized version of the ancient Greek words "ἀγκύλος" [crooked, curved, beaked, hooked] and "λοβός" [elongated projection, protuberance]. The epithet is an invariable noun in apposition and refers to the unusual hook-like anterodistal process of coxae III observed in the female holotype. Except for the present species, these anterodistal processes are absent in *Hormurus* females, only present in males of *H. krausi* sp. nov. and *H. papuanus*.

Diagnosis: *Hormurus ancylolobus* sp. nov. can be easily distinguished from other Papuan congeners by the presence of pointed processes at the anterodistal tips of coxae II-III in mature females (Fig. 70B, D-E). Those are hook-like and more strongly developed on coxae III than on coxae II. This unique character is not present in any other known *Hormurus* species. Moreover, the median notch of the anterior carapace margin in *H. ancylolobus* sp. nov. (Fig. 68A) is deeper than in other Papuan *Hormurus*.

Description of adult female: *Colouration* (Fig. 67): Dorsal surface of chelicera manus light brown with darker infuscation, more pronounced anteriorly; fingers black. Carapace black with lighter spots (reddish brown) in posterior half. Tergites brown. Pedipalps black, ventral intercarinal surfaces reddish brown. Legs dark brown with a network of lighter spots, as dark as tergites. Coxapophyses I-II black, their anterior tips brown; leg coxae and sternum brown with a network of orange spots; genital operculum and pectines yellow. Sternites III-VI brown to dark brown; sternite V with posterior margin pale yellow; sternite VII dark brown to black. Metasoma black, intercarinal surfaces slightly lighter (reddish brown). Telson reddish brown to black, aculeus black.
Cuticle: Nongranular surfaces of carapace, pedipalps, legs, mesosoma and metasoma finely punctate.

Table 7. *Hormurus ancylolobus* sp. nov., measurements (in mm), repository and inventory number of the adult female holotype.

	Holotype
Sex	♀
Repository	AMNH
Inventory number	LP4339
Locality	Sindik
Total length	94.00
Carapace, length	13.84
Carapace, anterior width	8.19
Carapace, posterior width	13.92
Pedipalp femur, length	15.25
Pedipalp femur, width	5.08
Pedipalp femur, height	2.59
Pedipalp patella, length	13.71
Pedipalp patella, width	5.73
Pedipalp patella, height	3.98
Pedipalp chela, length	29.52
Pedipalp chela, width	8.29
Pedipalp chela, height	5.70
Chela movable finger, length	15.20
Genital operculum length, female	2.93
Genital operculum width, female	3.51
Metasoma segment I, length	4.82
Metasoma segment I, width	3.51
Metasoma segment I, height	3.05
Metasoma segment II, length	5.49
Metasoma segment II, width	2.78
Metasoma segment II, height	2.93
Metasoma segment III, length	5.85
Metasoma segment III, width	2.62
Metasoma segment III, height	2.93
Metasoma segment IV, length	6.28
Metasoma segment IV, width	2.35
Metasoma segment IV, height	2.68
Metasoma segment V, length	7.80
Metasoma segment V, width	2.24
Metasoma segment V, height	2.50
Telson, length	9.45
Telson, width	2.68
Telson, height	2.78

Carapace (Fig. 68A-B): Anterior margin with median notch moderately excavated. Anterior furcated sutures distinct. Median ocular tubercle slightly raised; median ocelli present, at least twice the size of lateral ocelli, separated from each other by approximately the diameter of a median ocellus. Three pairs of lateral ocelli, equal in size, equidistant and adjacent to each other. Surfaces minutely and densely granular except for smooth anterior areas of frontal lobes and of median ocular area.

Chelicerae: Basal and median teeth of fixed finger fused into bicusp. Dorsal margin of movable finger with four teeth (one basal, one median, one subdistal and one distal); dorsal distal tooth smaller than ventral distal tooth; ventral margin smooth.

Pedipalps (Figs 67, 69): Segments rather short, femur approximately equal in length to carapace. Chela almost asetose.

Chela fingers (Fig. 70A): Dentate margins of movable and fixed fingers linear or nearly so, without pronounced lobe and notch, with two rows of primary denticles extending from tip to base of fingers and bearing large inner accessory denticles.

Pedipalp carinae: Femur (Fig. 69I-L): proventral carina visible as a ridge of medium-sized spiniform granules; promedian ventral carina obsolete, reduced to a single large granule in basal third of segment; prodorsal carina visible as a ridge of medium to large spiniform granules, more developed than proventral carina; retrodorsal carina visible as a ridge of medium to large spiniform granules, similarly developed as prodorsal carina; retroventral carina visible as a ridge of medium to large spiniform granules, similarly developed as retrodorsal carina; ventromedian carina obsolete, only discernible proximally as a ridge of medium-sized spiniform granules. Patella (Fig. 69E-H): proventral carina discernible as a costate-granular ridge proximally, obsolete distally; promedian and prodorsal carinae visible as ridges with medium to large spiniform granules, these equally developed and fused medially into a prominent spiniform process with a pointed, medially located apex; dorsomedian carina only visible proximally as a ridge of medium-sized spiniform granules; retrodorsal carina visible as a faint ridge of medium-sized spiniform granules; paired retromedian carinae fused and visible as a ridge of medium to large spiniform granules; retroventral carina crenulate (composed of medium to large granules). Chela manus (Fig. 69A-D): proventral and promedian carinae visible as faint ridges with medium-sized spiniform granules, these equally developed; prodorsal carina obsolete, visible as a very faint ridge of medium-sized spiniform granules; dorsomedian carina visible as a faint ridge of small to medium-sized spiniform granules, more strongly developed than prodorsal carina; dorsal secondary carina obsolete; digital carina visible as a ridge of small spiniform granules, less distinct in distal area, more developed than retromedian carina; fused retromedian carinae obsolete, visible as a faint ridge of medium-sized spiniform granules proximally; retrolateral secondary carina vestigial, only distinct proximal to condyle of movable finger, expressed as a ridge of small spiniform granules; retroventral carina crenulate (composed of medium-sized granules); ventromedian carina visible as a ridge of medium-sized spiniform granules, becoming decreasingly pronounced distally.

Pedipalp macrosculpture: Femur (Fig. 69I-L): prolateral intercarinal surface densely covered with small spiniform granules; dorsal intercarinal surface densely covered with small to medium-sized spiniform granules, distal area smooth; retrolateral intercarinal surface almost entirely smooth, very sparsely covered with small spiniform granules; proximal half of ventral intercarinal surface densely covered with small to medium-sized spiniform granules, distal half smooth. Patella (Fig. 69E-H): prolateral intercarinal surface densely covered with small to medium-sized spiniform granules, distal area smooth; dorsal intercarinal surface covered with dense reticulate network of medium-sized spiniform granules; retrolateral intercarinal surface with dense reticulate network of medium-sized spiniform granules; ventral intercarinal surface covered with sparse reticulate network of medium-sized spiniform granules, distal area smooth. Chela manus (Fig. 69A-D): prolateral intercarinal surface densely covered with small to medium-sized spiniform granules, smooth proximally; dorsal and retrolateral intercarinal surfaces covered with dense reticulate network of medium-sized spiniform granules; ventral intercarinal surface covered with sparse reticulate network of medium-sized spiniform granules, distal area smooth. Chela fingers densely covered with small spiniform granules in proximal half, smooth or nearly so distally, ventral surface smooth; trichobothria *dst*, *dsb* and *db* together in a single large smooth depression.

Trichobothria: Pedipalp orthobothriotaxic, accessory trichobothria absent. Patella (Fig. 69E-H): d_2 trichobothrium distal to patellar process; five *eb* trichobothria arranged in two groups (eb_1+eb_{4-5} and eb_{2-3}); two *esb*, two *em* and one *est* trichobotria arranged in three groups, i.e. esb_1, esb_2+em_{1-2} and *est* (esb_2 closer to em_{1-2} than to esb_1); three *et* trichobothria; three *v* trichobothria. Chela manus (Fig. 69A-D): *Dt* situated in proximal third of manus; Eb_3 close to Eb_{1-2}; *Esb* aligned with *Est*; *Est* situated near midpoint; four *V* trichobothria, V_3 distant from V_4. Fixed chela finger with *db* situated on dorsal surface; *esb* closer to *eb* than to *est*; *eb* situated at base of finger, proximal to point of articulation between fixed and movable fingers; two *i* trichobothria.

Coxosternum (Fig. 70B, D-E): Coxa II with a distinct but small pointed anterodistal process. Coxa III with a distinct hook-like anterodistal process. Sternum equilateral pentagonal (anterior width slightly greater than posterior width), wider than long.

Legs (Fig. 71): Femora I-IV with ventral surfaces

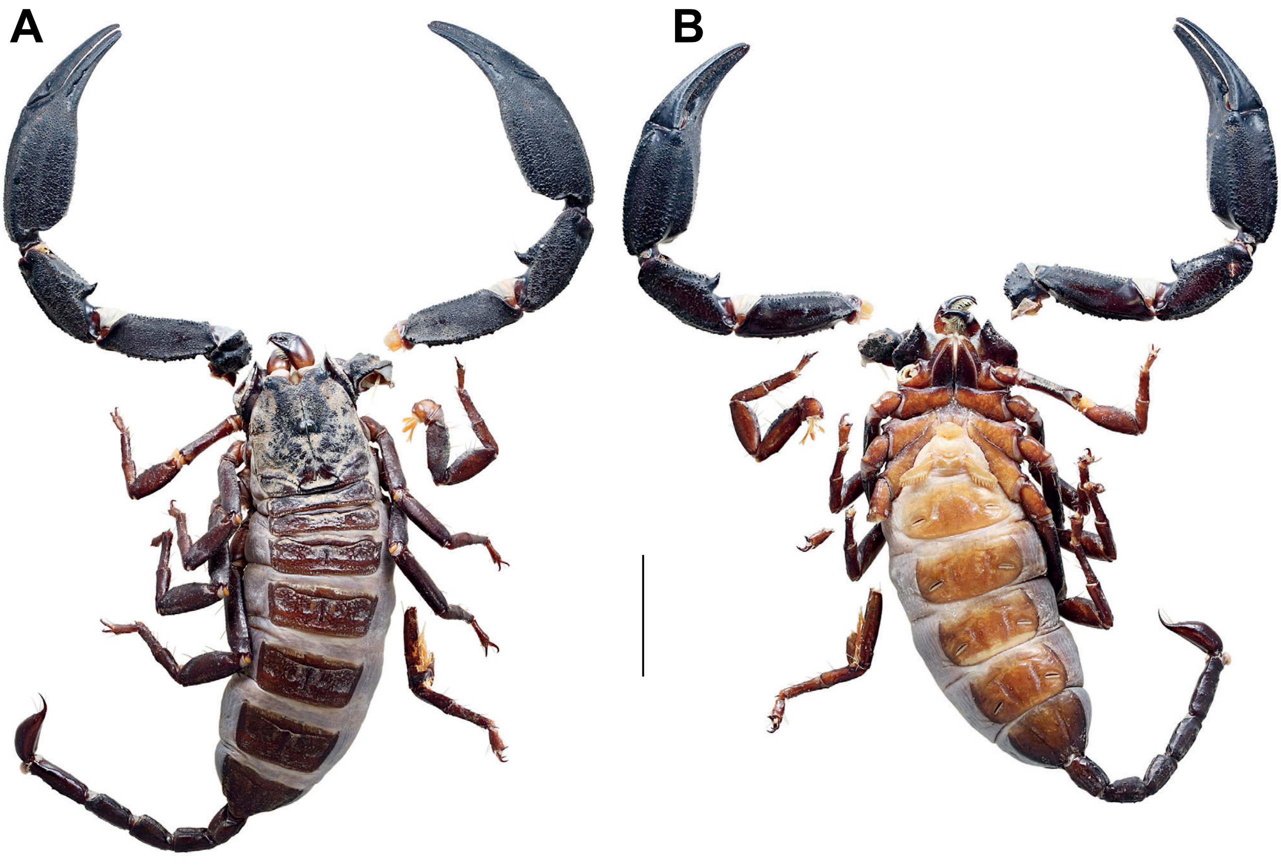

Fig. 67. *Hormurus ancylolobus* sp. nov., habitus of female holotype (AMNH [LP4339]). (A) Dorsal aspect. (B) Ventral aspect. Scale line: 15 mm.

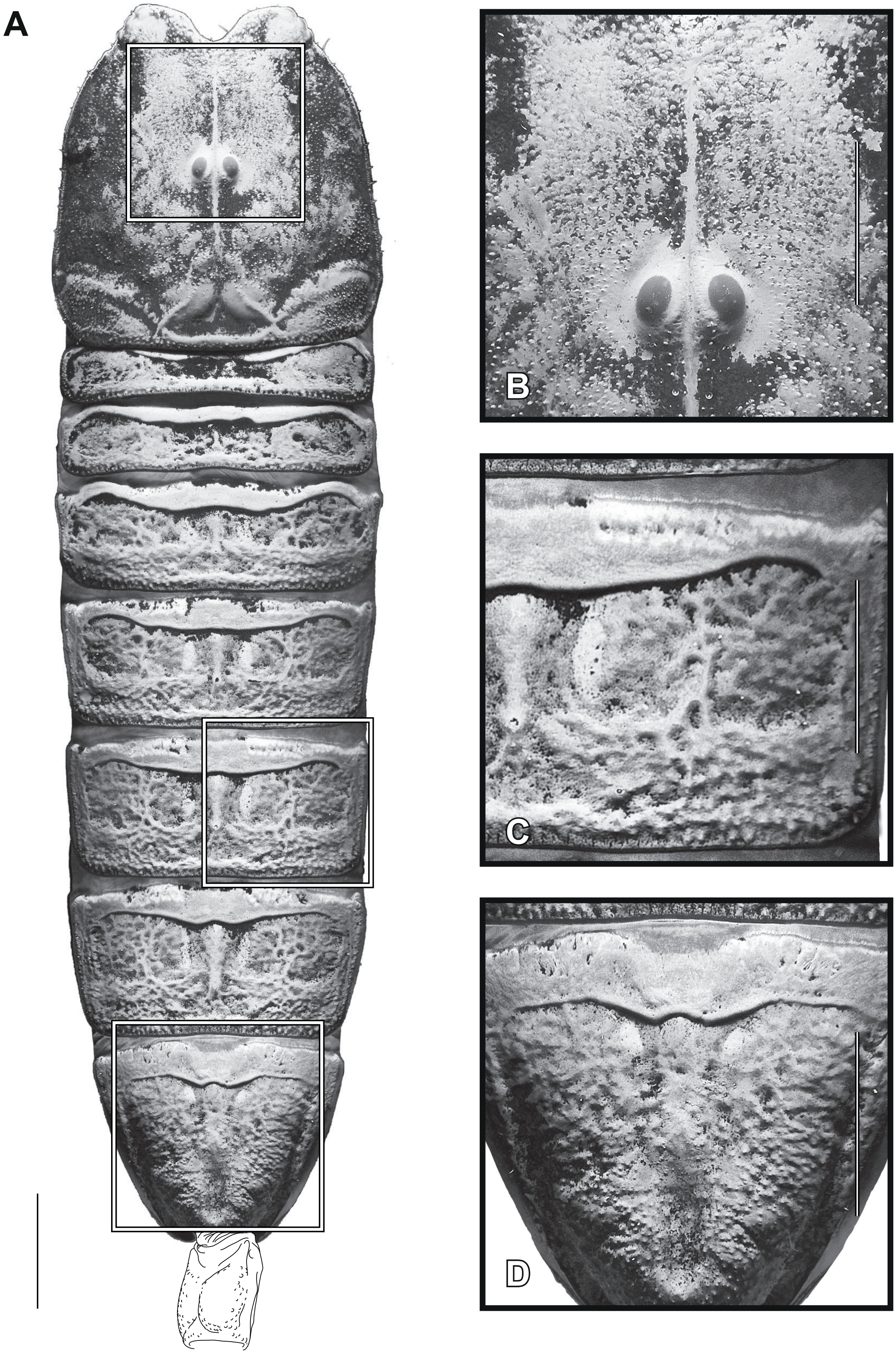

Fig. 68. *Hormurus ancylolobus* sp. nov., female holotype (AMNH [LP4339]), dorsal aspect. (A) Carapace and mesosomal tergites showing ornamentation and macrosculpture of cuticle. (B) Detailed view of carapace. (C) Detailed view of tergite V. (D) Detailed view of tergite VII. Scale lines: 5 mm (A), 3 mm (B-C), 4 mm (D).

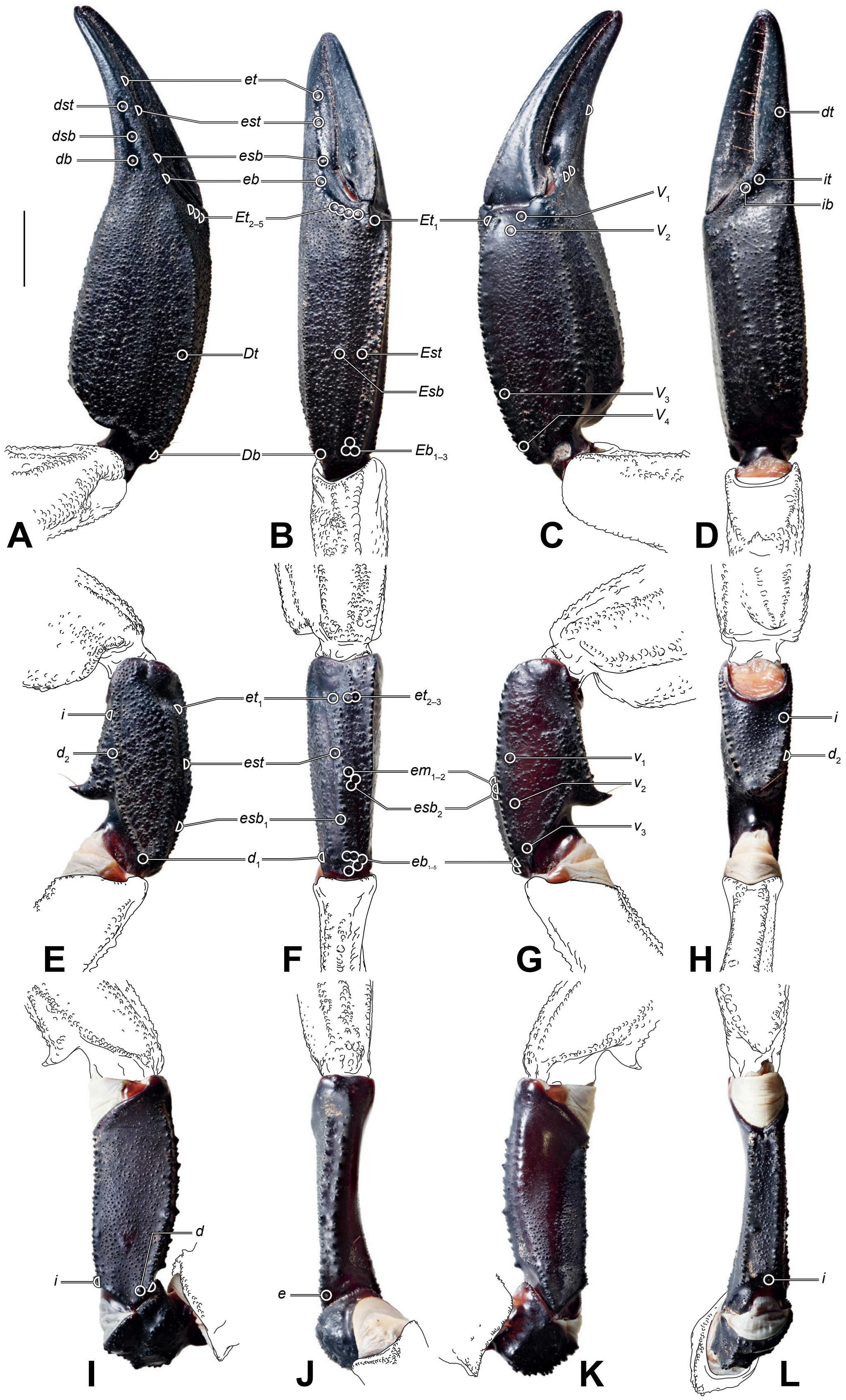

Fig. 69. *Hormurus ancylolobus* sp. nov., female holotype (AMNH [LP4339]), pedipalp chela (A-D), patella (E-H), femur and trochanter (I-L). Dorsal (A, E, I), retrolateral (B, F, J), ventral (C, G, K) and prolateral (D, H, L) aspects showing trichobothria pattern. Scale line: 5 mm.

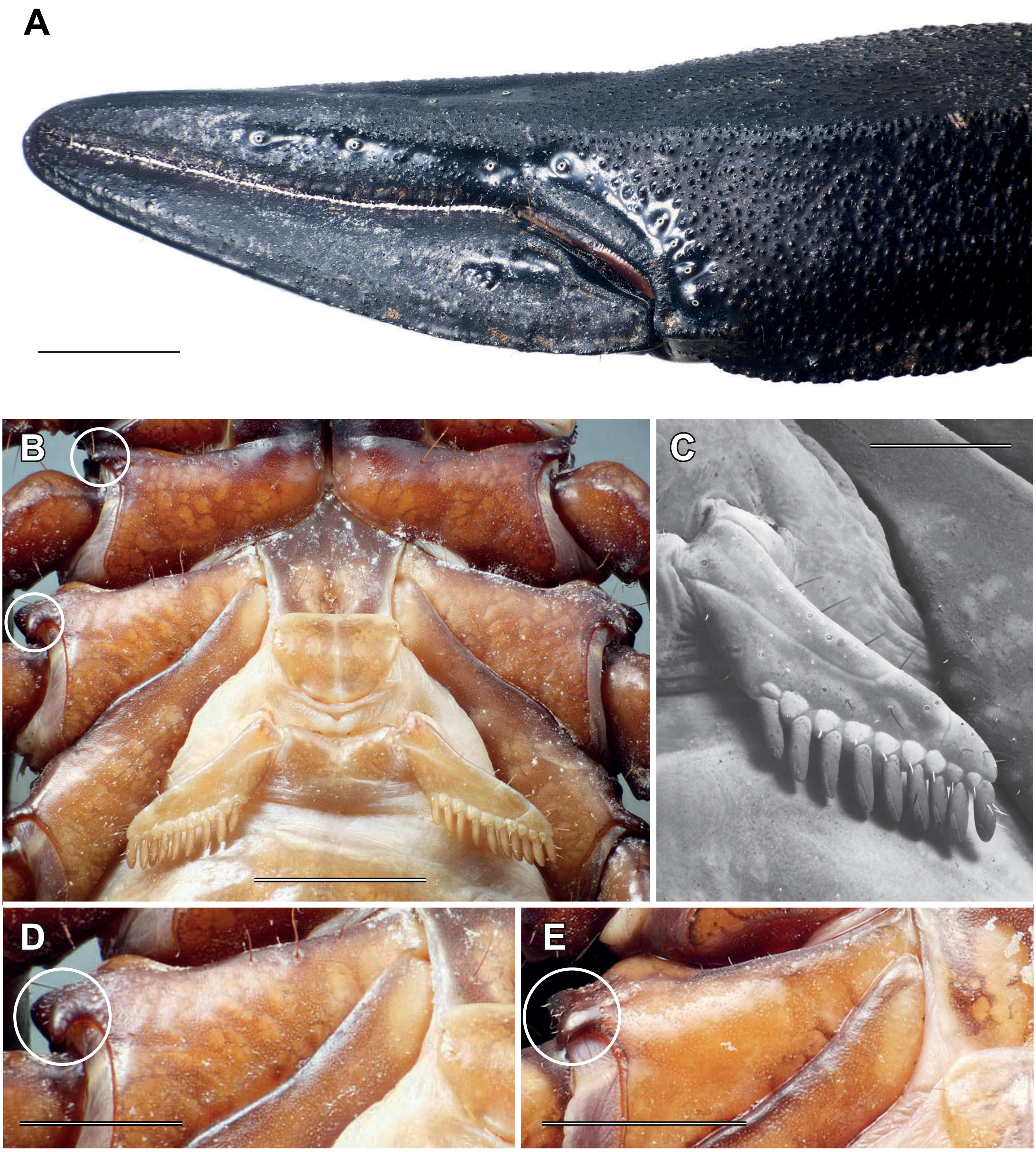

Fig. 70. *Hormurus ancylolobus* sp. nov., pedipalp chela, retrolateral aspect showing dentate margin of chela fingers (A), coxae II-IV, sternum, genital operculum and pectines, ventral aspect (B), left pecten under UV light (C), antero-distal margin of coxae III (D-E). (A-D) Female holotype (AMNH [LP4339]). (E) Subadult female paratype (AMNH [LP4339]). Pointed processes at the anterodistal tips of coxae II-III are indicated by white circles. Scale lines: 3 mm (A, D-E), 5 mm (B), 2 mm (C).

Fig. 71. *Hormurus ancylolobus* sp. nov., female holotype (AMNH [LP4339]), right tarsi, ventral (A-D) and retrolateral (E) aspects. (A) Tarsus I. (B) Tarsus II. (C) Tarsus III. (D-E) Tarsus IV. Scale line: 2 mm.

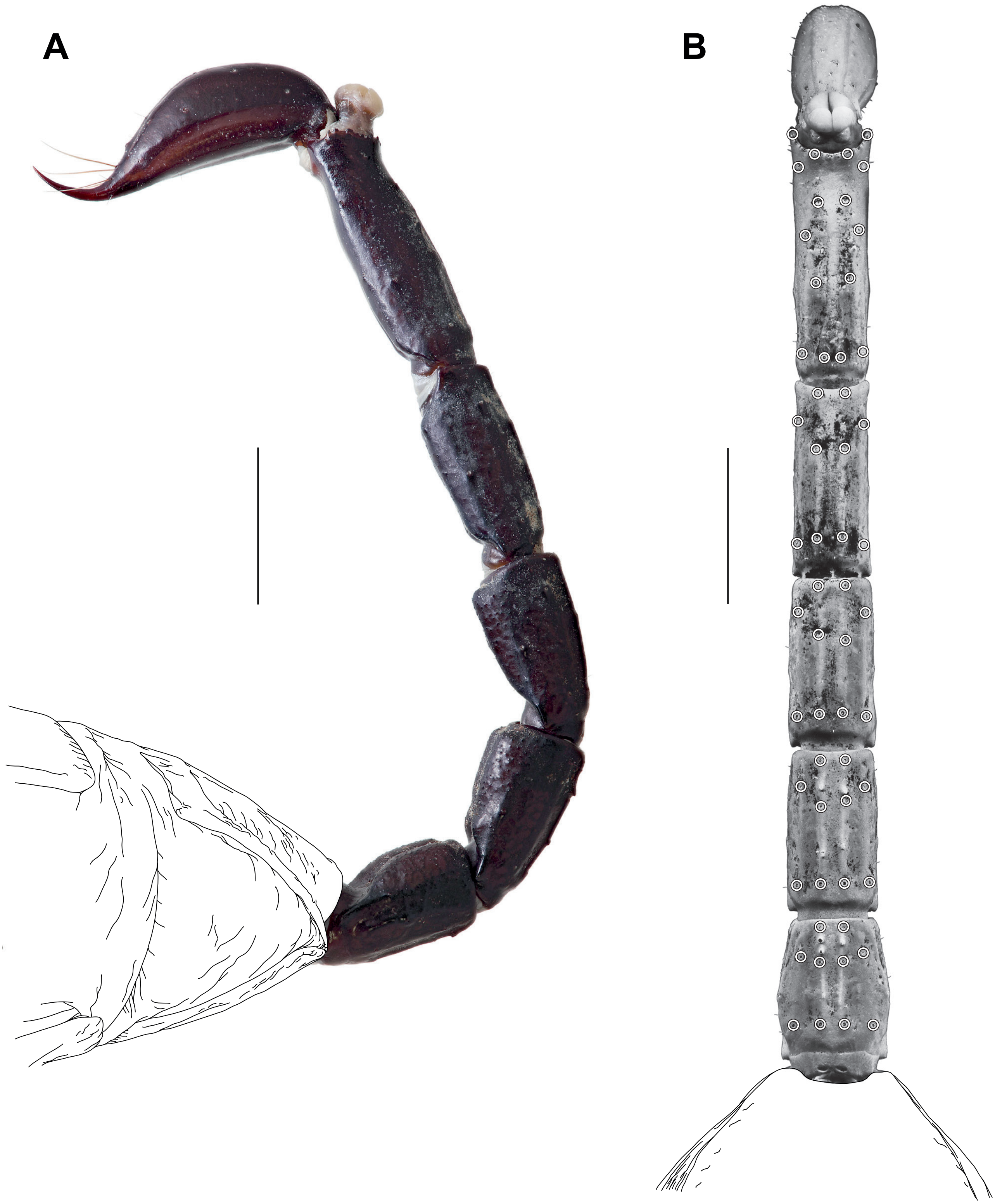

Fig. 72. *Hormurus ancylolobus* sp. nov., female holotype (AMNH [LP4339]), metasoma and telson. (A) Lateral aspect. (B) Ventral aspect. Scale lines: 5 mm.

bicarinate, pro- and retroventral carinae granular. Retrolateral margins of tibiae I-II without setiform macrosetae. Basitarsi I-IV: pro- and retroventral rows each with 4/4, 4/5, 4/5 and 4/5 setiform macrosetae, respectively. Telotarsi I-IV: pro- and retroventral row each with 3/3-4, 4/4, 5/5 and 5/5 setiform macrosetae, respectively; retroventral row with one proximal spinule; ventromedian spinules absent. Ungues curved, shorter than telotarsus, more than half its length.

Genital operculum (Fig. 70B): Oval to semi-oval, distinctly wider than long (length/width ratio = 0.83); opercular sclerites partly fused, with distinct median suture; posterior notch present, at least weakly developed.

Pectines (Fig. 70B-C): Short, distal edge not reaching distal edge of coxa IV; fulcrae and three marginal lamellae present. Pectinal teeth count 9-10; teeth short and straight, sensory papillae covering only distal half.

Mesosoma (Figs 67, 68A, C-D): Pre-tergites I-VII and posterior margins of pre-tergites smooth. Post-tergites: posterior margins of tergites I-VI sublinear, without distinct projection; lateral transversal sulcus present; intercarinal surfaces of I-II medially smooth, laterally granular; intercarinal surfaces of III-VI almost totally smooth, faintly granular along lateral margins; intercarinal surfaces of VII densely granular, proximal third smooth; intercarinal surfaces of III-VII with distinct reticulate network of ridges and dimples. Respiratory stigmata (spiracles) of sternites IV-VI long, their length at least one third of sternite width, and distinctly crescent shaped. Sternite VII acarinate.

Metasoma (Fig. 72): Not markedly compressed laterally; sparsely and minutely granular, posterior segments less so (segment IV-V almost smooth); dorsal intercarinal surface of V smooth and shiny medially; a distinct dorsomedian sulcus on segments I-IV, much less pronounced on segment V (usually only faintly expressed anteriorly).

Metasoma carinae: Segments I-IV: dorsolateral carinae obsolete on all segments; lateral median carinae weakly developed (as faint ridges); lateral inframedian carinae on segment I anteriorly expressed as a faint ridge, absent on other segments; ventrolateral carinae weakly developed (as faint ridges); paired ventrosubmedian carinae weakly developed (as low ridges). Segment V: dorsolateral and lateral median carinae obsolete; ventrolateral carinae only expressed as faint ridges; ventrosubmedian carinae fused, only expressed as a faint ridge in anterior two-thirds.

Metasoma spination: Segment I: dorsomedian posterior and dorsolateral posterior spiniform granules absent; ventrolateral carinae without large spiniform granules; ventrosubmedian carinae with one pair of subposterior spiniform granules and with 0-1 pair of median granules. Segment II: dorsomedian posterior and dorsolateral

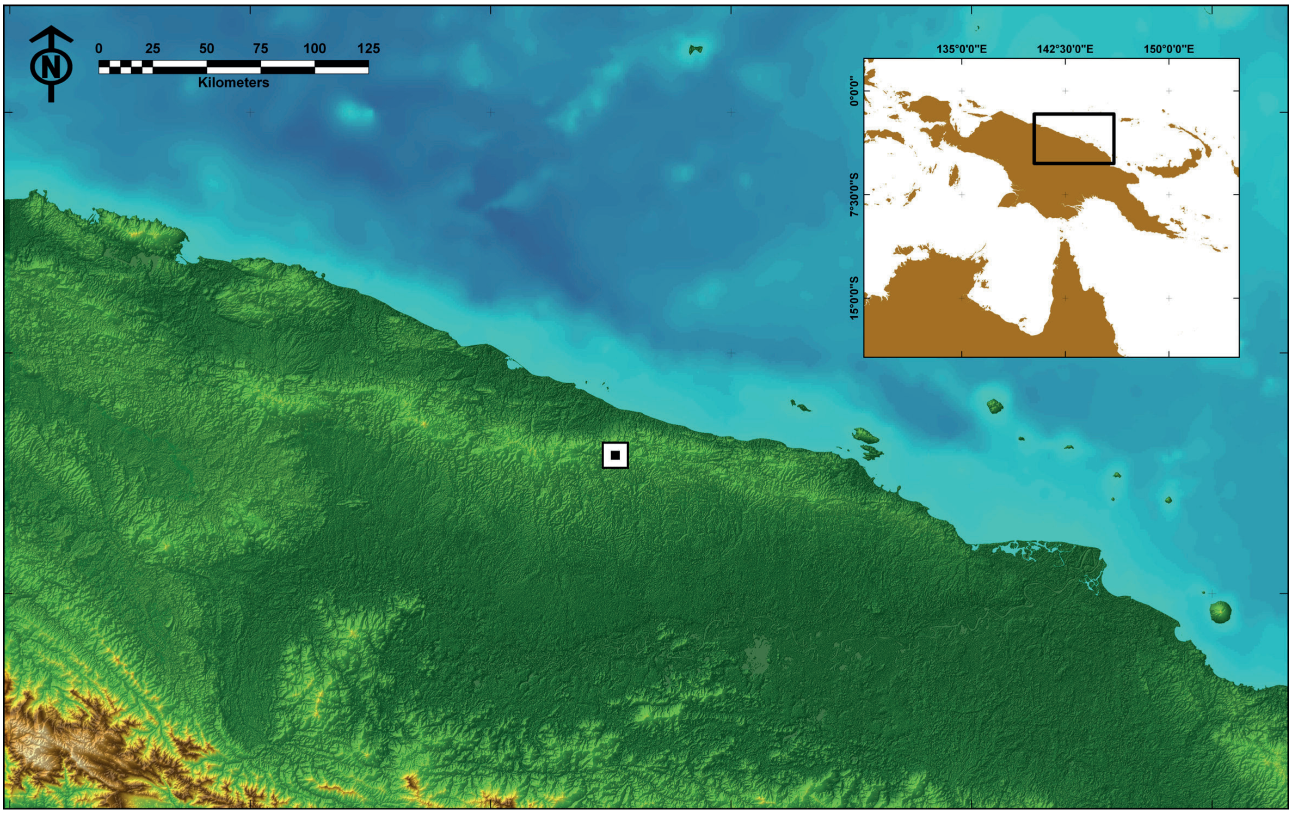

Fig. 73. Type locality and only known locality of *Hormurus ancylolobus* sp. nov. in northern Papua New Guinea, Sandaun Province. Color gradient indicates topography and bathymetry.

posterior spiniform granules absent; ventrolateral carinae without large spiniform granules; ventrosubmedian carinae with one pair of subposterior spiniform granules and 1-2 pairs of median spiniform granules. Segments III-IV: dorsolateral posterior spiniform granules absent; ventrolateral and ventrosubmedian carina without large spiniform granules. Segment V: ventrolateral carinae without large spiniform granules; ventromedian carina without spiniform granules; anal arch crenulate.

Ventral metasoma setation: Segments I-IV each with ten macrosetae, i.e. three pairs (anterior, median and posterior) on ventrosubmedian carinae and two pairs (anterior and supramedian) on ventrolateral carinae; segment V with 16 macrosetae, i.e. four pairs (anterior, median, subposterior and posterior) on ventrosubmedian carinae, and four pairs (anterior, supramedian, subposterior and posterior) on ventrolateral carinae.

Telson (Fig. 72A): Slightly longer than metasoma segment V; vesicle smooth, without granules; aculeus short (less than half of vesicle length), sharply curved.

Intraspecific variation: *Leg spination*: The number of setiform macrosetae in the retroventral row of telotarsi I varies from three to four.

Pectines: The pectinal teeth count varies from nine to ten in females.

Metasoma: Spination: One extra granule may be expressed in the median and subposterior groups of the ventrosubmedian carinae of segments I-II. One spiniform granule may be expressed in the posterior half of one of the ventrolateral carinae of segment V.

Distribution: *Hormurus ancylolobus* sp. nov. is only known from one locality in northern Papua New Guinea, Sandaun Province (Fig. 73).

Hormurus cameroni Monod, Austin & Prendini, sp. nov.

Figs 74-82, Tab. 8

Material: AMNH [LP 2731]; ♂ holotype; Papua New Guinea, Milne Bay Province, Pini Range, abandoned logging road W of Duabo Mission Station, 325 m, small remnant of rainforest in secondary forest, in large rotting log, 10.41°S, 150.30°E; 30.IV.2002; leg. F. Kraus. – AMNH [LP 2731]; 1 juvenile ♂ paratype; same data as for holotype. – UMMZ [LP 2731]; 1 juvenile ♂ paratype; same data as for holotype. – AMNH [LP 2716]; 1 ♂, 1 ♀ paratypes; Milne Bay Province, Cloudy Mountains, Ubwam Mountain, headwater to Watuti River, 715 m, rainforest, under logs, 10.50°S, 150.23°E; 11.IV.2002; leg. J.D. Slapcinsky (JS-0506). – UMMZ [LP 2716]; 1 imm. paratype; Milne Bay Province, Cloudy Mountains, Ubwam Mountain, headwater to Watuti River, 715 m, rainforest, under logs, 10.50°S, 150.23°E; 11.IV.2002; leg. J.D. Slapcinsky (JS-0506). – MHNG-ARTO-26551; 1 ♂, 1 ♀, 1 juvenile ♂, 1 juvenile ♀ paratypes; Duabo Lookout, 359 m, 10.42°S, 150.31°E; VIII.2006; leg. C. Austin. – MHNG-ARTO-26550; 2 ♂, 3 ♀, 2 subadult ♂ paratypes; Milne Bay Province, East Cape, N/S Rd, 261 m, 10.31°S, 150.62°E; 8.VIII.2006; leg. C. Austin. – MHNG-ARTO-26552; 4 ♀, 1 subadult ♀ paratypes; Milne Bay Province, Halowia Village, 22 m, 10°20.14S, 150°34.38E; VIII.2006; leg. C. Austin.

Etymology: The species is named after the late Howard Don Cameron. Upon his retirement from the University of Michigan in 2010, Cameron was the Chairman of the Department of Classical Studies, as well as Curator of Zoology. He was interested in arachnids, and especially scorpions. Because of their friendship, Fred Kraus made a concerted effort to collect scorpions, in addition to amphibians and reptiles, during his expeditions. A large part of the material upon which the present study is based is thus an indirect result of Cameron's influence.

Diagnosis: *Hormurus cameroni* sp. nov. is morphologically close to *Hormurus maiwa* sp. nov., both species possess hemispermatophores with subdistal lamellar hooks (situated between 1/3 and 3/7 from the base of the stalk; basal part/distal lamina ratio > 0.5 and < 0.75) and female genital opercula that are as wide as long (length/width ratio > 0.85 and < 1).

Hormurus cameroni sp. nov. differs from *H. maiwa* sp. nov. in the following characters: (1) the frontal lobes of the carapace are smooth in *H. cameroni* sp. nov. (Fig. 75), whereas they are at least sparsely granular in *H. maiwa* sp. nov. (Fig. 94); (2) the medially located apex of the prolateral patellar process of the pedipalp in *H. cameroni* sp. nov. (Fig. 76F-G, I) is less developed and less curved than in *H. maiwa* sp. nov. (Fig. 95F-G, I); (3) the pedipalps of *H. cameroni* sp. nov. (Fig. 76) are more finely granular and with weaker carinae than those of *H. maiwa* sp. nov. (Fig. 95); (4) on the retrolateral side of the pedipalp patella trichobothrium esb_2 is closer to esb_1 than to em_{1-2}, resulting in three (esb_{1-2}, em_{1-2} and *est*) or four (esb_1, esb_2, em_{1-2} and *est*) groups in *H. cameroni* sp. nov. (Fig. 76H), whereas esb_2 is close to em_{1-2}, resulting in three groups (esb_1, esb_2+em_{1-2} and *est*) in *H. maiwa* sp. nov. (Fig. 95H); (5) the pectines are slightly more elongated in *H. cameroni* sp. nov. (Fig. 78A-B, D-E) than in *H. maiwa* sp. nov. (Fig. 97A-B, D-E); (6) the hemispermatophore stalk is only slightly longer than the stem in *H. cameroni* sp. nov. (Fig. 81), whereas the length difference is much more pronounced in *H. maiwa* sp. nov. (Fig. 100); (7) the transverse ridge of the hemispermatophore merges with the anterior margin of the stalk more distally than the base of the laminar hook in *H. cameroni* sp. nov. (Fig. 81A, D-E, G), whereas it merges more proximally than the base of the laminar hook in *H. maiwa* sp. nov. (Fig. 100A, D-E, H).

Description of adult male (holotype): *Colouration* (Fig. 74A-B): Dorsal surface of chelicera manus dark orange with brown infuscation, more pronounced

Table 8. *Hormurus cameroni* sp. nov., measurements (in mm), repositories and inventory numbers of adult males and females.

	Holotype	Paratype	Paratype	Paratype	Paratype	Paratype
Sex	♂	♂	♂	♂	♀	♀
Repository	AMNH	MHNG	MHNG	MHNG	MHNG	MHNG
Inventory number	LP2731	ARTO-26551	ARTO-26550	ARTO-26550	ARTO-26551	ARTO-26550
Locality	Duabo Mission	Duabo lookout	East Cape	East Cape	Duabo lookout	East Cape
Total length	51.00	46.00	50.00	45.00	54.00	46.00
Carapace, length	7.25	7.31	7.41	6.58	7.86	7.50
Carapace, anterior width	4.66	4.91	5.00	4.66	5.06	5.06
Carapace, posterior width	8.10	8.17	7.92	7.31	8.65	7.25
Pedipalp femur, length	10.08	9.97	10.40	9.14	8.72	8.29
Pedipalp femur, width	3.13	3.17	3.29	2.90	3.17	3.05
Pedipalp femur, height	1.53	1.58	1.52	1.46	1.73	1.90
Pedipalp patella, length	9.36	9.33	9.85	8.59	8.47	7.89
Pedipalp patella, width	3.67	3.66	3.66	3.29	3.62	3.54
Pedipalp patella, height	2.55	2.56	2.62	2.32	2.78	2.56
Pedipalp chela, length	17.33	17.29	18.68	16.67	17.03	15.88
Pedipalp chela, width	4.89	5.24	5.34	4.27	5.79	5.85
Pedipalp chela, height	3.09	3.17	3.01	2.78	3.41	3.25
Chela movable finger, length	7.72	7.44	7.86	6.95	7.92	7.28
Genital operculum length, female	NA	NA	NA	NA	1.99	1.89
Genital operculum width, female	NA	NA	NA	NA	1.95	1.83
Metasoma segment I, length	2.96	2.93	2.93	2.63	2.86	2.68
Metasoma segment I, width	1.98	2.05	2.05	1.85	2.11	1.89
Metasoma segment I, height	1.73	1.74	1.77	1.62	1.89	1.77
Metasoma segment II, length	3.38	3.11	3.29	2.93	3.29	3.05
Metasoma segment II, width	1.66	1.65	1.73	1.52	1.72	1.50
Metasoma segment II, height	1.64	1.71	1.83	1.61	1.89	1.71
Metasoma segment III, length	3.42	3.35	3.47	3.11	3.41	3.24
Metasoma segment III, width	1.52	1.56	1.62	1.44	1.65	1.44
Metasoma segment III, height	1.65	1.73	1.83	1.65	1.83	1.68
Metasoma segment IV, length	3.94	3.66	3.78	3.45	3.78	3.54
Metasoma segment IV, width	1.46	1.44	1.46	1.34	1.46	1.34
Metasoma segment IV, height	1.58	1.58	1.79	1.58	1.68	1.62
Metasoma segment V, length	4.78	4.57	4.45	4.21	4.45	4.33
Metasoma segment V, width	1.47	1.46	1.46	1.35	1.52	1.32
Metasoma segment V, height	1.52	1.58	1.68	1.46	1.61	1.52
Telson, length	5.66	5.36	5.49	5.10	5.73	5.06
Telson, width	1.68	1.90	1.68	1.71	1.71	1.56
Telson, height	1.92	1.95	1.85	1.79	1.99	1.74

Table 8 (continued). *Hormurus cameroni* sp. nov., measurements (in mm) of adult females.

	Paratype	Paratype	Paratype	Paratype	Paratype
Sex	♀	♀	♀	♀	♀
Repository	MHNG	MHNG	MHNG	MHNG	MHNG
Inventory number	ARTO-26550	ARTO-26552	ARTO-26552	ARTO-26552	ARTO-26552
Locality	East Cape	Halowia Village	Halowia Village	Halowia Village	Halowia Village
Total length	45.00	53.00	51.00	47.00	48.00
Carapace, length	7.16	7.70	7.44	7.44	6.77
Carapace, anterior width	4.75	5.00	4.85	4.75	4.39
Carapace, posterior width	7.78	8.37	7.90	7.92	7.56
Pedipalp femur, length	7.62	8.35	8.05	8.23	7.47
Pedipalp femur, width	2.93	3.05	2.80	3.02	2.86
Pedipalp femur, height	1.58	1.58	1.58	1.58	1.56
Pedipalp patella, length	7.31	8.17	7.64	7.68	7.31
Pedipalp patella, width	3.35	3.41	3.23	3.41	3.17
Pedipalp patella, height	2.44	2.56	2.56	2.52	2.44
Pedipalp chela, length	14.97	16.93	16.00	16.02	14.70
Pedipalp chela, width	5.24	5.42	5.30	5.61	5.24
Pedipalp chela, height	2.88	3.05	2.99	3.11	2.93
Chela movable finger, length	6.95	7.83	7.40	7.13	6.70
Genital operculum length, female	1.83	1.95	1.77	1.89	1.83
Genital operculum width, female	1.95	2.19	2.05	1.93	1.95
Metasoma segment I, length	2.38	2.74	2.66	2.58	2.44
Metasoma segment I, width	1.83	1.89	1.85	1.93	1.87
Metasoma segment I, height	1.71	1.77	1.71	1.71	1.65
Metasoma segment II, length	2.71	3.17	3.11	3.08	2.80
Metasoma segment II, width	1.55	1.55	1.50	1.65	1.47
Metasoma segment II, height	1.68	1.80	1.71	1.71	1.68
Metasoma segment III, length	2.86	3.41	3.29	3.17	3.01
Metasoma segment III, width	1.40	1.55	1.43	1.52	1.40
Metasoma segment III, height	1.71	1.73	1.65	1.74	1.68
Metasoma segment IV, length	3.23	3.66	3.54	3.57	3.35
Metasoma segment IV, width	1.34	1.38	1.28	1.34	1.28
Metasoma segment IV, height	1.60	1.68	1.58	1.66	1.50
Metasoma segment V, length	3.90	4.39	4.14	4.39	4.02
Metasoma segment V, width	1.34	1.37	1.28	1.38	1.28
Metasoma segment V, height	1.45	1.46	1.46	1.46	1.46
Telson, length	4.88	5.12	5.00	5.12	4.75
Telson, width	1.65	1.76	1.58	1.62	1.51
Telson, height	1.83	1.80	1.77	1.83	1.71

anteriorly; fingers black. Carapace reddish brown, median ocular region black. Tergites reddish brown, its carinae darker. Pedipalps reddish brown; carinae and fingers black. Legs paler than tergites, dorsal surface pale brown to orange distally, with darker infuscation except on telotarsi; ventral surface dark orange to yellow (tibiae, telotarsi and basitarsi paler); prolateral carina of femora black. Coxapophysis II black; coxapophysis I and leg coxae light brown to orange, anterior margin black; sternum black, with two large light brown spots posteriorly; sternites III-V light brown, with a network of orange spots and dark brown lateral margins, V with posterior margin pale yellow; sternite VI dark brown, with network of orange spots; sternite VII dark brown; genital operculum and pectines pale yellow. Metasoma reddish brown with darker infuscation; telson paler than metasoma, vesicle orange, aculeus reddish brown.

Cuticle: Nongranular surfaces of carapace, pedipalps, legs, mesosoma and metasoma finely punctate.

Carapace (Fig. 75A, C): Anterior margin with median notch moderately excavated. Anterior furcated sutures distinct. Median ocular tubercle slightly raised; median ocelli present, at least twice the size of lateral ocelli, separated from each other by approximately the diameter of a median ocellus. Three pairs of lateral ocelli, equal in size, equidistant and adjacent to each other. Surfaces minutely and densely granular, except for smooth frontal lobes (median longitudinal sulci and anterior furcated sulci granular) and median ocular area.

Chelicerae: Basal and median teeth of fixed finger fused into bicusp. Dorsal margin of movable finger with four teeth (one basal, one median, one subdistal and one

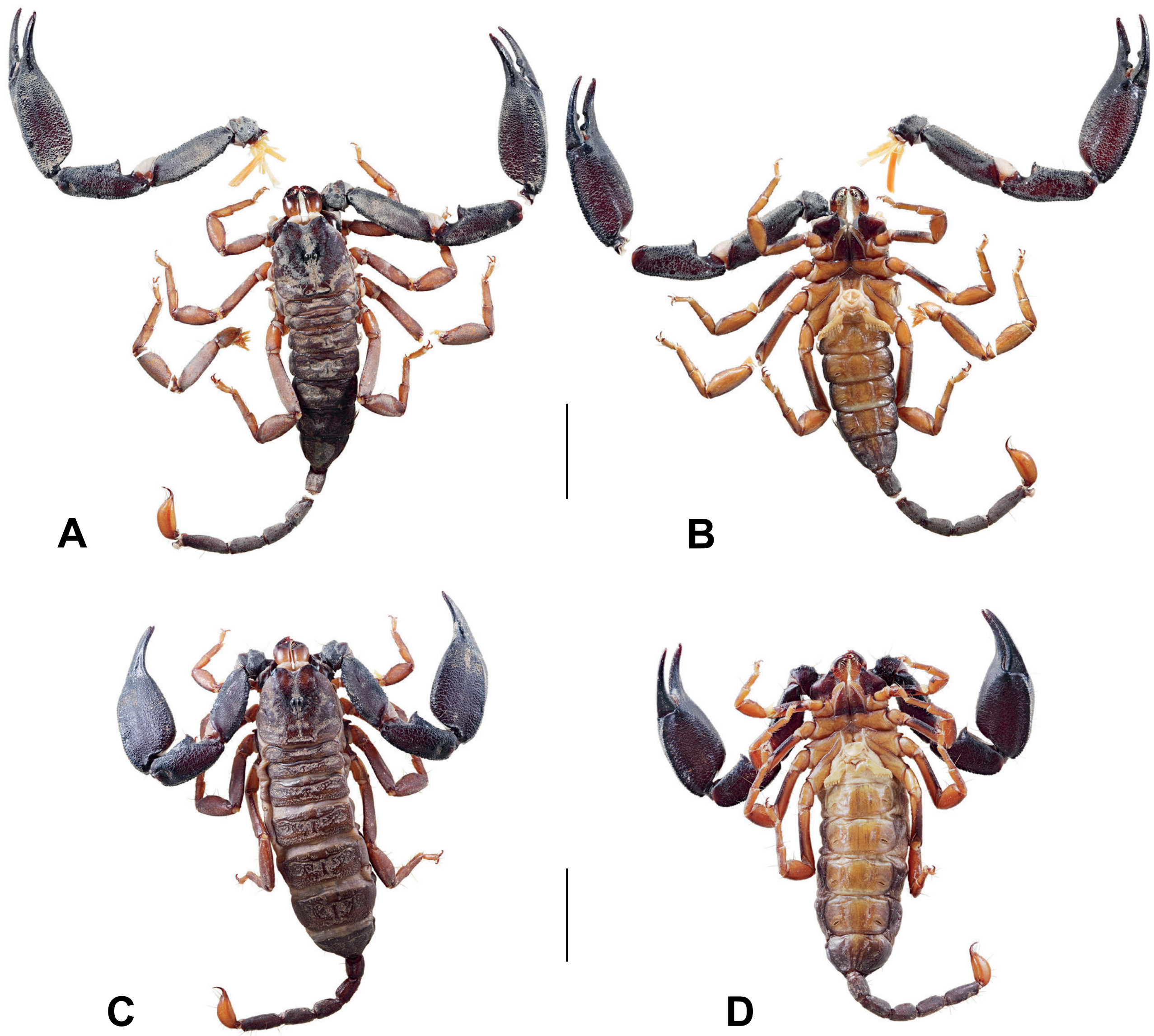

Fig. 74. *Hormurus cameroni* sp. nov., habitus, dorsal (A, C) and ventral (B, D) aspect. (A-B) Male holotype (AMNH [LP2731]). (C-D) Female paratype (AMNH [LP2716]). Scale lines: 10 mm.

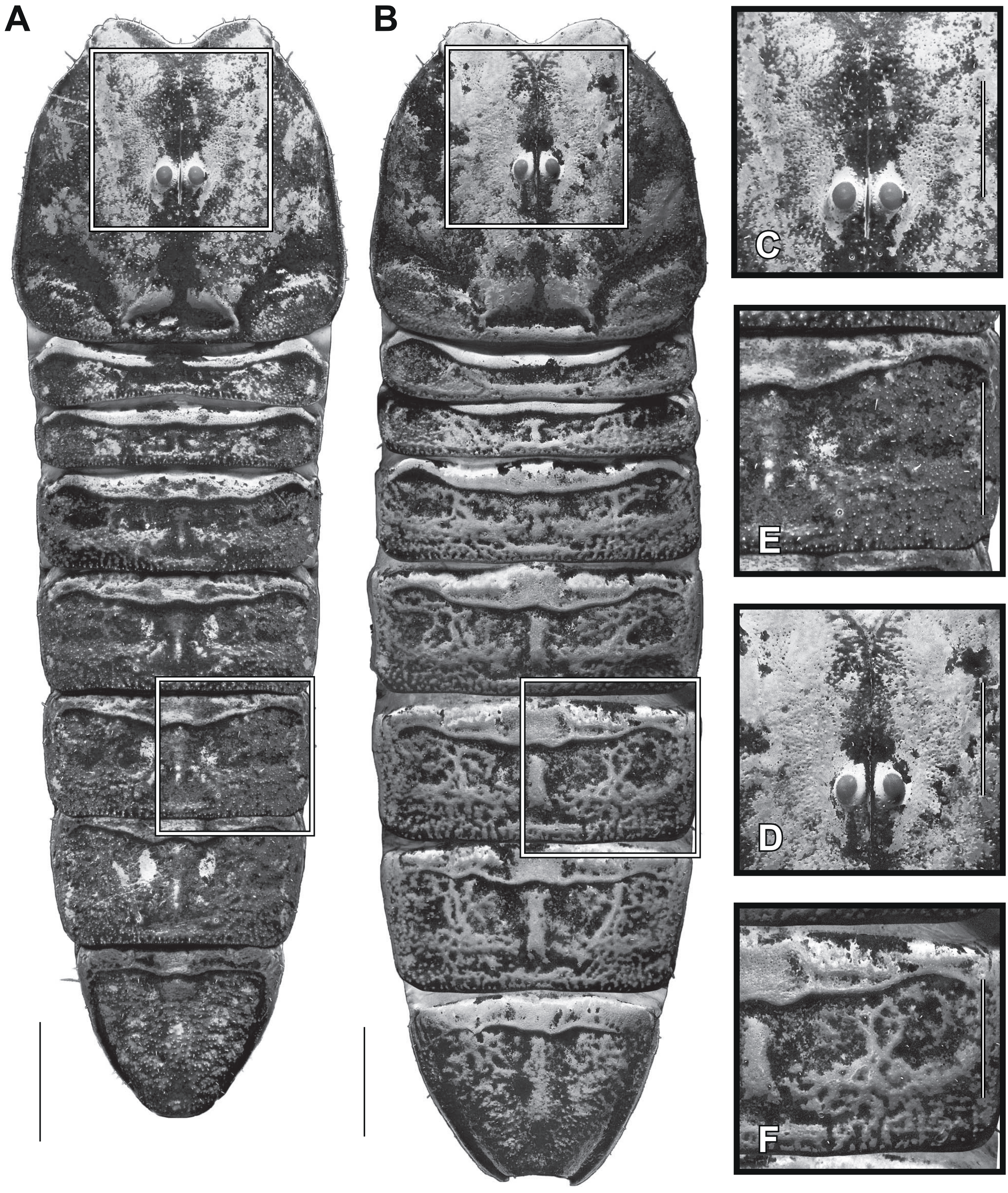

Fig. 75. *Hormurus cameroni* sp. nov., carapace and mesosomal tergites showing ornamentation and macrosculpture of cuticle (A-B), detailed views of carapace (C-D) and of tergite V (E-F), dorsal aspect. (A, C, E) Male holotype (AMNH [LP2731]). (B, D, F) Female paratype (AMNH [LP2716]). Scale lines: 3 mm (A-B), 2 mm (C-F).

distal); dorsal distal tooth smaller than ventral distal tooth; ventral margin smooth.

Pedipalps (Figs 74A-B, 76B-E, G-J, L-O): Segments long and slender, femur distincly longer than carapace. Chela almost asetose.

Chela fingers (Fig. 77A, C-D): Fixed finger: basal lobe well developed and conical; suprabasal notch distinct and deep; dentate margins distally (from tip of finger to median lobe) with two rows of primary denticles bearing large inner accessory denticles; few sparse denticles on suprabasal notch; single row of denticles on basal lobe. Movable finger: basal lobe absent; suprabasal lobe well developed, conical, gently rounded dorsally and lacking sharp conical tooth, not overlapping with fixed finger; suprabasal lobe and corresponding notch on fixed finger contiguous, no proximal gap or at most a reduced gap only evident when fingers closed; dentate margins distally (from tip of finger to suprabasal lobe) with two rows of primary denticles bearing large inner accessory denticles; few sparse denticles basally.

Pedipalp carinae: Femur (Fig. 76L-O): proventral carina visible as a ridge of medium-sized spiniform granules; promedian carinae absent; prodorsal carina visible as a ridge of medium-sized to large spiniform granules, similarly developed as proventral carina; retrodorsal carina visible as a ridge of medium-sized spiniform granules, similarly developed as prodorsal carina, more distinct in proximal third of segment; retroventral carina visible as a ridge of medium to large spiniform granules, distinctly more developed than retrodorsal carina; ventromedian carina obsolete, only discernible proximally as a ridge of medium-sized spiniform granules. Patella (Fig. 76G-J): proventral carina expressed as costate-granular ridge proximally, obsolete distally; promedian and prodorsal carinae visible as ridges with medium-sized spiniform granules, equally developed, fused medially into prominent spiniform process with medially located pointed apex; dorsomedian carina only visible proximally as a ridge of medium-sized spiniform granules; retrodorsal carina obsolete, only expressed proximally as a faint ridge of medium-sized spiniform granules; paired retromedian carinae fused and visible as a faint ridge of medium-sized spiniform granules; retroventral carina crenulate (composed of medium to large granules). Chela manus (Fig. 76B-E): proventral and promedian carinae visible as faint ridges with medium-sized spiniform granules, equally developed; prodorsal carina obsolete, visible as very faint ridge of medium-sized spiniform granules; dorsomedian carina visible as a faint ridge of medium-sized spiniform granules, more strongly developed than prodorsal carina; dorsal secondary carina obsolete; digital carina visible as a ridge of small spiniform granules, less distinct in distal area, more developed than retromedian carina; fused retromedian carinae obsolete, visible as a faint ridge of medium-sized spiniform granules proximally; retrolateral secondary carina vestigial, only discernible proximal to condyle of movable finger as a ridge of small spiniform granules; retroventral carina crenulate (composed of medium to large granules); ventromedian carina obsolete, only expressed proximally as a faint ridge of medium-sized spiniform granules.

Pedipalp macrosculpture: Femur (Fig. 76L-O): prolateral intercarinal surface densely covered with small spiniform granules; dorsal intercarinal surface densely covered with medium-sized spiniform granules, distal area smooth; retrolateral dorsal intercarinal surface sparsely covered with medium-sized spiniform granules; retrolateral ventral intercarinal surface densely covered with medium-sized spiniform granules, proximally smooth; ventral intercarinal surface densely covered with medium-sized spiniform granules, distal area smooth. Patella (Fig. 76G-J): prolateral intercarinal surface sparsely covered with small to medium-sized spiniform granules, distal area smooth; dorsal and retrolateral intercarinal surfaces covered with dense reticulate network of medium-sized spiniform granules; ventral intercarinal surface covered with sparse reticulate network of medium-sized spiniform granules, distal area smooth. Chela manus (Fig. 76B-E): prolateral intercarinal surface covered with sparse reticulate network of small to medium-sized spiniform granules, smooth proximally; dorsal and retrolateral intercarinal surfaces covered with dense reticulate network of medium-sized spiniform granules; ventral intercarinal surface covered with sparse reticulate network of medium-sized spiniform granules, distal area smooth. Chela fingers densely covered with small spiniform granules in proximal half, smooth or nearly so distally, ventral surface smooth; trichobothria *dst*, *dsb* and *db* together in a single large smooth depression.

Trichobothria: Pedipalp orthobothriotaxic, accessory trichobothria absent. Patella (Fig. 76G-J): d_2 trichobothrium distal to patellar process; five *eb* trichobothria arranged in two groups (eb_1+eb_{4-5} and eb_{2-3}); two *esb*, two *em* and one *est* trichobotria arranged in three groups (esb_{1-2}, em_{1-2} and *est*); three *et* trichobothria; three *v* trichobothria. Chela manus (Fig. 76B-E): *Dt* situated in proximal third of manus; Eb_3 close to Eb_{1-2}; *Esb* aligned with *Est*, sometimes situated slightly more distal to it; *Est* situated near midpoint; four *V* trichobothria, V_3 distant from V_4. Fixed chela finger with *db* situated on dorsal surface; *esb* only slightly closer to *eb* than to *est*; *eb* situated at base of finger, proximal to point of articulation between fixed and movable fingers; two *i* trichobothria.

Coxosternum (Fig. 78A, C): Coxa III elongated anterodistally, without anterodistal process. Sternum equilateral pentagonal (anterior width slightly greater than posterior width), slightly wider than long.

Legs (Fig. 79): Femora I-IV with ventral surfaces bicarinate, pro- and retroventral carinae granular. Retrolateral margins of tibiae I-II without setiform macrosetae. Basitarsi I-IV: pro- and retroventral rows each with 3/4, 4/5, 4/5 and 4/5 setiform macrosetae, respectively. Telotarsi I-IV: pro- and retroventral rows each with 3-4/4, 4/4, 4-5/4 and 4-5/5 setiform macrosetae, respectively; retroventral row with one proximal spinule;

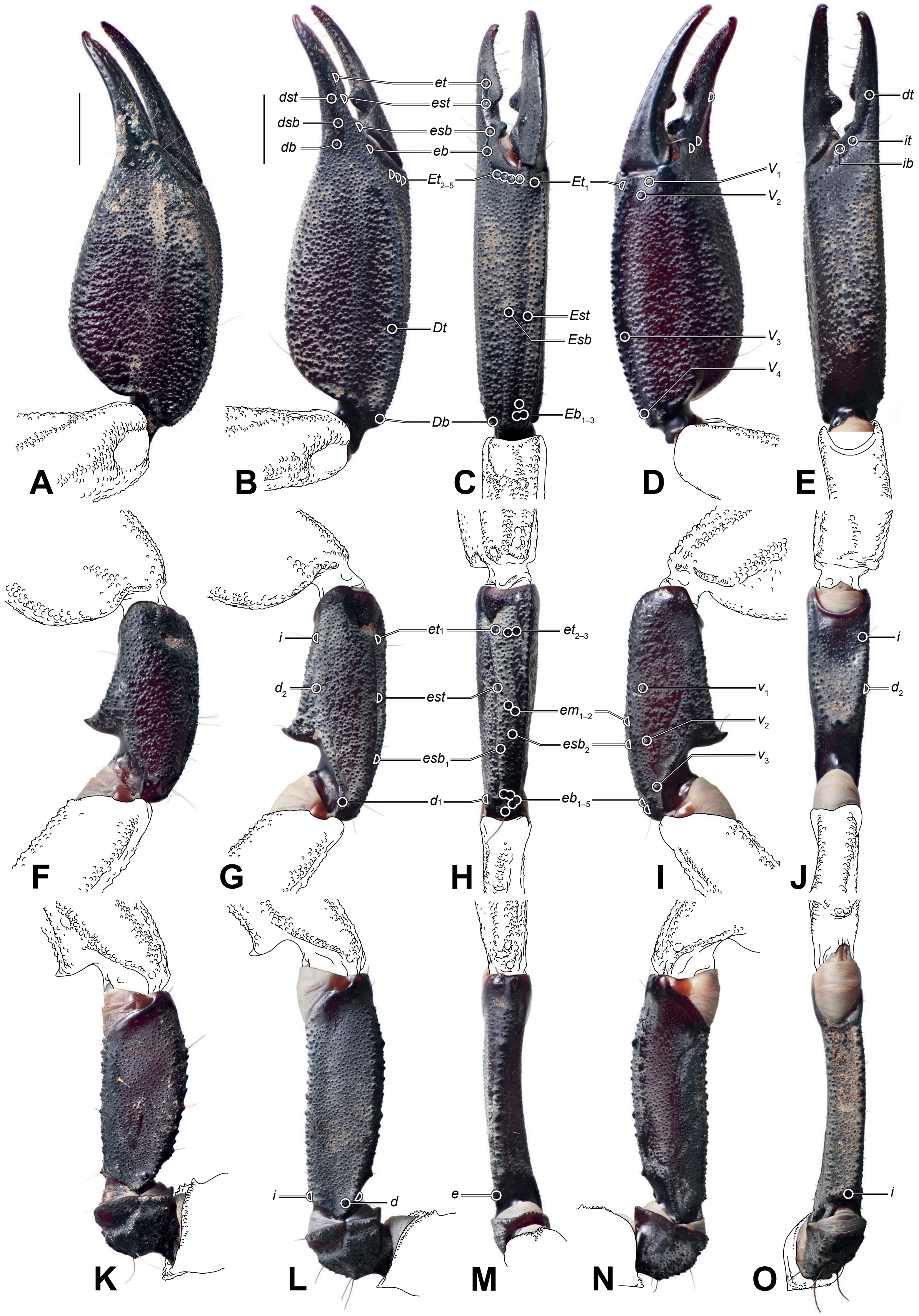

Fig. 76. *Hormurus cameroni* sp. nov., pedipalp chela (A-E), patella (F-J), femur and trochanter (K-O), dorsal (A-B, F-G, K-L), retrolateral (C, H, M), ventral (D, I, N) and prolateral (E, J, O) aspects showing trichobothria pattern. (A, F, K) Female paratype (AMNH [LP2716]). (B-E, G-J, L-O) Male holotype (AMNH [LP2731]). Scale lines: 3 mm.

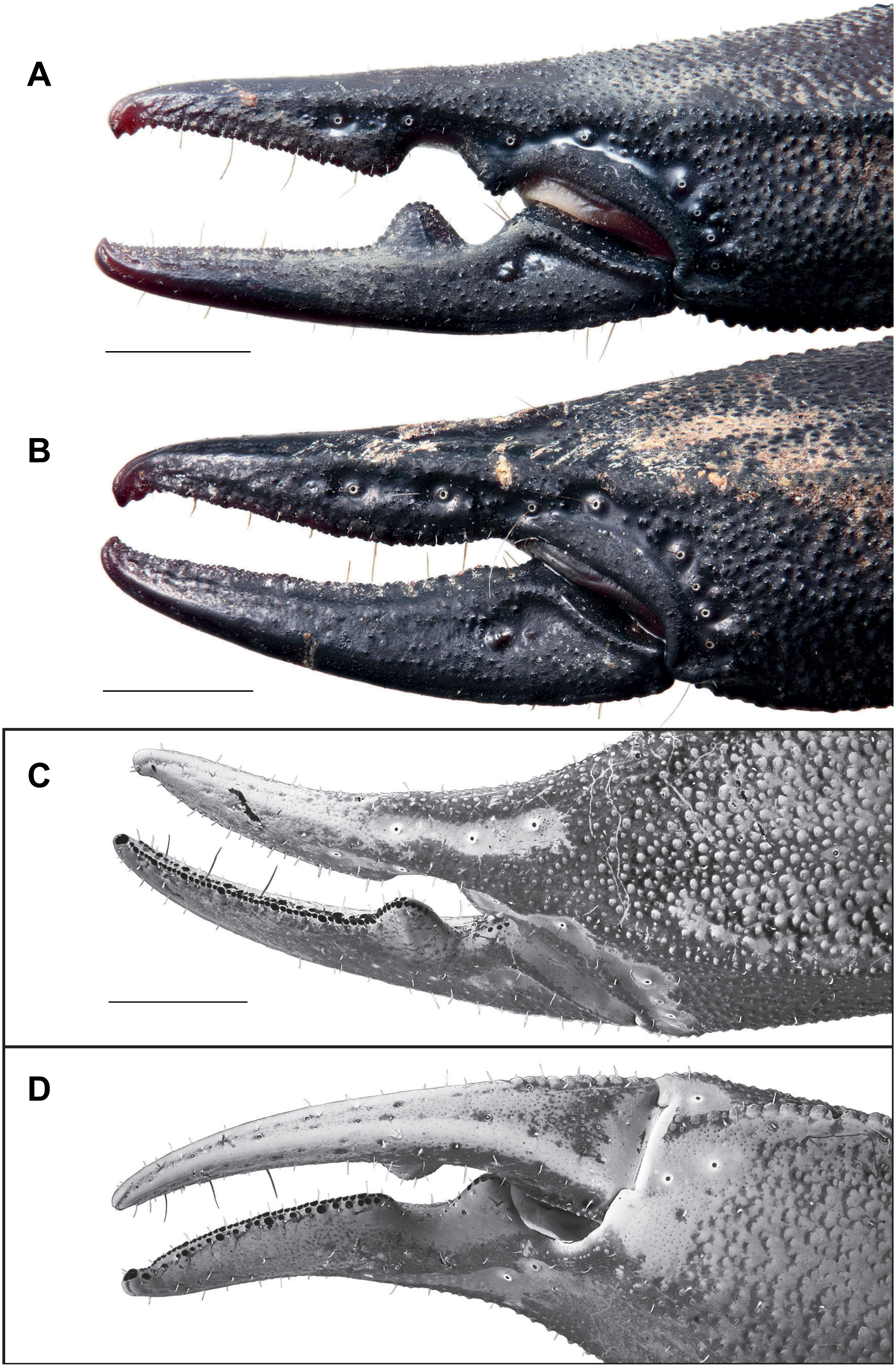

Fig. 77. *Hormurus cameroni* sp. nov., left pedipalp chelae, retrolateral aspect showing dentate margin of chela fingers (A-B), dorsal aspect showing dentate margin of movable finger (C), ventral aspect showing dentate margin of fixed finger (D). (A, C-D) Male holotype (AMNH [LP2731]). (B) Female paratype (AMNH [LP2716]). Scale lines: 2 mm.

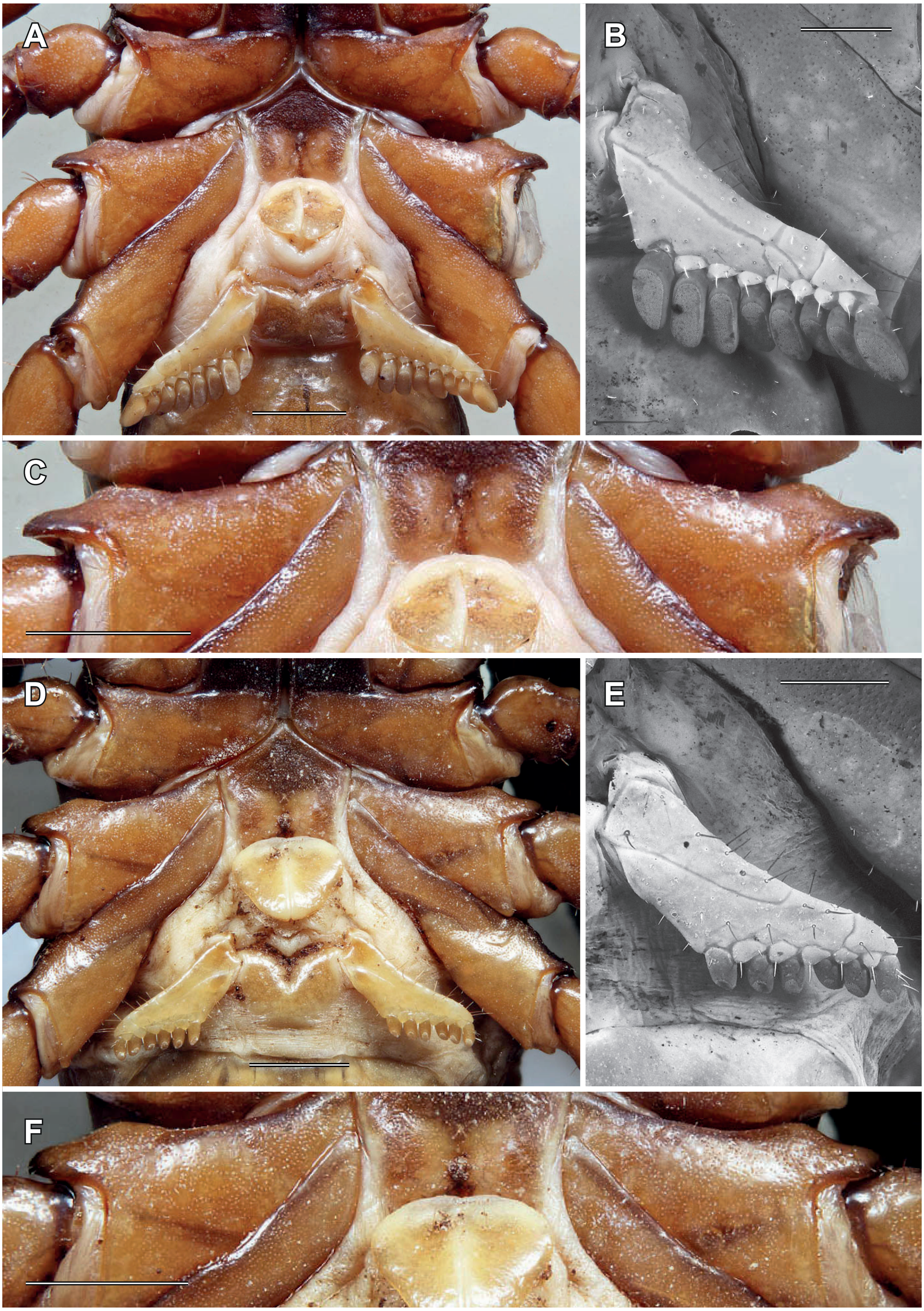

Fig. 78. *Hormurus cameroni* sp. nov., coxae II-IV, sternum, genital operculum and pectines, ventral aspect (A, D), left pecten under UV light (B, E), anterior margin of coxae III (C, F). (A-C) Male holotype (AMNH [LP2731]). (D-F) Female paratype (AMNH [LP2716]). Scale lines: 2 mm (A, C-D, F), 1 mm (B, E).

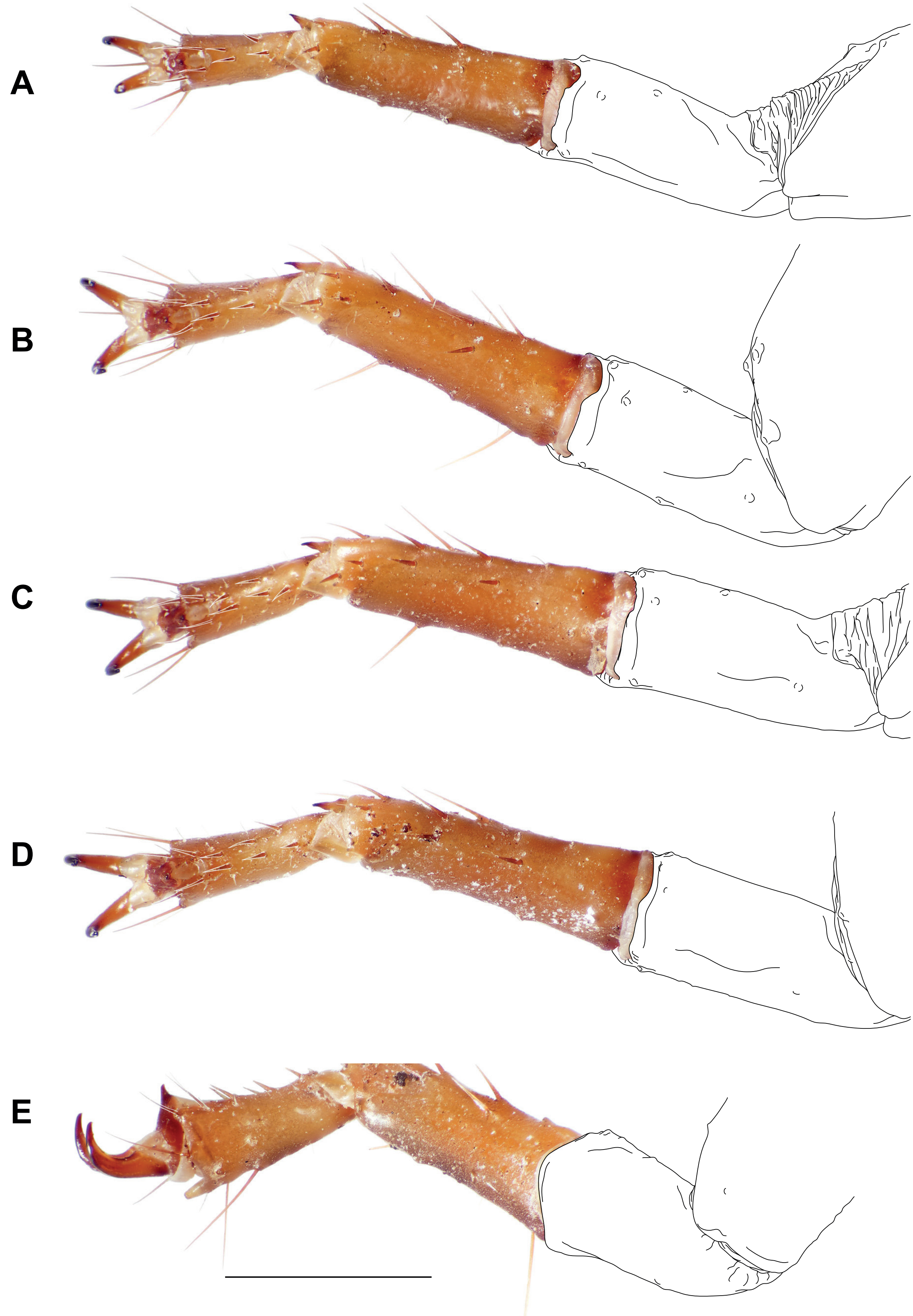

Fig. 79. *Hormurus cameroni* sp. nov., male paratype (LSUM, East Cape), right tarsi, ventral (A-D) and retrolateral (E) aspects. (A) Tarsus I. (B) Tarsus II. (C) Tarsus III. (D-E) Tarsus IV. Scale line: 2 mm.

ventromedian spinules absent. Ungues shorter than telotarsus, half its length or less.
Genital operculum (Fig. 78A): Composed of two subtriangular sclerites.
Pectines (Fig. 78A-B): Moderately elongated, distal edge reaching but not extending beyond distal edge of coxa IV; fulcrae and three marginal lamellae present. Pectinal teeth count 8-9; teeth straight, entirely covered with sensory papillae.
Mesosoma (Figs 74A-B, 75A, E): Pre-tergites I-VII and posterior margins of pre-tergites smooth. Post-tergites: posterior margins of tergites I-VI sublinear, without distinct projection; lateral transversal sulcus present; intercarinal surfaces of I-VII densely covered with small spiniform granules, slightly less granular medially on I-III; intercarinal surfaces of III-VII with distinct but faint reticulate network of ridges and dimples. Respiratory stigmata (spiracles) of sternites IV-VI short, their length less than third of sternite width, and distinctly crescent shaped. Sternite VII acarinate.
Metasoma (Fig. 80B-C): Not markedly compressed laterally; intercarinal surfaces sparsely and minutely granular, posterior segments less so; dorsal intercarinal surface of V smooth and shiny medially; distinct dorsomedian sulcus on segments I-IV, much less pronounced on segment V (usually only faintly expressed anteriorly).
Metasoma carinae: Segments I-IV: dorsolateral carinae obsolete on all segments; lateral median carinae weakly developed (as faint ridges); lateral inframedian carinae discernible anteriorly as a faint ridge on segment I, absent on other segments; ventrolateral carinae weakly developed (as faint ridges); paired ventrosubmedian carinae weakly developed (as low ridges). Segment V: dorsolateral and lateral median carinae obsolete; ventrolateral carinae only expressed as faint ridges; ventrosubmedian carinae fused, only expressed as a faint ridge in anterior two-thirds.
Metasoma spination: Segment I: dorsomedian posterior and dorsolateral posterior spiniform granules absent;

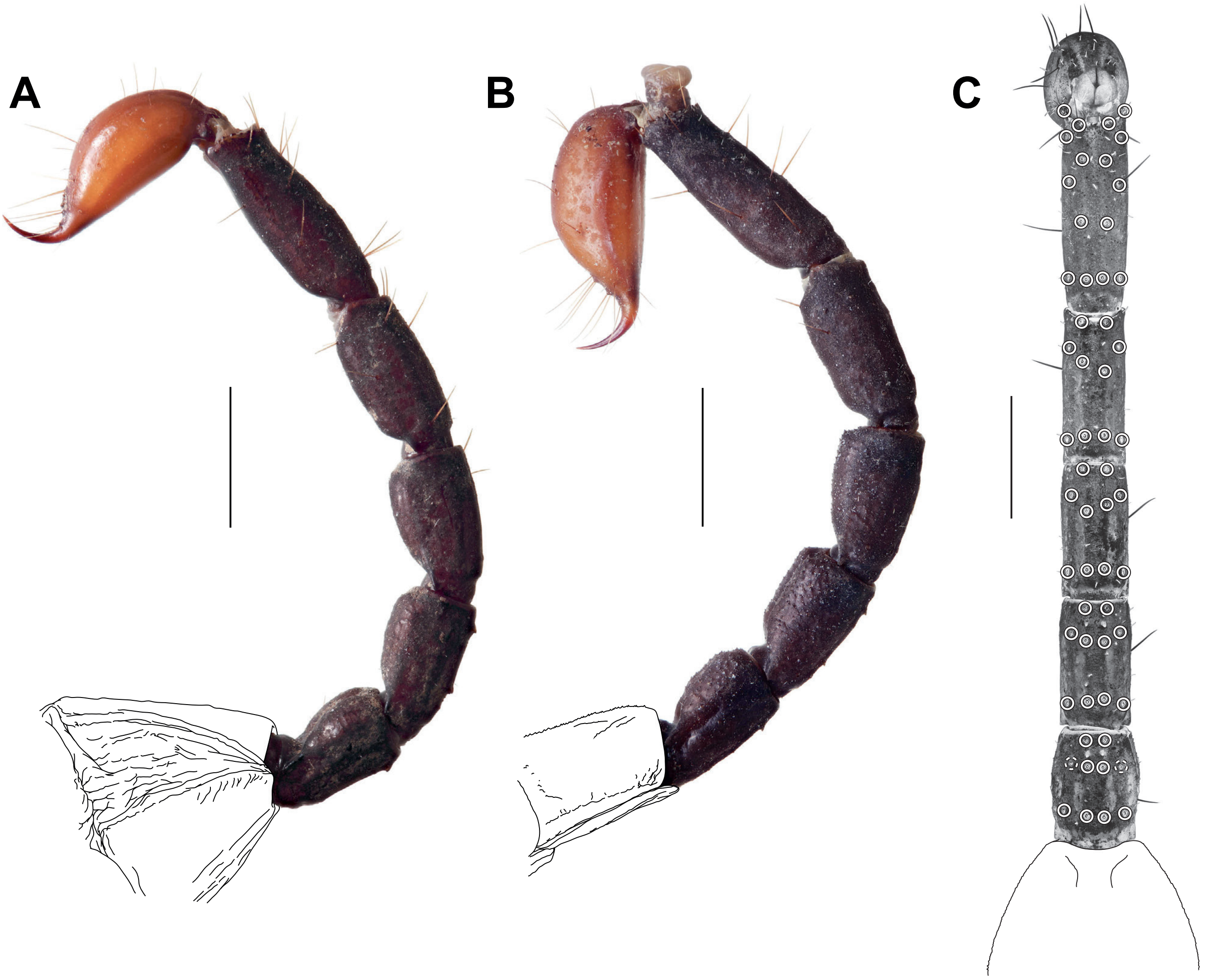

Fig. 80. *Hormurus cameroni* sp. nov., metasoma and telson, lateral (A-B) and ventral (C) aspects. (A) Female paratype (AMNH [LP2716]). (B-C) Male paratype (LSUM, Lookout Duabo). Dotted circles in C indicate macrosetae not expressed in some specimens. Scale lines: 3 mm.

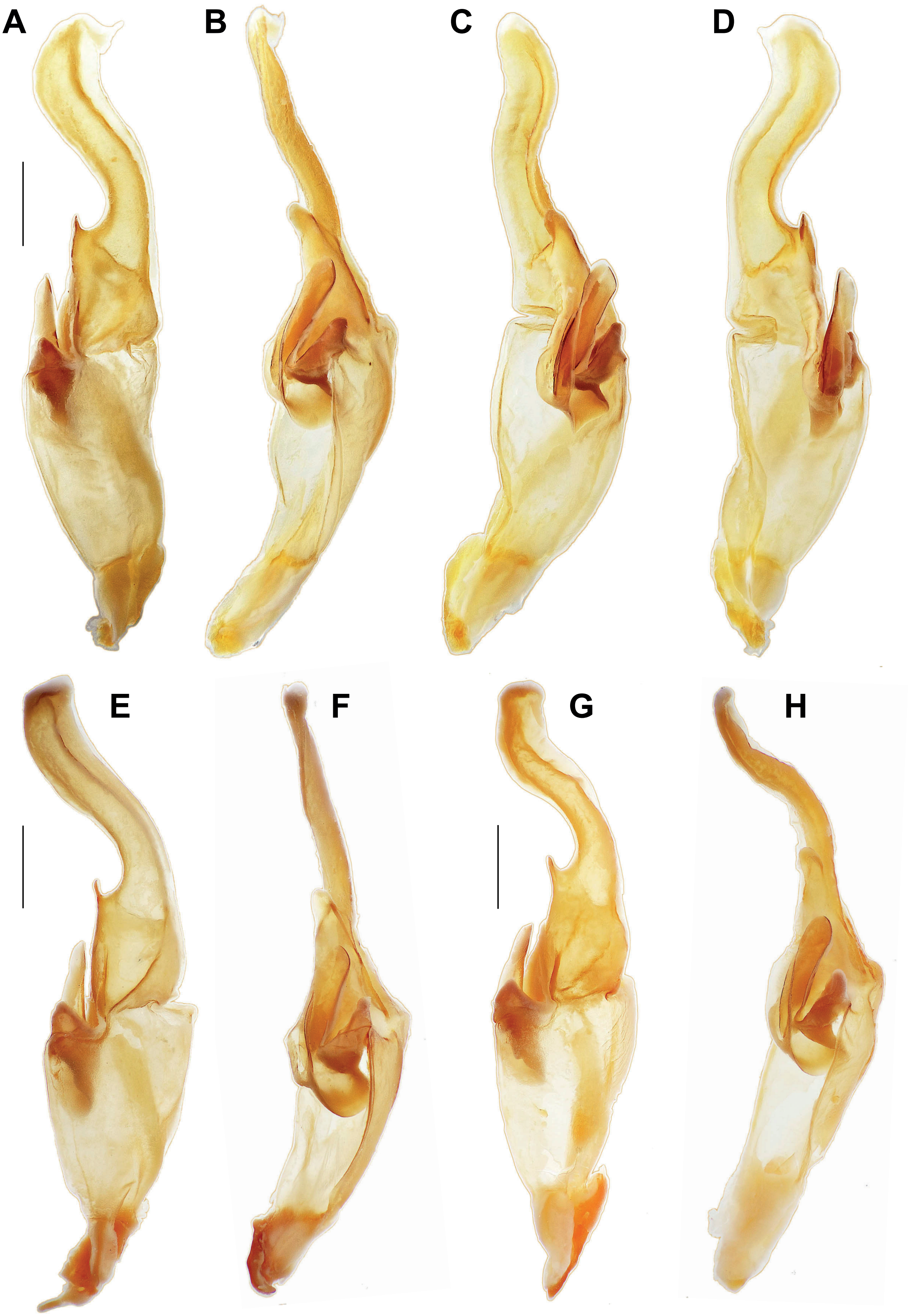

Fig. 81. *Hormurus cameroni* sp. nov., left hemispermatophore of male holotype (AMNH [LP273]) (A-D), of male paratype (LSUM, Lookout Duabo) (E-F) and of male paratype (LSUM, East Cape) (G-H). (A, E, G) Lateral aspect. (B, F, H) Anterior aspect. (C) Rotated approximately 45° counter-clockwise from anterior aspect. (D) Contralateral aspect. Scale lines: 1 mm.

ventrolateral carinae without large spiniform granules; ventrosubmedian carinae with one pair of subposterior spiniform granules and 0-1 pair of median granules. Segment II: dorsomedian posterior and dorsolateral posterior spiniform granules absent; ventrolateral carinae without large spiniform granules; ventrosubmedian carinae with one pair of subposterior spiniform granules and one pair of median spiniform granules. Segments III-IV: dorsolateral posterior spiniform granules absent; ventrolateral and ventrosubmedian carina without large spiniform granules. Segment V: ventrolateral carinae without distinct granules or spines, ventromedian carina usually also without distinct spines, rarely with minute spiniform granules; anal arch crenulate.

Ventral metasoma setation: Segment I with ten macrosetae, i.e. three pairs (anterior, median and posterior) on ventrosubmedian carinae and two pairs (anterior and supramedian) on ventrolateral carinae; segments II-IV each with ten macrosetae, i.e. three pairs (anterior, median and posterior) on ventrosubmedian carinae and two pairs (anterior and supramedian) on ventrolateral carinae; segment V with 16 macrosetae, i.e. four pairs (anterior, median, subposterior and posterior) on ventrosubmedian carinae and four pairs (anterior, supramedian, subposterior and posterior) on ventrolateral carinae.

Telson (Fig. 80B): Slightly longer than metasoma segment V; vesicle smooth, without granules; aculeus short (less than half of vesicle length), strongly curved.

Hemispermatophore (Fig. 81): Stalk slightly longer than stem. Distal lamina curved, without distal crest on anterior margin; single laminar hook, submedian, situated between 1/3 and 3/7 from base of stalk (basal part/distal lamina ratio = 0.55-0.66, median = 0.57); transverse ridge distinct, more proximal than base of laminar hook, merging with anterior margin more distally than base of laminar hook. Capsule: hemisolenos thin, folded on itself only proximally, above that unfolded to flattened distal tip (tip and base approximately of same width), without lateral longitudinal carina, laterodistal accessory hook or medioposterior accessory apophysis; tip of hemisolenos more proximal than base of laminar hook, more distal than tip of clasper. Clasper well developed, forming distinct hump, not hook-like, without anterior accessory process. Subex well developed, spoon-shaped, merging anteriorly with base of clasper; posterior edge forming obtuse angle (>90°) with hemisolenos; anterior edge forming right angle (90º) with hemisolenos.

Description of adult female: Same characters as for male except as follows. *Pedipalps* (Figs 74C-D, 76A, F, K): Segments noticeably shorter or more robust than in male.

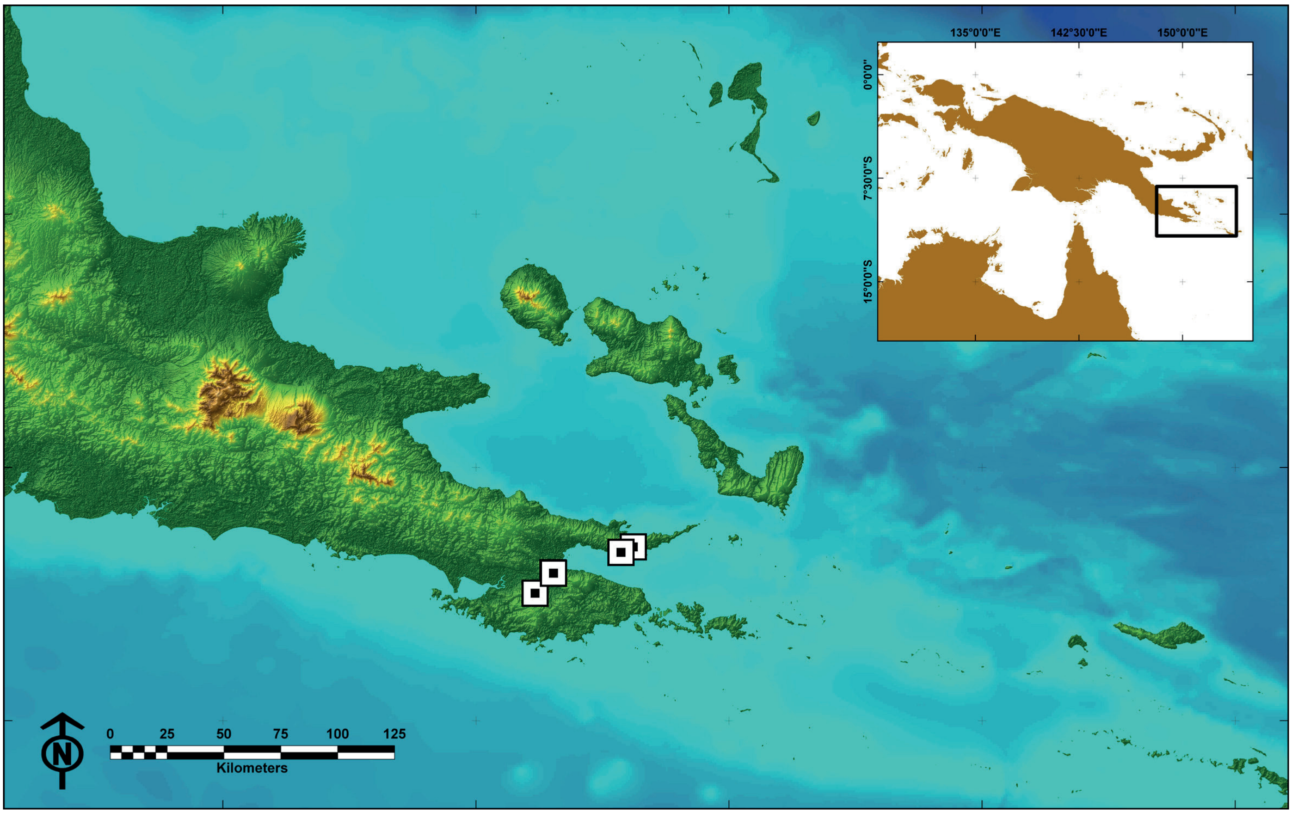

Fig. 82. Known localities of *Hormurus cameroni* sp. nov. at the eastern tip of mainland New Guinea, Milne Bay Province. Color gradient indicates topography and bathymetry.

Chela fingers (Fig. 77B): Dentate margins linear or nearly so, without pronounced lobe and notch, with two rows of primary denticles extending from tip to base of fingers and bearing large inner accessory denticles.
Carapace (Fig. 75B, D): Posteromedian margin smooth.
Genital operculum (Fig. 78D): Oval to semi-oval, as wide as long or only slightly wider than long (length/width ratio = 0.72-1.00, median = 0.94); opercular sclerites partly fused, with distinct median suture; posterior notch present, at least weakly developed.
Pectines (Fig. 78D-E): Short, distal edge not reaching distal edge of coxa IV. Pectinal teeth count 6-7; teeth short and straight, sensory papillae covering only distal half.
Mesosoma (Figs 74C-D, 75B, F): Post-tergites: reticulate network of ridges and dimples on segments III-VII more distinct than in male; intercarinal surfaces of I-II medially smooth, laterally granular; intercarinal surfaces of III-VI almost totally smooth, faintly granular along lateral margins; intercarinal surfaces of VII densely granular, proximal third smooth.
Metasoma (Fig. 80A): Spination: ventrosubmedian carinae of segment II with 1-2 pairs of subposterior spiniform granules and 0-2 pairs of median spiniform granules.

Intraspecific variation: *Pedipalp trichobothria*: On the retrolateral side of pedipalp patella trichobothrium esb_1 is in some specimens located midway between esb_2 and em_{1-2}, resulting in four groups (esb_1, esb_2, em_{1-2} and *est*) instead of three.
Leg spination: The number of setiform macrosetae varies from three to four in the proventral row of telotarsi I and from four to five in the proventral rows of telotarsi III-IV.
Genital operculum: The length/width ratio varies from 0.72 to 1.00 (median = 0.94).
Pectines: The pectinal teeth count varies from eight to nine in males and from six to seven in females.
Metasoma: Spination: 0-1 pair of median spiniform granules is present on the ventrosubmedian carinae of segment I; 1-2 pairs of subposterior spiniform granules and 0-2 pairs of median spiniform granules are present on the ventrosubmedian carinae of segment II. Furthermore, one more or one fewer granule may be expressed in each group of granules on each segment.
Ventral metasoma setation: One or two fewer macroseta may be expressed on each segment (usually in the supramedian group and less frequently in the anterior or posterior groups) resulting in a total of eight or nine macrosetae instead of ten on segments I-IV, and a total of 15 instead of 16 on segment V.
Hemispermatophores: The basal part/distal lamina ratio varies from 0.55 to 0.66 (median = 0.57).

Distribution and ecology: *Hormurus cameroni* sp. nov. is only known from the eastern tip of mainland New Guinea, Milne Bay Province (Fig. 82). Specimens were found in or under logs on the forest floor.

Hormurus yela Monod & Prendini, sp. nov.
Figs 4F, 83-92, Tab. 9

This species was treated under the manuscript name "Hormurus yelae" in Monod (2011a: 294, 533, 536).

Material: AMNH [LP 3007]; ♂ holotype; Papua New Guinea, Milne Bay Province, Rossel Island, Pipikea, camp 2, 253 m, 11.33°S, 154.22°E; 11.V.2004; leg. J.D. Slapcinsky (JS-0718). – AMNH [LP 3007]; 7 ♀ paratypes; same data as for holotype. – UMMZ [LP 3007]; 5 imm. paratypes; same data as for holotype. – AMNH [LP 3006]; 1 ♀ paratype; Rossel Island, Lubwe creek at base of Tachu Gap, 638 m, 11.35°S, 154.22°E; 6.V.2004; leg. J.D. Slapcinsky (JS-0716).

Etymology: Yela is the Papuan name for Rossel Island, to which the species is most probably endemic. The epithet is an invariable name in apposition.

Diagnosis: *Hormurus yela* sp. nov. can be easily distinguished from other Papuan *Hormurus* by the ventral setation of the metasoma. This species has the highest number of macrosetae (Fig. 90C): 12 on segment I, i.e. three pairs (anterior, median and posterior) on the ventrosubmedian carinae and three pairs (anterior, median and supramedian) on the lateral carinae, 16 on segments II-IV, i.e. four pairs (anterior, submedian, median and posterior) on the ventrosubmedian carinae and four pairs (anterior, submedian, median and supramedian) on the ventrolateral carinae, and 20 on segment V, i.e. five pairs (anterior, median, supramedian, subposterior and posterior) on the ventrosubmedian carinae and five pairs (anterior, median, supramedian, subposterior and posterior) on the lateral carinae. Moreover, among Papuan *Hormurus* the presence of a tetrahedral anterior accessory process on the hemispermatophore claspers (Fig. 91) is unique to this species.

Description of adult male (holotype): *Colouration* (Figs 83, 84A-B): Dorsal surface of chelicera manus dark orange with brown infuscation, more pronounced anteriorly; fingers black. Carapace reddish brown, median ocular region black. Tergites brown. Pedipalps reddish brown; carinae and fingers black. Legs paler than tergites, dorsal and ventral surfaces dark orange to yellow distally (tibiae, telotarsi and basitarsi paler than other sclerites); prolateral carina of femora black. Coxapophysis II brown to black; coxapophysis I and leg coxae light brown to orange; sternum light brown; sternites III-VI light brown to brown, with darkened lateral margins, V with medioposterior half pale yellow; sternite VII dark brown; genital operculum and pectines pale yellow. Metasoma reddish brown; telson paler than metasoma, vesicle orange, aculeus reddish brown.
Cuticle: Nongranular surfaces of carapace, pedipalps, legs, mesosoma and metasoma finely punctate.
Carapace (Fig. 85A, C): Anterior margin with median

Table 9. *Hormurus yela* sp. nov., measurements (in mm), repository and inventory number of adult male holotype and adult females paratypes.

	Holotype	Paratype	Paratype	Paratype	Paratype	Paratype	Paratype
Sex	♂	♀	♀	♀	♀	♀	♀
Repository	AMNH	AMNH	AMNH	AMNH	AMNH	AMNH	AMNH
Inventory number	LP3007	LP3007	LP3007	LP3007	LP3007	LP3007	LP3007
Locality	Pipikea	Pipikea	Pipikea	Pipikea	Pipikea	Pipikea	Pipikea
Total length	46.00	57.00	63.00	68.00	62.00	56.00	58.00
Carapace, length	6.95	8.41	8.53	8.41	8.17	8.29	8.17
Carapace, anterior width	5.06	6.22	6.10	5.97	5.85	6.24	5.85
Carapace, posterior width	7.56	9.87	9.39	9.57	9.51	10.00	8.87
Pedipalp femur, length	10.06	9.75	9.26	9.93	9.08	9.75	9.14
Pedipalp femur, width	2.93	3.54	3.41	3.66	3.41	3.54	3.47
Pedipalp femur, height	1.40	1.85	1.83	1.95	1.83	1.83	1.85
Pedipalp patella, length	9.81	9.63	9.39	9.57	8.96	9.63	9.20
Pedipalp patella, width	3.17	4.14	3.78	4.02	3.78	4.02	3.90
Pedipalp patella, height	2.32	3.05	2.93	3.17	3.05	3.05	2.93
Pedipalp chela, length	16.92	19.20	18.82	18.69	17.60	19.06	18.22
Pedipalp chela, width	4.63	7.44	7.13	7.05	6.70	7.19	6.61
Pedipalp chela, height	3.05	3.90	3.78	3.84	3.78	3.90	3.78
Chela movable finger, length	7.50	9.08	9.20	9.02	8.65	9.33	8.65
Genital operculum length, female	NA	2.32	2.32	2.32	2.07	2.32	2.00
Genital operculum width, female	NA	2.56	2.44	2.56	2.32	2.50	2.07
Metasoma segment I, length	2.86	3.17	3.05	3.17	2.99	3.02	3.05
Metasoma segment I, width	1.77	2.32	2.19	2.19	2.07	2.26	2.19
Metasoma segment I, height	1.71	2.07	1.95	2.19	2.01	2.05	2.01
Metasoma segment II, length	3.17	3.72	3.66	3.66	3.41	3.66	3.66
Metasoma segment II, width	1.52	1.83	1.80	1.95	1.79	1.85	1.83
Metasoma segment II, height	1.71	1.95	1.83	1.97	1.83	1.95	1.89
Metasoma segment III, length	3.35	3.96	3.90	3.90	3.66	3.90	4.02
Metasoma segment III, width	1.44	1.71	1.68	1.71	1.65	1.71	1.71
Metasoma segment III, height	1.58	1.93	1.83	1.95	1.80	1.89	1.83
Metasoma segment IV, length	3.54	4.27	4.14	4.02	3.90	4.21	4.08
Metasoma segment IV, width	1.28	1.52	1.56	1.58	1.46	1.56	1.56
Metasoma segment IV, height	1.49	1.71	1.71	1.83	1.68	1.71	1.71
Metasoma segment V, length	4.21	4.88	4.57	4.39	4.14	4.63	4.69
Metasoma segment V, width	1.34	1.58	1.58	1.46	1.52	1.52	1.56
Metasoma segment V, height	1.46	1.58	1.61	1.58	1.58	1.68	1.65
Telson, length	4.82	5.49	5.24	5.14	4.88	5.49	5.12
Telson, width	1.56	1.68	1.65	1.71	1.56	1.73	1.73
Telson, height	1.71	1.85	1.89	1.95	1.71	1.89	1.83

Fig. 83. *Hormurus yela* sp. nov., habitus of male, dorsal aspect, reconstruction based on photographs. Scale line: 10 mm.

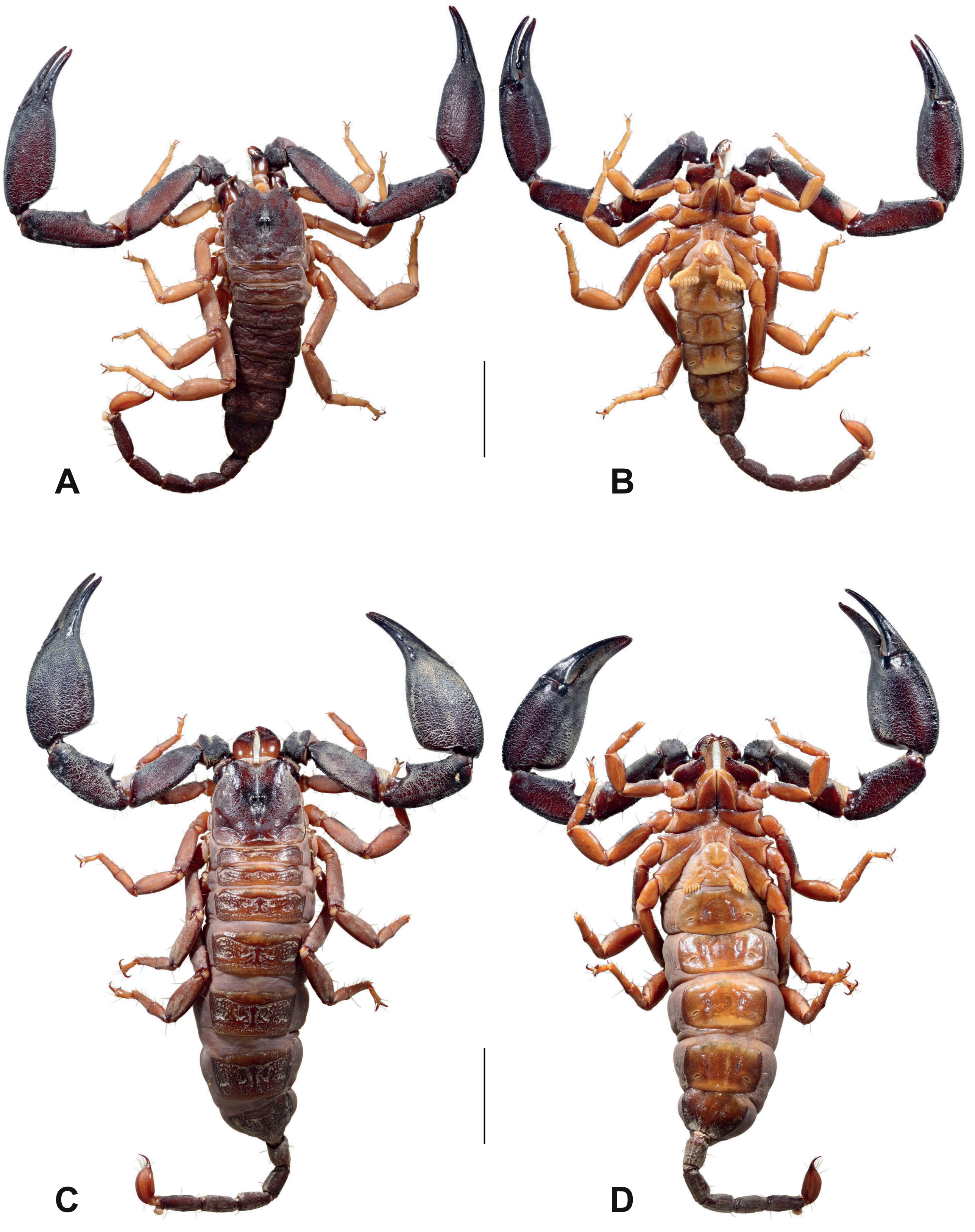

Fig. 84. *Hormurus yela* sp. nov., habitus, dorsal (A, C) and ventral (B, D) aspect. (A-B) Male holotype (AMNH [LP3007]). (C-D) Female paratype (AMNH [LP3007]). Scale lines: 10 mm.

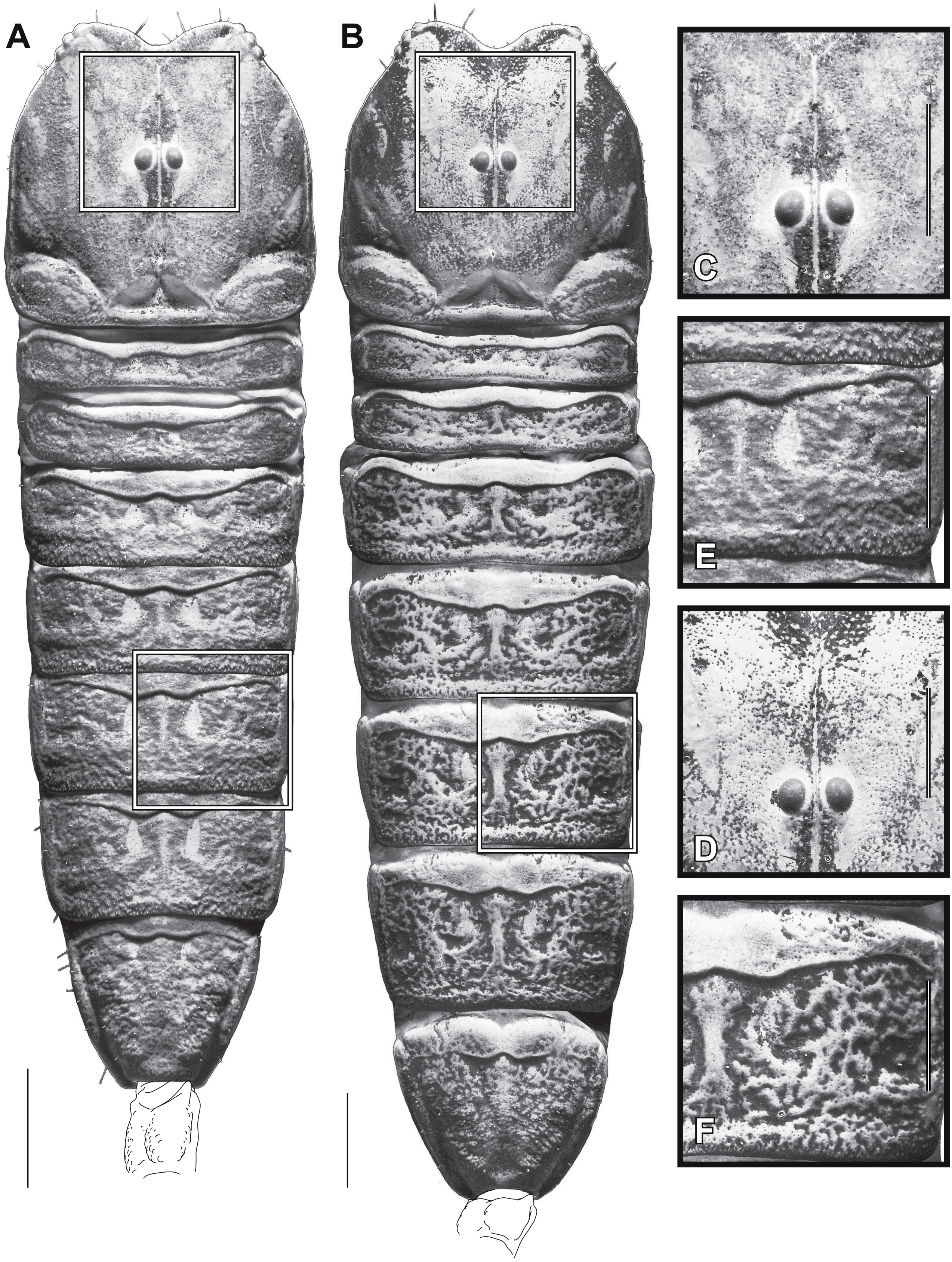

Fig. 85. *Hormurus yela* sp. nov., carapace and mesosomal tergites showing ornamentation and macrosculpture of cuticle (A-B), detailed views of carapace (C-D) and of tergite V (E-F), dorsal aspect. (A, C, E) Male holotype (AMNH [LP3007]). (B, D, F) Female paratype (AMNH [LP3007]). Scale lines: 3 mm (A-B), 2 mm (C-F).

notch moderately excavated. Anterior furcated sutures distinct. Median ocular tubercle slightly raised; median ocelli present, at least twice the size of lateral ocelli, separated from each other by approximately the diameter of a median ocellus. Three pairs of lateral ocelli, equal in size, equidistant and adjacent to each other. Surfaces minutely and sparsely granular, except for smooth frontal lobes (median longitudinal sulci and anterior furcated sulci granular) and median ocular area.

Chelicerae: Basal and median teeth of fixed finger fused into bicusp. Dorsal margin of movable finger with four teeth (one basal, one median, one subdistal and one distal); dorsal distal tooth smaller than ventral distal tooth; ventral margin smooth.

Pedipalps (Figs 83, 84A-B, 86B-E, G-J, L-O): Segments long and slender, femur longer than carapace. Chela almost asetose.

Chela fingers (Fig. 87A, C-D): Fixed finger: basal lobe well developed and conical; suprabasal notch distinct and deep; dentate margins distally (from tip of finger to median lobe) with two rows of primary denticles bearing large inner accessory denticles; denticles absent on suprabasal notch; single row of denticles on basal lobe. Movable finger: basal lobe absent; suprabasal lobe well developed, conical, gently rounded dorsally and lacking sharp conical tooth, not overlapping with fixed finger; suprabasal lobe and corresponding notch on fixed finger contiguous, no proximal gap or at most a reduced gap only evident when fingers closed; dentate margins distally (from tip of finger to suprabasal lobe) with two rows of primary denticles bearing large inner accessory denticles; few sparse denticles basally.

Pedipalp carinae: Femur (Fig. 86L-O): Proventral carina visible as a ridge of medium-sized spiniform granules; promedian carinae absent; prodorsal carina visible as a ridge of medium-sized to large spiniform granules, similarly developed as proventral carina; retrodorsal carina visible as a ridge of small to medium-sized spiniform granules, less developed than prodorsal carina, more distinct in proximal third of segment; retroventral carina visible as a ridge of medium to large spiniform granules, distinctly more developed than retrodorsal carina; ventromedian carina obsolete, only discernible proximally as a ridge of small spiniform granules. Patella (Fig. 86G-J): proventral carina expressed as costate-granular ridge proximally, obsolete distally; promedian and prodorsal carinae visible as ridges with medium-sized spiniform granules, equally developed, fused medially into low spiniform process with pointed medially located apex; dorsomedian carina only visible proximally as a ridge of small spiniform granules; retrodorsal carina obsolete, only expressed proximally as a faint ridge of small to medium-sized spiniform granules; paired retromedian carinae fused and visible as a faint ridge of medium-sized spiniform granules; retroventral carina costate-granular (composed of medium-sized spiniform granules). Chela manus (Fig. 86B-E): proventral and promedian carinae equally developed, visible as faint ridges with medium-sized spiniform granules; prodorsal carina obsolete, visible as very faint ridge of medium-sized spiniform granules; dorsomedian carina visible as a faint ridge of medium-sized spiniform granules, more strongly developed than prodorsal carina; dorsal secondary carina obsolete; digital carina visible as a ridge of small spiniform granules, less distinct in distal area, more developed than retromedian carina; fused retromedian carinae obsolete, visible as a faint ridge of medium-sized spiniform granules proximally; retrolateral secondary carina vestigial, only discernible proximal to condyle of movable finger, developed as a ridge of small spiniform granules; retroventral carina crenulate (composed of medium-sized to large granules); ventromedian carina obsolete, only expressed proximally as a faint ridge of medium-sized spiniform granules.

Pedipalp macrosculpture: Femur (Fig. 86L-O): prolateral intercarinal surface densely covered with small spiniform granules; dorsal intercarinal surface densely covered with small spiniform granules, distal area smooth; retrolateral dorsal intercarinal surface sparsely covered with small spiniform granules; retrolateral ventral intercarinal surface densely covered with small to medium-sized spiniform granules, proximally smooth; ventral intercarinal surface densely covered with small to medium-sized spiniform granules, distal area smooth. Patella (Fig. 86G-J): prolateral intercarinal surface densely covered with small to medium-sized spiniform granules, distal area smooth; dorsal intercarinal surface covered with dense reticulate network of medium-sized spiniform granules; retrolateral intercarinal surface with dense reticulate network of medium-sized spiniform granules; ventral intercarinal surface covered with sparse reticulate network of medium-sized spiniform granules, distal area smooth. Chela manus (Fig. 86B-E): prolateral intercarinal surface covered with sparse reticulate network of small to medium-sized spiniform granules, smooth proximally; dorsal and retrolateral intercarinal surfaces covered with dense reticulate network of medium-sized spiniform granules; ventral intercarinal surface covered with sparse reticulate network of medium-sized spiniform granules, distal area smooth. Chela fingers densely covered with small spiniform granules in proximal half, smooth or nearly so distally, ventral surface smooth; trichobothria *dst*, *dsb* and *db* together in a single large smooth depression.

Trichobothria: Pedipalp orthobothriotaxic, accessory trichobothria absent. Patella (Fig. 86G-J): d_2 trichobothrium distal to patellar process; five *eb* trichobothria arranged in two groups (eb_1+$eb_{4\text{-}5}$ and $eb_{2\text{-}3}$); two *esb*, two *em* and one *est* trichobotria arranged in three groups ($esb_{1\text{-}2}$, $em_{1\text{-}2}$ and *est*); three *et* trichobothria; three *v* trichobothria. Chela manus (Fig. 86B-E): *Dt* situated in proximal third of manus; Eb_3 close to $Eb_{1\text{-}2}$; *Esb* closer to *Est* than to *Eb* group; *Est* situated near midpoint; four *V* trichobothria, V_3 distant from V_4. Fixed chela finger

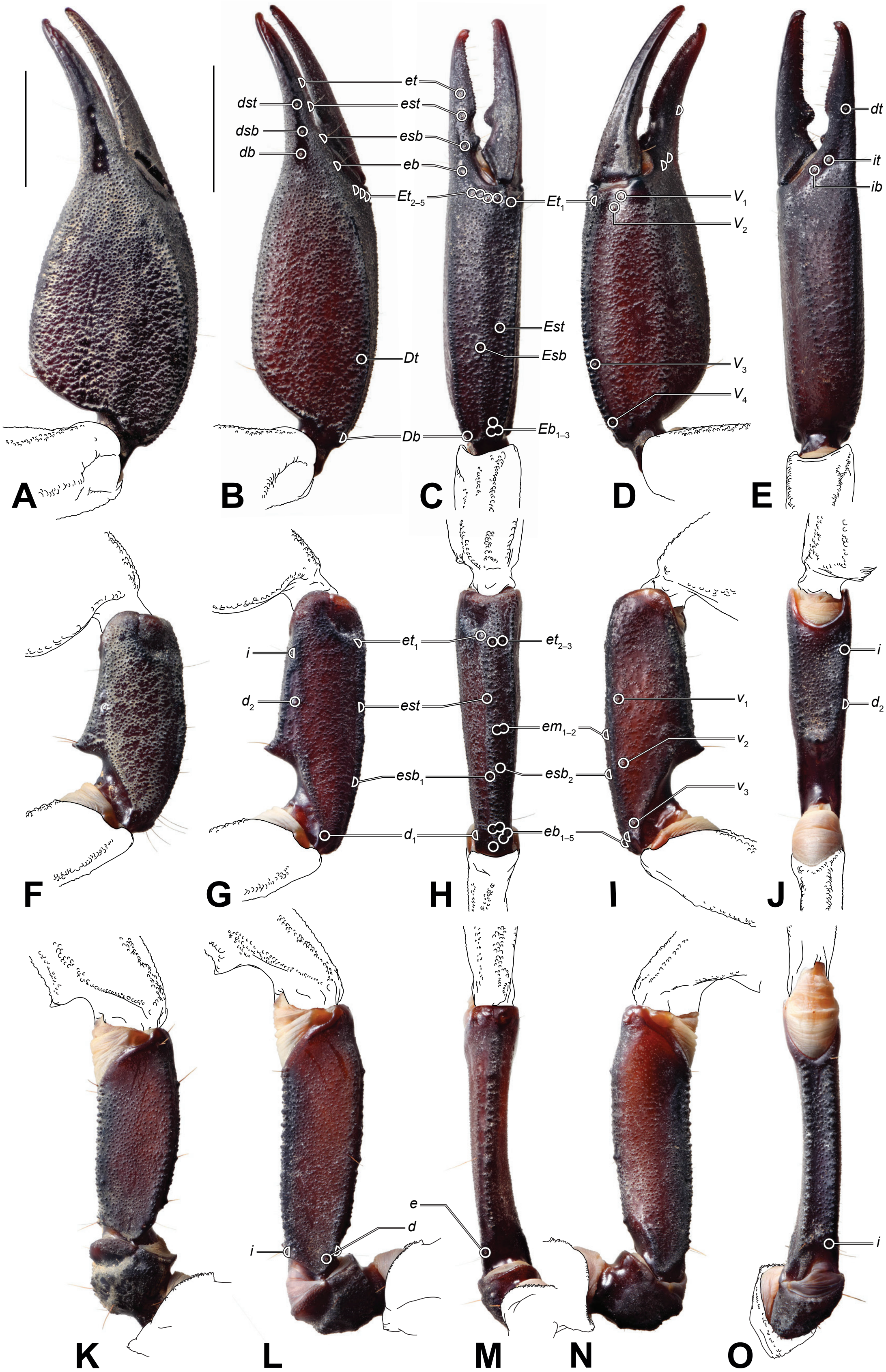

Fig. 86. *Hormurus yela* sp. nov., pedipalp chela (A-E), patella (F-J), femur and trochanter (K-O), dorsal (A-B, F-G, K-L), retrolateral (C, H, M), ventral (D, I, N) and prolateral (E, J, O) aspects showing trichobothria pattern. (A, F, K) Female paratype (AMNH [LP3007]). (B-E, G-J, L-O) Male holotype (AMNH [LP3007]). Scale lines: 5 mm.

with *db* situated on dorsal surface; *esb*, *eb*, *est* and *et* equidistant from each other; *eb* situated at base of finger, proximal to point of articulation between fixed and movable fingers; two *i* trichobothria.

Coxosternum (Fig. 88A, C): Coxa III elongated anterodistally, without anterodistal process. Sternum equilateral pentagonal (anterior width slightly greater than posterior width), wider than long.

Legs (Fig. 89): Femora I-IV with ventral surfaces bicarinate, pro- and retroventral carinae granular. Retrolateral margins of tibiae I-II without setiform macrosetae. Basitarsi I-IV: pro- and retroventral rows each with 4/4, 4/4, 4/5 and 4/5 setiform macrosetae, respectively. Telotarsi I-IV: pro- and retroventral row each with 3-4/4, 4/4, 4-5/5 and 4-5/5 setiform macrosetae, respectively; retroventral row with one proximal spinule; ventromedian spinules absent. Ungues shorter than telotarsus, half its length or less.

Genital operculum (Fig. 88A): Composed of two subtriangular sclerites.

Pectines (Fig. 88A-B): Moderately elongated, distal edge reaching but not extending beyond distal edge of coxa IV; fulcrae and three marginal lamellae present. Pectinal teeth count 7-8; teeth straight, entirely covered with sensory papillae.

Mesosoma (Figs 84A-B, 85A, E): Pre-tergites I-VII and posterior margins of pre-tergites smooth. Post-tergites: posterior margins of tergites I-VI sublinear, without distinct projection; lateral transversal sulcus present; intercarinal surfaces of I-VI almost smooth medially, sparsely covered with small spiniform granules laterally, posterior half more densely granular; intercarinal surface of VII sparsely covered with small spiniform granules; intercarinal surfaces of III-VII with distinct but faint reticulate network of ridges and dimples. Respiratory stigmata (spiracles) of sternites IV-VI short, their length less than third of sternite width, and distinctly crescent shaped. Sternite VII acarinate.

Metasoma (Fig. 90B-C): Not markedly compressed laterally; sparsely and minutely granular, posterior segments less so (segment V almost smooth); dorsal intercarinal surface of V smooth and shiny medially; distinct dorsomedian sulcus on segments I-IV, much less pronounced on segment V (usually only faintly expressed anteriorly).

Metasoma carinae: Segments I-IV: dorsolateral carinae obsolete on all segments; lateral median carinae weakly developed (as faint ridges); lateral inframedian carinae expressed anteriorly as a faint ridge on segment I, absent on other segments; ventrolateral carinae weakly developed (as faint ridges); paired ventrosubmedian carinae weakly developed (as low ridges). Segment V: dorsolateral and lateral median carinae obsolete; ventrolateral carinae only expressed as faint ridges; ventrosubmedian carinae fused, only expressed as a faint ridge in anterior two-thirds.

Metasoma spination: Segment I: dorsomedian posterior and dorsolateral posterior spiniform granules absent; ventrolateral carinae without large spiniform granules; ventrosubmedian carinae with one pair of subposterior spiniform granules. Segment II: dorsomedian posterior and dorsolateral posterior spiniform granules absent; ventrolateral carinae without large spiniform granules; ventrosubmedian carinae with one pair of subposterior spiniform granules and 0-1 pair of median spiniform granules. Segments III-IV: dorsolateral posterior spiniform granules absent; ventrolateral and ventrosubmedian carina without large spiniform granules. Segment V: ventrolateral and ventromedian carinae without distinct granules or spines; anal arch crenulate.

Ventral metasoma setation: Segment I with 12 macrosetae, i.e. three pairs (anterior, median and posterior) on ventrosubmedian carinae and three pairs (anterior, median and supramedian) on lateral carinae; segments II-IV each with 16 macrosetae, i.e. four pairs (anterior, submedian, median and posterior) on ventrosubmedian carinae and four pairs (anterior, submedian, supramedian and supramedian) on ventrolateral carinae]; segment V with 19 macrosetae, i.e. four pairs (anterior, median, subposterior and posterior) on ventrosubmedian carinae, five pairs (anterior, median, supramedian, subposterior and posterior) on lateral carinae and one supramedian macroseta between ventrosubmedian carinae.

Telson (Fig. 90B): Slightly longer than metasoma segment V; vesicle smooth, without granules; aculeus short (less than half of vesicle length), sharply curved.

Hemispermatophore (Fig. 91): Stalk longer than stem. Distal lamina curved, without distal crest on anterior margin; single laminar hook, submedian, situated between 1/3 and 3/7 from base of stalk (basal part/distal lamina ratio = 0.57-0.60, median = 0.58); transverse ridge distinct, approximately aligned with base of laminar hook, merging with anterior margin more distally than base of laminar hook. Capsule: hemisolenos thin, folded on itself only proximally, above that unfolded to flattened distal tip (tip and base approximately of same width), without lateral longitudinal carina, laterodistal accessory hook or medioposterior accessory apophysis; tip of hemisolenos more proximal than base of laminar hook and more distal than tip of clasper. Clasper well developed, forming distinct hump, not hook-like, with tetrahedral anterior accessory process. Subex well developed, spoon-shaped, merging anteriorly with base of clasper; posterior edge forming an obtuse angle (>90°) with hemisolenos; anterior edge forming a right angle (90º) with hemisolenos.

Description of adult female: Same characters as for male except as follows. *Colouration* (Fig. 84C-D): Legs and telson slightly darker than in male.

Pedipalps (Figs 84C-D, 86A, F, K): Segments noticeably shorter or more robust than in male.

Chela fingers (Fig. 87B): dentate margins linear or nearly so, without pronounced lobe and notch, with two rows of

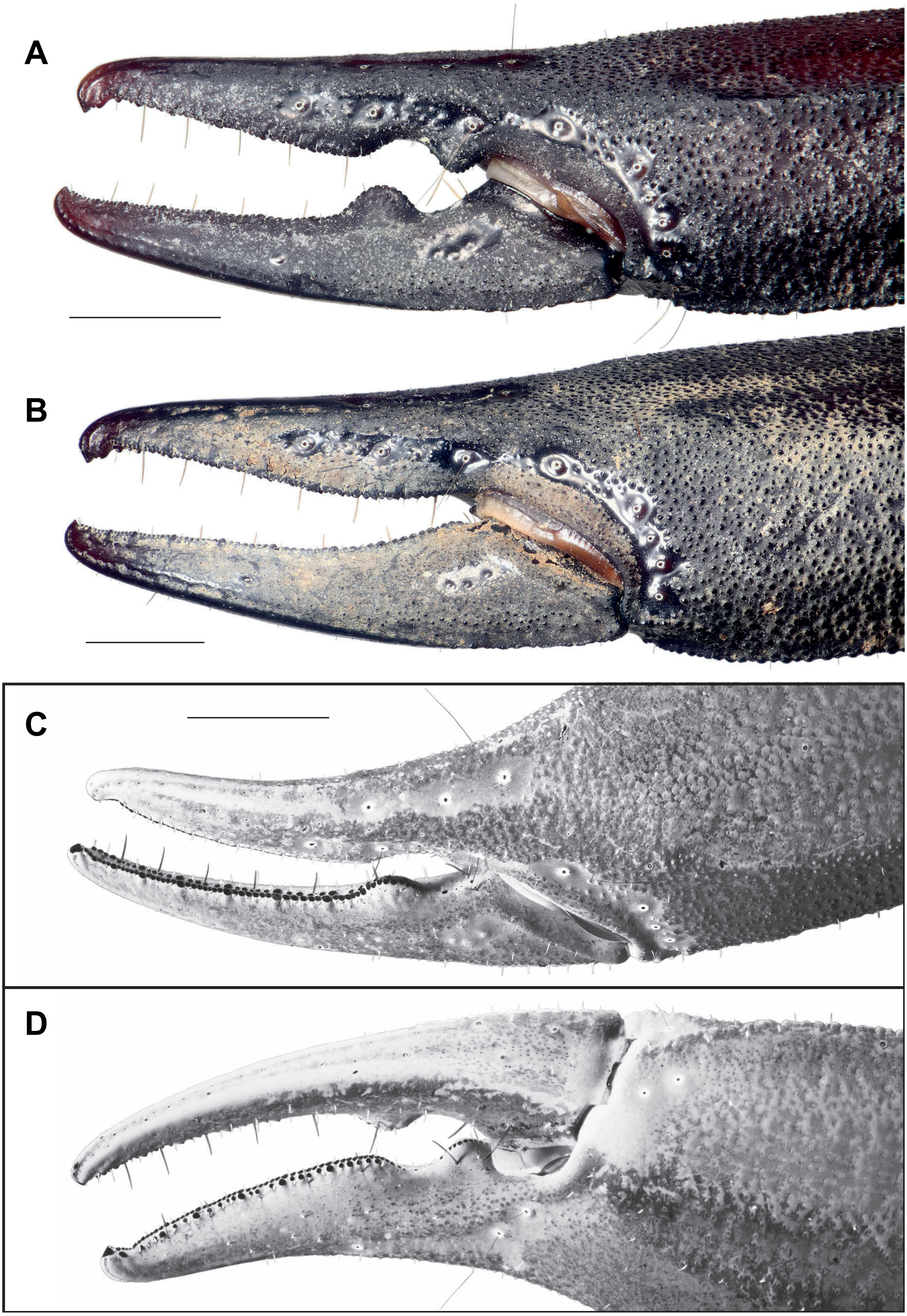

Fig. 87. *Hormurus yela* sp. nov., left pedipalp chelae, retrolateral aspect showing dentate margin of chela fingers (A-B), dorsal aspect showing dentate margin of movable finger (C), ventral aspect showing dentate margin of fixed finger (D). (A, C-D) Male holotype (AMNH [LP3007]). (B) Female paratype (AMNH [LP3007]). Scale lines: 2 mm.

Fig. 88. *Hormurus yela* sp. nov., coxae II-IV, sternum, genital operculum and pectines, ventral aspect (A, D), left pecten under UV light (B, E), anterior margin of coxae III (C, F). (A-C) Male holotype (AMNH [LP3007]). (D-F) Female paratype (AMNH [LP3007]). Scale lines: 2 mm (A, C-D, F), 1 mm (B, E).

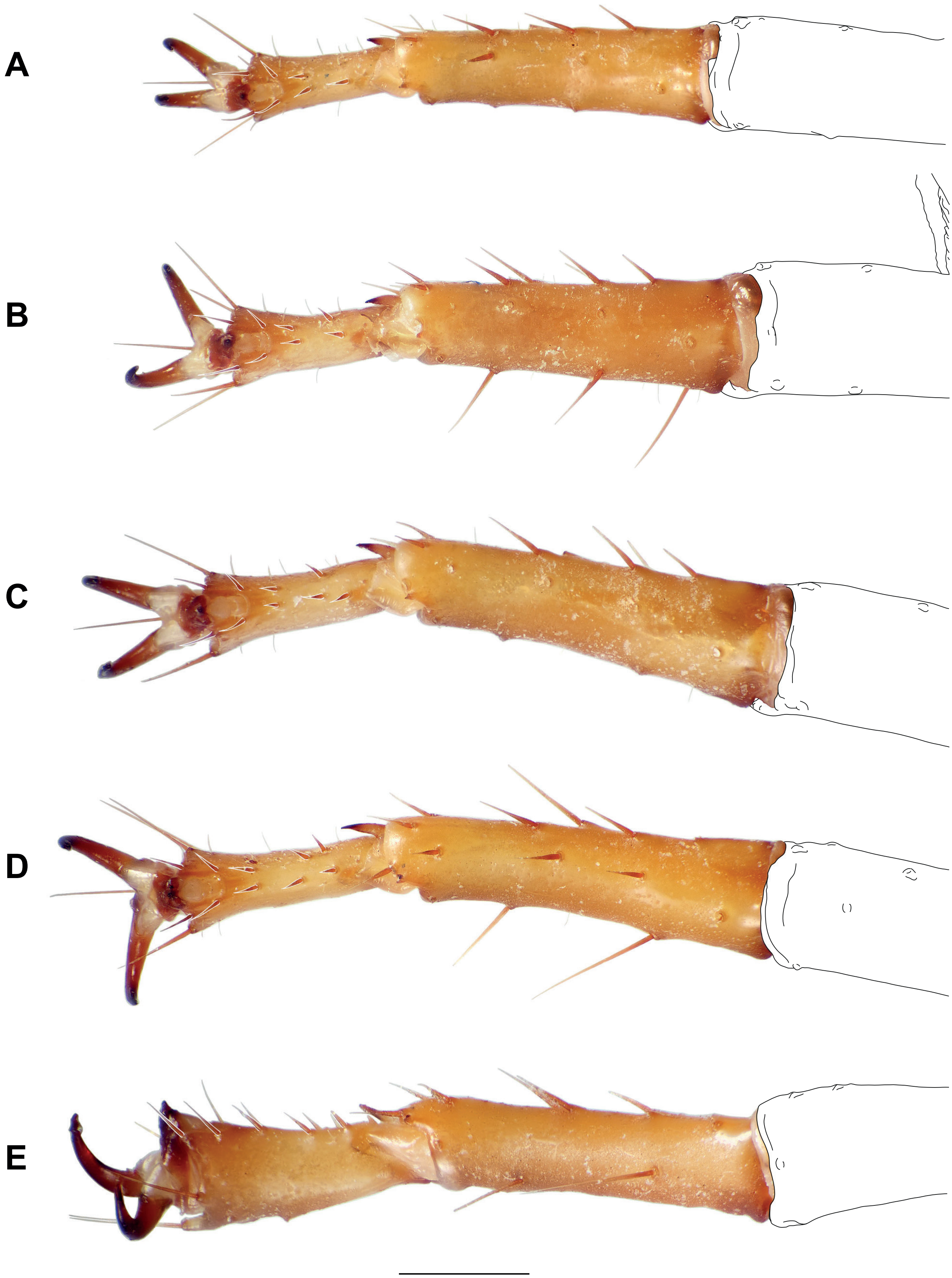

Fig. 89. *Hormurus yela* sp. nov., male holotype (AMNH [LP3007]), right tarsi, ventral (A-D) and retrolateral (E) aspects. (A) Tarsus I. (B) Tarsus II. (C) Tarsus III. (D-E) Tarsus IV. Scale line: 1 mm.

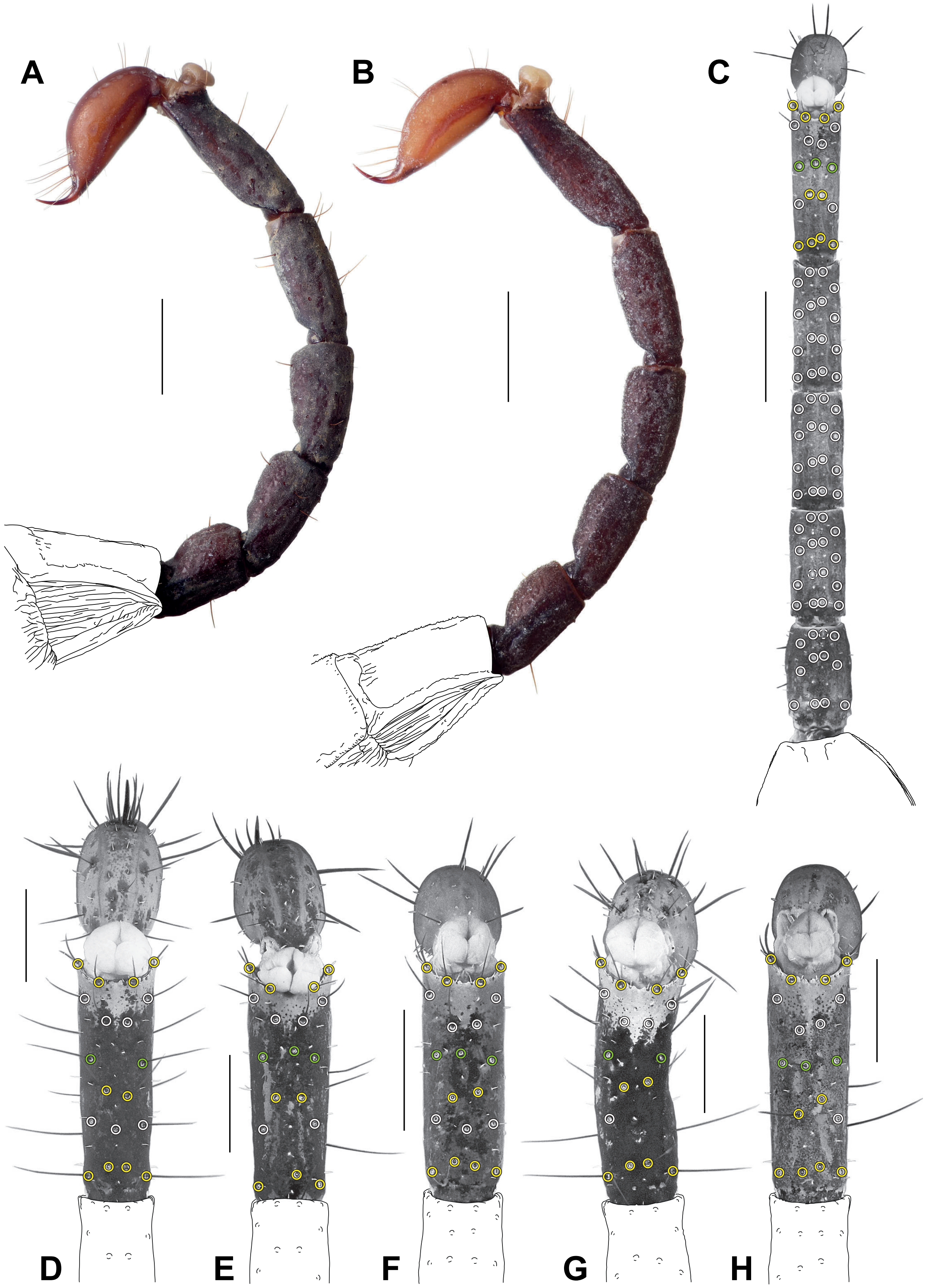

Fig. 90. *Hormurus yela* sp. nov., metasoma and telson, lateral (A-B) and ventral (C) aspects; metasoma segment V, ventral aspect (D-H). (A) Female paratype (AMNH [LP3007]). (B-C) Male holotype (AMNH [LP3007]). (D-E, G-H) Adult female paratypes (AMNH [LP3007]). (F) Subadult female paratype (AMNH [LP3007]). Dotted circles in C indicate additional macrosetae expressed in some specimens. Scale lines: 3 mm (A-C), 2 mm (D-H).

primary denticles extending from tip to base of fingers and bearing large inner accessory denticles.
Carapace (Fig. 85B, D): Posteromedian margin smooth.
Genital operculum (Fig. 88D): Oval to semi-oval, as wide as long or only slightly wider than long (length/width ratio = 0.89-0.96 median = 0.91); opercular sclerites partly fused, with distinct median suture; posterior notch present, at least weakly developed.
Pectines (Fig. 88D-E): Short, distal edge not reaching distal edge of coxa IV. Pectinal teeth count 5-7; teeth short and straight, sensory papillae covering only distal half.
Mesosoma (Figs 84C-D, 85B, F): Post-tergites: reticulate network of ridges and dimples on segments III-VII more distinct than in male; intercarinal surfaces of I-II medially smooth, granular along lateral margins; intercarinal surfaces of III-VI almost totally smooth, faintly granular along lateral margins; intercarinal surfaces of VII densely granular in distal two-thirds, in proximal third smooth.

Intraspecific variation: *Pedipalp trichobothria*: On the retrolateral side of the pedipalp patella trichobothrium esb_1 is in some specimens located midway between esb_2 and $em_{1\text{-}2}$ rather than close to esb_2, resulting in four groups (esb_1, esb_2, $em_{1\text{-}2}$ and *est*) instead of three. On the retrolateral side of the pedipalp chela *Esb* can be more distal than usual, aligning with *Est*.
Leg spination: The number of setiform macrosetae varies from three to four in the proventral row of telotarsi I and from four to five in the proventral row of telotarsi III-IV.

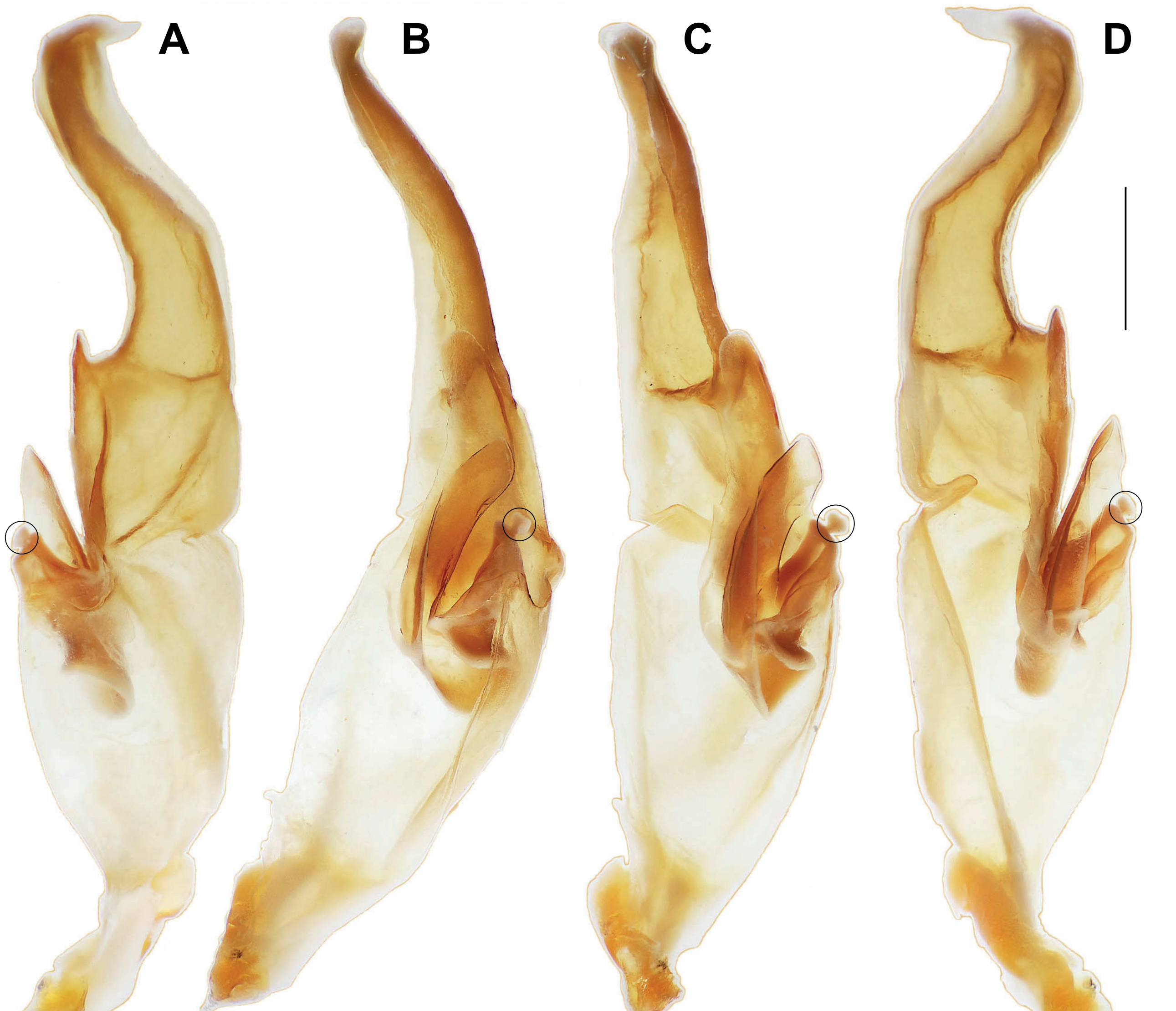

Fig. 91. *Hormurus yela* sp. nov., male holotype (AMNH [LP3007]), left hemispermatophore. (A) Lateral aspect. (B) Anterior aspect. (C) Rotated approximately 45° counter-clockwise from anterior aspect. (D) Contralateral aspect. The tetrahedral accessory process present on the anterodistal side of the claspers is indicated by circles. Scale line: 1 mm.

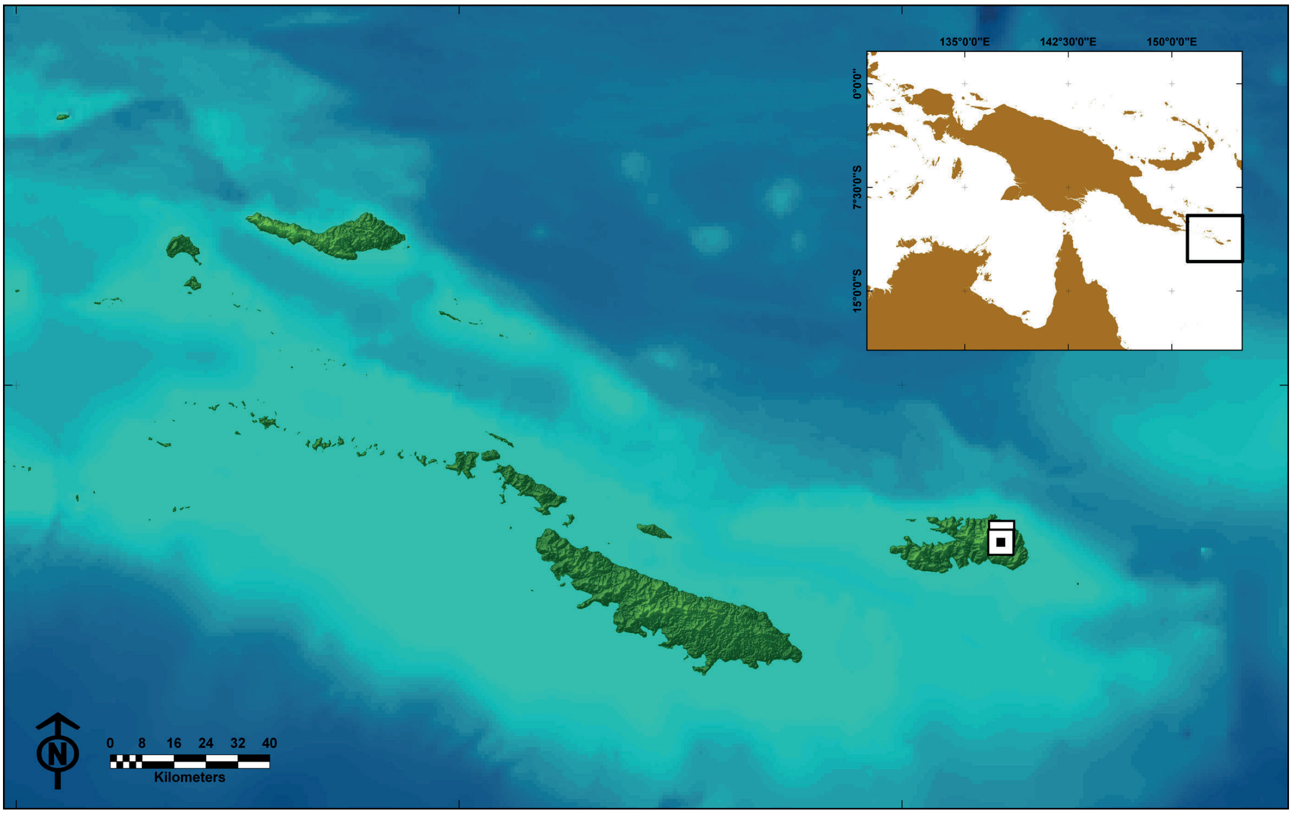

Fig. 92. Known localities of *Hormurus yela* sp. nov. on Rossel Island, the easternmost island of the Louisiade Archipelago off the eastern tip of New Guinea, Milne Bay Province. Color gradient indicates topography and bathymetry.

Genital operculum: The length/width ratio varies from 0.89 to 0.96 (median = 0.91).
Pectines: The pectinal teeth count varies from seven to eight in males and from five to seven in females.
Metasoma: Spination: 0-1 pair of median spiniform granules is present in the ventrosubmedian carinae of segment II. One or two extra granules may be expressed in the subposterior group of granules of segment I, and one fewer granule may be expressed in the median or subposterior group of granules of segment II.
Ventral metasoma setation: 0-3 fewer macrosetae may be expressed on one segment. Thus, segment I may possess 11 or 13 macrosetae instead of 12 (one more or one fewer expressed), segment II may have 14 or 15 instead of 16 (one or two not expressed), segments III-IV may have 15 instead of 16 (one not expressed) and segment V may have 17, 18 or 20 instead of 19 (one or two not expressed or one extra expressed) (Fig. 90C-H).
Hemispermatophores: The basal part/distal lamina ratio varies from 0.57 to 0.6 (median = 0.58).

Distribution and ecology: *Hormurus yela* sp. nov. is probably endemic to Rossel Island, the easternmost island of the Louisiade Archipelago off the eastern tip of New Guinea, Milne Bay Province (Fig. 92). Specimens were collected in a small ditch that retained moisture and was littered with numerous small rocks.

Hormurus maiwa Monod & Prendini, sp. nov.

Figs 93-101, Tab. 10

This species was treated under the manuscript name "Hormurus milneanus" in Monod (2011a: 289, 532, 543).

Material: AMNH (without registration number); ♂ holotype; Papua New Guinea, Milne Bay Province, Kwagira River, Peria Creek, camp 7 [9°39'28.8"S, 149°19'40.8"E]; 14.VIII.-6.IX.1953; leg. G.M. Tate, Archbold Expedition. – AMNH (without registration number); 1 ♂, 4 ♀, 1 juvenile ♂ paratypes; same data as for holotype. – AMNH (without registration number); 1 ♂, 2 ♀, 1 juvenile ♂, 1 juvenile ♀ paratypes; Papua New Guinea, Milne Bay Province, Maneau Range, N slope of Mount Dayman, camp 6 [9°41'31.2"S, 149°18'28.8"E], 700 m; 13.-26.VII.1953; leg. G.M. Tate, Archbold Expedition.

Etymology: The Maiwa are a Papuan people whose territory extends from the northern slopes and foothills of the Maneo Range, north of Mount Dayman, to

Table 10. *Hormurus maiwa* sp. nov., measurements (in mm) and repository of adult males and females.

	Holotype	Paratype	Paratype	Paratype	Paratype
Sex	♂	♂	♂	♀	♀
Repository	AMNH	AMNH	AMNH	AMNH	AMNH
Locality	Peria Ck	Peria Ck	Mt Dayman	Peria Ck	Peria Ck
Total length	58.00	46.00	50.00	57.00	52.00
Carapace, length	8.35	7.09	7.44	8.41	8.65
Carapace, anterior width	5.42	4.67	4.73	5.57	5.55
Carapace, posterior width	8.80	7.44	7.64	9.45	9.26
Pedipalp femur, length	10.91	8.78	8.78	8.68	8.90
Pedipalp femur, width	3.54	3.05	3.05	3.50	3.47
Pedipalp femur, height	1.95	1.58	1.52	2.26	2.13
Pedipalp patella, length	10.54	8.41	8.53	8.41	8.90
Pedipalp patella, width	4.14	3.54	3.51	4.02	4.12
Pedipalp patella, height	3.10	2.54	2.68	3.23	3.17
Pedipalp chela, length	20.14	16.40	16.95	17.89	18.24
Pedipalp chela, width	5.85	4.88	4.79	6.40	6.58
Pedipalp chela, height	3.66	2.93	3.07	3.88	3.78
Chela movable finger, length	8.53	7.44	7.74	8.36	8.41
Genital operculum length, female	NA	NA	NA	1.87	2.10
Genital operculum width, female	NA	NA	NA	2.39	2.32
Metasoma segment I, length	3.27	2.66	2.68	2.86	2.95
Metasoma segment I, width	2.32	2.01	2.01	2.44	2.32
Metasoma segment I, height	1.95	1.73	1.79	2.05	2.13
Metasoma segment II, length	3.54	2.93	3.07	3.29	3.44
Metasoma segment II, width	1.93	1.65	1.71	1.93	2.01
Metasoma segment II, height	1.95	1.71	1.77	2.04	2.10
Metasoma segment III, length	3.90	3.29	3.32	3.54	3.72
Metasoma segment III, width	1.79	1.56	1.58	1.83	1.83
Metasoma segment III, height	1.93	1.71	1.80	2.05	2.07
Metasoma segment IV, length	4.33	3.51	3.56	3.90	4.02
Metasoma segment IV, width	1.63	1.44	1.46	1.71	1.68
Metasoma segment IV, height	1.89	1.68	1.71	2.01	1.97
Metasoma segment V, length	5.36	4.27	4.51	4.88	5.00
Metasoma segment V, width	1.71	1.46	1.46	1.71	1.73
Metasoma segment V, height	1.73	1.56	1.56	1.83	1.85
Telson, length	5.49	5.42	5.49	5.79	6.10
Telson, width	2.04	1.72	1.73	1.95	1.97
Telson, height	2.07	1.83	1.95	2.13	2.13

Table 10 (continued). *Hormurus maiwa* sp. nov., measurements (in mm) of adult females.

	Paratype	Paratype	Paratype	Paratype
Sex	♀	♀	♀	♀
Repository	AMNH	AMNH	AMNH	AMNH
Locality	Peria Ck	Peria Ck	Mt Dayman	Mt Dayman
Total length	50.00		69.00	62.00
Carapace, length	8.75	9.02	9.08	8.41
Carapace, anterior width	5.79	5.69	5.73	5.58
Carapace, posterior width	9.79	9.02	9.35	8.87
Pedipalp femur, length	9.14	9.17	9.41	8.75
Pedipalp femur, width	3.57	3.47	3.66	3.47
Pedipalp femur, height	2.07	2.13	2.19	2.19
Pedipalp patella, length	9.08	9.12	9.39	8.65
Pedipalp patella, width	4.21	4.14	4.14	4.02
Pedipalp patella, height	3.17	3.19	3.41	3.23
Pedipalp chela, length	18.72	18.92	19.38	18.50
Pedipalp chela, width	6.68	6.46	6.70	6.46
Pedipalp chela, height	3.84	3.78	4.05	3.78
Chela movable finger, length	9.00	8.75	9.14	8.59
Genital operculum length, female	1.95	2.13	2.13	1.95
Genital operculum width, female	2.13	2.32	2.50	2.32
Metasoma segment I, length	3.05	3.11	3.17	3.05
Metasoma segment I, width	2.39	2.40	2.58	2.41
Metasoma segment I, height	2.10	2.05	2.10	2.07
Metasoma segment II, length	3.54	3.54	3.60	3.41
Metasoma segment II, width	1.96	1.97	2.05	1.95
Metasoma segment II, height	2.10	2.05	2.05	1.95
Metasoma segment III, length	3.78	3.90	3.78	3.54
Metasoma segment III, width	1.83	1.89	1.89	1.77
Metasoma segment III, height	2.04	2.01	2.07	2.05
Metasoma segment IV, length	4.14	4.14	4.08	3.87
Metasoma segment IV, width	1.73	1.73	1.77	1.67
Metasoma segment IV, height	1.95	1.91	2.05	1.95
Metasoma segment V, length	5.06	5.24	5.12	4.82
Metasoma segment V, width	1.77	1.83	1.83	1.77
Metasoma segment V, height	1.83	1.80	1.95	1.85
Telson, length	6.28	6.16	6.28	5.61
Telson, width	2.07	1.97	2.07	1.91
Telson, height	2.19	2.07	2.26	1.97

the coast in Moi Biri Bay (Dutton, 1971). The type locality alongside the Kwagira or Kwagila River is located in this area. The epithet is an invariable name in apposition.

Diagnosis: *Hormurus maiwa* sp. nov. is morphologically close to *Hormurus cameroni* sp. nov. The two species differ in the following characters: (1) the frontal lobes of the carapace are at least sparsely granular in *H. maiwa* sp. nov. (Fig. 94), whereas they are smooth in *H. cameroni* sp. nov. (Fig. 75); (2) the medially located apex of the prolateral patellar process is more developed and more curved in *H. maiwa* sp. nov. (Fig. 95F-G, I) than in *H. cameroni* sp. nov. (Fig. 76F-G, I); (3) the pedipalps of *H. maiwa* sp. nov. (Fig. 95) are more coarsely granular and with stronger carinae than those of *H. cameroni* sp. nov. (Fig. 76);

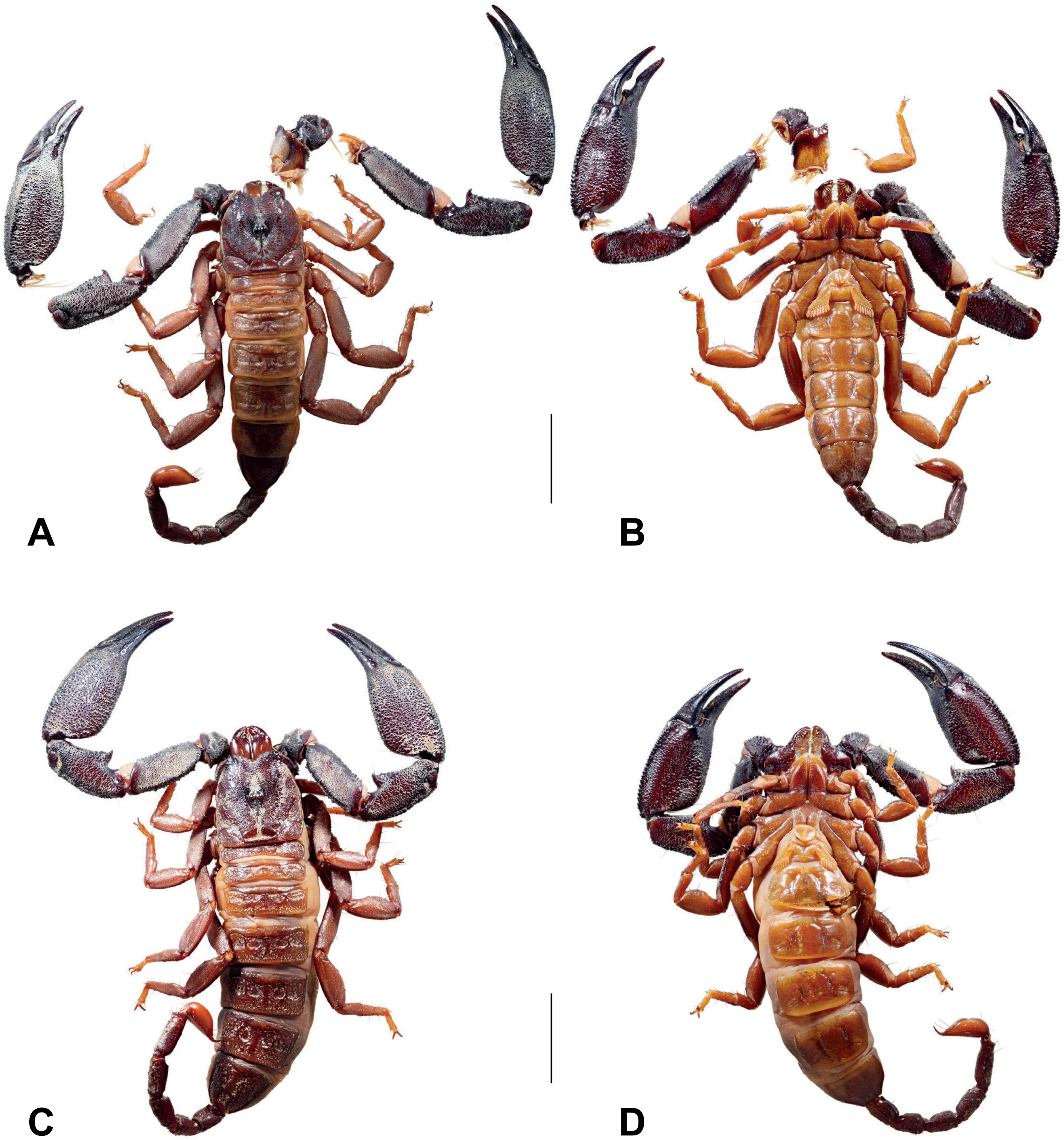

Fig. 93. *Hormurus maiwa* sp. nov., habitus, dorsal (A, C) and ventral (B, D) aspect. (A-B) Male holotype (AMNH, Peria Creek). (C-D) Female paratype (AMNH, Peria Creek). Scale lines: 10 mm.

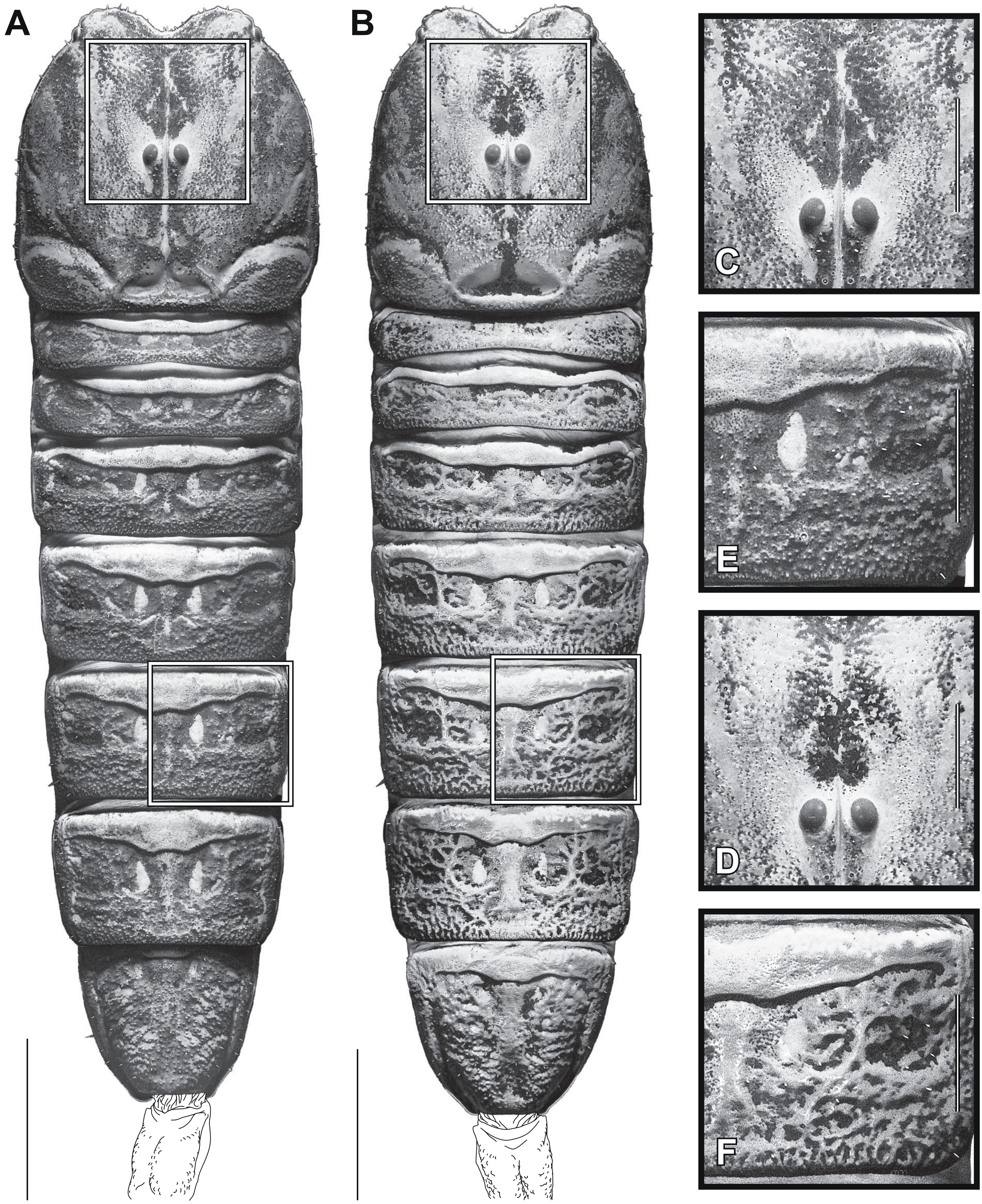

Fig. 94. *Hormurus maiwa* sp. nov., carapace and mesosomal tergites showing ornamentation and macrosculpture of cuticle (A-B), detailed views of carapace (C-D) and of tergite V (E-F), dorsal aspect. (A, C, E) Male holotype (AMNH, Peria Creek). (B, D, F) Female paratype (AMNH, Peria Creek). Scale lines: 5 mm (A-B), 2 mm (C-F).

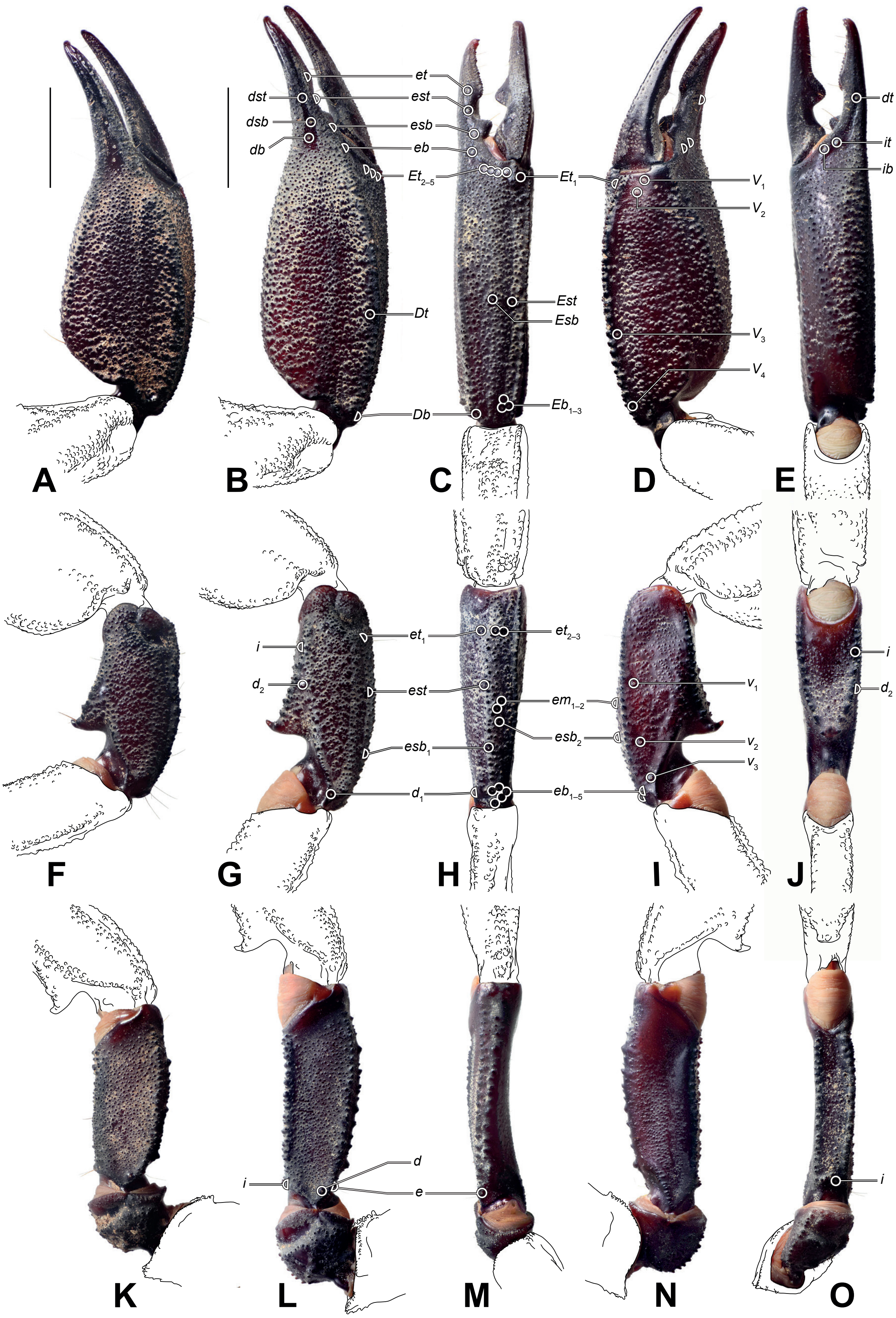

Fig. 95. *Hormurus maiwa* sp. nov., pedipalp chela (A-E), patella (F-J), femur and trochanter (K-O), dorsal (A-B, F-G, K-L), retrolateral (C, H, M), ventral (D, I, N) and prolateral (E, J, O) aspects showing trichobothria pattern. (A, F, K) Female paratype (AMNH, Peria Creek). (B-E, G-J, L-O) Male holotype (AMNH, Peria Creek). Scale lines: 5 mm.

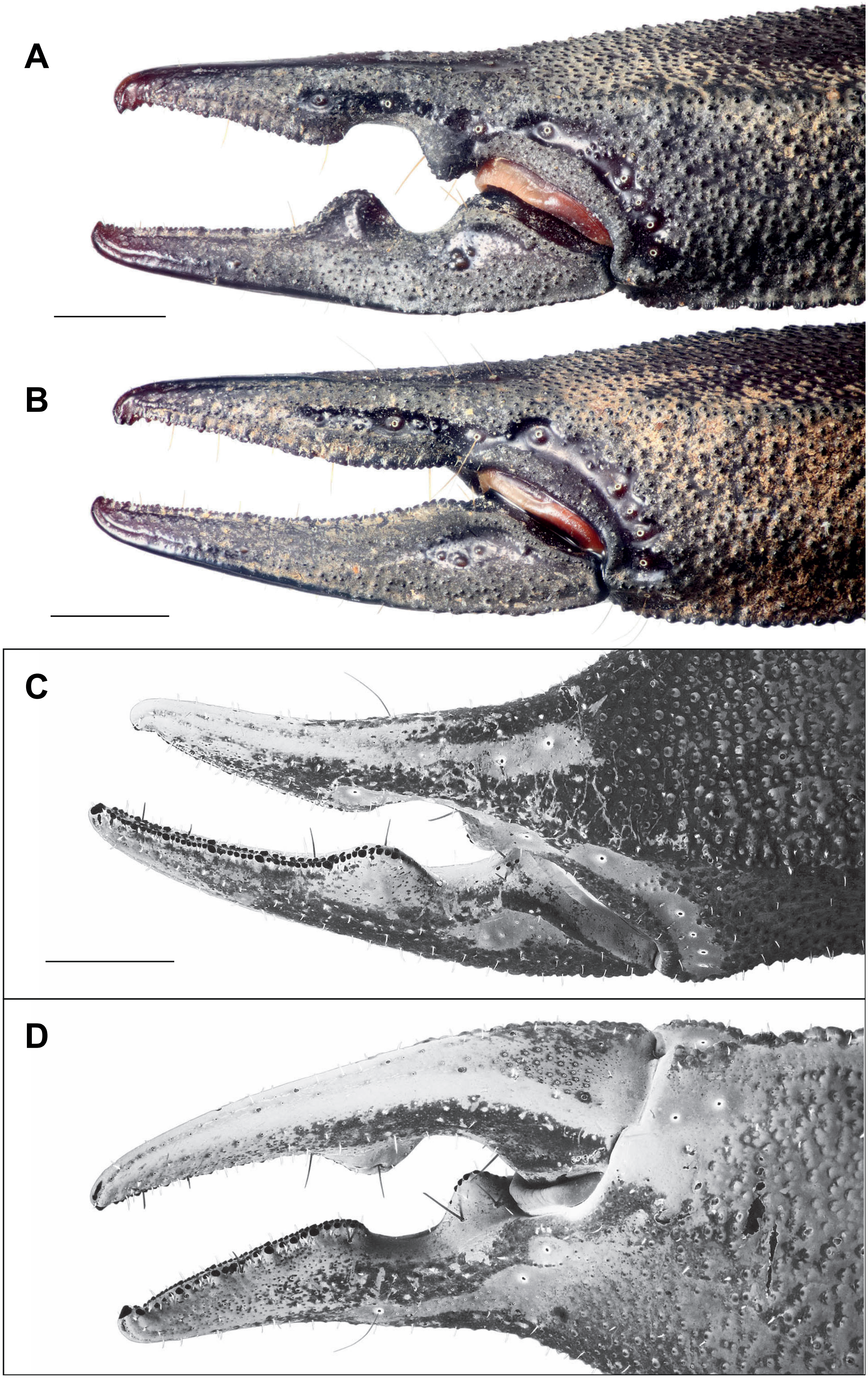

Fig. 96. *Hormurus maiwa* sp. nov., left pedipalp chelae, retrolateral aspect showing dentate margin of chela fingers (A-B), dorsal aspect showing dentate margin of movable finger (C), ventral aspect showing dentate margin of fixed finger (D). (A, C-D) Male holotype (AMNH, Peria Creek). (B) Female paratype (AMNH, Peria Creek). Scale lines: 2 mm.

(4) on the retrolateral side of the pedipalp patella trichobothrium esb_2 is close to em_{1-2}, resulting in three groups (esb_1, esb_2+em_{1-2} and *est*) in *H. maiwa* sp. nov. (Fig. 95H), whereas esb_2 is closer to esb_1 than to em_{1-2}, resulting in three (esb_{1-2}, em_{1-2} and *est*) or four (esb_1, esb_2, em_{1-2} and *est*) groups in *H. cameroni* sp. nov. (Fig. 76H); (5) the pectines are slightly shorter in *H. maiwa* sp. nov. (Fig. 97) than in *H. cameroni* sp. nov. (Fig. 78); (6) the hemispermatophore stalk is distincly longer than the stem in *H. maiwa* sp. nov. (Fig. 100), whereas the length difference is much less pronounced in *H. cameroni* sp. nov. (Fig. 81); (7) the transverse ridge merges with the anterior margin of the stalk more proximally than the base of laminar hook in *H. maiwa* sp. nov. (Fig. 100A, D-E, H), whereas it merges more distally than the base of laminar hook in *H. cameroni* sp. nov. (Fig. 81A, D-E, G).

Description of adult male (holotype): *Colouration* (Fig. 93A-B): Dorsal surface of chelicera manus dark orange with brown infuscation, more pronounced anteriorly; fingers black. Carapace reddish brown, median ocular region black. Tergites brown. Pedipalps reddish brown; carinae and fingers black. Legs slightly paler than tergites, light brown to dark orange, prolateral carina of femora black. Coxapophysis I orange, its anterior tip yellow; coxapophysis II, leg coxae and sternum reddish brown to dark orange; sternites III-VI brown, with darker lateral margins, V with posterior margin pale yellow; sternite VII dark brown; genital operculum and pectines pale orange. Metasoma reddish brown with darker infuscation; telson paler than metasoma, vesicle orange, aculeus reddish brown.

Cuticle: Nongranular surfaces of carapace, pedipalps, legs, mesosoma and metasoma finely punctate.

Carapace (Fig. 94A, C): Anterior margin with median notch moderately excavated. Anterior furcated sutures distinct. Median ocular tubercle slightly raised; median ocelli present, at least twice the size of lateral ocelli, separated from each other by approximately the diameter of a median ocellus. Three pairs of lateral ocelli, equal in size, equidistant and adjacent to each other. Surfaces minutely and densely granular, except for smooth anterior areas of frontal lobes and median ocular area.

Chelicerae: Basal and median teeth of fixed finger fused into bicusp. Dorsal margin of movable finger with four teeth (one basal, one median, one subdistal and one distal); dorsal distal tooth smaller than ventral distal tooth; ventral margin smooth.

Pedipalps (Figs 93A-B, 95B-E, G-J, L-O): Segments long and slender, femur distinctly longer than carapace. Chela almost asetose.

Chela fingers (Fig. 96A, C-D): Fixed finger: basal lobe well developed and conical; suprabasal notch distinct and deep; dentate margins distally (from tip of finger to median lobe) with two rows of primary denticles bearing large inner accessory denticles; denticles absent on suprabasal notch; single row of denticles on basal lobe. Movable finger: basal lobe absent; suprabasal lobe well developed, conical, gently rounded dorsally and lacking sharp conical tooth, not overlapping with fixed finger; suprabasal lobe and corresponding notch on fixed finger contiguous, no proximal gap or at most a reduced gap only evident when fingers closed; dentate margins distally (from tip of finger to suprabasal lobe) with two rows of primary denticles bearing large inner accessory denticles; denticles absent on suprabasal notch; few sparse denticles basally.

Pedipalp carinae: Femur (Fig. 95L-O): proventral carina visible as a ridge of medium-sized to large spiniform granules; promedian carinae absent; prodorsal carina visible as a ridge of medium-sized to large spiniform granules, similarly developed as proventral carina; retrodorsal carina visible as a ridge of medium-sized to large spiniform granules, less developed than prodorsal carina, more distinct in proximal third of segment; retroventral carina visible as a ridge of medium to large spiniform granules, distinctly more developed than retrodorsal carina; ventromedian carina obsolete, only discernible proximally as a ridge of medium-sized spiniform granules. Patella (Fig. 95G-J): proventral carina expressed as costate-granular ridge proximally, obsolete distally; promedian and prodorsal carinae visible as ridges with medium-sized to large spiniform granules, equally developed, fused medially into prominent spiniform process with pointed and curved medially located apex (hook-like); dorsomedian carina only visible proximally as a ridge of medium-sized spiniform granules; retrodorsal carina obsolete, only expressed proximally as a faint ridge of medium-sized spiniform granules; paired retromedian carinae fused and visible as a faint ridge of medium-sized to large spiniform granules; retroventral carina crenulate (composed of medium-sized to large granules). Chela manus (Fig. 95B-E): proventral and promedian carinae visible as faint ridges with medium-sized spiniform granules, equally developed; prodorsal carina obsolete, visible as very faint ridge of medium-sized spiniform granules; dorsomedian carina visible as a faint ridge of medium-sized spiniform granules, more strongly developed than prodorsal carina; dorsal secondary carina obsolete; digital carina visible as a ridge of small to medium-sized spiniform granules, less distinct in distal area, more developed than retromedian carina; fused retromedian carinae obsolete, visible as a faint ridge of medium-sized spiniform granules proximally; retrolateral secondary carina vestigial, only discernible proximal to condyle of movable finger as a ridge of small spiniform granules; retroventral carina crenulate (composed of medium to large granules); ventromedian carina obsolete, only expressed proximally as a faint ridge of medium-sized spiniform granules.

Pedipalp macrosculpture: Femur (Fig. 95L-O): prolateral intercarinal surface sparsely covered with small spiniform granules; dorsal intercarinal surface

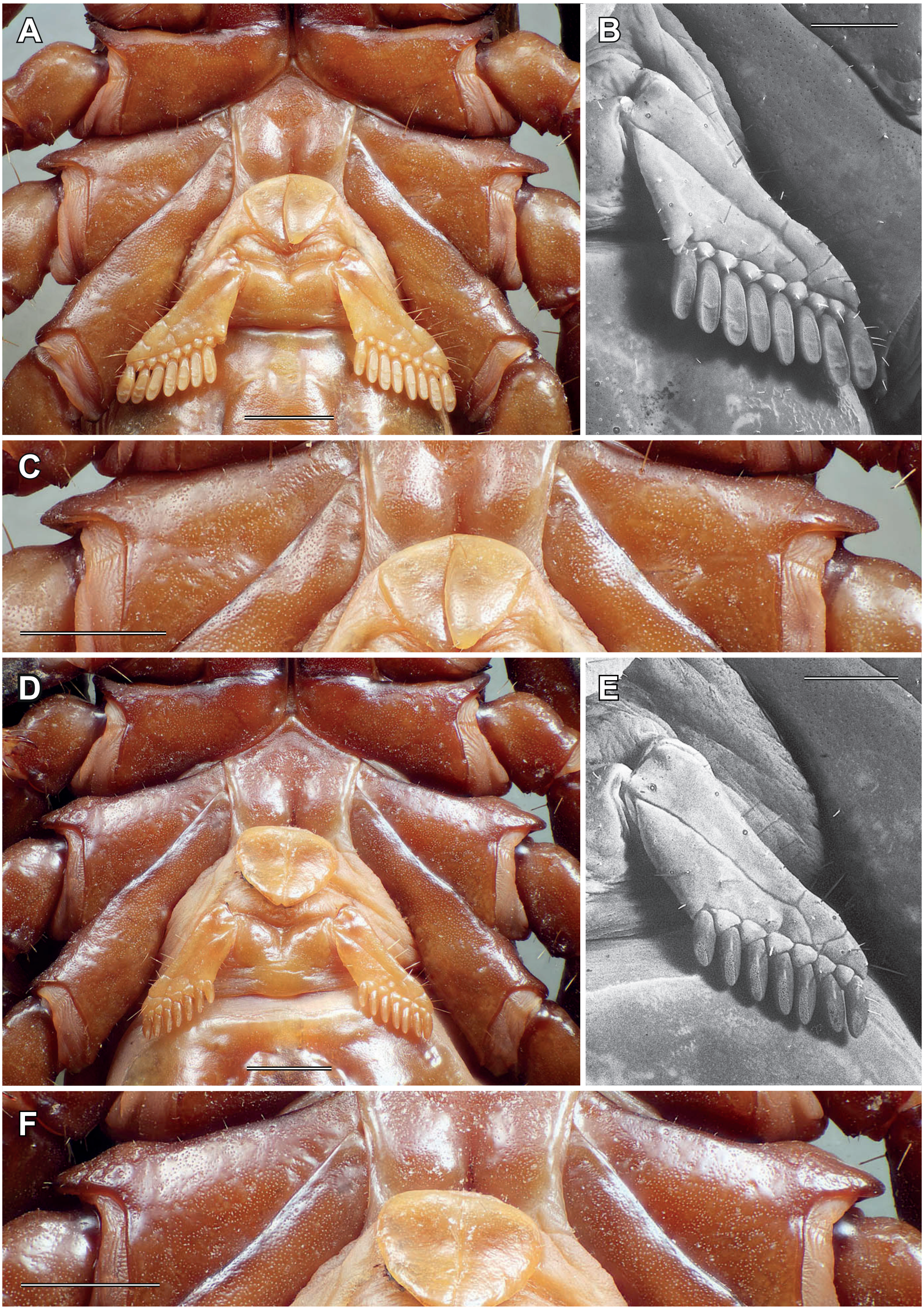

Fig. 97. *Hormurus maiwa* sp. nov., leg coxae II-IV, sternum, genital operculum and pectines, ventral aspect (A, D), left pecten under UV light (B, E), anterior margin of coxae III (C, F). (A-C) Male holotype (AMNH, Peria Creek). (D-F) Female paratype (AMNH, Peria Creek). Scale lines: 2 mm (A, C-D, F), 2 mm (B, E).

densely covered with medium-sized spiniform granules, distal area smooth; retrolateral intercarinal surface sparsely covered with medium-sized spiniform granules, proximally smooth; ventral intercarinal surface densely covered with medium-sized spiniform granules, distal third smooth. Patella (Fig. 95G-J): prolateral intercarinal surface sparsely covered with small to medium-sized spiniform granules, distal third smooth; dorsal and retrolateral intercarinal surfaces covered with dense reticulate network of medium-sized spiniform granules; ventral intercarinal surface covered with sparse reticulate network of medium-sized spiniform granules, distal area smooth. Chela manus (Fig. 95B-E): prolateral intercarinal surface covered with sparse reticulate network of small to medium-sized spiniform granules, smooth proximally; dorsal and retrolateral intercarinal surfaces covered with dense reticulate network of medium-sized spiniform granules; ventral intercarinal surface covered with sparse reticulate network of medium-sized spiniform granules, distal areas smooth. Chela fingers densely covered with small spiniform granules in proximal half, smooth or nearly so distally, ventral surface smooth; trichobothria *dst*, *dsb* and *db* together in a single large smooth depression.

Trichobothria: Pedipalp orthobothriotaxic, accessory trichobothria absent. Patella (Fig. 95G-J): d_2 trichobothrium distal to patellar process; five *eb* trichobothria arranged in two groups (eb_1+eb_{4-5} and eb_{2-3}); two *esb*, two *em* and one *est* trichobotria arranged in three (esb_1, esb_2+em_{1-2} and *est*) or two (esb_1 and esb_2+em_{1-2}+*est*) groups; three *et* trichobothria; three *v* trichobothria. Chela manus (Fig. 95B-E): *Dt* situated in proximal third of manus; Eb_3 close to Eb_{1-2}; *Esb* aligned with *Est*, sometimes slightly more distal; *Est* situated near midpoint; four *V* trichobothria, V_3 distant from V_4. Fixed chela finger with *db* situated on dorsal surface; *esb* only slightly closer to *eb* than to *est*; *eb* situated at base of finger, proximal to point of articulation between fixed and movable fingers; two *i* trichobothria.

Coxosternum (Fig. 97A, C): Coxa III elongated anterodistally, without anterodistal process. Sternum equilateral pentagonal (anterior width slightly greater than posterior width), slightly wider than long.

Legs (Fig. 98): Femora I-IV with ventral surfaces bicarinate, pro- and retroventral carinae granular. Retrolateral margins of tibiae I-II without setiform macrosetae. Basitarsi I-IV: pro- and retroventral rows each with 4/4, 4/5, 4/5 and 4/5 setiform macrosetae, respectively. Telotarsi I-IV: pro- and retroventral row each with 3-4/4, 4-5/4, 4-5/5 and 5/5 setiform macrosetae, respectively; retroventral row with one proximal spinule; ventromedian spinules absent. Ungues shorter than telotarsus, half its length or less.

Genital operculum (Fig. 97A): Composed of two subtriangular sclerites.

Pectines (Fig. 97A-B): Short, distal edge not reaching distal edge of coxa IV; fulcrae and three marginal lamellae present. Pectinal teeth count 7-9; teeth straight, entirely covered with sensory papillae.

Mesosoma (Figs 93A-B, 94A, E): Pre-tergites I-VII and posterior margins of pre-tergites smooth. Post-tergites: posterior margins of tergites I-VI sublinear, without distinct projection; lateral transversal sulcus present; intercarinal surfaces of I-VI densely covered with small spiniform granules, anteromedian half slightly less granular; intercarinal surface of VII densely covered with small spiniform granules; intercarinal surfaces of III-VII with distinct but faint reticulate network of ridges and dimples. Respiratory stigmata (spiracles) of sternites IV-VI short, their length less than third of sternite width, and distinctly crescent shaped. Sternite VII acarinate.

Metasoma (Fig. 99B-C): Not markedly compressed laterally; intercarinal surfaces sparsely and minutely granular, posterior segments less so; dorsal intercarinal surface of V smooth and shiny medially; distinct dorsomedian sulcus on segments I-IV, much less pronounced on segment V (usually only expressed faintly anteriorly) than on others.

Metasoma carinae: Segments I-IV: dorsolateral carinae obsolete on all segments; lateral median carinae weakly developed (as faint ridges); lateral inframedian carinae discernible anteriorly as a faint ridge on segment I, absent on other segments; ventrolateral carinae weakly developed (as faint ridges); paired ventrosubmedian carinae weakly developed (as low ridges). Segment V: dorsolateral and lateral median carinae obsolete; ventrolateral carinae only expressed as faint ridges; ventrosubmedian carinae fused, only expressed as a faint ridge in anterior two-thirds.

Metasoma spination: Segment I: dorsomedian posterior and dorsolateral posterior spiniform granules absent; ventrolateral carinae without large spiniform granules; ventrosubmedian carinae with one pair of subposterior spiniform granules and 0-1 pair of median granules. Segment II: dorsomedian posterior and dorsolateral posterior spiniform granules absent; ventrolateral carinae without large spiniform granules; ventrosubmedian carinae with one pair of subposterior spiniform granules and 0-1 pair of median granules. Segments III-IV: dorsolateral posterior spiniform granules absent; ventrolateral and ventrosubmedian carina without large spiniform granules. Segment V: ventrolateral and ventromedian carinae without distinct granules or spines; anal arch crenulate.

Ventral metasoma setation: Segment I with eight macosetae, i.e. three pairs (anterior, median and posterior) on ventrosubmedian carinae and one pair (anterior) on lateral carinae, or ten macrosetae, i.e. three pairs (anterior, median and posterior) on ventrosubmedian carinae and two pairs (anterior and supramedian) on ventrolateral carinae; segments II-IV with ten macrosetae, i.e. three pairs (anterior, median and posterior) on ventrosubmedian carinae and two pairs (anterior and supramedian) on ventrolateral carinae; segment V with 16 macrosetae, i.e.

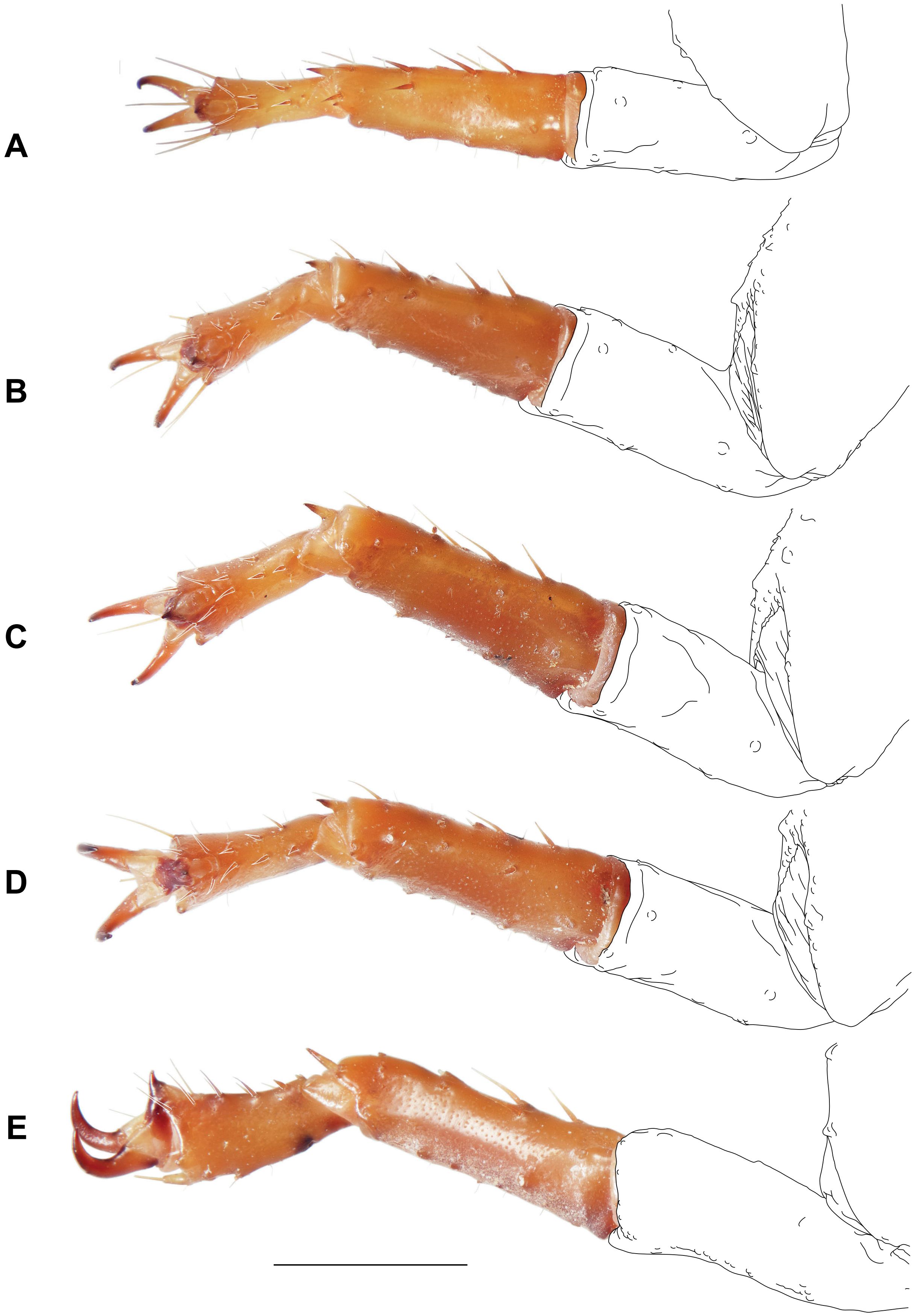

Fig. 98. *Hormurus maiwa* sp. nov., male holotype (AMNH, Peria Creek), right tarsi, ventral (A-D) and retrolateral (E) aspect. (A) Tarsus I. (B) Tarsus II. (C) Tarsus III. (D-E) Tarsus IV. Scale line: 2 mm.

four pairs (anterior, median, subposterior and posterior) on ventrosubmedian carinae and four pairs (anterior, supramedian, subposterior and posterior) on ventrolateral carinae.

Telson (Fig. 99B): Slightly longer than metasoma segment V; vesicle smooth, without granules; aculeus short (less than half of vesicle length), sharply curved.

Hemispermatophore (Fig. 100): Stalk distinctly shorter than stem. Distal lamina curved, without distal crest on anterior margin; single laminar hook submedian, situated between 1/3 and 3/7 from base of stalk (basal part/distal lamina ratio = 0.63-0.67, median = 0.66); transverse ridge distinct, more proximal than base of laminar hook, merging with anterior margin more proximally than base of laminar hook. Capsule: hemisolenos thin, folded on itself only proximally and above that unfolded to flattened distal tip (tip and base approximately of same width), without lateral longitudinal carina, laterodistal accessory hook or medioposterior accessory apophysis; tip of hemisolenos more proximal than base of laminar hook, more distal than tip of clasper. Clasper well developed, forming distinct hump, not hook-like, without anterior accessory process. Subex well developed, spoon-shaped, merging anteriorly with base of clasper; posterior edge forming obtuse angle (>90°) with hemisolenos; anterior edge forming right angle (90º) with hemisolenos.

Description of adult female: Same characters as male except as follows. *Pedipalps* (Figs 93C-D, 95A, F, K): Segments noticeably shorter or more robust than in male.

Chela fingers (Fig. 96B): Dentate margins linear or nearly so, without pronounced lobe and notch, with two rows of primary denticles extending from tip to base of fingers and bearing large inner accessory denticles.

Carapace (Fig. 94B, D): Frontal lobes smooth, median longitudinal sulci and anterior furcated sulci granular; posteromedian margin smooth.

Legs: Telotarsi I-IV: pro- and retroventral row each with

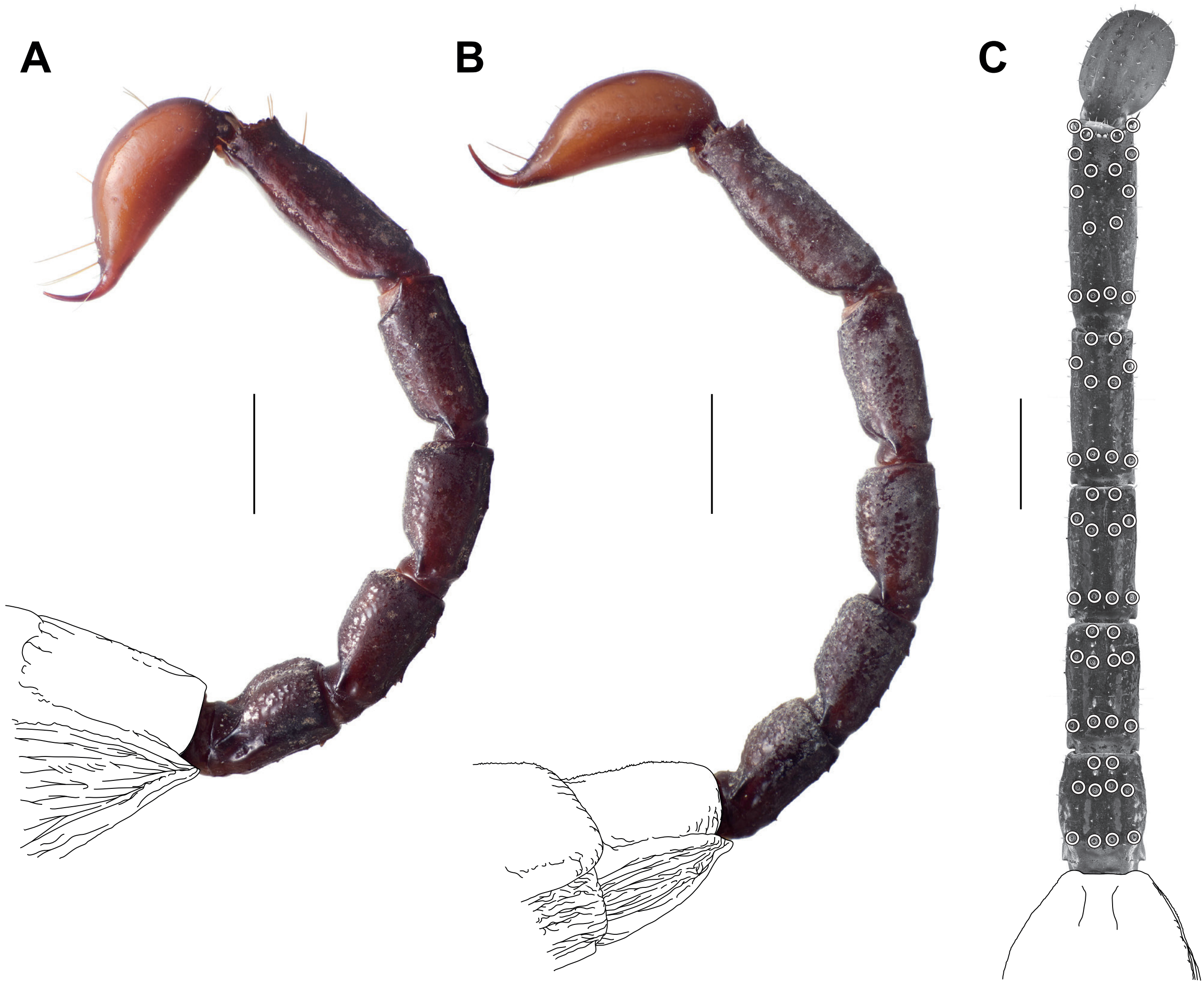

Fig. 99. *Hormurus maiwa* sp. nov., metasoma and telson, lateral (A-B) and ventral (C) aspects. (A) Female (AMNH, Peria Creek). (B-C) Male (AMNH, Peria Creek). Scale lines: 3 mm.

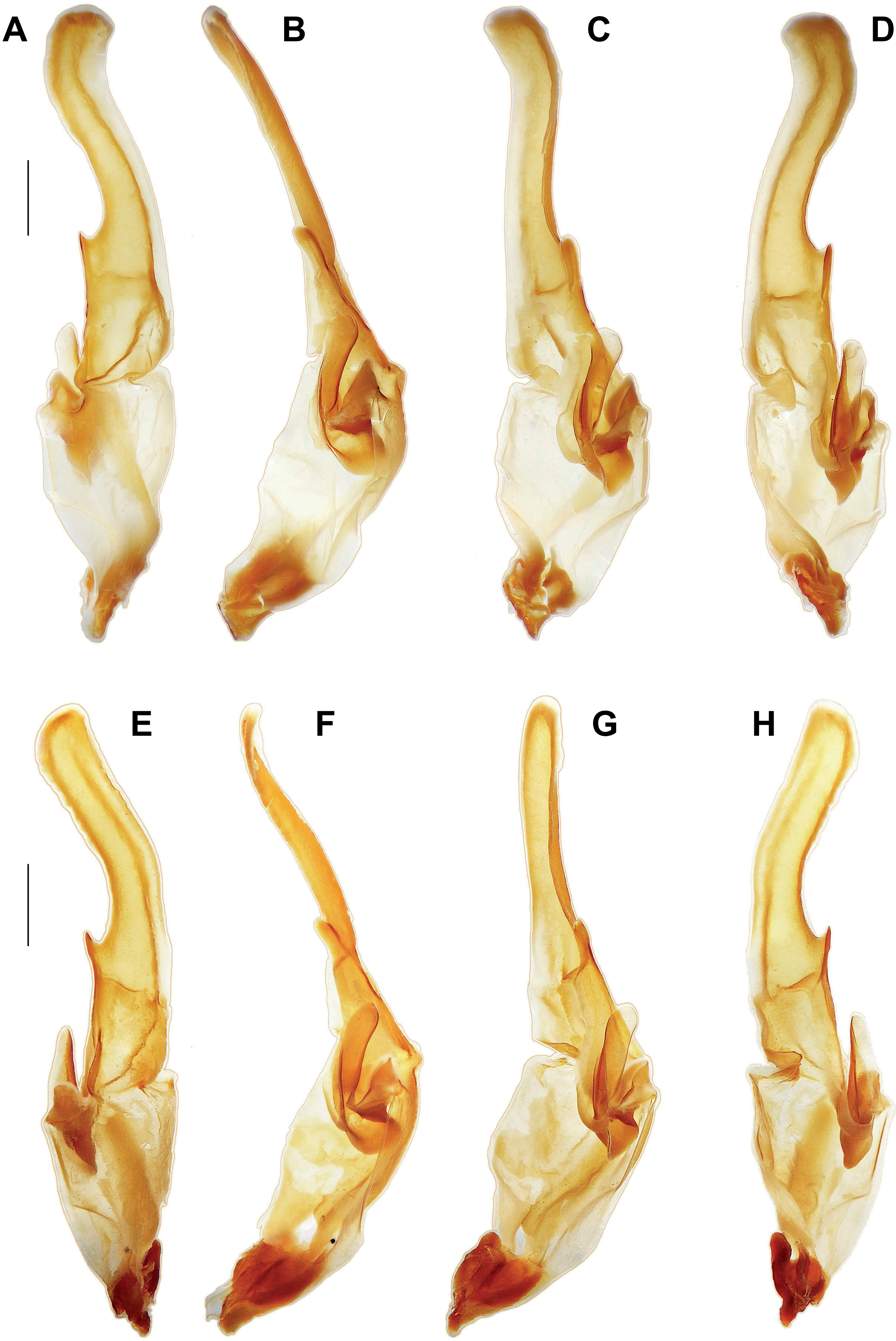

Fig. 100. *Hormurus maiwa* sp. nov., left hemispermatophore of male holotype (AMNH, Peria Creek; A-D) and of male paratype (AMNH, Mt Dayman; E-H). (A, E) Lateral aspect. (B, F) anterior aspect. (C, G) Rotated approximately 45° counter-clockwise from anterior aspect. (D, H) Contralateral aspect. Scale lines: 1 mm.

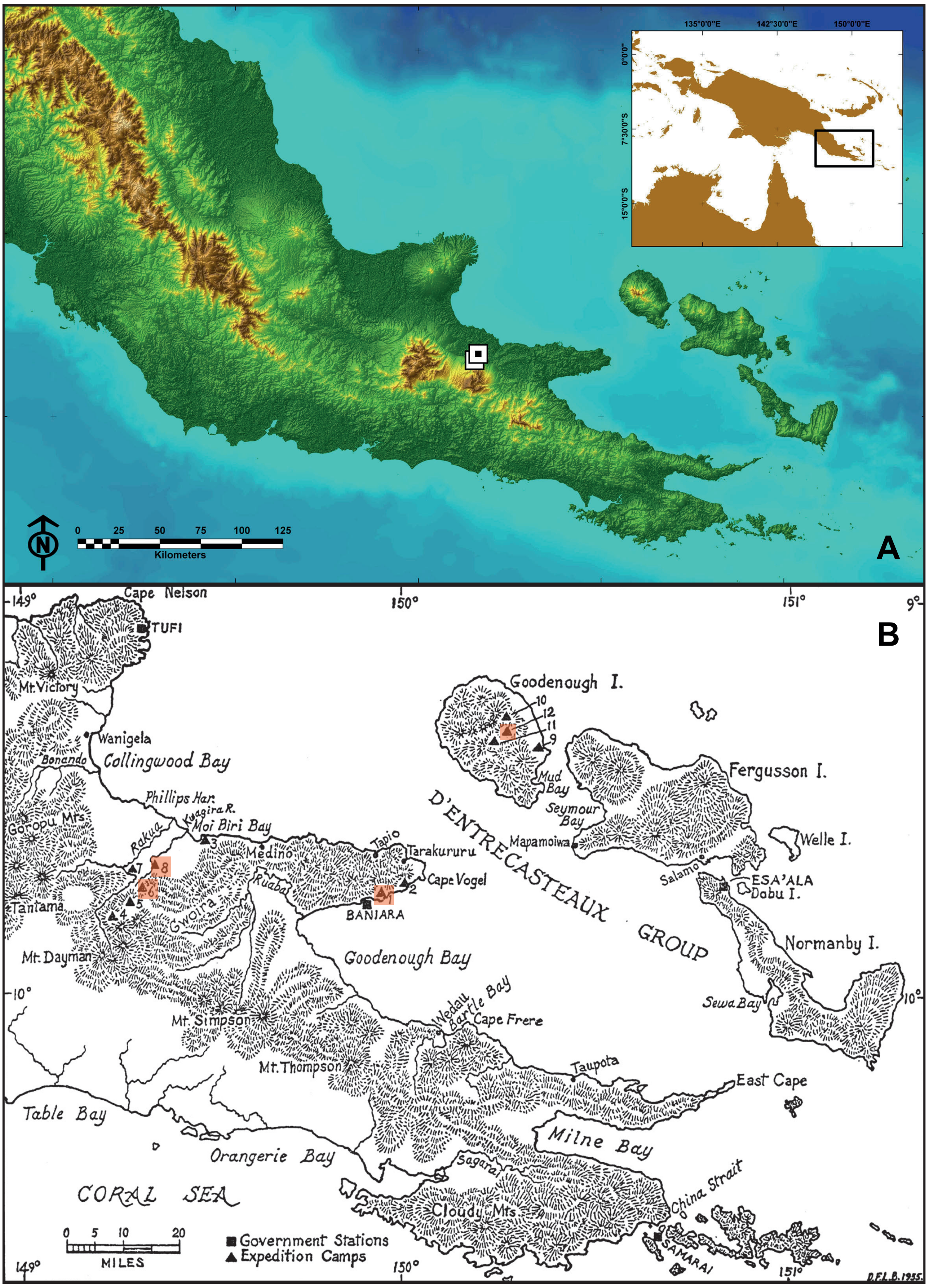

Fig. 101. (A) Known localities of *Hormurus maiwa* sp. nov. in the northern foothills of Mount Dayman in the Maneau Range, at the eastern tip of mainland New Guinea, Milne Bay Province. The color gradient indicates topography and bathymetry. (B) Maps of the fourth Archbold Expedition to New Guinea organised by the AMNH. Reproduced from Brass (1956). Localities of material treated in the present contribution are indicated with red squares: 1 - Menapi (type locality of *Hormurus menapi* sp. nov.); 6 - N slope of Mt Dayman; 8 - Peria Creek, Kwagira River, 50 m; 12 - Camp 2 (900 m), eastern slopes of Goodenough Island. Locality record of *Hormurus* sp. (Remarks about this specimen given in the section "Unidentified specimens").

3-4/4, 4/4-5, 4-5/4-5 and 4-5/5, respectively, retroventral row with one or two proximal spinules.
Genital operculum (Fig. 97D): Oval to semi-oval, as wide as long or only slightly wider than long (length/width ratio = 0.78-0.92, median = 0.89); opercular sclerites partly fused, with distinct median suture; posterior notch present, at least weakly developed.
Pectines (Fig. 97D-E): Short, distal edge not reaching distal edge of coxa IV. Pectinal teeth count 6-7; teeth short and straight, sensory papillae covering only distal half.
Mesosoma (Figs 93C-D, 94B, F): Post-tergites: reticulate network of ridges and dimples on segments III-VII more distinct than in male; intercarinal surfaces of I-II medially smooth, laterally granular; intercarinal surfaces of III-VI almost totally smooth, faintly granular along lateral margins; intercarinal surfaces of VII densely granular, proximal third smooth.
Metasoma (Fig. 99A): Spination: Segment II: ventrosubmedian carinae with 1-2 pairs of subposterior spiniform granules and 0-1 pair of median granules.

Intraspecific variation: *Pedipalp trichobothria*: On the retrolateral side of the pedipalp patella trichobothrium esb_1 is in some specimens located midway between esb_2 and em_{1-2} rather than close to em_{1-2}, resulting in four groups (esb_1, esb_2, em_{1-2} and *est*) rather than two or three.
Leg spination: The number of setiform macrosetae varies from three to four in the proventral row of telotarsi I, and from four to five in the proventral rows of telotarsi II-IV and in the retroventral rows of telotarsi II-III. One or two proximal spinules are present on the retroventral rows of the telotarsi.
Genital operculum: The length/width ratio varies from 0.78 to 0.92 (median = 0.89).
Pectines: The pectinal teeth count varies from seven to nine in males and from six to seven in females.
Metasoma: Spination: 0-1 pair of median spiniform granules are present on the ventrosubmedian carinae of segment I; 1-2 pairs of subposterior spiniform granules and 0-1 pair of median spiniform granules are present on the ventrosubmedian carinae of segment II. Furthermore, one more or one fewer granule may be expressed in each group of granules on each segment.
Ventral metasoma setation: One fewer macroseta may be expressed in the anterior group of segment II resulting in a total of nine macrosetae instead of ten. One to three fewer macrosetae may be expressed on segment V (in the anterior, median and/or subposterior groups) resulting in a total of 13 to 15 macrosetae instead of 16.
Hemispermatophores: The basal part/distal lamina ratio varies from 0.63 to 0.67 (median = 0.66).

Distribution: *Hormurus maiwa* sp. nov. is only known from the eastern banks of the Kwagira River in the northern foothills of Mount Dayman (2987 m) in the Maneau Range, Milne Bay Province (Fig. 101).

Remarks: The type specimens were collected during the fourth Archbold Expedition to New Guinea (Brass, 1956). The expedition leader, Leonard J. Brass, an Australian botanist, was accompanied by two zoologists, Hobart M. van Deusen and Geoffrey M. Tate, and a field assistant from the AMNH, Kenneth M. Wynn. The purpose of the expedition was to gather zoological and botanical collections from the Cape Vogel Peninsula and from the Goodenough and Fergusson Islands in the D'Entrecasteaux group. Six months into the trip (September 1953) Tate suffered a paralytic stroke, prematurely ending his participation in the fieldwork.

Hormurus papuanus Kraepelin, 1914

Figs 4C, 102-110, Tab. 11

Hormurus papuanus Kraepelin, 1914: 333. – Kopstein, 1921: 138 (part). – Monod, 2011a (part): 22, 532, 536, 686-689, fig. 122. – Monod *et al*., 2019: 148-151, 200, fig. 31, tab. 1.

Liocheles caudicula papuanus (Kraepelin, 1914). – Takashima, 1945: 96.

Liocheles karschii (Keyserling, 1885). – L.E. Koch, 1977: 173-172 (part).

Liocheles papuanus. – Monod, 2000: 113-117, pls 51-55, map 15. – Monod, 2011a: 16.

Material: ZMH (ZMH-A0015414); ♂ lectotype; [Papua New Guinea], SW Küste Neu Pommern [SW coast of New Britain], Liebliche Inseln [Arawe Islands] [6°06'07''S 148°59'53''E]; 11.-12.XII.1908, 05.I.1909, 26.-31.I.1909; leg. G. Duncker, Hamburg Südsee Expedition. – ZMH (ZMH-A0015416); 1 ♂, 4 ♀, 6 imm. ♂, 6 imm. ♀ paralectotypes, same data as for lectotype (2 T. under Steinen [two animals under rocks], 2 T. in moderndem Holz [two animals in decaying logs]). – MHNG-ARTO-26553; 1 ♂, 1 ♀ paralectotypes; same data as for lectotype. – ZMH (ZMH-A0015415); 1 ♂, [Papua New Guinea], Neu Pommern [New Britain], Möre Hafen [Kandrian] [6°11'24''S 149°32'51''E], Unterlauf des Wasserfall-Fl. [downstream of waterfall]; 13.-14.XII.1908, 20.-24. II.1909; leg. G. Duncker, Hamburg Südsee Expedition.

Diagnosis: Coxae II-III of *H. papuanus* bear knob-like anterodistal processes in males and females (Fig. 106A, C-E, G-H). These structures are more strongly developed in males than females, more strongly developed on coxae III than on coxae II in both sexes and less strongly developed in immatures than in adults. They are absent in all other Papuan *Hormurus* except *H. ancylolobus* sp. nov. where there are hook-like (Fig. 70B, D-E) instead of knob-like. Moreover, metasoma segment V bears 14 ventral macrosetae in *H. papuanus*, i.e. four pairs (anterior, median, supramedian and posterior) on the ventrosubmedian carinae and four pairs (anterior, supramedian and posterior) on the

Table 11. *Hormurus papuanus* Kraepelin, 1914, measurements (in mm), repositories and inventory numbers of adult males and female.

	Lectotype	Paralectotype	Paralectotype	Paralectotype
Sex	♂	♂	♂	♀ 1
Repository	ZMH	ZMH	MHNG	ZMH
Inventory number	A0015414	A0015416	ARTO-26553	A0015416
Locality	Arawe Islds	Arawe Islds	Arawe Islds	Arawe Islds
Total length	46.00	41.00	48.00	49.00
Carapace, length	7.19	6.49	7.07	6.95
Carapace, anterior width	4.75	4.39	4.75	4.51
Carapace, posterior width	7.90	6.89	7.62	7.68
Pedipalp femur, length	8.05	7.09	7.98	6.64
Pedipalp femur, width	3.11	2.68	3.05	2.80
Pedipalp femur, height	1.65	1.55	1.52	1.71
Pedipalp patella, length	7.68	6.83	7.68	6.52
Pedipalp patella, width	3.41	2.99	3.41	3.05
Pedipalp patella, height	2.68	2.40	2.71	2.54
Pedipalp chela, length	15.67	14.23	15.66	13.79
Pedipalp chela, width	5.67	4.88	5.30	5.02
Pedipalp chela, height	3.41	2.78	3.05	3.05
Chela movable finger, length	7.31	6.68	7.56	6.60
Genital operculum length, female	NA	NA	NA	1.89
Genital operculum width, female	NA	NA	NA	1.71
Metasoma segment I, length	2.68	2.44	2.68	2.38
Metasoma segment I, width	2.01	1.79	1.97	1.95
Metasoma segment I, height	1.77	1.58	1.71	1.71
Metasoma segment II, length	3.17	2.93	3.05	2.80
Metasoma segment II, width	1.71	1.56	1.71	1.58
Metasoma segment II, height	1.77	1.65	1.73	1.71
Metasoma segment III, length	3.29	3.05	3.29	2.93
Metasoma segment III, width	1.58	1.46	1.58	1.46
Metasoma segment III, height	1.77	1.65	1.77	1.77
Metasoma segment IV, length	3.54	3.29	3.41	3.17
Metasoma segment IV, width	1.46	1.32	1.45	1.43
Metasoma segment IV, height	1.79	1.61	1.73	1.68
Metasoma segment V, length	4.57	4.14	4.53	4.02
Metasoma segment V, width	1.61	1.37	1.58	1.46
Metasoma segment V, height	1.83	1.50	1.62	1.65
Telson, length	5.24	4.84	5.36	4.51
Telson, width	1.89	1.71	1.77	1.58
Telson, height	2.05	1.83	1.93	1.71

Table 11 (continued). *Hormurus papuanus* Kraepelin, 1914, measurements (in mm) of adult females.

	Paralectotype	Paralectotype	Paralectotype	Paralectotype
Sex	♀ 2+	♀ 3	♀ 4+	♀ 5
Repository	MHNG	ZMH	ZMH	ZMH
Inventory number	ARTO-26553	A0015416	A0015416	A0015416
Locality	Arawe Islds	Arawe Islds	Arawe Islds	Arawe Islds
Total length	48.00	45.00	46.00	41.00
Carapace, length	7.05	6.56	6.58	6.52
Carapace, anterior width	4.63	4.39	4.41	4.51
Carapace, posterior width	7.87	7.19	6.95	7.09
Pedipalp femur, length	7.07	6.52	6.58	6.58
Pedipalp femur, width	2.80	2.62	2.62	2.62
Pedipalp femur, height	1.78	1.56	1.58	1.58
Pedipalp patella, length	6.83	6.28	6.28	6.34
Pedipalp patella, width	3.17	2.80	2.93	2.99
Pedipalp patella, height	2.56	2.32	2.44	2.44
Pedipalp chela, length	14.18	13.42	13.45	13.62
Pedipalp chela, width	5.36	4.55	4.75	4.75
Pedipalp chela, height	3.35	2.74	2.86	2.80
Chela movable finger, length	6.70	6.64	6.70	6.58
Genital operculum length, female	1.97	1.83	1.83	1.85
Genital operculum width, female	1.83	1.77	1.71	1.73
Metasoma segment I, length	2.44	2.28	2.32	2.32
Metasoma segment I, width	1.97	1.71	1.71	1.77
Metasoma segment I, height	1.77	1.61	1.71	1.61
Metasoma segment II, length	2.83	2.74	2.66	2.68
Metasoma segment II, width	1.65	1.52	1.55	1.63
Metasoma segment II, height	1.71	1.61	1.61	1.71
Metasoma segment III, length	2.99	2.80	2.68	2.80
Metasoma segment III, width	1.52	1.46	1.52	1.49
Metasoma segment III, height	1.73	1.58	1.61	1.71
Metasoma segment IV, length	3.17	3.05	2.99	3.17
Metasoma segment IV, width	1.43	1.34	1.34	1.37
Metasoma segment IV, height	1.71	1.52	1.58	1.65
Metasoma segment V, length	4.00	3.90	3.78	3.90
Metasoma segment V, width	1.40	1.32	1.37	1.40
Metasoma segment V, height	1.63	1.46	1.49	1.52
Telson, length	4.69	4.33	4.39	4.33
Telson, width	1.58	1.52	1.58	1.58
Telson, height	1.83	1.58	1.61	1.58

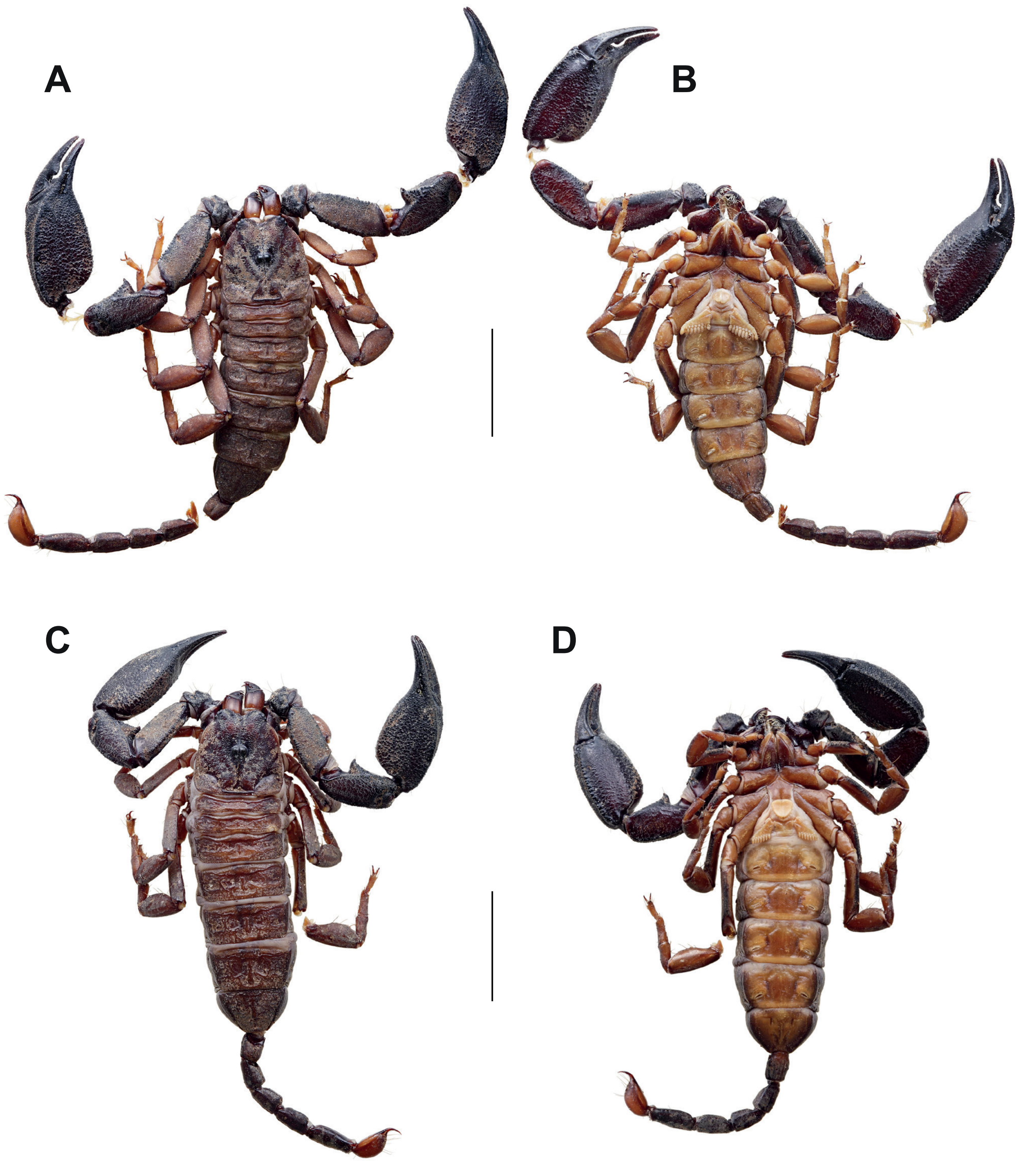

Fig. 102. *Hormurus papuanus* Kraepelin, 1914, habitus, dorsal (A, C) and ventral (B, D) aspect. (A-B) Male lectotype (ZMH). (C-D) Female paralectotype (MHNG-ARTO-26553). Scale lines: 10 mm.

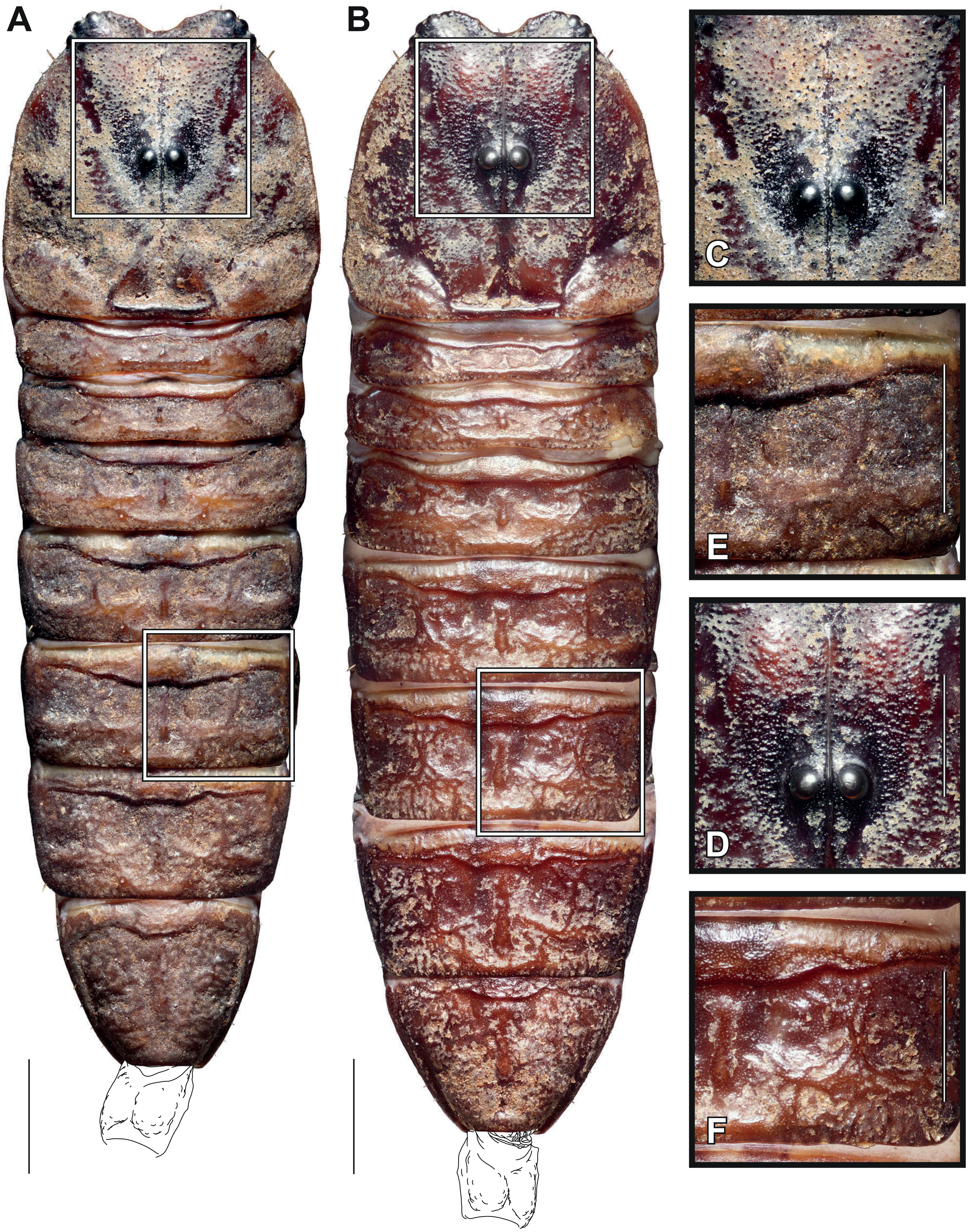

Fig. 103. *Hormurus papuanus* Kraepelin, 1914, carapace and mesosomal tergites showing ornamentation and macrosculpture of cuticle (A-B), detailed views of carapace (C-D) and of tergite V (E-F), dorsal aspect. (A, C, E) Male lectotype (ZMB). (B, D, F) Female paralectotype (MHNG-ARTO-26553). Scale lines: 3 mm (A-B), 2 mm (C-F).

ventrolateral carinae (Fig. 108C), whereas most other Papuan congeners possess a higher macrosetal count. Exceptions are *H. araiaspathe* sp. nov. (Figs 4B, 18B) and *H. barai* sp. nov. (Figs 4A, 28C), which possesses between 12 and 14 ventral macrosetae on metasoma segment V. The sole known specimen of *H. sibonai* sp. nov. also bears 13 ventral macrosetae on metasoma segment V (Fig. 145B), but this is most likely an anomalous pattern with three unexpressed macrosetae.

Description of adult male (lectotype): *Colouration* (Fig. 102A-B): Dorsal surface of chelicera manus dark orange with brown infuscation, more pronounced anteriorly; fingers black. Carapace reddish brown, median ocular region black. Tergites brown. Pedipalps reddish brown; carinae and fingers black. Legs only slightly paler than tergites, light brown to dark orange, prolateral carina of femora black. Coxapophysis I light brown, anterior tip pale yellow; coxapophysis II black; leg coxae and sternum light brown with lighter orange spots; sternites III-VI brown with yellow posterior margin; sternite VII dark brown; genital operculum and pectines pale yellow. Metasoma reddish brown with darker infuscation; telson paler than metasoma, vesicle orange, aculeus reddish brown.

Cuticle: Nongranular surfaces of carapace, pedipalps, legs, mesosoma and metasoma finely punctate.

Carapace (Fig. 103A, C): Anterior margin with median notch moderately excavated. Anterior furcated sutures distinct. Median ocular tubercle slightly raised; median ocelli present, at least twice the size of lateral ocelli, separated from each other by approximately half the diameter of a median ocellus. Three pairs of lateral ocelli, equal in size, equidistant and adjacent to each other. Surfaces minutely and sparsely granular, except for smooth anterior areas of frontal lobes and median ocular area.

Chelicerae: Basal and median teeth of fixed finger fused into bicusp. Dorsal margin of movable finger with four teeth (one basal, one median, one subdistal and one distal); dorsal distal tooth smaller than ventral distal tooth; ventral margin smooth.

Pedipalps (Figs 102A-B, 104B-E, G-J, L-O): Segments rather short and stout, femur length approximately equal to that of carapace. Chela almost asetose.

Chela fingers (Fig. 105A, C-D): Fixed finger: basal lobe well developed and conical; suprabasal notch distinct and deep; dentate margins distally (from tip of finger to median lobe) with two rows of primary denticles bearing large inner accessory denticles; single row of scattered denticles basally. Movable finger: basal lobe absent; suprabasal lobe well developed, conical, gently rounded dorsally and lacking sharp conical tooth, not overlapping with fixed finger; suprabasal lobe and corresponding notch on fixed finger contiguous, no proximal gap or at most reduced gap only evident when fingers closed; dentate margins distally (from tip of finger to suprabasal lobe) with two rows of primary denticles bearing large inner accessory denticles; few sparse denticles basally.

Pedipalp carinae: Femur (Fig. 104L-O): proventral carina visible as a ridge of medium-sized spiniform granules; promedian carinae absent; prodorsal carina visible as a ridge of medium-sized spiniform granules, similarly developed as proventral carina; retrodorsal carina visible as a ridge of medium-sized spiniform granules, less developed than prodorsal carina, more distinct in proximal third of segment; retroventral carina visible as a ridge of medium to large spiniform granules, distinctly more developed than retrodorsal carina; ventromedian carina obsolete, only discernible proximally as a ridge of medium-sized spiniform granules. Patella (Fig. 104G-J): proventral carina discernible as costate ridge proximally, obsolete distally; promedian and prodorsal carinae visible as ridges with medium-sized spiniform granules, equally developed, fused medially into prominent spiniform process with pointed medially located apex; dorsomedian carina only visible proximally as a ridge of medium-sized spiniform granules; retrodorsal carina obsolete, only expressed proximally as a faint ridge of medium-sized spiniform granules; paired retromedian carinae fused and visible as a faint ridge of medium-sized spiniform granules; retroventral carina costate-granular (composed of medium-sized spiniform granules). Chela manus (Fig. 104B-E): proventral and promedian carinae visible as faint ridges with medium-sized spiniform granules, equally developed; prodorsal carina obsolete, visible as a faint ridge of medium-sized spiniform granules; dorsomedian carina visible as a faint ridge of medium-sized spiniform granules, more strongly developed than prodorsal carina; dorsal secondary carina obsolete; digital carina visible as a ridge of small to medium-sized spiniform granules, less distinct in distal area, more developed than retromedian carina; fused retromedian carinae obsolete, visible as a faint ridge of medium-sized spiniform granules proximally; retrolateral secondary carina vestigial, only distinct proximal to condyle of movable finger, developed as a ridge of medium-sized spiniform granules; retroventral carina crenulate (composed of medium to large granules); ventromedian carina obsolete, only expressed proximally as a faint ridge of medium-sized spiniform granules.

Pedipalp macrosculpture: Femur (Fig. 104L-O): prolateral intercarinal surface sparsely covered with small spiniform granules; dorsal intercarinal surface densely covered with small to medium-sized spiniform granules, distal area smooth; retrolateral intercarinal surface smooth or nearly so (only few scattered granules distally); large part of ventral intercarinal surface sparsely covered with medium-sized spiniform granules, distal third smooth. Patella (Fig. 104G-J): prolateral intercarinal surface sparsely covered with small to medium-sized spiniform granules, distal area smooth; dorsal and retrolateral intercarinal surfaces covered with dense reticulate network of medium-sized spiniform granules; ventral intercarinal surface covered with faint and sparse reticulate network of anastomosed medium-sized spiniform granules, distal area smooth. Chela manus (Fig. 104B-E): prolateral intercarinal surface sparsely covered with small to medium-sized spiniform granules, smooth proximally; dorsal and retrolateral intercarinal surfaces covered with dense reticulate network of medium-sized spiniform granules; ventral intercarinal surface covered with sparse reticulate network of medium-sized anastomosed spiniform granules, distal area smooth. Chela fingers densely covered with small spiniform granules in proximal half, surface smooth or nearly so distally, ventral surface smooth; trichobothria *dst*, *dsb* and *db* together in a single large smooth depression.

Trichobothria: Pedipalp orthobothriotaxic, accessory trichobothria absent. Patella (Fig. 104G-J): d_2 trichobothrium distal to patellar process; five *eb* trichobothria arranged in two groups (eb_1+eb_{4-5} and eb_{2-3}); two *esb*, two *em* and one *est* trichobotria arranged in three (esb_1, esb_2+em_{1-2} and *est*) or two groups (esb_1 and esb_2+ em_{1-2}+*est*); three *et* trichobothria; three *v* trichobothria. Chela manus (Fig. 104B-E): *Dt* situated in proximal half of manus; Eb_3 close to Eb_{1-2}; *Esb* closer to Est than to *Eb* group, sometimes aligned with *Est*; *Est* situated near midpoint; four *V* trichobothria, V_3 distant from V_4. Fixed chela finger with *db* situated on dorsal surface; *esb* equidistant from *eb* and *est*, or nearly so; *eb* situated at base of finger, proximal to point of articulation between fixed and movable fingers; two *i* trichobothria.

Coxosternum (Fig. 106A, C-D): Coxa II with small knob-like anterodistal process. Coxa III with strongly developed knob-like anterodistal process. Sternum equilateral pentagonal (anterior width slightly greater than posterior width), as wide as long.

Legs (Fig. 107): Femora I-IV with ventral surfaces bicarinate, pro- and retroventral carinae granular. Retrolateral margins of tibiae I-II without setiform macrosetae. Basitarsi I-IV: pro- and retroventral rows each with 3/4, 4/5, 4/5 and 4/5 setiform macrosetae, respectively. Telotarsi I-IV: pro- and retroventral row each with 3-4/4, 4/4, 4-5/4-5 and 4-5/5 setiform macrosetae, respectively; retroventral row with one proximal spinule; ventromedian spinules absent. Ungues shorter than telotarsus, half its length or less.

Genital operculum (Fig. 106A): Composed of two subtriangular sclerites.

Pectines (Fig. 106A-B): Short, distal edge not reaching distal edge of coxa IV; fulcrae and three marginal lamellae present. Pectinal teeth count 8-10; teeth straight, entirely covered with sensory papillae.

Mesosoma (Figs 102A-B, 103A, E): Pre-tergites I-VII and posterior margins of pre-tergites smooth. Post-tergites: posterior margins of tergites I-VI sublinear, without distinct projection; lateral transversal sulcus present; intercarinal surfaces of I-III medially smooth, laterally granular; intercarinal surfaces of IV-VII almost totally smooth, faintly granular along lateral margins; intercarinal surfaces of III-VII with faint reticulate network of ridges and dimples. Respiratory stigmata (spiracles) of sternites IV-VI short, their length less than width of sternite III, and distinctly crescent shaped. Sternite VII acarinate.

Metasoma (Fig. 108B-C): Not markedly compressed laterally; sparsely and minutely granular, posterior segments less so (segment V almost smooth); dorsal intercarinal surface of V smooth and shiny medially; distinct dorsomedian sulcus on segments I-IV, much less pronounced on segment V (usually only faintly expressed anteriorly).

Metasoma carinae: Segments I-IV: dorsolateral carinae obsolete on all segments; lateral median carinae weakly developed (as faint ridges); lateral inframedian carinae discernible anteriorly as a faint ridge on segment I, absent on other segments; ventrolateral carinae weakly developed (as faint ridges); paired ventrosubmedian carinae weakly developed (as low ridges). Segment V: dorsolateral and lateral median carinae obsolete; ventrolateral carinae only expressed as faint ridges; ventrosubmedian carinae fused, only expressed as a faint ridge in anterior two-thirds.

Metasoma spination: Segments I-II: dorsomedian posterior and dorsolateral posterior spiniform granules absent; ventrolateral carinae without large spiniform granules; ventrosubmedian carinae with one pair of subposterior spiniform granules. Segments III-IV: dorsolateral posterior spiniform granules absent; ventrolateral and ventrosubmedian carina without large spiniform granules. Segment V: ventrolateral and ventromedian carinae without distinct granules or spines; anal arch crenulate.

Ventral metasoma setation: Segment I with eight macrosetae, i.e. three pairs (anterior, median and posterior) on ventrosubmedian carinae and one pair (anterior) on lateral carinae; segments II-IV each with ten macrosetae, i.e. three pairs (anterior, median and posterior) on ventrosubmedian carinae and two pairs (anterior and supramedian) on ventrolateral carinae; segment V with 14 macrosetae, i.e. four pairs (anterior, median, supramedian and posterior) on ventrosubmedian carinae and three pairs (anterior, supramedian and posterior) on ventrolateral carinae.

Telson (Fig. 108B): Slightly longer than metasoma segment V; vesicle smooth, without granules; aculeus short (its length less than half of vesicle length), sharply curved.

Hemispermatophore (Fig. 109): Stalk distinctly longer than stem. Distal lamina curved, without distal crest on anterior margin; single laminar hook, median, situated between 3/7 and 1/2 from base of stalk (basal part/distal lamina ratio = 0.8-1.01; median = 0.85); transverse ridge distinct, more proximal than base of laminar hook, merging with anterior margin more proximally than base of laminar hook. Capsule: hemisolenos thin, folded on itself only proximally and above that unfolded to flattened distal tip (tip and base approximately of same width), without lateral longitudinal carina, laterodistal accessory hook or medioposterior accessory apophysis; tip of

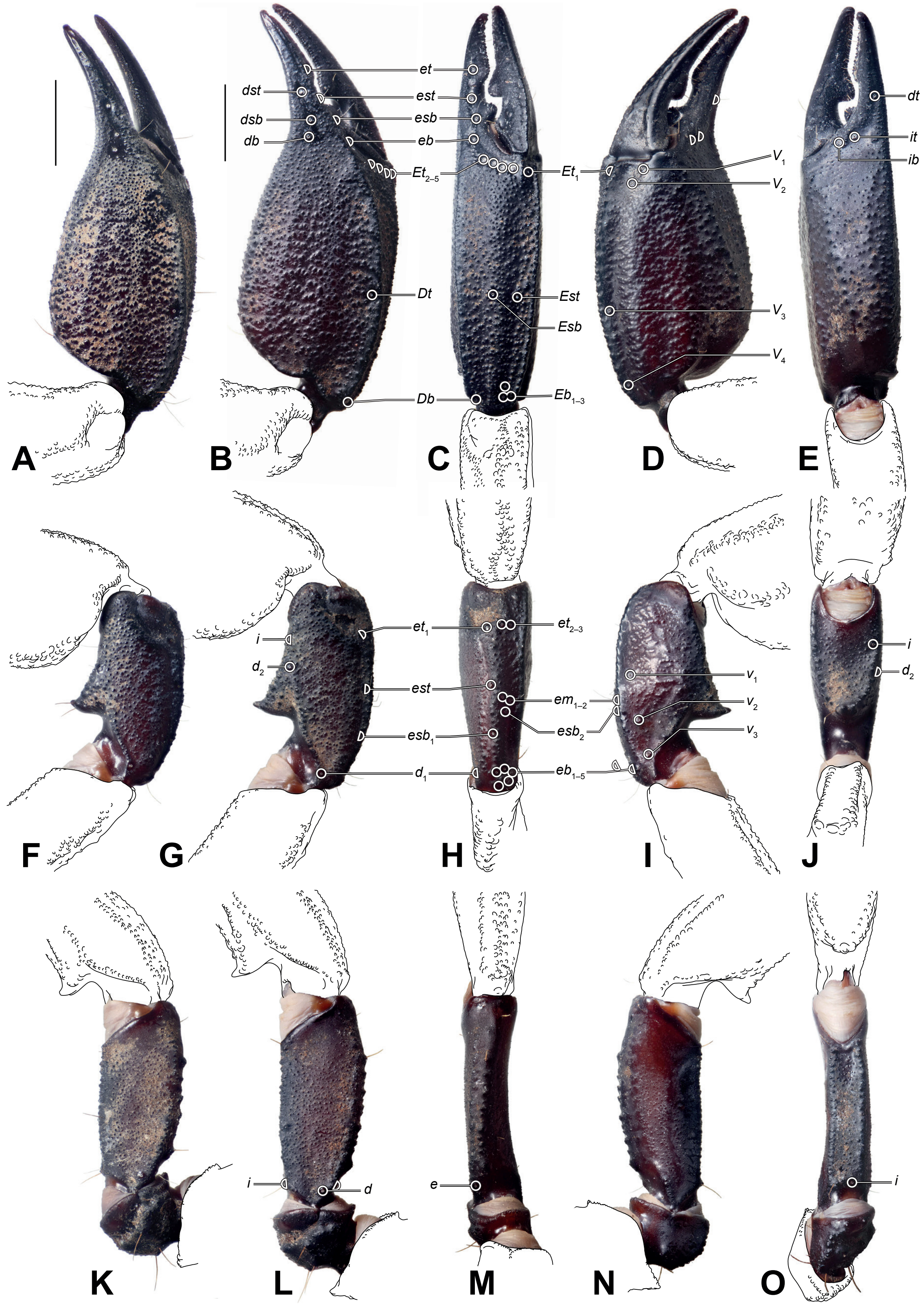

Fig. 104. *Hormurus papuanus* Kraepelin, 1914, pedipalp chela (A-E), patella (F-J), femur and trochanter (K-O), dorsal (A-B, F-G, K-L), retrolateral (C, H, M), ventral (D, I, N) and prolateral (E, J, O) aspects showing trichobothria pattern. (A, F, K) Female paralectotype (MHNG-ARTO-26553). (B-E, G-J, L-O) Male lectotype (ZMH). Scale lines: 3 mm.

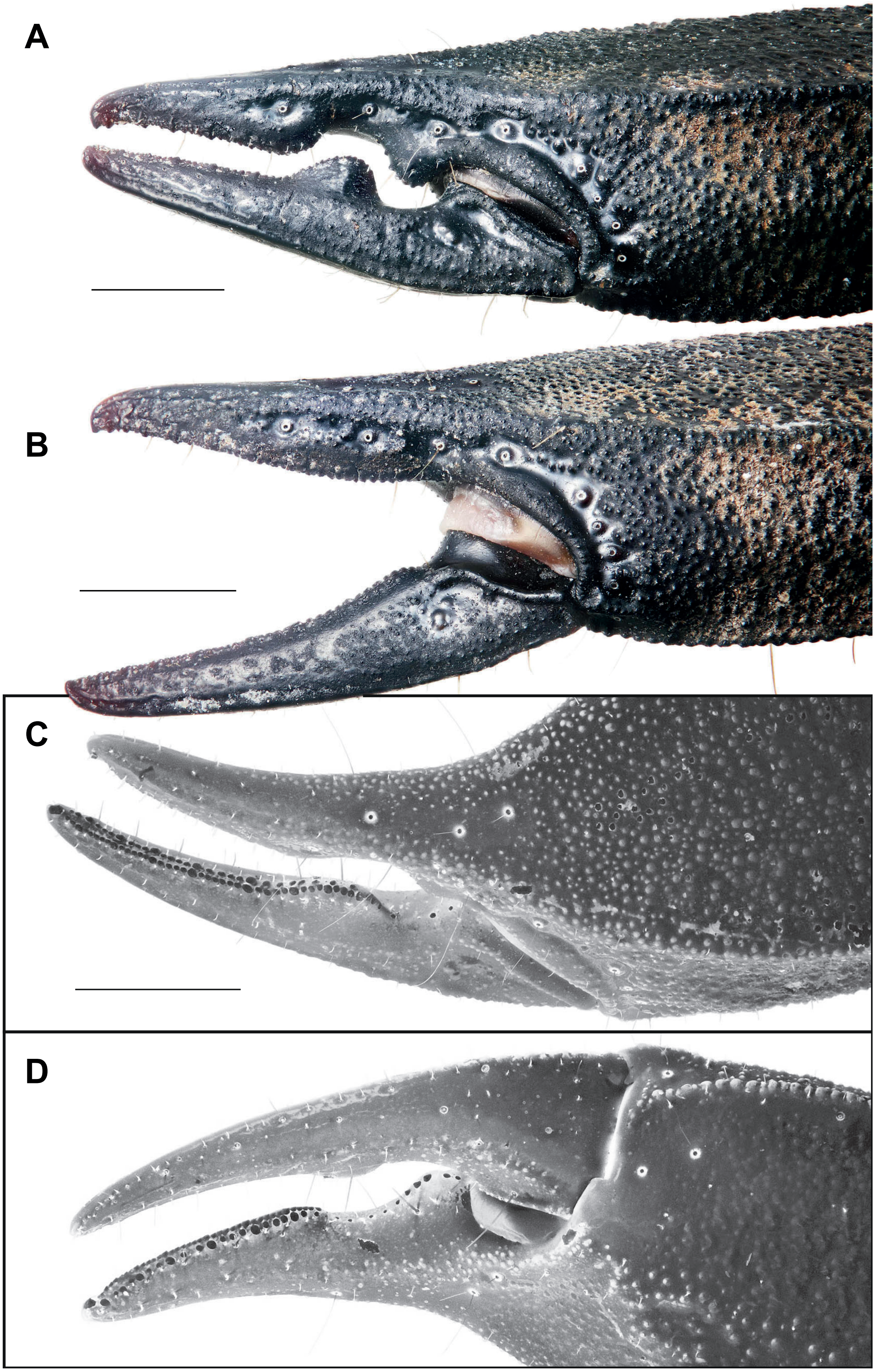

Fig. 105. *Hormurus papuanus* Kraepelin, 1914, left pedipalp chelae, retrolateral aspect showing dentate margin of chela fingers (A-B), dorsal aspect showing dentate margin of movable finger (C), ventral aspect showing dentate margin of fixed finger (D). (A, C-D) Male lectotype (ZMH). (B) Female paralectotype (MHNG-ARTO-26553). Scale lines: 2 mm.

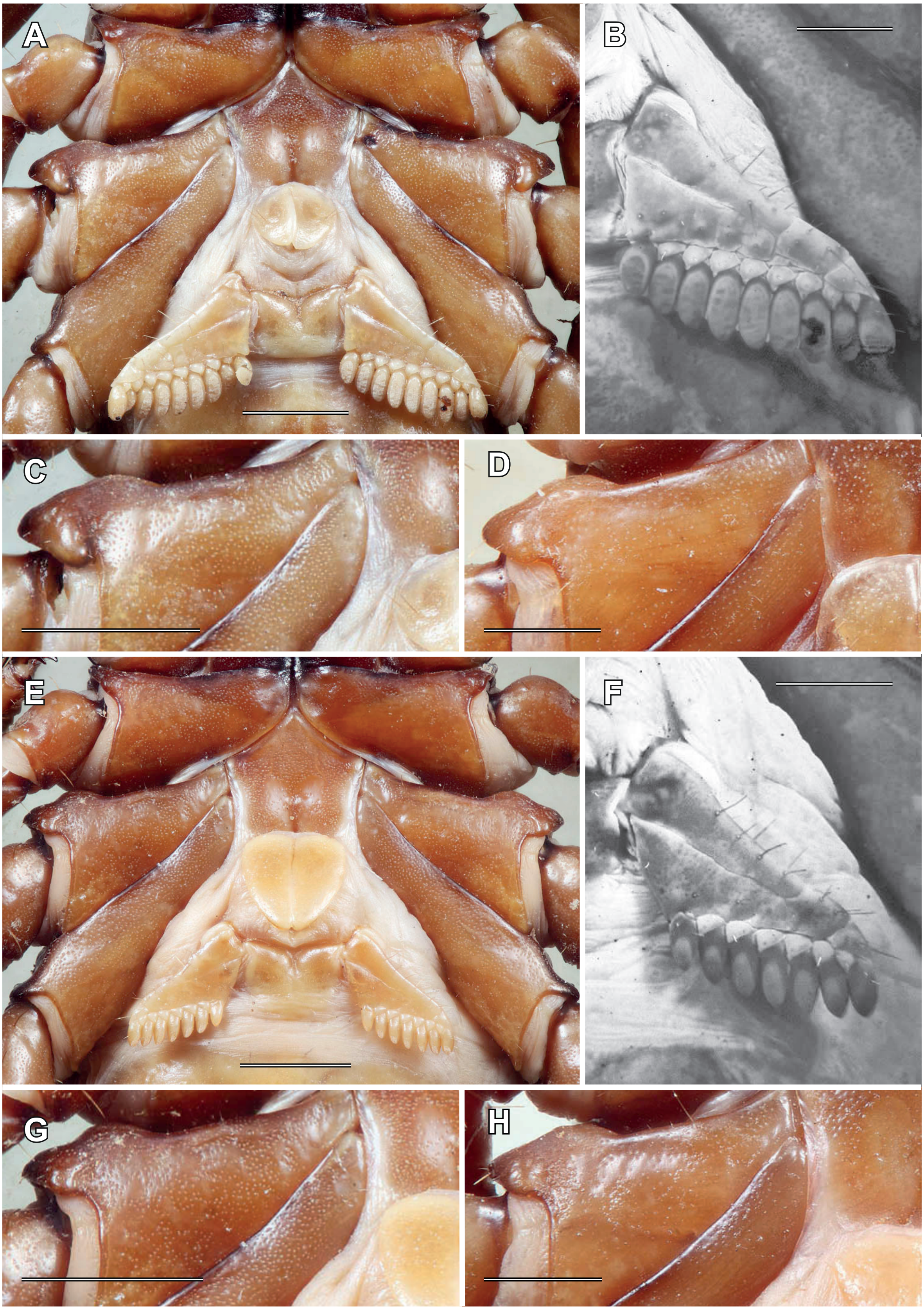

Fig. 106. *Hormurus papuanus* Kraepelin, 1914, coxae II-IV, sternum, genital operculum and pectines, ventral aspect (A, E), left pecten under UV light (B, F), anterior margin of coxae III (C-D, G-H). (A-C) Male lectotype (ZMH). (E-G) Female paralectotype (MHNG-ARTO-26553). (D) Juvenile male paralectotype (ZMH). (H) Juvenile female paralectotype (ZMH). Scale lines: 2 mm (A, C, E, G), 1 mm (B, D, F, H).

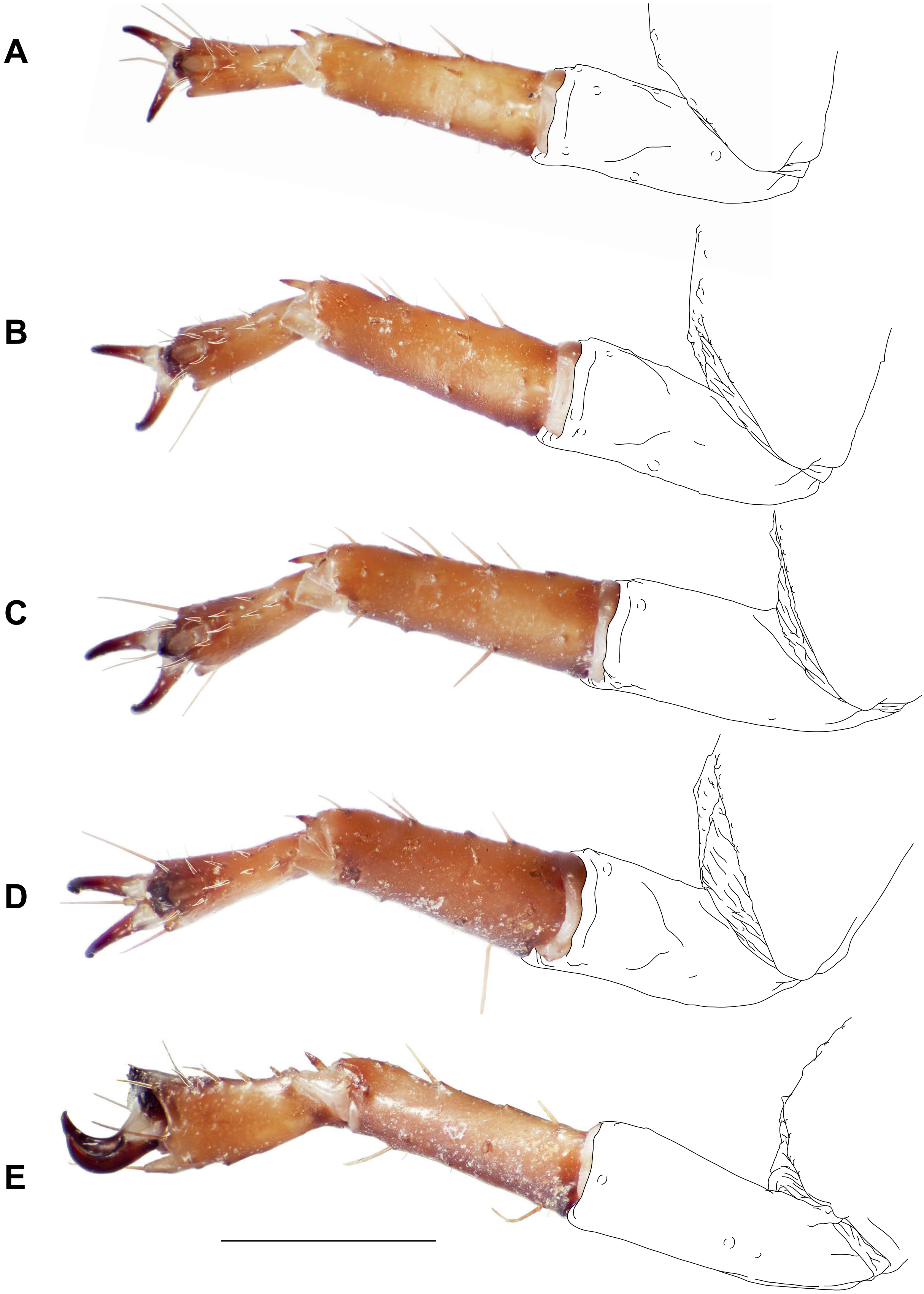

Fig. 107. *Hormurus papuanus* Kraepelin, 1914, male lectotype (ZMH), right tarsi, ventral (A-D) and retrolateral (E) aspect. (A) Tarsus I. (B) Tarsus II. (C) Tarsus III. (D-E) Tarsus IV. Scale line: 2 mm.

hemisolenos more proximal than base of laminar hook, more distal than tip of clasper. Clasper well developed, forming distinct hump, not hook-like, without anterior accessory process. Subex well developed, spoon-shaped, merging anteriorly with base of clasper; posterior edge forming obtuse angle (>90°) with hemisolenos; anterior edge forming right angle (90º) with hemisolenos.

Description of adult female: Same characters as for male except as follows. *Colouration* (Fig. 102C-D): Legs slightly darker than in male, almost as dark as tergites.
Pedipalps (Figs 102C-D, 104A, F, K): Segments not noticeably shorter or more robust than in male.
Chela fingers (Fig. 105B): Dentate margins linear or nearly so, without pronounced lobe and notch, with two rows of primary denticles extending from tip to base of fingers and bearing large inner accessory denticles.
Carapace (Fig. 103B, D): Posteromedian margin smooth.
Coxosternum (Fig. 106E, G-H): Knob-like anterodistal processes of coxae II-III less pronouced than in male.
Genital operculum (Fig. 106E): Oval to semi-oval, slightly longer than wide (length/width ratio = 1.07-1.08, median = 1.07); opercular sclerites partly fused, with distinct median suture; posterior notch present, at least weakly developed.
Pectines (Fig. 106E-F): Short, distal edge not reaching distal edge of coxa IV. Pectinal teeth count 7-9; teeth short and straight, sensory papillae covering only distal half.
Mesosoma (Figs 102C-D, 103B, F): Post-tergites: reticulate network of ridges and dimples more distinct than in male; intercarinal surfaces of I-VII almost totally smooth, faintly granular along lateral and posterior margins.

Intraspecific variation: *Pedipalp trichobothria*: On the retrolateral side of the pedipalp chela trichobothrium

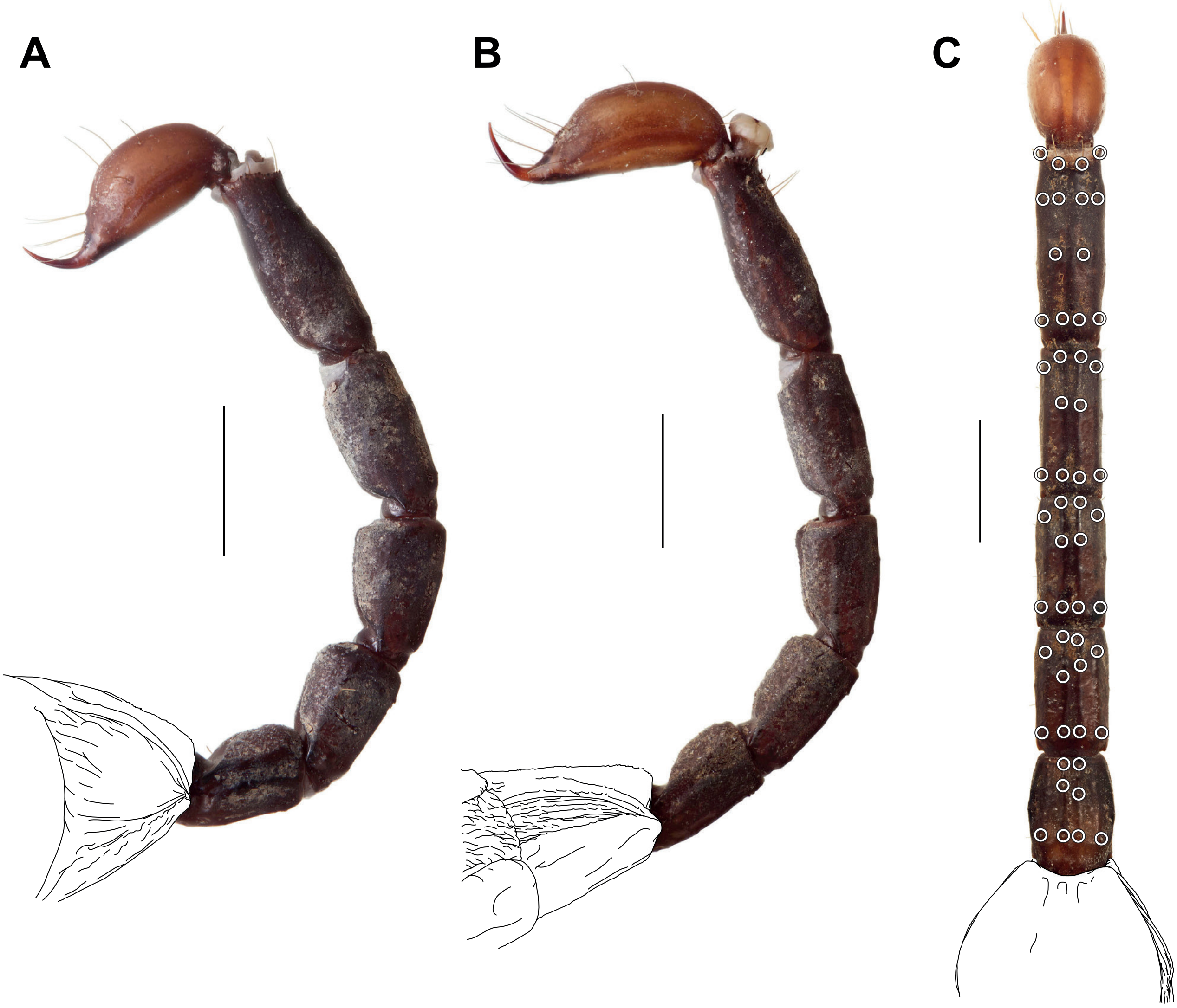

Fig. 108. *Hormurus papuanus* Kraepelin, 1914, metasoma and telson, lateral (A-B) and ventral (C) aspects. (A) Female paralectotype (MHNG-ARTO-26553). (B-C) Male lectotype (ZMH). Scale lines: 3 mm.

Esb in some specimens is more distal, aligning with *Est*.
Leg spination: The number of setiform macrosetae varies from three to four in the proventral row of telotarsi I, and from four to five in the proventral rows of telotarsi III-IV and in the retroventral rows of telotarsi III.
Genital operculum: The length/width ratio varies from 1.07 to 1.08 (median = 1.07).
Pectines: The pectinal teeth count varies from eight to ten in males and from seven to nine in females.
Metasoma: Spination: Segment II may have one more spiniform granule expressed in the subposterior group. In males a subposterior spiniform granule may be expressed on one of the ventrosubmedian carinae of segment III.
Ventral metasoma setation: One fewer macroseta may be expressed in the supramedian group of segment IV, resulting in a total of nine macrosetae instead of ten.
Hemispermatophores: The basal part/distal lamina ratio varies from 0.8 to 1.02 (median = 0.85).

Distribution and ecology: *Hormurus papuanus* is known only from the south-western coast of New Britain, the largest island of the Bismark Archipelago, off the northeastern coast of New Guinea (Fig. 110). Specimens were collected under stones and in decaying logs, some close to a stream.

Remarks: The type specimens were collected by (Paul) Georg (Egmont) Duncker during the Hamburg Südsee-Expedition (1908-1910) in the Bismarck Archipelago (Thilenius, 1927). Kraepelin (1914) listed 23 specimens from Neu Pommern (New Britain) and Neu Guinea (New Guinea) in his original description of this species. Among this material two specimens from Finschhafen (Papua New Guinea mainland) belong to a different species which is described below as *Hormurus krausi* sp. nov.

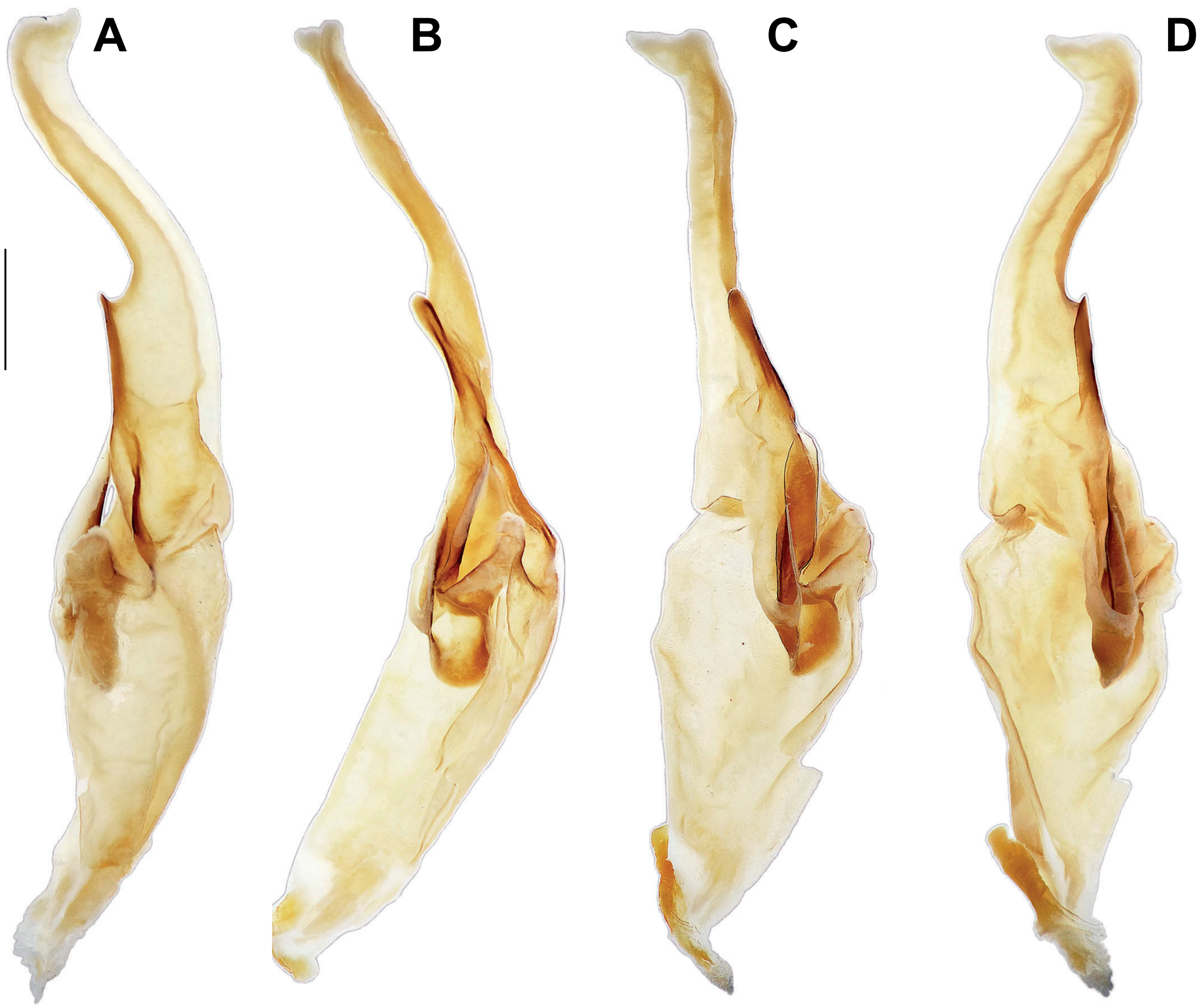

Fig. 109. *Hormurus papuanus* Kraepelin, 1914, male lectotype (ZMH), left hemispermatophore. (A) Lateral aspect. (B) Anterior aspects. (C) Rotated approximately 45° counter-clockwise from anterior aspect. (D) Contralateral aspect. Scale line: 1 mm.

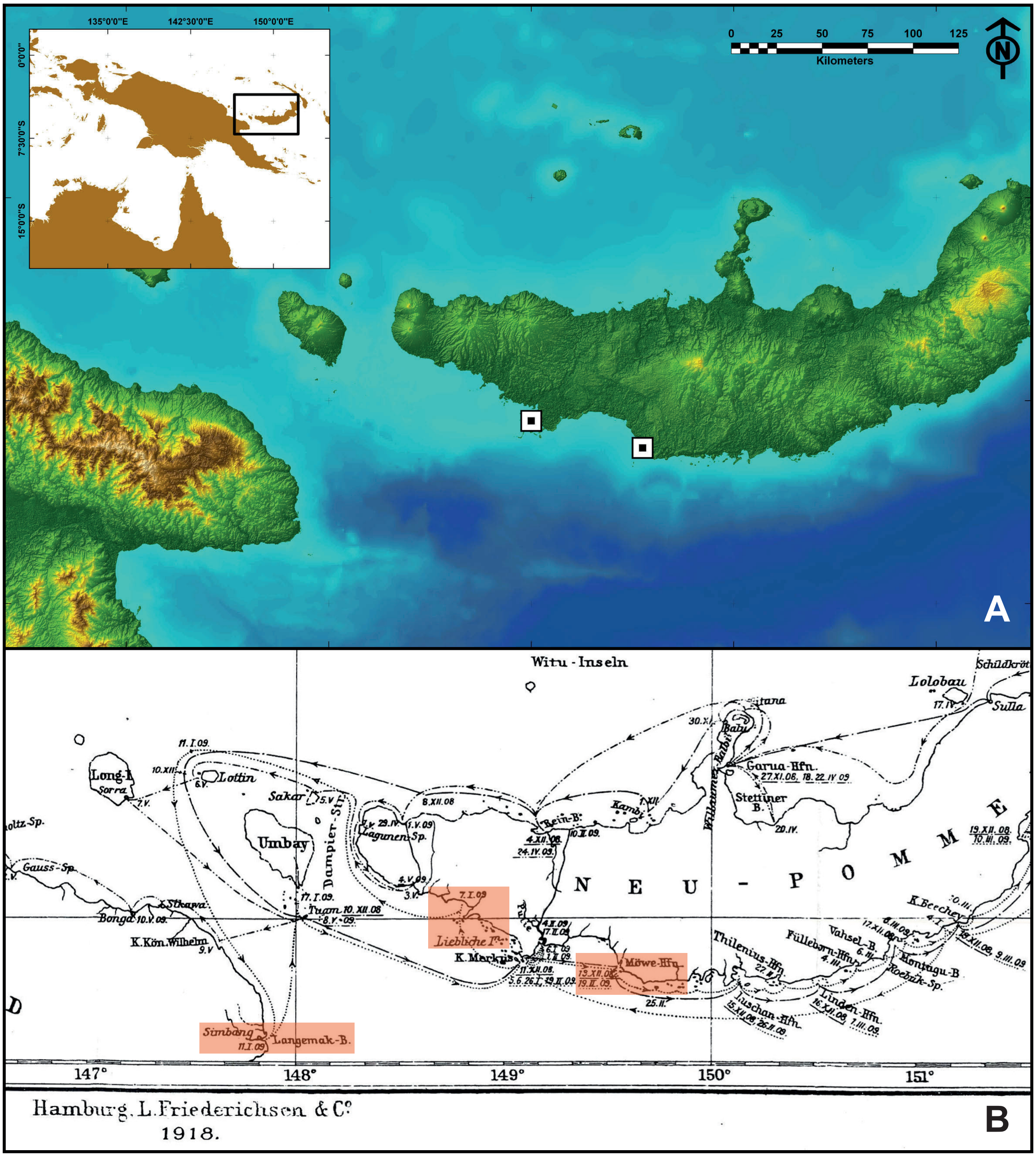

Fig. 110. (A) Known localities of *Hormurus papuanus* Kraepelin, 1914 near the south-western coast of New Britain, the largest island of the Bismark Archipelago, Papua New Guinea. The color gradient indicates topography and bathymetry. (B) Map of the Hamburger Südsee Expedition to German New Guinea (reproduced from Thilenius, 1927) showing the precise itinerary with date and geographic coordinates for each recorded locality. Localities relevant to the type series of *H. papuanus* are highlighted in red.

Hormurus sporacanthophorus Monod & Prendini, sp. nov.

Figs 111-112, 113A, 114-121, Tab. 12

This species was treated under the manuscript name "Hormurus asychnacaena" in Monod (2011a: 281, 532, 538, figs 16, 36).

Material: AMNH (without registration number); ♂ holotype; Papua New Guinea, Morobe Province, Lae, Botanical Garden [6°42'56''S, 146°59'14''E]; 18.VII.1964; leg. R. Zweifel & G. Sluder. – ZMB 7204; 1 ♀ paratype; Neu Guinea, [Madang Province], Astrolabe Bay? (see remarks below); leg. R. Rohde. – MHNG-ARTO-26376; 1 ♀ paratype; Morobe Province, Bukaua [6°43'33''S, 147°21'25''E], 35 miles W of Lae, near shore (beach); 26.XII.1972; leg. K.W. Ströder. – ZMB 15165; 3 ♀ paratypes; D. N. Guinea, [Morobe Province], Huon Gulf, Bukaua (Kap Arkona); [III-VII.1909]; leg. R.G. Neuhauss. – USNM 04167; 1 subadult ♂ paratype; New Guinea Area, 135 Med Group, APO 322, Unit 1. c/o PM San Fransisco [Morobe Province, Finschhafen (see remarks below), 6°33'29''S, 147°50'47''E]; 25.IX.1944. – BMNH 1934.2.10.10; 1 subadult ♀ paratype; [Oro Province], Kokoda [8°34'55''S, 147°15'8''E], 1200 ft; 1934; leg. L.E. Cheesman. – BMNH 1922.2.25.2; 1 subadult ♀ paratype; [Morobe Province], Huon Gulf, Lababia [7°17'57''S, 147°7'55''E]; acquisition 9.IV.1922 [probably collected in III.-IV.1920]; leg. W. Potter. – BMNH 1922.2.25.3; 1 subadult ♂ paratype; [Morobe Province], Huon Gulf, Lababia [7°17'57''S, 147°7'55''E]; 9.IV.1922; leg. W. Potter. – ZMB 15164; 1 ♂ paratype; [Morobe Province], Peiowa [Peihowa, 7°32'10''S, 147°22'41''E]; 1912; Reichsgesundheitsamt [Imperial Health Office].

Etymology: The name *sporacanthophorus* is the Latinized version of the ancient Greek words "σποράς" [scattered], "ἄκανθα" [thorn, prickle] and "φορεύς" [bearer, carrier]. The epithet is an invariable noun in apposition and refers to the unusually scattered granulation of the pedipalp cuticular surfaces (Fig. 113A).

Diagnosis: *Hormurus sporacanthophorus* sp. nov. differs from other Papuan species by the following combination of characters: (1) the median ocular tubercle is distinctly higher and more prominent (Fig. 114) than in any other Papuan species; (2) the suprabasal notch of the fixed finger on the pedipalp chelae of males is much shallower and the suprabasal lobe of the movable finger much weaker (represented by a low hump, Fig. 116A) than in the remaining taxa; (3) the retrodorsal carina of the pedipalp patella is distinct (Fig. 115G-H), whereas in all other Papuan *Hormurus* except *H. ancylolobus* sp. nov. it is obsolete and only expressed proximally as a faint ridge of spiniform granules; (4) the intercarinal surfaces of the pedipalp segments are more sparsely granular than in the other species, a difference that is particularly obvious for the dorsal and retrolateral surfaces (Fig. 113A); (5) the pectinal teeth count is the highest of any Papuan species (12-13 for males and 9-11 for females, Fig. 117), only *H. ancylolobus* sp. nov. gets close to that number (9-10 for females, unknown for males, Fig. 70B-C).

Description of adult male (holotype): *Colouration* (Fig. 112A-B): Dorsal surface of chelicera manus dark brown with black infuscation, more pronounced anteriorly; fingers black. Carapace reddish brown, median ocular region black. Tergites brown. Pedipalps reddish brown; carinae and fingers black. Legs paler than tergites, orange to yellow, prolateral carina of femora black. Coxapophysis I light brown, its anterior tip pale yellow; coxapophysis II reddish brown to black; coxae I-II and sternum dark orange, coxae II-III lighter than coxae I-II, orange to yellow; sternites III-VI brown, posterior half of V dark yellow; sternite VII dark brown to almost black; genital operculum and pectines pale orange to yellow. Metasoma reddish brown with darker infuscation; telson paler than metasoma, vesicle orange, aculeus reddish brown.

Cuticle: Nongranular surfaces of carapace, pedipalps, legs, mesosoma and metasoma finely punctate.

Carapace (Fig. 114A, C): Anterior margin with median notch moderately excavated. Anterior furcated sutures distinct. Median ocular tubercle distinctly raised; median ocelli present, at least twice the size of lateral ocelli, separated from each other by approximately the diameter of a median ocellus. Three pairs of lateral ocelli, equal in size, equidistant and adjacent to one another. Surfaces densely granular (with small to medium-sized granules), except for smooth frontal lobes and median ocular area.

Chelicerae: Basal and median teeth of fixed finger fused into a bicusp. Dorsal margin of movable finger with four teeth (one basal, one median, one subdistal and one distal); dorsal distal tooth smaller than ventral distal tooth; ventral margin smooth.

Pedipalps (Figs 112A-B, 115B-E, G-J, L-O): Segments long and slender, femur slightly longer than carapace. Chela almost asetose.

Chela fingers (Fig. 116A, C-D): Fixed finger: basal lobe weakly developed; suprabasal notch shallow; dentate margins distally (from tip of finger to median lobe) with two rows of primary denticles bearing large inner accessory denticles; single row of denticles basally. Movable finger: basal lobe absent; suprabasal lobe weakly developed (as a low hump), gently rounded dorsally and lacking sharp conical tooth, not overlapping with fixed finger; suprabasal lobe and corresponding notch on fixed finger contiguous, no proximal gap or at most reduced gap only evident when fingers closed; dentate margins distally (from tip of finger to suprabasal lobe) with two rows of primary denticles bearing large inner accessory denticles; single row of sparse denticles basally.

Table 12. *Hormurus sporacanthophorus* sp. nov., measurements (in mm), repositories and inventory numbers of adult males and females.

	Holotype	Paratype	Paratype	Paratype	Paratype	Paratype	Paratype
Sex	♂	♂	♀	♀	♀	♀	♀
Repository	AMNH	ZMB	ZMB	MHNG	ZMB	ZMB	ZMB
Inventory number		15164	7204	ARTO-26376	15165	15165	15165
Locality	Lae	Peiowa	Astrolabe Bay?	Bukaua	Bukaua	Bukaua	Bukaua
Total length	71.00	62.00	92.00	88.00	93.00	82.00	73.00
Carapace, length	11.95	10.61	13.16	13.66	13.62	12.51	11.77
Carapace, anterior width	7.68	6.89	8.41	9.02	9.02	8.14	7.80
Carapace, posterior width	12.11	11.24	13.90	14.39	14.08	13.52	12.48
Pedipalp femur, length	14.37	12.43	13.35	13.05	13.73	12.09	12.02
Pedipalp femur, width	4.63	4.12	4.94	5.00	5.12	4.63	4.51
Pedipalp femur, height	2.42	2.22	3.01	3.38	3.55	2.95	2.91
Pedipalp patella, length	13.50	11.28	12.88	12.90	13.92	12.07	11.81
Pedipalp patella, width	4.75	4.57	5.73	5.83	5.91	5.36	5.27
Pedipalp patella, height	3.80	3.66	4.42	4.79	4.83	4.36	4.20
Pedipalp chela, length	27.65	23.78	27.12	28.10	28.59	25.46	25.66
Pedipalp chela, width	6.95	6.40	8.41	8.84	9.14	7.80	7.86
Pedipalp chela, height	4.74	4.27	6.30	6.10	6.21	5.97	5.86
Chela movable finger, length	13.51	11.34	13.63	14.35	13.89	12.70	12.93
Genital operculum length, female	NA	NA	3.47	3.54	3.41	3.05	3.17
Genital operculum width, female	NA	NA	3.32	3.23	3.05	3.05	3.11
Metasoma segment I, length	4.45	4.02	4.57	4.75	4.88	4.33	4.27
Metasoma segment I, width	3.54	3.23	4.12	4.02	4.14	3.90	3.66
Metasoma segment I, height	2.86	2.56	3.29	3.19	3.39	2.99	3.05
Metasoma segment II, length	5.12	4.27	5.31	5.55	5.79	5.12	4.88
Metasoma segment II, width	2.90	2.68	3.29	3.27	3.35	3.05	3.07
Metasoma segment II, height	2.80	2.54	3.17	3.17	3.27	2.95	2.93
Metasoma segment III, length	5.24	4.69	5.36	5.85	5.91	5.30	5.12
Metasoma segment III, width	2.68	2.44	2.95	3.11	3.05	2.78	2.83
Metasoma segment III, height	2.80	2.50	3.17	3.19	3.27	2.99	2.93
Metasoma segment IV, length	5.91	5.18	5.97	6.46	6.58	5.85	5.61
Metasoma segment IV, width	2.19	2.07	2.66	2.63	2.68	2.44	2.41
Metasoma segment IV, height	2.86	2.46	2.93	3.11	3.11	2.86	2.80
Metasoma segment V, length	7.25	6.40	7.31	8.17	8.17	7.31	7.19
Metasoma segment V, width	2.41	2.17	2.80	2.66	2.80	2.50	2.44
Metasoma segment V, height	2.68	2.19	2.74	2.86	3.02	2.68	2.71
Telson, length	9.39	8.47	9.69	10.00	10.48	8.78	9.26
Telson, width	2.80	2.62	3.05	3.15	3.25	2.80	2.86
Telson, height	3.05	2.71	3.29	3.39	3.35	2.93	3.05

Fig. 111. *Hormurus sporacanthophorus* sp. nov., habitus of male, dorsal aspect, reconstruction based on photographs. Scale line: 10 mm.

Pedipalp carinae: Femur (Fig. 115L-O): proventral carina visible as a ridge of medium-sized to large spiniform granules; promedian carinae absent; prodorsal carina visible as a ridge of medium-sized to large spiniform granules, similarly developed as proventral carina; retrodorsal carina visible as a ridge of medium-sized to large spiniform granules, similarly developed as prodorsal carina; retroventral carina visible as a ridge of medium to large spiniform granules, only slightly more developed than retrodorsal carina; ventromedian carina obsolete, only discernible proximally as a ridge of medium-sized spiniform granules. Patella (Fig. 115G-J): proventral carina discernible as costate ridge proximally, obsolete distally; promedian and prodorsal carinae visible as ridges with medium-sized to large spiniform granules, equally developed, fused medially into prominent spiniform process with medially located pointed apex; dorsomedian carina only visible proximally as a ridge of medium-sized spiniform granules; retrodorsal carina obsolete, only expressed proximally as a faint ridge of medium-sized spiniform granules; paired retromedian carinae fused and visible as a faint ridge of medium-

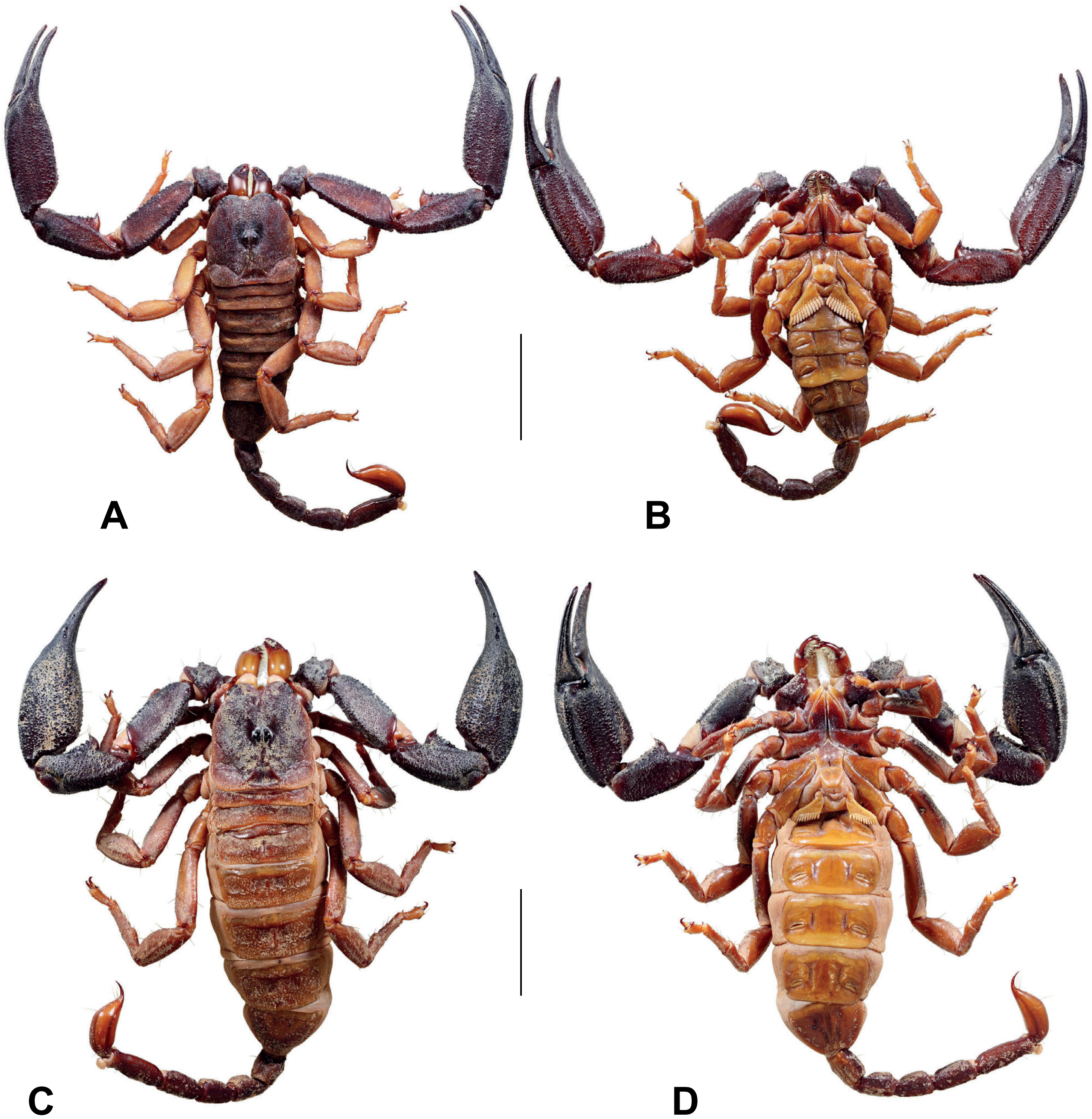

Fig. 112. *Hormurus sporacanthophorus* sp. nov., habitus, dorsal (A, C) and ventral (B, D) aspects. (A-B) Male holotype (AMNH). (C-D) Female paratype (ZMB 15165, Bukaua). Scale lines: 15 mm.

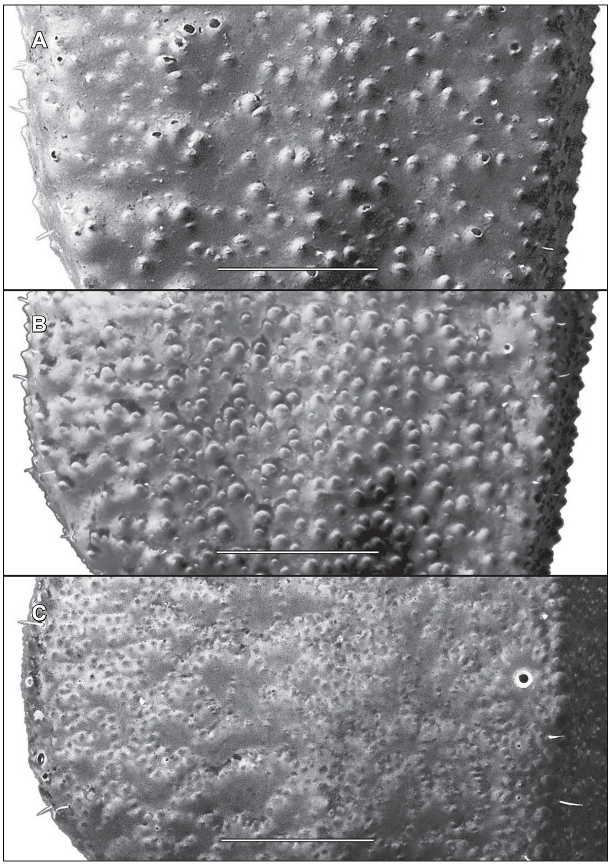

Fig. 113. Morphosculptures of the dorsal surface of the pedilalpal chela in Papuan species of *Hormurus*. (A) *Hormurus sporacanthophorus* sp. nov., male holotype (AMNH). (B) *Hormurus krausi* sp. nov., male holotype (AMNH [LP2715]). (C) *Hormurus barai* sp. nov., male holotype (AMNH [LP3001]). Scale lines: 1 mm (A-B), 2 mm (C).

sized to large spiniform granules; retroventral carina crenulate (composed of medium-sized to large granules). Chela manus (Fig. 115B-E): proventral and promedian carinae visible as faint ridges with medium-sized to large spiniform granules, equally developed; prodorsal carina obsolete, visible as a faint ridge of medium-sized to large spiniform granules; dorsomedian carina visible as a faint ridge of medium-sized to large spiniform granules, more strongly developed than prodorsal carina; dorsal secondary carina obsolete; digital carina visible as a ridge of small to medium-sized spiniform granules, less distinct in distal area, more developed than retromedian carina; fused retromedian carinae obsolete, visible as a faint ridge of medium-sized spiniform granules proximally; retrolateral secondary carina vestigial, only discernible proximal to condyle of movable finger as a ridge of medium-sized spiniform granules; retroventral carina crenulate (composed of medium to large granules); ventromedian carina obsolete, only expressed proximally as a faint ridge of medium-sized spiniform granules.

Pedipalp macrosculpture: Femur (Fig. 115L-O): prolateral intercarinal surface sparsely covered with small to medium-sized spiniform granules; dorsal intercarinal surface sparsely covered with small to medium-sized spiniform granules, distal area smooth; retrolateral intercarinal surface sparsely covered with medium-sized spiniform granules, smooth proximally; ventral intercarinal surface sparsely covered with medium-sized spiniform granules, distal third smooth. Patella (Fig. 115G-J): prolateral intercarinal surface sparsely covered with small to medium-sized spiniform granules, distal area smooth; dorsal and retrolateral intercarinal surfaces sparsely covered with medium-sized spiniform granules; ventral intercarinal surface covered with faint and sparse reticulate network of medium-sized spiniform granules, proximal and distal areas smooth. Chela manus (Fig. 115B-E): prolateral intercarinal surface sparsely covered with small to medium-sized spiniform granules, smooth proximally; dorsal intercarinal surface with faint and sparse reticulate network of medium-sized spiniform granules; retrolateral intercarinal surface with faint and sparse reticulate network of small to medium-sized spiniform granules; ventral intercarinal surface covered with faint and sparse reticulate network of medium-sized spiniform granules, distal area smooth. Chela fingers sparsely covered with small spiniform granules in proximal half, smooth or nearly so distally, ventral surface smooth; trichobothria *dst*, *dsb* and *db* each in single smooth depression.

Trichobothria: Pedipalp orthobothriotaxic, accessory trichobothria absent. Patella (Fig. 115G-J): d_2 trichobothrium distal to patellar process; five *eb* trichobothria arranged in two groups (eb_1+eb_{4-5} and eb_{2-3}); two *esb*, two *em* and one *est* trichobotria arranged in three (esb_1, esb_2+em_{1-2} and *est*) or four (esb_1, esb_2, em_{1-2} and *est*) groups; three *et* trichobothria; three *v* trichobothria. Chela manus (Fig. 115B-E): *Dt* situated in proximal third of manus; Eb_3 close to Eb_{1-2}; *Esb* closer to *Est* than to *Eb* group, usually aligned with *Est*, sometimes slightly more distal; *Est* situated near midpoint; four *V* trichobothria, V_3 distant from V_4. Fixed chela finger with *db* situated on dorsal surface; *esb* distinctly closer to *eb* than to *est*; *eb* situated at base of finger, proximal to point of articulation between fixed and movable fingers; two *i* trichobothria.

Coxosternum (Fig. 117A, C): Anterior margin of coxa III elongated distally, without anterodistal process. Sternum equilateral pentagonal (anterior width slightly greater than posterior width), almost as long as wide.

Legs (Fig. 118): Femora I-IV with ventral surfaces bicarinate, pro- and retroventral carinae granular. Retrolateral margins of tibiae I-II without setiform macrosetae. Basitarsi I-IV: pro- and retroventral rows each with 4/4, 4/5, 4/5 and 4/5 setiform macrosetae, respectively. Telotarsi I-IV: pro- and retroventral row each with 3-4/4, 3-4/4, 4-5/4-5 and 4-5/5 setiform macrosetae, respectively; retroventral row with one proximal spinule; ventromedian spinules absent. Ungues shorter than telotarsus, half its length or less.

Genital operculum (Fig. 117A): Composed of two subtriangular sclerites.
Pectines (Fig. 117A-B): Moderately elongated, distal edge reaching but not extending beyond distal edge of coxa IV; fulcrae and three marginal lamellae present. Pectinal teeth count 12-13; teeth straight, entirely covered with sensory papillae.
Mesosoma (Figs 112A-B, 114A, E): Pre-tergites I-VII and posterior margins of pre-tergites smooth. Post-tergites: posterior margins of tergites I-VI sublinear, without distinct projection; lateral transversal sulcus present; intercarinal surfaces of I-VII finely and densely granular, with reticulate network of ridges and dimples. Respiratory stigmata (spiracles) of sternites IV-VI long, their length at least one third of sternite width, and distinctly crescent shaped. Sternite VII acarinate.
Metasoma (Fig. 119B-C): Not markedly compressed laterally; sparsely and minutely granular, posterior segments less so (segment V smooth or nearly so); dorsal intercarinal surface of V smooth and shiny medially; distinct dorsomedian sulcus on segments I-IV, much less pronounced on segment V (usually only faintly expressed anteriorly).
Metasoma carinae: Segments I-IV: dorsolateral carinae obsolete on all segments; lateral median carinae weakly developed (as faint ridges); lateral inframedian carinae distinct anteriorly, visible as a faint ridge on segment I, absent on other segments; ventrolateral carinae weakly developed (as faint ridges); paired ventrosubmedian carinae weakly developed (as low ridges). Segment V: dorsolateral and lateral median carinae obsolete; ventrolateral carinae only expressed as faint ridges; ventrosubmedian carinae fused, only expressed as a faint ridge in anterior two-thirds.
Metasoma spination: Segments I-IV: dorsomedian posterior and dorsolateral posterior spiniform granules absent; ventrolateral and ventrosubmedian carinae without large spiniform granules. Segment V: ventrolateral and ventromedian carinae with scattered minute spiniform granules; anal arch crenulate.
Ventral metasoma setation: Segment I with eight macrosetae, i.e. three pairs (anterior, median and posterior) on ventrosubmedian carinae and one pair (anterior) on lateral carinae; segments II-IV each with ten macrosetae, i.e. three pairs (anterior, median and posterior) on ventrosubmedian carinae and two pairs (anterior and supramedian) on ventrolateral carinae; segment V with 16 macrosetae, i.e. four pairs (anterior, median, subposterior and posterior) on ventrosubmedian carinae and four pairs (anterior, supramedian, subposterior and posterior) on ventrolateral carinae.
Telson (Fig. 119B): Longer than metasoma segment V; vesicle smooth, without granules; aculeus short (less than half of vesicle length), sharply curved.
Hemispermatophore (Fig. 120): Stalk distinctly longer than stem. Distal lamina curved, without distal crest on anterior margin; single laminar hook, median, situated between positions 3/7 and 1/2 from base of stalk (basal part/distal lamina ratio = 0.74-0.98; median = 0.88); transverse ridge distinct, more proximal than base of laminar hook, merging with anterior margin more proximally than base of laminar hook. Capsule: hemisolenos thin, folded on itself only proximally and above that unfolded to flattened distal tip (tip and base approximately of same width), without lateral longitudinal carina, laterodistal accessory hook or medioposterior accessory apophysis; tip of hemisolenos more proximal than base of laminar hook, more distal than tip of clasper. Clasper well developed, forming distinct hump, not hook-like, with small anterior knob-like accessory process. Subex well developed, spoon-shaped, merging anteriorly with base of clasper; posterior edge forming obtuse angle (>90°) with hemisolenos; anterior edge forming right angle (90º) with hemisolenos.

Description of adult female: Same characters as male except as follows. *Colouration* (Fig. 112C-D): Legs slightly darker than in male, almost as dark as tergites.
Pedipalps (Figs 112C-D, 115A, F, K): Segments noticeably shorter or more robust than in male.
Chela fingers (Fig. 116B): Dentate margins linear or nearly so, without pronounced lobe and notch, with two rows of primary denticles extending from tip to base of fingers and bearing large inner accessory denticles.
Legs: Telotarsi I-IV: pro- and retroventral row each with 3-4/4, 4/4, 4-5/3-5 and 4-5/4-5 setiform macrosetae.
Genital operculum (Fig. 117D): Oval to semi-oval, slightly longer than wide (length/width ratio = 1-1.12, median = 1.04); opercular sclerites partly fused, with distinct median suture; posterior notch present, at least weakly developed.
Pectines (Fig. 117D-E): Short, distal edge not reaching distal edge of coxa IV. Pectinal teeth count 9-11; teeth short and straight, sensory papillae covering only distal two-thirds.
Mesosoma (Figs 112C-D, 114B, F): Post-tergites: reticulate network of ridges and dimples on segments III-VII more distinct than in male; intercarinal surfaces of I-II medially smooth, laterally granular; intercarinal surfaces of III-VI almost totally smooth, faintly granular along lateral margins; intercarinal surfaces of VII faintly granular, in proximal half smooth.

Intraspecific variation: *Pedipalp trichobothria*: On the retrolateral side of pedipalp patella trichobothrium esb_1 is in some specimens located midway between esb_2 and em_{1-2} rather than close to esb_2, resulting in four groups (esb_1, esb_2, em_{1-2} and *est*) instead of three (esb_{1-2}, em_{1-2} and *est*). On the retrolateral side of the pedipalp chela *Esb* may be slightly more proximal than *Est*, resulting in the two trichobothria not aligning with each other.
Leg spination: The number of setiform macrosetae varies from three to four proventrally on telotarsi I-II, from three to five retrolaterally on telotarsi III, from four to five proventrally on telotarsi III-IV and from four to five retroventrally on telotarsi IV.

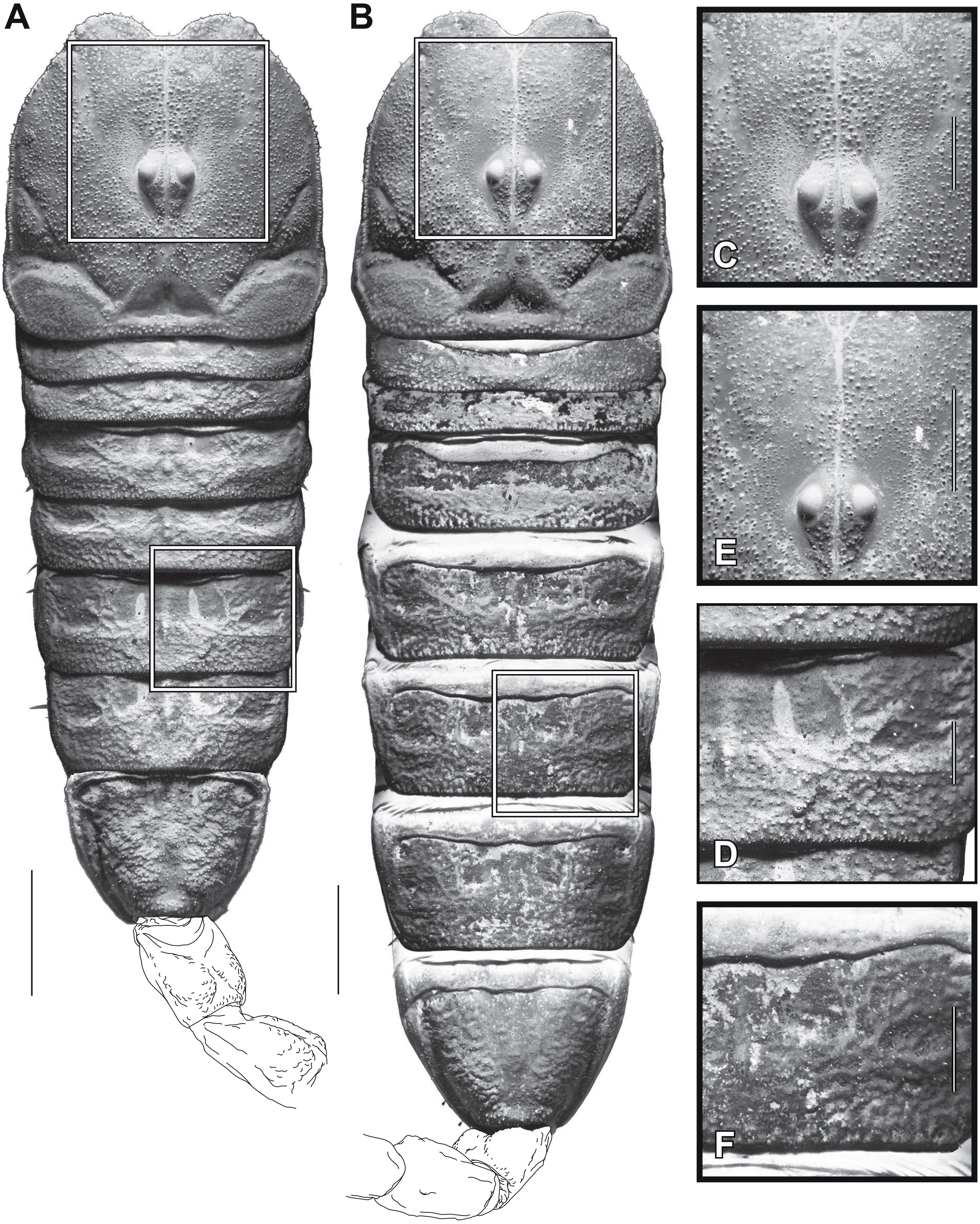

Fig. 114. *Hormurus sporacanthophorus* sp. nov., carapace and mesosomal tergites showing ornamentation and macrosculpture of cuticle (A-B), detailed views of carapace (C-D) and of tergite V (E-F), dorsal aspect. (A, C, E) Male holotype (AMNH). (B, D, F) Female paratype (ZMB 15165, Bukaua). Scale lines: 5 mm (A-B), 2 mm (C-F).

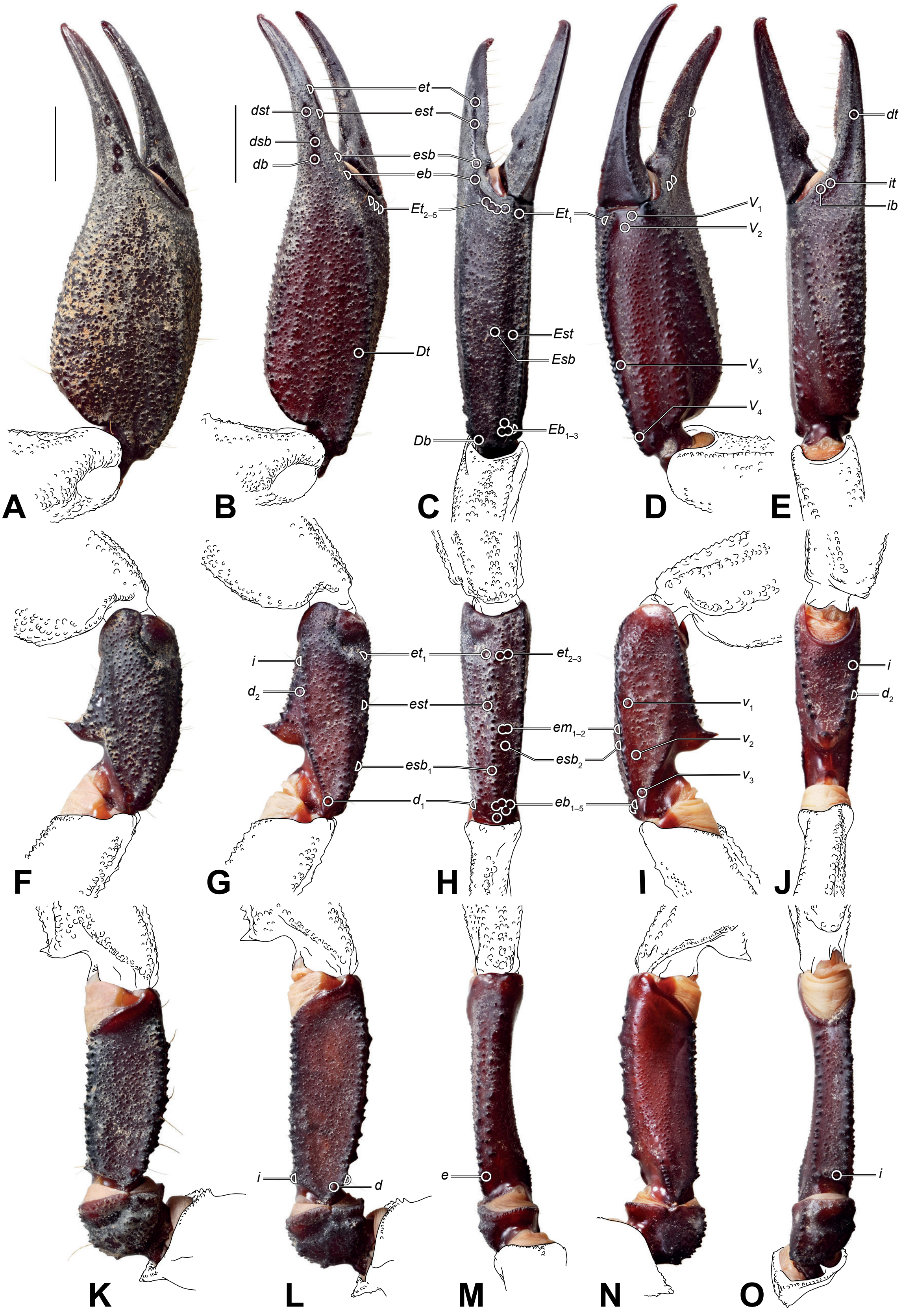

Fig. 115. *Hormurus sporacanthophorus* sp. nov., pedipalp chela (A-E), patella (F-J), femur and trochanter (K-O), dorsal (A-B, F-G, K-L), retrolateral (C, H, M), ventral (D, I, N) and prolateral (E, J, O) aspects showing trichobothria pattern. (A, F, K) Female paratype (ZMB 15165, Bukaua). (B-E, G-J, L-O) Male holotype (AMNH). Scale lines: 5 mm.

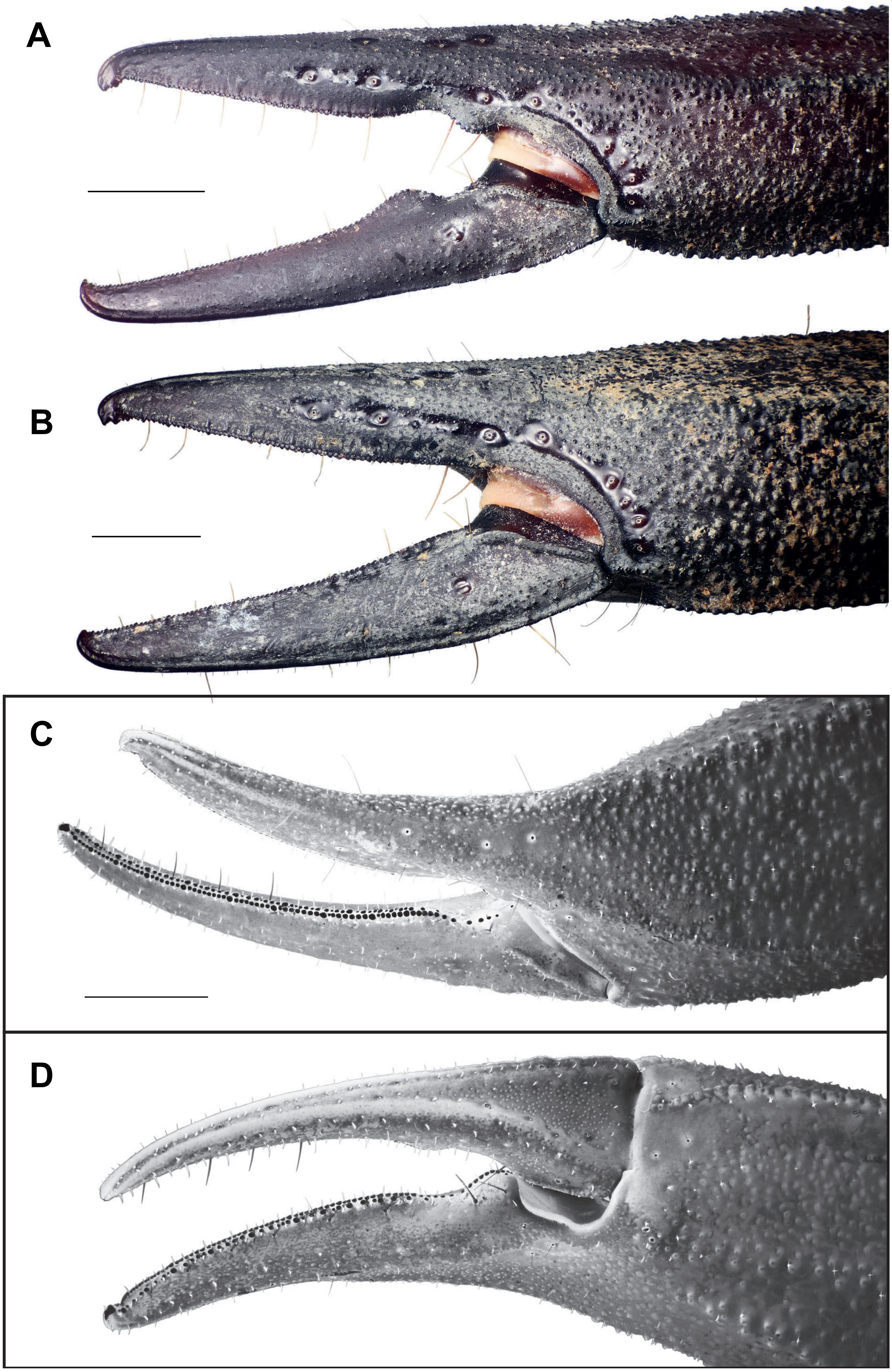

Fig. 116. *Hormurus sporacanthophorus* sp. nov., left pedipalp chelae, retrolateral aspect showing dentate margin of chela fingers (A-B), dorsal aspect showing dentate margin of movable finger (C), ventral aspect showing dentate margin of fixed finger (D). (A, C-D) Male holotype (AMNH). (B) Female paratype (ZMB 15165, Bukaua). Scale lines: 3 mm.

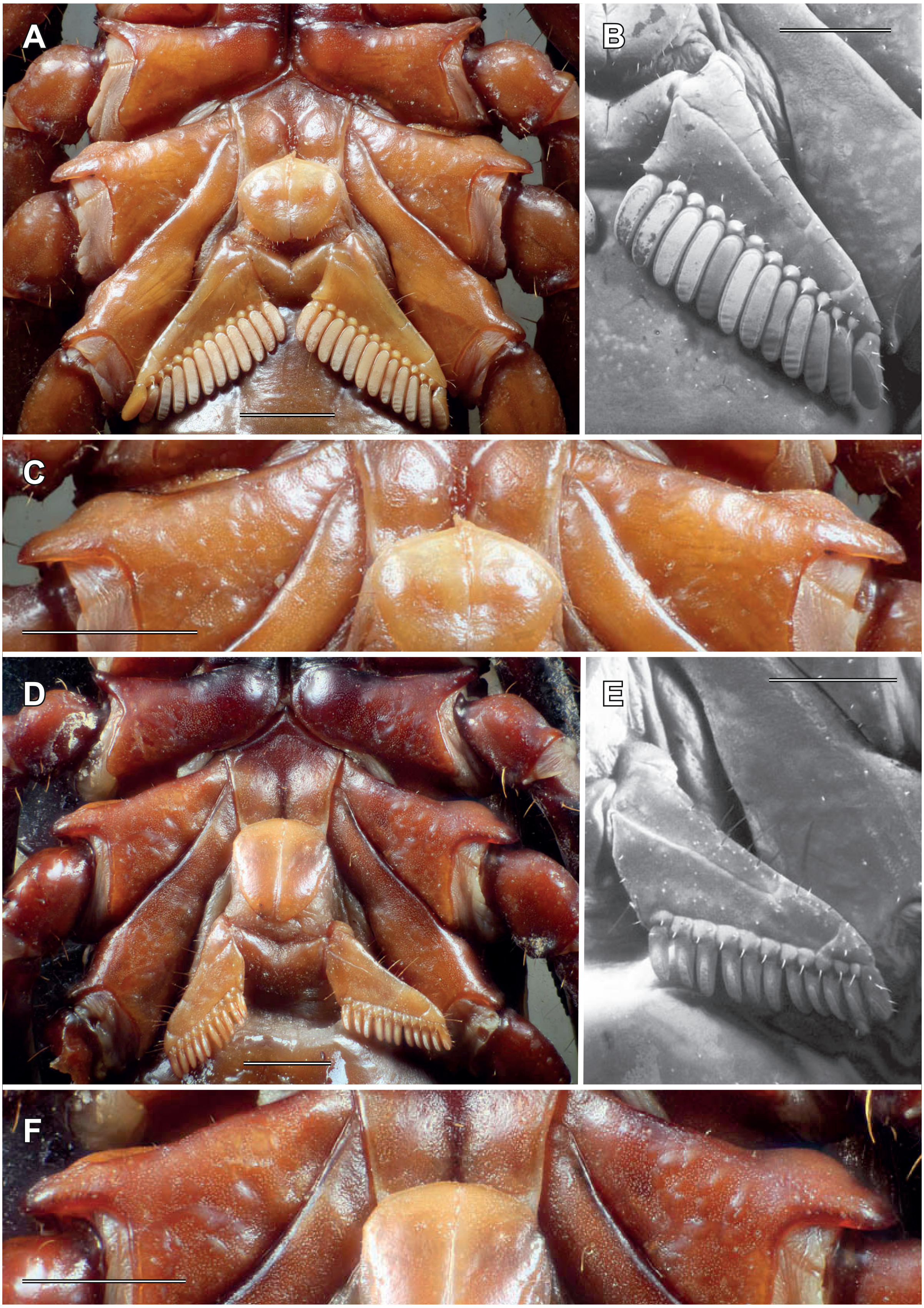

Fig. 117. *Hormurus sporacanthophorus* sp. nov., coxae II-IV, sternum, genital operculum and pectines, ventral aspect (A, D), left pecten under UV light (B, E), anterior margin of coxae III (C, F). (A-C) Male holotype (AMNH). (D-F) Female paratype (MHNG-ARTO-26376). Scale lines: 3 mm (A, D), 2 mm (B-C, E-F).

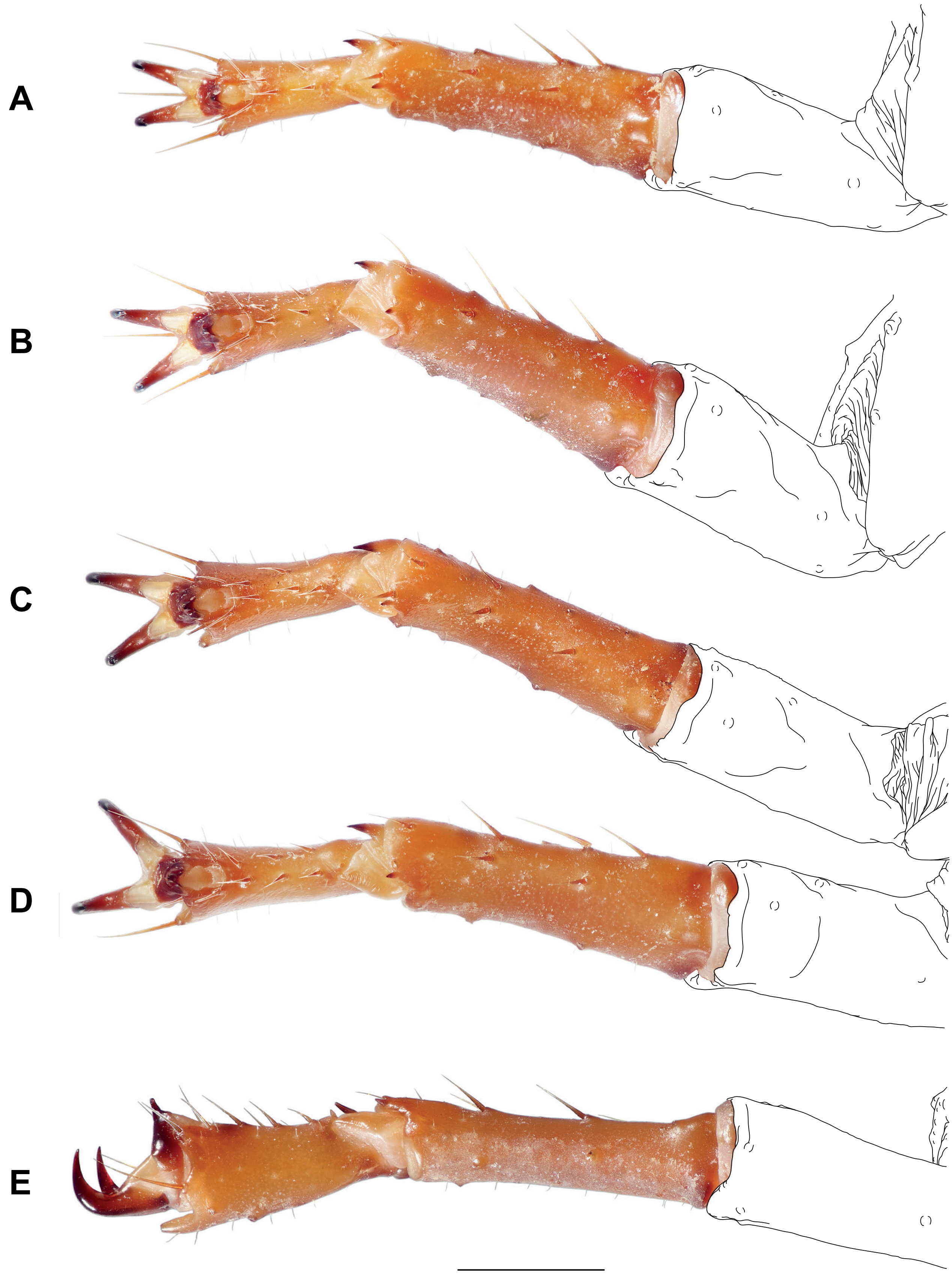

Fig. 118. *Hormurus sporacanthophorus* sp. nov., male holotype (AMNH), right tarsi, ventral (A-D) and retrolateral (E) aspect. (A) Tarsus I. (B) Tarsus II. (C) Tarsus III. (D-E) Tarsus IV. Scale line: 2 mm.

Female genital operculum: The length/width ratio varies from 1 to 1.12 (median = 1.04).
Pectines: The pectinal teeth count varies from 12 to 13 in males and from nine to 11 in females.
Ventral metasoma setation: Rarely one more macroseta may be expressed in the supramedian group of segment I, resulting in a total of nine macrosetae instead of eight. Segments II-IV may possess eight or nine instead of ten macrosetae (one or two macroseta not expressed) and segment V 13 to 15 instead of 16 (one to three macrosetae not expressed).
Hemispermatophores: The basal part/distal lamina ratio varies from 0.74 to 0.98 (median = 0.88).

Distribution and ecology: *Hormurus sporacanthophorus* sp. nov. is known from the coasts of Huon Bay in Morobe Province, and from one locality further inland in Oro Province (Fig. 121). The record from Astrolabe Bay is considered doubtful (see Remarks). Specimens of this species were collected together with specimens of *Hormurus krausi* sp. nov. at two localities, i.e. Lae and Bukaua. The two species occur syntopically in at least parts of their ranges.

Remarks: Ricardo Rohde was a collector who operated in South America (Argentina, Bolivia, Paraguay) from 1885 to 1886 before joining the German New Guinea Company in 1887 (Von den Steinen, 2010; Holdings of the archives of the Berliner Gesellschaft für Anthropologie, Ethnologie und Urgeschichte, http://www.bgaeu.de/BGAEU-EH.htm, accessed 5.II.2021). He was based in New Guinea at least until 1891 and collected during this period in Stephansort and Finschhafen (Wichmann, 1912; Froddin & Gressit, 1982). The specimen with registration number ZMB 7204 was among two other lots (ZMB 7415

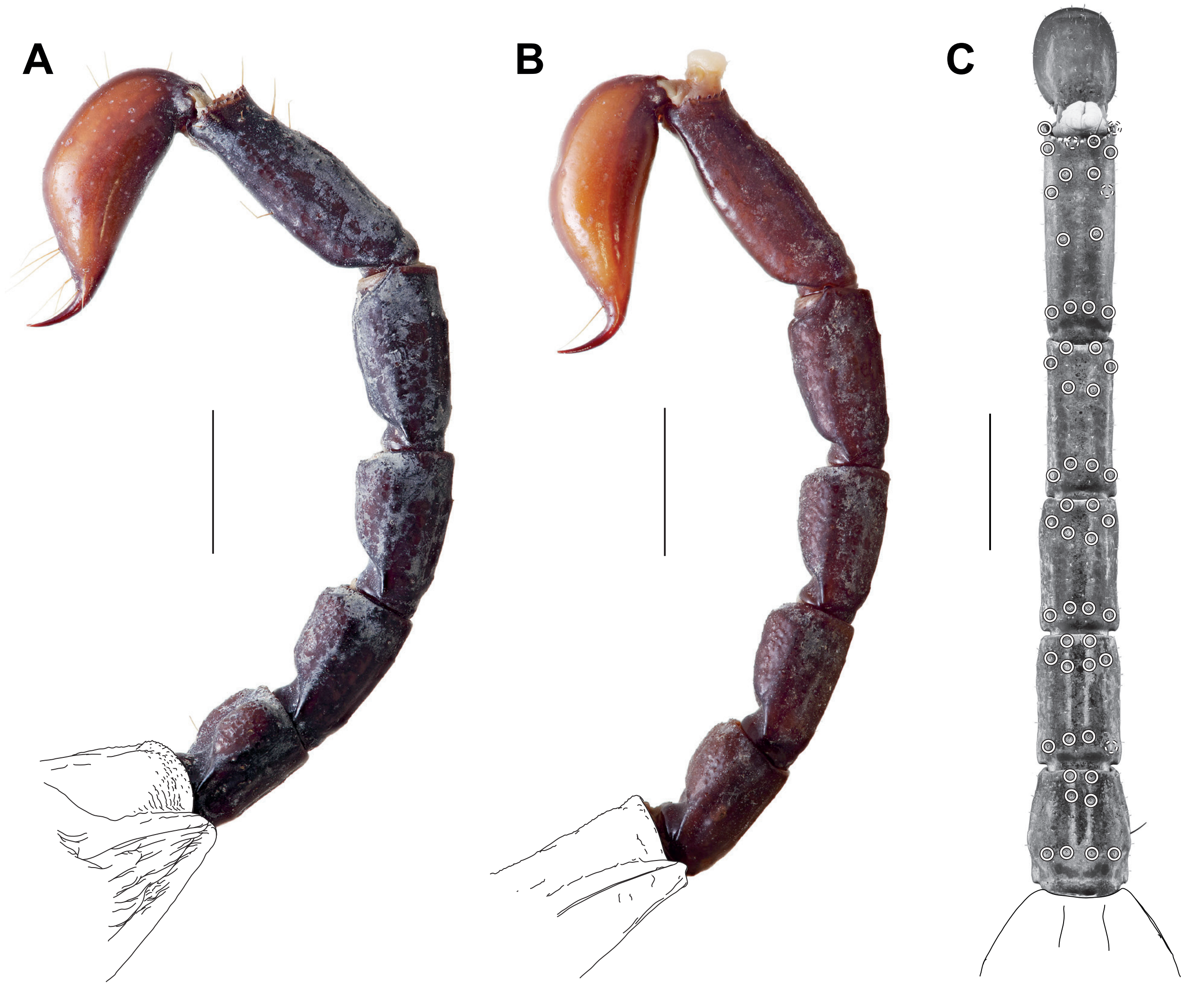

Fig. 119. *Hormurus sporacanthophorus* sp. nov., metasoma and telson, lateral (A-B) and ventral (C) aspects. (A) Female paratype (MHNG-ARTO-26376). (B-C) Male holotype (AMNH). Dotted circles in C indicate the additional macrosetae expressed in some specimens. Scale lines: 5 mm.

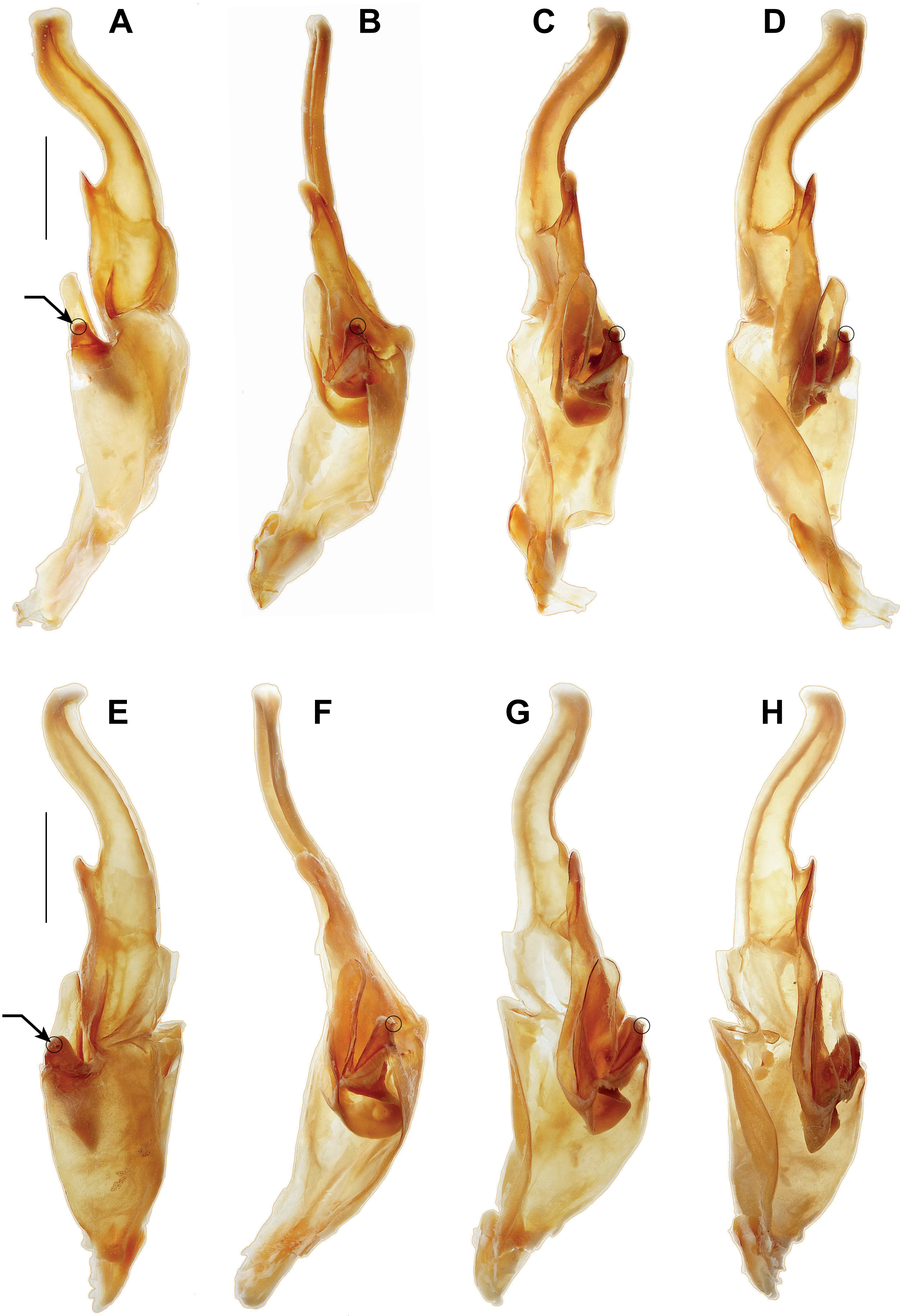

Fig. 120. *Hormurus sporacanthophorus* sp. nov., left hemispermatophore of male holotype (AMNH; A-D) and of male paratype (ZMB, Peihowa; E-H). (A, E) Lateral aspect. (B, F) Anterior aspect. (C, G) Rotated approximately 45° counter-clockwise from anterior aspect. (D, H) Contralateral aspect. The small anterior knob-like accessory processes present on the anterior side of the claspers is indicated by circles. Scale lines: 2 mm.

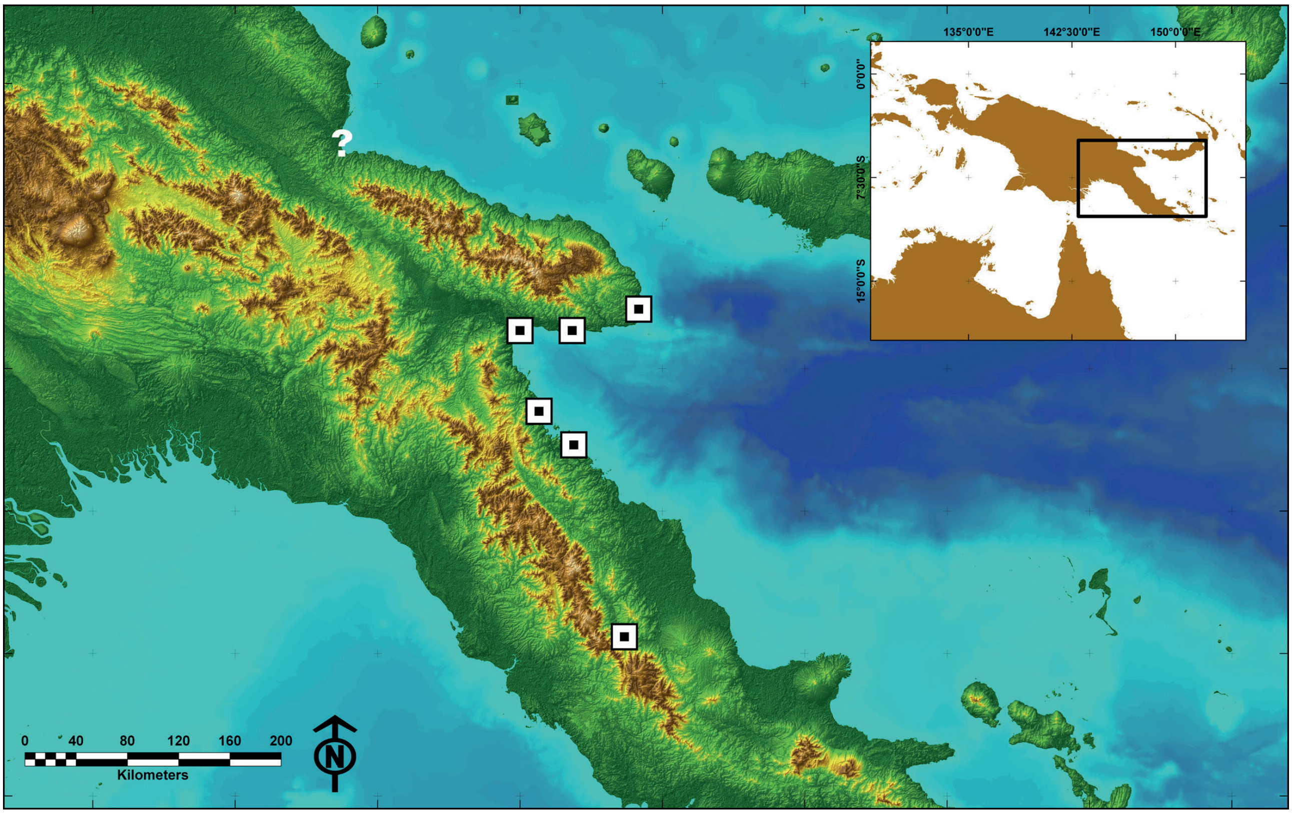

Fig. 121. Known localities of *Hormurus sporacanthophorus* sp. nov. near the coasts of Huon Bay in Morobe Province and in Oro Province, Papua New Guinea. The color gradient indicates topography and bathymetry.

and ZMB 7603) labelled as collected in Astrolabe Bay. This locality is considered as doubtful for *H. sporacanthophorus* sp. nov. It is imprecise and out of the distribution range assessed from verified records which mostly encompasses the coastal regions of Huon Gulf. Because Rohde also collected in this geographic area (Finschhafen), it is possibly a case of mislabelling.

Richard Gustav Neuhauss was a German physician who travelled in former German New Guinea from 1908 to 1910 in order to conduct anthropological and ethnological studies (Neuhauss, 1909, 1911), and also to collect botanical and zoological samples. On March 15, 1909 he travelled from Sattelberg via Finschhafen to Huon Gulf, establishing himself in Bukaua (Kap Arkona) for the next four months. He made several expeditions from Bukaua: a coastal trip to the English boundary, two expeditions up the Markham River and a trip to the village of Taminugetu. He left Bukaua on July 14, 1909. The three specimens of *H. sporacanthophorus* sp. nov. with registration number ZMB 15165 must have been collected during this period.

The label data for the specimen under registration number USNM 04167 indicates an Army Postal Office (APO) number. APOs were used during WW II to deliver and send mail to military units on the front lines without going through the regular post offices. Each APO was issued a specific number. APO 322 indicates that the person who collected and sent the specimen, probably an American military officer, was stationed in Finschhafen, Papua New Guinea (Anonymous, 1949).

Lucy Evelyn Cheesman was a British entomologist and explorer. Between 1933 and 1939 she made three solo expeditions to New Guinea under the auspices of the British Museum, London (Garner & Touzel, 2018). The specimen from Kokoda was collected during her first expedition (Cheesman, 1935).

William Potter collected birds for the British Museum in Musom and Singaua (Huon Gulf) from March to April 1920 (Gilliard, 1969). The scorpions from Lababia (BMNH 1922.2.25.2-3) were possibly collected during the same expedition since Lababia is also located in the Huon Gulf.

Hormurus menapi Monod & Prendini, sp. nov.

Figs 4D, 5C, 122-130, Tab. 13

Material: AMNH (without registration number); ♂ holotype; Papua New Guinea, [Milne Bay Province], Cape Vogel Peninsula, Menapi [9°45'35''S, 149°55'54''E], camp 1; 21.III.-4.V.1953; leg. G.M. Tate, Archbold Expedition. – AMNH (without registration number); 2 ♀, 1 subadult ♂, 1 subadult ♀, 2 juvenile ♂, 1 juvenile ♀ paratypes; same data as for holotype. – AMNH (without registration number); 1 ♂, 2 ♀ paratypes; same data as for holotype.

Remark: Three female specimens from the series collected at Menapi camp 1 were not conspecific with *H. menapi* sp. nov. described below. They are listed below as an unidentified material because the absence of males prevents their differentiation from the other taxa treated in the present contribution.

Etymology: Menapi is the name of the village on the southern coast of Cape Vogel (Milne Bay Province) where the type specimens were collected. The epithet is an invariable name in apposition.

Table 13. *Hormurus menapi* sp. nov., measurements (in mm) and repository of adult males and females.

	Holotype	Paratype	Paratype	Paratype	Paratype	Paratype
Sex	♂	♂	♀	♀	♀	♀
Repository	AMNH	AMNH	AMNH	AMNH	AMNH	AMNH
Locality	Menapi	Menapi	Menapi	Menapi	Menapi	Menapi
Total length	47.00	49.00	56.00	52.00	44.00	47.00
Carapace, length	16.99	18.34	16.36	16.86	16.23	17.12
Carapace, anterior width	4.75	5.24	5.73	5.85	5.49	5.85
Carapace, posterior width	2.90	3.21	3.05	3.23	3.05	3.11
Pedipalp femur, length	7.56	7.98	7.53	7.92	7.62	7.98
Pedipalp femur, width	8.90	9.87	7.90	8.11	7.86	8.39
Pedipalp femur, height	3.41	3.78	3.56	3.69	3.60	3.78
Pedipalp patella, length	2.56	2.56	2.68	2.78	2.58	2.78
Pedipalp patella, width	9.33	10.36	8.11	8.29	8.17	8.72
Pedipalp patella, height	3.05	3.35	3.05	3.17	3.08	3.29
Pedipalp chela, length	1.77	1.68	1.77	1.95	1.87	1.87
Pedipalp chela, width	7.11	7.74	7.74	7.80	7.92	8.29
Pedipalp chela, height	4.88	4.94	5.06	5.18	5.14	5.45
Movable finger, length	7.80	7.80	7.92	8.35	8.33	8.90
Genital operculum length, female	NA	NA	2.07	2.29	2.04	2.19
Genital operculum width, female	NA	NA	2.05	2.19	2.01	2.19
Metasoma segment I, length	2.74	2.93	2.68	2.74	2.74	2.86
Metasoma segment I, width	2.07	2.16	1.95	2.19	2.07	2.26
Metasoma segment I, height	1.77	1.80	1.73	1.95	1.73	1.89
Metasoma segment II, length	2.93	3.29	3.01	3.05	3.11	3.15
Metasoma segment II, width	1.71	1.78	1.65	1.80	1.71	1.83
Metasoma segment II, height	1.68	1.77	1.73	1.83	1.71	1.85
Metasoma segment III, length	3.15	3.54	3.25	3.41	3.29	3.51
Metasoma segment III, width	1.56	1.65	1.55	1.65	1.58	1.65
Metasoma segment III, height	1.65	1.77	1.72	1.83	1.79	1.83
Metasoma segment IV, length	3.54	3.90	3.66	3.78	3.54	3.90
Metasoma segment IV, width	1.37	1.44	1.37	1.49	1.40	1.52
Metasoma segment IV, height	1.60	1.65	1.65	1.77	1.61	1.71
Metasoma segment V, length	4.27	4.63	4.33	4.51	4.21	4.69
Metasoma segment V, width	1.35	1.46	1.34	1.41	1.26	1.49
Metasoma segment V, height	1.58	1.65	1.56	1.58	1.61	1.71
Telson, length	5.24	5.61	5.06	5.42	NA	5.61
Telson, width	1.58	1.71	1.58	1.62	NA	1.65
Telson, height	1.71	1.93	1.73	1.83	NA	1.85

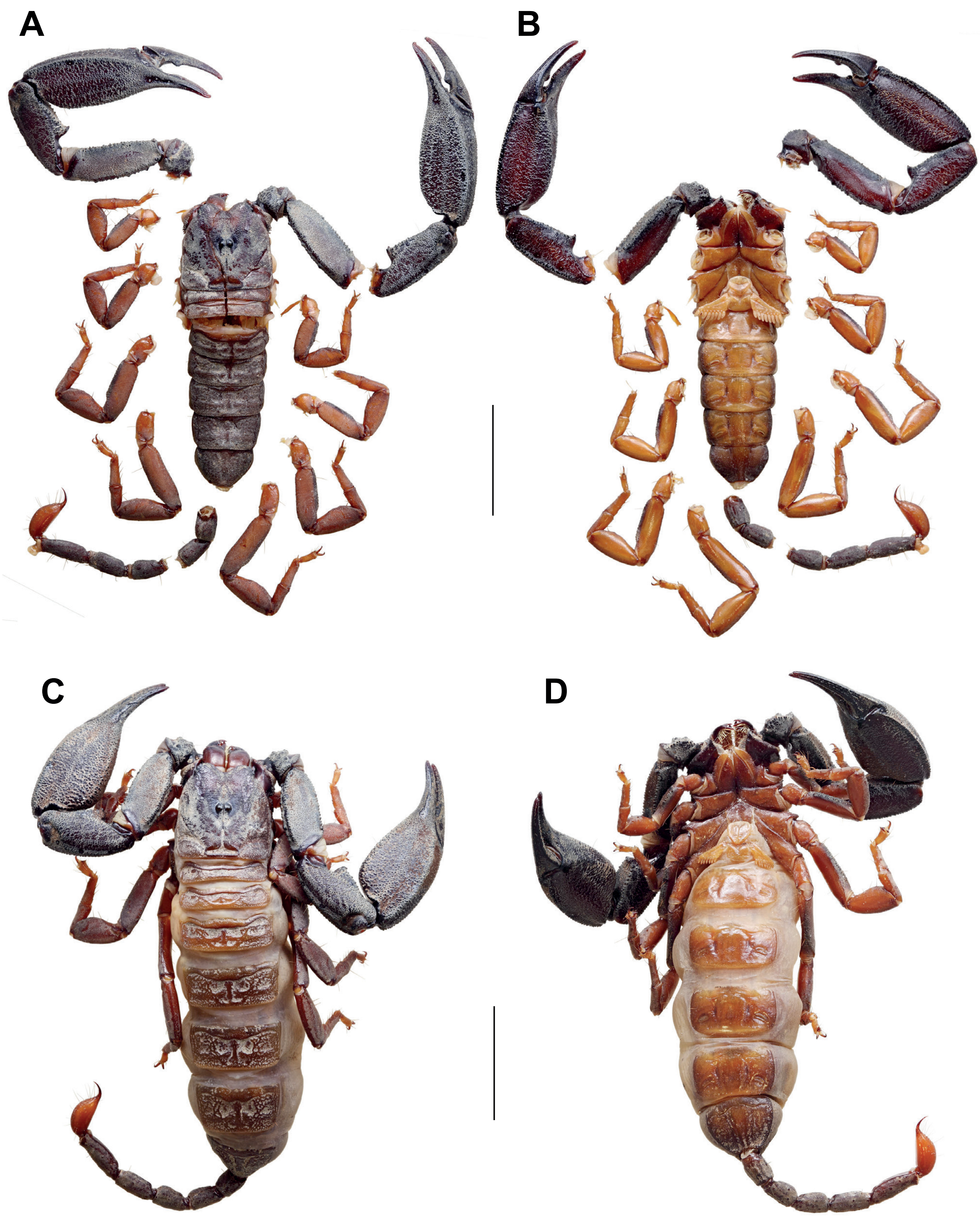

Fig. 122. *Hormurus menapi* sp. nov., habitus, dorsal (A, C) and ventral (B, D) aspect. (A-B) Male holotype (AMNH). (C-D) Female paratype (AMNH). Scale lines: 10 mm.

Diagnosis: *Hormurus menapi* sp. nov. is morphologically close to *H. maiwa* sp. nov. and *H. cameroni* sp. nov. and can be easily differentiated from these two species by its hemispermatophore morphology. The laminar hook is median (situated between positions 3/7 and 1/2 from the base of the stalk) in *H. menapi* sp. nov. (Fig. 129), whereas it is submedian (situated between 1/3 and 3/7 from the base of the stalk) in *H. maiwa* sp. nov. (Fig. 100) and *H. cameroni* sp. nov. (Fig. 81).

Description of adult male (holotype): *Colouration* (Fig. 122A-B): Dorsal surface of chelicera manus brown with black infuscation, more pronounced anteriorly; fingers black. Carapace reddish brown, median ocular region black. Tergites brown. Pedipalps reddish brown; carinae and fingers black. Legs paler than tergites, brown to orange dorsally, orange to yellow ventrally, prolateral carina of femora black. Coxapophysis I light brown, anterior tip pale yellow; coxapophysis II reddish brown to black; leg coxae light brown; sternum brown, lighter posterolaterally; sternites III-VI brown, posteromedian margin of V yellow; sternite VII dark brown to black posteriorly; genital operculum and pectines yellow. Metasoma reddish brown with darker infuscation; telson paler than metasoma, vesicle orange, aculeus reddish brown.

Cuticle: Nongranular surfaces of carapace, pedipalps, legs, mesosoma and metasoma finely punctate.

Carapace (Fig. 123A, C): Anterior margin with median notch moderately excavated. Anterior furcated sutures distinct; median ocular tubercle slightly raised; median ocelli present, at least twice the size of lateral ocelli, separated from each other by approximately the diameter of a median ocellus. Three pairs of lateral ocelli, equal in size, equidistant and adjacent to each other. Surfaces minutely and densely granular except for smooth frontal lobes (median longitudinal sulci and anterior furcated sulci granular) and median ocular area.

Chelicerae: Basal and median teeth of fixed finger fused into bicusp. Dorsal margin of movable finger with four teeth (one basal, one median, one subdistal and one distal); dorsal distal tooth smaller than ventral distal tooth; ventral margin smooth.

Pedipalps (Figs 122A-B, 124B-E, G-J, L-O): Segments long and slender, femur longer than carapace. Chela almost asetose.

Chela fingers (Fig. 125A, C-D): Fixed finger: basal lobe well developed and conical; suprabasal notch distinct and deep; dentate margins distally (from tip of finger to median lobe) with two rows of primary denticles bearing large inner accessory denticles; denticles absent on suprabasal notch; a single row of denticles on basal lobe. Movable finger: basal lobe absent; suprabasal lobe well developed, conical, gently rounded dorsally and lacking sharp conical tooth, not overlapping with fixed finger; suprabasal lobe and corresponding notch on fixed finger contiguous, no proximal gap or at most reduced gap only evident when fingers closed; dentate margins distally (from tip of finger to suprabasal lobe) with two rows of primary denticles bearing large inner accessory denticles; denticles absent on suprabasal notch; few scattered denticles basally.

Pedipalp carinae: Femur (Fig. 124L-O): proventral carina developed as a ridge of medium-sized spiniform granules; promedian carinae absent; prodorsal carina visible as a ridge of medium-sized spiniform granules, similarly developed to proventral carina; retrodorsal carina visible as a ridge of medium-sized spiniform granules, similarly developed as prodorsal carina; retroventral carina visible as a ridge of medium-sized to large spiniform granules, more developed than retrodorsal carina; ventromedian carina obsolete, only discernible proximally as a ridge of medium-sized spiniform granules. Patella (Fig. 124G-J): proventral carina discernible proximally as costate ridge, obsolete distally; promedian and prodorsal carinae visible as ridges with medium-sized to large spiniform granules, equally developed, fused medially into prominent spiniform process with pointed medially located apex; dorsomedian carina only visible proximally as a ridge of medium-sized spiniform granules; retrodorsal carina obsolete, only expressed proximally as a faint ridge of medium-sized spiniform granules; paired retromedian carinae fused and visible as a faint ridge of medium-sized spiniform granules; retroventral carina crenulate (composed of medium-sized spiniform granules). Chela manus (Fig. 124B-E): proventral and promedian carinae visible as faint ridges with medium-sized spiniform granules, equally developed; prodorsal carina obsolete, visible as a faint ridge of medium-sized spiniform granules; dorsomedian carina visible as a faint ridge of medium-sized spiniform granules, more strongly developed than prodorsal carina; dorsal secondary carina obsolete; digital carina visible as a ridge of small to medium-sized spiniform granules, less distinct in distal area, more developed than retromedian carina; fused retromedian carinae obsolete, visible as a faint ridge of medium-sized spiniform granules proximally; retrolateral secondary carina vestigial, only discernible proximal to condyle of movable finger as a ridge of medium-sized spiniform granules; retroventral carina crenulate (composed of medium-sized granules); ventromedian carina obsolete, only expressed proximally as a faint ridge of medium-sized spiniform granules.

Pedipalp macrosculpture: Femur (Fig. 124L-O): Prolateral intercarinal surface sparsely covered with small spiniform granules; dorsal intercarinal surface densely covered with small to medium-sized spiniform granules, distal area smooth; retrolateral intercarinal surface sparsely covered with medium-sized spiniform granules, smooth proximally; ventral intercarinal surface densely covered with medium-sized spiniform granules, distal area smooth. Patella (Fig. 124G-J): prolateral intercarinal surface densely covered with small to medium-sized spiniform granules, distal area smooth; dorsal and

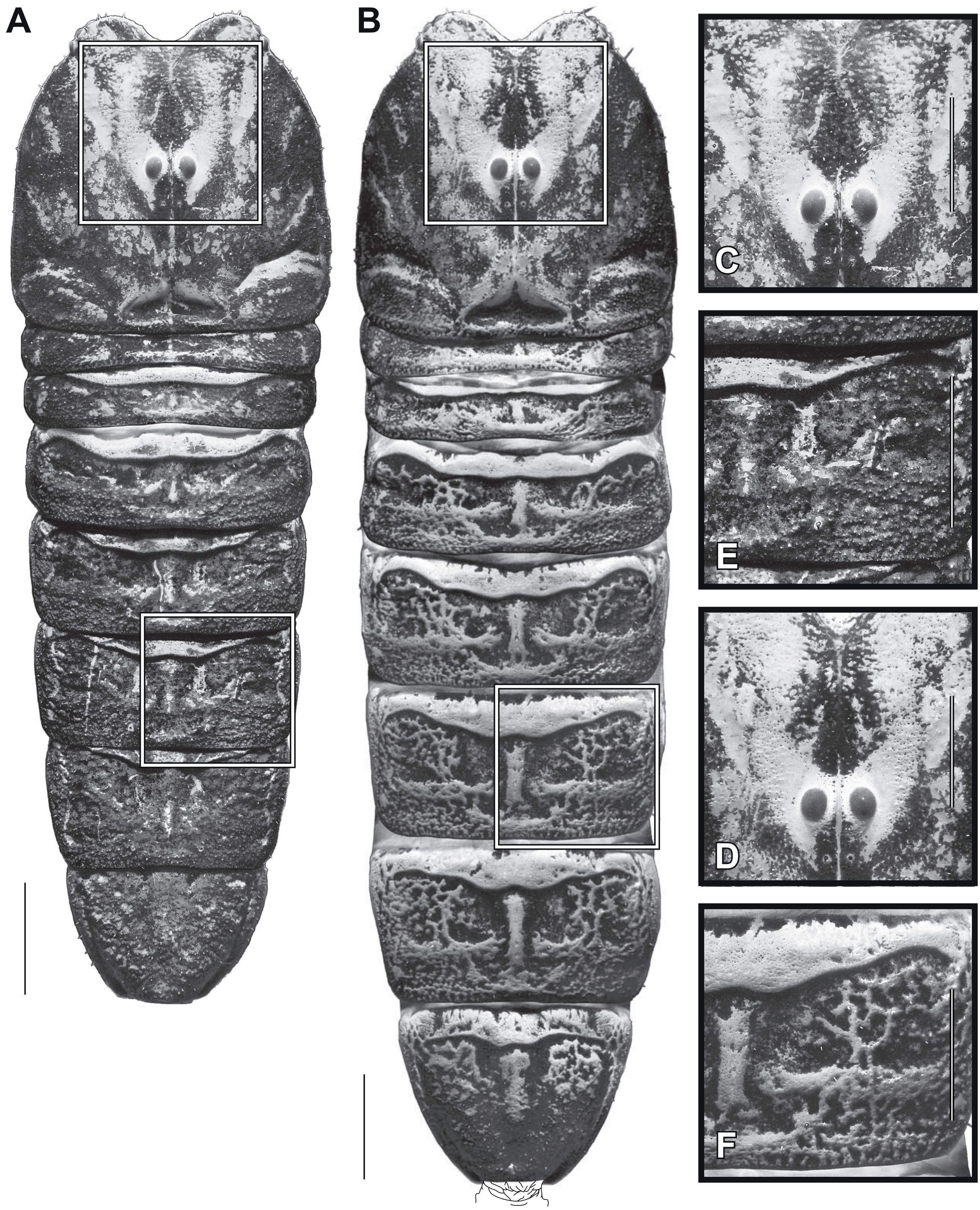

Fig. 123. *Hormurus menapi* sp. nov., carapace and mesosomal tergites showing ornamentation and macrosculpture of cuticle (A-B), detailed views of carapace (C-D) and of tergite V (E-F), dorsal aspect. (A, C, E) Male holotype (AMNH). (B, D, F) Female paratype (AMNH). Scale lines: 3 mm (A-B), 2 mm (C-F).

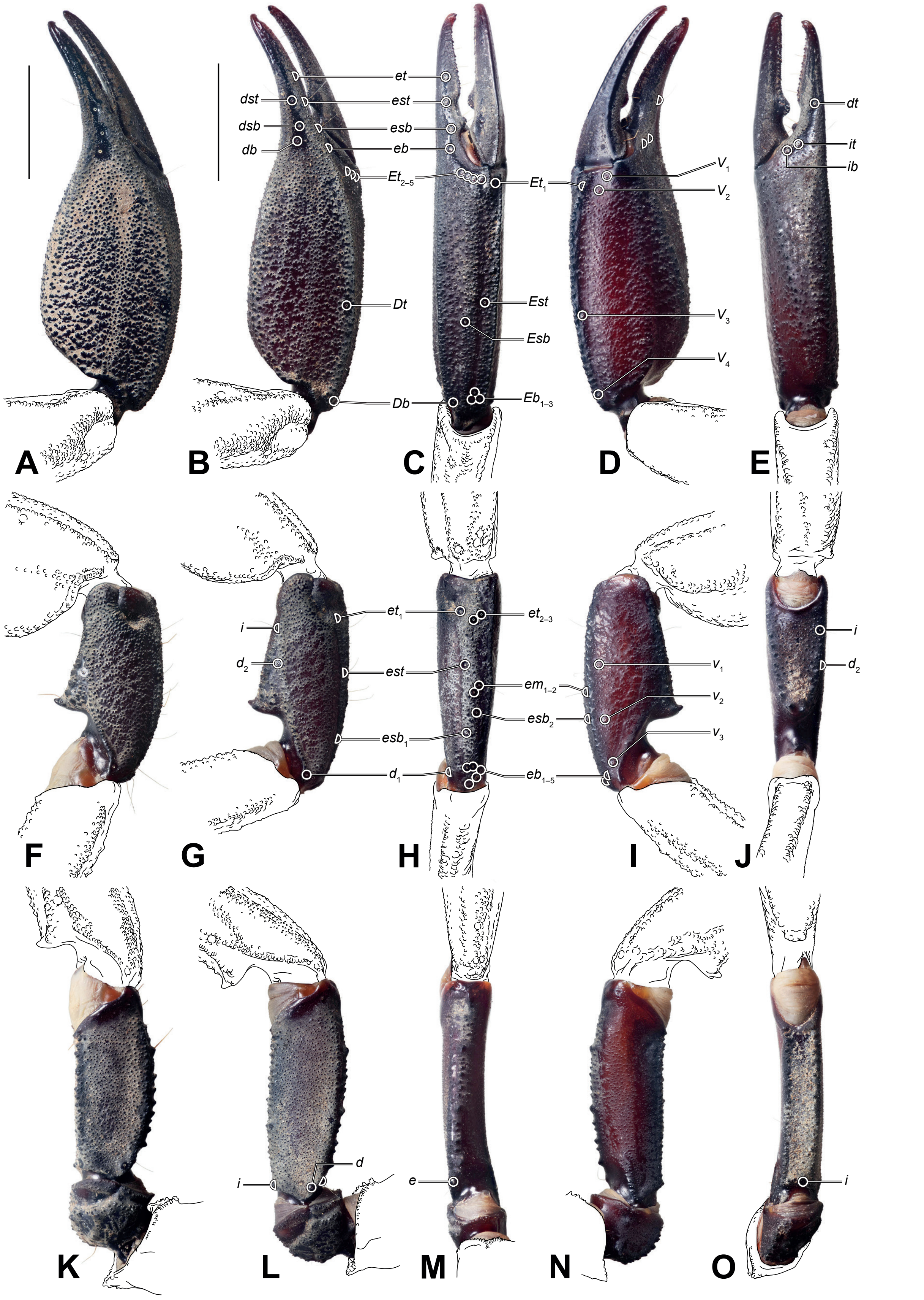

Fig. 124. *Hormurus menapi* sp. nov., pedipalp chela (A-E), patella (F-J), femur and trochanter (K-O), dorsal (A-B, F-G, K-L), retrolateral (C, H, M), ventral (D, I, N) and prolateral (E, J, O) aspect showing trichobothria pattern. (A, F, K) Female paratype (AMNH). (B-E, G-J, L-O) Male holotype (AMNH). Scale lines: 5 mm.

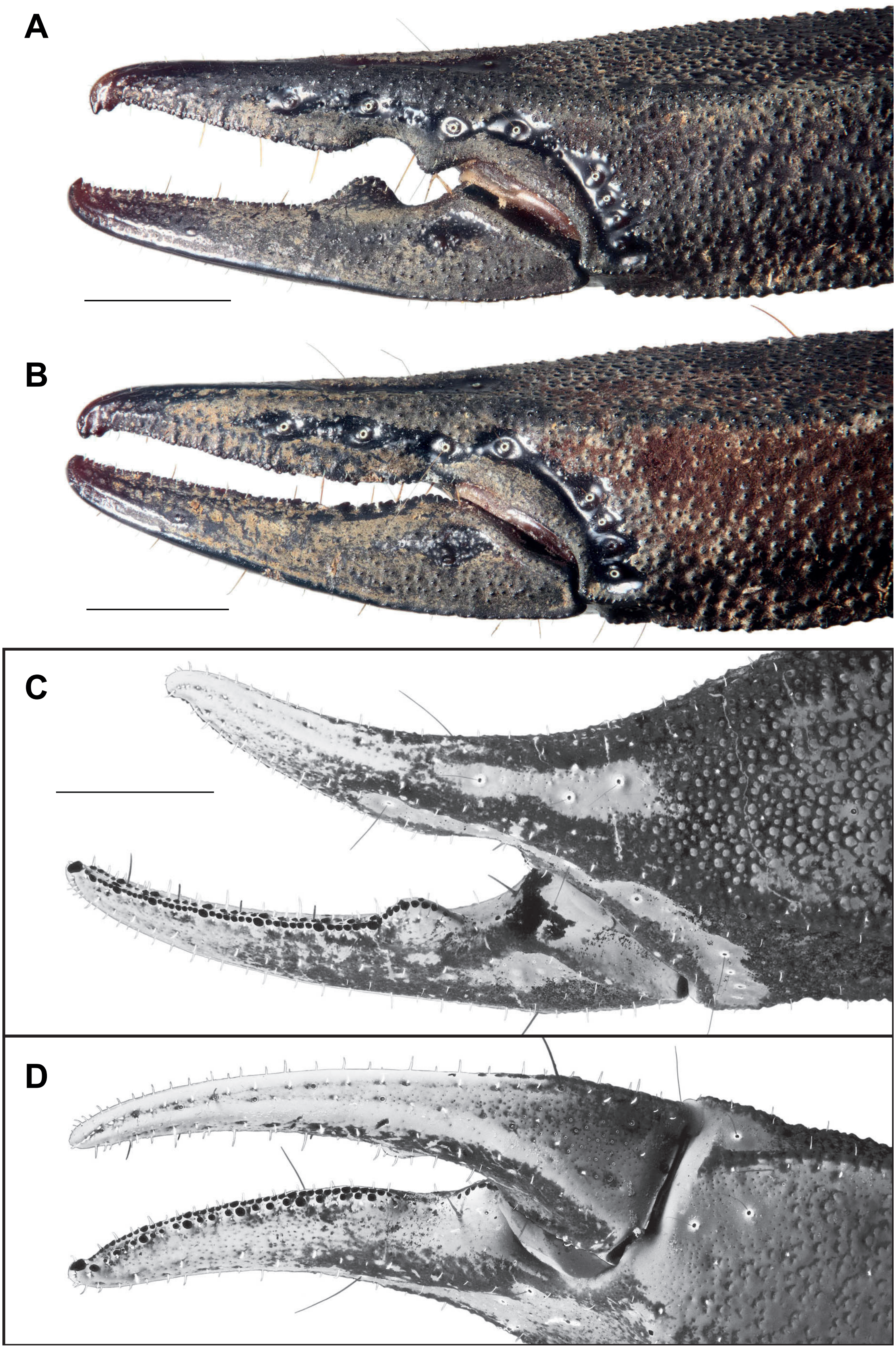

Fig. 125. *Hormurus menapi* sp. nov., left pedipalp chelae, retrolateral aspect showing dentate margin of chela fingers (A-B), dorsal aspect showing dentate margin of movable finger (C), ventral aspect showing dentate margin of fixed finger (D). (A, C-D) Male holotype (AMNH). (B) Female paratype (AMNH). Scale lines:, 2 mm.

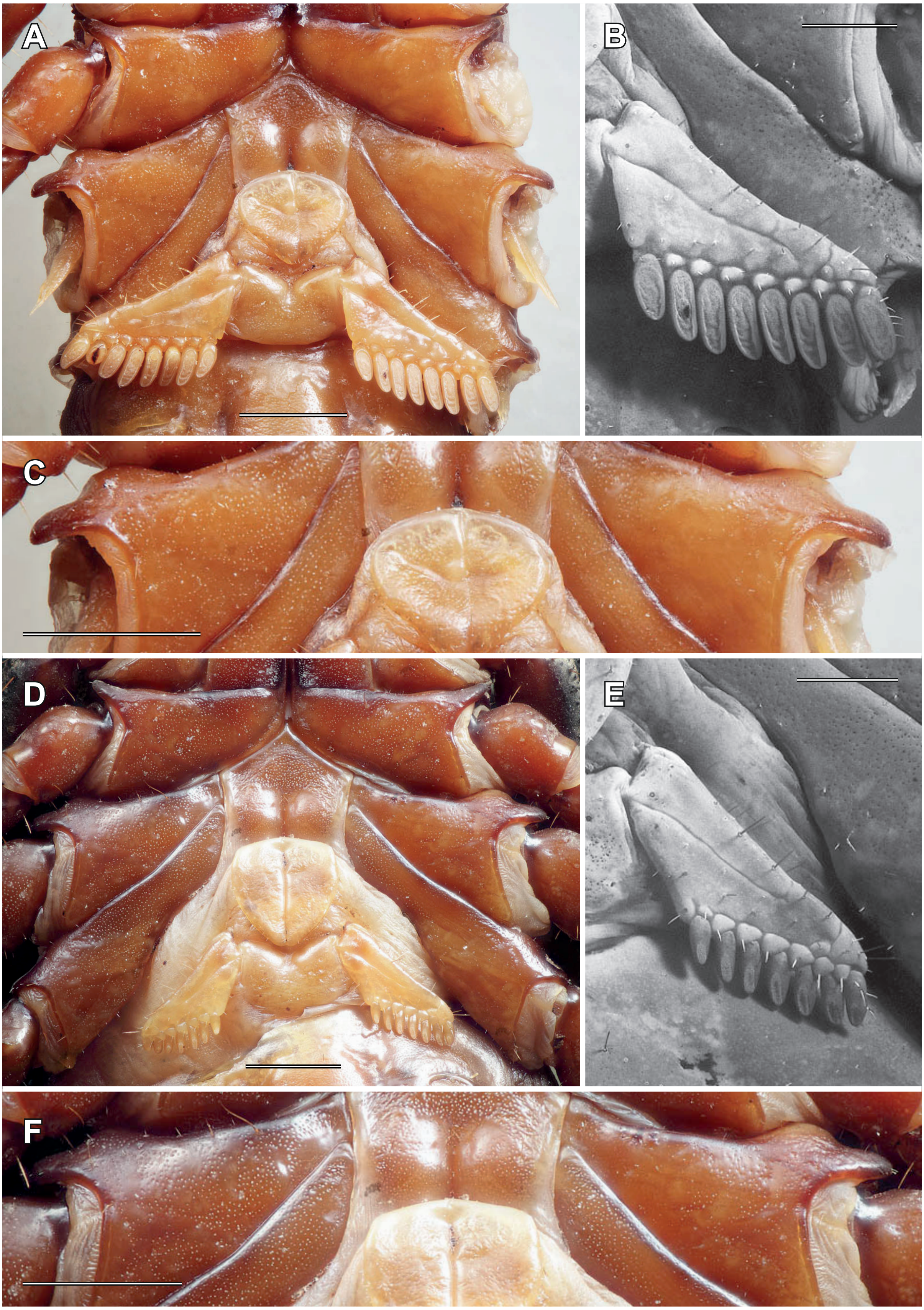

Fig. 126. *Hormurus menapi* sp. nov., coxae II-IV, sternum, genital operculum and pectines, ventral aspect (A, D), left pecten under UV light (B, E), anterior margin of coxae III (C, F). (A-C) Male holotype (AMNH). (D-F) Female paratype (AMNH). Scale lines: 2 mm (A, C-D, F), 1 mm (B, E).

retrolateral intercarinal surfaces covered with dense reticulate network of medium-sized spiniform granules; ventral intercarinal surface covered with sparse reticulate network of medium-sized spiniform granules, distal area smooth. Chela manus (Fig. 124B-E): prolateral intercarinal surface covered with sparse reticulate network of small to medium-sized spiniform granules, smooth proximally; dorsal and retrolateral intercarinal surfaces covered with dense reticulate network of medium-sized spiniform granules; ventral intercarinal surface covered with sparse reticulate network of medium-sized spiniform granules, distal area smooth. Chela fingers densely covered with small spiniform granules in proximal half, smooth or nearly so distally, ventral surface smooth; trichobothria *dst*, *dsb* and *db* together in a single large smooth depression.

Trichobothria: Pedipalp orthobothriotaxic, accessory trichobothria absent. Patella (Fig. 124G-J): d_2 trichobothrium distal to patellar process; five *eb* trichobothria arranged in two groups (eb_1+eb_{4-5} and eb_{2-3}); two *esb*, two *em* and one *est* trichobotria arranged in three (esb_1, esb_2+em_{1-2} and *est*) or four (esb_1, esb_2, em_{1-2} and *est*) groups; three *et* trichobothria; three *v* trichobothria. Chela manus (Fig. 124B-E): *Dt* situated in proximal half of manus; Eb_3 close to Eb_{1-2}; *Esb* closer to *Est* than to *Eb* group, sometimes aligned with *Est*; *Est* situated near midpoint; four *V* trichobothria, V_3 distant from V_4. Fixed chela finger with *db* situated on dorsal surface; *esb* slightly closer to *eb* than to *est*; *eb* situated at base of finger, proximal to point of articulation between fixed and movable fingers; two *i* trichobothria.

Coxosternum (Fig. 126A, C): Anterior margin of coxa III elongated distally, without anterodistal process. Sternum equilateral pentagonal (anterior width slightly greater than posterior width), as long as wide or nearly so.

Legs (Fig. 127): Femora I-IV with ventral surfaces bicarinate, pro- and retroventral carinae granular. Retrolateral margins of tibiae I-II without setiform macrosetae. Basitarsi I-IV: pro- and retroventral rows each with 4/4, 4/5, 4/5 and 4/5 setiform macrosetae, respectively. Telotarsi I-IV: pro- and retroventral row each with 4/4, 4/4, 4-5/5 and 4-5/5 setiform macrosetae, respectively; retroventral row with one proximal spinule; ventromedian spinules absent. Ungues shorter than telotarsus, half its length or less.

Genital operculum (Fig. 126A): Composed of two subtriangular sclerites.

Pectines (Fig. 126A-B): Moderately elongated, distal edge reaching but not extending beyond distal edge of coxa IV; fulcrae and three marginal lamellae present. Pectinal teeth count 7-8; teeth straight, entirely covered with sensory papillae.

Mesosoma (Figs 122A-B, 123A, E): Pre-tergites I-VII and posterior margins of pre-tergites smooth. Post-tergites: posterior margins of tergites I-VI sublinear, without distinct projection; lateral transversal sulcus present; intercarinal surfaces of I-VII densely covered with small spiniform granules, slightly less so medially on I-III; intercarinal surfaces of III-VII with distinct but faint reticulate network of ridges and dimples. Respiratory stigmata (spiracles) of sternites IV-VI short, their length less than third of sternite width, and distinctly crescent shaped. Sternite VII acarinate.

Metasoma (Fig. 128B-C): Not markedly compressed laterally; sparsely and minutely granular, posterior segments less so (segment V almost smooth); dorsal intercarinal surface of V smooth and shiny medially; distinct dorsomedian sulcus on segments I-IV, much less pronounced on segment V (usually only faintly expressed anteriorly).

Metasoma carinae: Segments I-IV: dorsolateral carinae obsolete on all segments; lateral median carinae weakly developed (as faint ridges); lateral inframedian carinae discernible anteriorly as a faint ridge on segment I, absent on other segments; ventrolateral carinae weakly developed (as faint ridges); paired ventrosubmedian carinae weakly developed (as low ridges). Segment V: dorsolateral and lateral median carinae obsolete; ventrolateral carinae only expressed as faint ridges; ventrosubmedian carinae fused, only expressed as a faint ridge in anterior two-thirds.

Metasoma spination: Segment I: dorsomedian posterior and dorsolateral posterior spiniform granules absent; ventrolateral carinae without large spiniform granules; ventrosubmedian carinae with one pair of subposterior spiniform granules. Segment II: dorsomedian posterior and dorsolateral posterior spiniform granules absent; ventrolateral carinae without large spiniform granules; ventrosubmedian carinae with 1-2 pairs of subposterior spiniform granules and 0-1 pair of median granules. Segments III-IV: dorsolateral posterior spiniform granules absent; ventrolateral and ventrosubmedian carina without large spiniform granules. Segment V: ventrolateral and ventromedian carinae with scattered minute spiniform granules; anal arch crenulate.

Ventral metasoma setation: Segment I with eight macrosetae, i.e. three pairs (anterior, median and posterior) on ventrosubmedian carinae and one pair (anterior) on lateral carinae, or ten macrosetae, i.e. three pairs (anterior, median and posterior) on ventrosubmedian carinae and two pairs (anterior and supramedian) on ventrolateral carinae; segments II-IV each with ten macrosetae, i.e. three pairs (anterior, median and posterior) on ventrosubmedian carinae and two pairs (anterior and supramedian) on ventrolateral carinae; segment V with 16 macrosetae, i.e. four pairs (anterior, median, subposterior and posterior) on ventrosubmedian carinae and four pairs (anterior, supramedian, subposterior and posterior) on ventrolateral carinae.

Telson (Fig. 128B): Slightly longer than metasoma segment V; vesicle smooth, without granules; aculeus short (its length less than half of vesicle length), sharply curved.

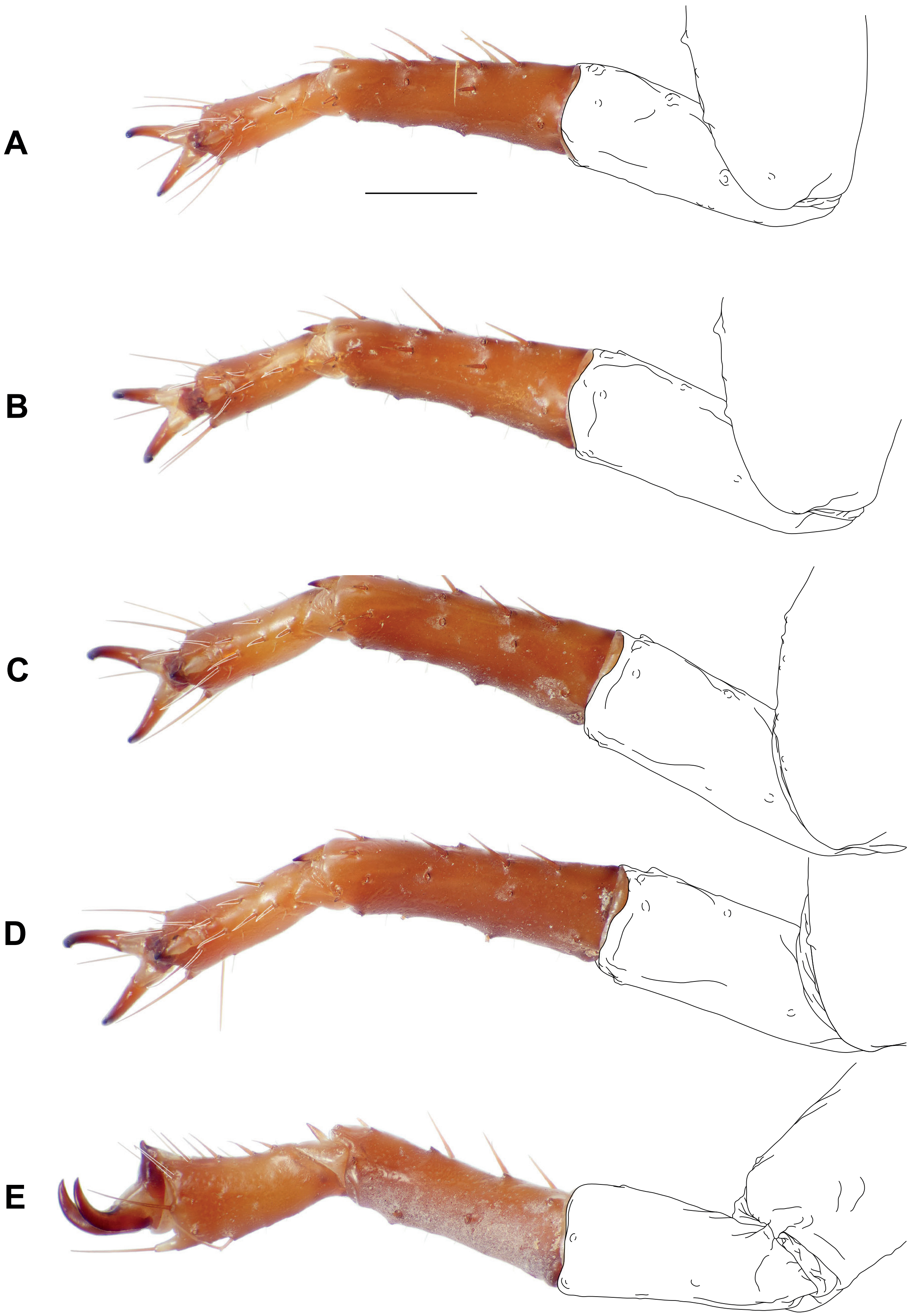

Fig. 127. *Hormurus menapi* sp. nov., male holotype (AMNH), right tarsi, ventral (A-D) and retrolateral (E) aspect. (A) Tarsus I. (B) Tarsus II. (C) Tarsus III. (D-E) Tarsus IV. Scale line: 1 mm.

Hemispermatophore (Fig. 129): Stalk distinctly longer than stem. Distal lamina curved, without distal crest on anterior margin; single laminar hook, median, situated between 3/7 and 1/2 from base of stalk (basal part/distal lamina ratio = 0.89-0.98, median = 0.97); transverse ridge distinct, more proximal than base of laminar hook, merging with anterior margin more proximally than base of laminar hook. Capsule: hemisolenos thin, folded on itself only proximally and above that unfolded to flattened distal tip (tip and base approximately of the same width), without lateral longitudinal carina, laterodistal accessory hook or medioposterior accessory apophysis; tip of hemisolenos more proximal than base of laminar hook, more distal than tip of clasper. Clasper well developed, forming distinct hump, not hook-like, without anterior accessory process. Subex well developed, spoon-shaped, merging anteriorly with base of clasper; posterior edge forming obtuse angle (>90°) with hemisolenos; anterior edge forming right angle (90º) with hemisolenos.

Description of adult female: Same characters as for male except as follows. *Colouration* (Fig. 122C-D): Legs slightly darker than in male, almost as dark as tergites.

Pedipalps (Figs 122C-D, 124A, F, K): Segments noticeably shorter or more robust than in male.

Chela fingers (Fig. 125B): Dentate margins linear or nearly so, without pronounced lobe and notch, with two rows of primary denticles extending from tip to base of fingers and bearing large inner accessory denticles.

Legs: Telotarsi I-IV: pro- and retroventral rows each with 4/4, 4-5/4, 4-5/5 and 5/5 setiform macrosetae, respectively.

Genital operculum (Fig. 126D): Oval to semi-oval, as wide as long or nearly so (length/width ratio = 1.00-1.04,

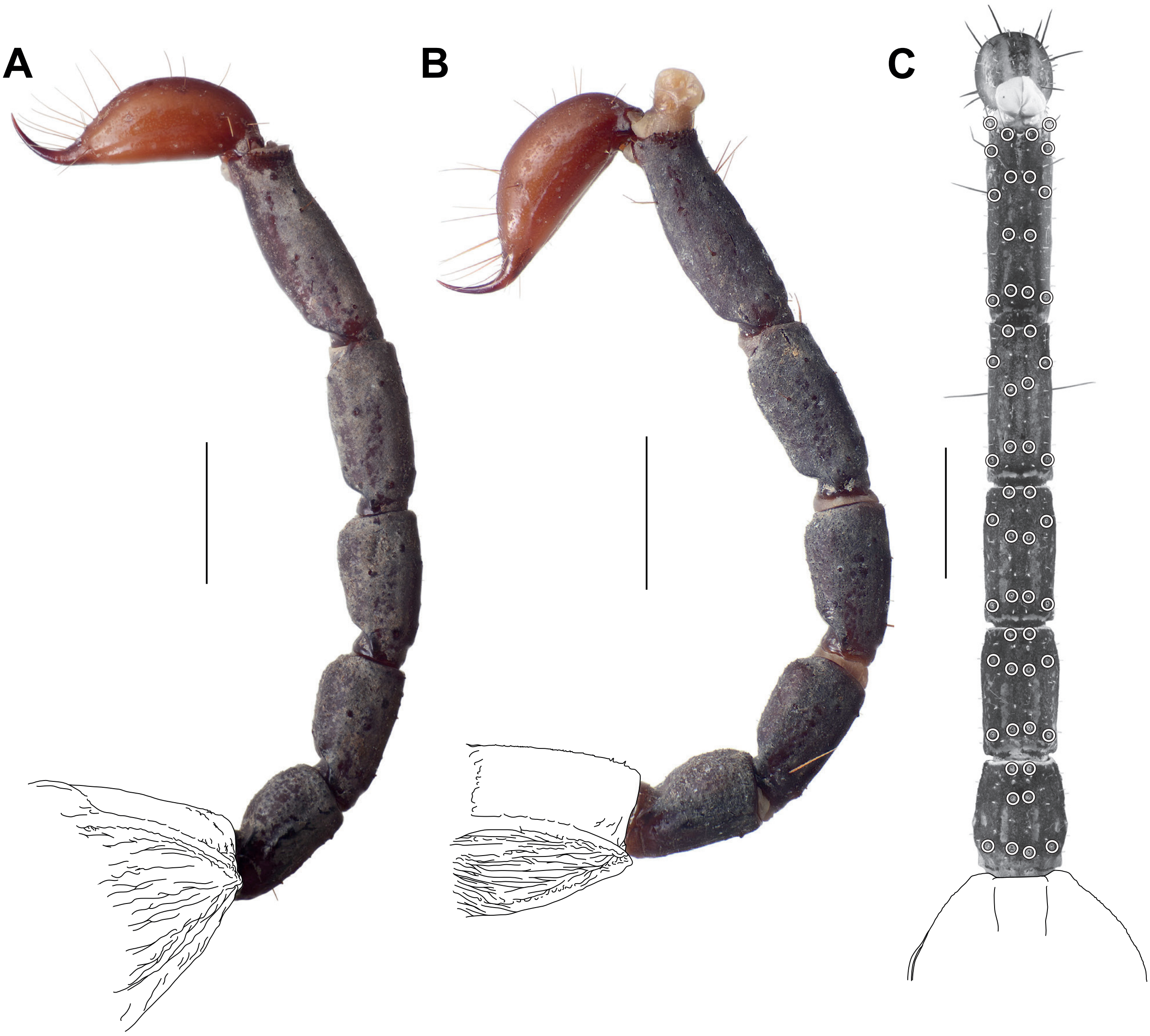

Fig. 128. *Hormurus menapi* sp. nov., metasoma and telson, lateral (A-B) and ventral (C) aspects. (A) Female paratype (AMNH). (B-C) Male holotype (AMNH). Scale lines: 3 mm.

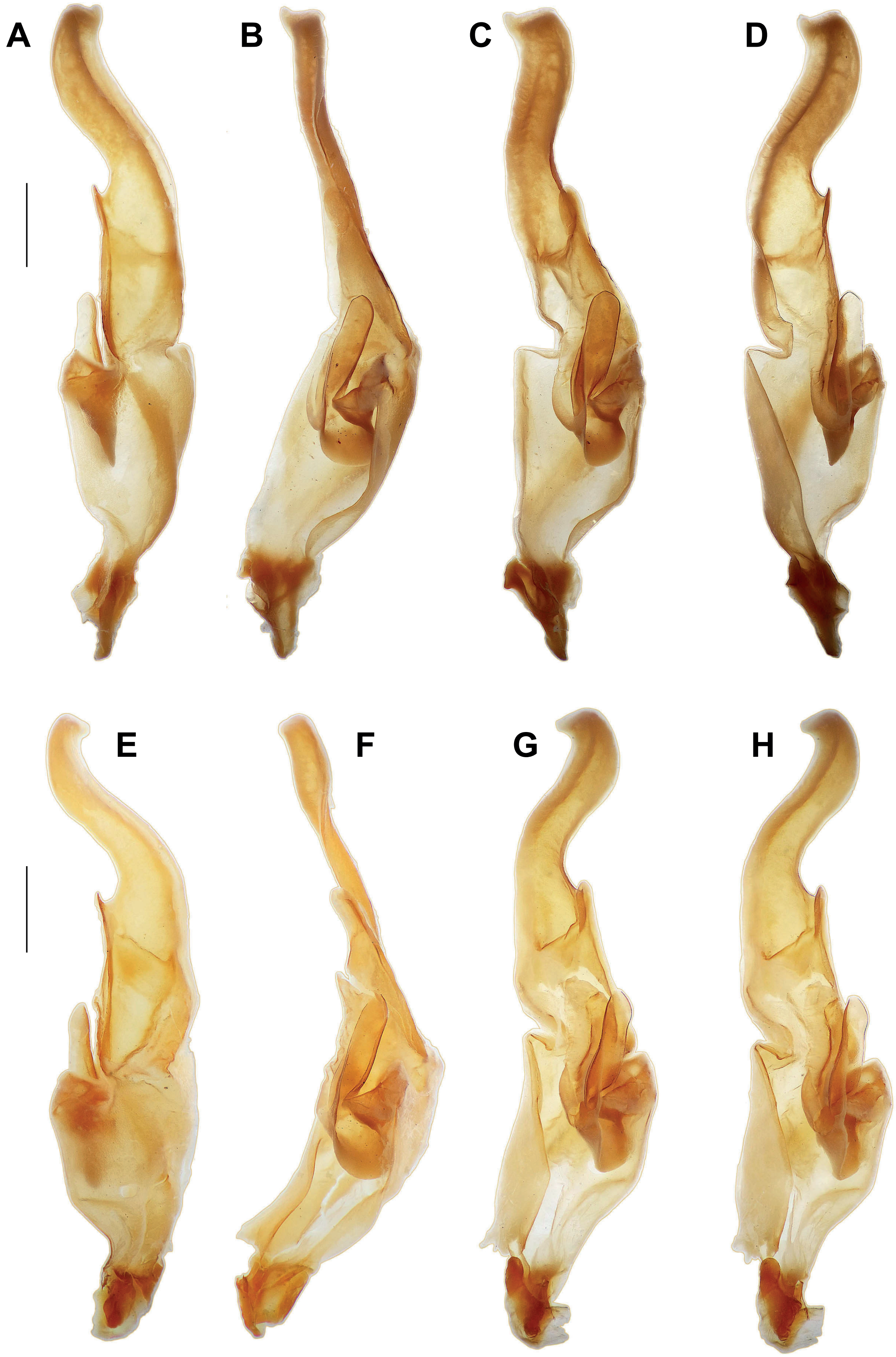

Fig. 129. *Hormurus menapi* sp. nov., left hemispermatophore of male holotype (AMNH; A-D) and of male paratype (AMNH; E-H). (A, E) Lateral aspect. (B, F) Anterior aspects. (C, G) Rotated approximately 45° counter-clockwise from anterior aspect. (D, H) Contralateral aspect. Scale lines: 1 mm.

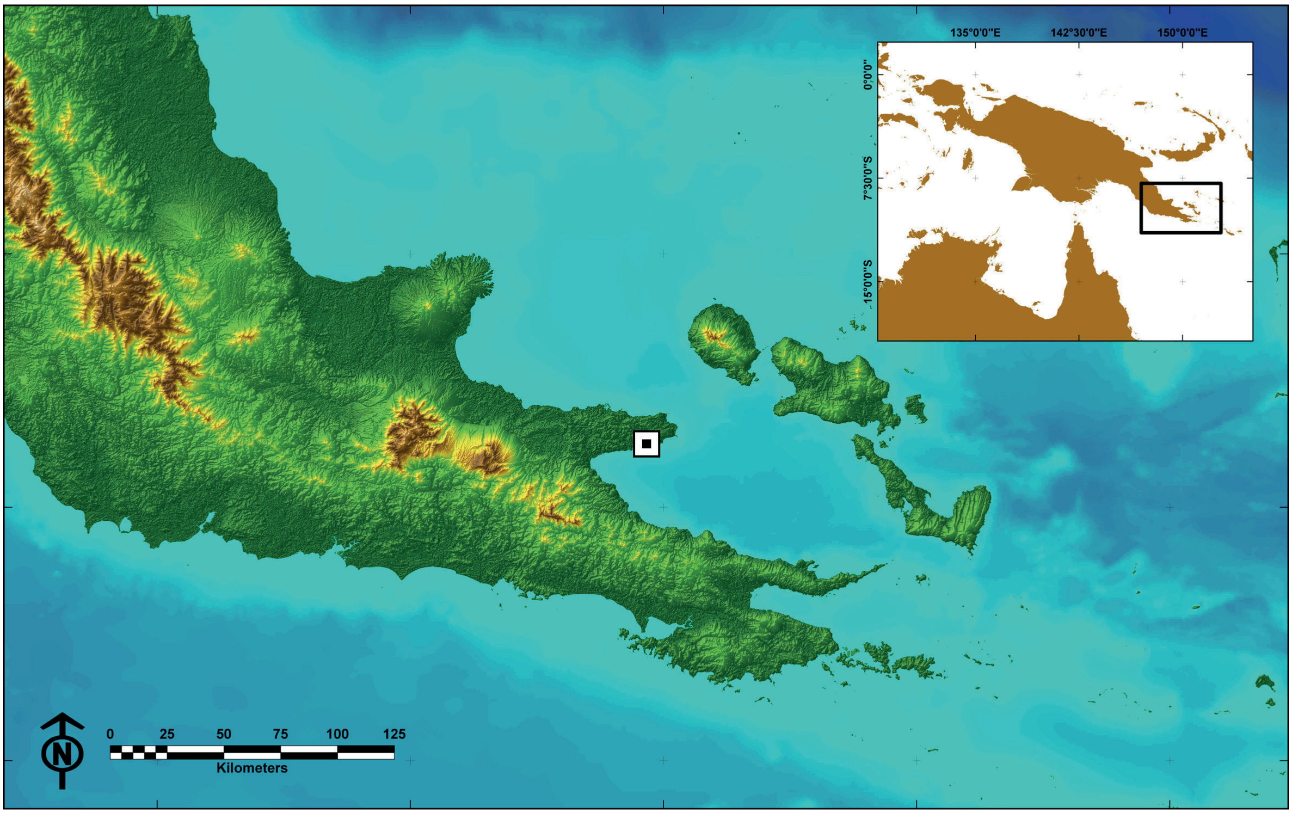

Fig. 130. Known localities of *Hormurus menapi* sp. nov. on Cape Vogel Peninsula, north of Goodenough Bay in Milne Bay Province, at the eastern tip of New Guinea. The color gradient indicates topography and bathymetry.

median = 1.01); opercular sclerites partly fused, with distinct median suture; posterior notch present, at least weakly developed.

Pectines (Fig. 126D-E): Short distal edge not reaching distal edge of coxa IV. Pectinal teeth count 7; teeth short and straight, sensory papillae covering only distal half.

Mesosoma (Figs 122C-D, 123B, F): Post-tergites: reticulate network of ridges and dimples on segments III-VII more distinct than in male; intercarinal surfaces of I-II medially smooth, laterally granular; anterior half of intercarinal surfaces of III-VI medially smooth, laterally granular, posterior half densely granular; anterior half of intercarinal surfaces of VII smooth, posterior half densely granular.

Metasoma (Fig. 128A): Spination: ventrosubmedian carinae of segment I with one pair of subposterior spiniform granules and 0-1 pair of median granules.

Intraspecific variation: *Pedipalp trichobothria*: On the retrolateral side of the pedipalp patella trichobothrium *est* is in some specimens close to em_{1-2}, resulting in three groups (esb_1, esb_2+em_{1-2} and *est*) instead of three (esb_{1-2}, em_{1-2} and *est*) or four (esb_1, esb_2, em_{1-2} and *est*). On the retrolateral side of the pedipalp chela *Esb* may be slightly more distal, aligning with *Est.*

Leg spination: The number of setiform macrosetae varies from four to five in the proventral row on telotarsi II-IV.

Female genital operculum: The length/width ratio varies from 1.00 to 1.04 (median = 1.01).

Pectines: The pectinal teeth count varies from seven to eight in males.

Metasoma: Spination: On the ventrosubmedian carinae of segment I 0-1 pair of median spiniform granules is present, and one more spiniform granule may be expressed in the subposterior group. One more spiniform granule may be expressed in the subposterior group of segment II, and one more or one fewer may be expressed in the median group.

Ventral metasoma setation: Eight to ten macroseta are expressed on segment I. Segment V may have 13 to 15 macrosetae instead of 16 (one to three macrosetae not expressed).

Hemispermatophores: The basal part/distal lamina ratio varies from 0.89 to 0.99 (median = 0.97).

Distribution and ecology: *Hormurus menapi* sp. nov. is only known from Menapi Village on the southern coast of the Cape Vogel Peninsula, north of Goodenough Bay in Milne Bay Province, eastern tip of New Guinea (Fig. 130, see also Fig. 101B). *Hormurus menapi* sp. nov. was collected together and is probably co-occurring with an undescribed *Hormurus* species (see further below).

Remarks: See remarks in the description of *H. maiwa* sp. nov. for details about the 1953 Archbold Expedition, and Fig. 101B for a historical map of the localities surveyed during this trip.

Hormurus tagula Monod & Prendini, sp. nov.

Figs 131-138, Tab. 14

This species was treated under the manuscript name "Hormurus tagulae" in Monod (2011a: 293, 532, 537).

Material: AMNH [LP 3008]; ♂ holotype; Papua New Guinea, Milne Bay Province, Sudest Island, Araetha Village, at sea level, 11.44°S, 153.43°E; 11.IV.2004; leg. J.D. Slapcinsky (sample JS-0705). – AMNH [LP 3008]; 1 ♀, 6 imm. paratypes; same data as for holotype. – UMMZ [LP 3008]; 6 imm. paratypes; same data as for holotype.

Etymology: Tagula is the Papuan name of Sudest Island where the types specimens were collected. The epithet is an invariable name in apposition.

Diagnosis: *H. tagula* sp. nov. is morphologically close to *H. sibonai* sp. nov. The two species may be differentiated by two characters in male specimens: (1) the number of pectinal teeth is higher in *H. tagula* sp. nov. (9-11; Fig. 135) than in *H. sibonai* sp. nov. (8, Fig. 143A-B); (2) the anterodistal tips of coxae II-III are narrower and more elongated in *H. tagula* sp. nov. (Fig. 135) than in *H. sibonai* sp. nov. (Fig. 143A, C).

Description of adult male: *Colouration* (Fig. 131A-B): Dorsal surface of chelicera manus dark brown with black infuscation, more pronounced anteriorly; fingers black. Carapace reddish brown, median ocular region black. Tergites brown. Pedipalps reddish brown; carinae and fingers black. Legs paler than tergites, pale brown dorsally, orange to yellow ventrally, prolateral carina of femora black. Coxapophyses I-II light brown, anterior tips black; coxae I-IV orange to yellow; sternum light brown, posterolaterally orange; sternites III-VI brown, posterior half of V pale yellow; sternite VII dark brown, almost black; genital operculum and pectines yellow. Metasoma reddish brown with darker infuscation; telson paler than metasoma, vesicle yellow to orange, aculeus reddish brown.
Cuticle: Nongranular surfaces of carapace, pedipalps, legs, mesosoma and metasoma finely punctate.
Carapace (Fig. 132A, C): Anterior margin with median notch moderately excavated. Anterior furcated sutures distinct. Median ocular tubercle slightly raised; median ocelli present, at least twice the size of lateral ocelli, separated from each other by approximately the diameter of a median ocellus. Three pairs of lateral ocelli, equal in size, equidistant and adjacent to each other. Surfaces densely granular (with small to medium-sized granules), except for smooth anterior areas of frontal lobes and median ocular area.
Chelicerae: Basal and median teeth of fixed finger fused into bicusp. Dorsal margin of movable finger with four teeth (one basal, one median, one subdistal and one distal); dorsal distal tooth smaller than ventral distal tooth; ventral margin smooth.
Pedipalps (Figs 131A-B, 133B-E, G-J, L-O): Segments moderately elongated, femur longer than carapace. Chela almost asetose.
Chela fingers (Fig. 134A, C-D): Fixed finger: basal lobe well developed and conical; suprabasal notch distinct and deep; dentate margins distally (from tip of finger to median lobe) with two rows of primary denticles bearing large inner accessory denticles; denticles absent on suprabasal notch; single row of denticles on basal lobe. Movable finger: basal lobe absent; suprabasal lobe well developed, conical, gently rounded dorsally and lacking sharp conical tooth, not overlapping with fixed finger; suprabasal lobe and corresponding notch on fixed finger contiguous, no proximal gap or at most reduced gap only evident when fingers closed; dentate margins distally (from tip of finger to suprabasal lobe) with two rows of primary denticles bearing large inner accessory denticles; denticles absent on suprabasal notch; few sparse denticles basally.
Pedipalp carinae: Femur (Fig. 133L-O): proventral carina visible as a ridge of medium-sized to large spiniform granules; promedian carinae absent; prodorsal carina visible as a ridge of medium-sized to large spiniform granules, more developed than proventral carina; retrodorsal carina visible as a ridge of medium-sized spiniform granules, less strongly developed than prodorsal carina; retroventral carina visible as a ridge of medium to large spiniform granules, more developed than retrodorsal carina; ventromedian carina obsolete, only discernible proximally as a ridge of medium-sized spiniform granules. Patella (Fig. 133G-J): proventral carina discernible as costate-granular ridge proximally, obsolete distally; promedian and prodorsal carinae visible as ridges with medium-sized to large spiniform granules, equally developed, fused medially into prominent spiniform process with pointed medially located apex; dorsomedian carina only visible proximally as a ridge of medium-sized spiniform granules; retrodorsal carina obsolete, only expressed proximally as a faint ridge of medium-sized spiniform granules; paired retromedian carinae fused and visible as a faint ridge of medium-sized spiniform granules; retroventral carina crenulate (composed of medium-sized granules). Chela manus (Fig. 133B-E): proventral and promedian carinae visible as faint ridges with medium-sized spiniform granules, equally developed; prodorsal carina obsolete, visible as a faint ridge of medium-sized spiniform granules; dorsomedian carina visible as a faint ridge of medium-sized spiniform granules, more strongly developed than prodorsal carina; dorsal secondary carina obsolete; digital carina visible as a ridge of small to medium-sized spiniform granules, less distinct in distal area, more

Table 14. *Hormurus tagula* sp. nov., measurements (in mm), repository and inventory number of adult male holotype and adult female paratype.

	Holotype	Paratype
Sex	♂	♀
Repository	AMNH	AMNH
Inventory number	LP3008	LP3008
Locality	Araetha	Araetha
Total length	52.00	57.00
Carapace, length	8.35	8.90
Carapace, anterior width	5.58	5.85
Carapace, posterior width	9.33	10.00
Pedipalp femur, length	10.48	9.26
Pedipalp femur, width	3.54	3.54
Pedipalp femur, height	1.83	2.13
Pedipalp patella, length	10.12	8.90
Pedipalp patella, width	3.90	4.05
Pedipalp patella, height	3.11	3.29
Pedipalp chela, length	19.50	18.82
Pedipalp chela, width	6.16	6.83
Pedipalp chela, height	3.54	3.90
Chela movable finger, length	8.92	8.92
Genital operculum length, female	NA	2.80
Genital operculum width, female	NA	2.44
Metasoma segment I, length	3.05	3.05
Metasoma segment I, width	2.23	2.26
Metasoma segment I, height	1.95	2.04
Metasoma segment II, length	3.41	3.47
Metasoma segment II, width	1.77	1.83
Metasoma segment II, height	1.93	2.01
Metasoma segment III, length	3.72	3.66
Metasoma segment III, width	1.68	1.71
Metasoma segment III, height	1.95	1.97
Metasoma segment IV, length	4.21	4.14
Metasoma segment IV, width	1.56	1.56
Metasoma segment IV, height	1.83	1.89
Metasoma segment V, length	5.42	5.18
Metasoma segment V, width	1.55	1.58
Metasoma segment V, height	1.83	1.83
Telson, length	6.36	6.22
Telson, width	1.83	1.83
Telson, height	2.17	2.16

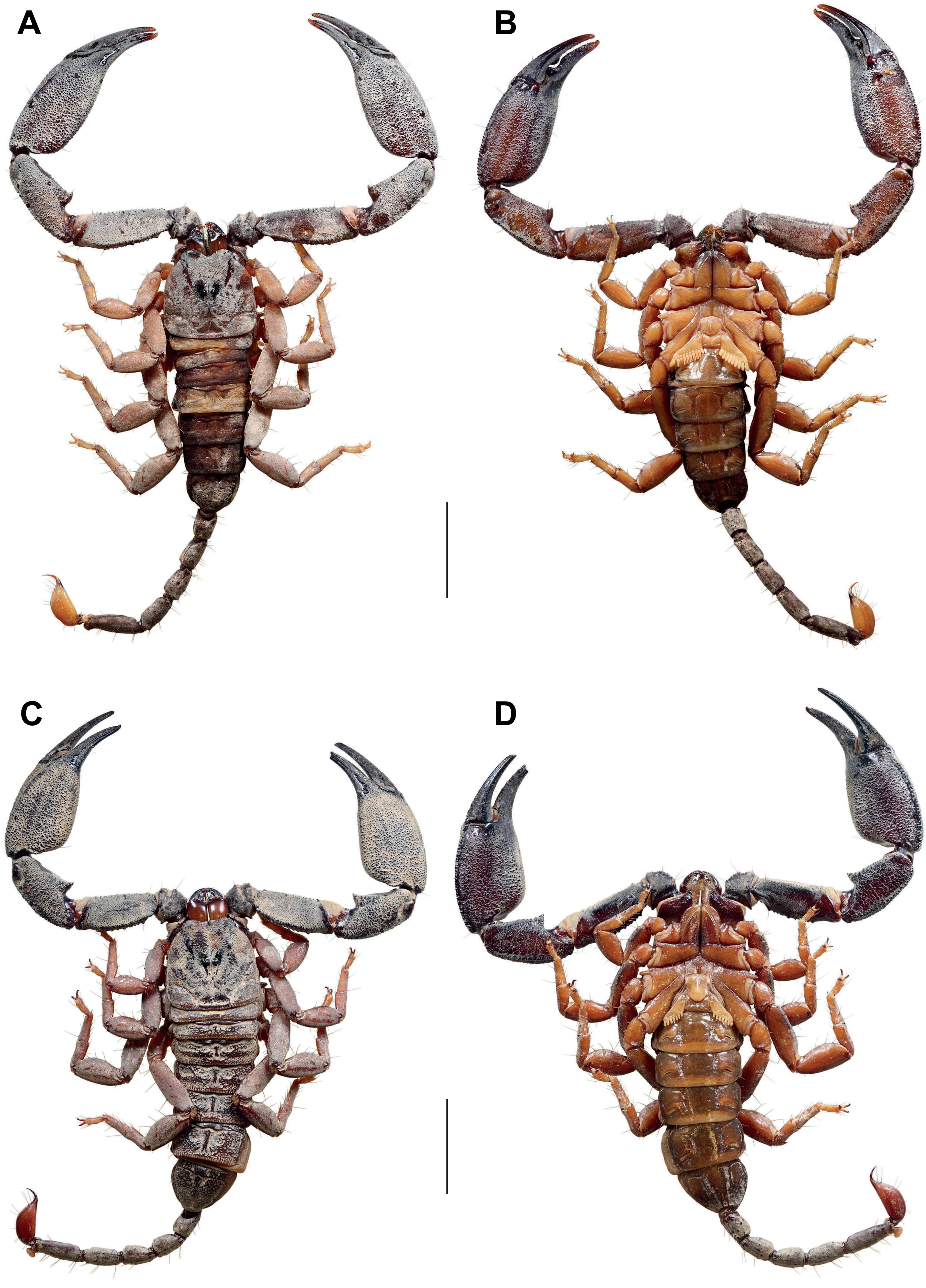

Fig. 131. *Hormurus tagula* sp. nov., habitus, dorsal (A, C) and ventral (B, D) aspect. (A-B) Male holotype (AMNH [LP3008]). (C-D) Female paratype (AMNH [LP3008]). Scale lines: 10 mm.

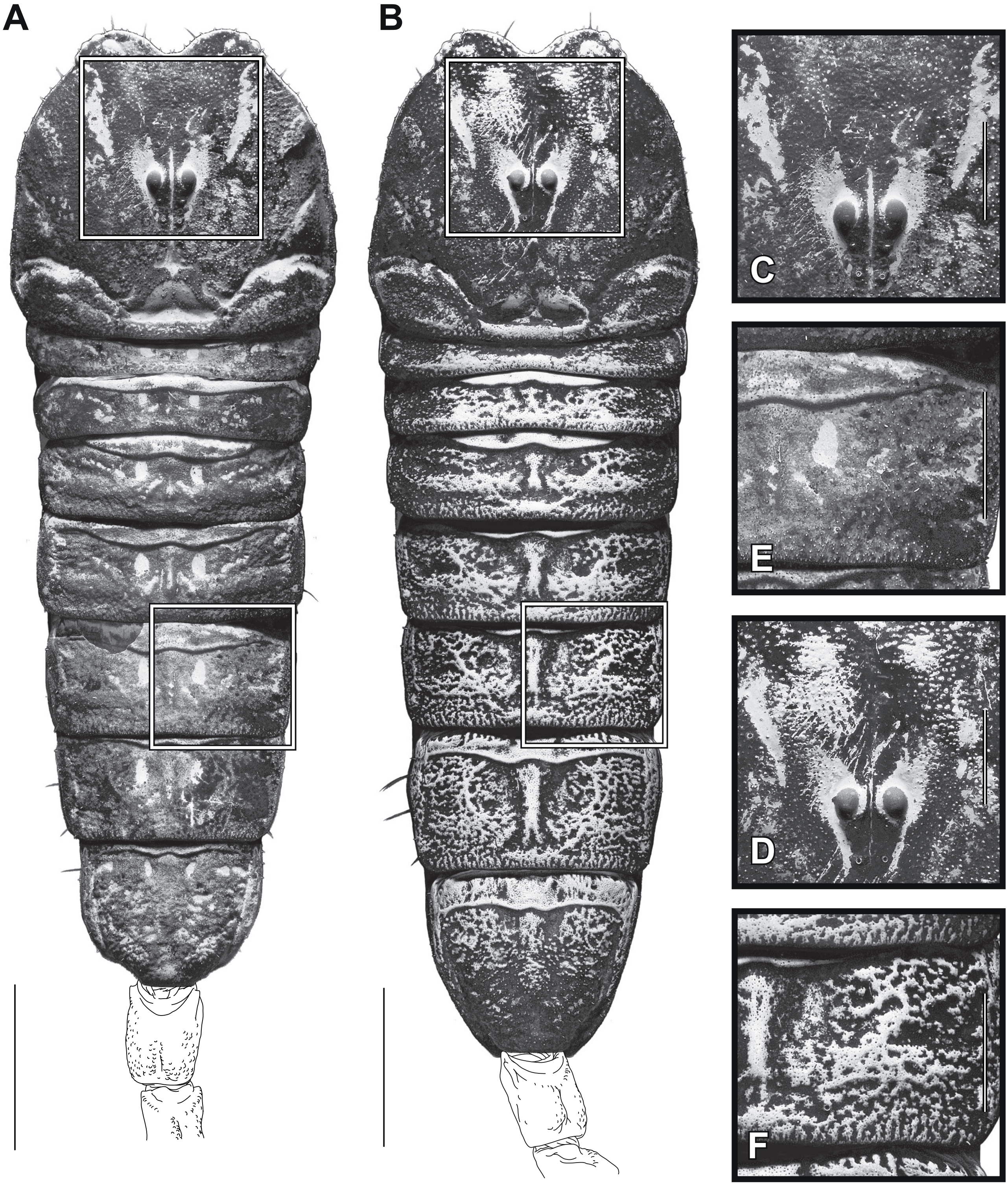

Fig. 132. *Hormurus tagula* sp. nov., carapace and mesosomal tergites showing ornamentation and macrosculpture of cuticle (A-B), detailed views of carapace (C-D) and of tergite V (E-F), dorsal aspect. (A, C, E) Male holotype (AMNH [LP3008]). (B, D, F) Female paratype (AMNH [LP3008]). Scale lines: 5 mm (A-B), 2 mm (C-F).

developed than retromedian carina; fused retromedian carinae obsolete, visible as a faint ridge of medium-sized spiniform granules proximally; retrolateral secondary carina vestigial, only discernible as a ridge of medium-sized spiniform granules proximal to condyle of movable finger; retroventral carina crenulate (composed of large granules in proximal half and medium-sized ones in distal half); ventromedian carina obsolete, only proximally expressed as a faint ridge of medium-sized spiniform granules.

Pedipalp macrosculpture: Femur (Fig. 133L-O): prolateral intercarinal surface sparsely covered with small spiniform granules; dorsal intercarinal surface sparsely covered with small to medium-sized spiniform granules, distal area smooth; retrolateral intercarinal surface sparsely covered with medium-sized spiniform granules, smooth proximally; ventral intercarinal surface sparsely covered with medium-sized spiniform granules, distal area smooth. Patella (Fig. 133G-J): prolateral intercarinal surface sparsely covered with small to medium-sized spiniform granules, distal area smooth; dorsal and retrolateral intercarinal surfaces covered with dense reticulate network of medium-sized spiniform granules; ventral intercarinal surface covered with sparse reticulate network of medium-sized spiniform granules, distal area smooth. Chela manus (Fig. 133B-E): prolateral intercarinal surface covered with dense reticulate network of medium-sized spiniform granules, smooth proximally; dorsal and retrolateral intercarinal surfaces covered with dense reticulate network of medium-sized spiniform granules; ventral intercarinal surface covered with dense reticulate network of medium-sized spiniform granules, distal area smooth. Chela fingers densely covered with small spiniform granules in proximal half, smooth or nearly so in distal half, ventral surface smooth; trichobothria *dst*, *dsb* and *db* together in a single large smooth depression.

Trichobothria: Pedipalp orthobothriotaxic, accessory trichobothria absent. Patella (Fig. 133G-J): d_2 trichobothrium distal to patellar process; five *eb* trichobothria arranged in two groups (eb_1+eb_{4-5} and eb_{2-3}); two *esb*, two *em* and one *est* trichobotria arranged in three (esb_{1-2}, em_{1-2} and *est*) or four (esb_1, esb_2, em_{1-2} and *est*) groups; three *et* trichobothria; three *v* trichobothria. Chela manus (Fig. 133B-E): *Dt* situated in proximal half of manus; Eb_3 close to Eb_{1-2}; *Esb* closer to *Est* than to *Eb* group; *Est* situated near midpoint; four *V* trichobothria, V_3 distant from V_4. Fixed chela finger with *db* situated on dorsal surface; *esb* slightly closer to *eb* than to *est*; *eb* situated at base of finger, proximal to point of articulation between fixed and movable fingers; two *i* trichobothria.

Coxosternum (Fig. 135A, C): Anterior margin of coxa III markedly elongated distally, without anterodistal process. Sternum equilateral pentagonal (anterior width slightly greater than posterior width), almost as long as wide.

Legs (Fig. 136): Femora I-IV with ventral surfaces bicarinate, pro- and retroventral carinae granular. Retrolateral margins of tibiae I-II without setiform macrosetae. Basitarsi I-IV: pro- and retroventral rows each with 4/4, 4/4, 4/5 and 4/5 setiform macrosetae, respectively. Telotarsi I-IV: pro- and retroventral row each with 4/4, 4-5/4-5, 4-5/5 and 5/4-5 setiform macrosetae, respectively; retroventral row with one proximal spinule; ventromedian spinules absent. Ungues shorter than telotarsus, half its length or less.

Genital operculum (Fig. 135A): Composed of two subtriangular sclerites.

Pectines (Fig. 135A-B): Relatively short, distal edge not reaching distal edge of coxa IV; fulcrae and three marginal lamellae present. Pectinal teeth count 9-11; teeth straight, entirely covered with sensory papillae.

Mesosoma (Figs 131A-B, 132A, E): Pre-tergites I-VII and posterior margins of pre-tergites smooth. Post-tergites: posterior margins of tergites I-VI sublinear, without distinct projection; lateral transversal sulcus present; intercarinal surfaces of I-III densely covered with small spiniform granules, smooth anteromedially; intercarinal surfaces of IV-VII densely covered with small spiniform granules, less so anteromedially; intercarinal surfaces III-VII with distinct but faint reticulate network of ridges and dimples. Respiratory stigmata (spiracles) of sternites IV-VI short, their length less than third of sternite width, and distinctly crescent shaped. Sternite VII acarinate.

Metasoma (Fig. 137B-C): Not markedly compressed laterally; sparsely and minutely granular, posterior segments less so (segment V almost smooth); dorsal intercarinal surface of V smooth and shiny medially; distinct dorsomedian sulcus on segments I-IV, much less pronounced on segment V (usually only faintly expressed anteriorly).

Metasoma carinae: Segments I-IV: dorsolateral carinae obsolete on all segments; lateral median carinae weakly developed (as faint ridges); lateral inframedian carinae discernible anteriorly as a faint ridge on segment I, absent on other segments; ventrolateral carinae weakly developed (as faint ridges); paired ventrosubmedian carinae weakly developed (as low ridges). Segment V: dorsolateral and lateral median carinae obsolete; ventrolateral carinae only expressed as faint ridges; ventrosubmedian carinae fused, only expressed as a faint ridge in anterior two-thirds.

Metasoma spination: Segment I: dorsomedian posterior and dorsolateral posterior spiniform granules absent; ventrolateral carinae without large spiniform granules; ventrosubmedian carinae with one pair of subposterior spiniform granules. Segment II: dorsomedian posterior and dorsolateral posterior spiniform granules absent; ventrolateral carinae without large spiniform granules; ventrosubmedian carinae with one pair of subposterior spiniform granules and 0-1 pair of median granules. Segments III-IV: dorsolateral posterior spiniform granules absent; ventrolateral and ventrosubmedian carina without large spiniform granules. Segment V:

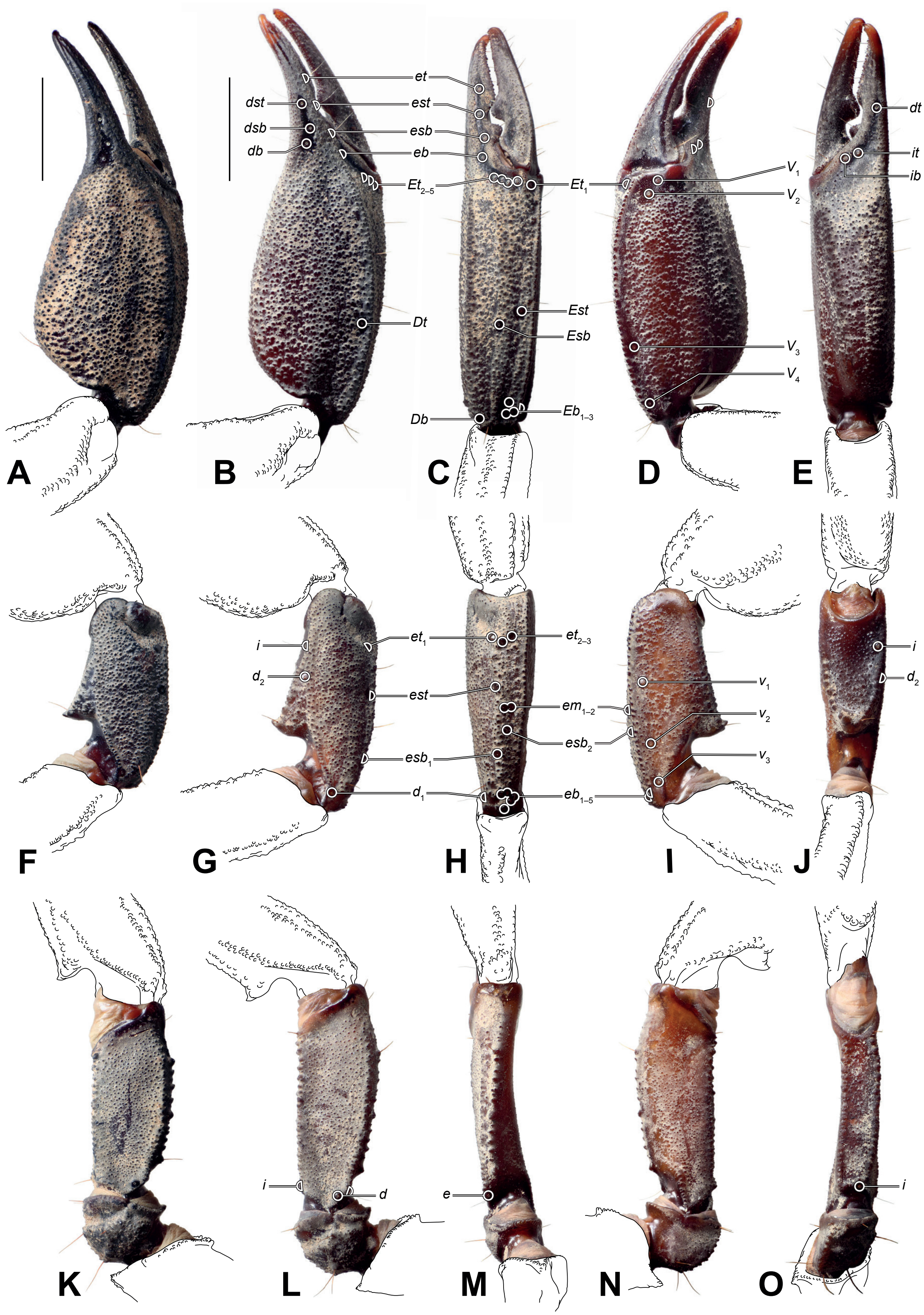

Fig. 133. *Hormurus tagula* sp. nov., pedipalp chela (A-E), patella (F-J), femur and trochanter (K-O), dorsal (A-B, F-G, K-L), retrolateral (C, H, M), ventral (D, I, N) and prolateral (E, J, O) aspect showing trichobothria pattern. (A, F, K) Female paratype (AMNH [LP3008]). (B-E, G-J, L-O) Male holotype (AMNH [LP3008]). Scale lines: 5 mm.

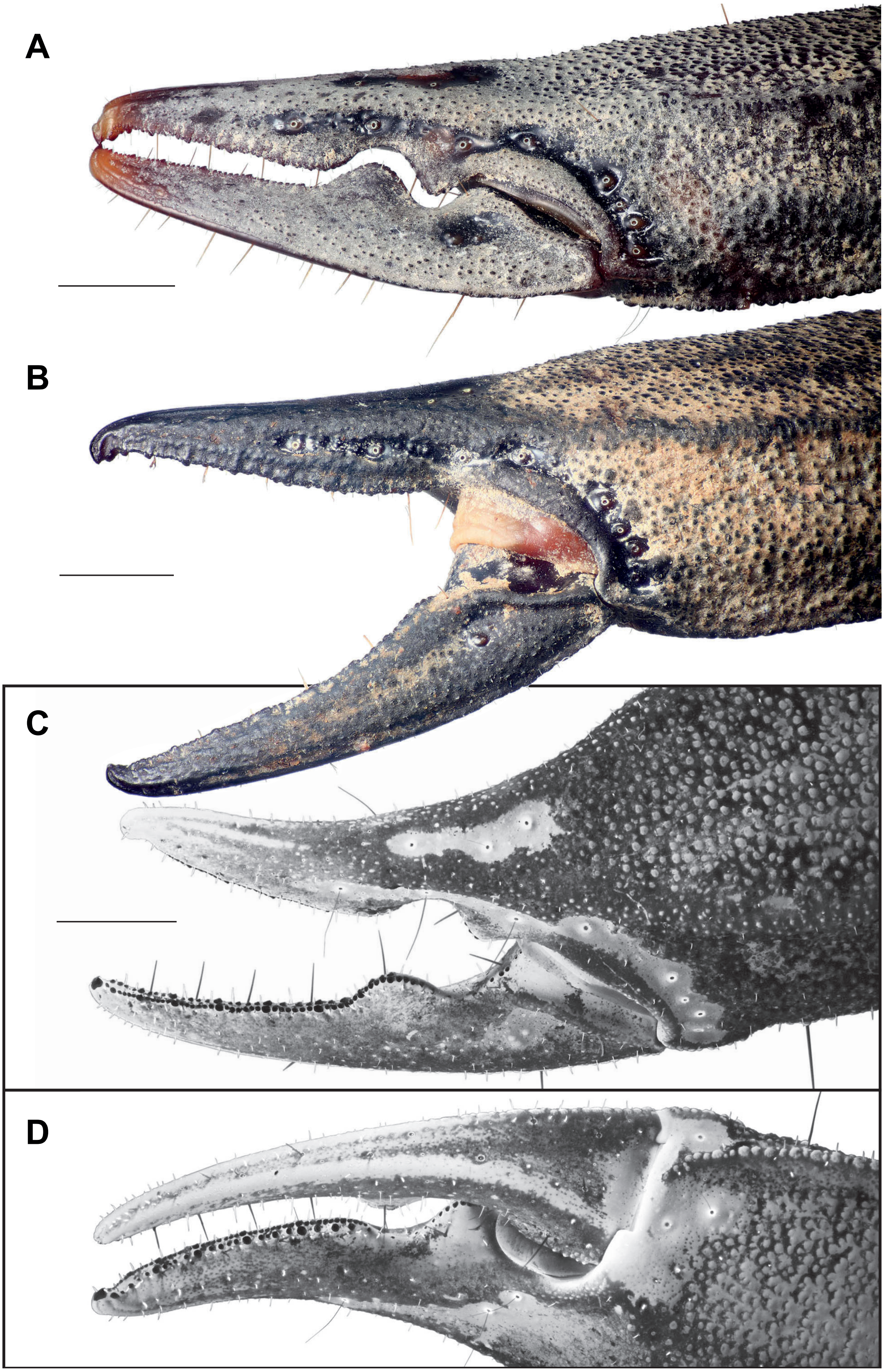

Fig. 134. *Hormurus tagula* sp. nov., left pedipalp chelae, retrolateral aspect showing dentate margin of chela fingers (A-B), dorsal aspect showing dentate margin of movable finger (C), ventral aspect showing dentate margin of fixed finger (D). (A, C-D) Male holotype (AMNH [LP3008]). (B) Female paratype (AMNH [LP3008]). Scale lines: 2 mm.

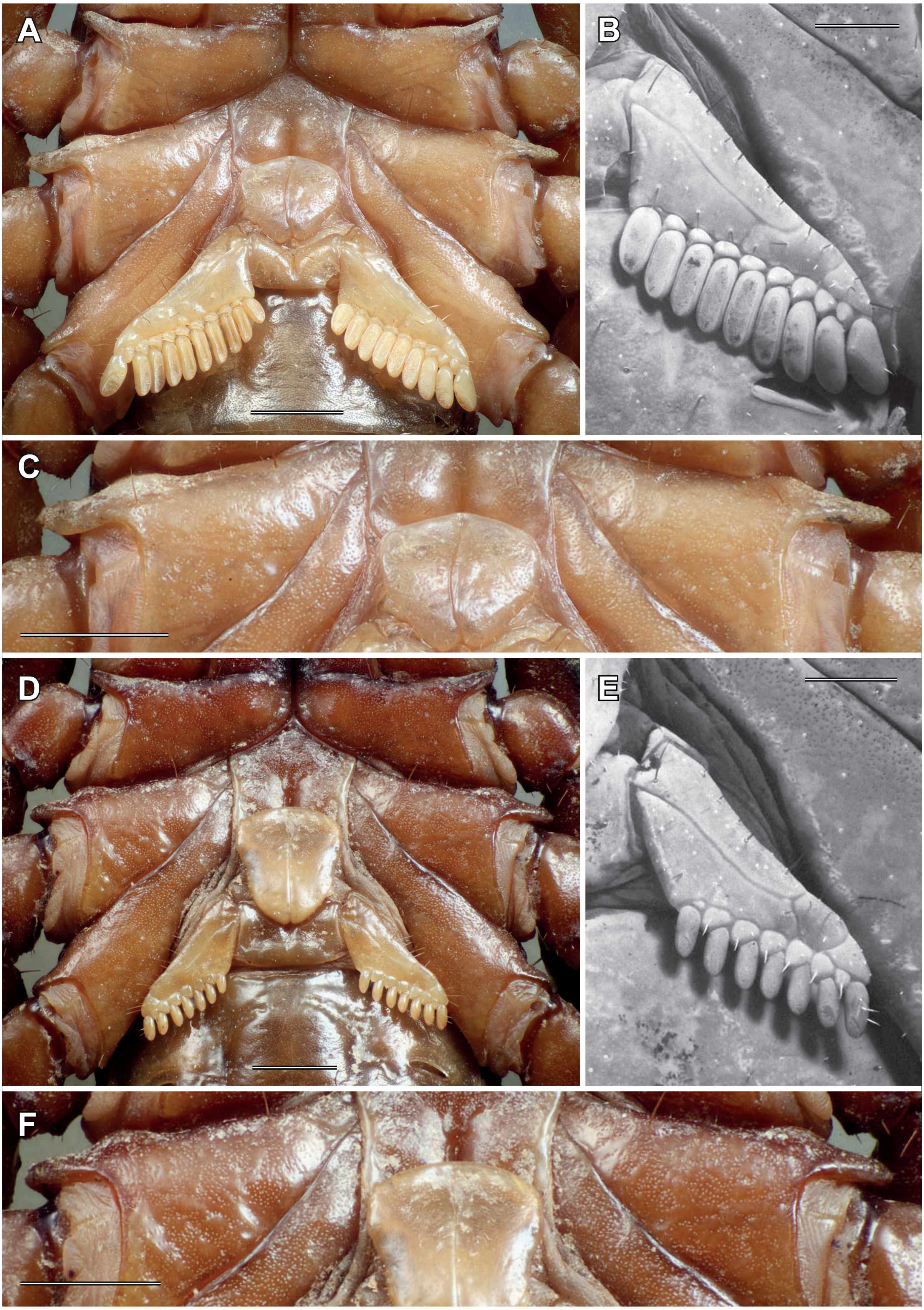

Fig. 135. *Hormurus tagula* sp. nov., coxae II-IV, sternum, genital operculum and pectines, ventral aspect (A, D), left pecten under UV light (B, E), anterior margin of coxae III (C, F). (A-C) Male holotype (AMNH [LP3008]). (D-F) Female paratype (AMNH [LP3008]). Scale lines: 2 mm (A, C-D, F), 1 mm (B, E).

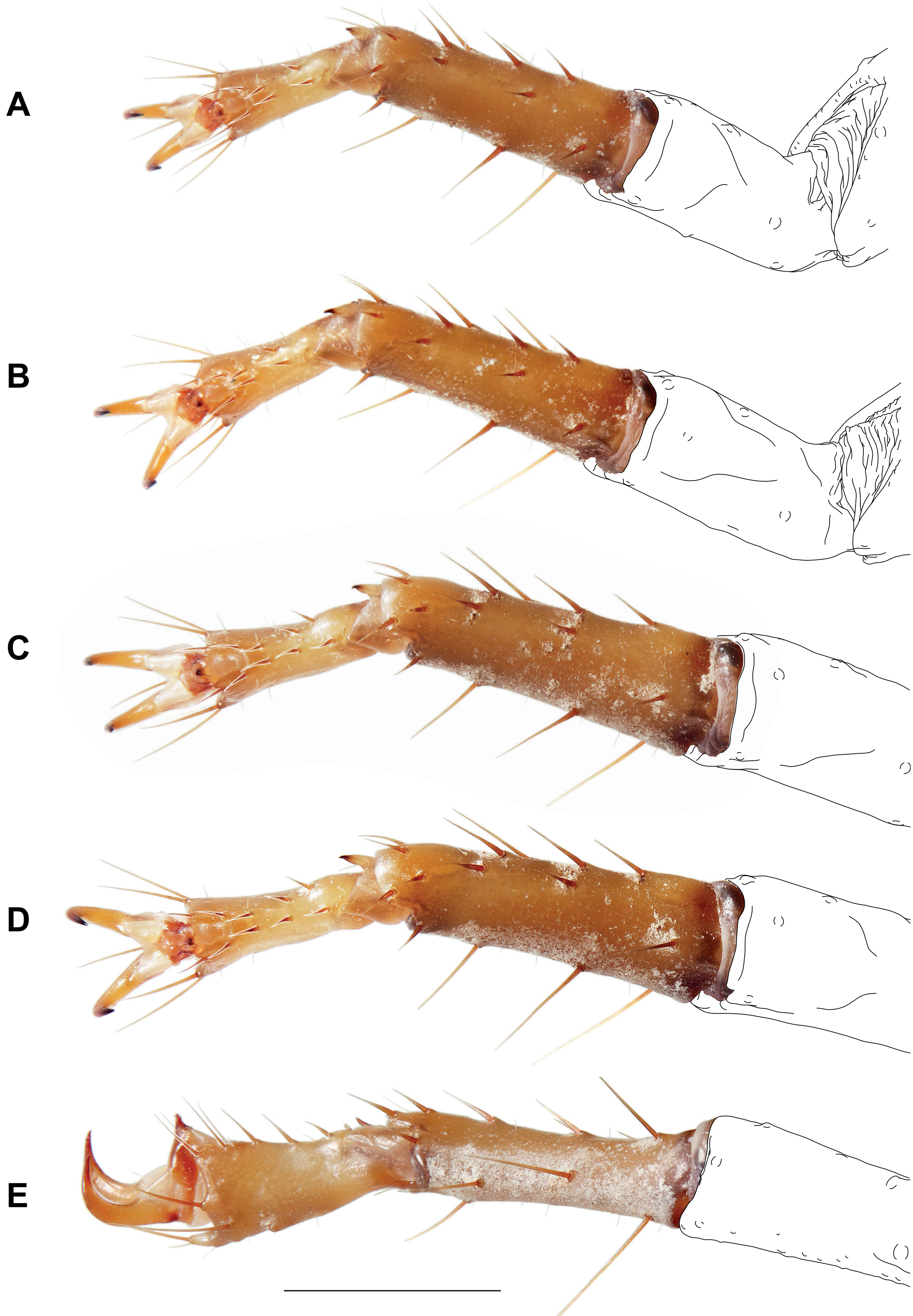

Fig. 136. *Hormurus tagula* sp. nov., male holotype (AMNH [LP3008]), right tarsi, ventral (A-D) and retrolateral (E) aspect. (A) Tarsus I. (B) Tarsus II. (C) Tarsus III. (D-E) Tarsus IV. Scale line: 2 mm.

ventrolateral and ventromedian carinae without large spiniform granules; anal arch crenulate.
Ventral metasoma setation: Segment I with eight macrosetae, i.e. three pairs (anterior, median and posterior) on ventrosubmedian carinae and one pair (anterior) on lateral carinae, or ten macrosetae, i.e. three pairs (anterior, median and posterior) on ventrosubmedian carinae and two pairs (anterior and supramedian) on ventrolateral carinae; segments II-IV with ten macrosetae, i.e. three pairs (anterior, median and posterior) on ventrosubmedian carinae and two pairs (anterior and supramedian) on ventrolateral carinae; segment V with 16 macrosetae, i.e. four pairs (anterior, median, subposterior and posterior) on ventrosubmedian carinae and four pairs (anterior, supramedian, subposterior and posterior) on ventrolateral carinae.
Telson (Fig. 137B): Slightly longer than metasoma segment V; vesicle smooth, without granules; aculeus short (less than half of vesicle length), sharply curved.
Hemispermatophore: Unknown. Given its state of preservation, the holotype, which is the only male known, is probably a freshly molted specimen. The

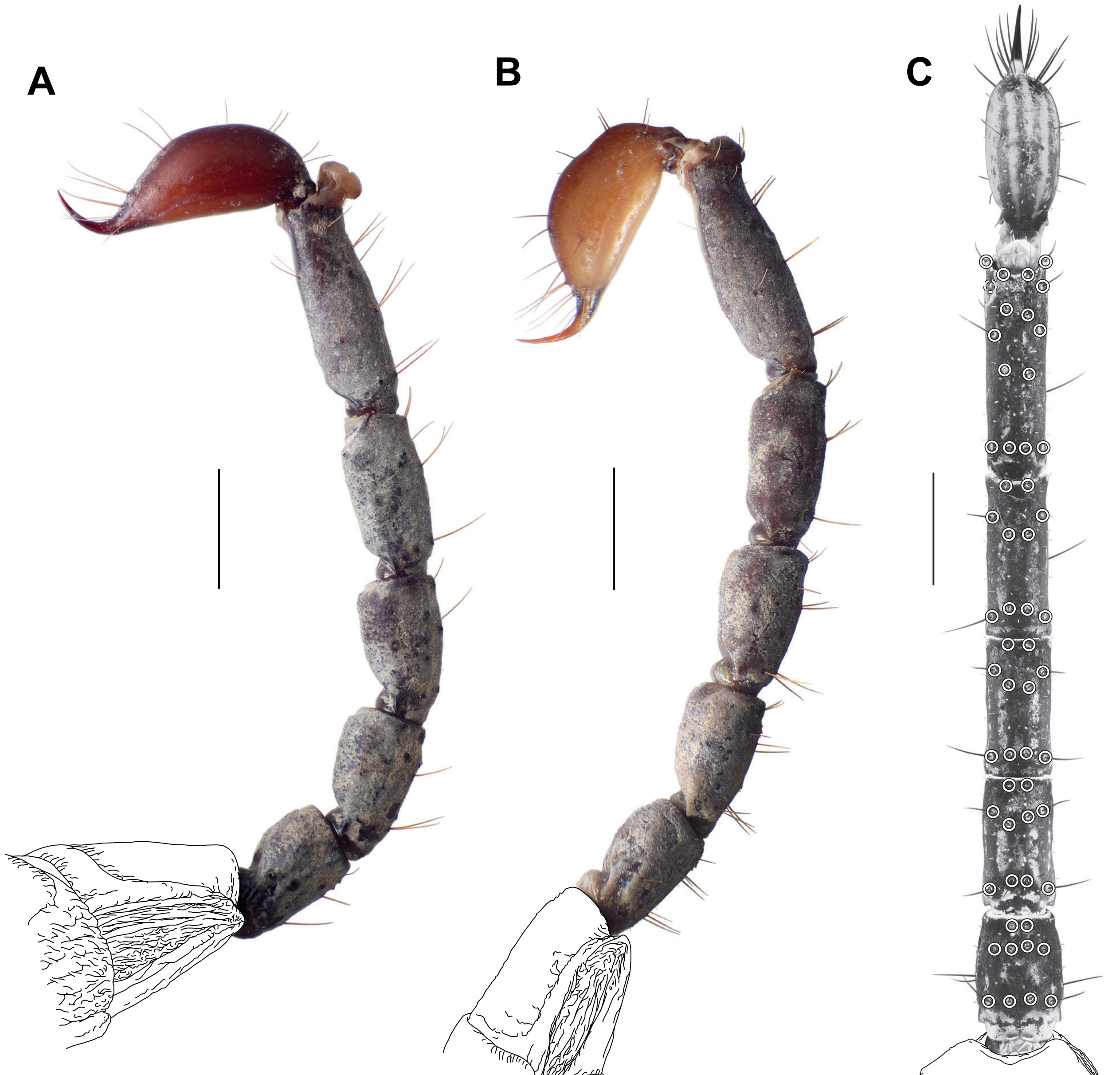

Fig. 137. *Hormurus tagula* sp. nov., metasoma and telson, lateral (A-B) and ventral (C) aspects. (A) Female paratype (AMNH [LP3008]). (B-C) Male holotype (AMNH [LP3008]). The dotted circle in C indicates the additional macroseta expressed in some specimens. Scale lines: 3 mm.

paraxial organs were probably not functional yet and the hemispermatophores had not been secreted at the time of preservation.

Description of adult female: Same characters as for male except as follows. *Colouration* (Fig. 131C-D): Legs slightly darker than in male, almost as dark as tergites.

Pedipalps (Figs 131C-D, 133A, F, K): Segments slightly shorter and more robust than in males.
Chela fingers (Fig. 134B): Dentate margins linear or nearly so, without pronounced lobe and notch, with two rows of primary denticles extending from tip to base of fingers and bearing large inner accessory denticles.
Legs: Telotarsi I-IV: pro- and retroventral rows each with 4/3-4, 4/4, 4-5/5 and 5/5 setiform macrosetae, respectively.
Genital operculum (Fig. 135D): Oval to semi-oval, longer than wide (length/width ratio = 1.15); opercular sclerites partly fused, with distinct median suture; posterior notch present, at least weakly developed.
Pectines (Fig. 135D-E): Short, distal edge not reaching distal edge of coxa IV. Pectinal teeth count 7-8; teeth short and straight, sensory papillae covering only distal half.
Mesosoma (Figs 131C-D, 132B, F): Post-tergites: reticulate network of ridges and dimples on segments III-VII more distinct than in male; intercarinal surfaces of I-II medially smooth, laterally granular; anterior half of intercarinal surfaces of III-VI medially smooth, laterally granular, posterior half densely granular; anterior half of intercarinal surfaces of VII smooth, posterior half densely granular.
Metasoma (Fig. 137A): Spination of segment I: ventrosubmedian carinae with 1-2 pairs of subposterior spiniform granules.

Intraspecific variation: *Pedipalp trichobothria*: On the retrolateral side of the pedipalp patella trichobothrium esb_1 is in some specimens located midway between esb_2 and em_{1-2} rather than close to esb_2, resulting in four groups (esb_1, esb_2, em_{1-2} and *est*) instead of three (esb_{1-2}, em_{1-2} and *est*). *Esb* on the retrolateral side of the pedipalp chela may be slightly more distal, aligning with *Est*.
Leg spination: The number of setiform macrosetae varies from three to four retroventrally on telotarsi I, from four to five proventrally on telotarsi II-III, and from four to five retroventrally on telotarsi II and IV.
Pectines: The pectinal teeth count varies from nine to 11 in males, and from seven to eight in females.
Metasoma: Spination: 1-2 pairs of subposterior spiniform granules are present on the ventrosubmedian carinae

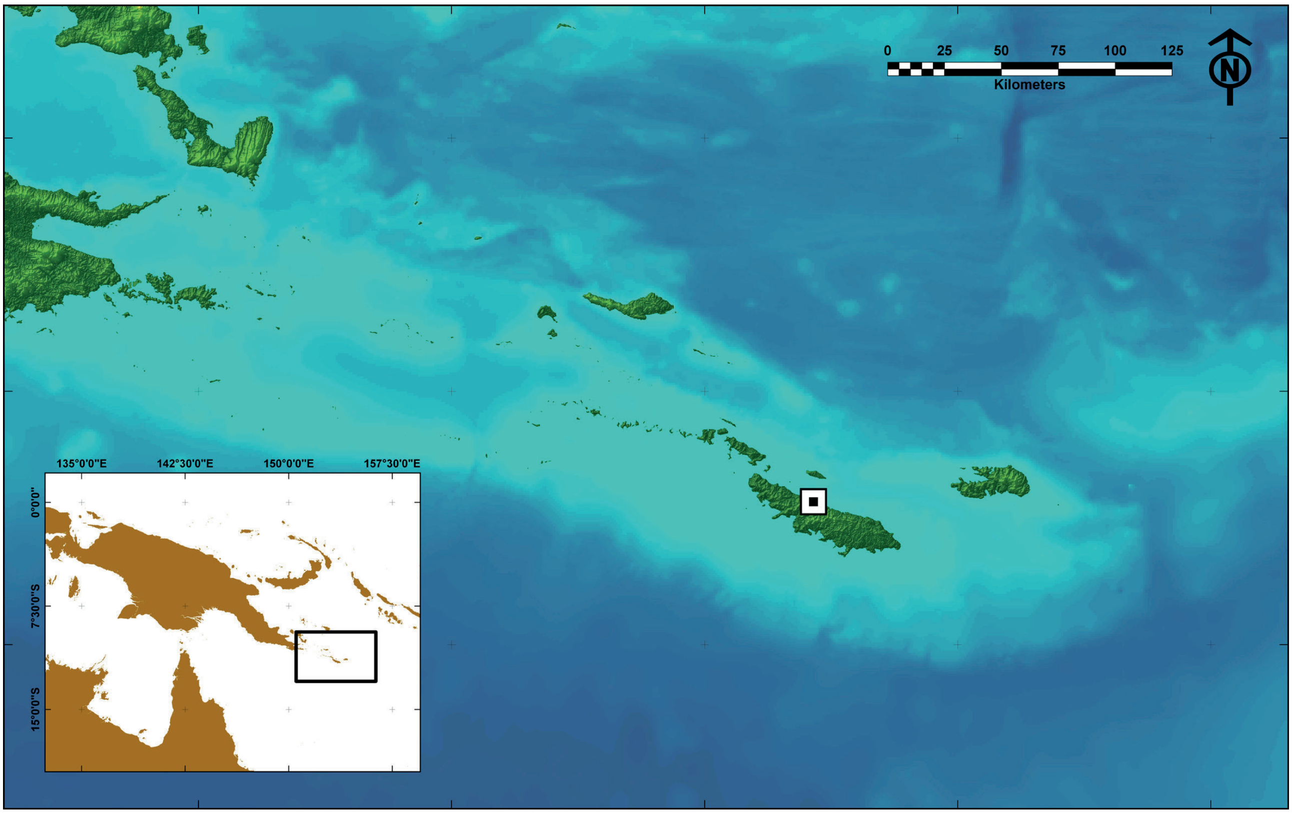

Fig. 138. Known locality of *Hormurus tagula* sp. nov. on Sudest Island in the Louisiades Archipelago, Milne Bay Province, off the eastern tip of New Guinea. The color gradient indicates topography and bathymetry.

of segment I, and one extra spiniform granule in this group may be expressed in specimens with only one pair; 0-1 pair of median spiniform granules is present on the ventrosubmedian carinae of segment II, one fewer spiniform granule may be expressed in the median and subposterior groups, and one more may be expressed in the subposterior group.
Ventral metasoma setation: Eight to ten macroseta are expressed on segment I. One fewer macroseta may be expressed in the anterior group of segment IV, making it a total of nine instead of ten macrosetae, and in the subposterior group of segment V, making it a total of 15 instead of 16 macrosetae.

Distribution: *Hormurus tagula* sp. nov. is only known from Sudest Island (also known as Tagula or Vanatinai), the largest island of the Louisiades Archipelago, in Milne Bay Province, off the eastern tip of New Guinea (Fig. 138).

Hormurus sibonai Monod & Prendini, sp. nov.

Figs 5D, 139-147, Tab. 15

Material: AMNH [LP 4744]; ♂ holotype; Papua New Guinea, Milne Bay Province, D'Entrecasteaux Islands, Normanby Island, Sewa Bay, 10.04°S, 150.98°E; 31.I.2003; leg. F. Kraus. (JS-0630).

Etymology: Sibonai is the predominant dialect spoken in the Sewa Bay area on Fergusson Island (Frawley, 2003; Glottolog website https://glottolog.org/resource/languoid/id/sewa1251 (accessed 9.XII.2022) where the holotype was collected. The epithet is an invariable name in apposition.

Diagnosis: Among Papuan *Hormurus H. sibonai* sp. nov., *H. hypseloscolus* sp. nov., *H. krausi* sp. nov. and *H. tagula* sp. nov. form a distinct group characterized by a distal position of the hemispermatophore laminar hook (situated in the distal half of the stalk; basal part/distal lamina ratio > 1) and by the longer than wide female genital opercula (length/width ratio >1). *Hormurus sibonai* sp. nov. can be distinguished from the other species in this group by the following characters in adult males (the female of *H. sibonai* sp. nov. is unknown): (1) the pedipalps in *H. sibonai* sp. nov. (Fig. 139) are much less elongated than in *H. hypseloscolus* sp. nov. (Figs 158, 159A-B); (2) the suprabasal lobe of the pedipalp chela finger and the corresponding notch of the fixed finger are contiguous in *H. sibonai* sp. nov. (Fig. 142), whereas they are separated by a distinct gap in *H. krausi* sp. nov. (Fig. 152A); (3) the anterodistal tips of coxae III do not exhibit any process or morphological modification in *H. sibonai* sp. nov. (Fig. 143A, C), whereas they are more elongated and narrower in *H. tagula* sp. nov. (Fig. 135A, C) and *H. hypseloscolus* sp. nov. (Fig. 163A, C), and they have an unusual lanceolate shape in *H. krausi* sp. nov. (Fig. 153A, C); (4) the number of pectinal teeth in *H. sibonai* sp. nov. (8; Fig. 143A-B) is lower than in *H. tagula* sp. nov. (9-11; Fig. 135A-B); (5) *H. sibonai* sp. nov. possesses eight ventral macrosetae on metasoma segment I (Fig. 145B), i.e. three pairs (anterior, median and posterior) on the ventrosubmedian carinae and one pair (anterior) on the

Table 15. *Hormurus sibonai* sp. nov., measurements (in mm) of the holotype adult male.

	Holotype
Sex	♂
Repository	AMNH
Inventory number	LP4744
Locality	Sewa Bay
Total length	49.00
Carapace, length	7.56
Carapace, anterior width	5.12
Carapace, posterior width	8.35
Pedipalp femur, length	9.39
Pedipalp femur, width	3.23
Pedipalp femur, height	1.55
Pedipalp patella, length	9.14
Pedipalp patella, width	3.66
Pedipalp patella, height	2.62
Pedipalp chela, length	17.93
Pedipalp chela, width	5.79
Pedipalp chela, height	2.93
Chela movable finger, length	7.92
Metasoma segment I, length	2.72
Metasoma segment I, width	2.01
Metasoma segment I, height	1.80
Metasoma segment II, length	3.11
Metasoma segment II, width	1.73
Metasoma segment II, height	1.80
Metasoma segment III, length	3.29
Metasoma segment III, width	1.55
Metasoma segment III, height	1.80
Metasoma segment IV, length	3.66
Metasoma segment IV, width	1.43
Metasoma segment IV, height	1.65
Metasoma segment V, length	4.45
Metasoma segment V, width	1.41
Metasoma segment V, height	1.52
Telson, length	5.95
Telson, width	1.89
Telson, height	2.01

lateral carinae, whereas the other three species possess ten, i.e. three pairs (anterior, median and posterior) on the ventrosubmedian carinae and two pairs (anterior and supramedian) on the ventrolateral carinae (Figs 137C, 155C, 165C); (6) the hemispermatophore lamellar hook is less distal in *H. sibonai* sp. nov. (basal part/distal lamina ratio = 1.2; Fig. 146) than in two of the other three species (basal part/distal lamina ratio = 1.43-1.8/1.84-1.93; Figs 156, 166, hemispermatophore unknown for *H. tagula* sp. nov.).

Description of adult male: *Colouration* (Fig. 139): Dorsal surface of chelicera manus dark brown with black infuscation, more pronounced anteriorly; fingers black. Carapace reddish brown, median ocular region black. Tergites brown. Pedipalps reddish brown; carinae and fingers black. Legs paler than tergites, dorsal surface brown with lighter spots (orange to yellow) more pronounced on tibiae and basitarsi, telotarsi yellow; ventral surface orange, distal segments (tibiae, basitarsi and telotarsi) slightly paler; prolateral carina of femora black. Coxapophyses I-II light brown, their anterior tip black; coxae I-IV light brown; sternum and sternites brown; genital operculum light brown, pectines light brown to yellow. Metasoma reddish brown with darker infuscation; telson paler than metasoma, vesicle yellow to orange, aculeus reddish brown.

Cuticle: Nongranular surfaces of carapace, pedipalps, legs, mesosoma and metasoma finely punctate.

Carapace (Fig. 140A-B): Anterior margin with median notch moderately excavated. Anterior furcated sutures distinct. Median ocular tubercle slightly raised; median ocelli present, at least twice the size of lateral ocelli, separated from each other by approximately the diameter of a median ocellus. Three pairs of lateral ocelli, equal in size, equidistant and adjacent to each other. Surfaces finely and densely granular, except for smooth anterior half of frontal lobes and median ocular area.

Chelicerae: Basal and median teeth of fixed finger fused into bicusp. Dorsal margin of movable finger with four teeth (one basal, one median, one subdistal and one distal); dorsal distal tooth smaller than ventral distal tooth; ventral margin smooth.

Pedipalps (Figs 139, 141): Segments moderately elongated, femur slightly longer than carapace. Chela almost asetose.

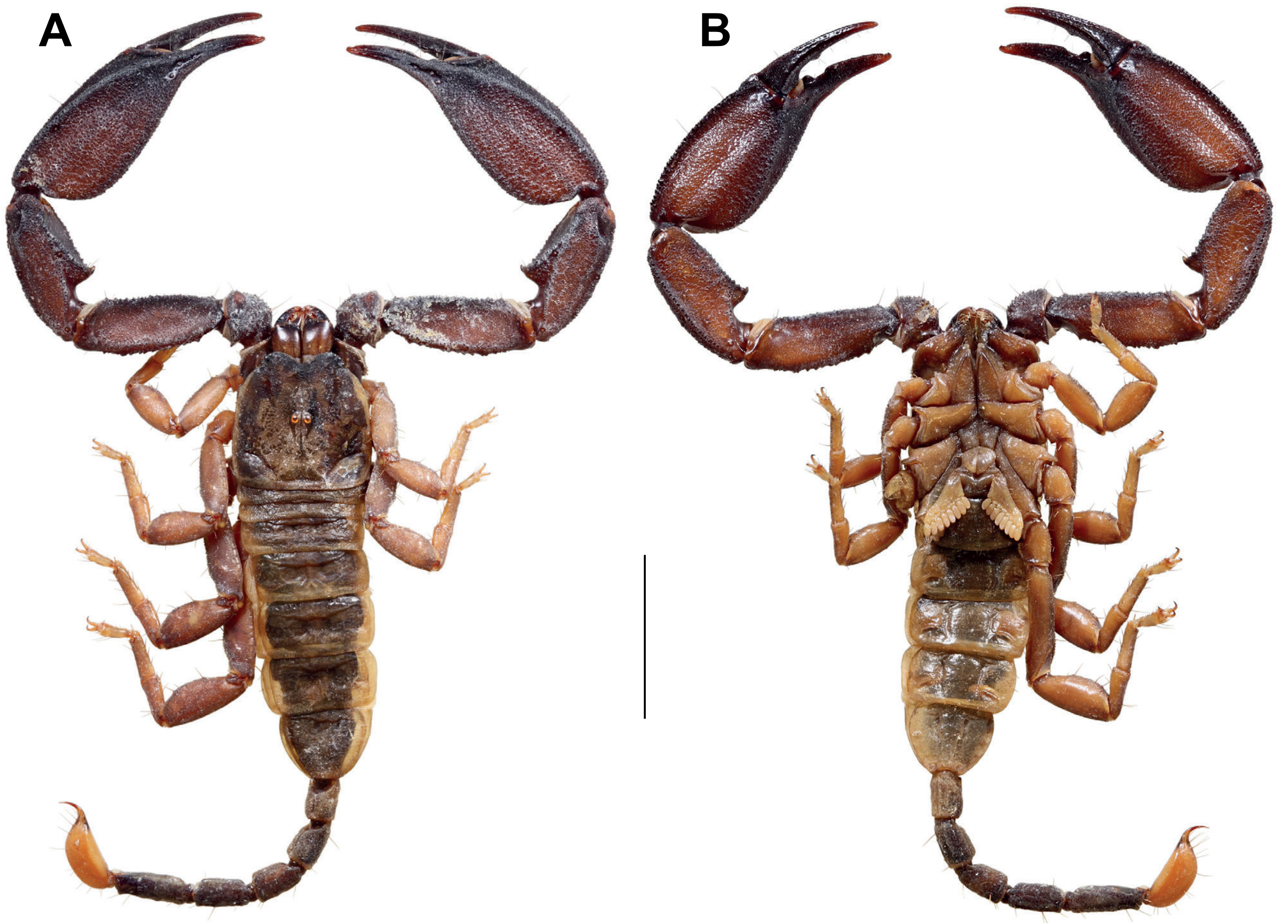

Fig. 139. *Hormurus sibonai* sp. nov., habitus of male holotype (AMNH [LP4744]), dorsal (A) and ventral (B) aspects. Scale line: 10 mm.

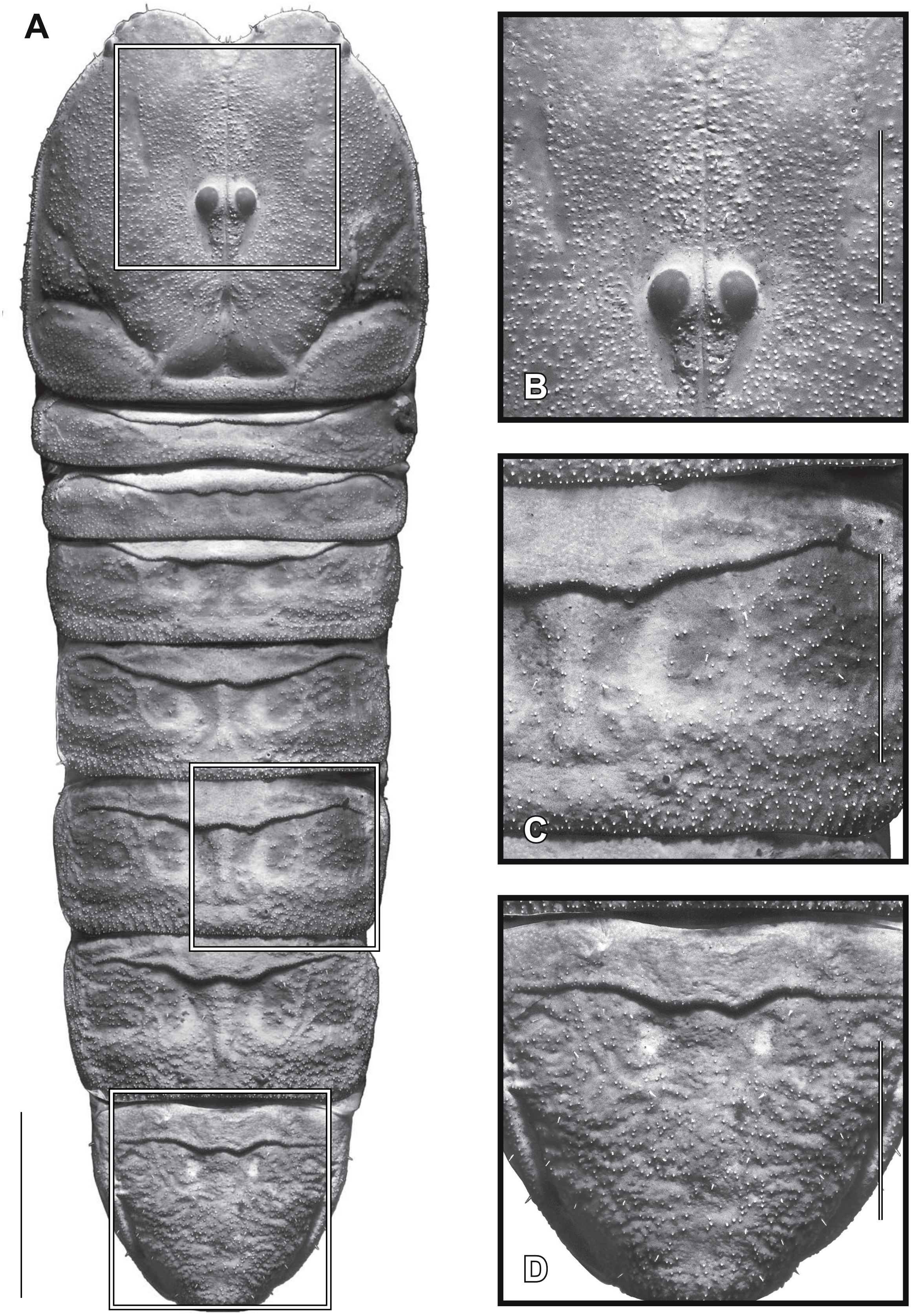

Fig. 140. *Hormurus sibonai* sp. nov., male holotype (AMNH [LP4744]), carapace and mesosomal tergites showing ornamentation and macrosculpture of cuticle (A), detailed view of carapace (B), of tergite V (C) and of tergite VII (D), dorsal aspect. Scale lines: 5 mm (A), 2 mm (B-D).

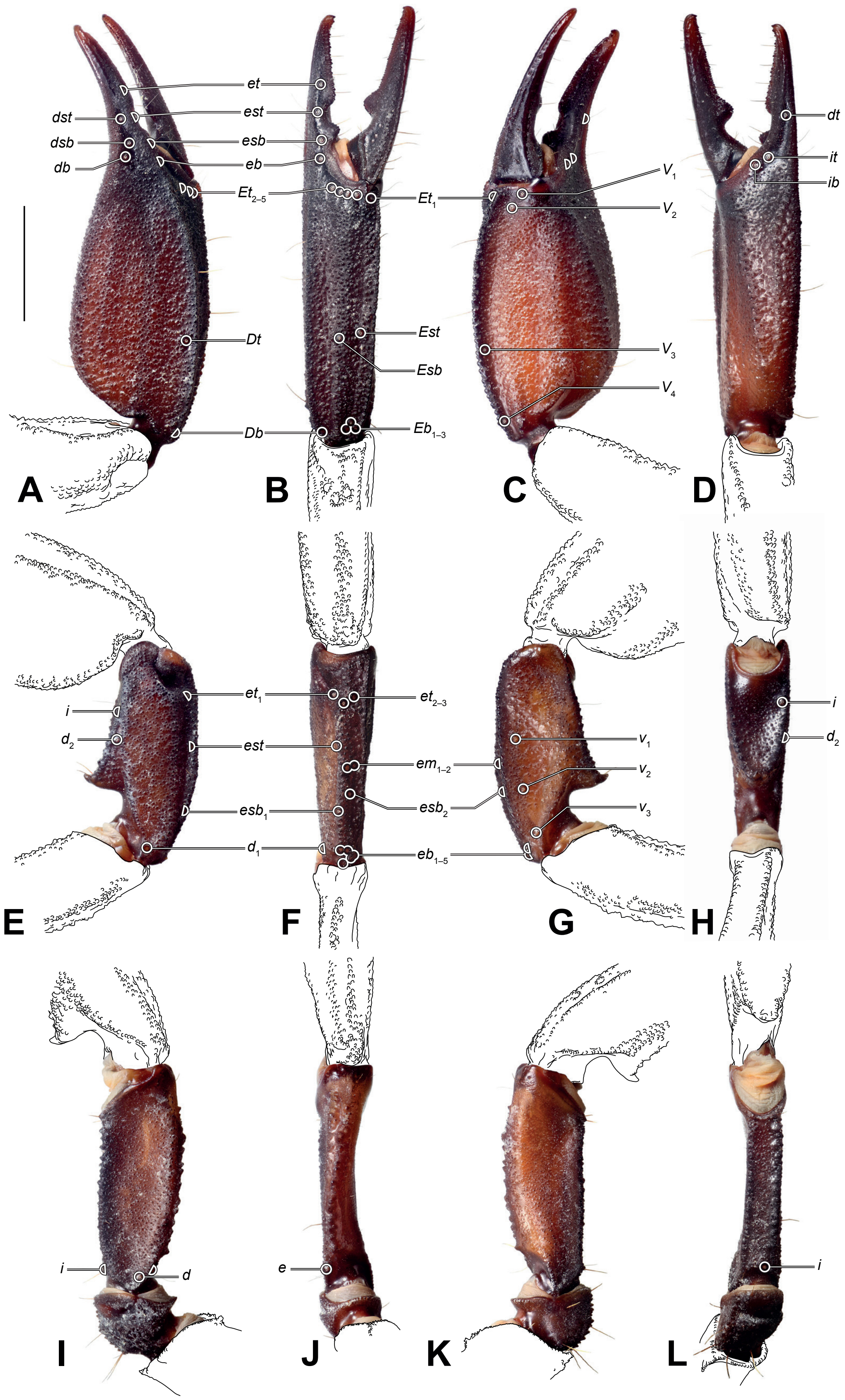

Fig. 141. *Hormurus sibonai* sp. nov., male holotype (AMNH [LP4744]), dorsal (A, E, I), retrolateral (B, F, J), ventral (C, G, K) and prolateral (D, H, L) aspects showing trichobothria pattern. (A-D) Pedipalp chela. (E-H) Patella. (I-L) Femur and trochanter. Scale line: 5 mm.

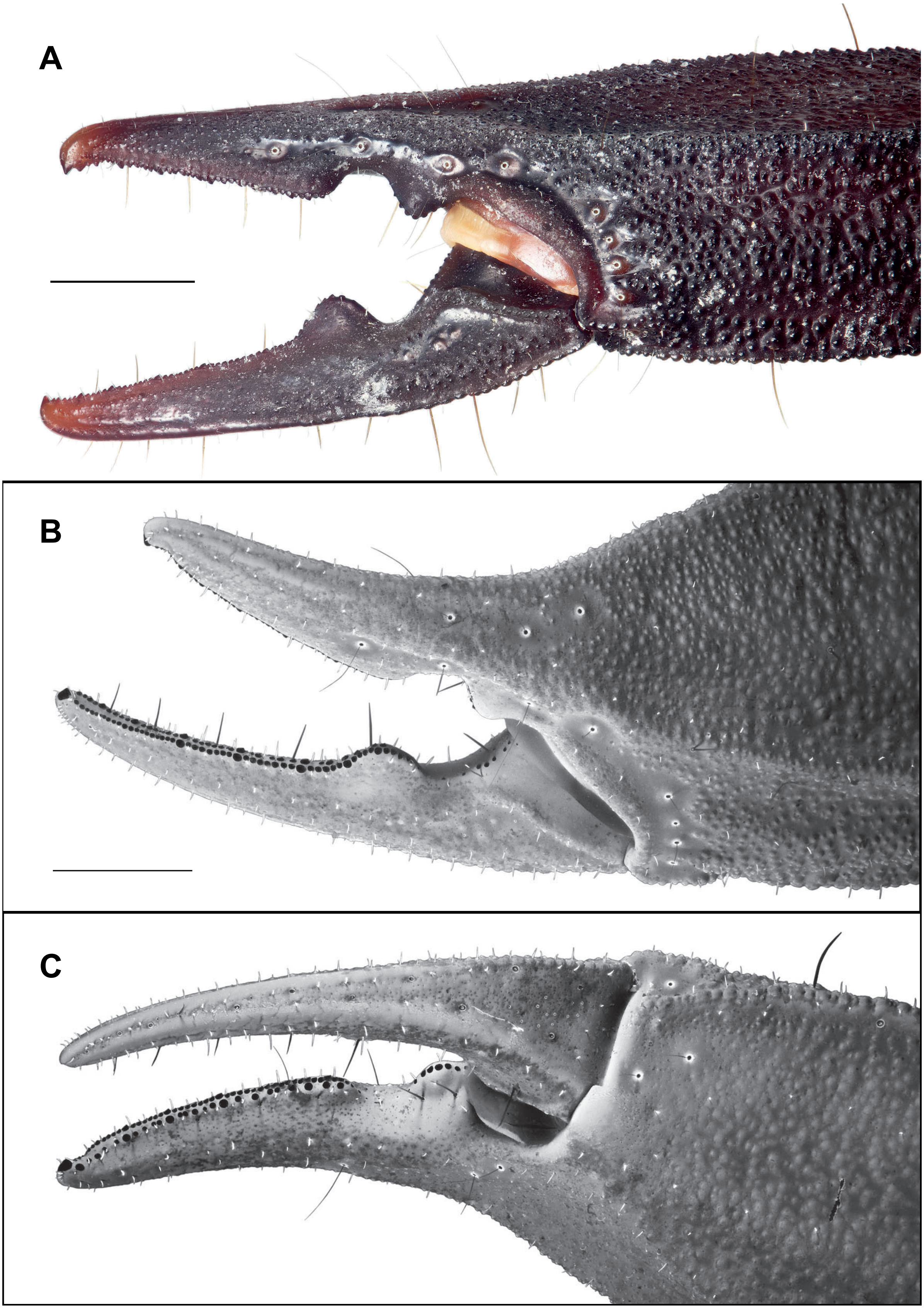

Fig. 142. *Hormurus sibonai* sp. nov., male holoptype (AMNH [LP4744]), left pedipalp chela. (A) Retrolateral aspect showing dentate margin of chela fingers. (B) Dorsal aspect showing dentate margin of movable finger. (C) Ventral aspect showing dentate margin of fixed finger. Scale lines: 2 mm.

Chela fingers (Fig. 142): Fixed finger: basal lobe well developed and conical; suprabasal notch distinct and deep; dentate margins distally (from tip of finger to median lobe) with two rows of primary denticles bearing large inner accessory denticles; denticles absent on suprabasal notch; single row of denticles on basal lobe. Movable finger: basal lobe absent; suprabasal lobe well developed, conical, gently rounded dorsally and lacking sharp conical tooth, not overlapping with fixed finger; suprabasal lobe and corresponding notch on fixed finger contiguous, no proximal gap or at most reduced gap only evident when fingers closed; dentate margins distally (from tip of finger to suprabasal lobe) with two rows of primary denticles bearing large inner accessory denticles; denticles absent on suprabasal notch; few scattered denticles basally.
Pedipalp carinae: Femur (Fig. 141I-L): proventral carina visible as a ridge of medium-sized spiniform granules; promedian carinae absent; prodorsal carina visible as a ridge of medium-sized to large spiniform granules, more developed than proventral carina; retrodorsal carina visible as a ridge of medium-sized spiniform granules, less strongly developed than prodorsal carina; retroventral carina visible as a ridge of medium to large spiniform granules, more developed than retrodorsal carina; ventromedian carina obsolete, only discernible proximally as a ridge of medium-sized spiniform granules. Patella (Fig. 141E-H): proventral carina discernible as costate-granular ridge proximally, obsolete distally; promedian and prodorsal carinae visible as ridges with medium-sized to large spiniform granules, equally developed, fused medially into prominent spiniform process with pointed medially located apex; dorsomedian carina only visible proximally as a ridge of medium-sized spiniform granules; retrodorsal carina obsolete, only expressed proximally as a faint ridge of medium-sized spiniform granules; paired retromedian carinae fused and visible as a faint ridge of medium-sized spiniform granules; retroventral carina crenulate (composed of medium-sized granules). Chela manus (Fig. 141A-D): proventral and promedian carinae visible as faint ridges with medium-sized spiniform granules, equally developed; prodorsal carina obsolete, visible as a faint ridge of medium-sized spiniform granules; dorsomedian carina visible as a faint ridge of medium-sized spiniform granules, more strongly developed than prodorsal carina; dorsal secondary carina

Fig. 143. *Hormurus sibonai* sp. nov., male holoptype (AMNH [LP4744]), ventral aspect. (A) Coxae II-IV, sternum, genital operculum and pectines. (B) Left pecten under UV light. (C) Anterior margin of coxae III. Scale lines: 3 mm (A), 2 mm (C), 1 mm (B).

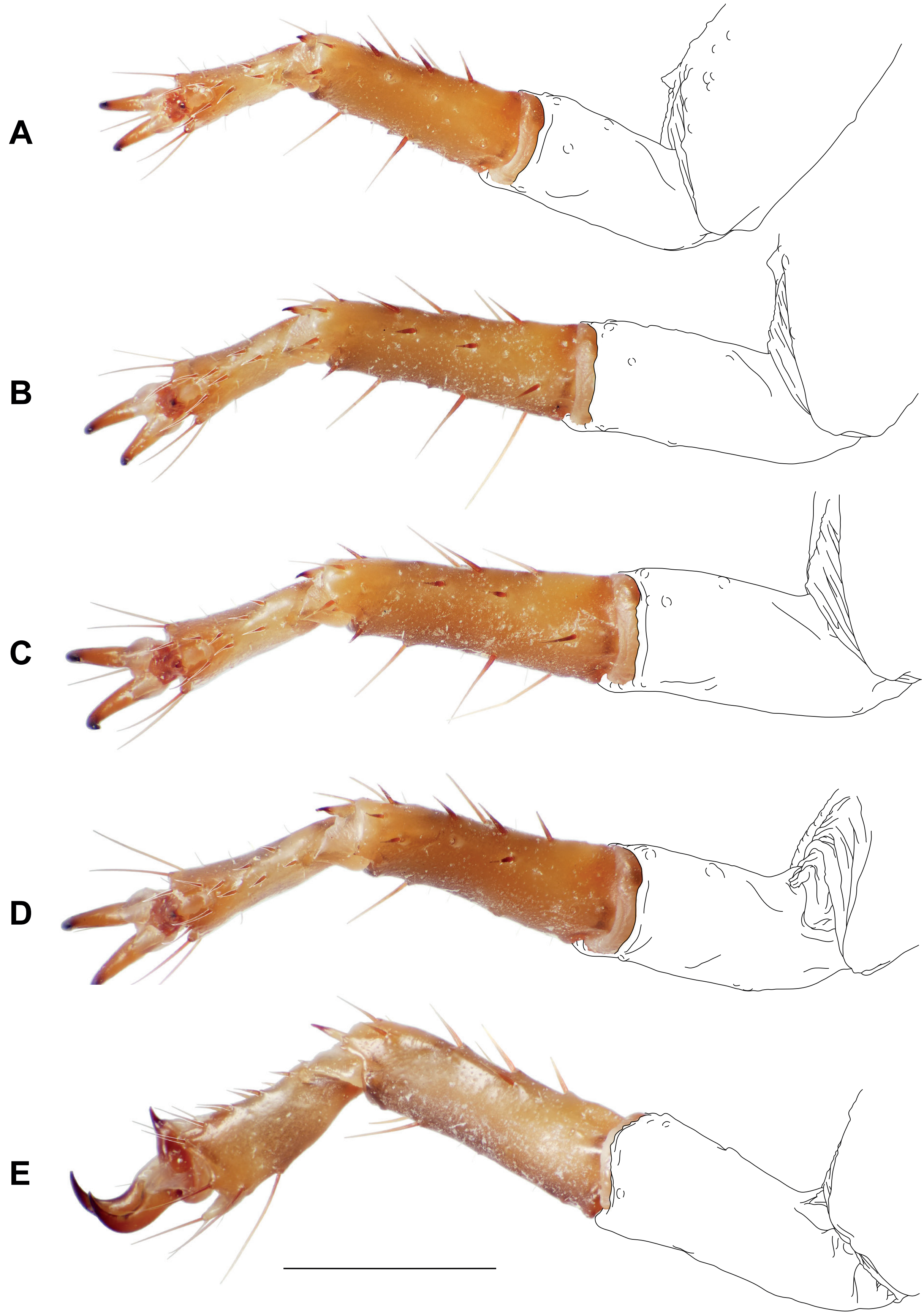

Fig. 144. *Hormurus sibonai* sp. nov., male holotype (AMNH [LP4744]), right tarsi, ventral (A-D) and retrolateral (E) aspect. (A) Tarsus I. (B) Tarsus II. (C) Tarsus III. (D-E) Tarsus IV. Scale line: 2 mm.

obsolete; digital carina visible as a ridge of small to medium-sized spiniform granules, less distinct in distal area, more developed than retromedian carina; fused retromedian carinae obsolete, visible as a faint ridge of medium-sized spiniform granules proximally; retrolateral secondary carina vestigial, only discernible proximal to condyle of movable finger as a ridge of medium-sized spiniform granules; retroventral carina crenulate (composed of large granules in proximal half, medium-sized in distal half); ventromedian carina obsolete, only expressed proximally as a faint ridge of medium-sized spiniform granules.

Pedipalp macrosculpture: Femur (Fig. 141I-L): prolateral intercarinal surface sparsely covered with small spiniform granules; dorsal intercarinal surface densely covered with small to medium-sized spiniform granules, distal area smooth; retrolateral intercarinal surface sparsely covered with medium-sized spiniform granules, smooth proximally; ventral intercarinal surface densely covered with medium-sized spiniform granules, distal third smooth. Patella (Fig. 141E-H): prolateral intercarinal surface sparsely covered with small to medium-sized spiniform granules, distal area smooth; dorsal and retrolateral intercarinal surfaces covered with dense reticulate network of medium-sized spiniform granules; ventral intercarinal surface covered with sparse reticulate network of medium-sized spiniform granules, distal area smooth. Chela manus (Fig. 141A-D): prolateral intercarinal surface covered with dense reticulate network of medium-sized spiniform granules, smooth proximally; dorsal and retrolateral intercarinal surfaces covered with dense reticulate network of medium-sized spiniform granules; ventral intercarinal surface covered with dense reticulate network of medium-sized spiniform granules, distal area smooth. Chela fingers densely covered with small spiniform granules in proximal half, smooth or nearly so distally, ventral surface smooth; trichobothria *dst*, *dsb* and *db* together in a single large smooth depression.

Fig. 145. *Hormurus sibonai* sp. nov., male holotype (AMNH [LP4744]), metasoma and telson, lateral (A) and ventral (B) aspects. Scale lines: 3 mm.

Trichobothria: Pedipalp orthobothriotaxic, accessory trichobothria absent. Patella (Fig. 141E-H): d_2 trichobothrium distal to patellar process; five *eb* trichobothria arranged in two groups (eb_1+eb_{4-5} and eb_{2-3}); two *esb*, two *em* and one *est* trichobotria arranged in three groups (esb_{1-2}, em_{1-2} and *est*); three *et* trichobothria; three *v* trichobothria. Chela manus (Fig. 141A-D): *Dt* situated in proximal half of manus; Eb_3 close to Eb_{1-2}; *Esb* closer to *Est* than to *Eb* group, aligned with *Est*; *Est* situated near midpoint; four *V* trichobothria, V_3 distant from V_4. Fixed chela finger with *db* situated on dorsal surface; *esb* closer to *eb* than to *est*; *eb* situated at base of finger, proximal to point of articulation between fixed and movable fingers; two *i* trichobothria.

Coxosternum (Fig. 143A, C): Anterior margin of coxa III moderately elongated distally, without anterodistal process. Sternum equilateral pentagonal (anterior width slightly greater than posterior width), slightly wider than long.

Legs (Fig. 144): Femora I-IV with ventral surfaces bicarinate, pro- and retroventral carinae granular. Retrolateral margins of tibiae I-II without setiform macrosetae. Basitarsi I-IV: pro- and retroventral rows each with 4/4, 4/5, 4/5 and 4/5 setiform macrosetae, respectively. Telotarsi I-IV: pro- and retroventral row each with 3-4/4, 4/4, 5/4 and 5/5 setiform macrosetae, respectively; retroventral row with one proximal spinule; ventromedian spinules absent. Ungues shorter than telotarsus, half its length or less.

Genital operculum (Fig. 143A): Composed of two subtriangular sclerites.

Pectines (Fig. 143A-B): Moderately elongated, distal edge reaching but not extending beyond distal edge of coxa IV; fulcrae and three marginal lamellae present. Pectinal teeth count 8; teeth straight, entirely covered with sensory papillae.

Mesosoma (Figs 139, 140A, C-D): Pre-tergites I-VII and posterior margins of pre-tergites smooth. Post-tergites: posterior margins of tergites I-VI sublinear, without distinct projection; lateral transversal sulcus present; intercarinal surfaces of I densely covered with small spiniform granules, smooth anteromedially; intercarinal surfaces of II-V densely covered with small spiniform granules, less so anteromedially; intercarinal surfaces of VI-VII densely covered with small spiniform granules; intercarinal surfaces of III-VII with distinct but faint reticulate network of ridges and dimples. Respiratory stigmata (spiracles) of sternites IV-VI short, their length less than third of sternite width, and distinctly crescent shaped. Sternite VII acarinate.

Metasoma (Fig. 145): Not markedly compressed laterally; sparsely and minutely granular, posterior segments less so (segment V almost smooth); dorsal intercarinal surface of V smooth and shiny medially; distinct dorsomedian sulcus on segments I-IV, much less pronounced on segment V (usually only faintly expressed anteriorly).

Metasoma carinae: Segments I-IV: dorsolateral carinae obsolete on all segments; lateral median carinae weakly developed (as faint ridges); lateral inframedian carinae

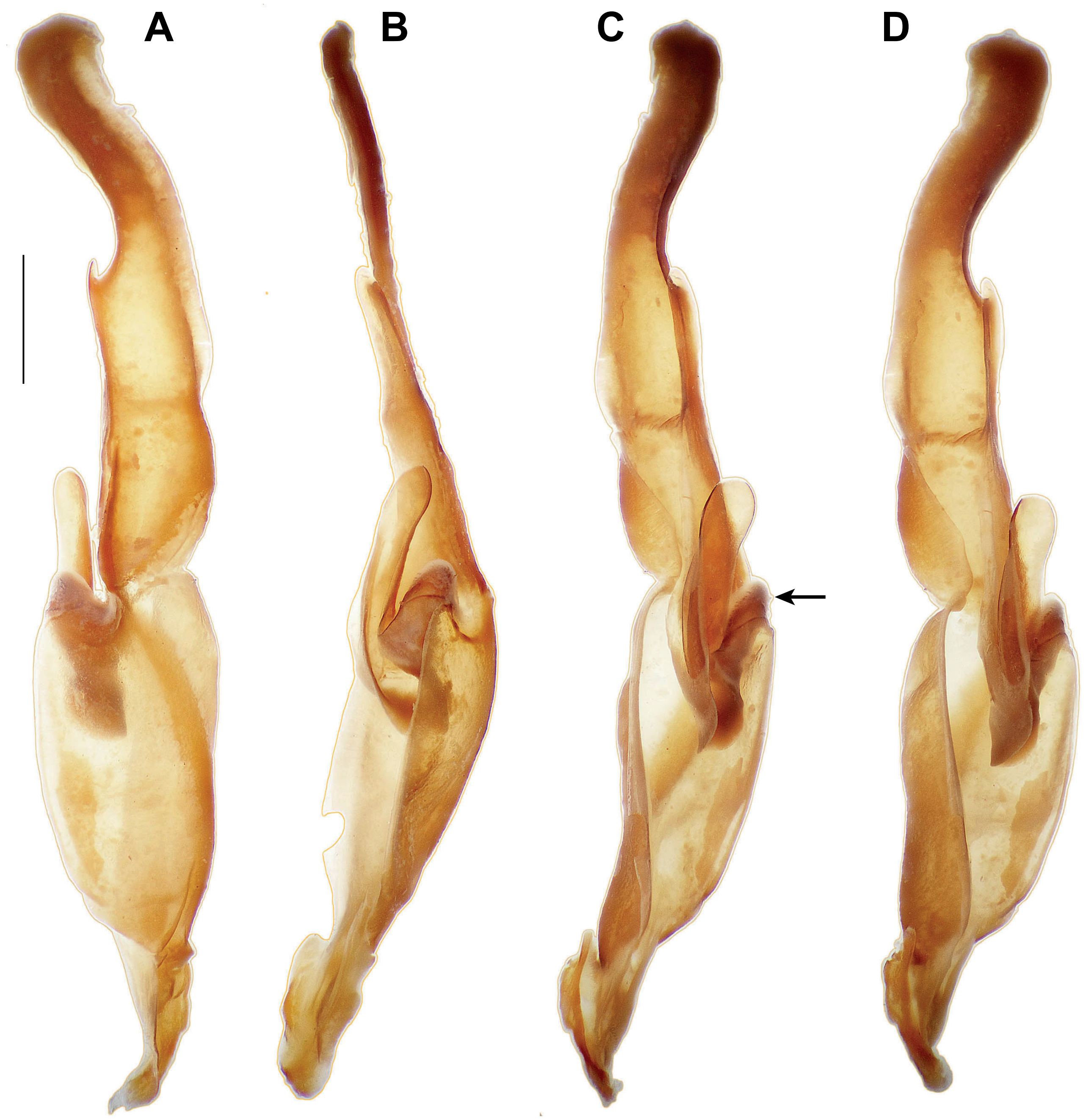

Fig. 146. *Hormurus sibonai* sp. nov., male holotype (AMNH [LP4744]), left hemispermatophore. (A) Lateral aspect. (B) Anterior aspect. (C) Rotated approximately 45° counter-clockwise from anterior aspect. (D) Contralateral aspect. Small accessory process present on anterior side of claspers indicated by arrow. Scale line: 1 mm.

discernible anteriorly as a faint ridge on segment I, absent on other segments; ventrolateral carinae weakly developed (as faint ridges); paired ventrosubmedian carinae weakly developed (as low ridges). Segment V: dorsolateral and lateral median carinae obsolete; ventrolateral carinae only expressed as faint ridges; ventrosubmedian carinae fused, only expressed as a faint ridge in anterior two-thirds.

Metasoma spination: Segment I: dorsomedian posterior and dorsolateral posterior spiniform granules absent; ventrolateral carinae without large spiniform granules; ventrosubmedian carinae with one pair of subposterior spiniform granules. Segment II: dorsomedian posterior and dorsolateral posterior spiniform granules absent; ventrolateral carinae without large spiniform granules; ventrosubmedian carinae with one pair of subposterior spiniform granules and one pair of median granules. Segments III-IV: dorsolateral posterior spiniform granules absent; ventrolateral and ventrosubmedian carina without large spiniform granules. Segment V: ventrolateral and ventromedian carinae without large spiniform granules; anal arch crenulate.

Ventral metasoma setation: Segment I with eight macrosetae, i.e. three pairs (anterior, median and posterior) on ventrosubmedian carinae and one pair (anterior) on lateral carinae; segments II-IV each with ten macrosetae, i.e. three pairs (anterior, median and posterior) on ventrosubmedian carinae and two pairs (anterior and supramedian) on ventrolateral carinae; segment V with 16 macrosetae, i.e. four pairs (anterior, median, subposterior and posterior) on ventrosubmedian carinae and four pairs (anterior, supramedian, subposterior and posterior) on ventrolateral carinae.

Telson (Fig. 145A): Longer than metasoma segment V; vesicle smooth, without granules; aculeus short (less than half of vesicle length), sharply curved.

Hemispermatophore (Fig. 146): Stalk distinctly longer than stem. Distal lamina curved, without distal crest on anterior margin; single laminar hook, situated in distal half of stalk (basal part/distal lamina ratio = 1.2); transverse ridge distinct, significantly more proximal than base of laminar hook, merging with anterior margin significantly more proximally than base of laminar hook. Capsule: hemisolenos thin, folded on itself only proximally and above that unfolded to flattened distal tip (tip and base approximately of same width), without lateral longitudinal carina, laterodistal accessory hook or medioposterior accessory apophysis; tip of hemisolenos more proximal than base of laminar hook, more distal than tip of clasper. Clasper well developed, forming distinct hump, not hook-like, with small anterior accessory process. Subex well developed, spoon-shaped,

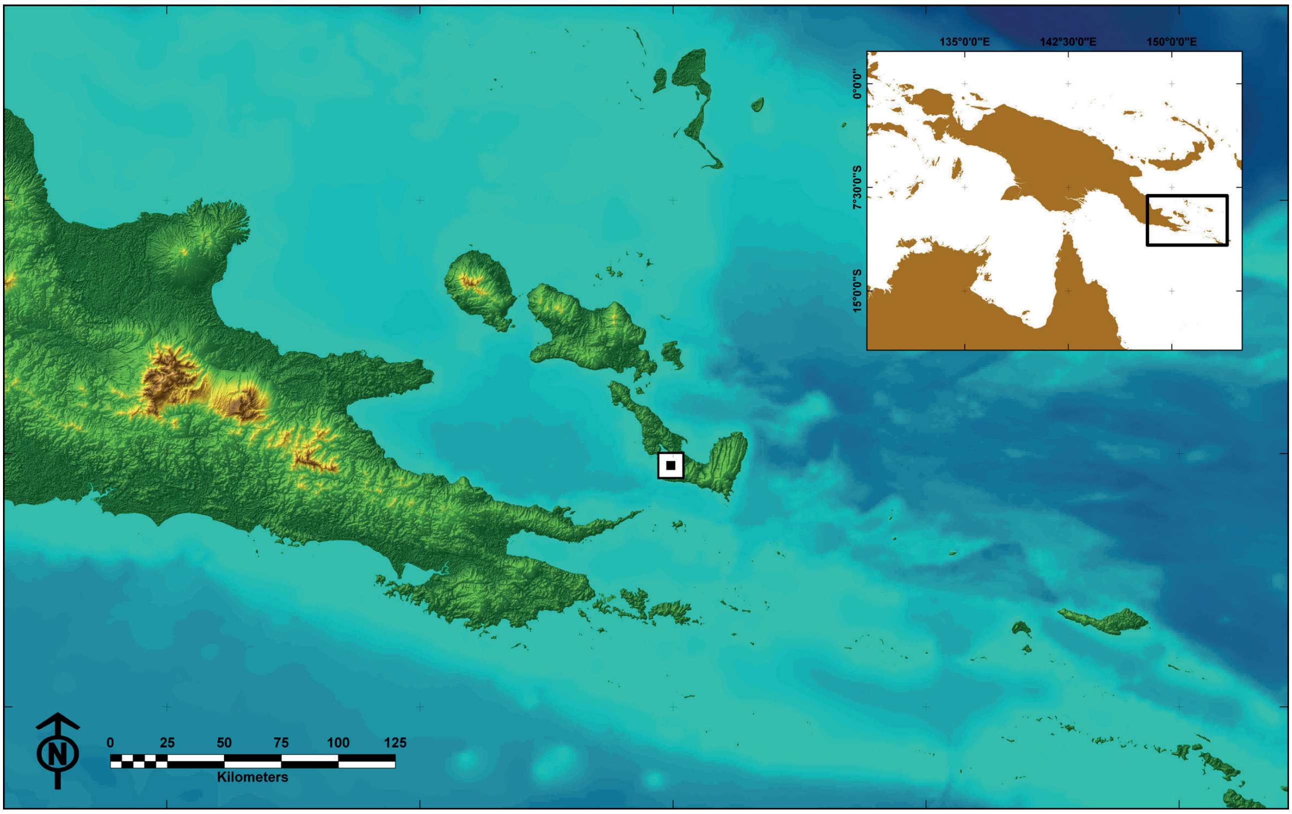

Fig. 147. Type locality of *Hormurus sibonai* sp. nov. on Normanby Island in the D'Entrecasteaux Archipelago, Milne Bay Province, off the northeastern tip of New Guinea. The color gradient indicates topography and bathymetry.

merging anteriorly with base of clasper; posterior edge forming obtuse angle (>90°) with hemisolenos; anterior edge forming right angle (90º) with hemisolenos.

Intraspecific variation: *Leg spination*: The number of setiform macrosetae varies from three to four in the proventral row of telotarsi I.

Metasoma: Spination: An extra subposterior spiniform granule may be expressed in one of the ventrosubmedian carinae of segment I.

Ventral metasoma setation: One or two fewer macrosetae may be expressed on each of the segments II-IV, making it a total of eight or nine instead of the usual ten per segment; and one to three fewer macrosetae may be expressed on segment V, making it a total of 13, 14 or 15 instead of the usual 16.

Distribution: *Hormurus sibonai* sp. nov. is only known from Normanby Island (also known in the local languages as Kwaiatabu and Duau), the southernmost island of the D'Entrecasteaux Archipelago, in Milne Bay Province, off the northeastern tip of New Guinea (Fig. 147).

Hormurus krausi **Monod & Prendini**, **sp. nov.**

Figs 113B, 148-157, Tab. 16

Hormurus papuanus Kraepelin, 1914 (in part; misidentification): 331, 333. – Monod, 2000 (in part; misidentification): 291, 536, 686-687, fig. 122.

Material: AMNH [LP 2715]; ♂ holotype; Papua New Guinea, Morobe Province, Mt Shungol, W of Apele, near junction of Kasang Creek and Ouz River, 860 m, broadleaf forest, arboreal, 1-3 m above ground on mossy tree trunks, 6.83°S, 146.70°E; 22.X.2003; leg. J.D. Slapcinsky & F. Kraus. – AMNH [LP 2715]; 1 ♂ paratype; same data as for holotype. – UMMZ [LP 2721]; 1 subadult ♂ paratype; same data as for holotype. – AMNH [LP 2724]; 1 ♀ paratype; Morobe Province, Mt Shungol, W of Apele, near junction of Kasang Creek and Ouz River, 750 m, broadleaf forest, arboreal, 1-3 m above ground on mossy tree trunks, 6.83°S, 146.70°E; 25.X.2003; leg. J.D. Slapcinsky. – AMNH [LP 2714]; 1 ♂ paratype; Morobe Province, Mt Shungol, site of Old Apele Village, 420 m, overgrown coconut and *Pandanus* garden, under coconut palm leaves, 6.79°S, 146.68°E; 24.X.2003; leg. J.D. Slapcinsky. – AMNH [LP 2725]; 1 ♀ paratype; Mt Shungol, W of Apele, Bwemamik, junction of Bwemamik Creek and Ouz River, 730 m, mature broadleaf forest, 6.81°S, 146.69°E; 17.X.2003; leg. J.D. Slapcinsky & F. Kraus. – UMMZ [LP 2726]; 1 subadult ♀, 1 juvenile paratypes; same data as for AMNH [LP 2725]. – UMMZ [LP 2727]; 1 juvenile ♀ paratype; same data as for AMNH [LP 2725]. – ZMB 15165 Bis; 2 ♂, 3 ♀, 2 juvenile ♀ paratypes; D. N. Guinea, [Morobe Province], Huon Gulf, Bukaua (Kap Arkona) [6°43'33''S, 147°21'25''E]; [III.-VII.1909]; leg. R.G. Neuhauss. – CAS (without registration number); 3 ♂, 2 ♀, 1 subadult ♂ paratypes; Morobe Province, Finschhafen [6°33'29''S, 147°50'47''E]; IV.1944; leg. E.S. Ross. – CAS (without registration number); 1 ♂ paratype; Finschhafen; 7.IV.1944; leg. E.S. Ross. – CAS (without registration number); 1 ♀ paratype; Finschhafen; 21.IV.1944; leg. E.S. Ross. – CAS (without registration number); 1 juvenile ♂ paratype; Finschhafen; IV.1944; leg. E.S. Ross. – CAS (without registration number); 1 juvenile ♀ paratype; Finschhafen; 12.IV.1944; leg. E.S. Ross. – AMNH (without registration number); 1 juvenile ♀ paratype; Morobe Province, Lae [6°43'24''S, 146°59'46''E]; 1959; leg. J. Gunn. – AMNH (without registration number); 1 ♀, 1 juvenile ♀ paratypes; Morobe Province, Huon Peninsula, Lae (within city limits); 1.X.1964; leg. H.M. van Deusen. – AMNH (without registration number); 1 ♀, 1 juvenile ♀ paratypes; Lae, Botanical Garden; 18.VII.1964; leg. R. Zweifel & K. Sluder. – AMNH (without registration number); 1 subadult ♀ paratype; Morobe Province, 12 miles W of Lae, 600 ft; 18.VIII.1964; leg. R. Tweifel & K. Sluder. – ZMH (ZMH-A0015417); 2 ♂ paratypes; [Morobe Province] Neu Guinea [Papua New Guinea], Sattelberg [6°29'S, 147°46'E] b. Finsch Hafen; IX.1908-IV.1909; leg. G. Duncker, Hamburg Südsee-Expedition. – ZMB 7603; 1 ♂, 6 ♀, 1 subadult ♀ paratypes; Neu Guinea, [Madang Province], Astrolabe Bay? (see Remarks); leg. R. Rohde.

Etymology: The species is named after Fred Kraus, a herpetologist from Michigan University who has conducted extensive zoological surveys across Papua New Guinea. Although he focused on reptiles and amphibians, he also collected scorpions, including the types specimens of the present species.

Diagnosis: *H. krausi* sp. nov. can be easily distinguished from the other two species with a distal hemispermatophore lamellar hook, *H. hypseloscolus* sp. nov. and *H. sibonai* sp. nov., by the following characters in adult males: (1) on the pedipalp chelae of *H. krausi* sp. nov. there is a distinct proximal gap between the suprabasal lobe on the movable finger and the corresponding notch on the fixed finger (Fig. 152A), whereas in *H. hypseloscolus* sp. nov. (Fig. 162A) and *H. sibonai* sp. nov. (Fig. 142A) the lobe and notch are contiguous, without a proximal gap; (2) the basal lobe of the fixed chela finger is weakly developed in *H. krausi* sp. nov. (Fig. 152A), whereas in *H. hypseloscolus* n. sp (Fig. 162A) and *H. sibonai* n. sp (Fig. 142A) it is much larger; (3) the anterodistal tip of coxae III has a distinct lanceolate shape in the male of *H. krausi* sp. nov. (Fig. 153A, C), whereas in males of *H. hypseloscolus* sp. nov. (Fig. 163A, C) and *H. sibonai* sp. nov. (Fig. 143A, C) the anterodistal tip of coxae III does not exhibit any pronounced morphological modification or accessory process.

Table 16. *Hormurus krausi* sp. nov., measurements (in mm), repositories and inventory numbers of adult males.

	Holotype	Paratype	Paratype	Paratype	Paratype	Paratype
Sex	♂	♂	♂	♂	♂	♂
Repository	AMNH	ZMH	ZMH	CAS	CAS	CAS
Inventory number	LP2715					
Locality	Mt Shungol	Sattelberg	Sattelberg	Finschhafen	Finschhafen	Finschhafen
Total length	57.00	53.00	44.00	43.00	46.00	53.00
Carapace, length	8.53	8.53	7.68	6.83	6.95	7.19
Carapace, anterior width	5.49	5.88	5.24	4.41	4.68	4.75
Carapace, posterior width	9.75	10.00	8.51	7.46	7.83	7.62
Pedipalp femur, length	10.48	10.26	9.02	7.56	8.17	8.65
Pedipalp femur, width	3.78	3.78	3.35	2.86	2.93	3.17
Pedipalp femur, height	1.83	1.77	1.58	1.43	1.49	1.52
Pedipalp patella, length	10.00	9.93	8.84	7.31	7.74	8.29
Pedipalp patella, width	4.14	4.14	3.54	3.11	3.41	3.54
Pedipalp patella, height	3.47	3.41	2.90	2.56	2.62	2.93
Pedipalp chela, length	20.15	19.87	17.45	14.46	15.50	16.41
Pedipalp chela, width	6.58	7.07	5.85	5.00	5.24	5.61
Pedipalp chela, height	4.27	4.21	3.29	2.93	3.23	3.41
Chela movable finger, length	9.51	9.63	8.17	6.95	7.44	7.86
Metasoma segment I, length	3.29	3.29	2.86	2.56	2.62	2.68
Metasoma segment I, width	2.38	2.34	1.95	1.83	1.85	1.95
Metasoma segment I, height	2.07	2.10	1.77	1.58	1.68	1.71
Metasoma segment II, length	3.90	3.66	3.17	2.86	2.99	3.02
Metasoma segment II, width	2.07	2.06	1.71	1.58	1.58	1.71
Metasoma segment II, height	2.07	2.07	1.77	1.58	1.71	1.73
Metasoma segment III, length	4.02	3.84	3.35	3.05	3.17	3.05
Metasoma segment III, width	1.95	1.95	1.61	1.46	1.52	1.58
Metasoma segment III, height	2.13	2.07	1.83	1.61	1.71	1.71
Metasoma segment IV, length	4.51	4.27	3.60	3.41	3.54	3.54
Metasoma segment IV, width	1.71	1.77	1.46	1.37	1.37	1.40
Metasoma segment IV, height	2.01	2.01	1.71	1.58	1.61	1.68
Metasoma segment V, length	5.49	5.12	4.45	4.12	4.29	4.39
Metasoma segment V, width	1.71	1.77	1.44	1.34	1.37	1.44
Metasoma segment V, height	1.99	1.95	1.58	1.46	1.56	1.65
Telson, length	6.46	6.46	5.75	5.12	5.12	5.61
Telson, width	2.05	2.07	1.68	1.56	1.61	1.80
Telson, height	2.19	2.28	1.95	1.68	1.71	1.95

Table 16 (continued). *Hormurus krausi* sp. nov., measurements (in mm) of adult males and females.

	Paratype	Paratype	Paratype	Paratype	Paratype	Paratype
Sex	♂	♂	♂	♂	♀	♀
Repository	CAS	ZMB	ZMB	ZMB	CAS	CAS
Inventory number		15165 Bis	15165 Bis	7603		
Locality	Finschhafen	Bukaua	Bukaua	Astrolabe Bay?	Finschhafen	Finschhafen
Total length	48.00	57.00	52.00	59.00	54.00	49.00
Carapace, length	7.19	8.23	7.78	8.53	7.31	8.23
Carapace, anterior width	4.82	5.12	5.07	5.61	4.66	4.63
Carapace, posterior width	7.56	8.65	9.02	9.39	7.68	9.14
Pedipalp femur, length	8.17	9.75	8.65	10.12	7.83	8.65
Pedipalp femur, width	3.01	3.54	3.41	3.66	2.93	3.47
Pedipalp femur, height	1.56	1.71	1.61	1.83	1.77	1.83
Pedipalp patella, length	7.80	9.20	8.29	9.93	7.41	8.17
Pedipalp patella, width	3.41	3.90	3.54	4.08	3.39	3.78
Pedipalp patella, height	2.80	3.05	2.86	3.29	2.78	3.05
Pedipalp chela, length	15.86	18.42	16.77	19.45	15.39	16.85
Pedipalp chela, width	5.51	5.97	5.75	6.64	5.36	6.22
Pedipalp chela, height	3.27	3.75	3.54	4.02	3.23	3.66
Chela movable finger, length	7.56	8.92	7.92	9.02	7.50	8.23
Genital operculum length, female	NA	NA	NA	NA	2.44	2.93
Genital operculum width, female	NA	NA	NA	NA	2.05	2.44
Metasoma segment I, length	2.68	2.95	2.93	3.29	2.68	2.80
Metasoma segment I, width	1.83	2.26	2.07	2.29	1.95	2.19
Metasoma segment I, height	1.68	1.89	1.83	1.90	1.67	1.97
Metasoma segment II, length	3.05	3.47	3.29	3.72	3.05	3.29
Metasoma segment II, width	1.65	1.95	1.80	1.95	1.71	1.89
Metasoma segment II, height	1.65	1.95	1.83	1.96	1.65	1.95
Metasoma segment III, length	3.17	3.60	3.47	3.90	3.05	3.35
Metasoma segment III, width	1.52	1.73	1.67	1.80	1.61	1.73
Metasoma segment III, height	1.67	1.95	1.89	2.01	1.71	1.97
Metasoma segment IV, length	3.47	4.02	3.90	4.33	3.47	3.72
Metasoma segment IV, width	1.44	1.52	1.56	1.65	1.44	1.58
Metasoma segment IV, height	1.61	1.95	1.77	1.95	1.58	1.83
Metasoma segment V, length	4.27	5.06	4.75	5.24	4.27	4.63
Metasoma segment V, width	1.46	1.65	1.46	1.68	1.44	1.58
Metasoma segment V, height	1.63	1.95	1.73	1.89	1.52	1.71
Telson, length	5.49	6.22	5.61	6.28	5.12	5.55
Telson, width	1.77	2.04	1.87	2.07	1.58	1.71
Telson, height	1.89	2.22	1.95	2.07	1.71	1.97

Table 16 (continued). *Hormurus krausi* sp. nov., measurements (in mm) of adult females.

	Paratype	Paratype	Paratype	Paratype	Paratype	Paratype
Sex	♀	♀	♀	♀	♀	♀
Repository	CAS	ZMB	ZMB	ZMB	AMNH	AMNH
Inventory number		15165 Bis	15165 Bis	15165 Bis		
Locality	Finschhafen	Bukaua	Bukaua	Bukaua	Lae	Lae
Total length	50.00	61.00	60.00	54.00	58.00	57.00
Carapace, length	8.50	8.84	8.65	8.59	8.47	8.94
Carapace, anterior width	5.12	5.69	5.36	5.61	5.06	5.61
Carapace, posterior width	9.65	10.45	8.53	9.36	8,71585 (deformed)	10.12
Pedipalp femur, length	8.65	9.51	9.39	8.96	8.78	9.81
Pedipalp femur, width	3.35	3.66	3.60	3.29	3.47	3.68
Pedipalp femur, height	1.97	1.95	1.97	1.95	1.95	1.95
Pedipalp patella, length	8.29	9.14	8.90	8.72	8.53	9.51
Pedipalp patella, width	3.80	4.27	4.11	3.78	3.86	4.27
Pedipalp patella, height	3.17	3.25	3.05	2.99	3.17	3.41
Pedipalp chela, length	17.14	18.72	18.81	18.16	17.66	19.65
Pedipalp chela, width	6.34	6.80	6.64	5.83	6.34	6.64
Pedipalp chela, height	3.78	4.02	3.90	3.54	3.68	3.90
Chela movable finger, length	8.31	9.14	9.04	8.87	8.61	9.51
Genital operculum length, female	2.74	2.93	3.05	2.93	2.93	2.99
Genital operculum width, female	2.29	2.38	2.44	2.19	2.44	2.56
Metasoma segment I, length	2.80	3.17	3.17	2.99	2.99	3.29
Metasoma segment I, width	2.19	2.38	2.32	2.07	2.19	2.34
Metasoma segment I, height	1.97	2.07	1.97	1.83	2.07	1.95
Metasoma segment II, length	3.29	3.54	3.54	3.41	3.54	3.78
Metasoma segment II, width	1.85	2.07	2.01	1.83	1.95	1.96
Metasoma segment II, height	1.97	2.07	2.07	1.83	2.01	2.05
Metasoma segment III, length	3.54	3.60	3.72	3.66	3.72	3.84
Metasoma segment III, width	1.77	1.91	1.83	1.68	1.79	1.95
Metasoma segment III, height	1.95	2.17	2.07	1.89	2.01	2.05
Metasoma segment IV, length	3.90	4.21	4.27	4.08	4.21	4.33
Metasoma segment IV, width	1.55	1.71	1.71	1.52	1.61	1.62
Metasoma segment IV, height	1.85	2.04	1.93	1.77	1.85	2.01
Metasoma segment V, length	4.75	5.24	5.12	4.96	4.94	5.42
Metasoma segment V, width	1.56	1.61	1.61	1.56	1.58	1.55
Metasoma segment V, height	1.73	1.95	1.91	1.73	1.77	1.97
Telson, length	5.61	6.10	5.97	5.61	5.85	6.10
Telson, width	1.73	1.85	1.89	1.71	1.77	1.85
Telson, height	1.97	2.07	2.07	1.83	1.95	2.13

Table 16 (continued). *Hormurus krausi* sp. nov., measurements (in mm) of adult females.

	Paratype	Paratype	Paratype	Paratype	Paratype	Paratype
Sex	♀	♀	♀	♀	♀	♀
Repository	ZMB	ZMB	ZMB	ZMB	ZMB	ZMB
Inventory number	7604	7605	7606	7607	7608	7609
Locality	Astrolabe Bay?	Astrolabe Bay?	Astrolabe Bay?	Astrolabe Bay?	Astrolabe Bay?	Astrolabe Bay?
Total length	55.00	52.00	47.00	56.00	49.00	45.00
Carapace, length	8.68	7.19	7.74	7.85	7.78	7.01
Carapace, anterior width	5.73	4.69	5.00	5.24	4.94	4.45
Carapace, posterior width	9.87	7.77	8.37	8.53	8.65	7.50
Pedipalp femur, length	9.00	7.44	8.17	8.47	8.35	6.91
Pedipalp femur, width	3.54	2.99	3.29	3.32	3.32	2.80
Pedipalp femur, height	1.95	1.56	1.83	1.83	1.74	1.58
Pedipalp patella, length	8.87	7.13	7.80	8.11	7.86	6.74
Pedipalp patella, width	4.14	3.29	3.54	3.74	3.66	3.17
Pedipalp patella, height	3.29	2.62	2.99	2.93	2.90	2.44
Pedipalp chela, length	18.21	14.71	16.09	16.85	16.35	13.93
Pedipalp chela, width	6.70	5.12	5.85	5.97	5.85	5.12
Pedipalp chela, height	3.90	3.17	3.60	3.39	3.47	2.93
Chela movable finger, length	8.90	6.95	7.56	8.05	7.68	6.70
Genital operculum length, female	2.68	2.19	2.68	2.68	2.71	2.19
Genital operculum width, female	2.40	1.95	2.23	2.22	2.29	1.89
Metasoma segment I, length	3.05	2.50	2.68	2.74	2.86	2.38
Metasoma segment I, width	2.22	1.89	1.97	2.07	2.13	1.79
Metasoma segment I, height	1.95	1.68	1.80	1.84	1.77	1.56
Metasoma segment II, length	3.45	2.86	3.05	3.10	3.05	2.68
Metasoma segment II, width	2.04	1.61	1.76	1.77	1.77	1.49
Metasoma segment II, height	1.97	1.68	1.80	1.83	1.83	1.56
Metasoma segment III, length	3.54	2.99	3.29	3.29	3.23	2.93
Metasoma segment III, width	1.83	1.52	1.65	1.68	1.68	1.40
Metasoma segment III, height	2.07	1.68	1.80	1.83	1.83	1.58
Metasoma segment IV, length	3.90	3.29	3.75	3.60	3.66	3.17
Metasoma segment IV, width	1.68	1.44	1.49	1.58	1.49	1.32
Metasoma segment IV, height	1.95	1.58	1.68	1.71	1.72	1.55
Metasoma segment V, length	4.75	4.12	4.39	4.45	4.39	3.72
Metasoma segment V, width	1.68	1.44	1.44	1.56	1.40	1.22
Metasoma segment V, height	1.83	1.58	1.58	1.71	1.61	1.46
Telson, length	5.79	4.85	5.49	5.49	5.30	4.51
Telson, width	1.85	1.58	1.67	1.71	1.68	1.37
Telson, height	1.95	1.65	1.83	1.83	1.71	1.52

Description of adult male (holotype): *Colouration* (Figs 148, 149A-B): Dorsal surface of chelicera manus brown with black infuscation, more pronounced anteriorly; fingers black. Carapace reddish brown with infuscation, median ocular region black. Tergites brown with black infuscation. Pedipalps reddish brown; carinae and fingers black. Legs paler than tergites, brown to dark orange dorsally, orange to yellow ventrally, prolateral carina of femora black. Coxapophysis I brown, anterior tip pale yellow; coxapophysis II reddish brown to black; coxae I-II brown; sternum brown, lighter posterolaterally; sternites III-VI brown, posterior margin of V pale yellow; sternite VII dark brown to black posteriorly; genital operculum and pectines pale yellow. Metasoma reddish brown with darker infuscation; telson paler than metasoma, vesicle orange, aculeus reddish brown.

Cuticle: Nongranular surfaces of carapace, pedipalps, legs, mesosoma and metasoma finely punctate.

Carapace (Fig. 150A, C): Anterior margin with median notch moderately excavated. Anterior furcated sutures distinct; median ocular tubercle slightly raised; median ocelli present, at least twice the size of lateral ocelli, separated from each other by approximately the diameter of a median ocellus. Three pairs of lateral ocelli, equal in size, equidistant and adjacent to each other. Surfaces minutely and sparsely granular, except for smooth anterior areas of frontal lobes and median ocular area.

Chelicerae: Basal and median teeth of fixed finger fused into bicusp. Dorsal margin of movable finger with four teeth (one basal, one median, one subdistal and one distal); dorsal distal tooth smaller than ventral distal tooth; ventral margin smooth.

Pedipalps (Figs 148, 149A-B, 151B-E, G-J, L-O): Segments moderately elongated, femur slightly longer than carapace. Chela almost asetose.

Chela fingers (Fig. 152A, C-D): Fixed finger: basal lobe weakly developed and conical; suprabasal notch distinct and deep; dentate margins distally (from tip of finger to median lobe) with two rows of primary denticles bearing large inner accessory denticles; denticles absent on suprabasal notch; few scattered denticles on basal lobe. Movable finger: basal lobe absent; suprabasal lobe well developed, conical, gently rounded dorsally and lacking sharp conical tooth, not overlapping with fixed finger; suprabasal lobe and corresponding notch on fixed finger with distinct proximal gap; dentate margins distally (from tip of finger to suprabasal lobe) with two rows of primary denticles bearing large inner accessory denticles; denticles absent basally.

Pedipalp carinae: Femur (Fig. 151L-O): proventral carina visible as a ridge of medium-sized to large spiniform granules; promedian carinae absent; prodorsal carina visible as a ridge of medium-sized to large spiniform granules, similarly developed as proventral carina; retrodorsal carina visible as a ridge of medium-sized spiniform granules, less developed than prodorsal carina; retroventral carina visible as a ridge of medium to large spiniform granules, more developed than retrodorsal carina; ventromedian carina obsolete, only discernible proximally as a ridge of medium-sized spiniform granules. Patella (Fig. 151G-J): proventral carina discernible as a costate-granular ridge proximally, obsolete distally; promedian and prodorsal carinae visible as ridges with medium-sized to large spiniform granules, equally developed, fused medially into prominent spiniform process with pointed medially located apex; dorsomedian carina only visible proximally as a ridge of medium-sized spiniform granules; retrodorsal carina obsolete, only expressed proximally as a faint ridge of medium-sized spiniform granules; paired retromedian carinae fused and visible as a faint ridge of medium-sized spiniform granules; retroventral carina crenulate (composed of medium-sized granules). Chela manus (Fig. 151B-E): proventral and promedian carinae visible as faint ridges with medium-sized spiniform granules, equally developed; prodorsal carina obsolete, visible as a faint ridge of medium-sized spiniform granules; dorsomedian carina visible as a faint ridge of medium-sized spiniform granules, more strongly developed than prodorsal carina; dorsal secondary carina obsolete; digital carina visible as a ridge of small to medium-sized spiniform granules, less distinct in distal area, more developed than retromedian carina; fused retromedian carinae obsolete, visible as a faint ridge of medium-sized spiniform granules proximally; retrolateral secondary carina vestigial, only discernible proximal to condyle of movable finger as a ridge of medium-sized spiniform granules; retroventral carina crenulate (composed of medium-sized granules); ventromedian carina obsolete, only expressed proximally as a faint ridge of medium-sized spiniform granules.

Pedipalp macrosculpture: Femur (Fig. 151L-O): prolateral intercarinal surface sparsely covered with small spiniform granules; dorsal intercarinal surface densely covered with small to medium-sized spiniform granules, distal area smooth; retrolateral dorsal intercarinal surface sparsely covered with medium-sized spiniform granules; retrolateral ventral intercarinal surface smooth or nearly so (very few scattered granules present); ventral intercarinal surface densely covered with medium-sized spiniform granules, distal third smooth. Patella (Fig. 151G-J): prolateral intercarinal surface sparsely covered with medium-sized spiniform granules, distal area smooth; dorsal and retrolateral intercarinal surfaces covered with dense reticulate network of medium-sized spiniform granules; ventral intercarinal surface covered with sparse reticulate network of medium-sized spiniform granules, distal area smooth. Chela manus (Fig. 151B-E): prolateral intercarinal surface covered with sparse reticulate network of small to medium-sized spiniform granules, smooth proximally; dorsal and retrolateral intercarinal surfaces covered with dense reticulate network of medium-sized spiniform granules; ventral intercarinal surface covered with sparse reticulate

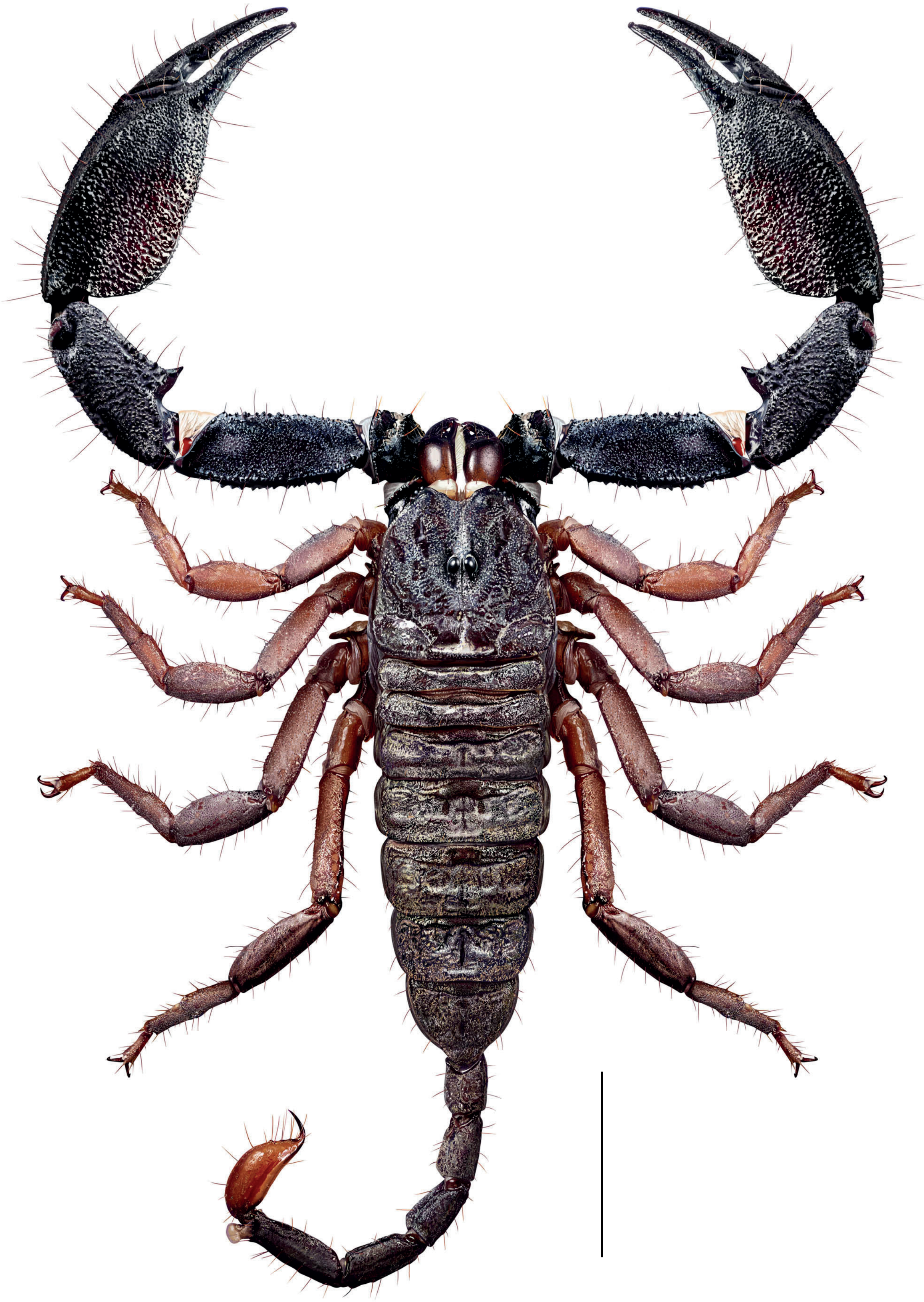

Fig. 148. *Hormurus krausi* sp. nov., habitus of male, dorsal aspect, reconstruction based on photographs. Scale line: 10 mm.

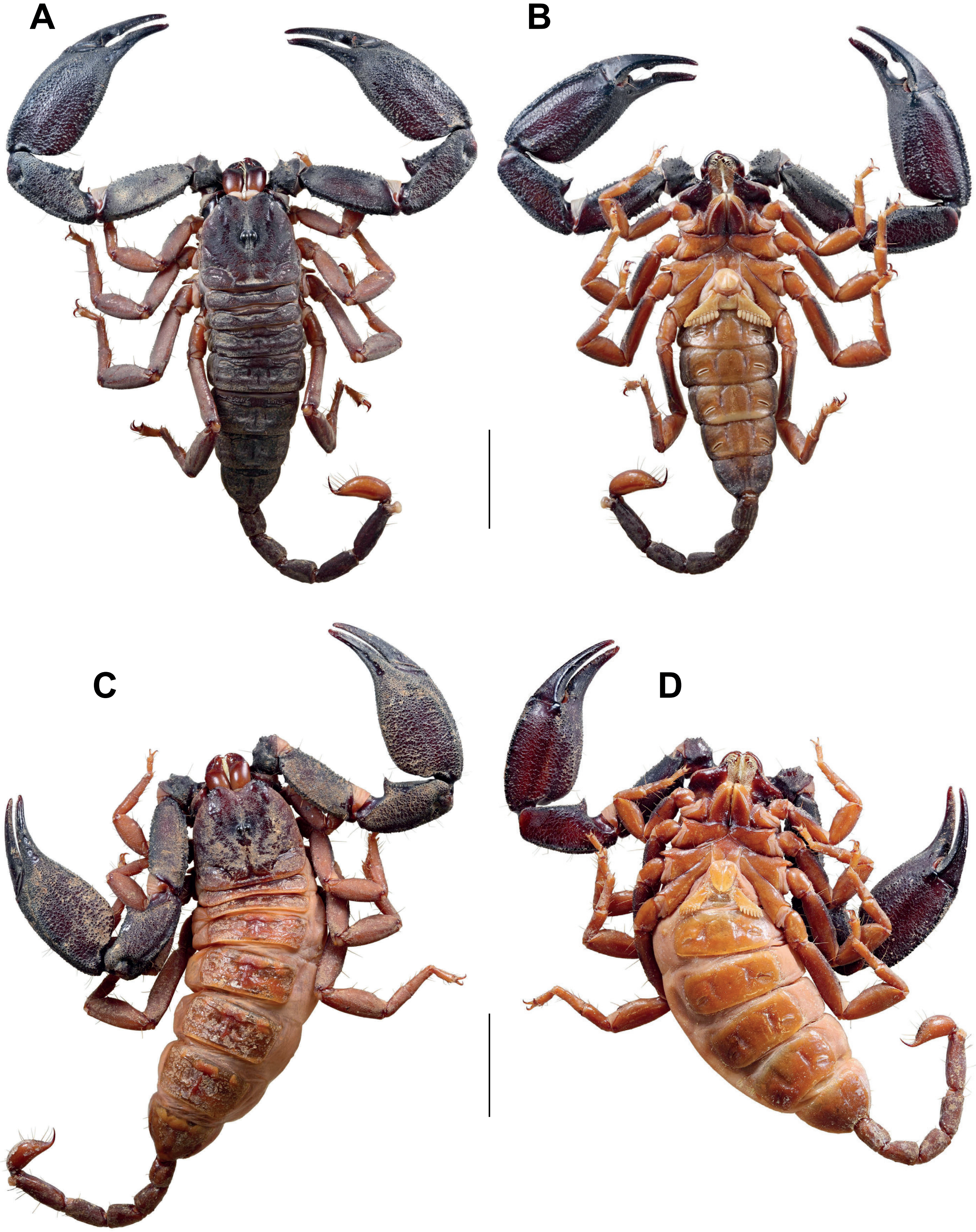

Fig. 149. *Hormurus krausi* sp. nov., habitus, dorsal (A, C) and ventral (B, D) aspect. (A-B) Male holotype (AMNH [LP2715]). (C-D) Female paratype (ZMB 15165 Bis, Bukaua). Scale lines: 10 mm.

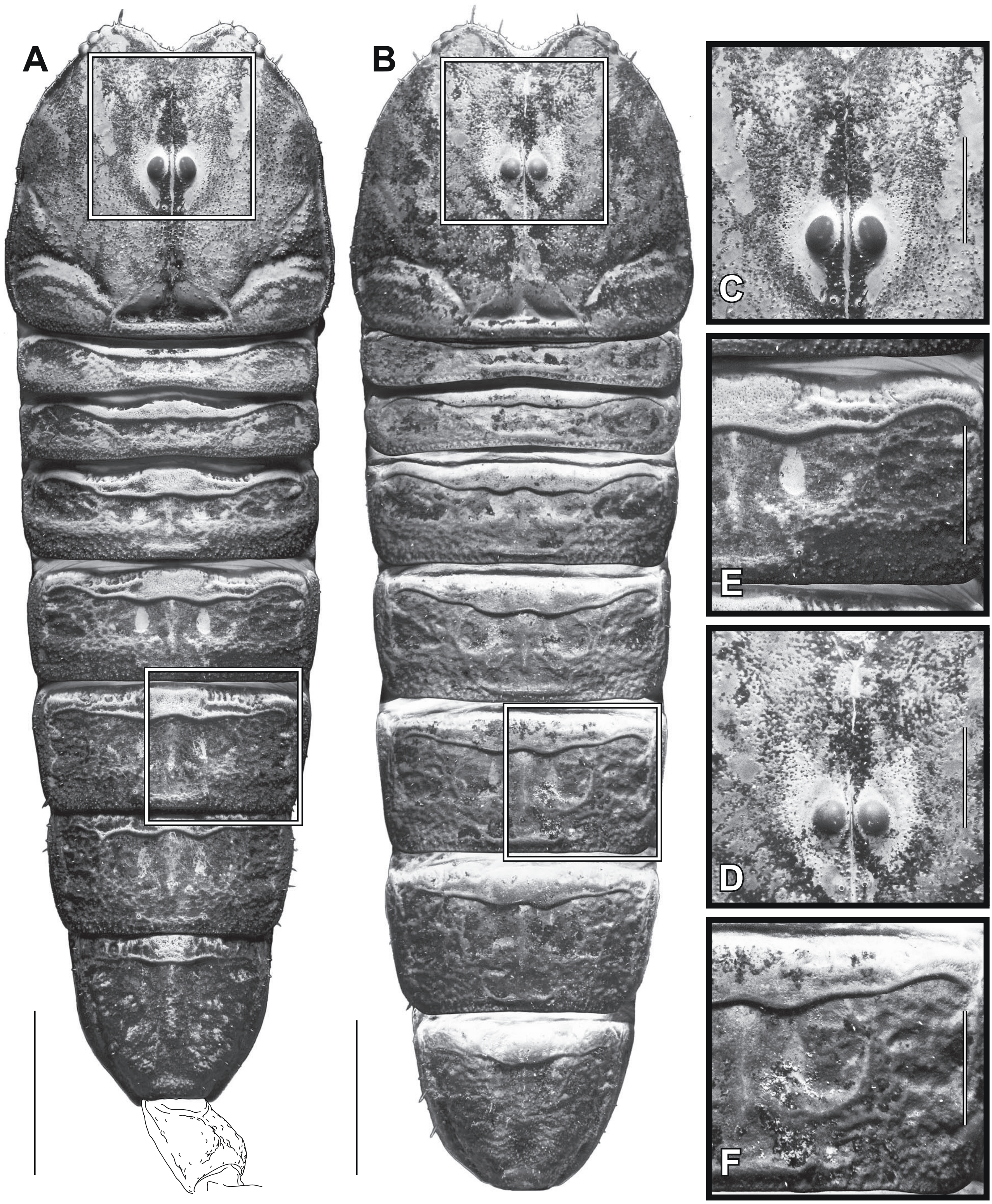

Fig. 150. *Hormurus krausi* sp. nov., carapace and mesosomal tergites showing ornamentation and macrosculpture of cuticle (A-B), detailed views of carapace (C-D) and of tergite V (E-F), dorsal aspect. (A, C, E) Male holotype (AMNH [LP2715]). (B, D, F) Female paratype (ZMB 15165 Bis, Bukaua). Scale lines: 5 mm (A-B), 2 mm (C-F).

network of medium-sized spiniform granules, distal area smooth. Chela fingers densely covered with small spiniform granules in proximal half, smooth or nearly so distally, ventral surface smooth; trichobothria *dst*, *dsb* and *db* together in a single large smooth depression.

Trichobothria: Pedipalp orthobothriotaxic, accessory trichobothria absent. Patella (Fig. 151G-J): d_2 trichobothria distal to patellar process; five *eb* trichobothria arranged in two groups (eb_1+eb_{4-5} and eb_{2-3}); two *esb*, two *em* and one *est* trichobotria arranged in three (esb_{1-2}, em_{1-2} and *est*) or four (esb_1, esb_2, em_{1-2} and *est*) groups; three *et* trichobothria; three *v* trichobothria. Chela manus (Fig. 151B-E): *Dt* situated in proximal half of manus; Eb_3 close to Eb_{1-2}; *Esb* closer to *Est* than to *Eb* group, usually aligned with *Est*, sometimes more distal than *Est*; *Est* situated near midpoint; four *V* trichobothria, V_3 distant from V_4. Fixed chela finger with *db* situated on dorsal surface; *esb* distinctly closer to *eb* than to *est*; *eb* situated at base of finger, proximal to point of articulation between fixed and movable fingers; two *i* trichobothria.

Coxosternum (Fig. 153A, C-D): Anterior margin of coxa III elongated distally, with a distinct lanceolate shape. Sternum equilateral pentagonal (anterior width slightly greater than posterior width), as long as wide or nearly so.

Legs (Fig. 154): Femora I-IV with ventral surfaces bicarinate, pro- and retroventral carinae granular. Retrolateral margins of tibiae I-II without setiform macrosetae. Basitarsi I-IV: pro- and retroventral rows each with 4/4, 4/5, 4/5 and 4/5 setiform macrosetae, respectively. Telotarsi I-IV: pro- and retroventral row each with 3-4/4, 3-4/4, 4-5/4-5 and 4-5/4-5 setiform macrosetae, respectively; retroventral row with one proximal spinule; ventromedian spinules absent. Ungues shorter than telotarsus, half its length or less.

Genital operculum (Fig. 153A): Composed of two subtriangular sclerites.

Pectines (Fig. 153A-B): Moderately elongated, distal edge reaching but not extending beyond distal edge of coxa IV; fulcrae and three marginal lamellae present. Pectinal teeth count 7-9; teeth straight, entirely covered with sensory papillae.

Mesosoma (Figs 149A-B, 150A, E): Pre-tergites I-VII and posterior margins of pre-tergites smooth. Post-tergites: posterior margins of tergites I-VI sublinear, without distinct projection; lateral transversal sulcus present; posterior half of intercarinal surfaces of I-VI densely covered with small spiniform granules, anterior half smooth medially, finely and densely granular laterally; intercarinal surfaces of VII densely covered with small spiniform granules; intercarinal surfaces of III-VII with distinct but faint reticulate network of ridges and dimples. Respiratory stigmata (spiracles) of sternites IV-VI long, their length at least one third of sternite width, and distinctly crescent shaped. Sternite VII acarinate.

Metasoma (Fig. 155B-C): Not markedly compressed laterally; sparsely and minutely granular, posterior segments less so (segment V almost smooth); dorsal intercarinal surface of V smooth and shiny medially; distinct dorsomedian sulcus on segments I-IV, much less pronounced on segment V (usually only faintly expressed anteriorly).

Metasoma carinae: Segments I-IV: dorsolateral carinae obsolete on all segments; lateral median carinae weakly developed (as faint ridges); lateral inframedian carinae discernible as a faint ridge anteriorly on segment I, absent on other segments; ventrolateral carinae weakly developed (as faint ridges); paired ventrosubmedian carinae weakly developed (as low ridges). Segment V: dorsolateral and lateral median carinae obsolete; ventrolateral carinae only expressed as faint ridges; ventrosubmedian carinae fused, only expressed as a faint ridge in anterior two-thirds.

Metasoma spination: Segment I: dorsomedian posterior and dorsolateral posterior spiniform granules absent; ventrolateral carinae without large spiniform granules; ventrosubmedian carinae with one pair of subposterior spiniform granules. Segment II: dorsomedian posterior and dorsolateral posterior spiniform granules absent; ventrolateral carinae without large spiniform granules; ventrosubmedian carinae with one pair of subposterior spiniform granules and 0-1 pair of median granules. Segments III-IV: dorsolateral posterior spiniform granules absent; ventrolateral and ventrosubmedian carina without large spiniform granules. Segment V: ventrolateral and ventromedian carinae usually without granules, rarely with few scattered minute spiniform granules or spines; anal arch crenulate. Ventral metasoma setation: Segments I-IV each with ten macrosetae, i.e. three pairs (anterior, median and posterior) on ventrosubmedian carinae and two pairs (anterior and supramedian) on ventrolateral carinae; segment V with 16 macrosetae, i.e. four pairs (anterior, median, subposterior and posterior) on ventrosubmedian carinae and four pairs (anterior, supramedian, subposterior and posterior) on ventrolateral carinae.

Telson (Fig. 155B): Slightly longer than metasoma segment V; vesicle smooth, without granules; aculeus short (less than half of vesicle length), sharply curved.

Hemispermatophore (Fig. 156): Stalk slightly longer than stem. Distal lamina curved, without distal crest on anterior margin; single laminar hook, situated in distal half of stalk (basal part/distal lamina ratio = 1.43-1.80, median = 1.62); transverse ridge distinct, significantly more proximal than base of laminar hook and merging with anterior margin significantly more proximally than base of laminar hook. Capsule: hemisolenos thin, folded on itself only proximally and above that unfolded to flattened distal tip (tip and base approximately of same width), without lateral longitudinal carina, laterodistal accessory hook or medioposterior accessory apophysis; tip of hemisolenos more proximal than base of laminar hook, more distal than tip of clasper. Clasper well developed, forming distinct hump, not hook-like, with

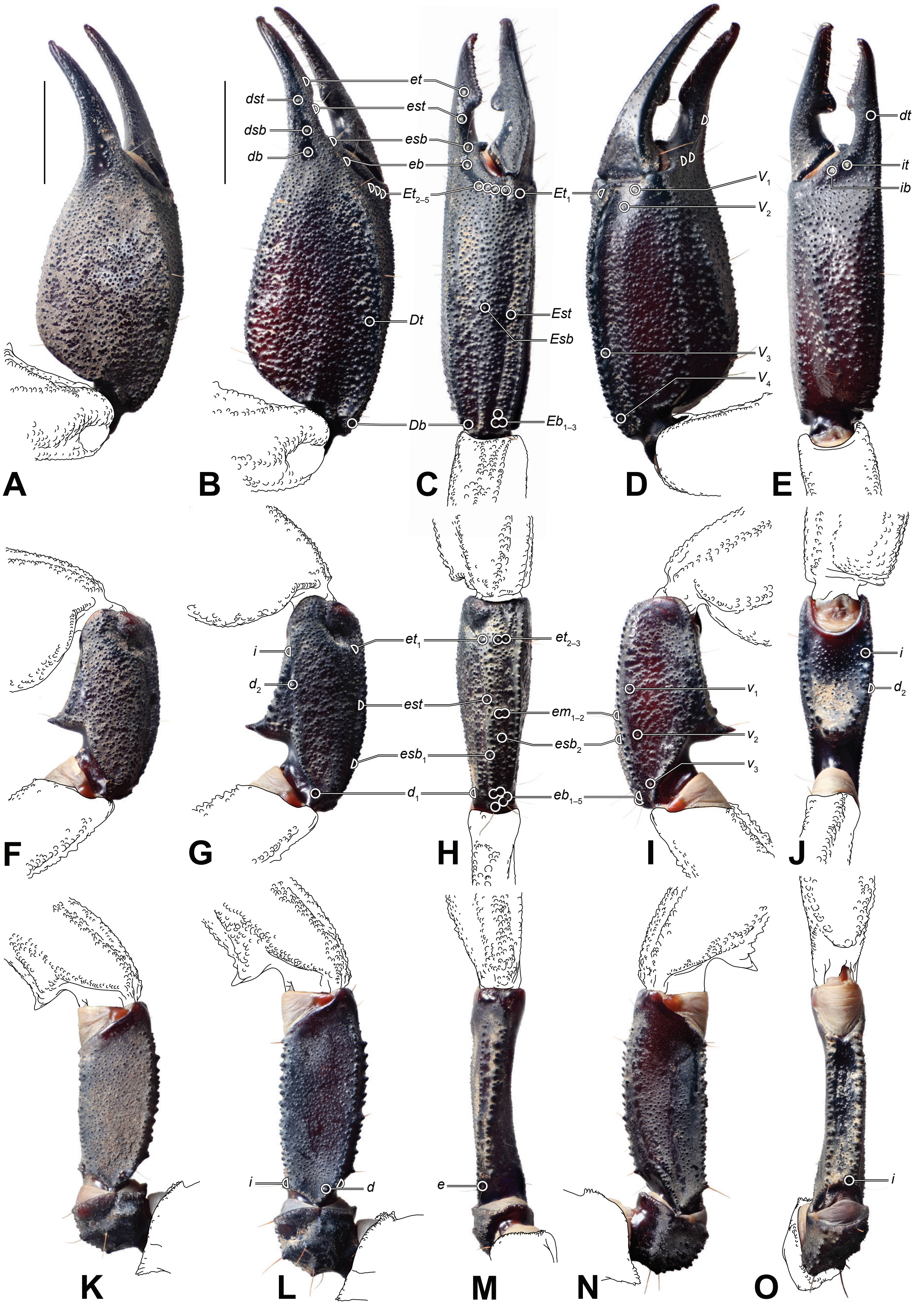

Fig. 151. *Hormurus krausi* sp. nov., pedipalp chela (A-E), patella (F-J), femur and trochanter (K-O), dorsal (A-B, F-G, K-L), retrolateral (C, H, M), ventral (D, I, N) and prolateral (E, J, O) aspects showing trichobothria pattern. (A, F, K) Female paratype (ZMB 7603, Astrolabe Bay). (B-E, G-J, L-O) Male holotype (AMNH [LP2715]). Scale lines: 5 mm.

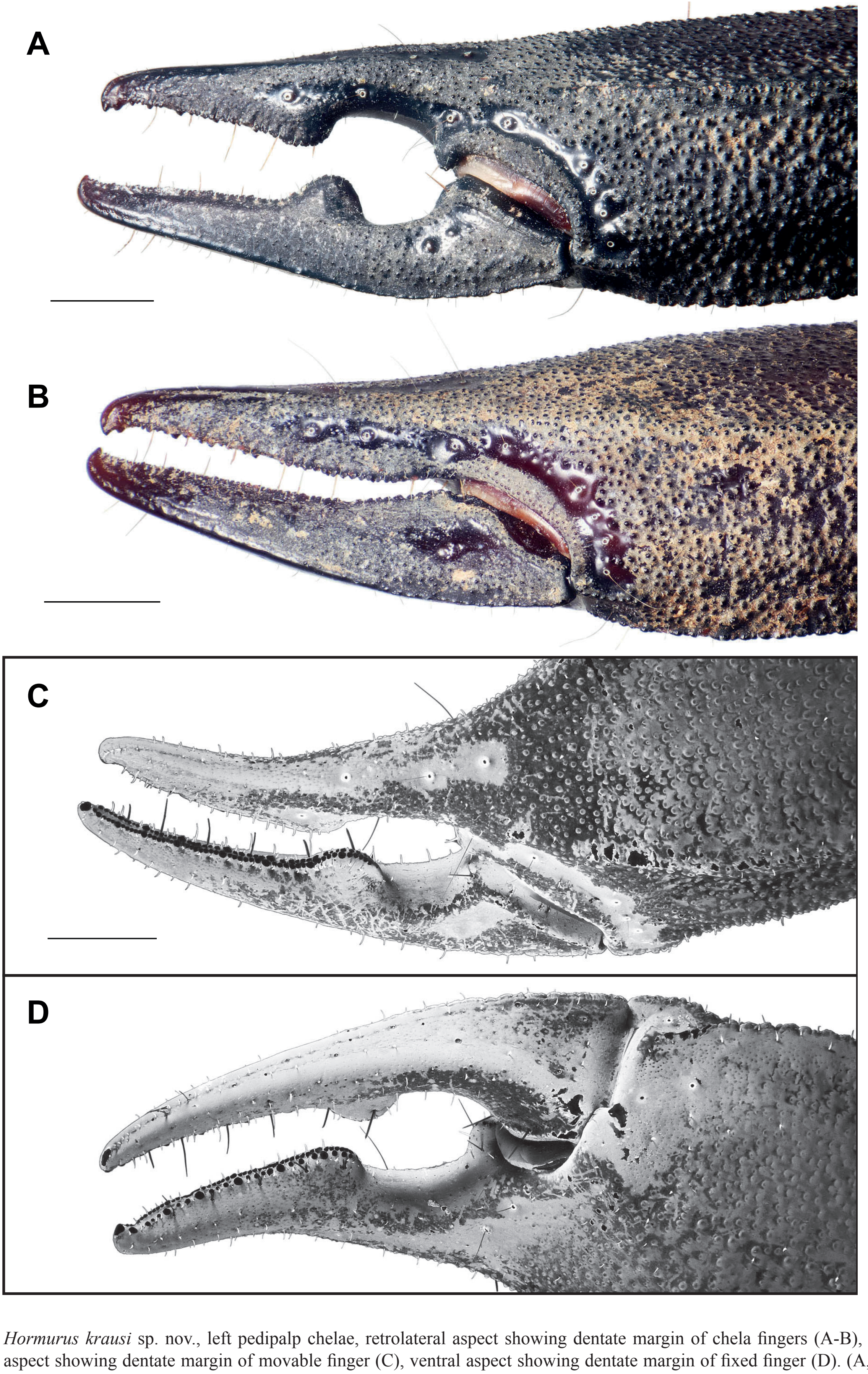

Fig. 152. *Hormurus krausi* sp. nov., left pedipalp chelae, retrolateral aspect showing dentate margin of chela fingers (A-B), dorsal aspect showing dentate margin of movable finger (C), ventral aspect showing dentate margin of fixed finger (D). (A, C-D) Male holotype (AMNH [LP2715]). (B) Female paratype (ZMB 15165 Bis, Bukaua). Scale lines: 2 mm.

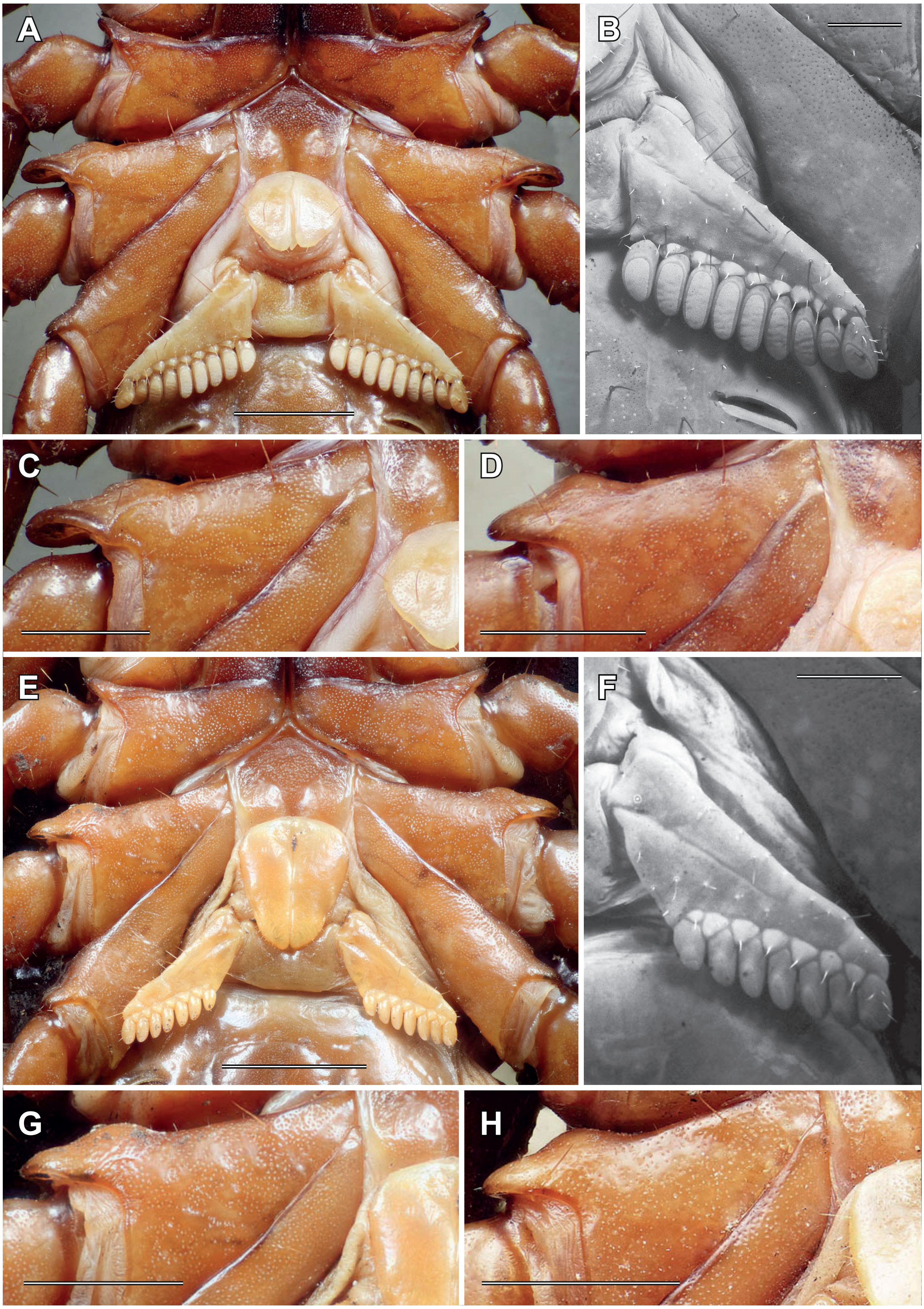

Fig. 153. *Hormurus krausi* sp. nov., coxae II-IV, sternum, genital operculum and pectines, ventral aspect (A, E), left pecten under UV light (B, F), anterior margin of coxae III (C-D, G-H). (A-C) Male holotype (AMNH [LP2715]). (D) Juvenile male paratype (AMNH [LP2721]). (E-G) Female paratype (ZMB 7603, Astrolabe Bay). (H) Juvenile female paratype (ZMB 7603, Astrolabe Bay). Scale lines: 3 mm (A, E), 2 mm (C-D, G-H), 1 mm (B, F).

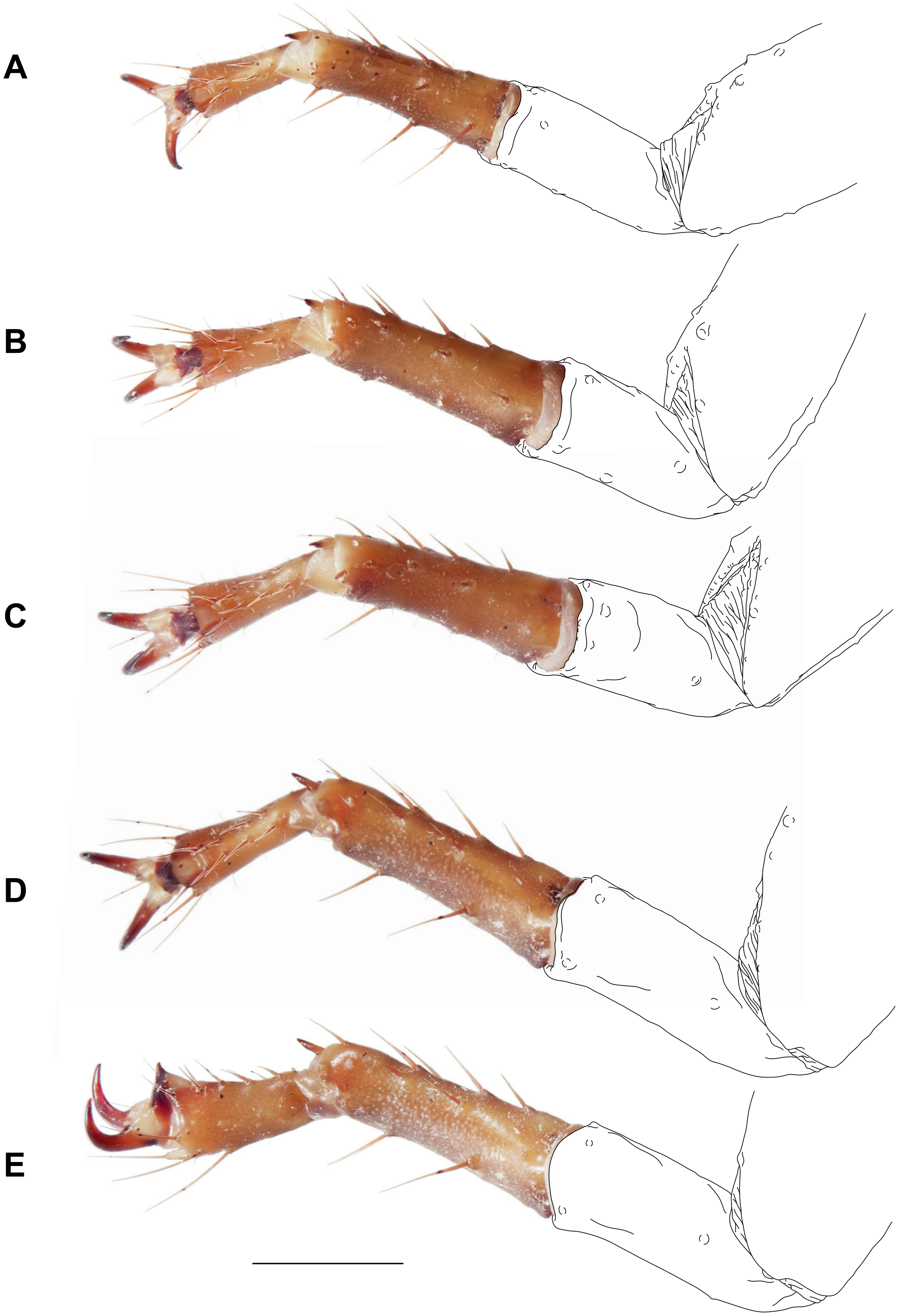

Fig. 154. *Hormurus krausi* sp. nov., male holotype (AMNH [LP2715]), right tarsi, ventral (A-D) and retrolateral (E) aspect. (A) Tarsus I. (B) Tarsus II. (C) Tarsus III. (D-E) Tarsus IV. Scale line: 2 mm.

small to medium-sized anterior accessory process. Subex well developed, spoon-shaped, merging anteriorly with base of clasper; posterior edge forming obtuse angle (>90°) with hemisolenos; anterior edge forming right angle (90º) with hemisolenos.

Description of adult female: Same characters as for male except as follows.

Pedipalps (Figs 149C-D, 151A, F, K): Segments not noticeably shorter or more robust than in males.

Chela fingers (Fig. 152B): Dentate margins linear or nearly so, without pronounced lobe and notch, with two rows of primary denticles extending from tip to base of fingers and bearing large inner accessory denticles.

Carapace (Fig. 150B, D): Frontal lobes and posteromedian margin smooth.

Coxosternum (Fig. 153E, G-H): Anterodistal margin of coxa III without morphological modification or accessory process.

Leg spination: Telotarsi I-IV: pro- and retroventral row each with 3-4/3-4, 3-4/4, 4-5/4-5 and 4-5/5 setiform macrosetae, respectively.

Genital operculum (Fig. 153E): Oval to semi-oval, longer than wide (length/width ratio = 1.12-1.25, median = 1.2); opercular sclerites partly fused, with distinct median suture; posterior notch present, at least weakly developed.

Pectines (Fig. 153E-F): Short, distal edge not reaching distal edge of coxa IV. Pectinal teeth count 6-8; teeth short and straight, sensory papillae covering only distal half.

Mesosoma (Figs 149C-D, 150B, F): Post-tergites: reticulate network of ridges and dimples on segments III-VII more distinct than in male; intercarinal surfaces of I-III medially smooth, laterally granular; intercarinal surfaces of IV-VI smooth or nearly so, lateral areas very faintly granular; anterior half of intercarinal surfaces of VII smooth, posterior half granular.

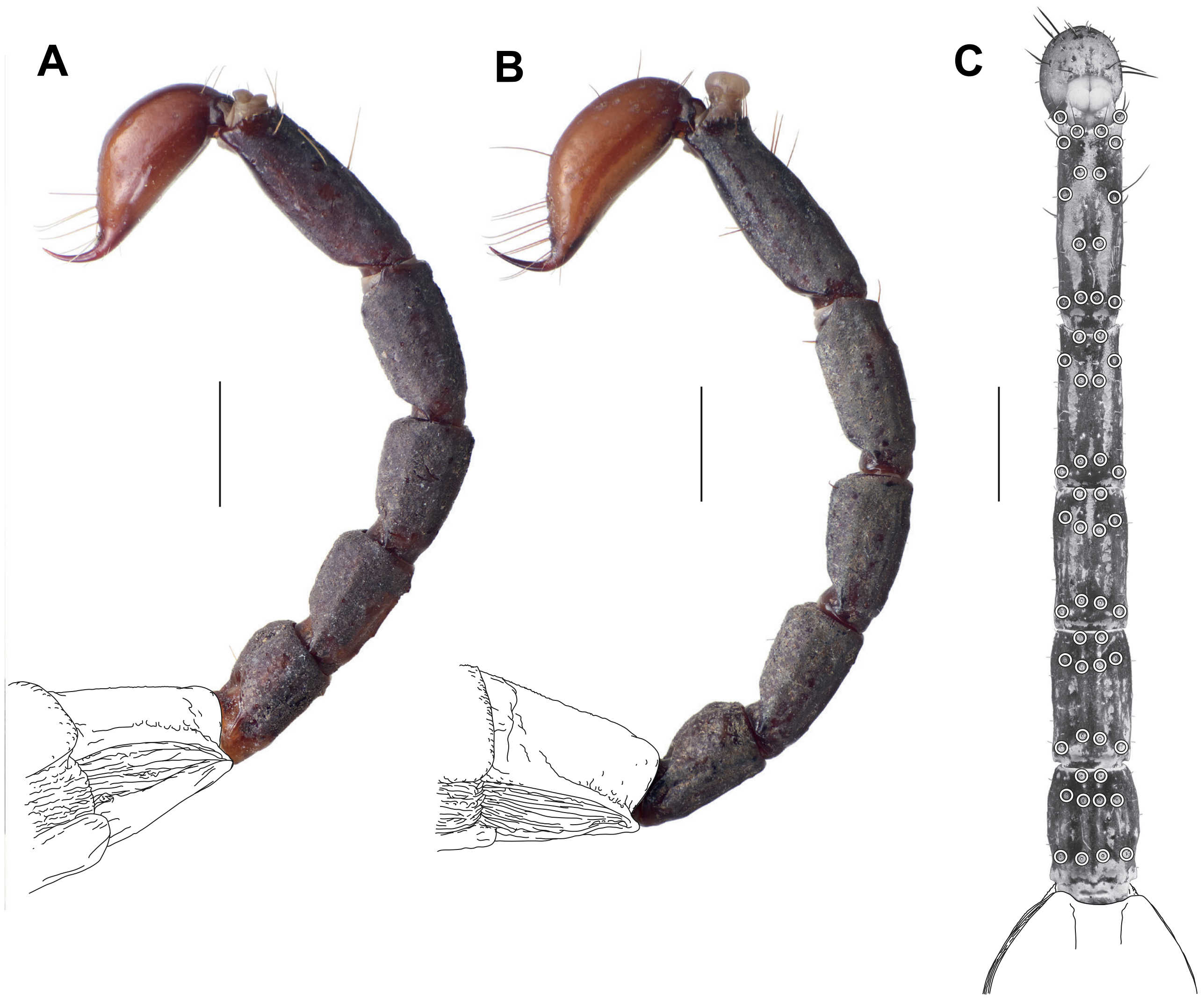

Fig. 155. *Hormurus krausi* sp. nov., metasoma and telson, lateral (A-B) and ventral (C) aspects. (A) Female paratype (ZMB 7603, Astrolabe Bay). (B-C) Male holotype (AMNH [LP2715]). Scale lines: 3 mm.

Fig. 156. *Hormurus krausi* sp. nov., left hemispermatophore of male paratype (ZMH, Finschhafen; A-D), of male holotype (AMNH [LP2715]; E), of male paratype (CAS, Finschhafen; F), of male paratype (CAS, Finschhafen; G) and of male paratype (ZMB 7603, Astrolabe Bay; H). (A, E-H) Lateral aspect. (B) Anterior aspect. (C) Rotated approximately 45° counter-clockwise from anterior aspect. (D) Contralateral aspect. Scale lines: 1 mm.

Intraspecific variation: *Pedipalp trichobothria:* On the retrolateral side of the patella trichobothria *esb*, *em* and *est* may be arranged in three (esb_{1-2}, em_{1-2} and *est*) or four (esb_1, esb_2, em_{1-2} and *est*) groups. On the retrolateral side of the pedipalp chela *Esb* may be slightly more proximal, not aligning with *Est*.
Leg spination: The number of setiform macrosetae varies from three to four proventrally on telotarsi I-II, from three to four retroventrally on telotarsi I, and from four to five proventrally and retroventrally on telotarsi III-IV.
Female genital operculum: The length/width ratio varies from 1.12 to 1.25 (median = 1.2).
Pectines: The pectinal teeth count varies from seven to nine in males and from six to eight in females.
Metasoma: Spination: One extra subposterior spiniform granule may be expressed on one of the ventrosubmedian carinae of segments I-II. On segment II the ventrosubmedian carinae have 0-1 pair of median granules, and one fewer median spiniform granule may be expressed on one of them.
Ventral metasoma setation: Segment IV may have nine macrosetae instead of the usual ten (one macroseta not expressed).
Hemispermatophores: The basal part/distal lamina ratio varies from 1.43 to 1.8 (median = 1.62).

Distribution and ecology: *Hormurus krausi* sp. nov. has only been reported from Morobe Province, on the southern coasts of the Huon Peninsula and in the Herzog Mountains south-east of Lae (Fig. 157). The record from Astrolabe Bay is considered doubtful (see description of *H. sporacanthophorus* sp. nov. for details). This species appears to be facultatively arboreal: it has been collected in broadleaf forests on mossy tree trunks, 1-3 m above the ground, but also in overgrown coconut and *Pandanus* gardens, under coconut palm leaves. It is probably syntopic with *Liocheles australasiae* (Fabricius, 1775) in Finschhafen and Lae, and with *H. sporacanthophorus* sp. nov. in Bukaua and Lae, because it was collected together with these two species at the localities mentioned.

Remarks: Edward Sherman Ross was an entomologist who worked as a curator at the Californian Academy of Sciences. During World War II he was sent to the battlefront in New Guinea and the Philippines, where he served as the commanding officer of an army malaria survey unit (Ross, 2009). When off-duty, he spent time collecting insects and other arthropods, among which are several specimens of the present species now deposited in the CAS collections.
All the specimens from the American Museum of Natural

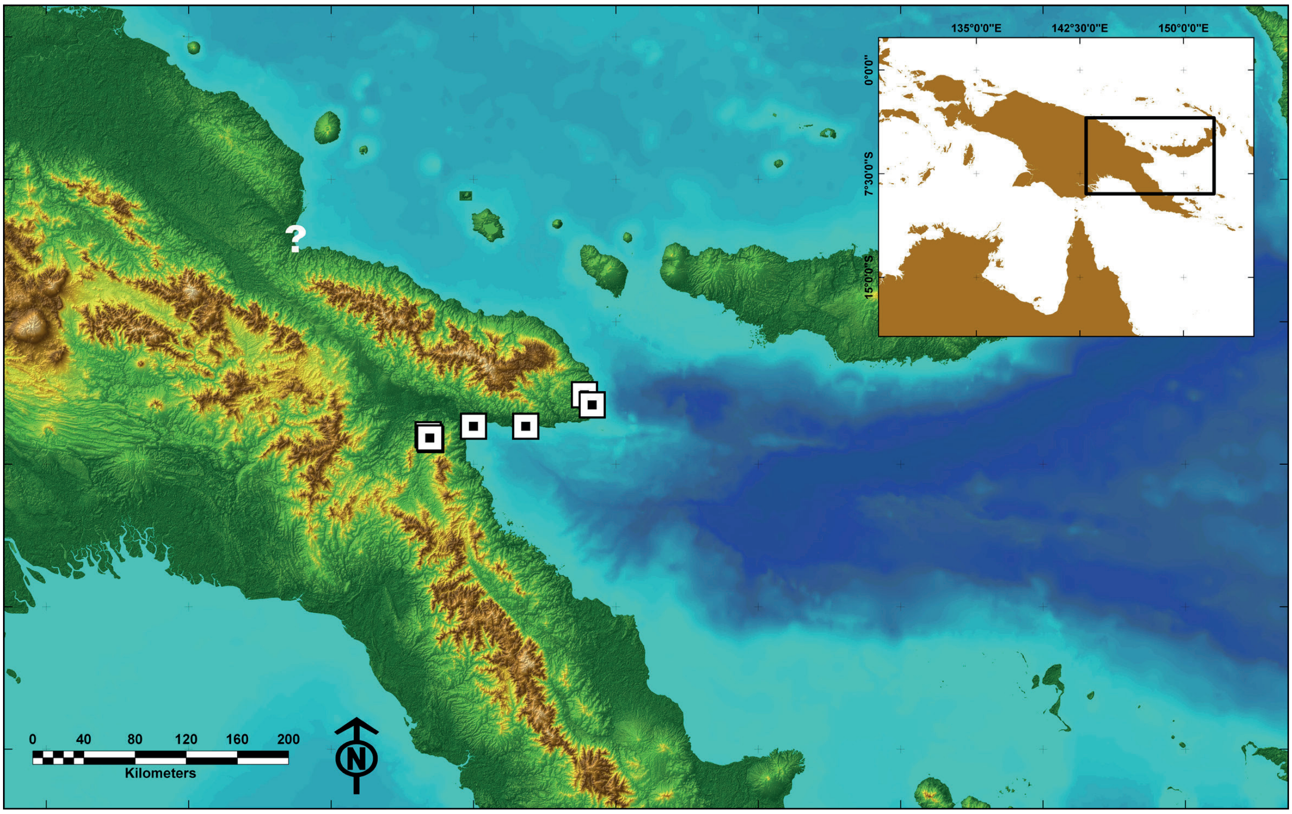

Fig. 157. Known localities of *Hormurus krausi* sp. nov. near the southern coasts of Huon Peninsula and in the Herzog Mountains, Morobe Province, Papua New Guinea. The color gradient indicates topography and bathymetry.

History listed in the material examined were collected during the last two Archbold expeditions to New Guinea:
(1) John Gunn was part of the collecting team in Lae during the sixth Archbold Expedition (Brass, 1964). He was probably a local guide.
(2) Hobart M. van Deusen was an employee of the American Museum of Natural History from 1945 to 1975, retiring as curator of the Mammalogy Department. He participated in three Archbold Expeditions to New Guinea, as mammalogist in 1953 and 1959, and as leader in 1964 (Horner & Van Gelder, 1979). He collected one female specimen of *H. sporacanthophorus* sp. nov. from Lae during the seventh and last of these expeditions in 1964.
(3) Richard G. Zweifel was a Curator of Herpetology at the AMNH from 1954 to 1989. He and his assistant Kip Sluder were guests of the seventh Archbold Expedition and collected mostly herpetological specimens (Van Deusen, 1964).
(Paul) Georg (Egmont) Duncker, an ichthyologist employed by the Hamburg Zoological Museum, collected two of the specimens listed above during the Hamburg Südsee-Expedition (1908-1910) to the Bismarck Archipelago (Thilenius, 1927). These specimens were originally part of the type series of *H. papuanus* Kraepelin, 1914.
Information on R. G. Neuhauss is provided in the description of *H. sporacanthophorus* sp. nov.

Hormurus hypseloscolus Monod & Prendini, sp. nov.
Figs 158-167, Tab. 17

This species was treated under the manuscript name "Hormurus hypselankylis" in Monod (2011a: 286, 532, 541).

Material: AMNH[LP 2717]; ♂ holotype; Papua New Guinea, Milne Bay Province, D'Entrecasteaux Islands, Fergusson Island, Basima, 250 m, 9.45°S, 150.8°E; 31.VIII.2002; leg. F. Kraus (sample JS-0640). – AMNH [LP 2717]; 3 ♀ paratypes; same data as for holotype. – UMMZ [LP 2717]; 1 ♀ paratype; same data as for holotype. – AMNH (without registration number); 1 ♀ paratype; Fergusson Island, mountains between Agamoia and Ailuluai, 900 m (Fig. 101B) [9°35'12"S, 150°37'50"E]; 5.-17.VI.1956; leg. L.J. Brass, Archbold Expedition.

Etymology: The name *hypseloscolus* is derived from the ancient Greek words "ὑψηλός" [high] and "σκῶλος" [pointed stake, thorn]. The epithet is an invariable noun in apposition and refers to the position of the hemispermatophore laminar hook, which is the most distal among the currently recognized species of *Hormurus*.

Diagnosis: *Hormurus hypseloscolus* sp. nov. differs from all other Papuan congeners in the very distal position of the hemispermatophore lamellar hook (Fig. 166). The basal part/distal lamina ratio varies from 1.84 to 1.93 (median = 1.88) in *H. hypseloscolus* sp. nov., whereas this ratio never exceeds 1.8 in the other species from Papua New Guinea. Moreover, the anterodistal margin of coxa III of males is narrower and more elongated in *H. hypseloscolus* sp. nov. (Fig. 163A, C) than in the other species. Small spiniform granules are present on the ventrolateral and ventrosubmedian carinae of segment V in *H. hypseloscolus* sp. nov., whereas these granules are usually absent in the other species.

Description of adult male: *Colouration* (Figs 158, 159A-B): Dorsal surface of chelicera manus brown with black infuscation, more pronounced anteriorly; fingers black. Carapace reddish brown with infuscation, median ocular region black. Tergites brown with black infuscation. Pedipalps reddish brown; carinae and fingers black. Legs paler than tergites, orange with brown infuscation dorsally, orange to yellow ventrally, prolateral carina of femora black. Coxapophysis I brown, anterior tip pale yellow; coxapophysis II reddish brown to black; leg coxae orange-brown; sternum brown, lighter posterolaterally; sternites III-VI brown, posterior margin of V pale yellow; sternite VII dark brown to black posteriorly; genital operculum and pectines pale yellow. Metasoma reddish brown with darker infuscation; telson paler than metasoma, vesicle orange, aculeus reddish brown to black.
Cuticle: Nongranular surfaces of carapace, pedipalps, legs, mesosoma and metasoma finely punctate.
Carapace (Fig. 160A, C): Anterior margin with median notch moderately excavated. Anterior furcated sutures distinct; median ocular tubercle slightly raised; median ocelli present, at least twice the size of lateral ocelli, separated from each other by approximately the diameter of a median ocellus. Three pairs of lateral ocelli, equal in size, equidistant and adjacent to each other. Surfaces minutely and sparsely granular, except for smooth frontal lobes (median longitudinal sulci and anterior furcated sulci granular) and median ocular area.
Chelicerae: Basal and median teeth of fixed finger fused into bicusp. Dorsal margin of movable finger with four teeth (one basal, one median, one subdistal and one distal); dorsal distal tooth smaller than ventral distal tooth; ventral margin smooth.
Pedipalps (Figs 158, 159A-B, 161B-E, G-J, L-O): Segments long and slender, femur longer than carapace. Chela almost asetose.
Chela fingers (Fig. 162A, C-D): Fixed finger: basal lobe well developed and conical; suprabasal notch distinct and deep; dentate margins distally (from tip of finger to median lobe) with two rows of primary denticles bearing large inner accessory denticles; denticles absent on suprabasal notch; single line of denticles on basal lobe. Movable finger: basal lobe absent; suprabasal lobe well

Table 17. *Hormurus hypseloscolus* sp. nov., measurements (in mm), repository and inventory number of adult male holotype and adult females.

	Holotype	Paratype	Paratype	Paratype	Paratype
Sex	♂	♀	♀	♀	♀
Repository	AMNH	AMNH	AMNH	AMNH	AMNH
Inventory number	LP2717	LP2717	LP2717	LP2717	
Locality	Basima	Basima	Basima	Basima	Agamoia-Ailuluai
Total length	55.00	58.00	62.00	56.00	52.00
Carapace, length	7.80	8.72	8.78	8.31	7.13
Carapace, anterior width	4.63	5.85	5.91	5.36	4.94
Carapace, posterior width	8.53	9.39	9.75	9.08	8.23
Pedipalp femur, length	11.86	10.06	10.30	9.26	8.05
Pedipalp femur, width	3.41	3.66	3.75	3.41	3.05
Pedipalp femur, height	1.58	1.95	2.04	1.83	1.77
Pedipalp patella, length	10.91	9.63	9.63	8.96	7.98
Pedipalp patella, width	3.54	4.02	4.14	3.84	3.32
Pedipalp patella, height	2.68	3.17	3.23	2.93	2.68
Pedipalp chela, length	20.24	19.64	19.99	18.24	16.44
Pedipalp chela, width	5.49	6.83	6.95	6.22	5.61
Pedipalp chela, height	2.93	3.66	3.72	3.44	3.29
Chela movable finger, length	8.78	8.90	9.26	8.23	7.62
Genital operculum length, female	NA	2.93	2.93	2.80	2.32
Genital operculum width, female	NA	2.40	2.41	2.19	2.26
Metasoma segment I, length	3.07	3.05	3.11	2.99	2.56
Metasoma segment I, width	2.07	2.26	2.19	2.19	1.97
Metasoma segment I, height	1.83	2.04	1.85	1.83	1.83
Metasoma segment II, length	3.60	3.47	3.60	3.35	2.80
Metasoma segment II, width	1.80	1.85	1.77	1.77	1.71
Metasoma segment II, height	1.83	2.01	1.89	1.83	1.77
Metasoma segment III, length	3.90	3.72	3.72	3.60	3.05
Metasoma segment III, width	1.69	1.71	1.71	1.61	1.58
Metasoma segment III, height	1.83	2.04	1.95	1.89	1.73
Metasoma segment IV, length	4.27	4.14	4.33	4.14	3.47
Metasoma segment IV, width	1.56	1.58	1.52	1.48	1.44
Metasoma segment IV, height	1.71	1.95	1.95	1.77	1.68
Metasoma segment V, length	5.18	5.06	5.36	5.00	4.27
Metasoma segment V, width	1.58	1.67	1.58	1.49	1.37
Metasoma segment V, height	1.68	1.73	1.95	1.71	1.58
Telson, length	6.52	6.46	5.85	5.49	5.12
Telson, width	1.77	1.91	1.85	1.83	1.67
Telson, height	1.97	2.19	2.17	2.07	1.83

Fig. 158. *Hormurus hypseloscolus* sp. nov., habitus of male, dorsal aspect, reconstruction based on photographs. Scale line: 10 mm.

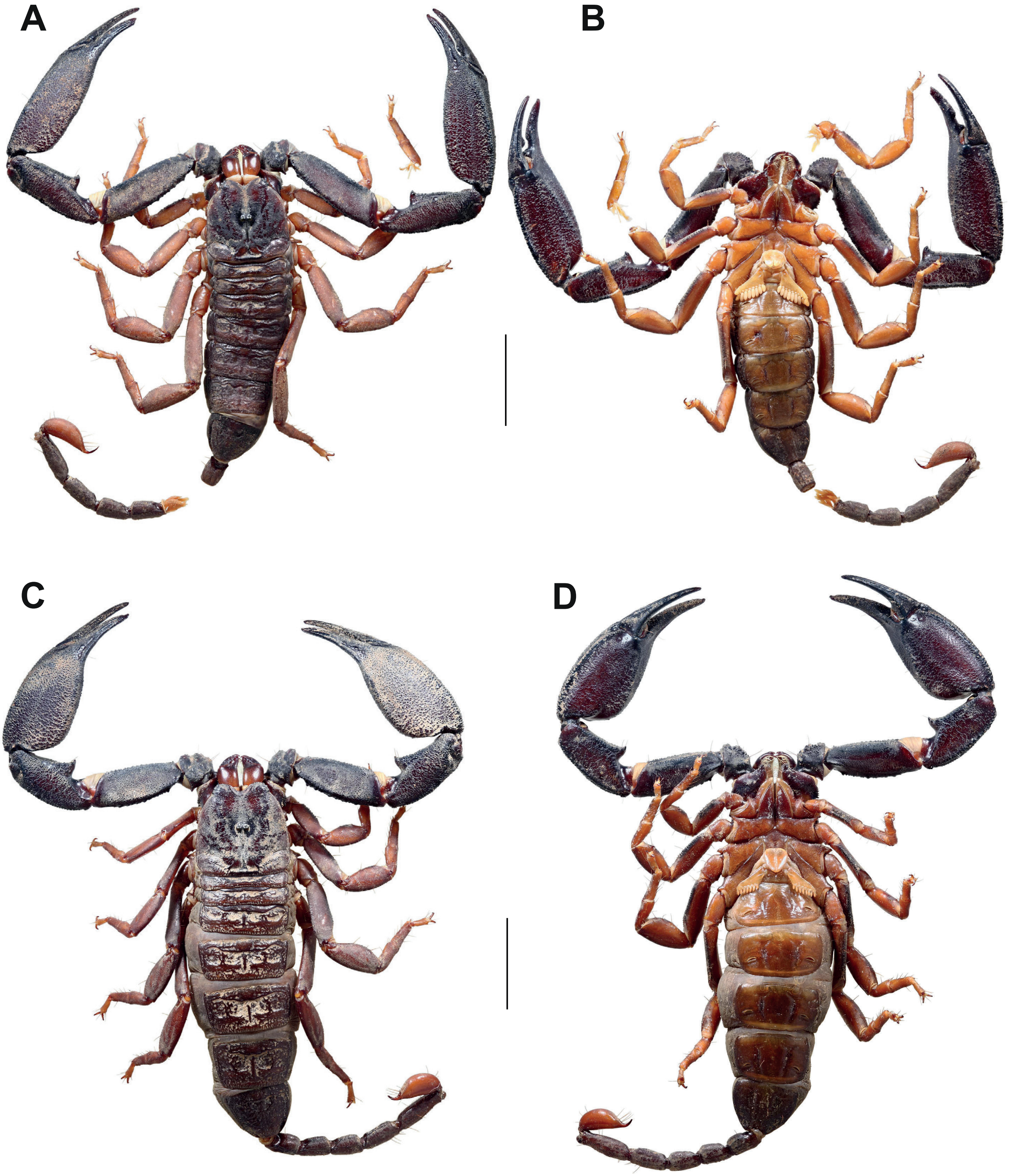

Fig. 159. *Hormurus hypseloscolus* sp. nov., habitus, dorsal (A, C) and ventral (B, D) aspects. (A-B) Male holotype (AMNH [LP2717]). (C-D) Female paratype (AMNH [LP2717]). Scale lines: 10 mm.

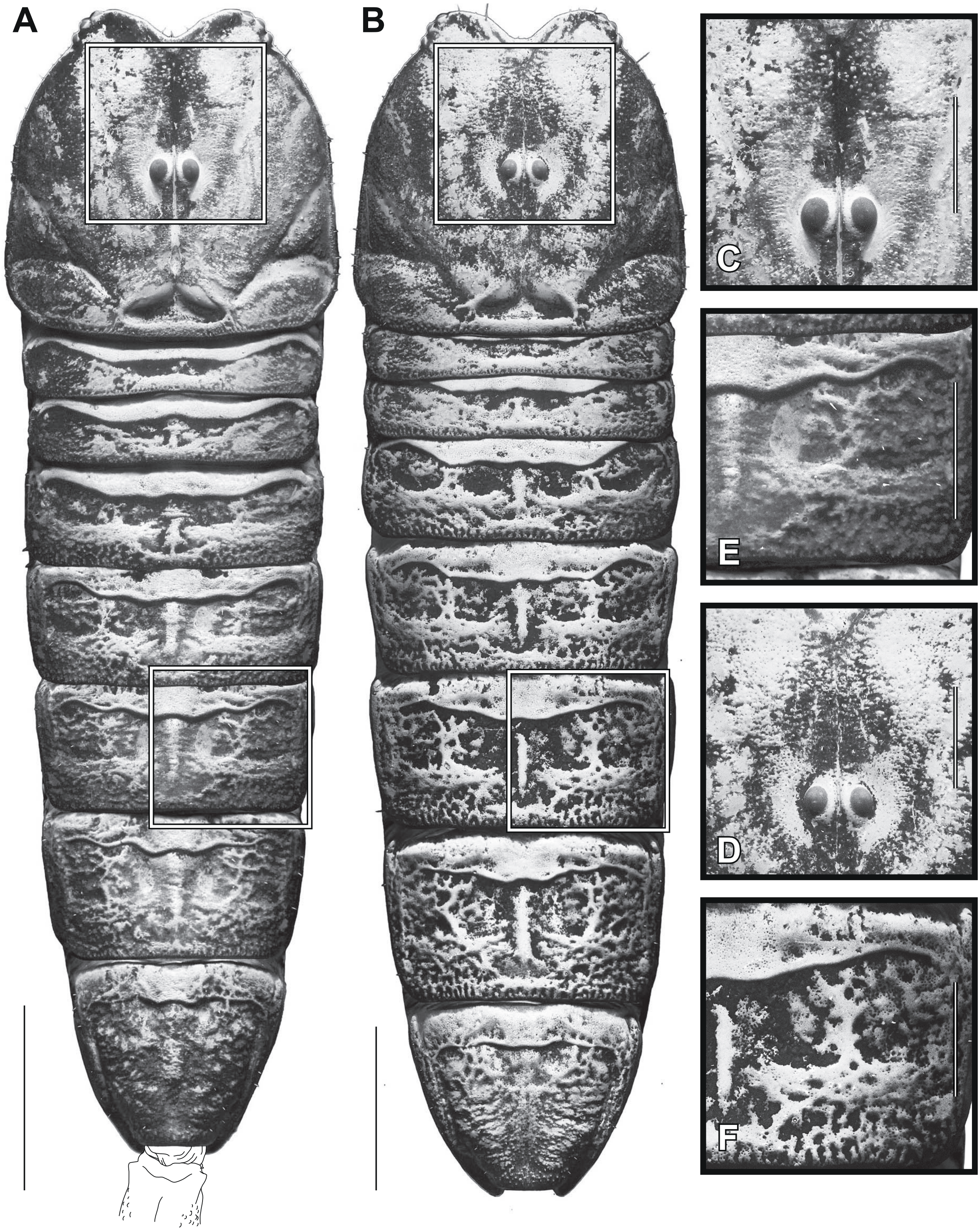

Fig. 160. *Hormurus hypseloscolus* sp. nov., carapace and mesosomal tergites showing ornamentation and macrosculpture of cuticle (A-B), detailed views of carapace (C-D) and of tergite V (E-F), dorsal aspect. (A, C, E) Male holotype (AMNH [LP2717]). (B, D, F) Female paratype (AMNH [LP2717]). Scale lines: 5 mm (A-B), 2 mm (C-F).

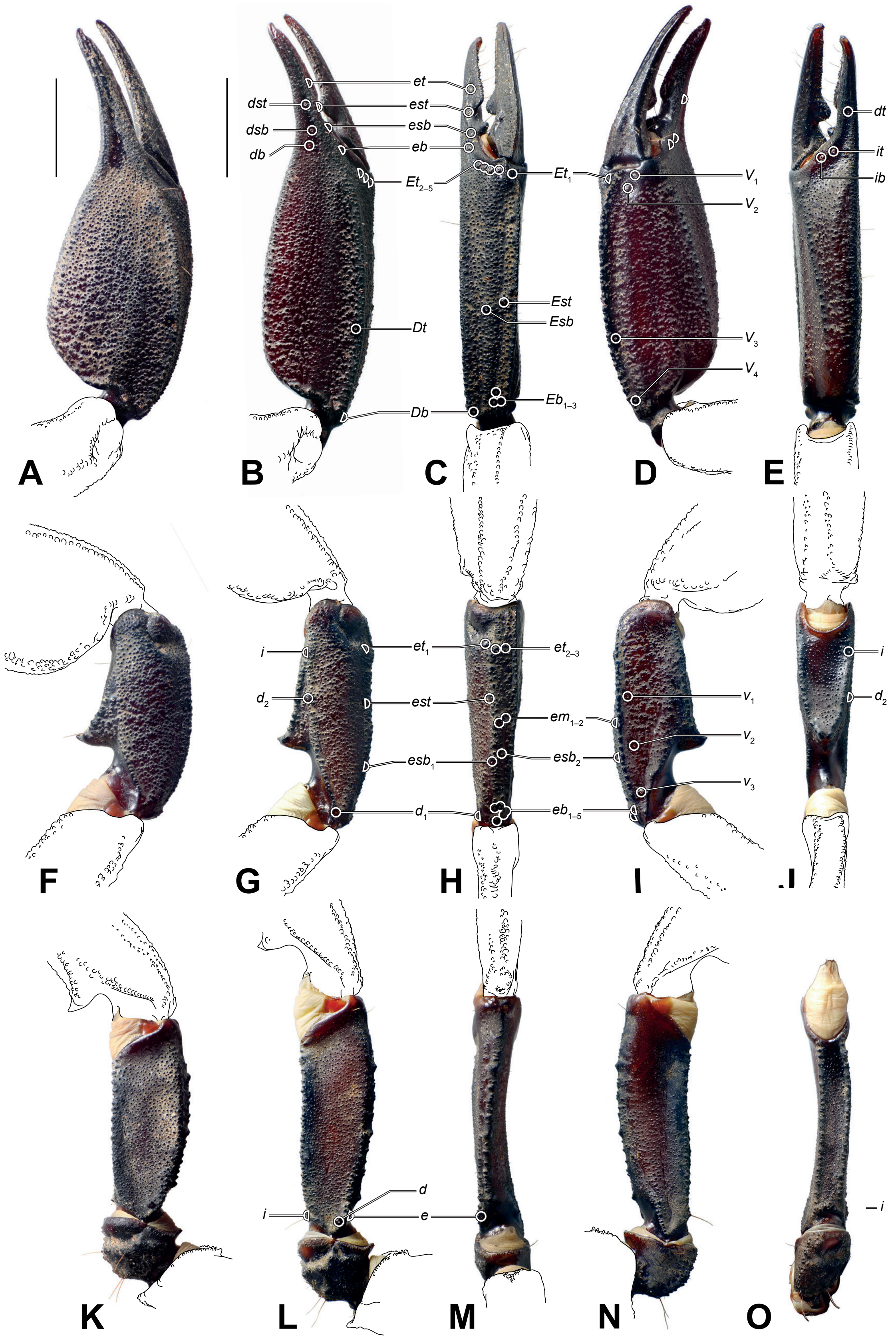

Fig. 161. *Hormurus hypseloscolus* sp. nov., pedipalp chela (A-E), patella (F-J), femur and trochanter (K-O), dorsal (A-B, F-G, K-L), retrolateral (C, H, M), ventral (D, I, N) and prolateral (E, J, O) aspects showing trichobothria pattern. (A, F, K) Female paratype (AMNH [LP2717]). (B-E, G-J, L-O) Male holotype (AMNH [LP2717]). Scale lines: 5 mm.

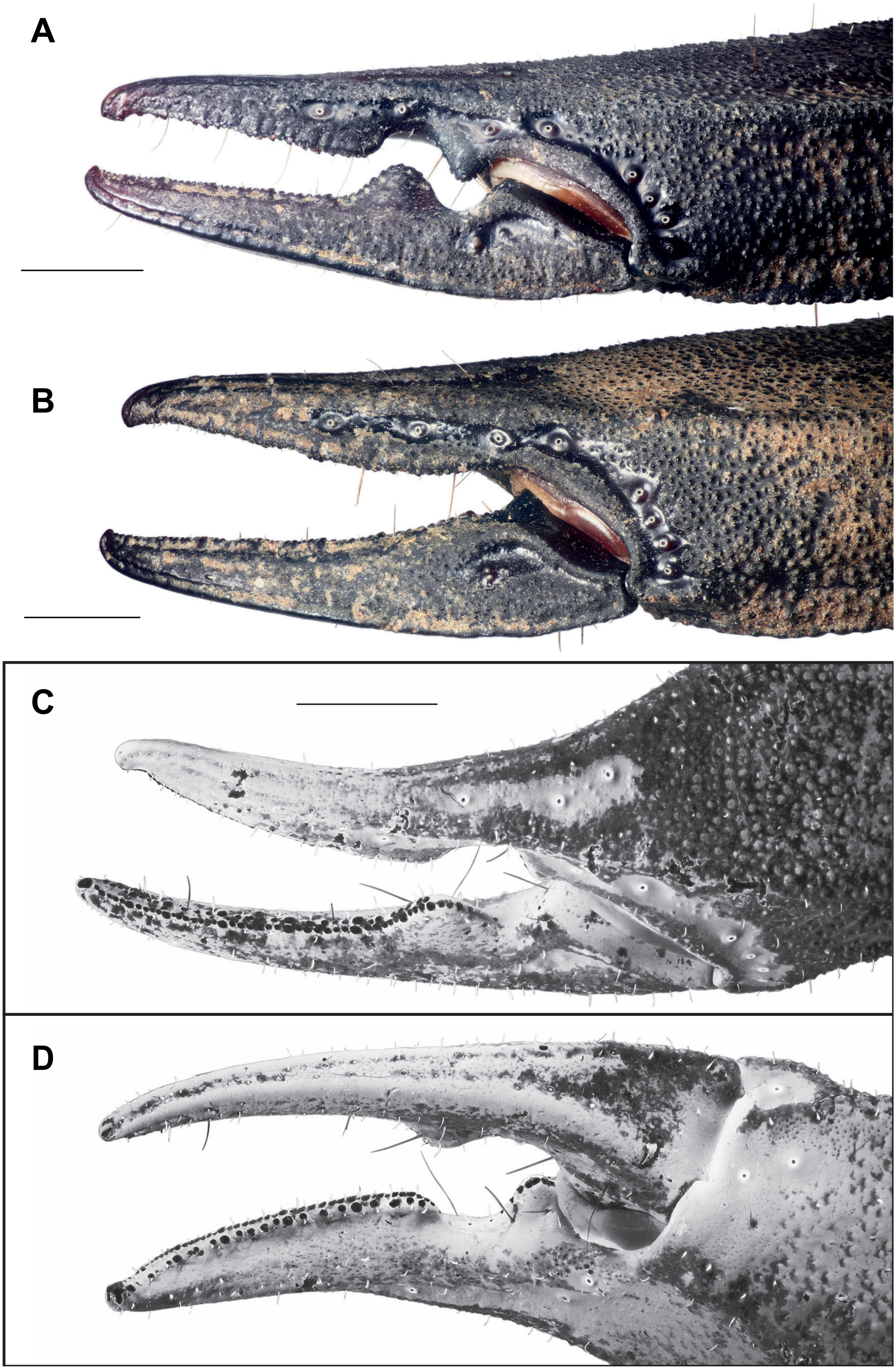

Fig. 162. *Hormurus hypseloscolus* sp. nov., left pedipalp chelae, retrolateral aspect showing dentate margin of chela fingers (A-B), dorsal aspect showing dentate margin of movable finger (C), ventral aspect showing dentate margin of fixed finger (D). (A, C-D) Male holotype (AMNH [LP2717]). (B) Female paratype (AMNH [LP2717]). Scale lines: 2 mm.

developed, conical, gently rounded dorsally and lacking sharp conical tooth, not overlapping with fixed finger; suprabasal lobe and corresponding notch on fixed finger contiguous, no proximal gap or at most reduced gap only evident when fingers closed; dentate margins distally (from tip of finger to suprabasal lobe) with two rows of primary denticles bearing large inner accessory denticles; denticles absent basally.

Pedipalp carinae: Femur (Fig. 161L-O): proventral carina visible as a ridge of medium-sized spiniform granules; promedian carinae absent; prodorsal carina visible as a ridge of medium-sized spiniform granules, similarly developed as proventral carina; retrodorsal carina visible as a ridge of medium-sized spiniform granules, similarly developed as prodorsal carina; retroventral carina visible as a ridge of medium to large spiniform granules, more developed than retrodorsal carina, more distinct in proximal two-thirds of segment; retroventral carina visible as a ridge of medium to large spiniform granules, more developed than retrodorsal carina; ventromedian carina obsolete, only discernible proximally as a ridge of medium-sized spiniform granules. Patella (Fig. 161G-J): proventral carina discernible proximally as costate ridge, obsolete distally; promedian and prodorsal carinae visible as ridges with medium-sized spiniform granules, equally developed, fused medially into prominent spiniform process with pointed medially located apex; dorsomedian carina only visible proximally as a ridge of medium-sized spiniform granules; retrodorsal carina obsolete, only expressed proximally as a faint ridge of medium-sized spiniform granules; paired retromedian carinae fused and visible as a faint ridge of medium-sized spiniform granules; retroventral carina crenulate (composed of medium-sized granules). Chela manus (Fig. 161B-E): proventral carina visible as a faint ridge of medium-sized spiniform granules; promedian carina visible as a ridge of medium-sized spiniform granules, more developed than promedian carina; prodorsal carina obsolete, visible as a faint ridge of medium-sized spiniform granules; dorsomedian carina visible as a faint ridge of medium-sized spiniform granules, more strongly developed than prodorsal carina; dorsal secondary carina obsolete; digital carina visible as a ridge of small to medium-sized spiniform granules, less distinct in distal area, more developed than retromedian carina; fused retromedian carinae obsolete, visible as a faint ridge of medium-sized spiniform granules proximally; retrolateral secondary carina vestigial, only distinct proximal to condyle of movable finger as a ridge of medium-sized spiniform granules; retroventral carina crenulate (composed of medium-sized granules); ventromedian carina obsolete, only expressed proximally as a faint ridge of medium-sized spiniform granules.

Pedipalp macrosculpture: Femur (Fig. 161L-O): prolateral intercarinal surface sparsely covered with small spiniform granules; dorsal intercarinal surface densely covered with small to medium-sized spiniform granules, distal area smooth; retrolateral intercarinal surface sparsely covered with medium-sized spiniform granules; ventral intercarinal surface densely covered with medium-sized spiniform granules, distal third smooth. Patella (Fig. 161G-J): prolateral intercarinal surface sparsely covered with medium-sized spiniform granules, distal area smooth; dorsal and retrolateral intercarinal surfaces covered with dense reticulate network of medium-sized spiniform granules; ventral intercarinal surface covered with sparse reticulate network of medium-sized spiniform granules, distal area smooth. Chela manus (Fig. 161B-E): prolateral intercarinal surface covered with sparse reticulate network of small to medium-sized spiniform granules, smooth proximally; dorsal and retrolateral intercarinal surfaces covered with dense reticulate network of medium-sized spiniform granules; ventral intercarinal surface covered with sparse reticulate network of medium-sized spiniform granules, distal area smooth. Chela fingers densely covered with small spiniform granules in proximal half, smooth or nearly so distally, ventral surface smooth; trichobothria *dst*, *dsb* and *db* each in a small smooth depression.

Trichobothria: Pedipalp orthobothriotaxic, accessory trichobothria absent. Patella (Fig. 161G-J): d_2 trichobothrium distal to patellar process; five *eb* trichobothria arranged in two groups (eb_1+$eb_{4\text{-}5}$ and $eb_{2\text{-}3}$); two *esb*, two *em* and one *est* trichobotria arranged in three groups ($esb_{1\text{-}2}$, $em_{1\text{-}2}$ and *est*); three *v* trichobothria. Chela manus (Fig. 161B-E): *Dt* situated in proximal third of manus; Eb_3 close to $Eb_{1\text{-}2}$; *Esb* closer to *Est* than to *Eb* group, usually aligned with *Est*; *Est* situated near midpoint; four *V* trichobothria, V_3 distant from V_4. Fixed chela finger with *db* situated on dorsal surface; *esb* distinctly closer to *eb* than to *est*; *eb* situated at base of finger, proximal to point of articulation between fixed and movable fingers; two *i* trichobothria.

Coxosternum (Fig. 163A, C): Anterior margin of coxa III narrow and markedly elongated distally, without anterodistal process. Sternum equilateral pentagonal (anterior width slightly greater than posterior width), as long as wide or nearly so.

Legs (Fig. 164): Femora I-IV with ventral surfaces bicarinate, pro- and retroventral carinae granular. Retrolateral margins of tibiae I-II without setiform macrosetae. Basitarsi I-IV: pro- and retroventral rows each with 4/4, 4/5, 4/5 and 4/5 setiform macrosetae, respectively. Telotarsi I-IV: pro- and retroventral row each with 4/4, 4/4, 5/5 and 5/5 setiform macrosetae, respectively; retroventral row with one proximal spinule; ventromedian spinules absent. Ungues shorter than telotarsus, half its length or less.

Genital operculum (Fig. 163A): Composed of two subtriangular sclerites.

Pectines (Fig. 163A-B): Moderately elongated, distal edge reaching but not extending beyond distal edge of coxa IV; fulcrae and three marginal lamellae present. Pectinal teeth count 9; teeth straight, entirely covered with sensory papillae.

Fig. 163. *Hormurus hypseloscolus* sp. nov., coxae II-IV, sternum, genital operculum and pectines, ventral aspect (A, D), left pecten under UV light (B, E), anterior margin of coxae III (C, F). (A-C) Male holotype (AMNH [LP2717]). (D-F) Female paratype (AMNH [LP2717]). Scale lines: 2 mm.

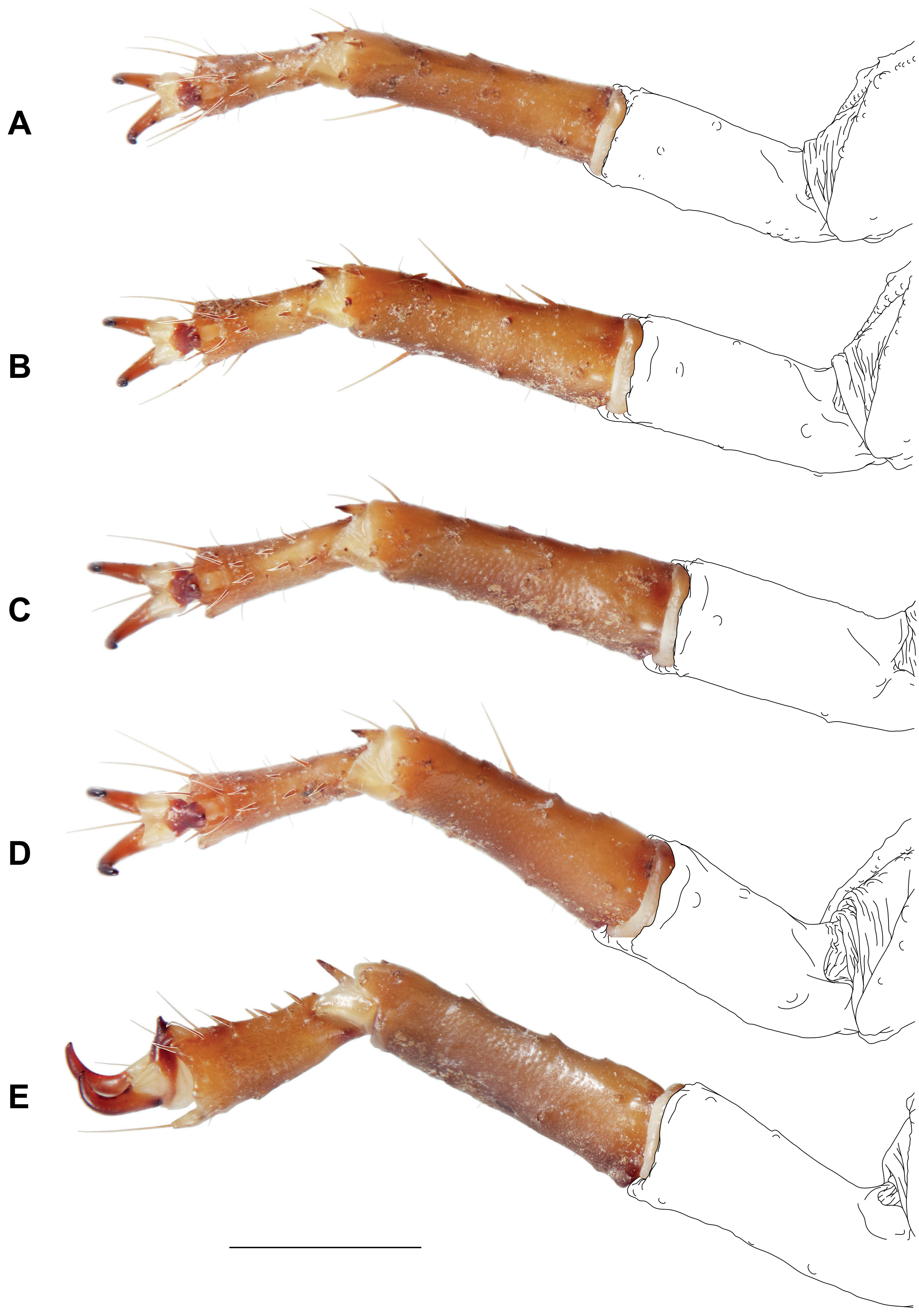

Fig. 164. *Hormurus hypseloscolus* sp. nov., male holotype (AMNH [LP2717]), right tarsi, ventral (A-D) and retrolateral (E) aspects. (A) Tarsus I. (B) Tarsus II. (C) Tarsus III. (D-E) Tarsus IV. Scale line: 2 mm.

Mesosoma (Figs 159A-B, 160A, E): Pre-tergites I-VII and posterior margins of pre-tergites smooth. Post-tergites: posterior margins of tergites I-VI sublinear, without distinct projection; lateral transversal sulcus present; intercarinal surfaces of I-II smooth medially, finely granular laterally; anterior half of intercarinal surfaces of III-VI smooth medially and finely granular laterally, posterior half finely granular; intercarinal surfaces of VII finely granular except along anteromedian margin; intercarinal surfaces of III-VII with distinct reticulate network of ridges and dimples. Respiratory stigmata (spiracles) of sternites IV-VI short, their length less than third of sternite width, and distinctly crescent shaped. Sternite VII acarinate.

Metasoma (Fig. 165B-C): Not markedly compressed laterally; sparsely and minutely granular, posterior segments less so; dorsal intercarinal surface of V smooth and shiny medially; distinct dorsomedian sulcus on segments I-IV, much less pronounced on segment V (usually only faintly expressed anteriorly).

Metasoma carinae: Segments I-IV: dorsolateral carinae obsolete on all segments; lateral median carinae weakly developed (as faint ridges); lateral inframedian carinae distinct anteriorly, developed as a faint ridge on segment I, absent on other segments; ventrolateral carinae weakly developed (as faint ridges); paired ventrosubmedian carinae weakly developed (as low ridges). Segment V: dorsolateral and lateral median carinae obsolete; ventrolateral carinae only expressed as faint ridges; ventrosubmedian carinae fused, only expressed as a faint ridge in anterior two-thirds.

Metasoma spination: Segment I: dorsomedian posterior and dorsolateral posterior spiniform granules absent; ventrolateral carinae without large spiniform granules; ventrosubmedian carinae with one pair of subposterior spiniform granules and one pair of median granules.

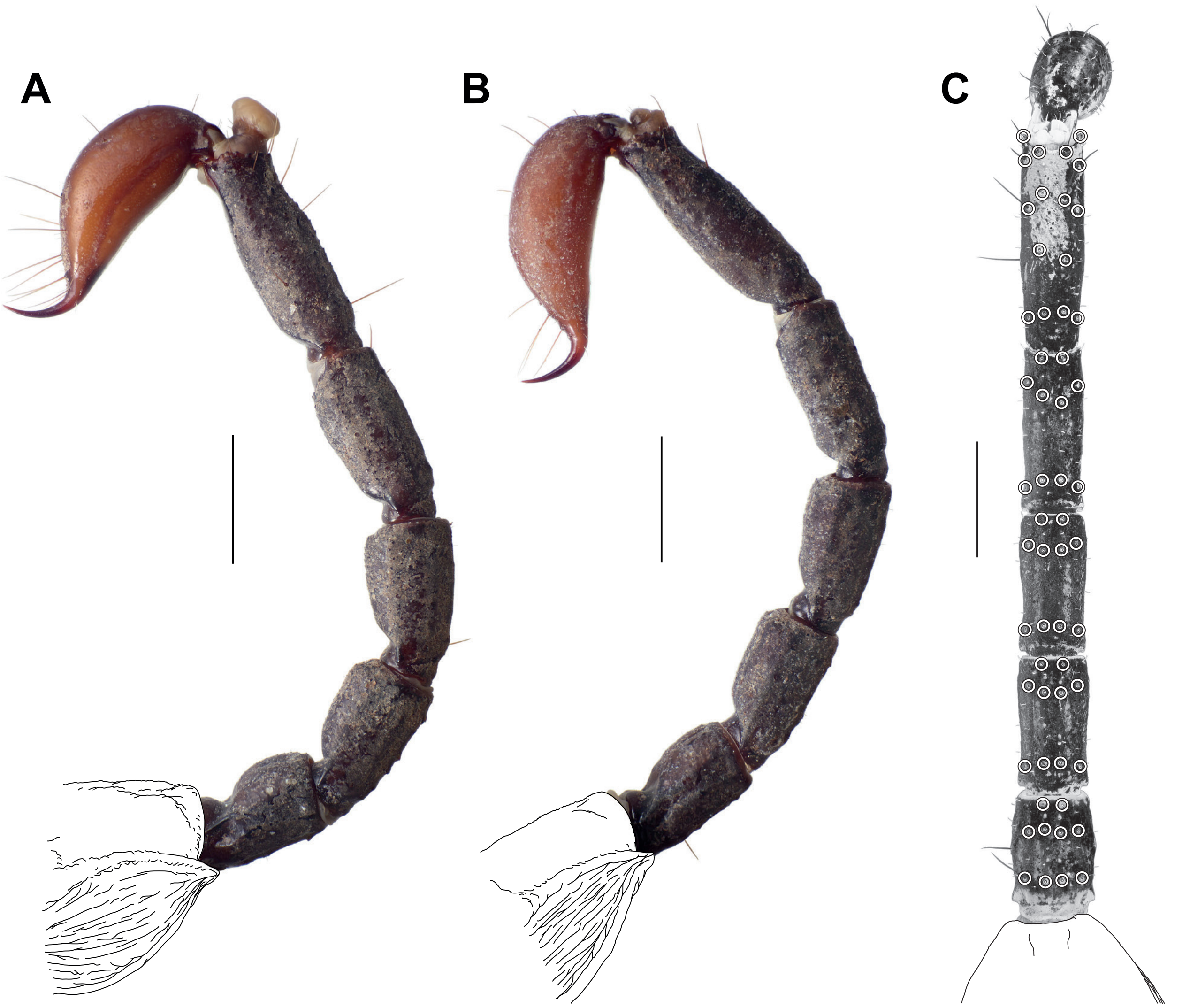

Fig. 165. *Hormurus hypseloscolus* sp. nov., metasoma and telson, lateral (A-B) and ventral (C) aspects. (A) Female (AMNH [LP2717]). (B-C) Male (AMNH [LP2717]). Scale lines: 3 mm.

Fig. 166. *Hormurus hypseloscolus* sp. nov., left hemispermatophore of male holotype (AMNH [LP2717]). (A) Lateral aspect. (B) Anterior aspect. (C) Contralateral aspect. Scale line, 1 mm.

Segment II: Dorsomedian posterior and dorsolateral posterior spiniform granules absent; ventrolateral carinae without large spiniform granules; ventrosubmedian carinae with one pair of subposterior spiniform granules and two pairs of median spiniform granules. Segments III-IV: dorsolateral posterior spiniform granules absent; ventrolateral and ventrosubmedian carinae without large spiniform granules. Segment V: ventrolateral and ventromedian carinae with few scattered small spiniform granules; anal arch crenulate.

Ventral metasoma setation: Segments I-IV each with ten macrosetae, i.e. three pairs (anterior, median and posterior) on ventrosubmedian carinae and two pairs (anterior and supramedian) on ventrolateral carinae; segment V with 16 macrosetae, i.e. four pairs (anterior, median, subposterior and posterior) on ventrosubmedian carinae and four pairs (anterior, supramedian, subposterior and posterior) on ventrolateral carinae.

Telson (Fig. 165B): Slightly longer than metasoma segment V; vesicle smooth, without granules; aculeus short (less than half of vesicle length), sharply curved.

Hemispermatophore (Fig. 166): Stalk distinctly longer than stem. Distal lamina at least slightly curved, without distal crest on anterior margin; single laminar hook, situated in distal half of stalk (basal part/distal lamina ratio = 1.84-1.93, median = 1.88); transverse ridge distinct, significantly more proximal than base of laminar hook and merging with anterior margin significantly more proximally than base of laminar hook. Capsule: hemisolenos thin, folded on itself only proximally, above that unfolded to flattened distal tip (tip and base approximately of same width), without lateral longitudinal carina, laterodistal accessory hook or medioposterior accessory apophysis; tip of hemisolenos more proximal than base of laminar hook, more distal than tip of clasper. Clasper well developed, forming distinct hump, not hook-like, without anterior accessory process. Subex well developed, spoon-shaped, merging anteriorly with base of clasper; posterior edge forming obtuse angle (>90°) with hemisolenos; anterior edge forming right angle (90º) with hemisolenos.

Description of adult female: Same characters as for male except as follows. *Colouration* (Fig. 159C-D): Legs darker than in male, almost as dark as tergites.

Carapace (Fig. 160C-D): Slightly more sparsely granuler than in male, posteromedian margin smooth.

Pedipalps (Figs 159C-D, 161A, F, K): All segments noticeable shorter and more robust than in males.

Chela fingers (Fig. 162B): Dentate margins linear or nearly so, without pronounced lobe and notch, with two rows of primary denticles extending from tip to base of fingers and bearing large inner accessory denticles.

Trichobothria: Patella: two *esb*, two *em* and one *est* trichobotria arranged in three (esb_{1-2}, em_{1-2} and *est*) or four (esb_1, esb_2, em_{1-2} and *est*; esb_1 distant from esb_2) groups.

Coxosternum (Fig. 163D, F): Anterior margin of coxa III distally not as elongated and broader than in males.

Leg spination: Telotarsi I-IV: pro- and retroventral rows each with 3-4/4, 3-4/4, 5/4-5 and 5/5 setiform macrosetae, respectively.

Genital operculum (Fig. 163D): Oval to semi-oval, longer than wide (length/width ratio = 1.03-1.28, median = 1.21); opercular sclerites partly fused, with distinct median suture; posterior notch present, at least weakly developed.

Pectines (Fig. 163D-E): Short, distal edge not reaching distal edge of coxa IV. Pectinal teeth count 6-9; teeth short and straight, sensory papillae covering only distal half.

Mesosoma (Figs 159C-D, 160B, F): Post-tergites: reticulate network of ridges and dimples on segments III-VII more distinct than in male; intercarinal surfaces of I-III medially smooth, laterally granular; intercarinal surfaces of III-VI smooth, lateral margins faintly granular; anterior third of intercarinal surfaces of VII smooth, posterior two-thirds finely granular.

Metasoma (Fig. 165A): Spination: ventrosubmedian carinae of segment II with one pair of subposterior spiniform granules and 1-2 pairs of median spiniform granules.

Intraspecific variation: *Pedipalp trichobothria:* On the retrolateral side of the patella trichobothria *esb*, *em* and *est* may be arranged in three (esb_{1-2}, em_{1-2} and *est*) or four (esb_1, esb_2, em_{1-2} and *est*) groups. On the retrolateral side of the pedipalp chela *Esb* may be situated slightly more proximal, not aligning with *Est*.

Leg spination: The number of setiform macrosetae varies from three to four proventrally on telotarsi I-II, and four to five retroventrally on telotarsi III.

Female genital operculum: The length/width ratio varies from 1.03 to 1.28 (median = 1.21).

Pectines: The pectinal teeth count varies from six to nine in females.

Metasoma: Spination: One more subposterior spiniform granule and one less median granule may be expressed on one of the ventrosubmedian carinae of segment I. On segment II the ventrosubmedian carinae have one or two pairs of median spiniform granules, and one extra subposterior granule may be expressed on one of them.

Hemispermatophores: The basal part/distal lamina ratio varies from 1.84 to 1.93 (median = 1.88).

Distribution and ecology: *Hormurus hypseloscolus* sp. nov. is only known from Fergusson Island in the D'Entrecasteaux Archipelago, off the northeastern tip of New Guinea, and it is probably endemic to the island (Fig. 167). The species only appears to inhabit the lowlands (below 900 m), contrary to the other two species recorded from the same island, i.e. *H. oyatabu* sp. nov. and *H. oyawaka* sp. nov., which are probably restricted to the highlands above 1000 m.

Remarks: Leonard John Brass was an Australian botanist and explorer (Van Deusen, 1971; Perry, 1971;

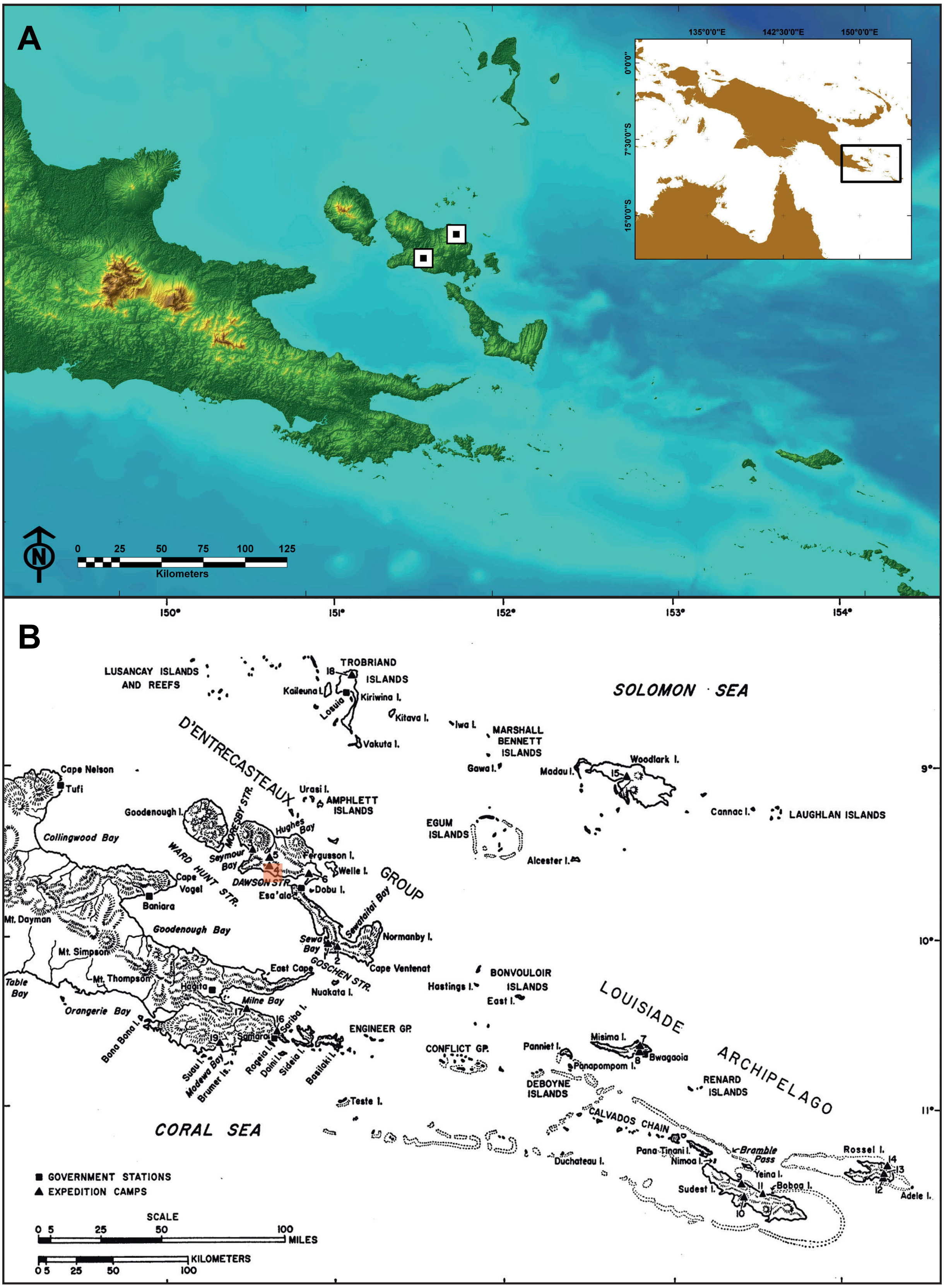

Fig. 167. (A) Known localities of *Hormurus hypseloscolus* sp. nov. on Fergusson Island in the D'Entrecasteaux Archipelago, Milne Bay Province, off the northeastern tip of New Guinea. The color gradient indicates topography and bathymetry. (B) Map of the fifth Archbold Expedition to New Guinea organised by the AMNH. Reproduced from Brass (1959). Locality 4 (mountains between Agamoia and Aluluai), where one female was collected, is indicated with a red square.

Forster, 1997). He was an Associate Curator for the AMNH from 1933 to 1966, and participated in six Archbold Expeditions to New Guinea, being leader of the last three. A female specimen of the present species was collected during the fifth Archbold Expedition (Brass, 1959).

Unidentified specimens

Several specimens examined in the course of this study could not be formally assigned to a known species or described as new taxa because of insufficient data. The absence of adult males or the poor quality of the preserved material prevented an unambiguous taxonomic assessment. The relevant specimens are listed below.

AMNH [LP 2741]; 1 juvenile ♀; Papua New Guinea, Central Province, Dorobisoro, 9.45°S, 147.92°E; 8.X.2003; leg. J.D. Slapcinsky.
Remark: The specimen appears to have affinities with *H. barai* sp. nov., but due to the lack of diagnostic characters in immatures and females it is not possible to unambiguously confirm its identity.

AMNH [LP 2718]; 1 ♀ or subadult ♀; Papua New Guinea, Morobe Province, Kamiali Guest House, 3 m, coastal forest, 7.30°S, 147.12°E; 12.X.2003; leg. J.D. Slapcinsky & F. Kraus.
Remark: The specimen is morphologically similar to those of *H. krausi* sp. nov., but the pedipalp segments are not as high and the chela more slender than in the latter species. The sex of the specimen (female) and the uncertainty regarding its developmental stage do not permit an unequivocal identification.

AMNH (without registration number); 1 ♂, 2 ♀; Papua New Guinea, Goodenough Island, east slopes, 900 m (Fig. 101B) [9°20'13''S, 150°15'32''E]; 25.X.1953; leg. K.M. Wynn, Fourth Archbold Expedition to New Guinea.
Remark: The specimens are badly preserved and probably dried up at some point before being placed back into alcohol. Moreover, the first two segments of the male metasoma, which are important for a morphometric diagnosis, are missing. The specimens share characters with those of *H. cameroni* sp. nov. and *H. muyua* sp. nov., but cannot be assigned unambiguously to either species. Fresh material needs to be collected to determine the taxonomic status of these specimens.

AMNH; 1 ♀, 1 subadult ♀, 1 juvenile ♀; Papua New Guinea, [Milne Bay Province], Cape Vogel Peninsula, Menapi [9°45'35''S, 149°55'54''E], camp 1; 21.III.-4.V.1953; leg. G.M. Tate, Archold Expedition.
Remark: Three female specimens from the series collected at the Menapi camp 1 do not belong to *H. menapi* sp. nov. described above. Their genital opercula are not as elongated as those of *H. menapi* sp. nov. The lack of males does not permit to accurately identify diagnostic characters to differentiate them from other taxa treated in the present contribution.

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