Review of the South African and Mozambican stomatopod fauna

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‘Through the naturalist’s eyes, a sparrow can be as interesting as a bird of paradise, the behaviour of a mouse as interesting as that of a tiger, and a humble lizard as fascinating as a crocodile’
—Gerald Durrell

The mantis shrimp: ‘known to fisherman as “prawn killers,” “thumb splitters,” or “devil shrimp”’
(Ahyong *et al.* 2017)

COVER PHOTOS. *Pterygosquilla capensis* Manning, 1969a, male, Kommetjie, Cape Town, photos taken by Jannes Landschoff.

Plagiarism declaration

I, Rouane Brokensha, hereby declare that I know the meaning of plagiarism, and that this thesis is all my own work, expect where otherwise acknowledged. This thesis and the work presented herein is a direct result of original research carried out at the Department of Biological Science, University of Cape Town. This work has not been submitted for a degree at any other university and any assistance I have received is fully acknowledged.

It is important to note that the taxonomic diagnoses presented herein closely resemble those given by previous authors in the literature. These diagnoses I have copied and added information where applicable. This is the way with taxonomic work where standardization of accounts is encouraged to limit any ambiguity caused by changing the text. I have made sure to reference all authors of taxonomic accounts used and acknowledge their work.

Signature: Signed by candidate Date: 13th October 2022

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Acknowledgements

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Abstract

Mantis shrimps or stomatopods (Crustacea: Stomatopoda) form an important component of the marine benthos and are notorious predators. Globally some 480 species have been described. However, the current taxonomic knowledge on the mantis shrimp fauna of southern Africa remains limited and outdated, with the last taxonomic revision of the group being that of K.H. Barnard in 1950, who recorded 17 species from South Africa and southern Mozambique. The present study aims to collate literature records, examine existing museum specimens, update species accounts and distribution records, and report on new species records from both South Africa and Mozambique. This study is primary based on the stomatopod collection housed at the Iziko South African Museum, Cape Town, South Africa.

A guide to the South African stomatopod fauna is presented in **Chapter 1**. Keys for South African superfamilies, families, genera and species are compiled to produce the first comprehensive and fully illustrated identification guide to the mantis shrimps of South Africa. Detailed taxonomic accounts of all known species are given, and drawn illustrations presented for those species for which material was available, which includes new feature variations for species and genera worldwide, as well as in South Africa. Five species are added as new records for the region, increasing the number of South African stomatopods from 26 to 31 species belonging to 20 genera from nine families. *Lysiosquilla colemani* is recorded for the second time globally as a new record for the Western Indian Ocean and South Africa. Another little-known species, *Gonodactyllelus crosnieri,* is also recorded for the second time and represents a new species record for South Africa. Furthermore, genus *Odontodactylus* comprised of two species, *O. hansenii* and *O. scyllarus*, is taxonomically presented from South African material for the first time. The second species of *Clorida* from South Africa, *C. albolitura* is also recognised as a new record for southern Africa.

Chapter 2 reports on notable stomatopods from Mozambique present in the material housed in the Iziko South African Museum. Seven species are recorded for the first time from Mozambican waters, bringing the known Mozambican stomatopod fauna to 22 species in 17 genera and eight families. Taxonomic accounts of eight species are given, seven of these representing new species records, while the eighth description is of the previously poorly documented species, *Erugosquilla woodmasoni*, which is reported on from new material. The new record of *Manningia australiensis* represents the first record of the family Eurysquillidae from southern Africa.

While this study examines existing collections of southern African stomatopods, it was not possible to sample additional fresh material and the stomatopod fauna of southern Africa, and especially Mozambique, remains highly under-sampled. The present guide and species additions provide a detailed account of the fauna, thereby improving our current understanding of this distinctive group in this unique geographic area. Using this guide and the collated information therein, future taxonomic work will be well-equipped to take advantage of modern techniques when collecting new material from previously under-sampled habitats.

Background and motivation

Today, the natural world is facing many threats, one of which is a loss of biodiversity referred to as the 6th mass extinction. Meanwhile, globally, and particularly in southern Africa, we have hardly scratched the surface of foundational biodiversity research. This is especially true in the marine realm for smaller and more cryptic taxonomic groups. The latest South African National Biodiversity Assessment (NBA) draws a clear picture of South Africa's exceptional marine biodiversity on the one hand, and its threats and pressures on the other hand. One of its key findings is that marine species, particularly marine invertebrates, are highly data deficient (Sink *et al.* 2019). The marine Taxonomic Working Group (TWG) held at SANBI in 2019 informed the NBA and proposed 10 priority action plan points for the management and restoration of marine biodiversity in South Africa. These points include the improvement of the accuracy of taxonomic components of biodiversity research, the support of South Africa's young taxonomists, the development of modern taxonomic keys and the enhancement of research on biodiversity priority groups, such as Crustacea.

The South African coastline and offshore environment support an exceptional diversity of marine ecosystems and biodiversity, with a high level of endemism (Sink *et al*. 2019). At least 13 000 marine species are recorded for South African, of which some 26 to 33% are considered endemic (Sink *et al.* 2019). South Africa's diversity is principally credited to the dynamic influences of the Atlantic, Southern and Indian Oceans, creating a highly variable oceanographic regime. While depth habitat has a major influence over offshore biological communities, inshore and coastal species assemblages are highly influenced by the coastal temperature regimes. The west (Atlantic Ocean) coast has a relatively broad continental shelf and is influenced by the cold temperate Benguela Current. In contrast, the east (Indian Ocean) coast has a narrow shelf and is dominated by the swift-flowing, warm temperate Agulhas Current. Both these currents interact on the south coast, creating a highly unique marine environment which hosts a high proportion of endemic species. Worldwide, South Africa's marine realm is recorded to have the third highest endemism with peak levels of marine endemism consistently reported for the south coast.

In comparison to other African countries, South Africa has a strong history of taxonomic research, resulting in the regional marine fauna being relatively well-documented. This is especially true for intertidal and nearshore environments. However, this is not true of other southern African counties. Beyond the relatively consistent sampling of Inhaca Island, Maputo Bay, and its immediate surroundings, the Mozambican Channel and coastal habitats have been erratically sampled, with the regional biodiversity reflecting this poor sampling effort. In South Africa, the targeted sampling of marine benthic invertebrates was predominantly conducted during the University of Cape Town Ecological Survey between 1940 and 1980, since which time collecting has been limited. Benthic invertebrate sampling has been most intense along the west coast, with several inshore sites such as Lambert's Bay, St. Helena Bay, Saldanha Bay, Table Bay and False Bay being particularly well-sampled. The south and east coasts have less sampling coverage with the coast of KwaZulu-Natal being highly data-deficient (Griffiths *et al*. 2010). The Iziko South African Museum, Cape Town, houses the primary collection of southern African marine invertebrates, comprising some 129 000 records with significant coverage of most major marine taxa (Griffiths *et al*. 2010). However, the collections of some of these groups have not been studied for decades, due to the very limited number of marine taxonomic experts working in the regional museums and universities.

The mantis shrimps or stomatopods (Order Stomatopoda) are an example of one such group where regional taxonomic coverage is limited and largely outdated. Early records of stomatopod diversity in southern Africa were included in broader studies of regional Crustacea (Krauss, 1843; Stebbing, 1902; 1908; 1910; 1917), usually

including species from both South Africa and southern Mozambique. The last dedicated account of the stomatopods of southern Africa and review of the specimens housed in the Iziko South African Museum was by Barnard (1950). Since Barnard's work species records for southern Africa have been scattered in the literature (Barnard, 1955; 1958; 1962; Kalk, 1958; Manning, 1969a; Kensley and Buxton, 1984; Manning and Makarov, 1978; Ahyong, 2005) and except for the most recent study by Ahyong (2005), date back at least half a century. Globally, the last 50 years have seen great advancements in the morphological taxonomy of stomatopods and modern molecular tools have been found to be a valuable resource in the diagnosis of stomatopods (Ahyong *et al*. 2020; Ahyong and Lin, 2022). This means that most accounts of stomatopods from southern Africa are outdated, both in terms of morphological terminology and nomenclature, as well as lacking comprehensive illustrations of modern diagnostic features. Also, the mantis shrimp fauna of South Africa has not been treated in its entirety since Barnard (1950) making it difficult for non-specialists to either keep track of the diversity of the group, or to accurately identify sampled species.

Thus, there is a great need for an update of the southern African stomatopod fauna that provides modern taxonomic tools to better identify species in the field and to inform broader biodiversity research for national as well as global comparison. The present study aims to taxonomically review the stomatopod fauna of southern Africa to produce an identification guide to the South African species and to report on new species records from Mozambique.

Chapter 1: Guide to the Mantis Shrimps (Crustacea: Stomatopoda) of South Africa

ABSTRACT:

Mantis shrimps are important predatory crustaceans in the marine benthos and comprise some 480 described species worldwide, the majority inhabiting the tropics, with a few found in temperate regions. However, current taxonomic knowledge of the mantis shrimp fauna of South Africa is limited and outdated. The aim of this study is to collate literature records, examine existing museum specimens, update species accounts and to report on new species records for South Africa. Based on the collection in the Iziko South African Museum, Cape Town, five species are added to the national fauna, increasing the number of South African stomatopods from 26 to 31 species. Where possible, inaccuracies from outdated or inadequate previous descriptions are rectified. Taxonomic species accounts of all known national species are compiled to present the first comprehensive and fully illustrated identification guide of the stomatopods from South African waters.

INTRODUCTION:

Stomatopods, commonly known as mantis shrimps, are exclusively predatory marine malacostracan crustaceans of the order Stomatopoda. Worldwide, some 480 species exist within seven superfamilies, which exhibit great diversity in body morphology and habitat. Most studied in coastal waters, mantis shrimps play an important ecological role as prey species, as well as infamous benthic predators. Considered the most efficient benthic predators and known of as the “thug(s) of crustaceandom” (Schmitt, 1965), stomatopods capture their prey in various ways, depending on the form and hold of the dactylus of the raptorial claw. The dactylus of the raptorial claw can be extended for spearing or folded in the form of a club for smashing. Although all stomatopods can imitate either attack method, these two methods of striking prey define two broad functional groups within the Stomatopoda: the ‘spearers’ (Fig. 1.2D) and the ‘smashers’ (Fig. 1.2C) (Caldwell and Dingle, 1976). The strike of the mantis shrimp is extremely fast, approaching 5–8 milliseconds, and the force of the most powerful ‘smasher’ can mimic that of a .22 calibre bullet and smash glass up to 10 mm thick (Patek and Caldwell, 2005). Mantis shrimps also have commercial value, with some species’ striking colours making them desirable in the aquarium trade, while others are harvested for mostly Asian or eastern cuisines. Only a few species of Squillidae and Lysiosquilldae are commercially targeted, the most commonly harvested being *Squilla mantis* (Linnaeus, 1758) from the Mediterranean Sea and *Oratosquilla oratoria* (De Haan, 1844) from East Asia (Ahyong, 2012).

Comprised of seven extant superfamilies, 17 families with over 100 genera, the mantis shrimps are known to occupy a wide range of habitats, ranging from the tropics and subtropics to temperate and subantarctic waters and from the intertidal to depths of 1500 m. In general, they are highly abundant in soft and level sedimentary systems and noticeably common on coral reefs (Ahyong, 2012). Members of Gonodactyloidae, or gonodactyloids, are most active during the day and inhabit the widest range of habitat types, but typically are most common in coral reef systems and lagoon seagrass beds. Members of other superfamilies are typically nocturnal and dig U-shaped burrows in soft substrates. The members of Lysiosquilloidae (lysiosquilloids) and Squilloidae (squilloids) are abundant from the shore to the continental shelf, while members of Bathysquilloidae (bathysquilloids) are typically deep-water species from the outer shelf.

South Africa's coast includes two major current systems, the cold Benguela and warm Agulhas Currents, with conditions ranging from cold temperate in the west to subtropical in the north-east. The region thus supports an unusually high diversity of habitats and a very diverse marine biota of some 13 000 described species (Sink *et al*. 2019). South Africa is also considered the southeastern distribution limit for many species widespread in the Indo-West Pacific, thus species records from this region are important for understanding global species distribution patterns. The South African stomatopod fauna is reported on herein.

WORLD STOMATOPOD STUDIES

The taxonomy of Stomatopoda is comparatively well-known globally, with increased scientific focus on the group over the last 50 years. In the Atlantic, Manning (1969b; 1977a) revised the stomatopod fauna, recognizing 62 species representing 18 genera for the western Atlantic and 28 species representing 18 genera for the eastern Atlantic. Manning (1977a) listed four species occurring on both sides of the Atlantic and these four were considered widespread in the Indo-West Pacific, however, currently only two are still recognised from both localities. Including Schmitt's (1940) study on the eastern Pacific stomatopods, an estimated 160 species are currently known from the Atlanto-East Pacific (Ahyong, 2012).

In the Western Indian Ocean, 15 species are recognised from Mozambique (Barnard, 1950; 1958; 1962; Kalk, 1958; Manning, 1969a; Manning and Makarov, 1978). Manning (1968a; 1970a and b, 1978a, b and c) revised the stomatopod fauna of Madagascar, recognising 30 species. Moosa (1984) listed 26 stomatopod species from Réunion and Mauritius, 24 and 12 species respectively, while more recent work found 17 species from Réunion (Poupin, 2009; Legall and Poupin, 2022). Meanwhile, 14 species were recorded from the Comoros and Mayotte Islands in the Mozambican Channel (Poupin *et al.* 2019). Twenty species are known from the Seychelles (Manning, 1962a; Moosa and Cleva, 1984), while the first major work on the stomatopods from Somalia found 17 species for the region (Cappola and Manning, 1995).

The stomatopods of the Indo-West Pacific comprise the largest portion of species worldwide and have also received the most attention. They were first studied by Kemp (1913), recognizing 139 species worldwide, of which 98 are from the Indo-West Pacific. Other major taxonomic treatments of the Indo-West Pacific include Moosa's (1986, 1991) study of the Stomatopoda of the Philippines and New Caledonia, as well as Manning's (1995) revision of Serène's stomatopod collection from Vietnam.

Table 1. 1. **Stomatopod species richness** for localities in the southeastern Atlantic and Indo-West Pacific recorded prior to the present study. Adapted from Poupin *et al.* 2019.

Region	Number of stomatopod species	Reference
Namibia	1	Abelló and Macpherson (1990)
South Africa	26	Barnard (1950; 1955); Manning (1969a); Kensley and Buxton (1984); Ahyong (2005)

Mozambique	15	Barnard (1950; 1958; 1962); Kalk (1958); Manning (1969a); Manning and Makarov (1978)
Comoros and Mayotte	14	Poupin *et al*. (2019)
Madagascar	30	Manning (1968a; 1970[a and b]; 1978 [a, b, and c])
Réunion	17	Moosa (1984); Poupin (2009); Legall and Poupin (2022)
Mauritius	24	Moosa (1984)
Somalia	17	Cappola and Manning (1995)
India	72	Trivedi *et al.* (2020)
Vietnam	72	Manning (1995)
Singapore	17	Ahyong (2016)
Philippines	85	Moosa (1986); Ahyong (2004)
Taiwan	72	Ahyong *et al.* (2008); Wang and Chiou (2017); Ahyong and Lin (2022)
Christmas, Cocos (Keeling) Islands	13	Ahyong (2014)
Australia	152	Ahyong (2001); Ahyong (2008); Ahyong and Wassenberg (2015)
New Caledonia	90	Ahyong (2007); Legall and Poupin (2022)
New Zealand	20	Ahyong (2012)
French Polynesia	45	Ahyong (2002b); Ahyong (2017); Ahyong and Caldwell (2017)
Hawaii	20	Ahyong (2002a)

It must be noted that the fauna of some areas has received more attention, with greater sampling effort and more regional studies (Table 1.1). For example, the high species richness (152 species) recorded for Australia is the result of the major contribution of Ahyong (2001) whose work has dominated studies of stomatopods in the Indo-West Pacific for the last 20 years (Table 1.1). Meanwhile, the low species number for such regions as South Africa and Mozambique reflect the sparse collecting efforts and the limited sampling of specific regional habitats.

PERVIOUS SOUTH AFRICAN STOMATOPOD STUDIES

In South Africa, the taxonomic study of stomatopods had many early contributors (Krauss, 1843; Hansen, 1895; Stebbing, 1902; 1908; 1910; 1917). These earlier records were assembled and reviewed with the inclusion of additional specimens in the first descriptive summary of South African stomatopod fauna by Barnard (1950).

Significant further taxonomic additions and revisions were provided by Manning (1969a). After Barnard (1950) and Manning (1969a), species descriptions and additions have been scattered in the literature (Manning, 1975a; Kensley and Buxton, 1984; Ahyong, 2005) making identification of local stomatopod species difficult in the field. To date, the two catalogues by Barnard (1950) and Manning (1969a), reviewing 17 and 13 species respectively, remain the primary sources of comprehensive taxonomic knowledge on this group in South African waters. The taxonomic accounts below provide the first fully illustrated and comprehensive guide to the known stomatopods of South Africa in over 50 years.

In South Africa, the underlying foundational knowledge of marine species, especially invertebrates, has been inadequate (Sink *et al.* 2019). Moreover, it is astonishing that every study on South African stomatopods has reported either a new species to science, or new species records for the region (Barnard, 1950; Manning, 1969a, 1975a; Ahyong, 2005) showing the underrepresentation of stomatopod diversity in the literature. The present guide focuses on the species with known occurrence records within the South African Exclusive Economic Zone (EEZ), thus species reported from southern Mozambique, although likely to occur in South Africa, are not included.

Both Barnard (1950) and Manning (1969a) reported on species from north of the South African border into southern Mozambique, anticipating species presence along the coastline south of the South African border into Maputo Bay to be uninterrupted. As a result, the most recently published estimate of mantis shrimp diversity in South Africa counted 35 species (Griffiths *et al*. 2010), whereas only 26 of these have been actually documented from within South African waters. For example, the cosmopolitan gonodactyloid species *Pseudosquilla ciliata* Fabricius, 1787, was erroneously reported on from South Africa by Barnard (1950), who examined a specimen collected from Maputo Bay (formerly Delagoa Bay), Maputo Province, Mozambique. This species is known to be widespread in the Western Indian Ocean, occurring in both Mozambique and Madagascar (Manning, 1970a) and while the present study examined several samples housed at Iziko South African Museum, it became clear that no known specimen has ever been collected from inside South Africa's EEZ. A similar situation is true for the squillid *Alima neptuni* (Linnaeus, 1768) reported on as *Squilla hieroglyphica* by Barnard (1950) and as *Squilla alba* by Manning (1969a). Barnard's account of *A. neptuni* and Manning's revision are based on a single specimen also collected from Maputo Bay, but the assumption that the species is recorded from South African waters is reiterated in the literature (Griffiths, 1999). Another two examples are *Gonodactylellus demanii* Henderson, 1893 and *Gonodactylaceus glabrous* Brooks, 1886 reported on by Barnard (1950) and unjustifiably considered present in South African waters without a species' occurrence record. *Lenisquilla lata* was also mistaken to occur within South Africa's EZZ (Manning, 1969a), when the original record was for a specimen collected off the Xai-Xai district, Mozambique (Barnard, 1950).

Barnard's (1950) catalogue remains the last full taxonomic study of the stomatopod material housed in the Iziko South African Museum. It is evident that with the accumulation of scattered literature records, new specimen deposits and developing national imperatives for marine biodiversity management in South Africa, there is a need for a comprehensive update on all known South African stomatopod species. The aim of the present work is to examine existing material and to document all known stomatopod species from South Africa, thereby making mantis shrimp identification easier and more accessible for regional researchers.

METHODS AND MATERIALS

STUDY AREA

The study region was restricted to localities within the South African Exclusive Economic Zone (EEZ) (Fig. 1.1), with the exception of a specimen of *Bathysquilla crassispinosa* (Fukuda, 1909) collected from off the east coast of South Africa just beyond the limits of the EEZ (Fig. 1.4).

The South African coastline measures 3650 km with an Exclusive Economic Zone (EEZ) of 1,068,659 km^2 around mainland South Africa reaching depths of 5,700 m (Griffiths *et al*. 2010). South Africa's marine environment is traditionally separated into three coastal regions; the cool temperate west coast, the warm temperate south coast, and the subtropical east coast, defined by their differing and interactive oceanographic and current regimes. The South African coast is dominated by two major current systems. To the west, the Atlantic coast is influenced by the cold Benguela Current and to the east, the warm Agulhas Current runs along the Indian Ocean coast with the southern mixing zone between Cape Agulhas and Cape Point experiencing an overlap in south and west oceanographic influences. The warm temperate *Agulhas* ecoregion on the south coast has consistently reported the highest marine endemicity for South Africa (Sink *et al.* 2019).

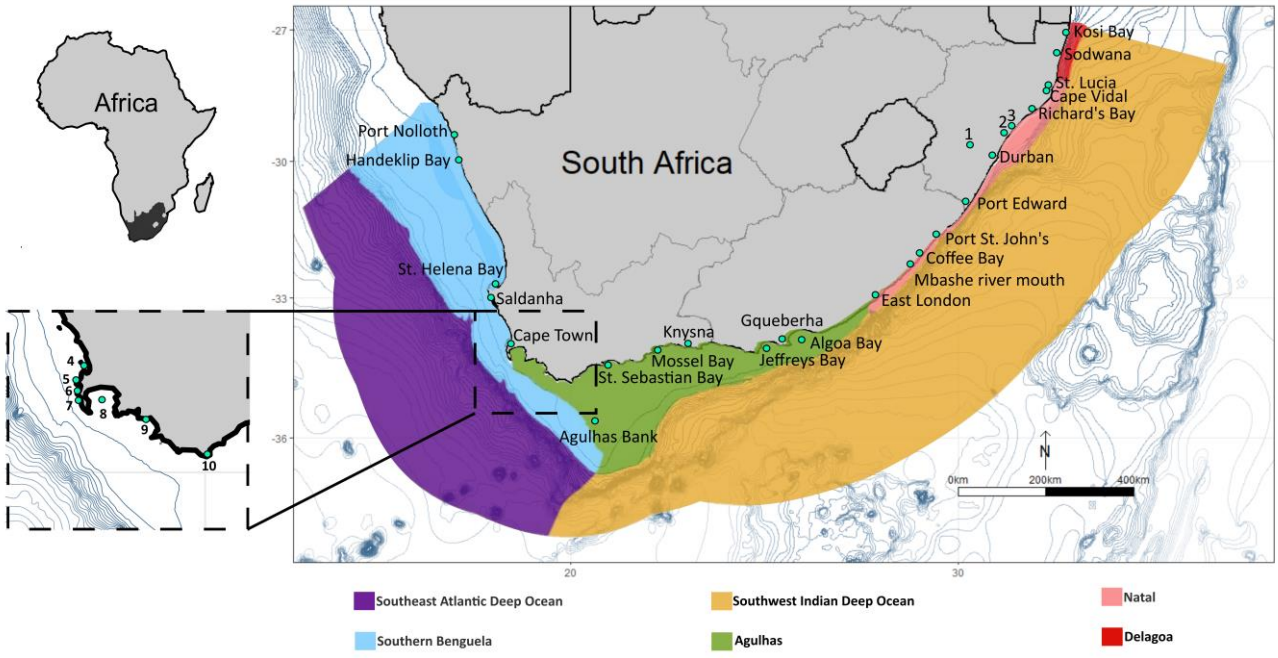

Figure 1.1. Map of the South African coast showing the exclusive economic zone with six ecoregions as defined by Sink *et al.* (2019) and 150 m bathymetry contour lines. Localities mentioned in the text: **1,** Pietermaritzburg; **2**, Kwadukuza; **3**, Tugela River Mouth; **4**, Table Bay; **5**, Kommetjie; **6**, Misty Cliffs; **7**, Oliphantsbos; **8**, False Bay; **9**, Hermanus; **10**, Stilbaai.

In terms of biogeography, the South African coast has been recently separated into six ecoregions (Fig. 1.1), which are further distinguished into regions to reflect areas with distinctive biodiversity patterns (Sink *et al.* 2019). Offshore, the *Southeast Atlantic Deep Ocean* spans the west coast and meets the *Southwest Indian Deep Ocean* on the south and east coasts. Meanwhile, running along the coast from west to south to east, are the

cool temperate *Southern Benguela*, the warm temperate *Agulhas* and the subtropical *Natal* and *Delagoa* ecoregions. The tropical *Delagoa* ecoregion in the far northeast of South Africa's Exclusive Economic Zone extends into southern Mozambique.

STUDY MATERIAL

All stomatopod material examined is based on preserved specimens housed in the Iziko South African Museum, Cape Town, South Africa (SAMC). The present study examined all adult mantis shrimp material deposited in the museum to provide a contemporary identification guide to the mantis shrimp fauna of South Africa. Specimens are preserved in 70% ethanol and their collection by hand, dredge, bottom or midwater trawl dates between 1875 and 2017. In general, only species occurring in the South African Exclusive Economic Zone are included herein, but in some cases specimens of these species housed in Iziko South African Museum from other localities were listed when these additional specimens extend known species distributions or include new morphological variations and were examined as comparative material.

Excluding one specimen of *Pterygosquilla capensis* collected during a mass washup event and photographed herein, no live specimens were available for assessment or illustration and therefore, species images of live mantis shrimp are either taken from online resources or from photographs taken by citizen scientists during shore dives in South African waters. Several specimens had locality records in the museum database with the pier at Durban harbour given as collection coordinates. It is most likely that these records were derived from the catch data of non-research fishing vessels. However, it is assumed that these specimens came from the area surrounding Durban. While the locality data are given in unchanged form herein, any descriptive data given, such as depth and named location, is reproduced to give the most accurate location available for each specimen. Other abbreviations or acronyms used to describe locality data are Northern Cape (NC), Western Cape (WC); Eastern Cape (EC); KwaZulu-Natal (KZN); collected (coll.); determined (det.), station name or number (stat.); SFI-RS *Africana* Anchovy recruitment cruise (SFI) and DSF-RS *Africana* Anchovy assessment cruise (DSF). Iziko South African Museum collection(s) hereafter referred to as 'Iziko collection'.

The guide follows the form of Ahyong (2012). Keys are given for the South African superfamilies, families, genera and species of the stomatopod fauna recorded from within the South African EZZ. However, the key to the diverse genera of family Squillidae includes some genera reported on by Barnard (1950) and Chapter 2 from southern Mozambique, due to the close physical proximity of these records to the South African border with Mozambique and hence high probability that they will eventually be recorded in South Africa. However, taxonomic entries are only given for genera and species already recorded from South Africa. Entries for superfamily, family and genus include the sections *Diagnosis*, *Composition* and *Remarks*. All diagnoses are adapted from the most recently published information, but most closely resemble Ahyong (2001; 2012).

Each species account includes the sections *Material examined* [sorted by South African province given in bold; specimens from outside the South African EEZ separated], *Diagnosis* [in full], *Colour in alcohol*, *Colour in life* [based on previous species accounts from the literature], *Measurements*, *Distribution and Habitat* [global and local] and *Remarks*. Maps showing the bathymetry of South Africa's coastline with 150 m contour lines are presented for previous and present records of each species' distribution within the South African EZZ. For most accounts a full taxonomic illustration is presented for each species. Species that have never been previously listed to occur in South Africa are indicated as new records. Moreover, in some cases, no preserved material was available in the museum collection for species previously reported from South Africa. These species are termed as originating from 'Literature' herein and are included in the guide as reported on by the most recent or appropriate literature pertaining to South African material. Preserved specimens of each species were

photographed and traced to produce digital drawings in Inkscape Project (2020). These figures show features considered most characteristic for each species in accordance with the most recent literature for each species. Distribution maps and other figures were produced using RStudio Team (2022).

TAXONOMIC TERMINOLOGY AND MEASUREMENTS

Each species synonymy is given according to the most recent literature. Taxonomic terminology and size descriptors follow Ahyong (2001; 2012) and as shown in the illustration of basic morphology below (Figs. 1.2–1.3). Total length (TL) is measured along the midline from the apex of the rostral plate to the apices of the submedian teeth of the telson. Carapace length (CL) is measured along the midline and excludes the rostral plate. Measurements of the antennule (A1) and antenna (A2) are expressed as proportionate to the carapace length (CL), unless specified otherwise. The relative lengths of the uropodal exopod segments and the endopod are useful for identifying some species, for which length and width are measured at the greatest length and width respectively. For other measurements and abbreviations used in the present study see summary below.

Summary of abbreviations for morphological structures and measurements:

A1	antennule	
A2	antenna	
MXP	maxilliped	
AS	abdominal somite	
TS	thoracic somite	
PLP	pleopod	
MD	median	
SM	submedian	
IM	intermediate	
LT	lateral	
MG	marginal	
CL	carapace length	
CI	corneal index	*100CL/corneal width*
AWCLI	abdominal-width carapace-length index	*100(AS5 width)/CL*
PI	propodal index	*100CL/propodus length*
PLDI	propodus length-depth index	*100propodus length/propodus greatest width*

The representation of spination of the abdominal carinae follows Ahyong's (2012) system. For example, 'SM 6, IM (4)5–6, LT 1–6, MG 1–5' means that the submedian carinae are posteriorly spined on AS6; the intermediate carinae may or may not be spined on AS4, but are always spined on AS5–6; the lateral carinae are spined on AS1–6 and the marginal carina are spined on AS1–5.

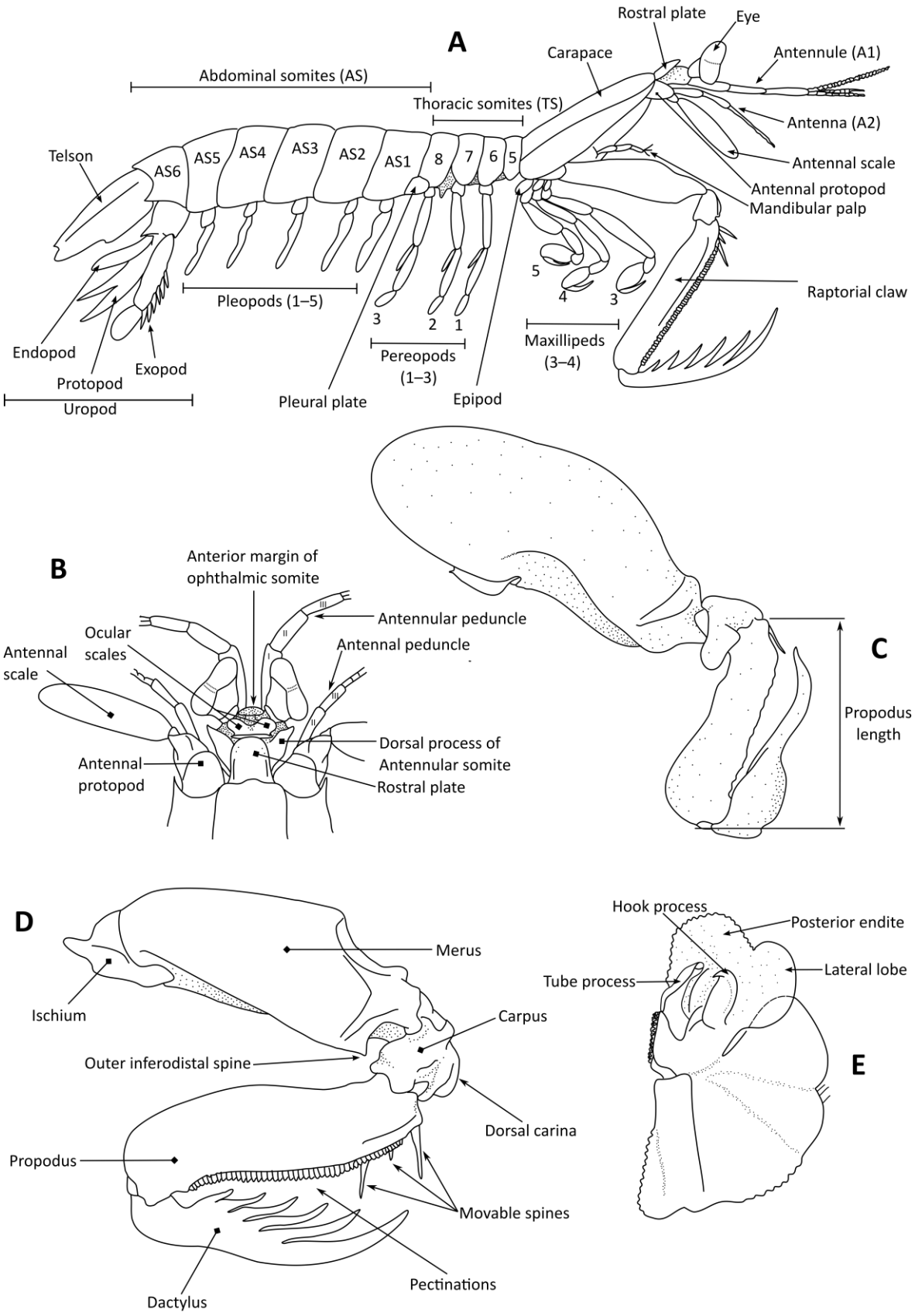

Figure 1.2. Stomatopod general morphology (adapted from Ahyong, 2012). **A,** entire, right lateral; **B,** anterior cephalothorax; **C,** right raptorial claw, 'smasher'; **D,** right raptorial claw, 'spearer'; **E,** right pleopod 1 endopod, male.

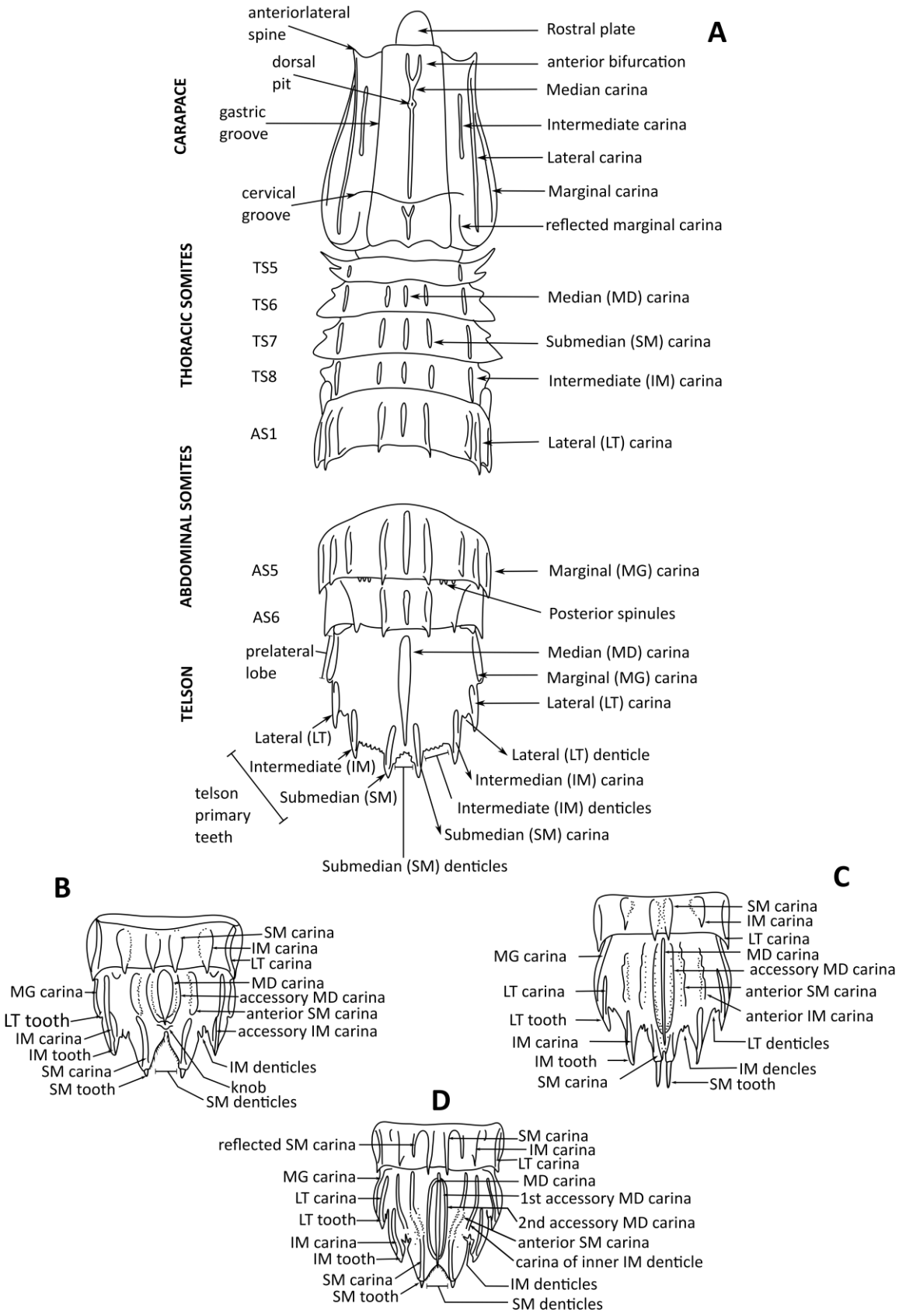

Figure 1.3. Stomatopod general morphology (adapted from Ahyong, 2001; 2012). **A,** dorsal carinae defined as a normal complement of carinae; **B,** telson (Gonodactylidae); **C,** telson (Eurysquillidae, Parasquillidae, Pseudosquillidae, Alainosquillidae and Hemisquillidae); **D,** telson (Odontodactylidae).

SYSTEMATICS

STOMATOPODA

Key to South African superfamilies of Stomatopoda

1. Apices of all primary teeth of telson movable (Figs. 1.4B; 1.5G)……**Bathysquilloidea**

– Apices of SM teeth of telson movable only, or all primary teeth of telson fixed……..2

2. Propodi of MXP3–4 subquadrate, with distal ribbing, telson lacking sharp MD carina……..**Lysiosquilloidea**

– Propodi of MXP3–4 ovate, without distal ribbing, telson with sharp MD carina……..3

3. Telson with 4 or more IM denticles……**Squilloidea**

– Telson with 1–2 (rarely 3) IM denticles……**Gonodactyloidea**

BATHYSQUILLOIDEA Manning, 1967a

Diagnosis (Ahyong, 2012). Cornea without rows of mid-band ommatidia; facets (if present) hexagonal. MXP3–4 propodi ovate, not ribbed or beaded ventrally. Body depressed, articulation compact. Raptorial claw with terminal ischiomeral articulation; propodus occlusal margin with 2 rows of fixed spines and 4 movable spines proximally; dactylus uninflated basally, occlusal margin lined with spines. Telson with distinct MD carina; all primary teeth with movable apices; IM denticles absent. Uropodal protopod with two primary spines; articulation of exopod segments terminal or distal segment separated from proximal by diaeresis.

Composition. Bathysquillidae Manning, 1967a, Indosquillidae Manning, 1995.

Remarks. Exclusively deep-water species, bathysquilloids are known for their degenerate eyes, consisting of a reduced cornea lacking a mid-band of ommatidia. Only one species is represented in South Africa waters.

BATHYSQUILLIDAE Manning, 1967a

Diagnosis (Ahyong, 2012). AS5 mid-posterior margin unarmed or at most with minute spinules, without long, posteriorly directed median spine. Telson wider than long, with rugose, tuberculate or granular dorsum. Segments of uropodal exopod fully articulated; distal segment longer than proximal.

Composition. *Altosquilla* Bruce, 1985; ***Bathysquilla*** Manning, 1963a.

Remarks. Only *Bathysquilla* is known from South Africa.

Bathysquilla Manning, 1963a

Diagnosis (Ahyong, 2012). Carapace with cervical groove distinct across dorsum. Male PLP1 endopod with lateral lobe on posterior endite. Telson posterior margin with 4 pairs of primary teeth, each with movable apices.

Composition. ***Bathysquilla crassispinosa*** (Fukuda, 1909); *B. microps* (Manning, 1961).

Remarks. One species known from South Africa.

Bathysquilla crassispinosa (Fukuda, 1909)

Figure 1.4(A–B) – 1.5(A–G)

Lysiosquilla crassispinosa Fukuda, 1909: 61, pl. 5 [type locality off Atami, Sagami Bay, Japan]; 1910: 146–149, pl. 4, fig. 4. –Barnard, 1950: 859–860, fig. 3b.

Bathysquilla crassispinosa. –Manning, 1969b: 95, 98. –Ingle and Merrett, 1971: 197. –Manning and Struhsaker, 1976: 440–443, figs. 1, 2. –Bruce, 1985: 474–475, fig. 4. –Moosa, 1986: 371, pl. 1. –Bruce, 1988: 87–89, figs. 2–5. –Manning *et al.* 1990: 312–313, fig. 1; 1991: 1–3, 13, figs. 1, 2; 1995: 18, 28. –Ahyong, 2001: 11–12, fig. 6.

Material examined. KZN: SAMC–A007812 1 male (TL 245 mm), north of Durban, 29°42'00.0"S 31°28'59.9"E, 1931, depth unknown, Fishery Marine Biology Survey Report 9, 1932, det. K.H. Barnard.

Other material examined. SAMC–A065722 1 male (TL 223 mm), continental slope, north of Durban, 29°44'48.0"S 31°25'36.0"E, 20 Aug 1988, 325 m, stat. 30-01, Icelandic trawl, SFI-RS *Benguela*.

Diagnosis. Eye large, cornea subglobular, pigmented. Rostral plate longer than broad; dorsally with broad median groove. Carapace anterolateral margin broadly rounded. Raptorial claw dactylus with 10–11 teeth; carpus dorsal margin with 2 slender spines; propodus occlusal margin with inner row of 9–11 large erect spines, outer row with 30–32 short spines. AS1–5 with indistinct IM carinae; MG carinae distinct; unarmed except for posterior spine of MG carinae. Abdominal carinae spined as follows: SM 6, LT 6, MG 1–5. Telson accessory MD carina indistinct, indicated by line of tubercles; anterior SM carinae short, low, indicated anteriorly, subparallel to MD carina. Uropodal protopod dorsally with tuberculate carina; outer margin with short ventral spine anterior to exopod articulation. Uropodal exopod proximal segment unarmed dorsally except for dorsal spine above exopod articulation; outer margin with lower row of short, fixed teeth corresponding to upper row of 6–11 movable spines.

Colour in life. Eyes with metallic grey cornea. Dorsally reddish orange with propodus and dactylus of raptorial claw, pereopods, uropodal exopod and endopod pale orange to yellow.

Measurements. Male (n = 2) TL 223–245 mm. A1 peduncle 0.74–0.80CL. A2 scale 0.950–1.03CL. Uropod endopod length 2.56–2.89 times width. Largest specimen recorded at TL 297 mm (Barnard, 1950; Manning *et al.* 1990).

Distribution and Habitat: Widely distributed in the Indo-West Pacific from South Africa, Madagascar, Australia, Philippines, South China Sea, and Japan. A deep-water species occurring in soft sediment at depths between 240–297 m.

Remarks: *Bathysquilla crassispinosa* was first reported from South Africa by Barnard (1950). Although Barnard (1950) noted that his specimens lacked papillae on the antennal protopod, re-examination of his material by Ingle and Merrett (1971) found the antennal protopod to have two distinct papillae and thus there are no recorded differences between specimens from Japan and the Indian Ocean. Two papillae were observed for the present material.

In agreement with Ahyong (2001), the South African specimens examined exhibit several differences compared to the account of the holotype (Fukuda, 1909; 1910). As with the Australian material, both South African specimens have strongly serrated mid-dorsal carinae of the proximal uropodal exopod (Fig. 1.5G) instead of the relatively smooth illustration of the holotype (Fukuda, 1910). Accounts by Moosa (1986) and recent examination by Ahyong (2001) of specimens from the Philippines also show an absence of mid-dorsal carina serration. Further study is needed to determine the significance of this difference. One notable difference between Australian and South African material is the reduced number of short spines on the outer row of the propodus toothed margin of the raptorial claw dactylus: 30–32 reported herein for South African specimens rather than 32–39 reported for Australia (Ahyong, 2001). The use of morphological and genetic tools in comparing material from all localities is needed to clarify the observed differences.

Barnard recorded two female specimens from off Durban which included South Africa's largest recorded specimen of 297 mm from depths between 240–270 m. Unfortunately, Barnard's specimens could not be found in the museum collection and are presumed lost, making re-examination and comparison of uropodal serration impossible. It is assumed that the specimens exhibited similar serration to the present study material.

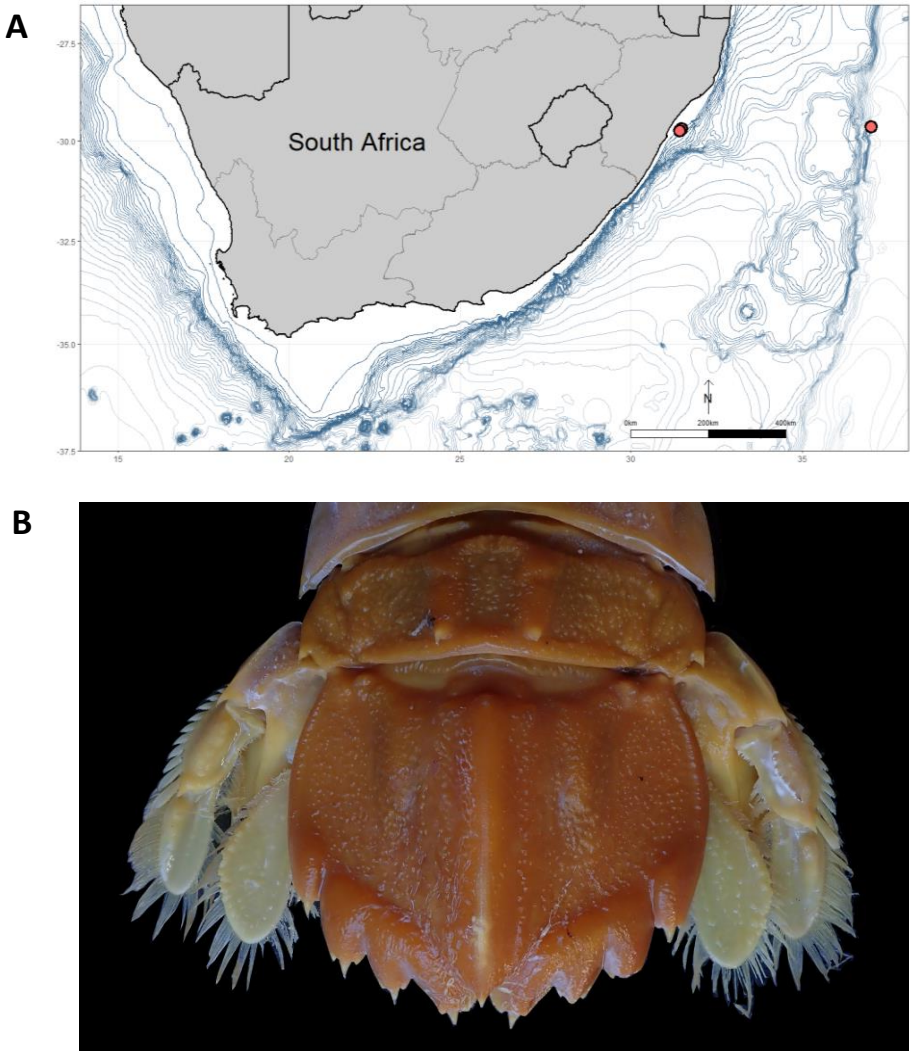

Figure 1.4. *Bathysquilla crassispinosa* (Fukuda, 1909). **A,** South African distribution; **B,** telson dorsal, male TL 223 mm, SAMC–A065722.

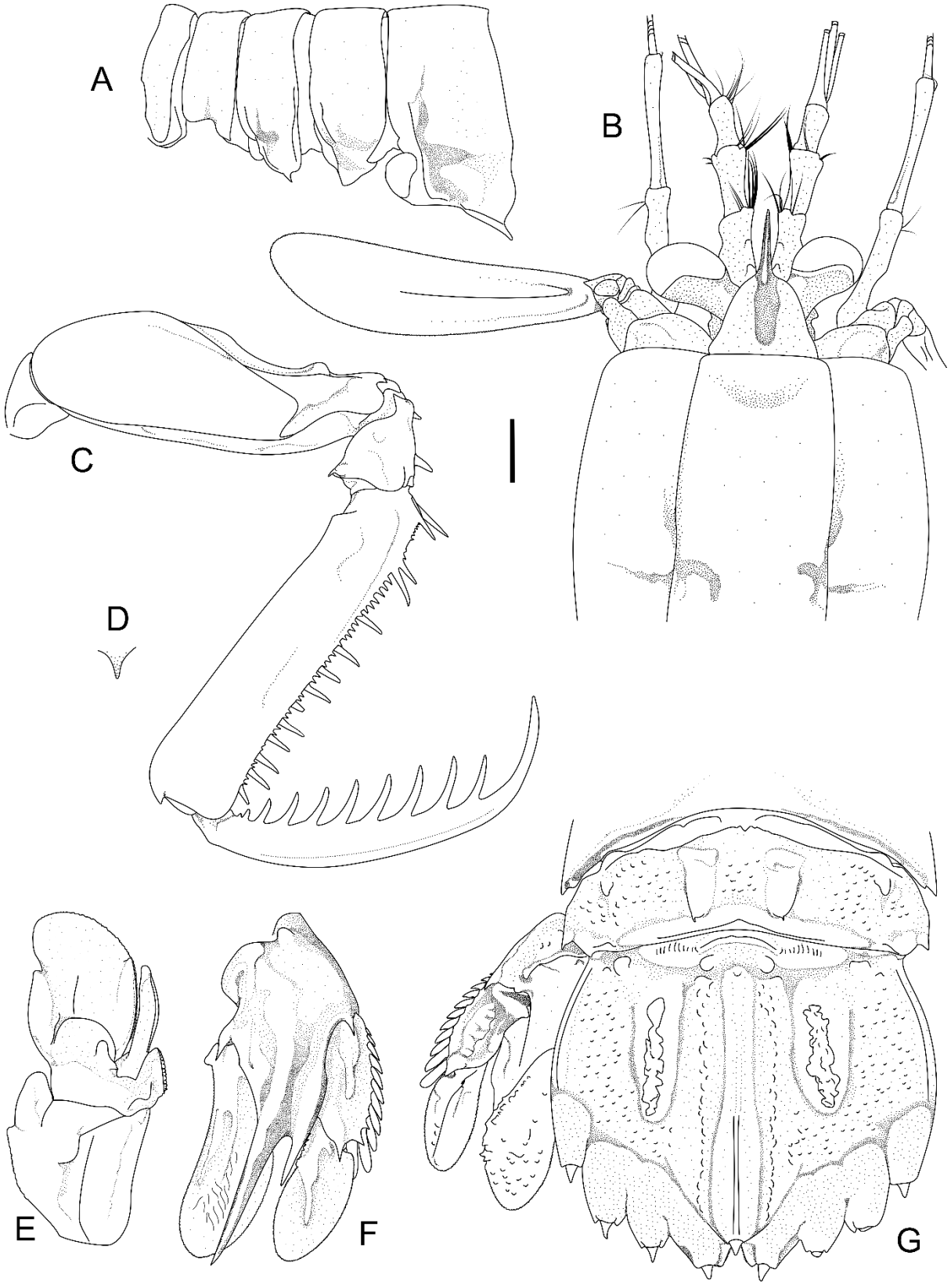

Figure 1.5. *Bathysquilla crassispinosa* (Fukuda, 1909) male TL 223 mm, SAMC–A065722. **A,** TS5–8 and AS1, left lateral; **B,** anterior cephalothorax, dorsal; **C,** right raptorial claw, lateral; **D,** TS8 sternal keen, posterior; **E,** left pleopod 1 endopod, anterior; **F,** left uropod, ventral; **G,** AS6, telson and left uropod, dorsal. Scale **A–D, F–G** = 10 mm, **E** = 5 mm.

GONODACTYLOIDEA Giesbrecht, 1910

Diagnosis (Ahyong, 2012). Cornea mid-band with 6 rows of rectangular ommatidia. Propodi of MXP3–4 ovate, not ribbed or beaded ventrally. Body subcylindrical, articulation compact. Raptorial claw with terminal or subterminal ischiomeral articulation; dactylus inflated or not inflated basally. Telson with distinct MD carina; SM teeth with movable apices; at most with 3 IM denticles, arising marginally. Uropodal protopod with 1 or 2 primary spines; articulation of exopod segments terminal or subterminal.

Composition. Alainosquillidae Moosa, 1991; **Pseudosquillidae** Manning, 1977a; Hemisquillidae Manning, 1980; **Odontodactylidae** Manning, 1980; **Gonodactylidae** Giesbrecht, 1910; **Protosquillidae** Manning, 1980; **Takuidae** Manning, 1995.

Remarks. Five families of Gonodactyloidea are recorded from South African waters and distinguished in the key below. The regional fauna comprises eight genera with a total of 14 species. Gonodactyloidea include the majority of coral reef and rocky shore stomatopods, most notably the 'smashers' of families Gonodactylidae, Protosquillidae, Odontodactylidae and Takuidae. Species of Alainosquillidae and Pseudosquillidae are the only gonodactyloids to bear a spearing claw (Ahyong, 2001) but only Pseudosquillidae is represented in South African waters.

Key to South African families of the GONODACTYLOIDEA

1. Raptorial claw with terminal ischiomeral articulation; base of dactylus uninflated or at most slightly thickened……..**PSEUDOSQUILLIDAE**

– Ischiomeral articulation of raptorial claw subterminal; base of dactylus strongly inflated into blunt heel.....2

2. Articulation of uropodal exopod segments terminal.....3

– Articulation of uropodal exopod segments subterminal.....4

3. Dactylus of raptorial claw with short teeth on inner margin. A2 protopod with articulated plate dorsally. AS6 articulating with telson. Telson with distinct MD carina.....**ODONTODACTYLIDAE**

– Dactylus of raptorial claw (Fig. 1.23A) without teeth on inner margin. A2 protopod (Fig. 1.23B) with fixed spine dorsally. AS6 (Fig. 1.23G) fused with telson (demarcation usually indicated by dorsal groove). Telson (Fig. 1.23G) with MD boss……**PROTOSQUILLIDAE**

4. Distal spines on outer margin of uropodal exopod stout, strongly recurved anteriorly (Fig. 1.32F, G).....**TAKUIDAE**

– Distal spines on outer margin of uropodal exopod slender, straight or slightly curved, not strongly recurved anteriorly.....**GONODACTYLIDAE**

GONODACTYLIDAE Giesbrecht, 1910

Gonodactylinae Giesbrecht, 1910: 148.

Gonodactylidae. –Manning, 1968b: 137.

Diagnosis (Ahyong, 2012). Rostral plate trispinous or with median spine and trapezoid basal portion. Antennal protopod dorsally with fixed, anteriorly directed spine or tooth. Raptorial claw with subterminal ischiomeral articulation; propodus occlusal margin sparsely pectinate; dactylus of raptorial claw without teeth on inner margin, outer basal margin strongly inflated into blunt heel. AS6 articulating with telson. Telson with distinct MD carina. Articulation of uropodal exopod segments subterminal. Distal spines on outer margin of uropodal exopod slender, straight or slightly curved, not strongly recurved anteriorly.

Composition. *Gonodactylaceus* Manning, 1995; ***Gonodactylellus*** Manning, 1995; *Gonodactyloideus* Manning, 1984a; ***Gonodactylolus*** Manning, 1970b; *Gonodactylopsis* Manning, 1969c; ***Gonodactylus*** Berthold, 1827; *Hoplosquilla* Holthuis, 1964; *Hoplosquilloides* Manning, 1978a; *Neogonodactylus* Manning, 1995.

Remarks. All gonodactylids bear smashing claws and are most abundant on coral reefs. Three gonodactylid genera are recorded from South African waters.

Key to South African genera of GONODACTYLIDAE

1. Mandibular palp absent .....***Gonodactylolus***

– Mandibular palp present 2

2. Ocular scales truncate, wider than base of median spine of rostral plate .....***Gonodactylus***

– Ocular scales rounded or angular, narrower than base of apical spine of rostral plate.....***Gonodactylellus***

Gonodactylellus Manning, 1995

Gonodactylellus Manning, 1995: 56–57. [Type species *Gonodactylus affinis* de Man, 1902, by original designation. Gender masculine].

Gonodactylinus Manning, 1995: 66. [Type species *Gonodactylus viridis* Serène, 1954, by original designation and monotypy. Gender masculine].

Diagnosis (Ahyong, 2012). Eye subcylindrical, cornea not broader than stalk in dorsal view. Ocular scales small, narrower than basal width of median spine of rostral plate, usually rounded dorsally. Rostral plate with slender median spine and short, broad, trapezoid basal portion. Anterolateral margins of carapace convex, extending anteriorly beyond base of rostral plate. Mandibular palp present. Propodus of raptorial claw with proximal movable spine in adults. Telson with 3 or 5 mid-dorsal carinae; IM carina of telson without accessory longitudinal carina on mesial margin; anus located ventrally. Uropodal protopod without lobes between terminal spines; endopod without spines on inner margin.

Composition. *Gonodactylellus annularis* Erdmann and Manning, 1998; *G. affinis* (de Man, 1902); *G. barberi* Ahyong and Erdmann, 2007; *G. bicarinatus* (Manning, 1968a); *G. caldwelli* Erdmann and Manning, 1998; *G. choprai* (Manning, 1967b); ***G. crosnieri*** (Manning, 1968a); *G. demanii* (Henderson, 1893); *G. dianae* Ahyong, 2008; *G. erdmanni* Ahyong, 2001; *G. espinosus* (Borradaile, 1898); *G. incipiens* (Lanchester, 1903); *G. kandi* Ahyong and Erdmann, 2007; *G. kume* Ahyong, 2012.; ***G. lanchesteri*** (Manning, 1967b); *G. micronesicus* (Manning, 1971a); *G. molyneux* Ahyong, 2001; *G. osheai* Ahyong, 2012; *G. rubriguttatus* Erdmann and Manning, 1998; *G. sentosa* Ahyong, 2016; *G. snidvongsi* (Naiyanetr, 1987); *G. spinosus* (Bigelow, 1893); *G. spiridonovi* Ahyong, 2021; *G. viridis* (Serène, 1954). Currently 24 species comprise the genus of which two are known from South Africa: *G. crosnieri* and *G. lanchesteri*.

Remarks. Two small species of *Gonodactylellus* are found in the coastal waters of northern KwaZulu-Natal, South Africa. One, *G. crosnieri*, is herein recorded for the first time from South African waters.

Key to the species of *Gonodactylellus* from South Africa

1. Uropodal endopod (Fig. 1.7G, I) broad with inner margin strongly convex; inner margin smooth, mostly or entirely devoid of setae; width about 0.50 telson width.....***G. crosnieri***

– Uropodal endopod (Fig. 1.9F, G, H) slender with inner margin completely fringed with setae, margin serrate for insertion of setae; width less than 0.33 telson width.....***G. lanchesteri***

Gonodactylellus crosnieri (Manning, 1968a), **new record**

Figures 1.6 – 1.7(A–I)

Gonodactylus crosnieri Manning, 1968a: 48–50, fig. 15 [type locality Banc de Pracel, western coast of Madagascar].
Gonodactylellus crosnieri. –Manning, 1995: 56–57,65 [new combination]. –Poupin *et al*. 2019: 5.

Material examined. KZN: SAMC–A079451 1 female (TL 18.5 mm), off Kosi Bay, 26°52'24.0"S 32°55'12.0"E, 45–47 m, dredge, coll. Natal Museum Dredging Programme; SAMC–A079454 1 female (TL 23 mm), off Kosi Bay, 26°53'36.0"S 32°55'36.0"E, same as above.

Diagnosis. Ocular scales small, rounded, separate. Rostral plate with anterior margins straight or sloped slightly posterolaterally, anterior angles acute but rounded; median spine longer than base. Mandibular palp 3-segmented. 5 epipods present. Lateral processes of TS6–7 subtruncate, subequal with TS6 being slightly larger. AS1–5 unarmed posterolaterally. Telson as long as broad with SM and IM teeth distinct and no denticles present between teeth; LT teeth not developed. Telson dorsal surface with numerous spinules and tubercle; MD carina short with spine and tubercles and flanked by 2 rows of spines; SM carina anteriorly covered in spines, anterior SM carina flanked by row of spines; IM carina with posteriorly pointing spines and flanked on inner margin by 2 spinules. Uropod exopod proximal segment with 10 movable spines and distal, ventral spine; proximal segment lacks setae and distal segment entire margin setose. Uropodal endopod broad, width about 0.5 telson width, with long dorsal carina, inner margin strongly convex, only distally setose.

Colour in alcohol. Faded with raptorial claw of dactylus white to light lavender. Colour in life unknown.

Measurements. Females (n = 2) TL 18.5–23.0 mm. A2 scale length 2.0–2.3 mm. AWCLI 800–825. Manning (1968a) reported specimens to 19.3 mm. The TL 23 mm female examined herein is the largest known specimen of the species.

Distribution. Known only from Western Indian Ocean. Previously recorded from Madagascar and Comoro Islands at 50 m and now from Kosi Bay, South Africa [KZN] at 45–47 m depth.

Remarks. This is only the second species record of *Gonodactylellus crosnieri* in scientific literature after being described for specimens from Madagascar and Comoro Islands (Manning, 1968a). The specimens examined herein agree well with the original description. The species is distinguished from similar species by the characteristically broad uropodal endopod (Fig. 1.7G, I). This species is potentially rare with only four specimens known to be collected. The small size, apparent preferred depth of the species beyond shallow SCUBA limits and lack of habitat knowledge has made the collection of material scarce. Colour in life remains unknown and no male has been observed. Furthermore, the proximity of Kosi Bay to the South African border with Mozambique and the distribution of the species restricted to the coastal regions of northern KwaZulu-Natal and western Madagascar suggests that *G. crosnieri* is also likely to occur in the reef systems of Mozambique.

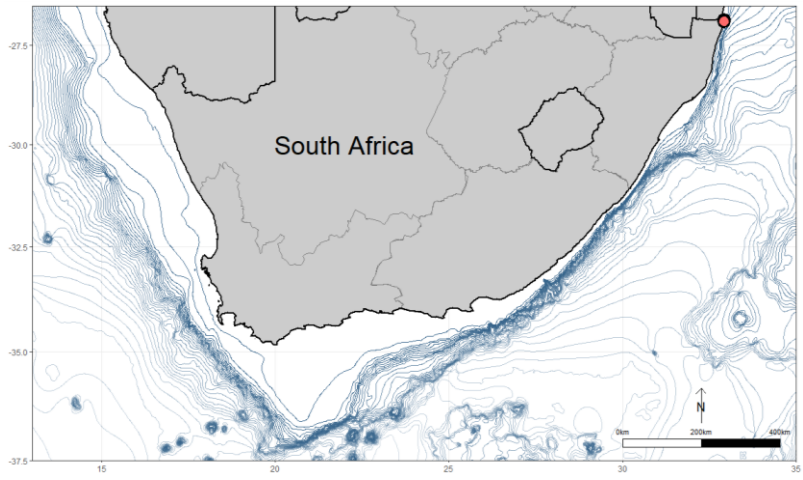

Figure 1.6. South African distribution of *Gonodactylellus crosnieri* (Manning 1968a).

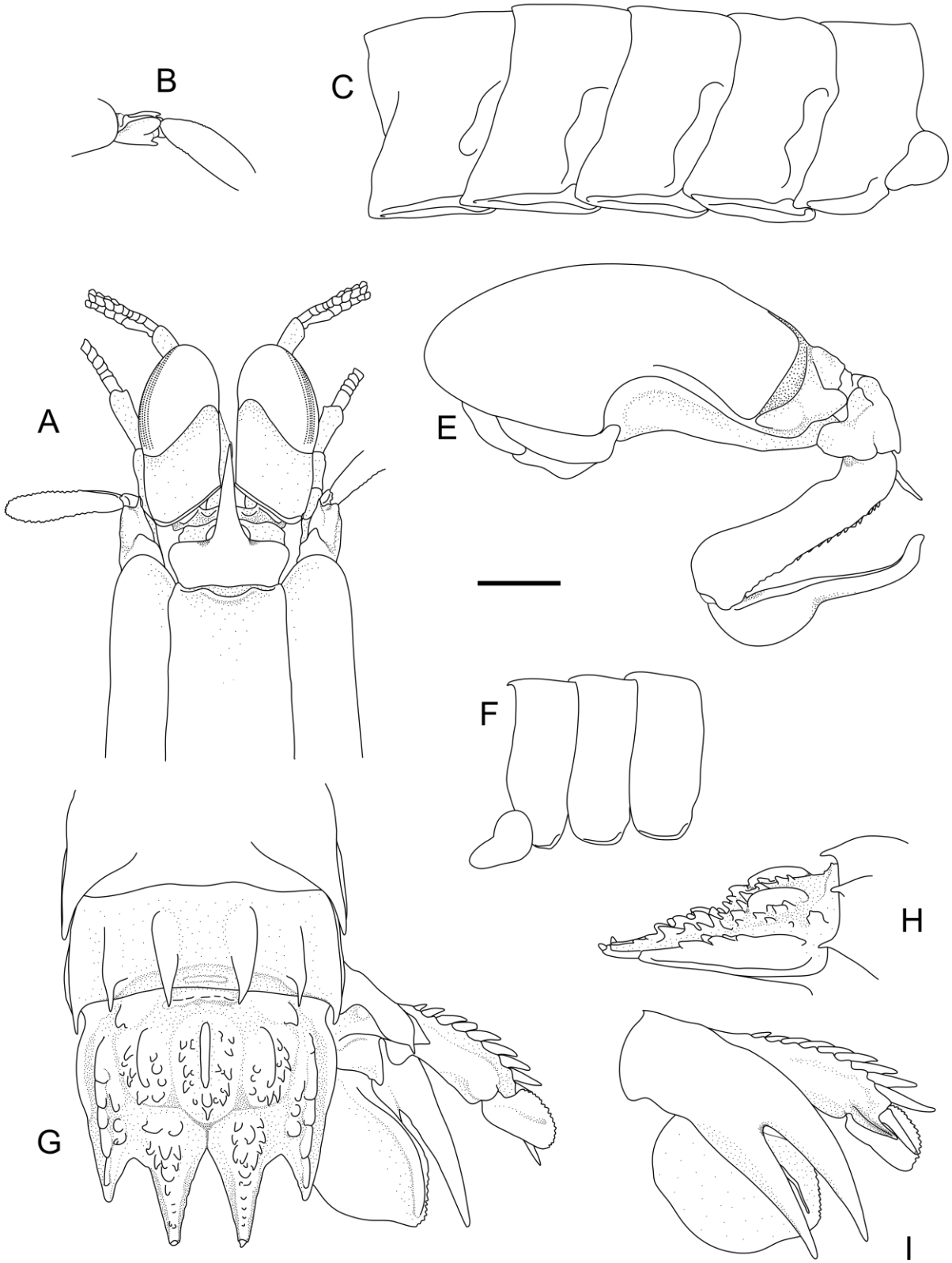

Figure 1.7. *Gonodactylellus crosnieri* (Manning, 1968a) female TL 18.5 mm, SAMC–A079451. **A,** anterior cephalothorax, dorsal; **B,** right antennal protopod, lateral; **C**, AS1–5, right lateral; **E**, right raptorial claw, lateral; **F,** TS6–8, left lateral; **G**, AS6, telson and right uropod, dorsal; **H**, telson, left lateral; **I**, left uropod, ventral. Scale **A–I** = 1 mm.

Gonodactylellus lanchesteri (Manning, 1967b)

Figures 1.8(A–B) – 1.9(A–H)

Gonodactylus lanchesteri Manning, 1967b: 11–13, fig. 4 [type locality Junghi Bay, Ibo Archipelago, Mozambique]. –Cappola and Manning, 1995: 276.

Gonodactylus demanii. –Barnard, 1950: 862, fig. 3e.

Gonodactylellus lanchesteri. –Manning, 1995: 64–66, fig. 26. –Poupin *et al*. 2019: 5.

Material examined. KZN: SAMC–A015626 1 female (TL 22 mm), Sodwana Six Mile Reef, 27°37'00.1"S 32°39'00.0"E, 26 Jul 1976, shore, RW 16–17, coll. R. Winterbottom, det. S. Ahyong; SAMC–A015642 5 males (TL 13–29 mm), 11 females (TL 11–26 mm), Sodwana 2.5 km south of Boteler Point, 27°01'59.9"S 32°51'00.0"E, 30 Jul 1976, same as above.

Other material examined. Mozambique: SAMC–A019435 3 males (TL 14–27 mm), 2 females (TL 22–28 mm), Vilankulos, 21°59'59.6"S 35°18'59.8"E, 22 May 1973, depth unknown, det. B. F. Kensley; SAMC–A19436 1 female (TL 11.3 mm), Magaruque Island, 24 May 1973, det. B. F. Kensley. SAMC–A002205 1 female (TL 27 mm), Mozambique islands, 1912, shore, stat. 13.S, coll. K.H. Barnard.

Diagnosis. Ocular scales low, separate, rounded or subtruncate. Rostral plate basal portion with anterior margins transverse or sloping posterolaterally; anterolateral corners rounded; apical spine just longer than base. Mandibular palp 3-segmented. 5 epipods present. TS6–7 lateral process subequal, rounded to subtruncate. PLP1 endopod in adult males with lateral lobe on posterior endite. AS1–5 unarmed posterolaterally. AS6 with swollen carinae, apical spines occasionally absent on larger specimens. Telson broader than long; SM teeth with movable apices; IM and LT teeth short, blunt, apices rounded but sharper in smaller specimens; IM tooth of telson well-formed and extending posteriorly beyond IM denticles; LT tooth distinctly set off from margin or at least separated from margin by gap. Dorsal spination of telson variable; MD carina strongly inflated, with or without numerous dorsal spinules; SM carinae swollen, with several scattered dorsal tubercles or spinules; IM carinae with few scattered dorsal tubercles or spinules. SM denticles 9–13 present; 1 or usually 2 IM denticles present. Uropodal exopod proximal segment with 10–12 movable spines and distal, ventral spine; inner margin of proximal segment and entire margin of distal segment setose. Uropodal endopod inner margin sinuous, entire margin setose.

Colour in alcohol. Faded, but with dark chromatophore dots positioned mid-dorsally on TS6, AS1, 3–5. Dactylus blue with some blue pigmentation on raptorial claw. Telson and uropod with varying degrees of blue pigmentation. Several specimens examined by Manning (1967b) exhibit dark chromatophores scattered and concentrated on patches for TS8 and AS1. Dark, transverse bands reported on the carapace and abdominal somites and lateral patches on TS6. Colour in life unknown.

Measurements. Male (n = 8) TL 13–29 mm, female (n = 15) TL 11–28 mm. AWCLI 630–850. Barnard (1950) records specimens up to TL 40 mm.

Distribution and Habitat. From Vietnam and Pakistan, the Persian Gulf and Red Sea to Somalia, Kenya, Comoro Islands, Madagascar, Mozambique and South Africa; shore to 13.5 m (Ahyong, 2005).

Remarks. A relatively small species distinguished from other *Gonodactylellus* species with spinules covering the telson via the uropodal endopod having the entire margin lined with setae. The similar *G. demanii* Henderson,

1893, is distinguished from *G. lanchesteri* by only having a few setae proximally on the inner margin of the uropodal endopod, adjacent to articulation. Early accounts of South African stomatopod fauna report occurrences of *G. demanii* from Mozambique (Hansen, 1926; Barnard, 1950). However, these early identifications need verification since Manning's (1967b) investigation into the then subspecies of *G. demanii* in the Indo-West Pacific and the erection of three new species, including *G. lanchesteri*. One of the specimens identified as *G. demanii* by Barnard (1950) from Mozambique Island has been re-examined herein and can be confidently identified as *G. lanchesteri*. This suggests that Barnard's *G. demanii* was misidentified and can be considered *G. lanchesteri*. This is true for all specimens examined and previously identified as *G. demanii* in the Iziko collection.

Ahyong's (2005) more recent report of *G. lanchesteri* is the first reliable account of the species from South Africa. The species is known for its variability in telson spinule ornamentation, which is illustrated herein for specimens reported on by Ahyong (2005). Typically, the telson carinae of males are more inflated, while the spinules of the telson are longer and sharper in females (Fig. 1.9D–F, H). Furthermore, a greater number of telson spinules present is observed for smaller specimens when compared to large adults. This loss of spinules with greater size has been recorded by Manning (1967b) and is hereby confirmed for the examined specimens.

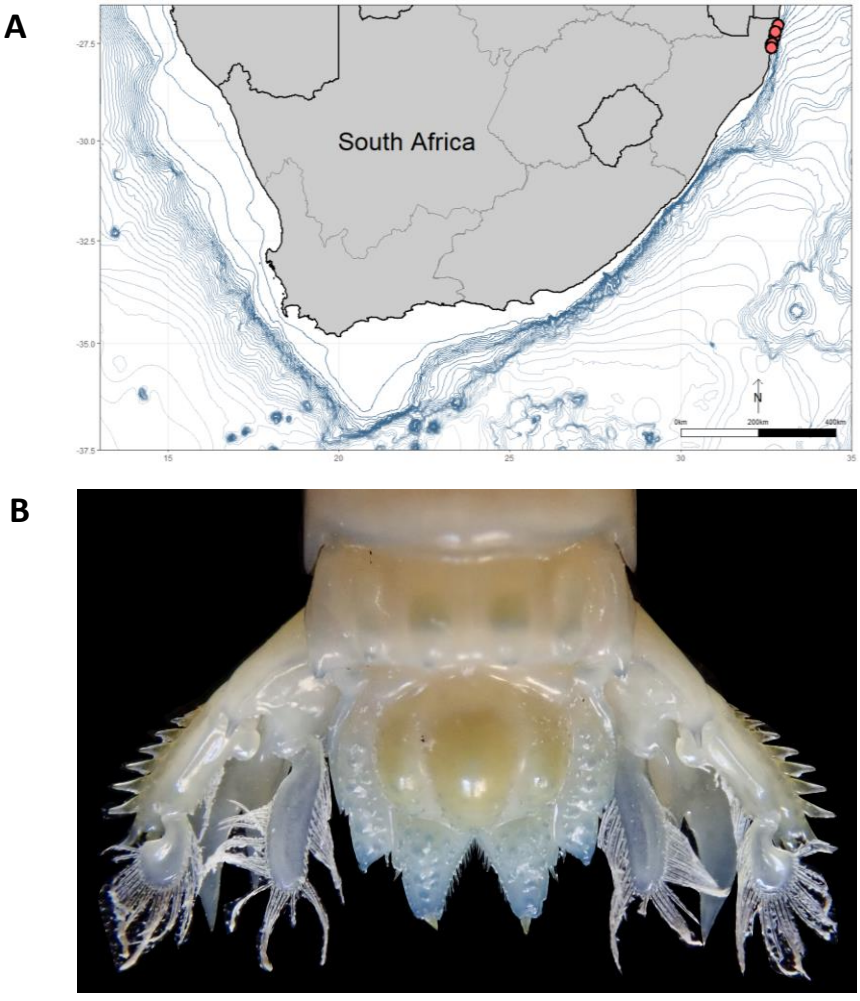

Figure 1.8. *Gonodactylellus lanchesteri* (Manning, 1967b), **A,** South African distribution. **B,** dorsal telson, male TL 29 mm, SAMC–A015642.

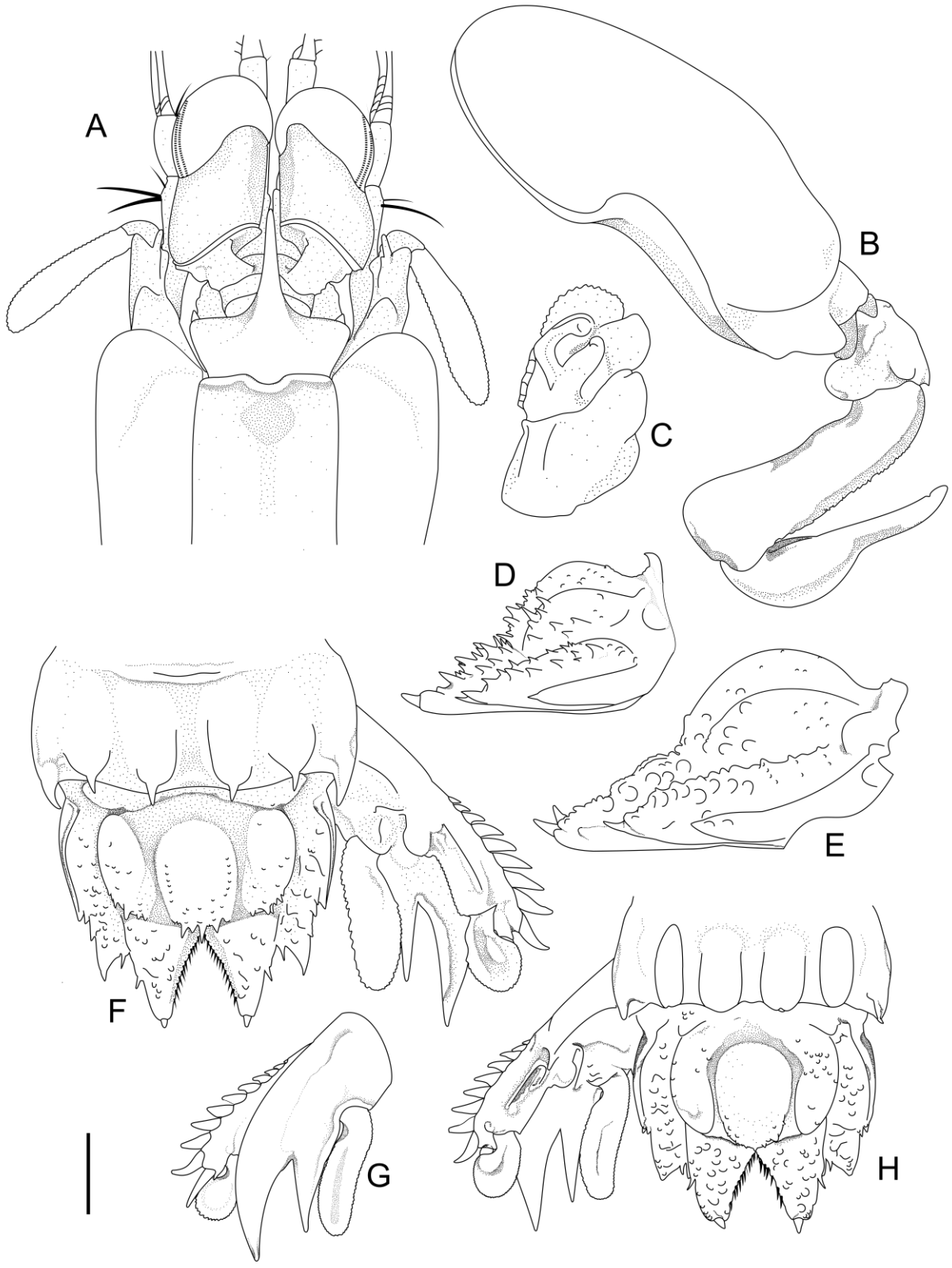

Figure 1.9. *Gonodactylellus lanchesteri* (Manning, 1967b) **A–C, E, G–H** male TL 29 mm; **D, F** female TL 26 mm, SAMC–A015642. **A,** anterior cephalothorax, dorsal; **B,** right raptorial claw, lateral; **C,** left pleopod 1 endopod, anterior; **D–E,** telson, right lateral; **F, H,** AS6, telson and right uropod, dorsal; **G,** right uropod, ventral. Scale **A, C–H** = 1 mm, **B** = 1.3 mm.

Gonodactylolus Manning, 1970

Gonodactylolus Manning, 1970b: 206–209, fig. 1. [Type species *Gonodactylolus paulus* Manning, 1970b by monotypy. Gender masculine].

Diagnosis. Eye subglobular, cornea tapering distally. Ocular scales small, apparently fused medially. Rostral plate with median spine, basal portion of plate anterolaterally acute. Anterior margins of carapace slightly concave, not extending anteriorly beyond base of rostral plate. Mandibular palp absent. Propodus of raptorial claw with proximal movable spine in adults; ischiomeral articulation of claw not terminal; articulation of propodus and dactylus of claw inflated. Telson with three pairs of marginal teeth; IM and LT teeth small; SM teeth large with movable apices. Telson with 3 mid-dorsal carinae. IM carina of telson without accessory longitudinal carina on mesial margin; anus located ventrally. Uropodal protopod without lobes between terminal spines; endopod without spines on inner margin. Uropodal exopod with proximal segment extending beyond articulation with distal segment, movable spines on outer margin straight or slightly curved; uropodal endopod stout, with single row of marginal setae.

Composition. ***Gonodactylolus paulus*** Manning, 1970b.

Gonodactylolus paulus Manning 1970b

Figures 1.10 – 1.11(A–H)

Gonodactylolus paulus Manning, 1970b: 206–209, fig. 1 [type locality Tanikely, Madagascar]. –Cappola and Manning, 1995: 274.

Material examined. KZN: SAMC–A015638 1 female (TL 12 mm), Sodwana Bay, 27°31'00.1"S 32°40'59.9"E, 23 Jul 1976, 13.5 m, RW 76–13, coll. R. Winterbottom, det. S, Ahyong; SAMC–A015639 3 females (TL 13–14 mm), Sodwana Bay, 27°31'00.1"S 32°40'59.9"E, 27 Jul 1976, 13.5 m, RW 14, same as above; SAMC–A015640 1 male (TL 10 mm), 2.5 km south of Boteler Point, 27°01'59.9"S 32°51'00.0"E, 30 Jul 1976, shore, RW 76-23, same as above.

Diagnosis. Ocular scales low, poorly formed, apparently fused medially; eyestalk inflated, broader than cornea; cornea subglobular, tapering distally. Rostral plate with basal portion with anterior margins concave; anterolateral angles acute but rounded; lateral margins transverse; apical spine much longer than base. Carapace with anterior margins of lateral plates truncated. Antennal scale broad. Mandibular palp absent. Raptorial claw dactylus with prominent notch on outer proximal margin. TS5–8 and AS1–6 unarmed; AS6 with six low bosses, unarmed posteriorly. Telson wider than long, with three pairs of marginal teeth; SM well-developed; IM distinct but stout, usually shorter than two IM denticles; LT teeth demarcated by small notch, apex blunt, not projecting well off margin of telson. Telson MD and anterior SM carina inflated; SM and IM carina short; MG carina present. Uropodal exopod proximal segment lacking fixed ventral spine on outer margin, inner margin smooth; distal segment of exopod setose and with subterminal articulation with proximal segment. Uropodal endopod ovate, broad with margin completely setose. Uropodal basal prolongation with rectangular projection on mesial margin, proximal to articulation of endopod.

Measurements. Male (n = 1) TL 10 mm, female (n = 4) TL 12–14 mm. CI 435–625. AWCLI 620–740. Several specimens examined herein are recorded at TL 14 mm and are the largest known specimens.

Colour in alcohol. Almost completely faded, but with traces of a lateral black spot on each abdominal somite. Black spot positioned on dorsal niche of carpus of raptorial claw and two spots on carapace lateral margin. Colour in life unknown.

Distribution and habitat. Western Indian Ocean from Somalia, Réunion Island, Madagascar and South Africa; shore to 13.5 m (Ahyong, 2005). Supposedly associated with coral reef substrata, as well as rocky intertidal.

Remarks. *Gonodactylolus paulus* has several characteristic features, such as the unusual shape of the eye, the unusually large ventral projection of the rostral plate and the broad antennal scale. After the description of this small monotypic species from Madagascar (Manning, 1970b), four female specimens have been identified from the Western Indian Ocean. The first and only species account from South Africa was by Ahyong (2005) from Sodwana. The specimens collected by Ahyong (2005) are re-examined and illustrated herein, including the first illustration of a male specimen. The present specimens of *G. paulus* agree well with the description of the holotype housed in the Muséum National d'Histoire naturelle, Paris. Specimens from Réunion Island were noted to be host to the parasitic gastropod *Caledoniella montrouzieri* Souverbie, 1869 (Cappola and Manning, 1995).

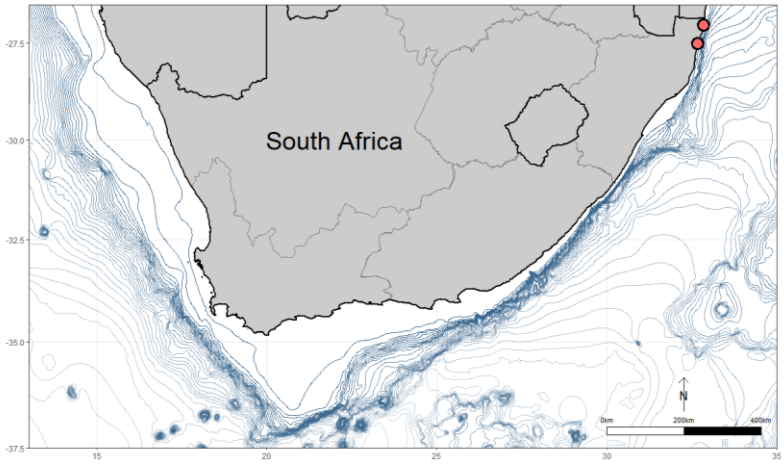

Figure 1.10. South African distribution of *Gonodactylolus paulus* Manning 1970b.

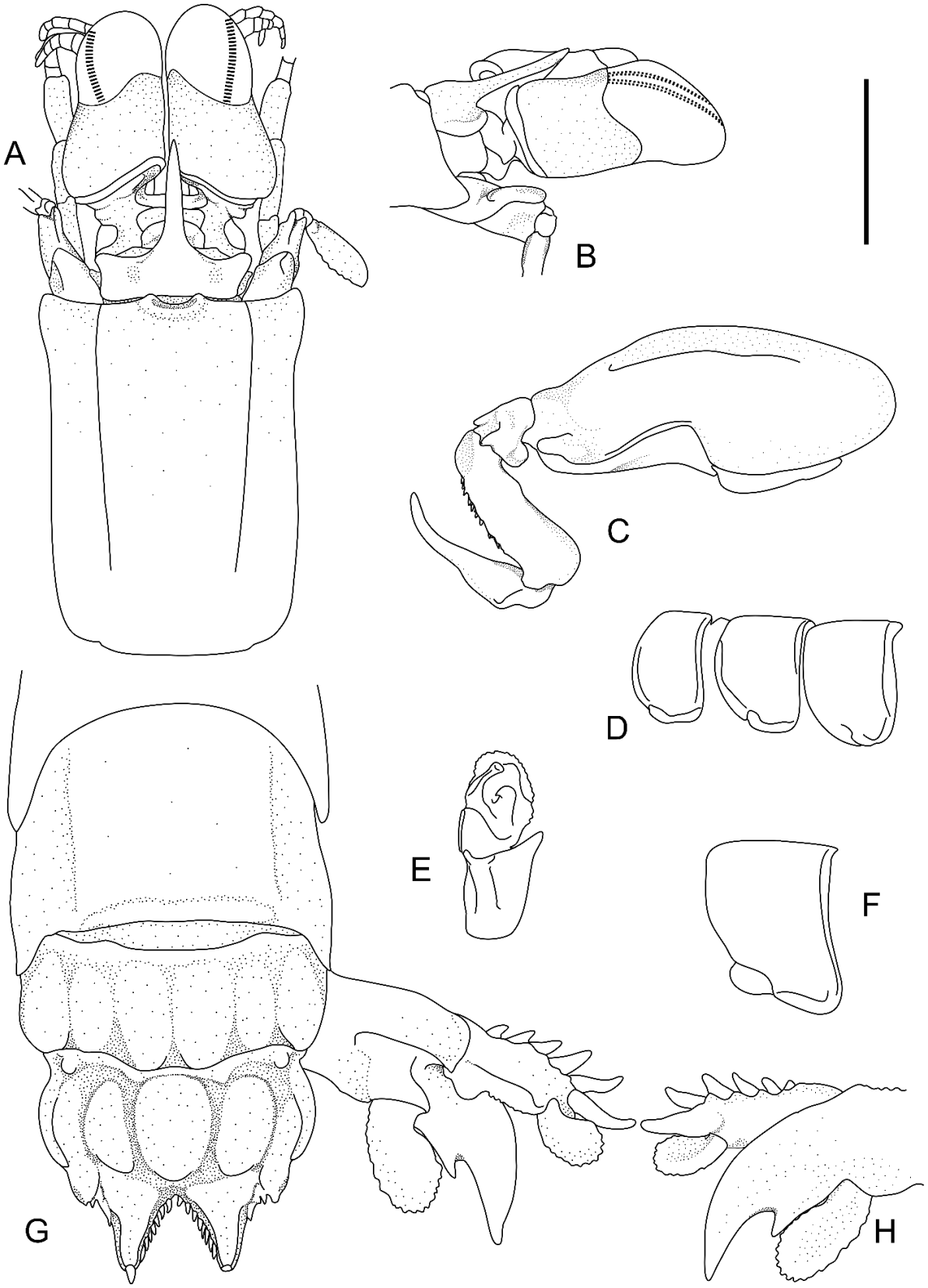

Figure 1.11. *Gonodactylellus paulus* Manning, 1970b, **A** female TL 14 mm, SAMC–A015639; **B–D, F** female TL 12 mm, SAMC–A015638; **E, G–H** male TL 10 mm, SAMC–A015640. **A,** anterior cephalothorax, dorsal; **B,** anterior cephalothorax, right lateral; **C,** left raptorial claw, lateral; **D,** TS6–8, left lateral; **E,** left pleopod 1 endopod, anterior; **F**, AS1, left lateral; **G,** AS5–6, telson and uropod, dorsal; **H,** right uropod, ventral. Scale **A–H** = 1 mm.

Gonodactylus Berthold, 1827

Gonodactylus Berthold, 1827: 271. [Type species *Squilla chiragra* Fabricius, 1781, by subsequent designation. Gender masculine].

Diagnosis (Ahyong, 2012). Eye subcylindrical, cornea not broader than stalk in dorsal view. Ocular scales large, wider than basal width of median spine of rostral plate, distinctly wider than high, flattened dorsally. Rostral plate with slender median spine and short, broad, trapezoid basal portion. Anterolateral margins of carapace convex, extending anteriorly beyond base of rostral plate. Mandibular palp present. Propodus of raptorial claw with or without proximal movable spine in adults. Telson with 3 mid-dorsal carinae. IM carina of telson without accessory longitudinal carina on mesial margin; anus located ventrally. Uropodal protopod without lobes between primary terminal spines; endopod without spines on inner margin.

Composition. *Gonodactylus acutirostris* de Man, 1898; ***G. botti*** Manning, 1975b; *G. childi* Manning, 1971a; ***G. chiragra*** (Fabricius, 1781); *G. platysoma* Wood-Mason, 1895; ***G. smithii*** Pocock, 1893.

Remarks. Some of the largest specimens of Gonodactylidae are members of *Gonodactylus*. All six species are found in the Indo-West Pacific region associated with coral or rock-reefs and inhabiting holes in rock and coral rubble. Of these three occur in South African waters.

Key to the species of *Gonodactylus*

1. Telson without LT tooth, with margin of telson between anterolateral angle and apex of IM tooth unbroken. Ocular scales extending laterally almost to anterolateral angle of rostral plate……..*G. platysoma*

– Telson with LT tooth indicated by shallow notch in margin of telson between anterolateral angle and apex of IM tooth. Ocular scales not extending laterally to anterolateral angle of rostral plate……2

2. Lateral margins of rostral plate strongly divergent.....3

– Lateral margins of rostral plate subparallel or slightly divergent…….. 4

3. Anterolateral angles of rostral plate spinular .....*G. acutirostris*

– Anterolateral angles of rostral plate (Fig. 1.17A, D) blunt or angular, but not spinular.....***G. smithii***

4. Rostral plate (Fig. 1.15D) with anterior margins deeply concave.....***G. chiragra***

– Rostral plate with anterior margins transverse or slightly concave……..5

5. Telson (Fig. 1.13H) with blunt IM teeth. Anterior margin of ocular scales (Fig. 1.13A, C) transverse.....***G. botti***

– Telson with sharp IM teeth. Anterior margin of ocular scales inclined posteriorly .....*G. childi*

Gonodactylus botti Manning, 1975b

Figures 1.12(A–B) – 1.13(A–G)

Gonodactylus chiragra. –Holthuis, 1967b: 26, 41 [list], fig. 7a. –Tirmizi and Manning, 1968: 21, fig. 7. [not *G. chiragra* (Fabricius 1781)].

Gonodactylus botti Manning, 1975b: 289, fig. 1 [type locality Jakarta, Indonesia]. –Manning and Lewinsohn, 1986: 5, 15 [list], fig. 3. –Manning, 1990: 97, 104 (key). –Cappola and Manning, 1995: 274–275.

Not *Gonodactylus botti*. –Moosa, 1991: 155 [*Gonodactylellus affinis* (de Man, 1902)].

Material examined. KZN: SAMC–A015632 1 male (TL 63 mm), 8 females (TL 10–66 mm), Jesser Point, Sodwana Bay, 27°32'33"S 32°40'50.0"E, 2 Aug 1976, rock pool at 13.5 m, RW 26, coll. R. Winterbottom, det. S. Ahyong; SAMC–A015631 21 males (TL 18–57 mm), 60 females (TL 10–71 mm), Sodwana 6.5 km north of Island Rock, 27°13'21"S, 32°47'48"E, 28 Jul 1976, 13.5 m, RW 76–22, same as above.

Diagnosis. Ocular scales broad, flattened, separate, together slightly broader than 0.50 rostral plate width, anterior margins transverse. Rostral plate basal portion with anterior margins slightly concave; anterolateral angles rounded; lateral margins divergent anteriorly; apical spine just longer than base. Lateral margin of TS6 broader than TS7. Telson with LT tooth indicated by shallow notch in margin of telson between anterolateral angle and apex of IM tooth; mid-dorsal carinae blunt, neither sharp nor crested dorsally and strongly inflated in adults; MD carina unarmed posteriorly; accessory MD carinae forming “anchor”; with 8–13 SM denticles. Uropodal exopod distal segment outer margin with 12 movable spines.

Colour in alcohol. Faded yellow, but with scattered blue pigment on all limbs and uropods. Dactylus of raptorial claw and uropodal endopod blue. Raptorial claw with ‘meral spot’ white. Colour in life unknown.

Measurements: Male (n = 1) TL 63 mm, female (n = 8) TL 10–66 mm. A1 peduncle 0.51–0.67CL. A2 scale 0.52–0.67CL. AWCLI 714–852.

Distribution and Habitat. Indonesia to the Western Indian Ocean from Pakistan, Red Sea, Persian Gulf, Somalia, and South Africa; shore to 13.5 m (Ahyong, 2005). Found in coral reefs, both sandy and rocky tidal pools at the base of dead coral.

Remarks. Although common in the Western Indian Ocean, *G. botti* has not been well-studied. Since its description from Jakarta, Indonesia, the species has only been recorded with any confidence from the Western Indian Ocean (Ahyong, 2001). After intensive and unsuccessful sampling of Indonesia for the species, the type material from the Pacific is suspected to have originated in the Western Indian Ocean (Ahyong, 2001) and specimens from the west of Pakistan are considered the only records that can be identified with certainty as *G. botti* (Ahyong, 2005). Moosa’s (1991) singular Pacific Ocean account of the species from New Caledonia is suspected to be referrable to *Gonodactylellus annularis* Erdmann and Manning 1998 (Ahyong, 2001).

The distributional disjuncture and erroneous identifications highlight the difficulty in distinguishing this understudied species. In southern Africa, preserved specimens of *G. botti* can easily be mistaken for *G. chiragra* as the extent to which the anterior margins of the rostral plate are concave can overlap in the two species. The rostral plate is distinguished in the two species by the anterior margins being only slightly concave in specimens of *G. botti* and being distinctly concave in *G. chiragra*, however, the rostral plate can be only slightly concave in *G. chiragra* as is usual in *G. botti*. The two species can be easily distinguished in freshly preserved specimens by the colour of the 'meral spot' of the raptorial claw: white for *G. botti* and maroon to dark blue for *G. chiragra*. The more inflated mid-dorsal carina of the telson also distinguishes *G. botti* from *G. chiragra* in specimens over 23 mm (Ahyong, 2001).

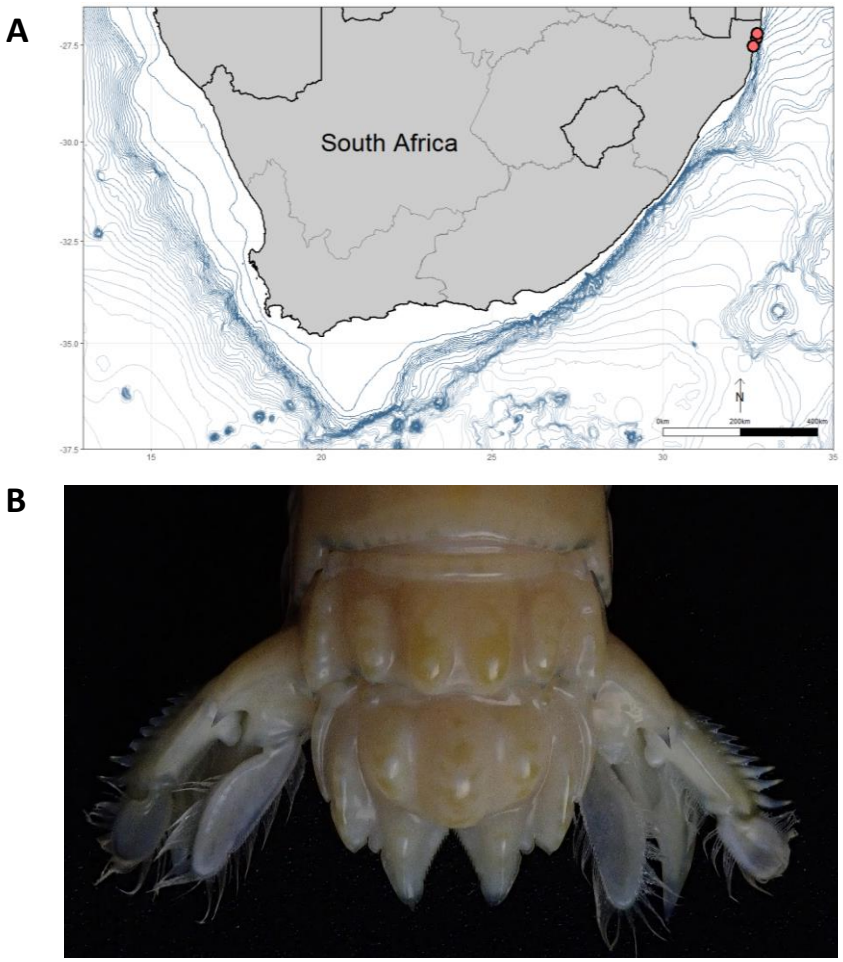

Figure 1.12. *Gonodactylus botti* Manning, 1975b, **A,** South African distribution; **B,** dorsal telson, male TL 63 mm, SAMC–A015632.

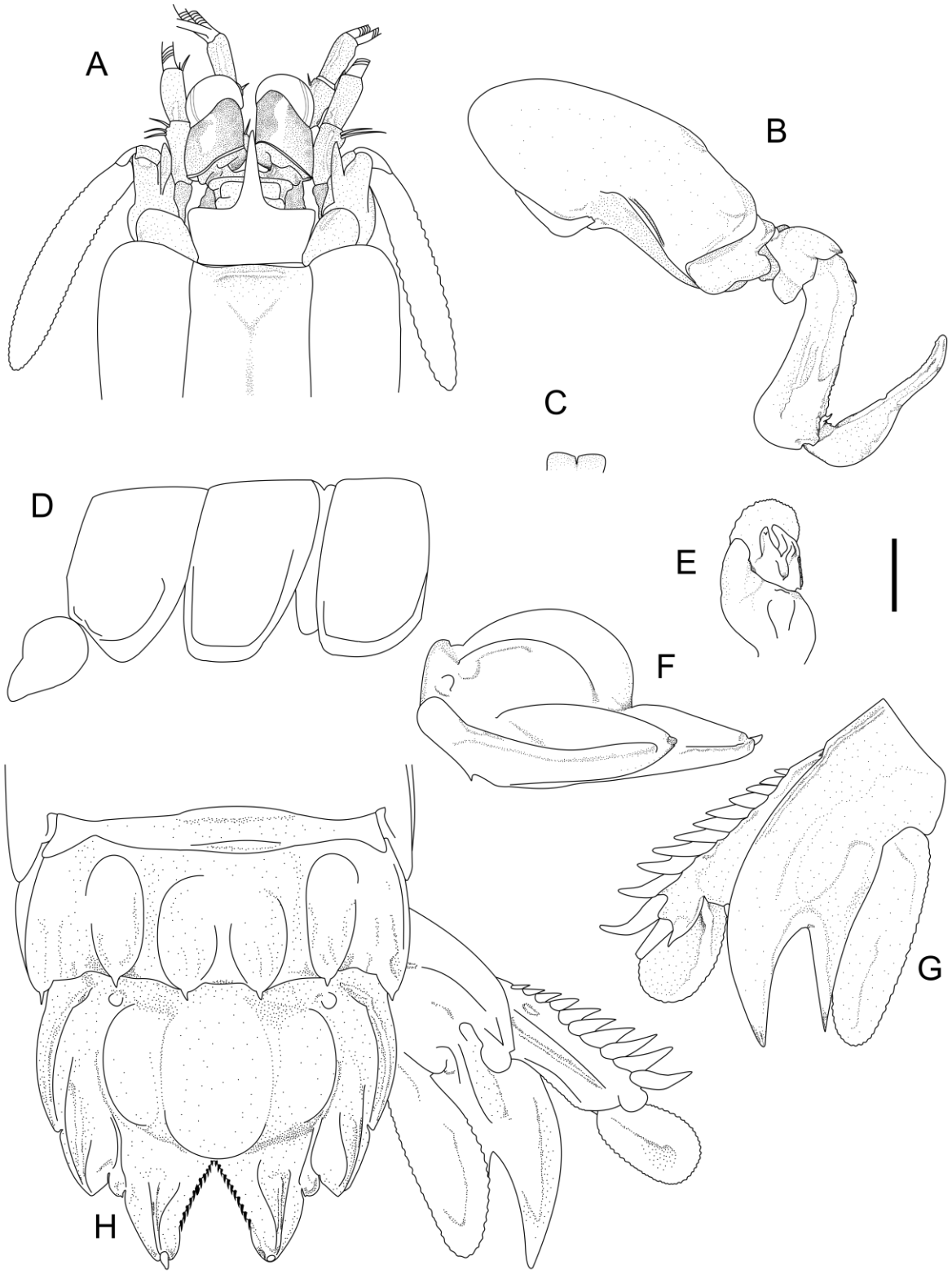

Figure 1.13. *Gonodactylus botti* Manning, 1975b, male TL 63 mm, SAMC–A015632. **A,** anterior cephalothorax, dorsal; **B,** right raptorial claw, lateral; **C,** ocular scales, dorsal; **D,** TS6–8, right lateral; **E,** right pleopod 1 endopod, anterior; **F,** telson, left lateral; **G,** right uropod, ventral; **H,** AS6, telson and right uropod, dorsal. Scale **A, C–H** = 2 mm, **B** = 4 mm.

Gonodactylus chiragra (Fabricius, 1781)

Figures 1.14 – 1.15(A–H)

Squilla chiragra Fabricius, 1781: 515 [type locality restricted to Ambon, Indonesia, by neotype selection (Manning, 1981: 217)].

Gonodactylus chiragrus. –Krauss, 1843: 60.

Gonodactylus chiragra. –White, 1847: 84. –Kemp, 1913: 4, 11, 147, 155, fig. 2, pl. 9, fig. 107 (part). –McNeill, 1926: 316 (part). –Hale, 1929: 34. –Stephenson, 1952: 11. –Stephenson and McNeill, 1955: 250–252 (part). –Stephenson, 1962: 34. –Manning, 1966: 108, 113–114 (part). –McNeill, 1968: 89. –Moosa, 1986: 381; 1991: 155– 156. –Manning, 1991: 2; 1995: 71–75, pls. 5–8, figs. 8e, f, 9a, b, 10a, 11a, 27a, 28–30. –Gosliner *et al*., 1996: 195. –Ahyong and Norrington, 1997: 100–101. –Debelius, 1999: 273. –Poupin *et al*. 2019: 6, fig. 2B.

Material examined. KZN: SAMC–A008451 1 female (TL 56 mm), St. Lucia Bay, 28°21'40.8"S 32°24'26.1"E, [no date – suspected to be Barnard's (1950) specimen (Manning, 1969a)], depth unknown, coll. H.W. Bell-Marley; SAMC–A012158 4 females (TL 31–62 mm), 1 male (TL 55 mm), Boteler Point intertidal pools, Sodwana Bay, 27°00'59.8"S 32°51'59.8"E, Dec 1964, shore, coll. O. Bourquin, det. B. F. Kensley in Jan 1965.

Other material examined. Southern Mozambique: SAMC–A19433 3 males (TL 21–48 mm), 1 female (TL 30), Santa Maria, Inhaca, [23°10'22.2"S 35°33'04.3"E], Jun 1971, depth unknown, det. B. F. Kensley; SAMC–A092091 1 male (TL 63 mm), Maputo Bay, Jun 1920, depth unknown, stat. 207.

Diagnosis. Ocular scales broad, flattened, separate, together broader than half rostral plate width. Rostral plate basal portion with anterior margins strongly concave in adults; anterolateral angles blunt or rounded; lateral margins subparallel or slightly divergent anteriorly; apical spine shorter or longer than base. Lateral margin of TS6 and TS7 subequal. AS6 spination better presented in smaller specimens. Telson with LT tooth indicated by shallow notch in margin of telson between anterolateral angle and apex of IM tooth; mid-dorsal carinae blunt, neither sharp nor crested dorsally; MD carina unarmed posteriorly; accessory MD carinae forming "anchor"; with 11–14 SM denticles. Uropodal exopod distal segment outer margin with 10–13 movable spines.

Colour in alcohol. Males: Body faded dark orange to brown; pereopods yellow, with grey blue dactyl; raptorial claw dark brown to purple, dactylus purple [KZN] to light blue [southern Mozambique]; uropod exopod segment faded blue/purple. **Females:** Body colour faded; pereopods with distal segment faded light blue; dactylus of raptorial claw light blue/lavender to white.

Colour in life. Raptorial claw with 'meral spot' dark blue to maroon. **Males:** Body dark green to brown; pereopods yellow, with orange-red dactyl; uropodal exopod distal segment yellow orange. **Females:** Mottled grey-green and white; pereopods with distal segment pale yellow.

Measurements. Male (n = 4) TL 21–55 mm, female (n = 6) TL 30–56 mm. A1 peduncle 0.48–0.56CL. A2 scale 0.47–0.59CL. AWCLI 725–875. The largest known specimen at TL 105 mm recorded by Kemp (1913).

Distribution and Habitat. Indo-West Pacific from French Polynesia to Japan, Australia and Indo-Malayan region to Madagascar, Mozambique and South Africa in the Western Indian Ocean. Common in the upper intertidal of coral reef flats, but also known from the nearshore or onshore rocky reefs.

Remarks. *Gonodactylus chiragra* was the first stomatopod to be reported from South African waters (Krauss, 1843) and was reported on in early revisions of the South African mantis shrimp fauna (Stebbing, 1917; Barnard, 1950; Manning, 1969a). Barnard (1950) remarks on the possibility that Krauss' specimen from Durban may be attributed to *G. platysoma* Wood-Mason, 1895, however, without the specimen this is unverifiable. Furthermore, *G. platysoma* can easily be distinguished in the genus by the absence of a lateral tooth of the telson and to date, no specimen of that species has been reported from South Africa.

Gonodactylus chiragra is distinguished by the shape of the rostral plate with the anterior margins of the basal portion being strongly concave in adults. Ahyong (2001) describes some rostral plate variation with the anterior angles blunt to rounded while the lateral margins are subparallel or slightly anteriorly divergent. Furthermore, the anterior margins have been recorded to be sometimes only slightly concave which overlaps with descriptions of *G. childi* and *G. botti*. Ahyong (2001) suggests the relatively short telson to distinguish *G. childi* and the strongly inflated mid-dorsal carinae of *G. botti* to be distinguishable from *G. chiragra*. However, when examining Barnard's (1950) specimen from St. Lucia and several specimens from Mozambique and KwaZulu-Natal determined by B. F. Kensley, the mid-dorsal carinae of the telson appear strongly inflated, which is apparent in the 55 mm TL male determined by S. Ahyong from Sodwana (Fig. 1.15H). Therefore, while the specimens examined herein can be distinguished from *G. childi,* there is some confusion as to whether they can be morphologically distinguished from the examined specimens of *G. botti*.

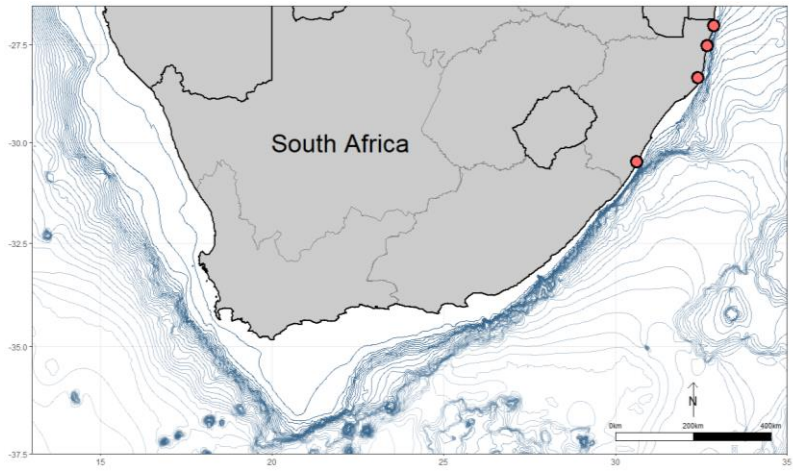

Figure 1.14. South African distribution of *Gonodactylus chiragra* (Fabricius, 1781).

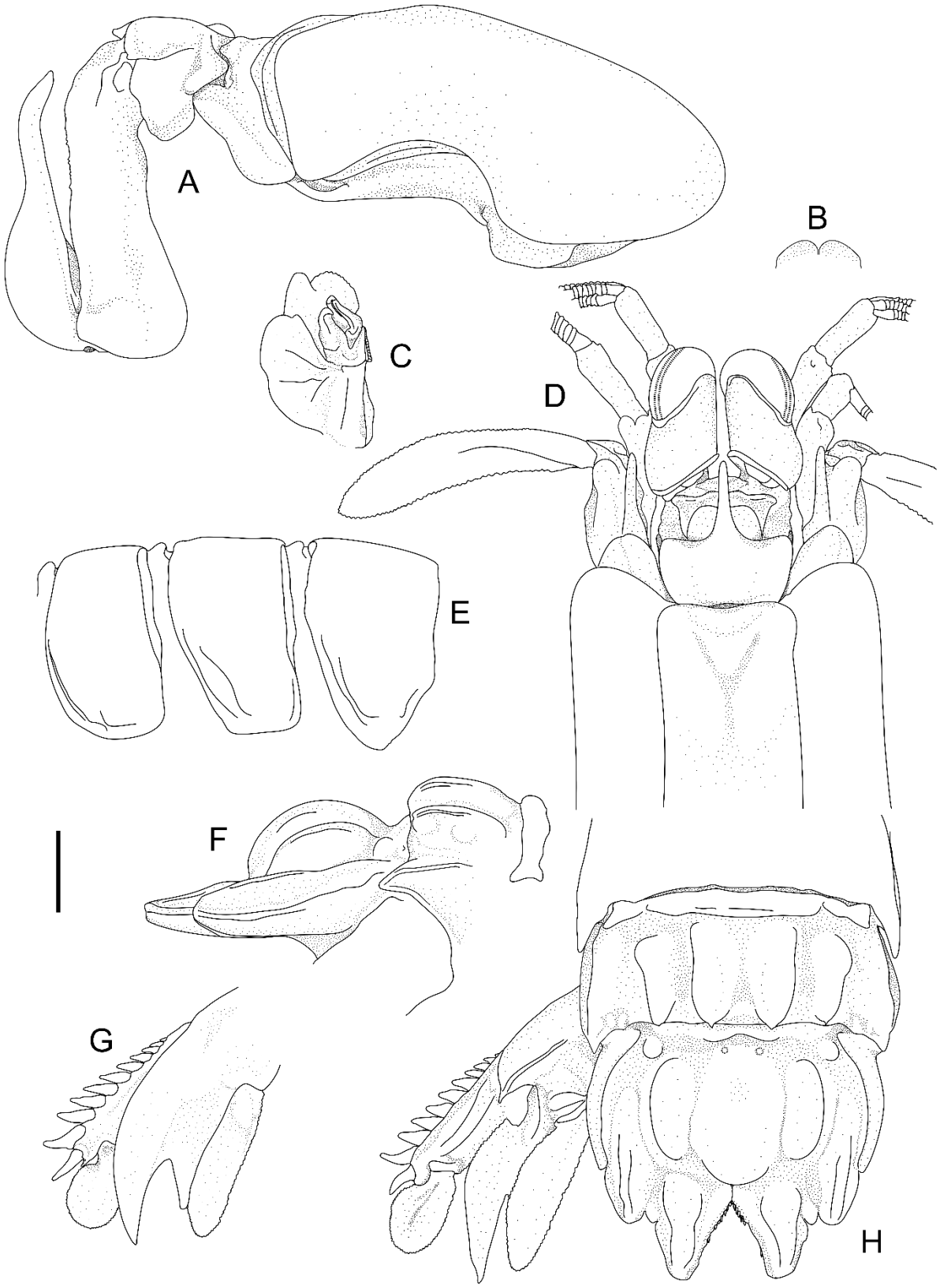

Figure 1.15. *Gonodactylus chiragra* (Fabricius, 1781) male TL 55 mm, SAMC–A012158. **A,** left raptorial claw, lateral; **B,** ocular scales, dorsal; **C**, right pleopod 1 endopod, anterior; **D,** anterior cephalothorax, dorsal; **E,** TS6–8, left lateral; **F,** telson, right lateral; **G,** right uropod, ventral; **H,** AS6, telson and left uropod, dorsal. Scale **A–H** = 2 mm.

Gonodactylus smithii Pocock, 1893

Figures 1.16(A–B) – 1.17(A–K)

Gonodactylus smithii Pocock, 1893: 475, pl. 20B [type locality Arafura Sea]. –Manning, 1968a: 44–46. –Cappola and Manning, 1995: 277–278. –Manning, 1995: 20, 76–80, pls. 11, 12, figs. 9e, 10c, 11d, 27c, 32–35. –Ahyong and Norrington, 1997: 101–102. –Ahyong, 2001: 72–75, fig. 36. –Poupin *et al.* 2019: 7, fig. 2C.

Gonodactylus chiragra var. anancyrus Borradaile, 1900: 395, 397, 401 [type localities Talili Bay, New Britain and Lifou, Loyalty Islands].

Gonodactylus minikoiensis Ghosh, 1990: 201, 202, fig. 1 [type locality Minikoy Island, Lakshadweep].

Gonodactylus *arabica* Ghosh, 1990: 201, 205, figs. 2, 3e [type locality Kavaratti, Lakshadweep].

Material examined. KZN: SAMC–A015633 1 male (TL 57 mm), Sodwana Bay, 27°31'00.1"S 32°40'59.9"E, 23 Jul 1976, 13.5 m, stat. RW 13, coll. R. Winterbottom, det. S. Ahyong; SAMC–A015637 2 males (TL 34–45 mm), Sodwana Bay, 27°31'00.1"S 32°40'59.9"E, 1 Aug 1976, RW 24, same as above; SAMC–A015636 1 male (TL 29 mm), 2 females (TL 19–26 mm), Sodwana Bay, 27°13'00.1"S 32°46'59.9"E, 28 Jul 1976, RW 22, same as above.

Diagnosis: Ocular scales broad, flattened, separate, together as broad as or broader than half rostral plate width. Rostral plate basal portion with anterior margins concave; anterolateral angles acute but not spiniform; lateral margins strongly divergent anteriorly; apical spine longer than base. Telson with LT tooth indicated by shallow notch in margin of telson between anterolateral angle and apex of IM tooth; dorsal carinae often sharp or crested dorsally; MD carina usually armed posteriorly with stout spine, but often obsolete in adult males; accessory MD carinae forming “anchor”; with 12–18 SM denticles. Uropodal exopod distal segment outer margin with 10–13 movable spines.

Colour in alcohol. Body colour faded blue-green but with some evidence of mottling on margin of abdominal somites. Raptorial claw with ‘meral spot’ dark red to purple; propodus blue distally; dactylus pink. Uropodal protopod with purple dorsal spot basally.

Colour in life (Ahyong, 2001). Overall or mottled light green to dark green. ‘Meral spot’ of raptorial claw dark red to purple outlined with white; propodus blue distally; dactylus pink. Uropodal protopod with bright red dorsal spot basally; setae on exopod and endopod often purple. A2 scale clear yellow.

Measurements. Male (n = 4) TL 29–57 mm, female (n = 3) TL 19–27 mm. A1 peduncle 0.57–0.68CL. A2 scale 0.51–0.73CL. AWCLI 767–828. The largest known specimen is a TL 90 mm female from Australia.

Distribution and Habitat: Indo-West Pacific from Okinawa, New Caledonia, Australia, Vietnam and South China Sea to Madagascar and South Africa; shore to 14 m (Ahyong, 2005). Generally thought of as a reef-related species (Ahyong, 2001; Ahyong, 2005). Ahyong and Norrington (1997) documented their foraging behaviour on reef flats at low tide in Australia. Manning’s (1968a) account from Madagascar reports specimens from the shore to 80 m.

Remarks. *Gonodactylus smithii* is distinguishable from other species in the genus by the slender telson carinae and shape of the rostral plate with exaggerated divergent lateral margins. The latter feature has been known to

vary in the degree of sharpness of the rostral plate anterolateral corners where the acuteness of the anterolateral angles increases with increasing body size (Ahyong, 2001). This is apparent in the present series for the TL 19 mm and TL 57 mm males illustrated (Fig. 1.17A, C). The degree of sharpness of the median carina apex is also observed to vary with size. The median carina was armed with a stout spine in the small male examined (TL 19 mm) (Fig. 1.17J), while the spine was absent in the large male (TL 57 mm) (Fig. 1.17K).

The present material agrees well with previous published accounts of specimens of a similar size. First recorded for southern Africa in Madagascar (Manning, 1968a), *G. smithii* specimens larger than TL 23 mm have one notable variation of the uropod endopod compared to specimens from the eastern Indian Ocean and western Pacific (Ahyong and Norrington, 1997; Ahyong, 2001). Specimens from Madagascar have the inner margin of the uropodal endopod sinuous instead of convex. *Gonodactylus smithii* has been documented from coral reef habitat in Sodwana Bay, South Africa (Ahyong, 2005). South African specimens re-examined herein exhibit the same variation of uropod endopod as the Madagascan material, furthering the observed heterogeneity of the species already suggested by Ahyong (2005).

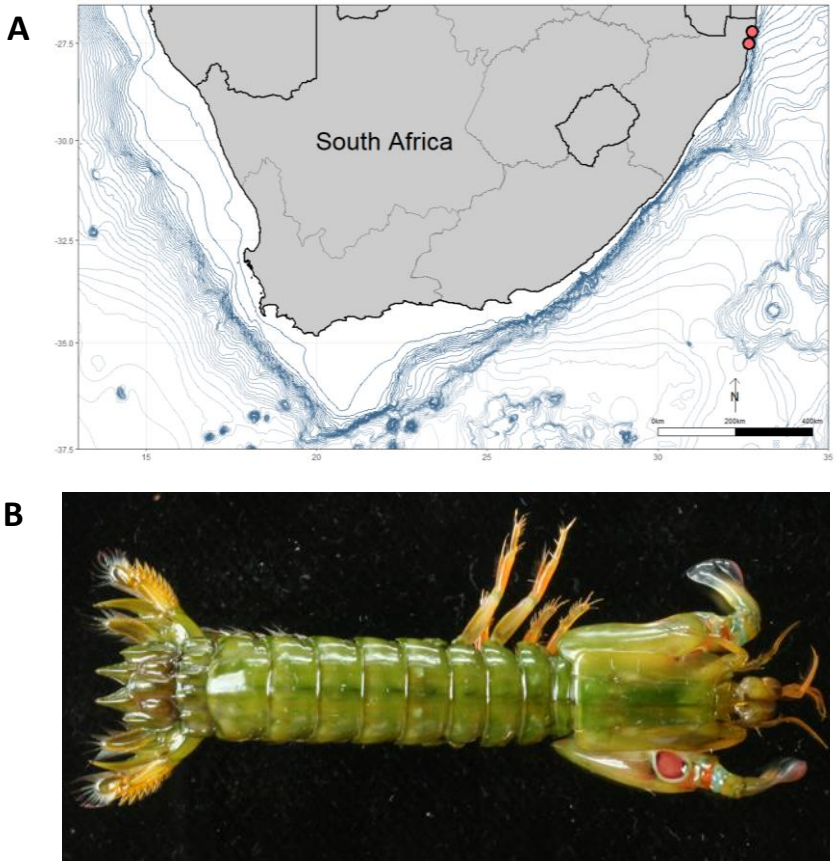

Figure 1.16. *Gonodactylus smithii* Pocock, 1893. **A,** South African distribution; **B,** dorsal habitus, TL 50 mm, intertidal at Mutsumbatsou reef flat (source: Poupin *et al*. 2019; photo taken by Poupin/Cléva).

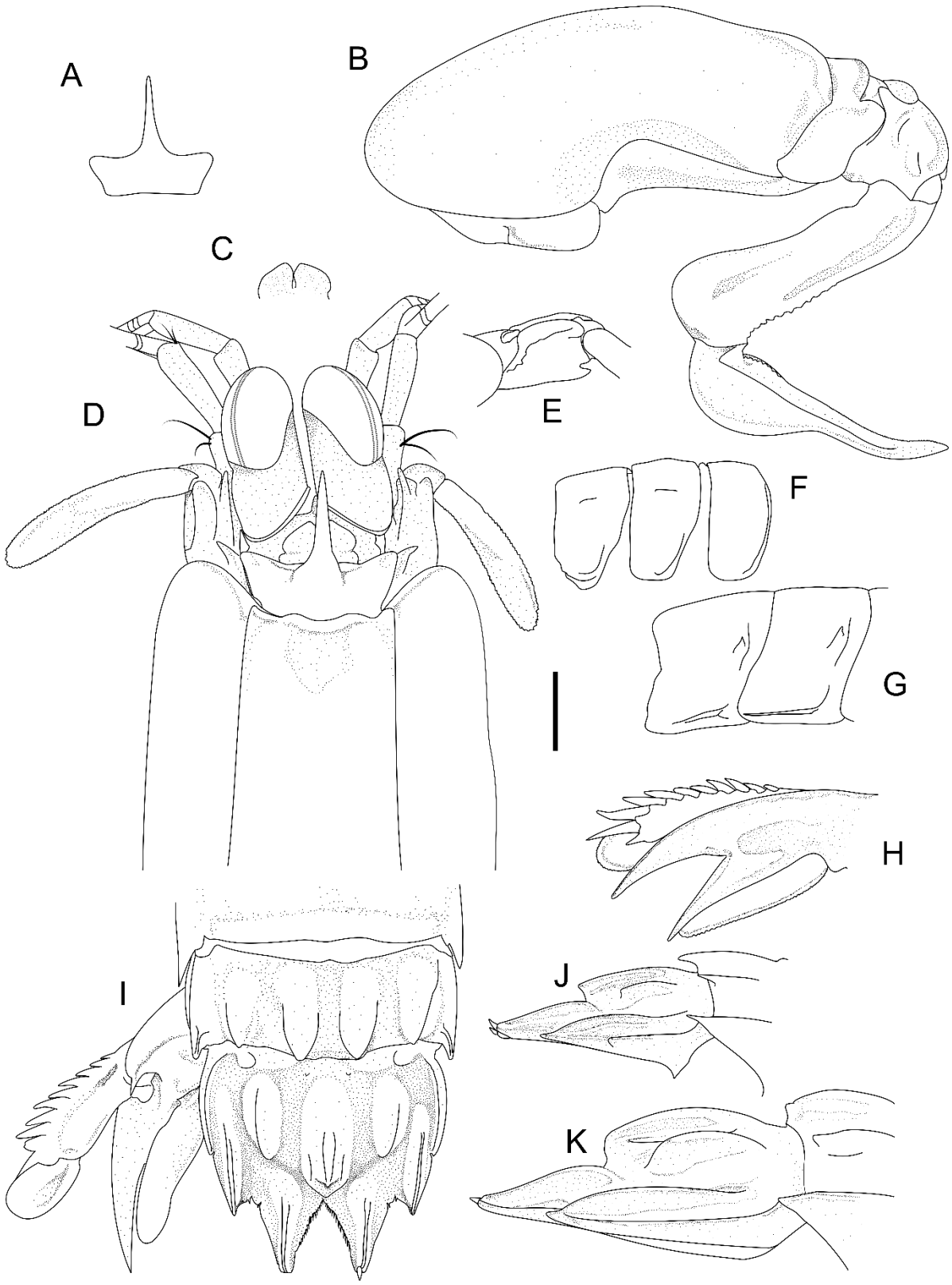

Figure 1.17. *Gonodactylus smithii* Pocock, 1893, **A** male TL 19 mm, SAMC–A015636; **B–I, K** male TL 57 mm, SAMC–A015633; **J** male TL 45 mm, SAMC–A015637. **A,** Rostrum variation, dorsal; **B,** right raptorial claw, lateral; **C,** ocular scales, dorsal; **D,** anterior cephalothorax, dorsal; **E,** right antennal protopod, right lateral; **F,** TS5–8, right lateral; **G,** AS4–5, right lateral; **H,** right uropod, ventral; **I,** AS6, telson and left uropod, dorsal; **J–K,** telson, right lateral. Scale **A–E, I–K** = 2 mm, **F–H** = 3 mm.

ODONTODACTYLIDAE Manning, 1980

Odontodactylidae Manning, 1980: 366, 369.

Diagnosis (Ahyong, 2012). Eyes subglobular. Rostral plate rounded to trapezoid. Raptorial claw with subterminal ischiomeral articulation; propodus occlusal margin non-pectinate, without proximal movable spines; dactylus with short teeth on occlusal margin and strongly inflated heel on outer proximal margin. Telson and AS6 fully articulating, not fused. Distal segment of uropodal exopod articulating at distal end of proximal segment; distal movable spines on outer margin of proximal segment not recurved anteriorly.

Composition. ***Odontodactylus*** Bigelow, 1893.

Remarks. While all species of Odontodactylidae are 'smashers', they differ from Gonodactylidae and Protosquillidae by having teeth on the inner margin of the dactylus of the raptorial claw. This is the first account of the family from South Africa.

Odontodactylus Bigelow, 1893

Odontodactylus Bigelow, 1893: 100. [Type species *Cancer scyllarus* Linnaeus, 1758, by subsequent designation by Bigelow (1931: 144). Gender masculine].

Raoulius Manning, 1995: 86. [Type species: *Gonodactylus cultrifer* White, 1851, by original designation. Gender masculine].

Diagnosis. As for family.

Composition. *Odontodactylus brevirostris* (Miers, 1884); ***O. hansenii*** (Pocock, 1893); *O. havanensis* (Bigelow, 1893); *O. hawaiiensis* Manning, 1967c; *O. japonicus* (De Haan, 1844); *O. latirostris* Borradaile, 1907; ***O. scyllarus*** (Linnaeus, 1758).

Key to the South African species of *Odontodactylus*

1. Dactylus of raptorial claw (Fig. 1.19A) with 8 or 9 small teeth on inner margin……***O. hansenii***

– Dactylus of raptorial claw (Fig. 1.21B) with 2 or 3 small teeth on inner margin……***O. scyllarus***

Odontodactylus hansenii (Pocock, 1893), **new record**

Figures 1.18(A–B) – 1.19(A–I)

Gonodactylus hansenii Pocock, 1893: 473–479, pl. 20.B, fig. 3 [type locality Macclesfield Bank, South China Sea].

Odontodactylus hansenii. –Manning, 1967c: 4–5 (text). –Ahyong, 2001: 78–79. –Poupin, 2010: 59, 76.

Material examined. KZN: SAMC–A079452 1 male (TL 37 mm), Sodwana Bay, 27°31.8'S 32°42.8'E, 2 June 1990, 70 m, Natal Museum Dredging Programme, stat. ZH 18; SAMC–A079453 1 female (TL 60 mm), off 'Dog Pond' Kosi Bay, 27°06'00.0"S 32°53'17.9"E, 74 m, stat. ZC 10, dredge.

Diagnosis. Ocular scales separated by deep concavity, margins truncate. A2 scale anterior margins setose, distal setae present or becoming reduced in size. Rostral plate ovoid, apex rounded. Raptorial claw with 8 or 9 teeth on inner margin. TS6–7 lateral margins rounded. AS(3)4–5 with posterolateral spine. Telson mid-dorsal surface with distinct MD carina and 2 longitudinal carinae either side of midline (accessory MD; anterior SM) in addition to carinae of primary teeth. Uropod exopod proximal segment entirely or almost entirely black, outer margin with 11 movable spines; exopod distal segment with distinctly shorter than proximal segment; endopod with 2 subequal dorsal carinae and 1 ventral carina.

Colour in alcohol. Almost completely faded except for a dark, transverse patch mid-dorsal on the carapace; the distinctive uropod exopod proximal segment entirely or almost entirely black. Dark mottled speckles on posterior margin of AS1; all primary teeth of telson with some dark brown colouration.

Colour in Life. A previous note describes a live specimen with 'telson pink, eyes apple green, dorsum rusty, mottled' (Bigelow, 1931). More recently, a colour photograph of a specimen from Réunion Island shows the dorsum to be mottled rust, yellow and orange (Fig. 1.18B) (Legall and Poupin, 2022).

Measurements. Male (n = 1) TL 37 mm, female (n = 1) TL 60 mm. Largest specimen recorded by Pocock (1893) for a TL 60 mm female.

Distribution and Habitat. Indo-West Pacific. South China Sea, Japan, Philippines, New Caledonia, Hawaii, Réunion Island and now from South Africa [KZN]; 70–74 m. Associated with rock and rubble substrata, recorded depths between 20–324 m.

Remarks. *Odontodactylus hansenii* is a warm water species known from South Africa only by the present specimens from KwaZulu-Natal. Unfortunately, no male specimen from South African waters was available for examination. *O. hansenii* has 'small' post larvae and is considered mature by the development of the telson carinae at TL 25 mm (Ahyong, 2001).

Previously thought to be a synonym of *Odontodactylus brevirostris* by Manning (1967c), *O. hansenii* is now considered distinct (Ahyong, 2001). The confusion of the three species: *O. havanensis*, *O. hansenii* and *O. latirostris*, with *O. brevirostris* is also referred to as the '*O. brevirostris* complex'. To help resolve this species group, Ahyong (2001) suggested the use of characters such as extent of antennal scale setation and colouration, presence of AS3 posterolateral spine and relative length of uropodal exopod proximal segment, as well as overall colour to distinguish species. *Odontodactylus hansenii* is distinguished from other *Odontodactylus* species with single accessory MD carina either side of the MD carina of the telson and AS3–5 posterolaterally spined by the uropodal exopod distal segment being shorter than the proximal segment and the uropodal exopod proximal segment coloured completely black (Ahyong, 2001). Ahyong (2001) gives a preliminary key to the species of *Odontodactylus* but stresses the continuation of study and re-examination of specimens for species within the '*O. brevirostris* complex'.

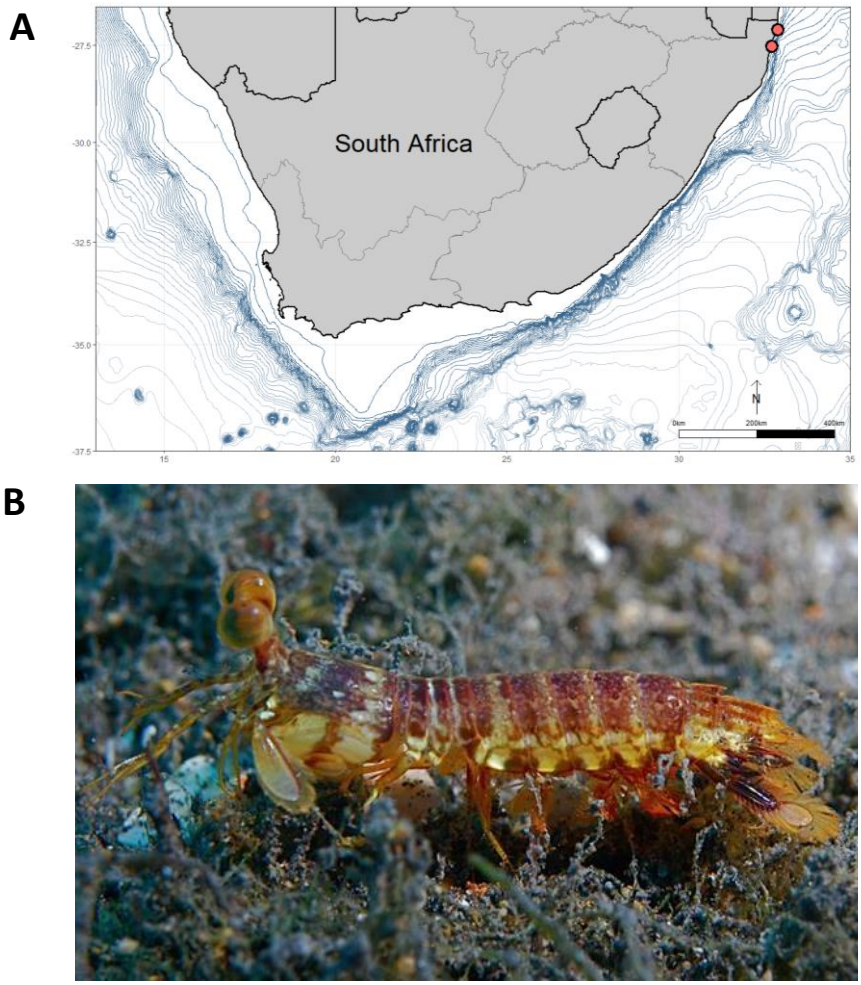

Figure 1.18. *Odontodactylus hansenii* (Pocock, 1893). **A,** South African distribution; **B,** live specimen, Réunion Island (source: Legall and Poupin, 2022, photo taken by A. Diringer).

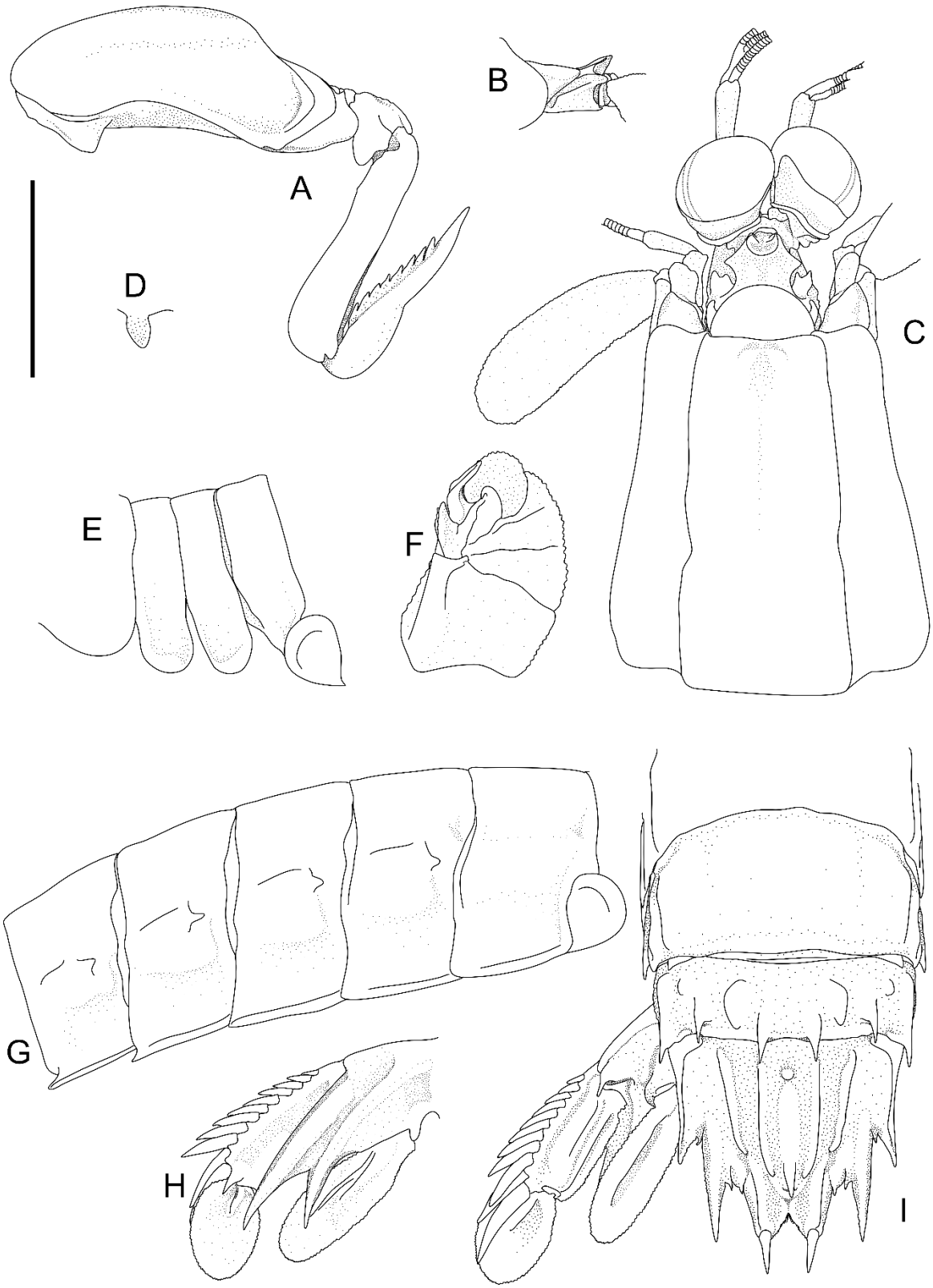

Figure 1.19. *Odontodactylus hansenii* (Pocock, 1893), **A–B, E–I** male TL 37 mm, SAMC–A079452; **C,** female TL 60 mm, SAMC–A079453. **A,** right raptorial claw, lateral; **B**, right antennal protopod, right lateral; **C,** anterior cephalothorax, dorsal; **D**, TS8 sternal keel, left lateral; **E**, TS6–8, left lateral; **F**, right pleopod 1 endopod, anterior; **G,** AS1–5, right lateral; **H,** right uropod, ventral; **I,** AS5–6, telson and left uropod, dorsal. Scale **A–B, E, G–I** = 5 mm, **C–D, F** = 2.5 mm.

Odontodactylus scyllarus (Linnaeus, 1758), **new record**

Figures 1.20(A–B) – 1.21(A–I)

Cancer scyllarus Linnaeus, 1758: 633 [type locality Rinca, Greater Sunda Island, Sulawesi, Indonesia, by neotype selection (Ahyong 2001: 85)].

Gonodactylus bleekeri A. Milne-Edwards, 1868: 65, footnote [type locality Batavia, Jakata, Indonesia].

Gonodactylus elegans Miers, 1884: 566, 575, pl. 52: fig. b [type localities Providence Island and Providence Reef, Seychelles]. –Kemp, 1913: 4, 11, 134, 139.

Odontodactylus scyllarus. –Manning, 1967c: 10–15, fig. 3. –Manning, 1970a: 1431, table 1. –Ahyong, 2001: 85, fig. 41. –Ahyong *et al.*, 2008: 29–30, fig. 22. –Ahyong, 2012: 39–42, figs. 18, 19. –Poupin *et al.* 2019: 8, fig. 3B.

Material examined. KZN: SAMC–A079410 1 female (TL 88 mm), Sodwana Bay, 1988, depth unknown, coll. W. Emmerson.

Other material examined. Mozambique: SAMC–A019341 1 male (TL 129 mm), Inhassoro, 21°32'04.9"S 35°12'07.9"E, depth unknown, stat. PEA 23 A, UCT Ecological Survey, det. R. B. Manning.

Diagnosis. Ocular scales oblique to midline, appressed medially, margin truncate. A2 scale with entire margin setose, anterior setae shorter. Rostral plate triangular; lateral margins convex; apex deflexed. Raptorial claw dactylus with 2 or 3 small teeth on inner margin. AS(3)4–5 with posterolateral spine. Telson mid-dorsal surface with distinct MD carina and 3 longitudinal carinae either side of midline (double accessory MD, anterior SM) in addition to carinae of primary teeth; carina of IM denticle short, not extending onto mid-dorsal surface. Uropodal exopod proximal distinctly longer than distal segment; outer margin with 10–12 flattened movable spines, apices sharp, evenly tapering.

Colour in alcohol. Somewhat faded with evidence of overall diffuse spots. Dactylus of raptorial claw orange along outer margin.

Colour in life (Ahyong, 2012). Overall dorsal colour reddish brown to green, often with diffuse banding and dark lateral spot on each somite. Large males deep green. Posterior margin of thoracic and abdominal somites orange red. Carapace with anterolateral and usually posterolateral areas with large dark brown spots outlined in white. A2 scale orange yellow with dark apex; setae red. Ventral surface, dactylus of raptorial claw and pereopods red. Uropodal protopod pale basally; exopod blue with iridescent blue outline and red marginal setae; endopod dark blue with iridescent blue outline and red marginal setae.

Measurements. Male (n = 1) TL 129 mm, female (n = 1) TL 88 mm. CI (female) 500. Manning (1967c) reported specimens to TL 171 mm.

Distribution and Habitat. Western Indian Ocean from Mozambique, Madagascar, Comoros, Réunion, Mauritius and Seychelles to South China Sea, Japan, New Caledonia, Fiji, northern New Zealand, Australia, and now South Africa [KZN]. Associated with hard bottom substrates, such as rock and rubble in shallow waters; 0–100 m.

Remarks. Known as the ‘peacock mantis shrimp’, *Odontodactylus scyllarus* is one of the most recognisable species with the fastest and most powerful punch of the ‘smashers’ and high popularity in the aquarium trade. The raptorial claw biomechanics (Patek et al. 2004) and visual system of this well-known warmwater species has

been well-researched. However, this female specimen collected from Sodwana Bay, KZN, is the first specimen of the species to be taxonomically examined from South Africa. Although an infrequent but definite animal siting by divers on excursions in KwaZulu-Natal*, O. scyllarus* has never been documented from South Africa in scientific literature. Meanwhile, it has been repeatedly mentioned in early revisions of South African stomatopod fauna (Barnard, 1950; Manning, 1969a) that the presence of *O. scyllarus* on the east coast of South Africa is highly feasible. This is now confirmed. The species has been recorded from multiple localities along the coast of eastern Africa including southern Mozambique (Barnard, 1958), Madagascar (Manning, 1970a), Comoros (Mayotte), Réunion, Mauritius and Seychelles (Ahyong, 2012).

The single South African specimen closely resembles the most recent revisions of the species (Ahyong, 2001; 2012). The specimen has posterolateral spines on abdominal somites 3–5 (Fig. 1.21F) and two small teeth on the inner margin of the dactylus of the raptorial claw (Fig. 1.21B) as well as 10–11 movable spines on the outer margin of uropodal exopod (Fig. 1.21H, I). The Mozambican specimen examined herein and the specimen from Madagascar (Manning, 1970a) both exhibited the same ornamentation of the raptorial claw and abdominal spination as the South African specimen.

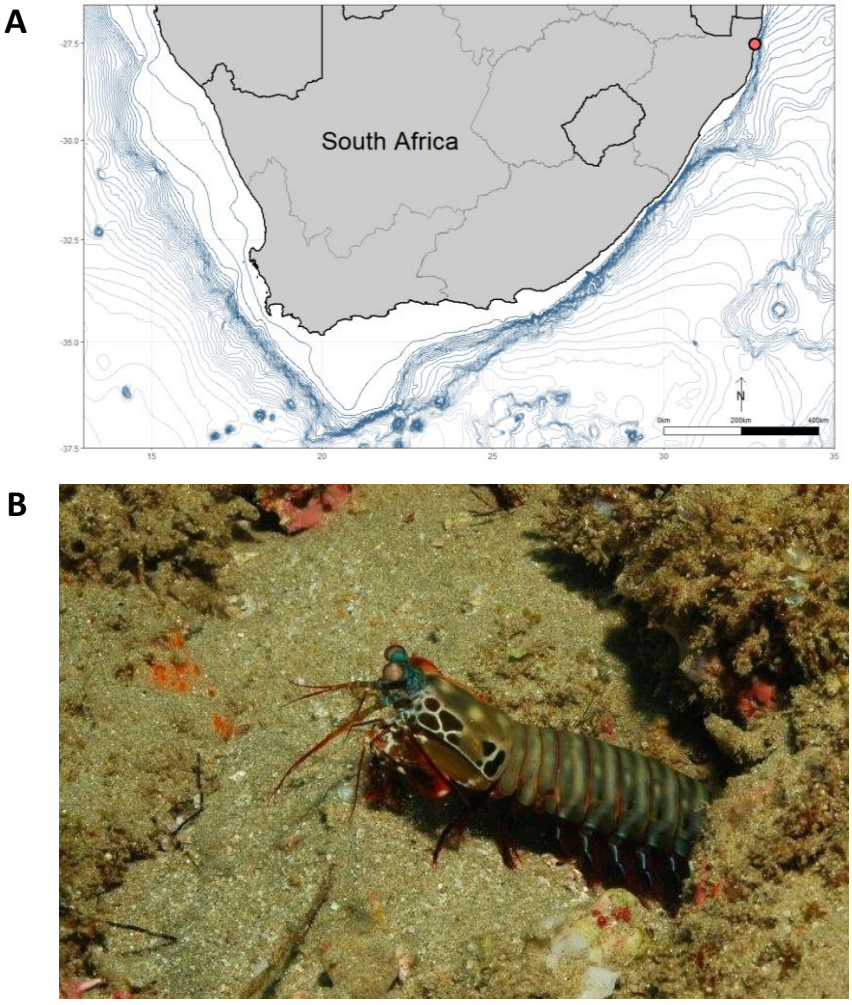

Figure 1.20. *Odontodactylus scyllarus* (Linnaeus, 1758) **A,** South African distribution; **B,** Live specimen from Sodwana, South Africa (photo taken by Valda Fraser).

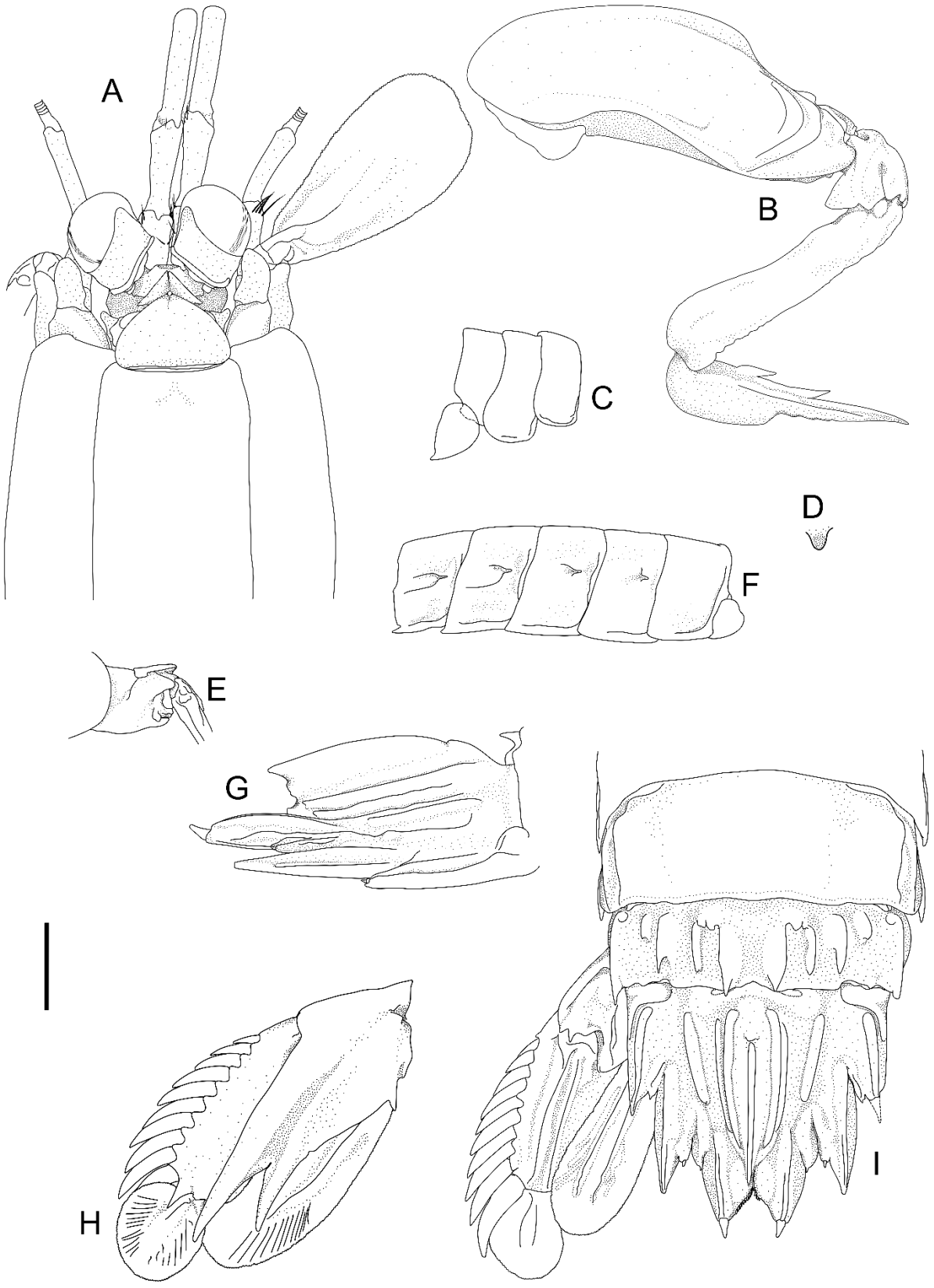

Figure 1.21. *Odontodactylus scyllarus* (Linnaeus, 1758), female, TL 88 mm, SAMC–A079410. **A,** anterior cephalothorax, dorsal; **B,** right raptorial claw, lateral; **C,** TS6–8, right lateral; **D,** TS8 sternal keel, left lateral; **E,** right antennal protopod, lateral; **F**, AS1–5, right lateral; **G**, telson, right lateral; **H**, right uropod, ventral; **I**, AS5–6, telson and right uropod, dorsal. Scale **A–B, E, G–I** = 5 mm, **C, F** = 10 mm, **D** = 2.5 mm.

PROTOSQUILLIDAE Manning, 1980

Protosquillidae Manning, 1980: 366, 369.

Diagnosis (Ahyong, 2012). Rostral plate trispinous. Antennal protopod dorsally with fixed, anteriorly directed spine or tooth. Raptorial claw with subterminal ischiomeral articulation; propodus occlusal margin sparsely pectinate; dactylus with smooth or microscopically serrated occlusal margin and strongly inflated heel on outer proximal margin. Telson and AS6 immovably fused forming pleotelson (though demarcation usually visible). Distal segment of uropodal exopod articulating at distal end of proximal segment; distal movable spines on outer margin of proximal segment not recurved anteriorly.

Composition. ***Chorisquilla*** Manning, 1969c; *Echinosquilla* Manning, 1969c; *Haptosquilla* Manning, 1969c; *Protosquilla* Brooks, 1886; *Rayellus* Ahyong, 2010a; *Siamosquilla* Naiyanetr, 1989.

Remarks. One genus and species known from South Africa.

Chorisquilla Manning, 1969c

Chorisquilla Manning, 1969c: 157. [Type species *Gonodactylus excavatus* Miers, 1880, by original designation. Gender feminine].

Diagnosis (Ahyong, 2001). Cornea flattened dorsally, broadened laterally. Rostral plate trispinous. Mandibular palp 2-segmented. MXP1–5 with epipod. AS1 with small, articulated, pleural plate anterolaterally. AS6 fused with telson but usually demarcated by dorsal groove. Telson posterior margin divided by deep V- or U-shaped median margination. Uropodal endopod without dorsal spines.

Composition. *Chorisquilla andamanica* Manning, 1975c; *C. brooksii* (de Man, 1888); *C. convoluta* Ahyong, 2001.; *C. excavata* (Miers, 1880); *C. gyrosa* (Odhner, 1923); *C. hystrix* (Nobili, 1899); *C. kroppi* Ahyong and Erdmann, 2003; *C. mehtae* Erdmann and Manning, 1998; *C. orientalis* Hwang, Ahyong and Kim, 2018; *C. pococki* Manning, 1975c; *C. quinquelobata* (Gordon, 1935); *C. similis* Ahyong, 2002c; ***C. spinosissima*** (Pfeffer, 1888); *C. trigibbosa* (Hansen, 1926); *C. tweediei* (Serène, 1950); *C. tuberculata* (Borradaile, 1907).

Remarks. Only one species recorded for South African waters.

Chorisquilla spinosissima (Pfeffer, 1888)

Figures 1.22(A–B) – 1.23(A–H)

Gonodactylus spinosissima Pfeffer, 1888: 35 [type locality Mombasa, Kenya, by neotype selection (Ahyong, 2001)]. –Poupin *et al.* 2019: 9, fig. 2D.

Chorisquilla spinosissima. –Cappola and Manning, 1995: 280. –Ahyong, 2001: 95–97, fig. 46. –Poupin *et al.* 2019: 7, fig. 2D.

Chorisquilla longispinosa Sun and Yang, 1998: 143–144, 151–152, fig. 1 [type locality Sanjiao Reef, Nansha islands, South China Sea].

Protosquilla spinosissima. –Manning, 1968a: 55–56.

Material examined. KZN: SAMC–A015623, 1 male (TL 40 mm), 1 female (TL 34 mm), Sodwana Bay, 27°31'00.1"S 32°40'59.9"E, 1 Aug 1976, 13.5 m, RW 24, coll. R. Winterbottom, det. S. Ahyong; SAMC–A015622, 2 males (TL 12–18 mm), Sodwana Bay, 27°31'00.1"S 32°40'59.9"E, 28 Jul 1976, 13.5 m, RW 21, same as above.

Diagnosis. Raptorial claw propodus with movable spine proximally. AS4 smooth medially; laterally corrugated. AS5 with posterolateral spine; smooth medially, at most with row of short, narrow, transverse grooves on posterior margin; laterally corrugated and carinate; posterior margin unarmed. AS6 anterior margin with row of short, slender, posteriorly directed spines; dorsally ornamented with numerous long spines. Telson with 2 pairs of primary teeth, apices spiniform; dorsal surface entirely covered with long spines, obscuring MD and SM bosses; MD boss circular to ovate, SM bosses extending posteriorly beyond apex of median excavation; lateral margin with 7–12 short spines; 7–11 spiniform SM denticles, increasing in length distally; and 2 spiniform IM denticles; ventral surface with low, short, postanal carina. Uropodal protopod dorsally with 1 or 2 slender proximal spines and shorter spine above proximal exopod articulation. Uropodal exopod proximal segment outer margin with 10 or 11 movable spines.

Colour in alcohol. Completely faded. Ahyong (2001) describes the body to be uniformly dark green-brown in recently preserved specimens and Manning (1968a) records preserved material from Nosy Bay, Madagascar, as mottled brown with telson and uropod more lightly coloured than body. See Figure 1.22B for colour in life.

Measurements. Male (n = 3) TL 12–40 mm, female (n = 1) TL 34 mm. A1 peduncle 0.59–0.86CL. A2 scale 0.44–0.50CL. Uropodal endopod length 3.38–3.60 times width. The present specimen of TL 40 mm is the largest known of the species.

Distribution and Habitat: Indian Ocean from South Africa, Madagascar, Mayotte and Somalia to Sri Lanka, Red Sea, South China Sea and north-western Australia; shore to 14 m (Ahyong, 2001).

Remarks. First recorded for southern Africa in Madagascar by Manning (1968a), this small species is mainly known from shallow habitats, but has been found to inhabit depths of up to 65 m in New Caledonia (Moosa, 1991). The present series of specimens was examined by Ahyong (2005) for his paper on coral reef related Stomatopoda from Sodwana Bay, South Africa. The specimens agree well with Manning's (1968a) description of the species from Madagascar and the more recently published species account from Australian waters (Ahyong, 2001).

The similarities between *Chorisquilla spinosissima* and C. *hystrix* have been discussed in previous studies suggesting that the two species could be western and eastern populations of the same widespread Indo-West Pacific species (Ahyong, 2001). However, this has yet to be determined. With size, the development of the number of marginal spines of the telson viewed ventrally is a feature recorded in specimens of both *C. spinosissima* and C. *hystrix*. In the smallest specimen examined (TL 12 mm), 7 or 9 spines are present on the lateral margins of the telson; by TL 18 mm, 8 or 10 spines, and by TL 34 mm, 10 spines are present. The largest specimen (TL 40 mm) has 11 or 12 spines on the lateral margins of the telson.

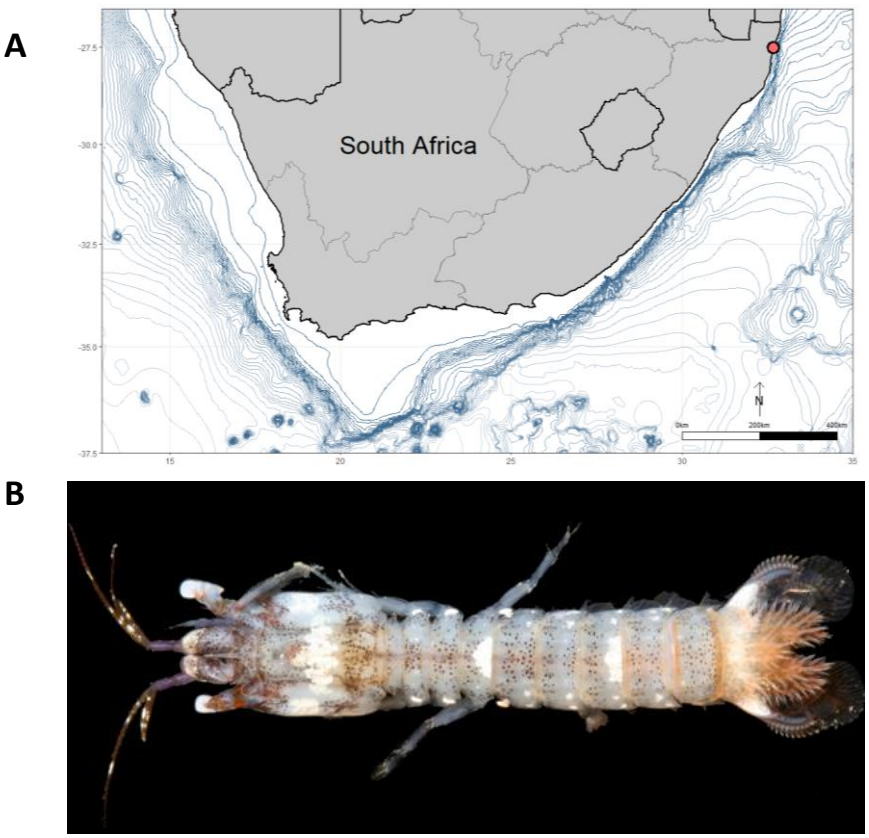

Figure 1.22. *Chorisquilla spinosissima* (Pfeffer, 1888). **A,** South African distribution; **B,** dorsal habitus, TL 15.7 mm, Mayotte (source: Poupin *et al.* 2019)

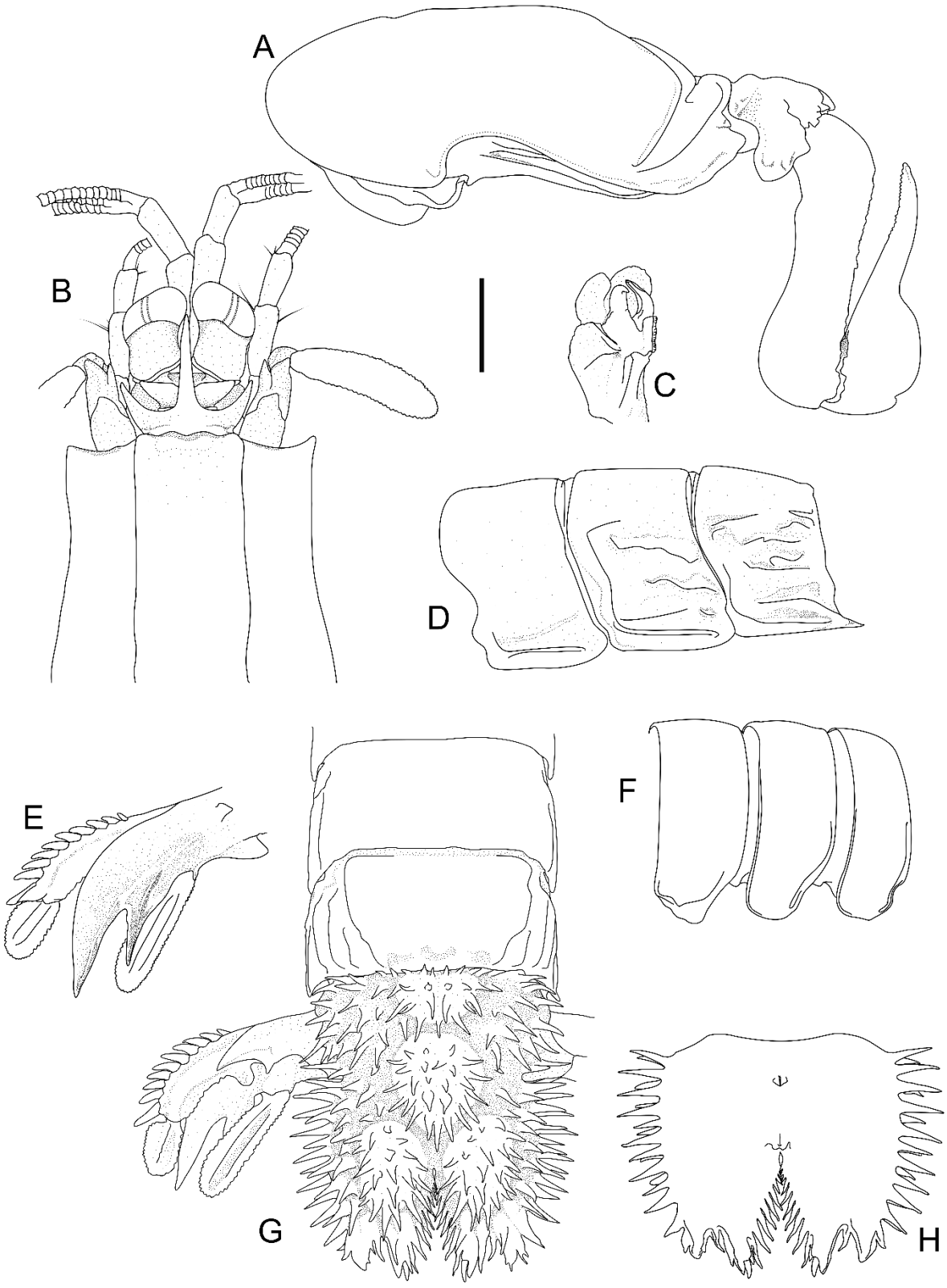

Figure 1.23. *Chorisquilla spinosissima* (Pfeffer, 1888) male TL 40 mm, SAMC–A015623. **A,** right raptorial claw, lateral; **B,** anterior cephalothorax, dorsal; **C**, right pleopod 1 endopod, anterior; **D,** AS3–5, left lateral; **E,** right uropod, ventral; **F,** TS6–8, right lateral; **G,** AS5–6, telson and left uropod, dorsal; **H,** telson, ventral. Scale **A–H** = 2 mm.

PSEUDOSQUILLIDAE Manning, 1977a

Pseudosquillidae Manning, 1977a: 95. [Type genus *Pseudosquilla* Dana, 1852].

Diagnosis (Ahyong, 2001). Dorsal surface of A2 protopod with articulated, ventrally carinate plate. Ischiomeral articulation of raptorial claw terminal; propodus occlusal margin evenly pectinate proximally, becoming sparsely pectinate distally; dactylus slender with 3 teeth, basally uninflated. Mandibular palp 3-segmented. MXP1–5 with epipod. AS6 articulating with telson. Telson with distinct, slender MD carina; SM denticles absent in adults. Articulation of uropodal exopod segments terminal; distal spines on outer margin of uropodal exopod slender, straight or slightly curved, but not strongly recurved anteriorly.

Composition. *Pseudosquilla* Dana, 1852; *Pseudosquillana* Cappola and Manning, 1995; ***Pseudosquillisma*** Cappola and Manning, 1995; ***Raoulserenea*** Manning, 1995.

Remarks. While only two of the four genera have been recorded in South Africa, it is expected that *Pseudosquilla*, previously recorded for Mozambique, may occur along the east coast of South Africa.

Key to the genera of Pseudosquillidae of southern Africa [South African in bold]

1. Telson with 3 carinae either side of MD carina.....2

– Telson with 4 carinae either side of MD carina (Fig. 1.25J)..... ***Pseudosquillisma***

2. Cornea subglobular, not broadened anteriorly. Carapace without pair of large dark spots. Uropodal protopod with inner spine longer.....*Pseudosquilla*

– Cornea flattened, broadened anteriorly. Carapace with pair of large dark, circular patches. Uropodal protopod with inner spine shorter.....***Raoulserenea***

Pseudosquillisma Cappola and Manning, 1995

Pseudosquillisma Cappola and Manning, 1995: 284–285. [Type species *Squilla oculata* Brullé, 1837, by original designation. Gender feminine].

Diagnosis. Eye with cornea strongly broadened, broader than stalk. Rostral plate ovoid, with short anterior spine. Carapace dorsum with pair of large, dark, circular eyespots. Raptorial claw propodus with 3 movable spines proximally. AS1–5 with MG carinae only. Telson dorsal surface with 4 longitudinal carinae lateral to MD carina (accessory MD, anterior SM, anterior IM, MG). Uropodal protopod terminating in 2 slender flattened spines, outer spine longer.

Composition. *Pseudosquillisma adiastalta* (Manning, 1964); *P. guttata* (Manning, 1972a); ***P. kensleyi*** Ahyong, 2005; *P. oculata* (Brullé, 1837); *P. tweediei* Ahyong, 2014.

Remarks. Most similar to species of *Raoulserenea*, species of *Pseudosquillisma* bear a pair of large eyespots on the carapace, which along with general colour pattern is the most reliable way of distinguishing between species. There are additional subtle morphological differences between species, but the genus needs revision, with the potential of an undescribed *Pseudosquillisma* species in the central Pacific (Ahyong, 2014). The current knowledge of the genus restricts *P. oculata* sensu stricto (Brullé, 1837) to the Atlantic Ocean. Of the four species of *Pseudosquillisma* from the Indo-Pacific, only one is known from South African waters.

Pseudosquillisma kensleyi Ahyong, 2005

Figures 1.24 – 1.25(A–J)

Pseudosquillisma kensleyi Ahyong, 2005: 160–162, fig. 1 [type locality Sodwana Bay, South Africa].

Material examined. KZN: SAMC–A015617 1 male (TL 30 mm), Hully Point, 25.5 km north of Sodwana Bay, 27°19'59.9"S 32°45'00.0"E, 21 Jan 1976, rotenone station, depth unknown, RW 11, coll. R. Winterbottom, det. S. Ahyong.

Diagnosis (Ahyong, 2005). Cornea subglobular, strongly inflated, expanded dorsally and laterally. Carapace with pair of dark circular 'eyespots' at most with indistinct pale outline. AS1–3 posterolaterally rounded. AS4 blunt but angular. AS5 with posterolateral spine. Uropodal protopod with distinct step on inner proximal margin; exopod proximal segment outer margin with 11 movable spines.

Colour in alcohol. Overall dorsal body described in original description as faded to uniform grey-brown. Carapace with pair of dark brown, circular 'eyespots', at most with indistinct pale outline. Raptorial claw merus and propodus grey-brown; dactylus bleached pale. Posterolateral margin of AS5 and posterior margin of AS6 with dark spots of maroon. Telson and uropods with scattered maroon colouration. Colour in life unknown.

Measurements of holotype (Ahyong, 2005). TL 30 mm. CL 6.4 mm. Cornea width 2.1 mm. A1 peduncle length 3.8 mm. A2 scale length 2.8 mm. AS5 width 4.8 mm.

Distribution. South Africa. Only known from the type locality of Hully Point, just north of Sodwana Bay, KZN.

Remarks. *Pseudosquillisma kensleyi* is known only from a single specimen collected from Hully Point, near Sodwana Bay, KZN, and at present is considered endemic to South Africa. However, given this locality, it is most likely that the species occurs at least in the Mozambican Channel. *Pseudosquillisma kensleyi* is distinguished by the size of its strongly inflated eyes being expanded both laterally and dorsally rather than laterally expanded and dorsally flattened, as in other species of *Pseudosquillisma*.

The type material in the Iziko collection was originally identified as *Pseudosquillisma oculata* (Brullé, 1837), as both *P. oculata* and *P. kensleyi* share a similar colour pattern with the diagnostic pair of eye spots on the carapace surrounded, at most, by an indistinct pale ring. However, no live specimen or description of colour in life is available for *P. kensleyi* and thus the only colour description is based on already faded material. Unfortunately, no habitat description was given for the Hully Point collection site, but it is assumed that this species inhabits the coral reef systems around Sodwana Bay (Ahyong, 2005). A female of the species has yet to be recorded.

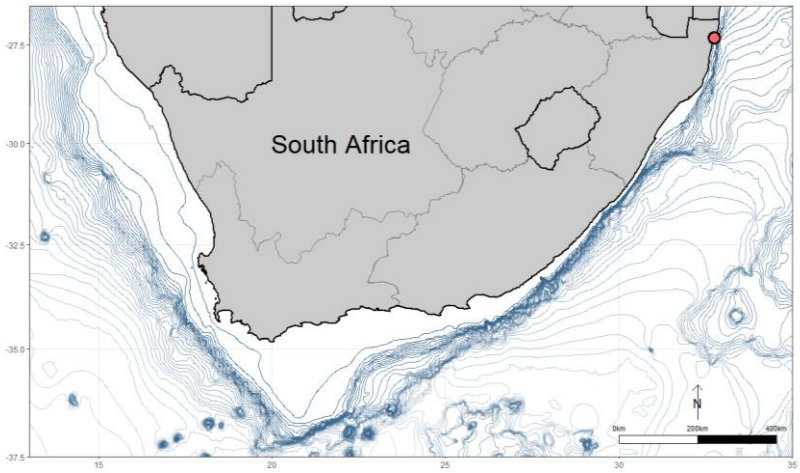

Figure 1.24. South African distribution of *Pseudosquillisma kensleyi* Ahyong, 2005.

Note on *Pseudosquillisma oculata* Brullé, 1837. There have been accounts of the species from Mauritius (Barnard, 1950) and Madagascar (Manning, 1970a), however, the records give very little detail in terms of characteristic features and specimen comparison. Ahyong (2014) described a new species *P. tweediei* Ahyong, 2014, for specimens originally thought to be *P. oculata* most easily distinguished by colour in life. The holotype was collected from the Cocos (Keeling) Islands, however, the observation of morphological heterogeneity among Indo-West Pacific, eastern and western Atlantic populations of the species lead to a revaluation of the distribution of *P. oculata*. It is suggested that *P. oculata* as originally described is restricted to the Atlantic Ocean, while the Indo-West Pacific form should be considered the separate species *P. tweediei* (Ahyong, 2014). Therefore, those documented occurrences of *P. oculata* from Mauritius and Madagascar can tentatively be redefined as *P. tweediei*.

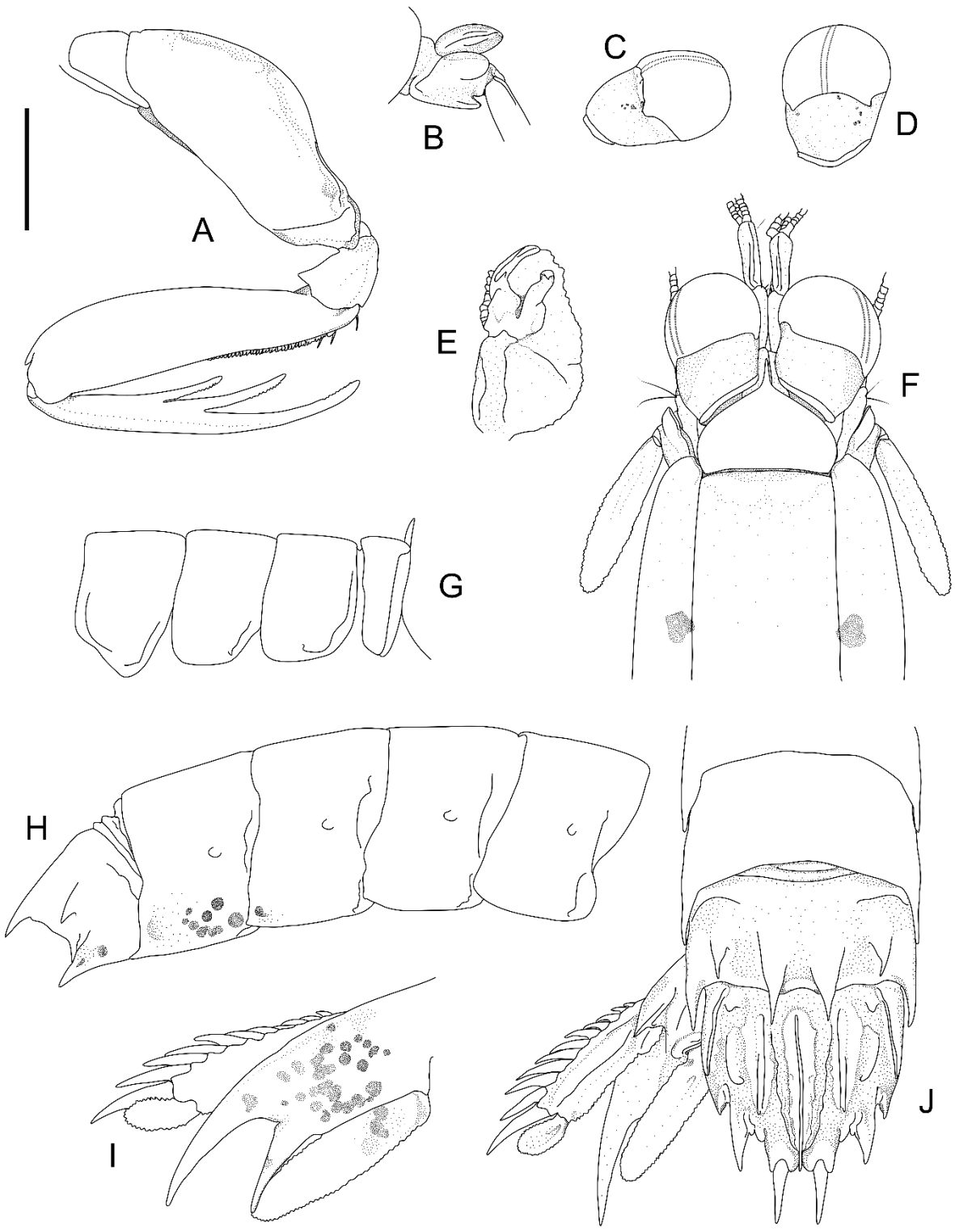

Figure 1.25. *Pseudosquillisma kensleyi* Ahyong, 2005, male TL 30 mm, SAMC–A015617. **A,** raptorial claw, lateral; **B,** right antennal protopod, lateral; **C–D**, eye, lateral and dorsal; **E**, right pleopod 1 endopod, anterior; **G,** TS5–8, right lateral; **H,** AS2–5, right lateral; **I,** right uropod, ventral; **J,** AS5–6, left uropod and telson, dorsal. Scale **A–D, G–J** = 2 mm, **E** = 1 mm.

Raoulserenea Manning, 1995

Raoulserenea Manning, 1995: 116. [Type species *Pseudosquilla ornata* Miers, 1880, by original designation. Gender feminine].

Diagnosis (Ahyong, 2001). Eye with cornea broadened, but not bilobed, as broad as or broader than stalk. Rostral plate ovoid, with or without short anterior spine. Carapace dorsum with pair of large, dark, circular 'eyespots'. Raptorial claw propodus with 3 movable spines proximally. AS1–5 with MG carinae only. Telson dorsal surface with 3 longitudinal carinae lateral to MD carina (accessory MD, anterior SM, LT, MG). Uropodal protopod terminating in 2 slender, flattened spines, outer spine longer.

Composition. *Raoulserenea hieroglyphica* (Manning, 1972a); ***R. komaii*** (Moosa, 1991); *R. moorea* Ahyong and Caldwell, 2017; ***R. ornata*** (Miers, 1880); ***R. oxyrhyncha*** (Borradaile, 1898).

Remarks. Colour pattern is particularly important in distinguishing species of *Raoulserenea*. Presently, the two species bearing an anterior spine on the rostral plate, *R. komaii* and *R. oxyrhyncha,* can be distinguished only by colour pattern and might prove conspecific. Species of *Raoulserenea* are common on coral reefs amongst rubble and live coral on the reef flat and slope. A feature shared by species of the *Raoulserenea* and *Pseudosquillisma* is the presence of paired 'eyespots' on the carapace, the function of which is unknown (Ahyong, 2001). Three species of *Raoulserenea* have been recorded from Sodwana Bay, South Africa.

Key to South African species of *Raoulserenea*

1. Rostral plate with short median anterior spine……..2

– Rostral plate (Fig. 1.28A) rounded or angular anteriorly but without median spine……..……***R. ornata***

2. Carapace 'eyespots' (Fig. 1.29C) with diffuse margins, at most surrounded by several small, white spots or pale diffuse patches……***R. oxyrhyncha***

– Carapace 'eyespots' (Fig. 1.26B) well-defined, surrounded by continuous or near continuous white ring……***R. komaii***

Raoulserenea komaii (Moosa, 1991)

Figure 1.26(A–B)

Pseudosquilla komaii Moosa, 1991: 171–173, fig. 4 [type locality Chesterfield Islands, New Caledonia].

Raoulserenea komaii. –Manning, 1995: 21, 116. –Ahyong, 2001: 121–122, fig. 59; 2002b: 357, fig. 6; 2005: 162; 2007: 334. –Ahyong and Davie, 2002: 70. –Ahyong and Erdmann, 2003: 335. –Ahyong, 2014: 251. –Ahyong and Caldwell, 2017: 612, fig. 2C.

Material examined. No material available for study.

Previously examined South African material. KZN: SAMC–A015619, 1 female (TL 92 mm), Sodwana Bay, 27°31'00.1"S 32°40'59.9"E, 25 Jul 1976, 13.5 m, RW 76–19, coll. R. Winterbottom, det. S. Ahyong.

Diagnosis (Ahyong, 2001). Cornea noticeably broader than stalk, trapezoid in dorsal view. Rostral plate ovoid, with short anterior spine. Carapace dorsum with pair of dark 'eyespots' surrounded by continuous or near continuous light ring. Raptorial claw propodus with pale spots. Thoracic and abdominal somites with rows of small pale spots and lines. AS1–2 posterolaterally rounded. AS3–4 posterolaterally angular. AS5 with posterolateral spine. Uropodal exopod proximal segment with 11 movable spines on outer margin.

Colour in alcohol. Detailed accounts given by Moosa (1991), Ahyong and Erdmann (2003). Moosa (1991) describes newly preserved material with "Dense reticulated arrangements - somewhat resembling panther pattern - seen on the anterolateral part of carapace and, with slightly different pattern, on antero-median part of carapace". He continues "Carapace with a pair of large black spots surrounded by almost entire light ring which is interrupted only at dorso-posterior part."

Colour in life (Ahyong and Caldwell, 2017). Body and carapace with strongly reticulated pattern of light and dark with the paired 'eyespots' on the carapace surrounded by a continuous or near continuous white ring (Fig. 1.26B).

Measurements. Female (n = 1) TL 92 mm. Ahyong (2001) records the largest specimen at TL 100 mm from Australia.

Distribution and Habitat. From French Polynesia, New Caledonia, Australia, Guam and Japan to South Africa; shore to 13.5 m (Ahyong, 2005). Associated with coral reefs systems; shore to 25 m (Ahyong and Caldwell, 2017).

Remarks. The single specimen of *R. komaii* collected from Sodwana, KZN, was deposited in the Iziko collection and reported on by Ahyong (2005). However, since the review, the specimen has been badly damaged and can no longer be safely identified as *R. komaii*. Thus, the present study is reliant on the previous account. Ahyong (2005) identified the specimen, remarking on its colour pattern closely resembling that of the holotype from New Caledonia (Moosa, 1991) as well as specimens from Guam (Ahyong and Erdmann, 2003). The present specimen exhibits a reticulated colour pattern on the body and carapace and a distinct pale ring surrounding the characteristic 'eyespots' on the carapace.

At present, *Raoulserenea komaii* and *R. oxyrhyncha* are only distinguishable by colour pattern with *R. komaii* consistently having a pattern of light and dark markings strongly reticulated on the carapace and body (Ahyong and Caldwell, 2017). The most noticeable difference in preserved specimens is the continuous ring surrounding the paired eyespots on the carapace of *R. komaii,* versus the pale blotches present around the eyespots of *R. oxyrhyncha*. In colour pattern *R. komaii* is most similar to *R. hieroglyphica* Manning, 1972a, but is readily identified by the presence of the rostral apical spine, absent in *R. hieroglyphica*. *Raoulserenea hieroglyphica* has not yet been found in the coastal waters of South Africa.

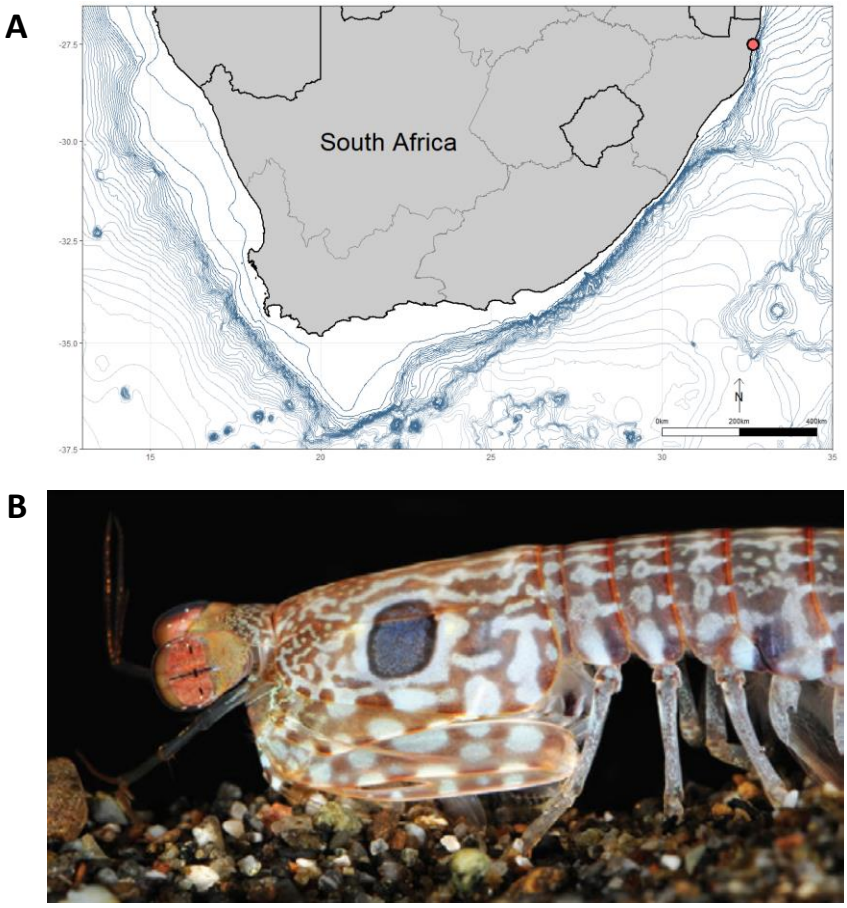

Figure 1.26. *Raoulserenea komaii* (Moosa, 1991) **A,** South African distribution; **B,** right lateral habitus of live female, TL 45 mm, Moorea, Society Islands (source: Ahyong and Caldwell, 2017).

Raoulserenea ornata (Miers, 1880)

Figures 1.27(A–B) – 1.28(A–H)

Pseudosquilla ornata Miers, 1880: 4, 111, pl. 3, figs. 5, 6 [type locality unknown, probably southwestern Pacific Ocean, by lectotype designation (Ahyong, 2014)]. –Roxas and Estampador, 1930: 108–109, figs. 4, 5, pl. II. –Bigelow, 1931: 161. –Holthuis, 1941: 263–264, fig. 3. –Liu, 1975: 185, pl. 1: 1–5. –Manning, 1977a: 286. –Moosa, 1984: 38.

Pseudosquilla ciliata. –Boone, 1934: 17, pl. 4 [Samoan specimen].

Raoulserenea pygmaea. –Caldwell and Manning, 2000: 101–106 [not *R. pygmaea* Caldwell and Manning, 2000].

Raoulserenea ornata. –Manning, 1995: 21, 116, 118, pl. 22, figs. 59b, 60c, d, f, 64. –Sun *et al.*, 1998: 20, fig. 11. –Moosa, 2000: 427. –Ahyong, 2001: 122, fig. 60; 2002b: 369; 2005: 163; 2014: 251, fig. 1F–I. –Ahyong and Davie, 2002: 70. –Barber and Boyce, 2006: fig. 1. –Ahyong, 2014: 251–252, fig. 1F–I. –Ahyong and Caldwell, 2017: 612–613, fig. 2D.

Material examined. KZN: SAMC–A015620 1 female (TL 43 mm), 27°31'00.1"S 32°40'59.9"E, Sodwana Bay, 27 Jul 1976, shore, RW 19, coll. R. Winterbottom, det. S. Ahyong.

Diagnosis. Cornea not distinctly broader than stalk, oblong in dorsal view. Rostral plate broader than long, without anterior spine. Carapace dorsum uniformly coloured with pair of dark circular 'eyespots' surrounded by pale ring. A2 scale clear, without dark spots. Raptorial claw propodus uniformly coloured, without pale spots and irregular lines. Thoracic and abdominal somites uniformly coloured, without distinctly reticulated colour pattern. AS1–3 posterolaterally rounded. AS4 posterolaterally angular. AS5 with posterolateral spine. Uropodal exopod proximal segment outer margin with 9–11 movable spines.

Colour in alcohol. Body colouration mostly faded to pinkish grey. Carapace with pair of black 'eyespots', pale ring surrounding eyespots just visible. Raptorial claw carpus with dark spot on inner surface; with merus and propodus same as body colour, propodus distal spine and dactylus pink. Ahyong (2001) records a dark spot at the base of each pereopod of TS6–8. AS4 with dark pink spot medially on lateral margin. AS6 with SM spines dark pink, dark pink spot at base of LT carina; sternum with dark posterior margin. Telson with MD carina and all primary teeth pink posteriorly, dark patches interspersed marginally on denticles and MG carina. Uropodal protopod with dark pink patch sub-basally and on teeth, across proximal 0.50 of endopod and anterior 0.33 of proximal segment of exopod. Movable teeth of exopod dusky pink.

Colour in life. Body uniformly dark. Carapace with pair of black 'eyespots' surrounded by pale ring (see Ahyong, 2017, for live colouration of French Polynesian specimen).

Measurements. Female (n = 1) TL 43 mm. CI 432. A1 peduncle 0.74CL. A2 scale 0.52CL. PI 095. PLDI 500. AWCLI 642.

Distribution and Habitat. From South Africa [KZN] in the Western Indian Ocean to French Polynesia, Xisha Islands, Indonesia, Vietnam and Australia. Found among live coral and coral reef boulders in shallow water, shore to at least 18 m (Ahyong, 2001).

Remarks. Colour pattern is an important feature with which to distinguish the species of *Raoulserenea* (Manning, 1995; Ahyong, 2001; 2005; Ahyong and Caldwell, 2017). Most specimens of *R. ornata* exhibit a uniformly dark body with the distinctive paired 'eyespots' on the carapace surrounded by a pale ring. This is only visible on freshly preserved material. *Raoulserenea ornata* is most similar in colouration to the recently described *R. moorea* Ahyong and Caldwell, 2017, from Moorea, Society Islands, which is considered a dwarf species of *Raoulserenea* with maximum size recorded at TL 27 mm, versus *R. ornata* at TL 61 mm. The colour of the raptorial claw and the relative length of the intermediate teeth of the telson, as well as the shape of the rostral plate and eye, further distinguishes these two species.

The present single female specimen from Sodwana Bay, KwaZulu-Natal, has been previously examined and reported to have the same colour pattern described by Ahyong (2001) for specimens from Australia (Ahyong, 2005). The specimen agrees in all other features with the lectotype of *Raoulserenea ornata* collected by the HMS *Herald* from the southwestern Pacific (Ahyong, 2014). At TL 43 mm, the specimen agrees well with previous accounts of the species exhibiting a rounded rostrum (Ahyong, 2001). The eye length is greater than 1.5 times its width and a distinct step is present on the inner margin of the uropodal protopod. The uropodal exopod has 11 movable spines on its outer margin. The pink colouration of the dactylus of the raptorial claw

further identifies this specimen and distinguishes it from *R. moorea* which displays a light green raptorial claw (Ahyong and Caldwell, 2017)

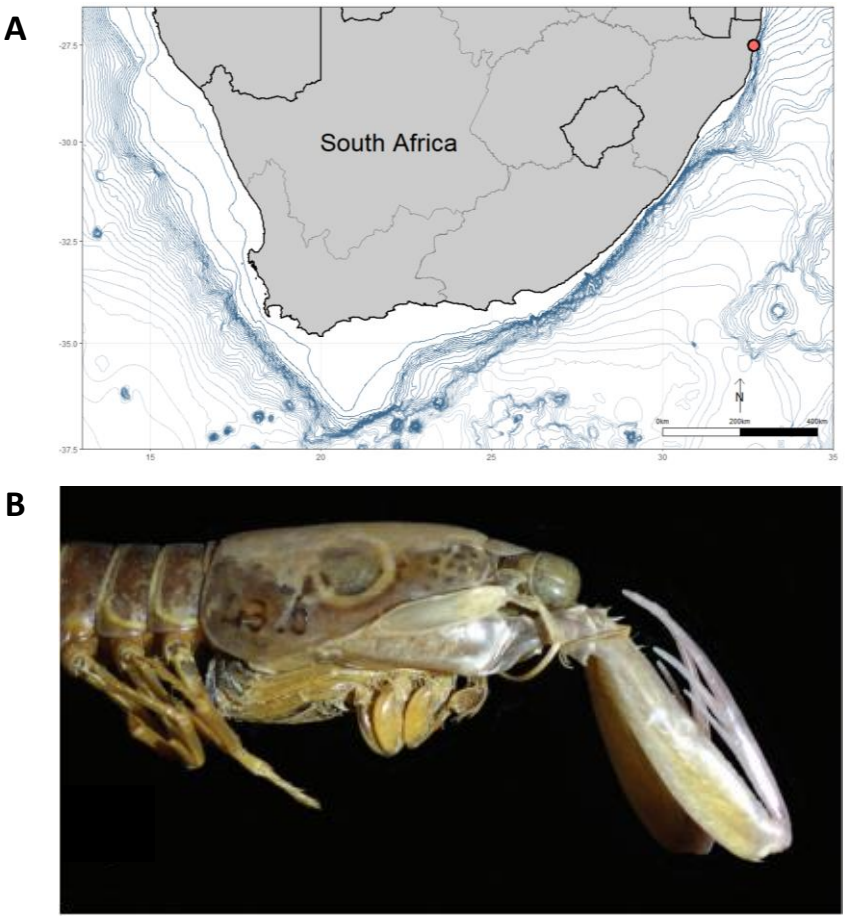

Figure 1.27. *Raoulserenea ornata* (Miers, 1880). **A,** South African distribution; **B,** right lateral habitus, male lectotype, NHM 62 35 (source: Ahyong, 2014).

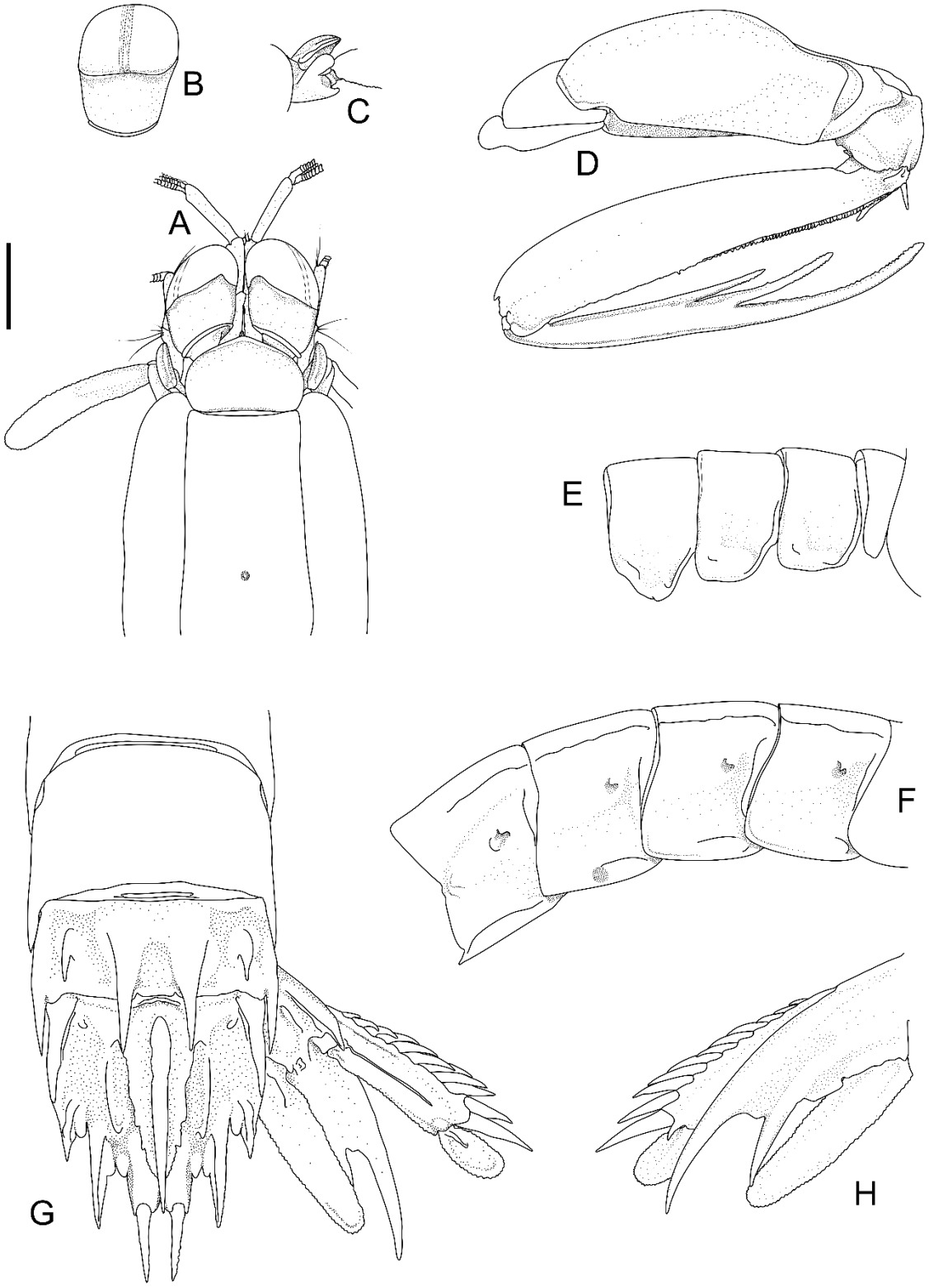

Figure 1.28. *Raoulserenea ornata* (Miers, 1880) female TL 43 mm, SAMC–A015620**. A,** anterior cephalothorax, dorsal; **B**, right eye, lateral; **C,** antennal protopod, lateral; **D,** right raptorial claw, lateral; **E,** TS5–8, right lateral; **F,** AS2–5, right lateral; **G**, AS5–6, telson and right uropod, dorsal; **H**, right uropod, ventral. Scale **A–H** = 2 mm.

Raoulserenea oxyrhyncha (Borradaile, 1898)

Figures 1.29 – 1.30(A–H)

Pseudosquilla oxyrhyncha Borradaile, 1898: 37, pl. 6: figs. 9–9d [type locality Rotuma, Fiji]. –Holthuis, 1941: 264–266, fig. 4.

Raoulserenea oxyrhyncha. –Manning, 1995: 116. –Ahyong, 2001: 123–125, fig. 61; 2005: 163; 2012: 247. –Ahyong and Davie, 2002: 70. –Ahyong and Erdmann, 2003: 335–336. –Ahyong and Caldwell, 2017: 613, fig. 2E.

Material examined. KZN: SAMC–A044726 1 male (TL 30.5 mm), Sodwana, 27°31'00.1"S 32°40'59.9"E, 25 Jul 1976, 13.5 m, stat. RW 15, coll. R. Winterbottom, det. S. Ahyong; SAMC–A015618 1 male (TL 35 mm), Sodwana, 27°31'00.1"S 32°40'59.9"E, 24 Jul 1976, 13.5 m, stat. RW 14, same as above.

Diagnosis. Cornea distinctly broader than stalk, trapezoid in dorsal view. Rostral plate ovoid, with short anterior spine. Carapace dorsum with pair of dark 'eyespots' with diffuse margins surrounded at most by pale spots or diffuse paler patches, not merging to form a continuous light ring. Raptorial claw propodus with pale spots. Thoracic and abdominal somites uniformly coloured, diffusely banded or mottled, without distinctly reticulated colour pattern. AS1–2 posterolaterally rounded. AS3–4 posterolaterally angular. AS5 with posterolateral spine. Uropodal exopod proximal segment outer margin with 11 movable spines.

Colour in alcohol. Body colouration mostly faded yellowish pink. Carapace with pair of black 'eyespots', pale blotches surrounding 'eyespots' just visible. AS1 with dark spot adjacent to pleural plate. Raptorial claw with movable spines of propodus and dactylus mottled pink. AS5 posterior margin and AS6 SM and LT spines tipped pink. Telson SM and IM teeth tipped with dark pink. Uropodal protopod and endopod with mottled dark pink patches, exopod with movable spines on outer margin purple.

Colour in life. Body and carapace ranging in colour from uniform to mottled. See Figure 1.29B and C for live colouration.

Measurements. Male (n = 2) TL 30.5–35.0 mm. CI 350–400. A1 peduncle 0.55–0.74CL. A2 scale 0.44–0.46CL. PLDI 400–480. AWCLI 660–700.

Distribution and habitat. Cocos-Keeling Islands (eastern Indian Ocean) to Indonesia, Papua New Guinea, Guam, Rotuma (Fiji), Moorea, French Polynesia and South Africa; shore to 13.5 m (Ahyong, 2005). Associated with coral reef systems of rock and rubble substrata from shallow water; shore to 23 m.

Remarks. Although known to vary in general colour pattern, the pair of large dark spots are always present on the carapace and surrounded by several diffuse pale patches. The characteristic 'eyespots' are never surrounded by a distinct pale ring, as in *Raoulserenea ornata* and *R. komaii* (Ahyong and Caldwell, 2017). However, the body and carapace has been recorded to vary from uniform colouration to light and dark mottled banding (Ahyong, 2001; Ahyong and Erdmann, 2003; Ahyong and Caldwell, 2017).

Raoulserenea oxyrhyncha and *R. komaii* are presently considered morphologically indistinguishable and can be identified by colouration alone. It has been suggested that the two species may represent colour variants of the same species (Ahyong, 2001), however, in this study *R. oxyrhyncha* and *R. komaii* are treated as separate species. The uniform colour variant of *R. oxyrhyncha* resembles that of *R. moorea* Ahyong and Caldwell, 2017,

but the species can easily be distinguished by the presence of an apical spine on the rostral plate of *R. oxyrhyncha* specimens, absent in *R. moorea*.

Both male specimens examined herein were reported on by Ahyong (2005). Although the colour is faded in the present series, Ahyong (2005) remarked that the specimens exhibit the same colour pattern as the holotype of *Raoulserenea oxyrhyncha* from Rotuma, Fiji. The holotype, as well as the present specimen, exhibit subtle mottling on the body and the carapace bears pale patches surrounding the dark eyespots.

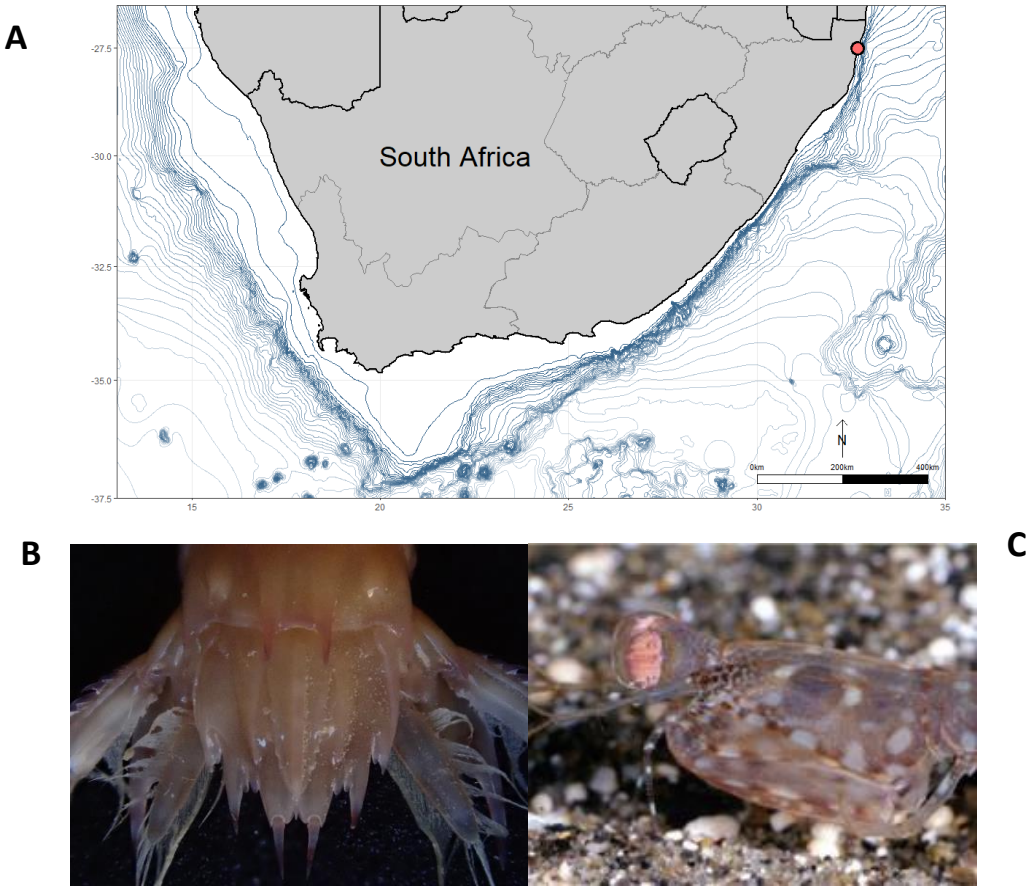

Figure 1.29. *Raoulserenea oxyrhyncha* (Borradaile, 1898). **A,** South African distribution; **B,** telson, dorsal, showing colour ornamentation, male TL 35 mm, SAMC–A015618; **C,** right lateral habitus of live female specimen, Moorea, Society Islands, FLMNH UF9864 (source: Ahyong and Caldwell, 2017).

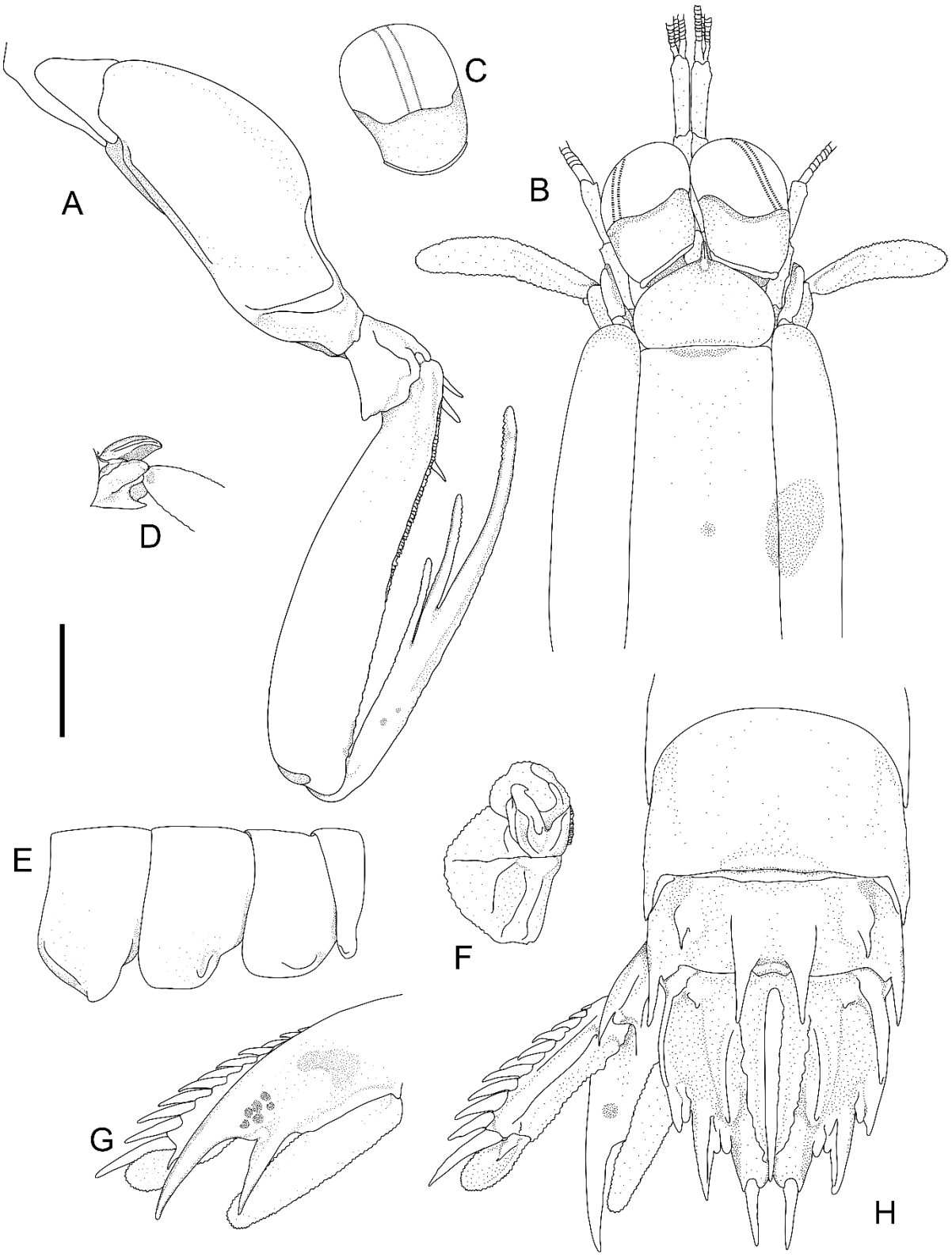

Figure 1.30. *Raoulserenea oxyrhyncha* (Borradaile, 1898) male TL 35 mm, SAMC–A015618. **A,** right raptorial claw, lateral; **B,** anterior cephalothorax, dorsal; **C**, left eye, lateral; **D**, right antennal protopod, lateral; **E,** TS5–8, right lateral; **F,** left pleopod 1 endopod, anterior; **G,** right uropod, ventral; **H**, AS4–6, telson and left uropod, dorsal. Scale **A–C, E, G–H** = 2 mm, **D, F** = 1.5 mm.

TAKUIDAE Manning, 1995

Takuidae Manning, 1995: 119. [Type genus *Taku* Manning, 1995].

Diagnosis (Ahyong, 2001). A2 protopod dorsally with fixed, anteriorly directed spine. Ischiomeral articulation of raptorial claw subterminal. Dactylus of raptorial claw without teeth on inner margin, outer basal margin strongly inflated into blunt heel; propodus without proximal movable spines. AS6 articulating with telson. Articulation of uropodal exopod segments subterminal. Distal spines on outer margin of uropodal exopod strongly recurved anteriorly.

Composition. *Mesacturus* Miers, 1880; ***Mesacturoides*** Manning, 1978b; *Taku* Manning, 1995.

Remarks. All Takuidae species occur in the Indo-West Pacific. Only one species and genus known from South Africa.

Mesacturoides Manning, 1978b

Mesacturoides Manning 1978b: 1–4. [Type species *Gonodactylus crinitus* Manning, 1962a. Gender masculine].

Diagnosis. Cornea subglobular. Rostral plate sharply trispinous. Anterior margins of lateral plates of carapace convex, extending anteriorly beyond base of rostral plate. Mandibular palp 3-segmented. Propodus of claw lacking proximal movable spine. Telson a flattened plate, with 2 pairs of teeth; SM with movable apices. Uropodal exopod with distal spines on outer margin of proximal segment of enlarged, strongly recurved. Uropodal endopod curved laterally; dorsal spines absent. Uropodal exopod and endopod lacking fixed spines on inner margin.

Composition. *Mesacturoides brevisquamatus* (Paulson, 1875); *M. crinitus* (Manning, 1962a); ***M. fimbriatus*** (Lenz, 1905).

Mesacturoides fimbriatus (Lenz, 1905)

Figures 1.31(A–B) – 1.32(A–G)

Gonodactylus fimbriatus Lenz, 1905: 388, pl. 47, fig. 2 [type locality Zanzibar].

Mesacturoides fimbriatus. –Manning, 1962a: 7, 8, 10, fig. 2b. –Cappola and Manning, 1995: 279–280.

Material examined. KZN: SAMC–A015621 1 male (TL 21 mm), Sodwana Bay, 27°31'00.1"S 32°40'59.9"E, 27 Jul 1976, 13.5 m, RW 14, coll. R. Winterbottom, det. S. Ahyong.

Diagnosis. Rostral plate distinctly trispinous with anterior margins concave; anterior angles spiniform; lateral margins convex; slender median spine longer than base. Carapace with anterior margins convex, extending anteriorly beyond base, but not beyond anterior angles of rostral plate. A2 protopod dorsally with fixed, anteriorly directed spine. Mandibular palp 3-segmented. 5 epipods present. Dactylus of raptorial claw without teeth on inner margin, outer basal margin strongly inflated into blunt heel; propodus without proximal movable

spines. AS6 unarmed, LT carina produced posteriorly as a blunt triangular lobe. Telson with two pairs of primary teeth well-formed; SM teeth with movable apices and 6-11 SM slender denticles; IM teeth apices shorter than SM teeth with 5-8 IM denticles. Telson dorsal surface with 3 mid-dorsal carinae; MD carina broad with two posteriorly appressed swellings; MD carina flanked by two low carinae. Uropod protopod outer spine boarder and longer than inner. Uropodal exopod proximal segment with 5 movable spines on outer margin, 2 proximal spines straight, 3 distalmost enlarged and strongly recurved anteriorly; proximal segment with dorsal patch of setae, distal segment dorsal surface completely setose. Uropod endopod outer margin fully setose, inner margin at most sparsely setose; ventral surface completely setose.

Measurements. Male (n = 1) TL 21 mm. At TL 31 mm, a female specimen from Somalia is the largest recorded (Cappola and Manning, 1995).

Colour in alcohol. Completely faded. The only mention of species colouration in life is 'dark brown' (Lenz, 1905).

Distribution and Habitat. From Arabian Sea, Pakistan, Persian Gulf to Western Indian Ocean, Somalia, Seychelles, Zanzibar and South Africa [KZN]; shore to 13.5 m (Ahyong, 2005). Associated with live and dead coral.

Remarks. The examined specimen agrees with the original species description by Lenz (1905), as well as the more recent report by Manning (1962a). *Mesacturoides fimbriatus* is most similar to *M. brevisquamatus* (Paulson, 1875) and can be distinguished by the morphology and setation of the uropods, as well as the number and form of the SM and IM denticles of the telson (Manning, 1962a; 1969c). However, the type material of both *M. fimbriatus* from Zanzibar and *M. brevisquamatus* are considered lost. Due to the two species distributional overlap in the Indian Ocean, the erection of neotypes for both species is recommended (Ahyong, 2005).

In South African waters, this reef-associated species has so far only been found once in Sodwana Bay, KwaZulu-Natal (Ahyong, 2005). The species appears to be restricted to the northern as well as the Western Indian Ocean, ranging from Pakistan and the Persian Gulf to Somalia and extending south to the Seychelles, Zanzibar and South Africa. A targeted study of coral reef related mantis shrimps would likely find this species in coastal waters between Zanzibar and South Africa. The species inhabits live as well as dead coral and has been recorded as a host to the parasitic gastropod *Caledoniella montrouzieri* Souverbie, 1869 (Cappola and Manning, 1995). Species of *Mesacturoides* are suspected to use their highly modified uropods for securing themselves in their reef borrows, however, this has yet to be observed (Manning, 1962a; 1978b).

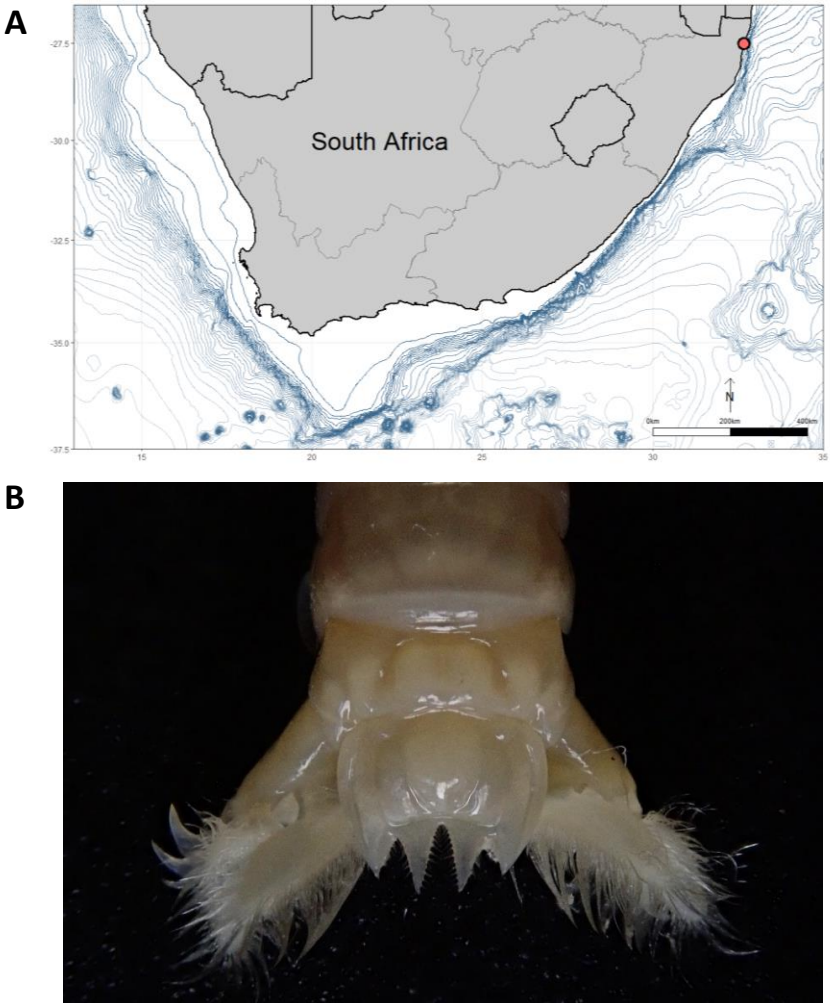

Figure 1.31. *Mesacturoides fimbriatus* (Lenz, 1905). **A,** South African distribution of; **B,** telson, dorsal, male TL 21 mm, SAMC–A015621.

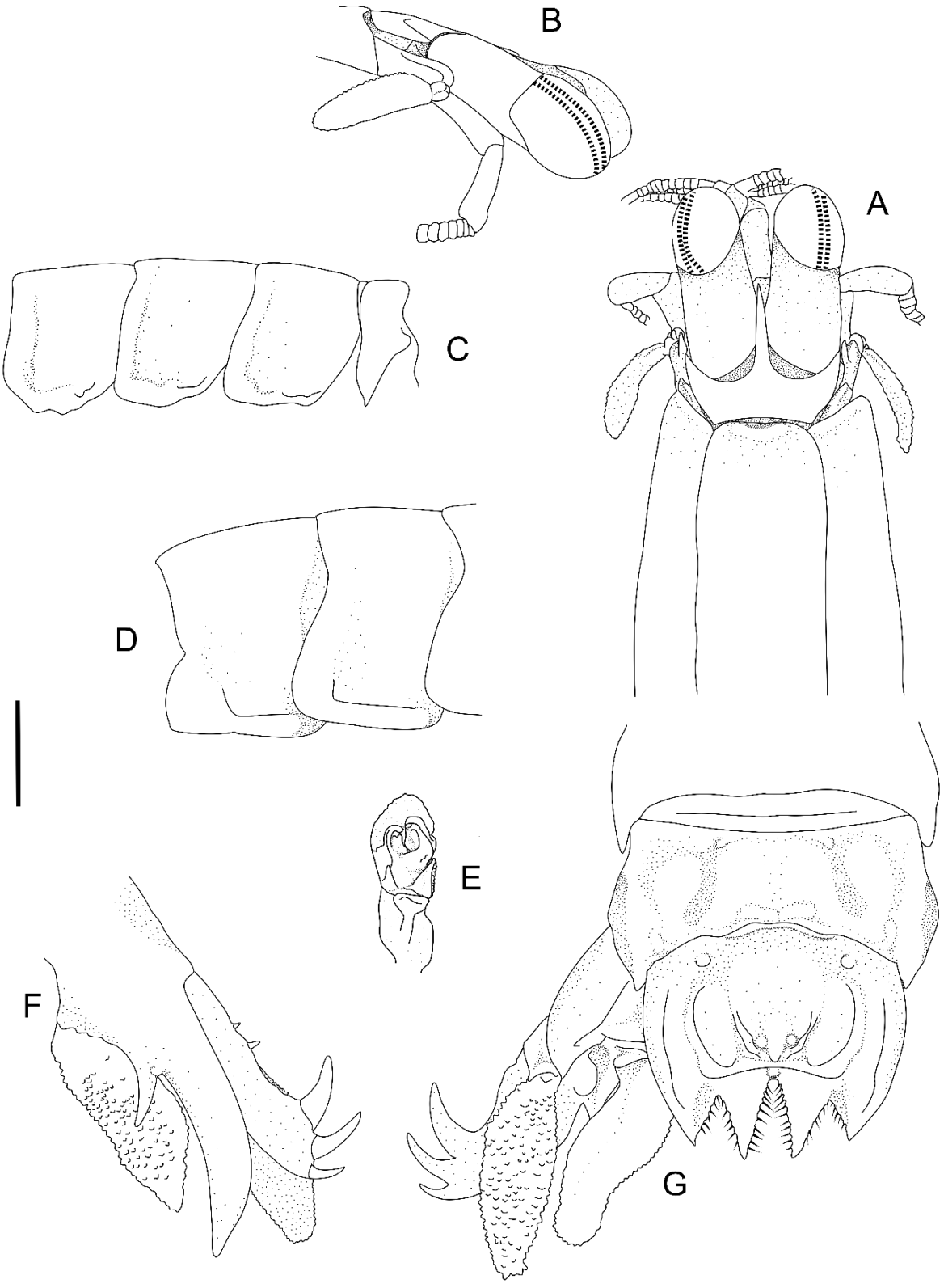

Figure 1.32. *Mesacturoides fimbriatus* (Lenz, 1905) male TL 21 mm, SAMC–A015621. **A,** anterior cephalothorax, dorsal; **B**, anterior cephalothorax, right lateral; **C,** TS5–8, right lateral; **D,** AS4–5, right lateral; **E,** left pleopod 1 endopod, anterior; **F,** left uropod, ventral; **G,** AS6, telson and left uropod, dorsal. Scale **A–G** = 1 mm.

LYSIOSQUILLOIDEA Giesbrecht, 1910

Diagnosis (Ahyong, 2012). Cornea mid-band with 6 (rarely 2) rows of hexagonal ommatidia. A1 somite dorsal processes spiniform or dorsoventrally flattened, not anteriorly compressed and rounded laterally. MXP3–4 with propodi subquadrate, ribbed or beaded distally (smooth in some species of *Neocoronida*). Body flattened, loosely articulated or compact. Raptorial claw with ischiomeral articulation terminal, dactylus inflated or uninflated basally. Telson without distinct MD carina; at most with movable SM teeth. Uropodal protopod with at most two primary spines; articulation of exopod segments terminal.

Composition. Coronididae Manning, 1980; **Lysiosquillidae** Giesbrecht, 1910; **Nannosquillidae** Manning, 1980; **Tetrasquillidae** Manning and Camp, 1993.

Remarks. Typically inhabiting deep burrows in soft sediment, lysiosquilloids rarely leave their shelters but instead ambush prey from the mouths of their burrows. Lysiosquilloids are predominantly 'spearers' with only some species in family Coronididae possessing a smashing claw. Of the four families recognised three are known from South Africa, all of which possess a raptorial claw adapted for spearing prey.

Key to the South African families of LYSIOSQUILLOIDEA

1. Dorsal margin of uropodal endopod (Fig. 1.55H) with strong proximal fold. Raptorial claw ischium (Fig. 1.55A) exceeding half merus length……**Nannosquillidae**

– Dorsal margin of uropodal endopod without strong proximal fold. Raptorial claw ischium not exceeding third merus length……2

2. Telson with primary teeth fused to margin, present at most as short projections. Abdominal somites loosely articulated……**Lysiosquillidae**

– Telson with primary teeth and denticles distinct, slender. Abdominal articulation compact……**Tetrasquillidae**

LYSIOSQUILLIDAE Giesbrecht, 1910

Diagnosis. Cornea strongly bilobed, set obliquely on stalk. A2 protopod with 1 mesial and 2 ventral papillae. Raptorial claw with dactylus uninflated basally; propodus with 4 proximal movable spines. MXP1–5 with epipod. Abdominal segments depressed, loosely articulated. Pereopods 1–3 with slender or ovate endopods. Proximal margin of uropodal endopod without strong dorsal fold. Telson with primary teeth fused into margin, presenting at most appearance of short projections.

Composition. ***Lysiosquilla*** Dana, 1852; *Lysiosquilloides* Manning, 1977a.

Remarks. Until recently, three genera, *Lysiosquilla* Dana, 1852, *Lysiosquilloides* Manning, 1977a and *Lysiosquillina* Manning, 1995, were recognised. Manning (1995) distinguished *Lysiosquillina* from *Lysiosquilla* based on antennal scale morphology and erected *Lysiosquillina* for three species with a broad antennal scale (length less than 3.0 times greatest width) and that lack the mesial dorsal spine on the antennal protopod.

Meanwhile, *Lysiosquilla* was restricted to species with a mesial dorsal spine on the protopod of the antennae and having a slender antennal scale (length 3.0 or more times greatest width). However, with the description of more species, some exhibited characteristics intermediate between *Lysiosquilla* and *Lysiosquillina* (Ahyong, 2001; Ahyong and Lin, 2022). Subsequently, *Lysiosquillina* was synonymised with *Lysiosquilla* and phylogenetic analysis of all known species of Lysiosquillidae found species of the preciously recognised *Lysiosquillina* to be monophyletic, but nested within *Lysiosquilla,* making the latter paraphyletic (Ahyong and Lin, 2022). The Lysiosquillidae include the largest known mantis shrimps, with all species exceeding 100 mm in total length. The largest known specimen of *L. maculata* grows up to 385 mm (Roxas and Estampador, 1930). One characteristic of the group is the loosely articulated abdominal somites, which allow for better movement within their vertical burrows. One genus is known from South Africa.

Key to the genera of Lysiosquillidae

1. SM teeth of telson with movable apices, SM denticles present in adults. Telson median boss with short posterior spine or lobe……*Lysiosquilloides*

– SM teeth of telson fixed, SM denticles absent in adults. Telson median boss unarmed……***Lysiosquilla***

Lysiosquilla Dana, 1852

Lysiosquilla Dana, 1852: 615. [Type species *Lysiosquilla inornata* Dana, 1852, a junior subjective synonym of *Lysiosquilla scabricauda* (Lamarck, 1818), by subsequent designation by Fowler (1912: 539). Gender feminine].

Lysiosquillina Manning, 1995: 133. [Type species *Squilla maculata* Fabricius, 1793, by original designation. Gender feminine].

Diagnosis. Rostral plate anteriorly smooth or with low median carina, without median groove. Eye large, T-shaped, cornea strongly bilobed, medial lobe rounded. Antennular peduncle article 1 weakly crested laterally; article 2 subcylindrical. Antennal protopod medially unarmed, with short blunt lobe or short anteromesial spine anterior to mesial papilla. Mandibular palp present or absent. Telson SM teeth with fixed apices in adults; SM denticles absent in adults; median boss without posterior spine or lobe.

Composition. *Lysiosquilla campechiensis* Manning, 1962b*;* ***L. capensis*** Hansen, 1895*;* ***L. colemani*** Ahyong, 2001*; L. glabriuscula* (Lamarck, 1818)*; L. hoevenii* (Herklots, 1851)*; L. isos* Ahyong, 2004*; L. lisa* (Ahyong and Randall, 2001)*.;* ***L. maculata*** (Fabricius, 1793); *L. manningi* Boyko, 2000*; L. monodi* Manning, 1977a*; L. panamica* Manning, 1971c*; L. scabricauda* (Lamarck, 1818)*; L. sulcata* Manning, 1978d*; L. sulcirostris* Kemp, 1913*; L. suthersi* Ahyong, 2001*;* ***L. tredecimdentata*** Holthuis, 1941.

Remarks. Due to the recent synonymy of *Lysiosquillina* with *Lysiosquilla*, 16 species are recognised worldwide, including the four species previously considered *Lysiosquillina*: *L. glabriuscula, L. lisa*, *L. maculata*, and *L. sulcate.* Of the nine species known from the Indo-West Pacific, three occur in the Western Indian Ocean from the south and east coasts of South Africa. One other species of *Lysiosquilla* is endemic to South Africa.

Key to the South African species of *Lysiosquilla*

1. Rostral plate dorsally smooth, without carinae or grooves……2

– Rostral plate with median carina and/or grooves.....3

2. Mandibular palp absent……..***L. colemani***

– Mandibular palp present……***L. capensis***

3. TS8 sternal keel (Fig. 140B) a posteriorly directed spine with sharp apex…….. ***L. tredecimdentata***

– TS8 sternal keel (Fig. 1.38B) rounded.....***L. maculata***

Lysiosquilla capensis Hansen, 1895

Figure 1.33 – 1.34(A–I)

Lysiosquilla capensis Hansen, 1895: 74 [type locality Gqeberha, formerly Port Elizabeth]. –Stebbing, 1910: 406. –Kemp, 1913: 117. –Parisi, 1922: 105, fig. 3. –Manning, 1963a: 317 [list]. –Holthuis, 1967a: 15 [references]. –Manning, 1968a: 36 (key). –Manning, 1969a: 5–6, fig. 1. –Ahyong, 2001: 129 (key).

Lysierichthus pulcher Hansen, 1895: 74 [type locality St. Helena Bay, Western Cape] [larval form]. –Stebbing, 1910: 409. –Barnard, 1950: 856, fig. 4e [larval form].

Material examined. Western Cape: SAMC–A001335 1 male (TL 91 mm), False Bay, 34°10'59.9"S 18°37'00.1"E, Sep 1904, depth unknown, S. S. *Pieter Faure*. **Eastern Cape:** SAMC–A001336 1 male (TL 47 mm), 1 female (TL 45 mm), Bird Island Light House, Gqeberha, 33°54'24.5"S 26°25'42.6"E, 5 Dec 1901, 49 m, stat. P. F. 14156, S.S. *Pieter Faure*; SAMC–A079782 1 male (TL 112 mm), Coffee Bay, 11 Aug 1974, depth unknown. **Unknown location:** SAMC–A011013 1 male (TL 95 mm), [data unavailable].

Diagnosis. Ocular scales produced as slender spines, directed anteriorly. A1 somite dorsal processes directed anterolaterally. Rostral plate dorsal surface smooth, without carinae or grooves. A2 protopod with mediodorsal tooth. Mandibular palp present. Raptorial claw dactylus with 15–17 teeth; carpus dorsal tooth directed ventrally, slightly recurved medially. TS8 sternal keel produced as a posteriorly directed spine. Male PLP1 endopod with posterior endite. AS5–6 posterior margin unarmed. Uropodal protopod with short ventral spine anterior to endopod articulation; endopod apex dark.

Colour in alcohol. Completely faded. Barnard (1950) records a pinkish colouration. Colour in life unknown.

Measurements. Male (n = 3) TL 47–112 mm, female (n = 1) TL 45 mm. CI 285–446. A1 peduncle 0.46–0.67CL. A2 scale 0.43–0.53CL. The present study examined the largest known specimen of the species.

Distribution and Habitat. Known only from South African waters, shore to 88 m. Reported from Gqeberha, Agulhas Bank, False Bay; 18–88 m, Knysna Estuary (Manning, 1969a) and now Coffee Bay [EC].

Remarks. Endemic to South Africa, *Lysiosquilla capensis* has previously been reported on the south coast from False Bay (Barnard, 1950) in the Western Cape to Gqeberha (Hansen, 1895) in the Eastern Cape. The present study extends the range to Coffee Bay on the South African east coast.

Barnard (1950) commented on the 'abnormal' semi-circular rostrum form of his largest specimen when compared to Hansen's (1895) description of the species. After the examination of the material herein, it was concluded that this 'abnormality' is a character variation. Rostrum shape can appear rounded as well as having a long apical projection (Fig. 1.34A, C). Of the specimens recorded, only the illustrated male exhibits the rounded rostrum variation. Relatively large specimens up to 91 mm total length have a rostrum with an apical projection. Hence this variation appears to have no connection to size, as previously suggested by Barnard (1950).

Although the specimens studied herein have either 15 or 16 teeth on the raptorial claw of the dactylus, 17 teeth have been previously recorded for a specimen from Knysna Estuary, South Africa (Manning, 1969a). *Lysiosquilla capensis* is most similar to *L. colemani* Ahyong, 2001, previously only reported from Australia, but now also known from South Africa. *Lysiosquilla capensis* differs from *L. colemani* in having a greater number of teeth on the dactylus of the raptorial claw (15–17 instead of the 11–14 recorded for *L. colemani*) and the presence of a mandibular palp versus the absence of the mandibular palp in *L. colemani* (Ahyong, 2001). However, the present series of both species exhibits an overlap in teeth number reflected in the key above. Another recorded difference between the species is depth habitat. *Lysiosquilla capensis* is associated with shallow depths while *L. colemani* has never been recorded from the shore.

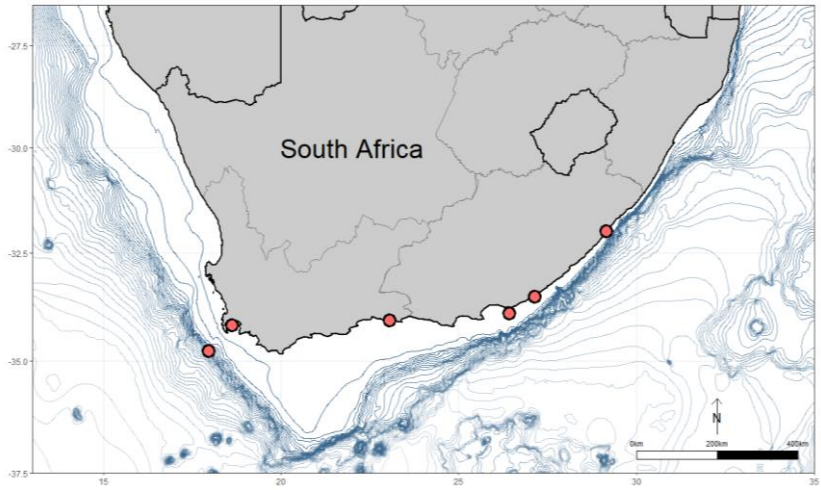

Figure 1.33. South African distribution of *Lysiosquilla capensis* Hansen, 1895.

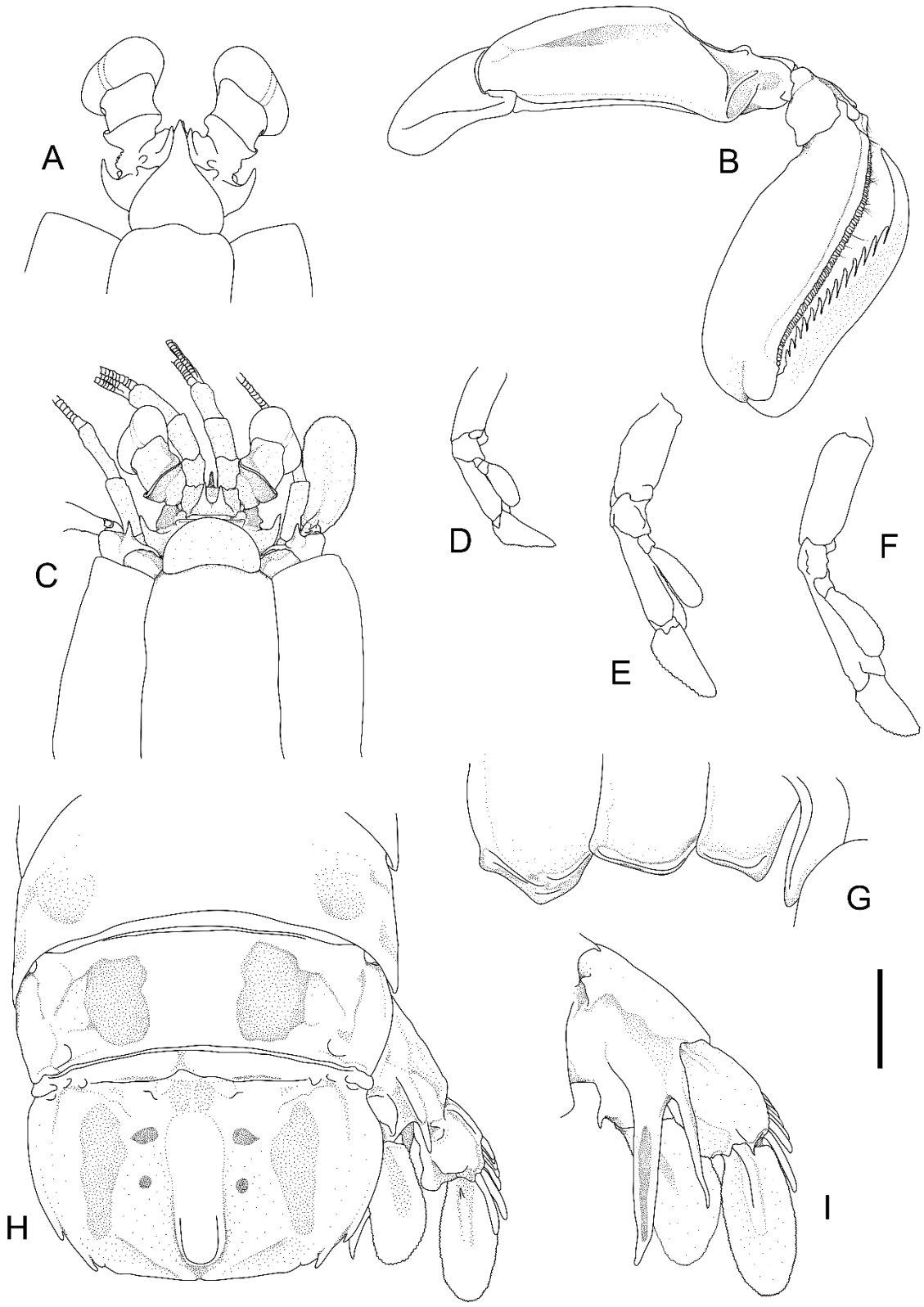

Figure 1.34. *Lysiosquilla capensis* Hansen, 1895, **A** male TL 95 mm, SAMC–A011013; **B–I** male TL 91 mm, SAMC–A001335. **A,** anterior cephalothorax variation, dorsal; **B,** right raptorial claw, lateral; **C,** anterior cephalothorax, dorsal; **D–F**, right pereopods 1–3, posterior; **G**, TS5–8, right lateral; **H,** AS5–6, telson and right uropod, dorsal; **I,** left uropod, ventral. Scale **A–I** = 5 mm.

Lysiosquilla colemani Ahyong, 2001, **new record**

Figures 1.35 – 1.36(A–J)

Lysiosquilla maculata. –Stephenson and McNeill, 1955: 246 [New South Wales specimen only, not *L. maculata* Fabricius, 1793].

Lysiosquilla tredecimdentata. –Coleman, 1987: 92 (not *L. tredecimdentata* Holthuis, 1941).

Lysiosquilla n. sp. –Graham *et al*. 1993a: 24, 64; 1993b: 73.

Lysiosquilla colemani Ahyong, 2001: 130–134, fig. 63 [type locality New South Wales].

Material examined. Western Cape: SAMC–A001337 2 males (TL 43–48 mm), St. Sebastian Bay, 34°25'36.3"S 20°54'13.6"E, 22 Jun 1900, 71 m, S.S. *Pieter Faure*, stat. PF 6047; SAMC–A001338 2 males (TL 39–42 mm), Struys Point, 34°51'35.6"S 20°26'55.3"E, 9 Jul 1902, 88 m, S.S. *Pieter Faure,* PF 15317. **Eastern Cape:** SAMC–A079457 1 male (TL 46 mm), Jeffrey's Bay, 23 Sep 1987, depth unknown, midwater trawl.

Diagnosis. Ocular scales produced as slender spines, directed anteriorly. A1 somite dorsal processes directed anterolaterally. Rostral plate dorsal surface smooth, without carinae or grooves. A2 protopod with mediodorsal tooth. Mandibular palp absent. Raptorial claw dactylus with 14–16 (usually 15) teeth; carpus dorsal tooth directed ventrally, slightly recurved medially. TS8 sternal keel produced as a posteriorly directed spine. Male PLP1 endopod with posterior endite. AS5–6 posterior margin unarmed. Uropodal protopod with short ventral spine anterior to endopod articulation; endopod apex dark.

Colour in alcohol. Mostly faded, uniform beige to amber brown. Sub-medial bosses of telson and AS6 dark brown. Cornea dark brown. Raptorial claw merus and propodus as well as uropodal exopod dark brown. One specimen speckled with dark spots completely covering the rostrum, medially on carapace, dorsally on abdominal and thoracic segments as well as on pereopods, telson and uropods.

Colour in life (Ahyong, 2001). Dorsum overall pale cream with transverse bands of dark brown. Carapace with dark spots on gastric groove anteriorly; with diffuse brown band anteriorly (including rostral plate); dark diffuse median patch; and diffuse, dark brown posterior band. TS5–8 and AS1–6 with dark brown transverse band across articulations. Telson dark brown across posterior 0.75, excepting pale area between bosses. Uropodal protopod dark brown anteriorly; endopod black; exopod proximal segment with outer spines dark red, distal 0.5 (including outer spines) black-brown extending onto proximal 0.67 of distal segment; distal segment with distal third light blue. A2 protopod with dark anterior margin. A2 scale with dark brown outline. Raptorial claw dusky; merus with inferodistal margin dark red, distally dark at articulation with carpus; carpus dusky with dark brown posterodistal margin; dactylus and propodus pale orange. Pereopods with proximal 0.5 dark brown; distal 0.5 light blue.

Measurements. Male (n = 5) TL 39–48 mm. CI 275–300. Ahyong (2001) recorded the largest specimen at TL 170 mm.

Distribution and Habitat. Only known from eastern Australia and now from the south coast of South Africa. Associated with level muddy to sandy substrates at depths 36–280 m in Australia (Ahyong, 2001). Now also from south coast of South Africa [WC; EC] at depths 71–88 m (present study).

Remarks. This is a new species record for South Africa. *Lysiosquilla colemani* is most similar to the South African endemic *L. capensis,* but differs in depth range, having never been found shallower than 36 m and being more common in deeper water. Both essentially temperate water species, *L. colemani* and *L. capensis* share features such as the anteriorly directed, spiniform ocular scales, the unadorned dorsum of the rostral plate and the spine on the uropodal protopod adjacent to endopodal articulation. The lack of a mandibular palp distinguishes *L. colemani* from *L. capensis*. The South African specimens agree in most part with Ahyong's (2001) description of *L. colemani* from Eastern Australia, with a few apparent differences. The rostrum appears longer in SA specimens, projecting beyond the anteriorly directed A1 somite dorsal processes (Fig. 1.36D). This feature variation was not illustrated by Ahyong (2001).

One difference between South African and Australian specimens is the recorded number of teeth on the dactylus of the raptorial claw. While Ahyong (2001) uses the fewer teeth (11–14) as one of the features to distinguish *L. colemani* from *L. capensis*, the present series found specimens to have 14–16 teeth on the dactylus of the raptorial claw. *Lysiosquilla capensis* is distinguished by having 15–17 teeth, however, the present series found specimens to have 14–16 teeth. Teeth variation could be related to size, as the TL 39 mm male is the smallest known specimen of *L. colemani*, while the smallest specimen examined by Ahyong (2001) was TL 87 mm. Because of the overlap in teeth count for the two species this identification character is unsuited for distinguishing the South African material and hence the identification remains somewhat speculative. More material of especially larger specimens will either confirm this identification or reveal that these specimens represent a new species of genus *Lysiosquilla* for South Africa.

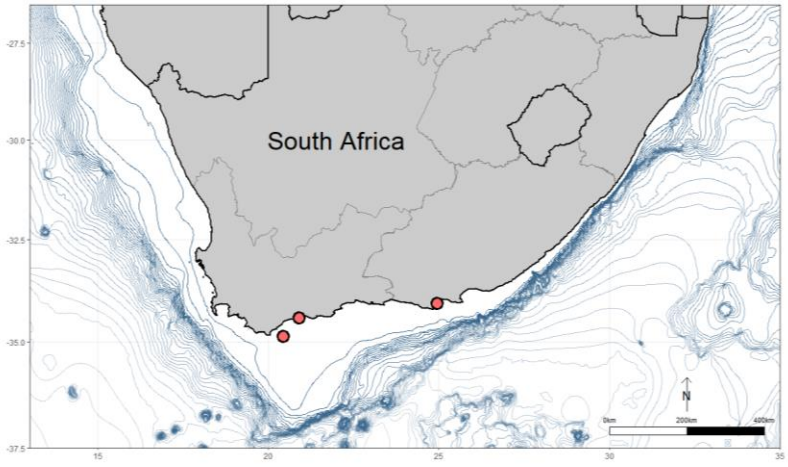

Figure 1.35. South African distribution of *Lysiosquilla colemani* Ahyong, 2001.

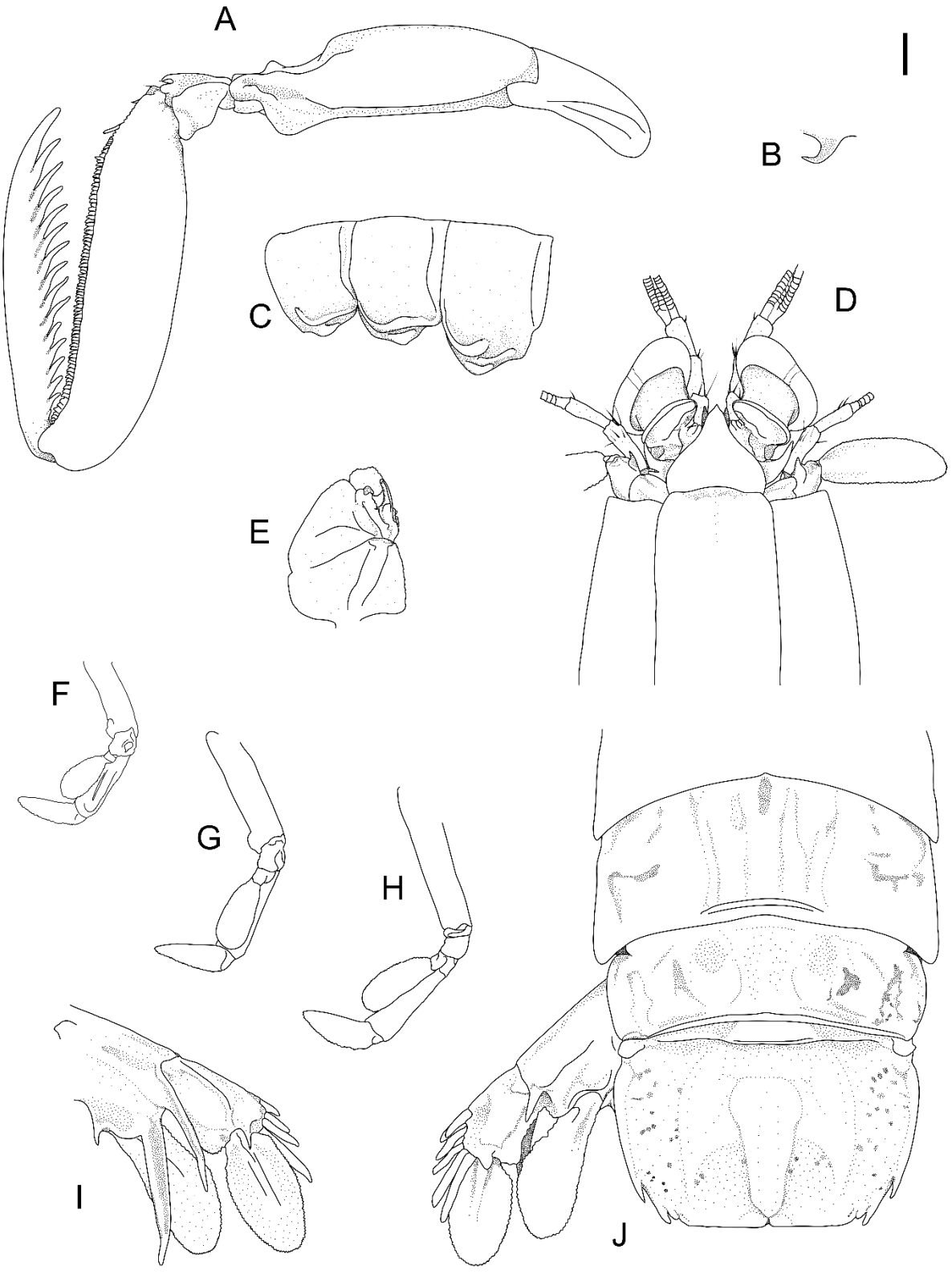

Figure 1.36. *Lysiosquilla colemani* Ahyong, 2001, male TL 43 mm, SAMC–A001337. **A**, left raptorial claw, lateral; **B**, TS8 sternal keel, right lateral; **C,** TS6–8, left lateral; **D**, anterior cephalothorax, dorsal; **E**, left pleopod 1 endopod, anterior; **F–H,** left pereopods 1–3, posterior; **I**, left uropod, ventral; **J,** AS5–6, telson and left uropod, dorsal. Scale **A–J** = 1 mm.

Lysiosquilla maculata (Fabricius, 1793)

Figures 1.37(A–B) – 1.38(A–I)

Squilla maculata Fabricius, 1793: 511 [type locality Manado, Indonesia, by neotype selection (Ahyong, 2001)].

Lysiosquilla miersi de Vis, 1883: 321 [type locality Moreton Bay, Queensland, Australia].

Lysiosquilla maculata. –Barnard, 1950: 855, fig. 3d. –Stephenson, 1953a: 44, 45. –Stephenson and McNeill, 1955: 246 (Western Australian specimen only). –McNeill, 1968: 88. –Manning, 1968a: 36–38, fig. 12; 1978d: 3–7, figs. 1–3, 9. –Moosa, 1991: 179. –Manning, 1991: 7. –Ahyong and Lin, 2022: figs. 1D, 2.

Lysiosquilla miersi. –Kemp, 1913: 4, 10, 111, 116–117.

Lysiosquillina maculata. –Manning, 1995: 134–137, figs. 68c, 70a, b, 71a, b, 72a, b, 74–77, 78a, 80a. –Ahyong, 2001: 137–139, fig. 67; 2002a: 830.

Material examined. KZN: SAMC–A001333 1 female (TL 111 mm), Durban, 29°53'06.6"S 31°00'00.0"E, depth and date unknown, stat. 156; SAMC–A008219 1 male (TL 229 mm), Durban, 29°53'06.6"S 31°00'00.0"E, depth and date unknown, coll. H.W. Bell Marley; SAMC–A001334, 1 female (TL 203 mm), Umsunduzi River, Pietermaritzburg, 29°36'59.8"S 30°39'59.8"E, river bank, coll. Dr. Gilchrist.

Diagnosis. Rostral plate cordiform (occasionally subtriangular), usually broader than long and broadest in advance of base; with distinct median carina anteriorly, not flanked by longitudinal grooves or carinae. Mandibular palp 3-segmented. Raptorial claw dactylus with 7–11 teeth. TS8 sternal keel rounded. AS5 smooth dorsally. AS6 smooth medially; with low lateral boss, medially marked with parallel grooves. Uropodal exopod proximal segment outer margin with 7–9 movable spines; endopod at least 0.66 dark distally; exopod proximal half also dark.

Colour in alcohol: Uropodal endopod with distal 0.75 completely dark; proximal half of uropodal exopod also dark. Dactylus of raptorial claw pale; propodus dark along inner margin. Banding faded in large specimen except for two dark transverse bands on medial section of carapace.

Colour in life (Ahyong, 2001). Dorsum base colour white to pale yellow, with dark brown to black transverse bands. Carapace with three dark transverse bands intervened by pale bands of about the same width. Uropodal exopod with distal half of proximal segment and proximal 0.66 of distal segment black; endopod with distal 0.66 black. A2 scale with diffuse patch of dark brown chromatophores across central portion.

Measurements. Male (n = 2) TL 203–229 mm, female (n = 1) TL 111 mm. CI 375–455. A1 peduncle 0.46–0.52CL. A2 scale length 2.2–4.2 times width and 0.59–0.62CL; entire margin setose. PI 81–86 (male), 81 (female). Uropodal endopod length 1.9–2.0 times width. Manning (1978d) records the largest known specimen at TL 385 mm.

Distribution and habitat. Indo-West Pacific from South Africa, Mozambique and Madagascar to Australia, Vietnam, Japan and Hawaii. Occupies deep burrows on level intertidal and shallow subtidal habitats in sand and mud flats.

Remarks. *Lysiosquilla maculata* is the largest and most widely distributed species of *Lysiosquilla* in the Indo-West Pacific. However, due to the recent revisions within the family, it is expected that many reported examples of *L. maculata* could refer to other species of Lysiosquillidae and all species material and references to *L.*

maculata require verification (Manning, 1978d; Ahyong, 2001; Ahyong and Lin, 2022). Within the Iziko collection, two specimens of *L. tredecimdentata* Holthuis, 1941, were misidentified as *L. maculata*. Meanwhile, Barnard recorded *L. maculata* specimens of up to TL 300 mm, but these specimens are considered lost and cannot be verified. Sexual dimorphism is recorded particularly for large females and is observed in the relative size and number of spines of the raptorial claw (Manning, 1995; Ahyong, 2001). Females larger than 230 mm have the propodus of the raptorial claw shorter than the carapace and exhibit a reduced number of teeth on the dactylus, usually 7–8 (Ahyong, 2001). This is compared to the usually longer propodus in smaller specimens with more teeth. While the present series only records 9–10 teeth, Ahyong (2001) diagnosis of the species records 7–11 teeth (usually 10–11) on the dactylus of the raptorial claw.

Until recently, the species was placed in *Lysiosquillina* and while this genus is now considered a synonym of *Lysiosquilla*, *L. maculata* is still characterized by its broad antennal scale; its length being less than 3.0 times its greatest width. Ahyong and Lin (2022) define three major clades of *Lysiosquilla*: the 'maculata clade' is defined for species that share the broadened antennal scale and lack the anteromesial antennal spine and contains *L. maculata* and other species previously in *Lysiosquillina*. Species of the second clade have dorsally spinulate and scabrous telsons, AS6 and uropods, while the third clade containing *L. tredecimdentata* consists of the remaining dorsally non-spinose species with an elongate or ovate pereopod 1 endopod.

The specimens present in this study mostly agree with published accounts of the species (Manning, 1978d; Manning, 1995; Ahyong, 2001). Most specimens agree with the recommended proportions of the antennal scale length being 2.5 times its width. However, the largest male examined appears to have a slenderer antennal scale with a length 4.2 times its width. This previously unrecorded variation could be due to its long storage in ethanol since the early 1900s. Otherwise the specimen exhibits the feature combination of the three-segmented mandibular palp (distinguishing *L. maculata* from *Lysiosquillina lisa* Ahyong and Randall, 2001), and the blunt and rounded shape of the TS8 sternal keel (distinguishing *L. maculata* from *L. tredecimdentata*), assuring this identification within *Lysiosquilla* as the genus is currently understood (Ahyong and Lin, 2022).

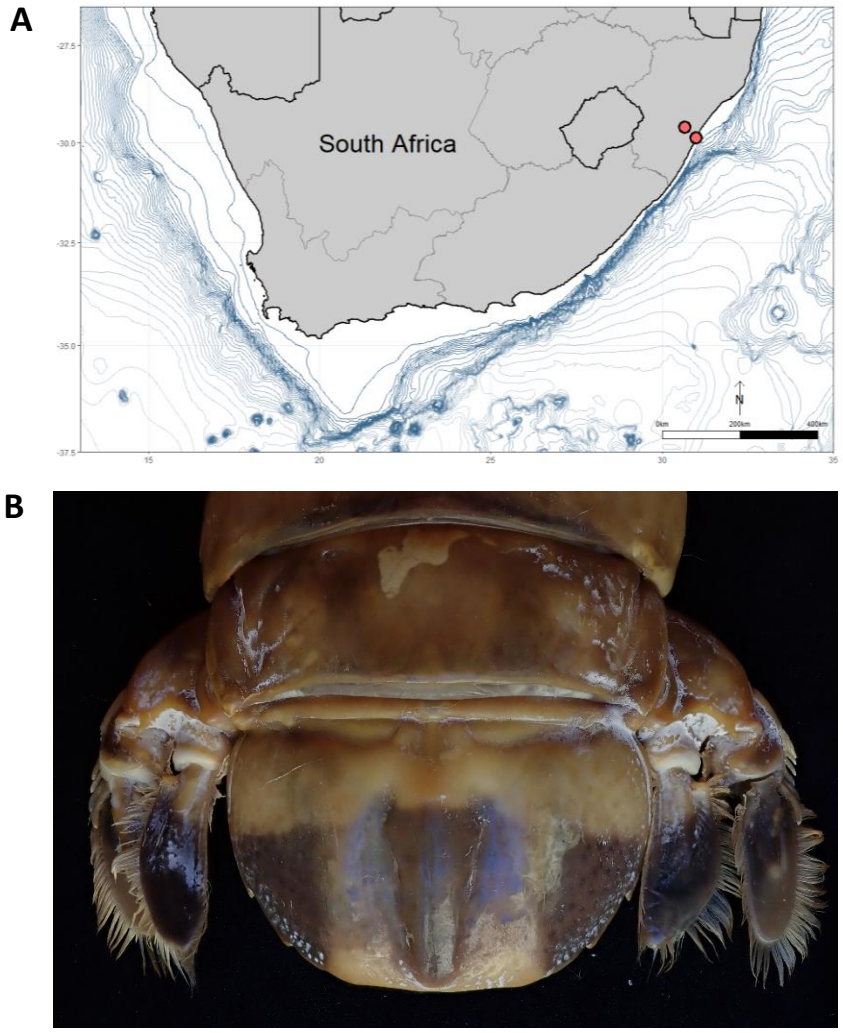

Figure 1.37. *Lysiosquilla maculata* (Fabricius, 1793) **A,** South African distribution; **B,** telson, dorsal, male TL 229 mm, SAMC–A008219.

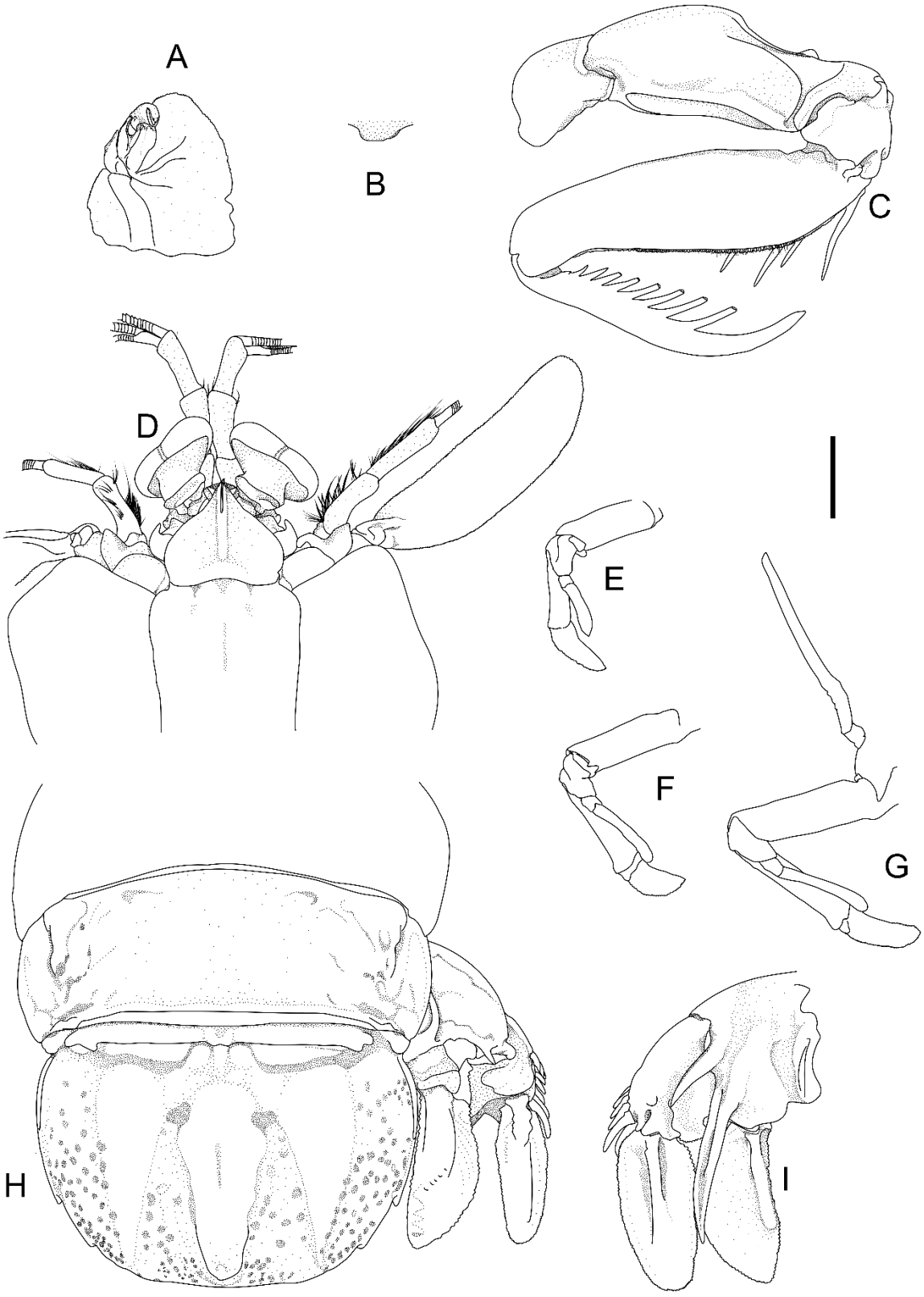

Figure 1.38. *Lysiosquilla maculata* (Fabricius, 1793) male TL 229 mm, SAMC–A008219. **A,** right pleopod 1 endopod, anterior; **B,** TS8 sternal keel, right lateral; **C,** right raptorial claw, lateral; **D,** anterior cephalothorax, dorsal; **E–G** right pereopods 1–3, posterior; **H,** AS6, telson and right uropod, dorsal; **I,** right uropod, ventral. Scale **A–I** = 10 mm.

Lysiosquilla tredecimdentata Holthuis, 1941

Figures 1.39 – 1.40(A–I)

Lysiosquilla maculata var. *tredecimdentata* Holthuis, 1941: 273–274, fig. 6 [type locality Hedjaff, near Aden].

Lysiosquilla maculata. –Kemp, 1913: 111, pl. 8: figs. 87–89 [not *L. maculata* (Fabricius, 1793)].

Lysiosquilla tredecimdentata. –Manning, 1968a: 38–41, fig. 13. –Holthuis, 1967a: 23. –Manning, 1978d: 3, 13, 15, fig. 13; 1995: 132–133, pl. 24, figs. 68b, 69c, f. –Ahyong, 2001: 135–137, fig. 66. –R. Liu, 2008: [list]. –Ahyong and Lin, 2022: fig. 2.

Material examined. KZN: SAMC–A019445 1 female (TL 125 mm), Durban, 29°53'06.6"S 31°00'00.0"E, Apr 1922, depth unknown, coll. H.W. Bell Marley. SAMC–A092087 1 female (TL 116 mm), Durban, same as above, depth and date unknown.

Diagnosis. Ocular scales triangular, erect, inclined anteriorly. A1 somite dorsal processes directed anteriorly. Rostral plate cordiform; broadest in advance of base; with median carina anteriorly, not flanked by grooves or carinae. A2 protopod with blunt mediodorsal tooth. Mandibular palp present. Raptorial claw dactylus with 10–13 teeth; carpus dorsal tooth directed ventrally, recurved medially. Pereopods 1–3 with slender endopod. TS8 sternal keel produced as a posteriorly directed spine. Male PLP1 endopod with posterior endite. Uropodal protopod usually with small spine anterior to endopod articulation; exopod proximal segment outer margin with 7–9 movable spines; endopod apex dark.

Colour in alcohol. Completely faded.

Colour in life (Ahyong, 2001). Dorsum base colour pale yellow, with black transverse bands. Carapace with three dark, broad, transverse bands intervened by narrower pale bands. Uropodal exopod with distal half of proximal segment and proximal 0.66 of distal segment black; outer movable spines dark red. Uropodal endopod with distal 0.66 black. A2 scale with dark brown outline. Pereopods with pink setae on distal segment.

Measurements. Female (n = 2) TL 116–125 mm. CI 358–383. A1 peduncle 0.56–0.59CL. A2 scale length 3.02–3.18 times width and 0.60–0.61CL. PI 80–85 (females). Uropodal endopod length 1.76–1.83 times width. Ahyong (2001) records the largest known specimen at TL 276 mm.

Distribution and Habitat. Indo-West Pacific from Australia, Central Pacific, Vietnam, Thailand and India to Madagascar and South Africa in the Western Indian Ocean. Occupies deep burrows in sand and mud substrates on level intertidal and subtidal habitats.

Remarks. First recorded for South Africa by Manning (1969a) from Durban, KwaZulu-Natal. Both specimens of *Lysiosquilla tredecidentata* examined herein were originally labelled *L. maculata* in the museum collection, further highlighting the need for all early identifications of lysiosquillids to be verified. The specimens examined agree well with previous accounts of the species (Manning 1968a; Ahyong, 2001). Allometric variation in the presence of the spinule adjacent to the articulation of the uropodal endopod is known for the species (Ahyong, 2001). Specimens exceeding 180 mm usually lack the uropodal spinule, but rather exhibit a low tubercle. Both specimens examined herein demonstrate the spinule. A reduced number of teeth on the dactylus of the

raptorial claw is known for larger females, where nine teeth are recorded for Australian material (Ahyong, 2001). However, this is not reflected in the present study material.

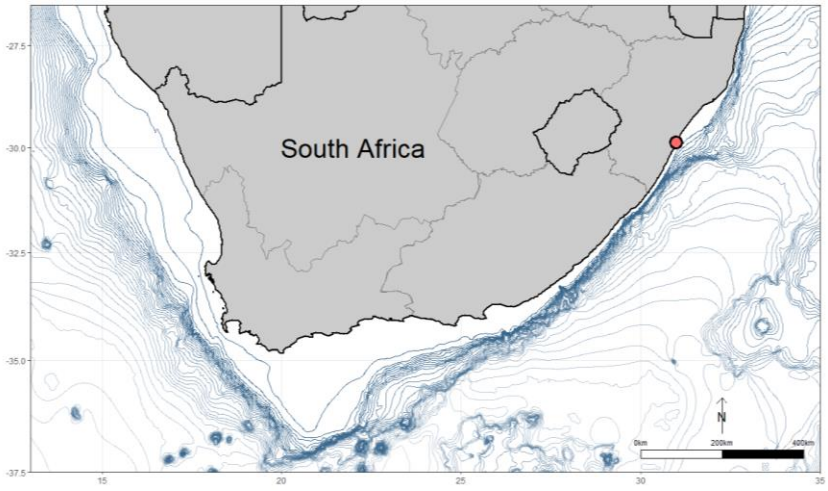

Figure 1.39. South African distribution of *Lysiosquilla tredecimdentata* Holthuis, 1941.

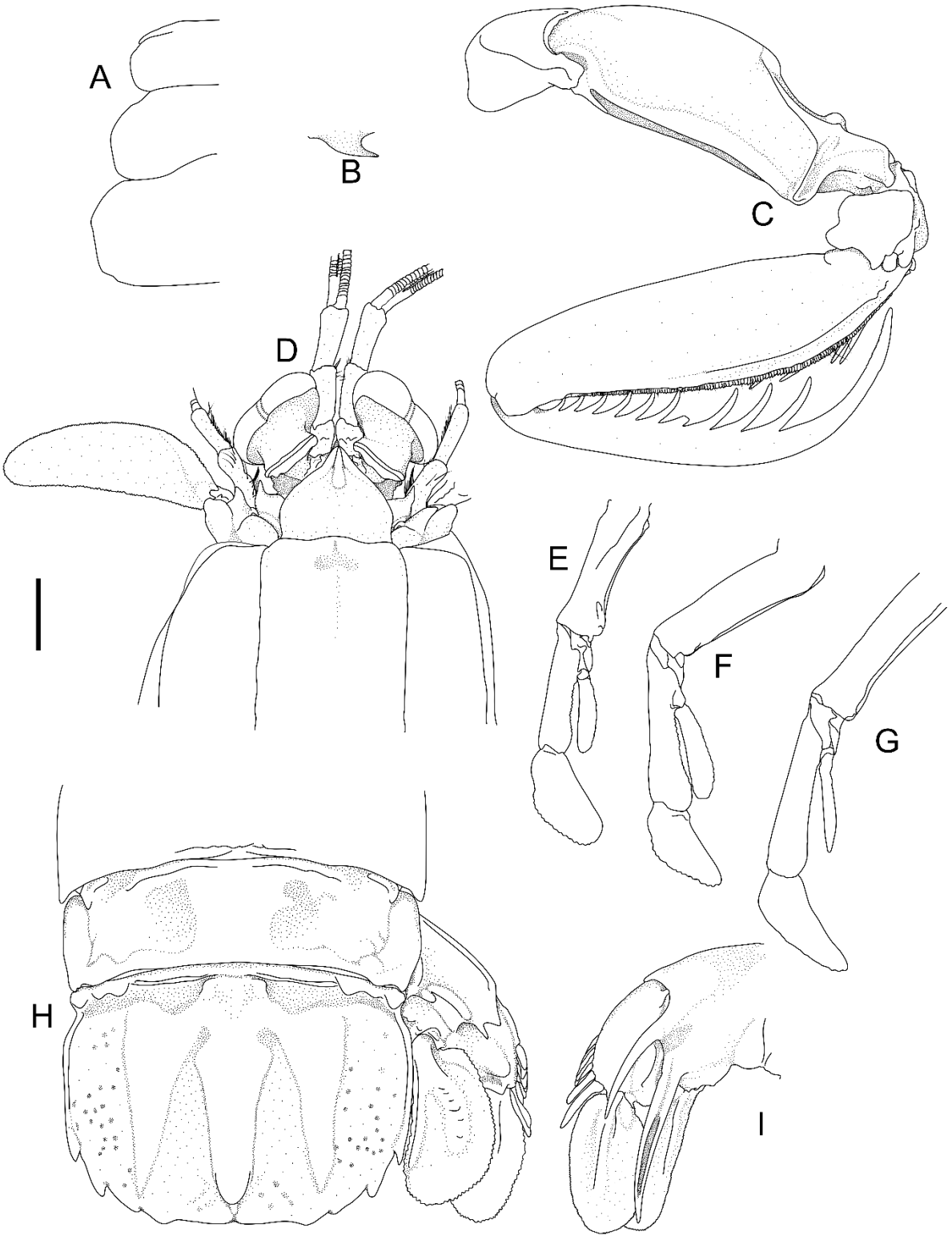

Figure 1.40. *Lysiosquilla tredecimdentata* Holthuis, 1941, female TL 116 mm, SAMC–A092087. **A,** TS6–8, left lateral; **B,** TS8 sternal keel, left lateral; **C,** right raptorial claw, lateral; **D,** anterior cephalothorax, dorsal; **E–G**, right pereopods 1–3, posterior; **H**, AS6, telson, right uropod, dorsal; **I,** right uropod, ventral. Scale **A–I** = 5 mm.

TETRASQUILLIDAE Manning and Camp, 1993

Tetrasquillidae Manning and Camp, 1993: 88–89.

Heterosquillidae Manning, 1995: 123.

Diagnosis. Cornea bilobed. Raptorial claw dactylus uninflated basally; propodus with 3 or 4 proximal movable spines, occlusal margin pectinate; ischium shorter than half merus length. Pereopod 1–2 endopods subcircular or ovate. Pereopod 3 endopod slender or oval elongate. Abdominal articulation compact. Telson with primary teeth and denticles distinct, slender, not fused into margin. Proximal margin of uropodal endopod with weak dorsal fold.

Composition. *Acaenosquilla* Manning, 1991; *Allosquilla* Manning, 1977a; *Colubrisquilla* Ahyong, 2012; *Heterosquilla* Manning, 1963a; ***Heterosquilloides*** Manning, 1966; *Heterosquillopsis* Moosa, 1991; *Kasim* Manning, 1995; *Pariliacantha* Ahyong, 2012; *Tectasquilla* Adkison and Hopkins, 1984; *Tetrasquilla* Manning and Chace, 1990.

Remarks. Only one species of the genus *Heterosquilloides* is represented in South African waters.

Heterosquilloides Manning, 1966

Heterosquilloides Manning, 1966: 124. [Type species *Lysiosquilla insolita* Manning, 1963a, by original designation. Gender masculine].

Diagnosis. Cornea bilobed, with two rows of ommatidia in the mid-band; eyes not concealed by rostral plate. A2 protopod without mesial papillae. Raptorial claw propodus with 4 proximal movable spines. Pereopods 1–2 with oval, elongate endopods. Telson with low, irregular dorsal carinae or spinules; posterior margin with movable SM teeth and 2 pairs of fixed primary teeth; 4 IM denticles present; telson ventral surface without post-anal spine. Uropodal protopod with inner spine as long as or longer than outer; with ventral spine anterior to endopod articulation.

Composition. *Heterosquilloides armata* (Smith, 1881); ***H. insignis*** (Kemp, 1911); *H. insolitus* (Manning, 1963a).

Remarks. One Indo-Pacific species is known from South Africa.

Heterosquilloides insignis (Kemp, 1911), **Literature record**

Figure 1.41

Lysiosquilla insignis Kemp, 1911: 94–95 [type locality off north Andaman Island]; 1913: 4, 11, 111, 126–128, pl. 9: figs. 99–102. –Barnard, 1950: 859, fig. 3c.

Heterosquilla (Heterosquilloides) insignis. –Holthuis, 1967a: 13.

Heterosquilla (Heterosquilloides) insolita. –Manning, 1969b: 58, 60 (Galapagos Island specimen only, not *H. insolita* Manning, 1963a).

Heterosquilla (Heterosquilloides) zarenkovi Makarov, 1978: 179, fig. 2 [type locality Tonkin Bay, Vietnam].

Heterosquilloides insignis. –Moosa, 1986: 386, pl. 1: fig. c. –Manning, 1991: 6; 1995: 22, 124. –Ahyong, 2001: 175–176, fig. 87; 2002a: 830–832, fig. 1.

Material examined. No material available for study.

Previously examined South African material. KZN: 1 male (TL 42 mm), off Durban, South Africa, 29°55'00.0"S 30°20'00.0"E, 445–460 m, stat. 196, sandy mud, 13–14 Feb 1951, *Galathea*, deposited in Zoological Museum, Copenhagen, source Manning (1991); 1 male, north of Durban, 274 m, source Barnard (1950).

Diagnosis (Ahyong, 2001). Eye with cornea strongly bilobed. Ocular scales fused. A2 protopod with 2 ventral papillae. Rostral plate longer than broad; broadest at base. Raptorial claw dactylus with 7 or 8 teeth. Pereopods 1–2 basal segment with inner and outer, ventrally directed spine. Pereopod 3 basal segment with outer spine only. TS6 lateral process quadrate. AS1–5 without posterior spinules; AS(3)4–5 each with short posterolateral spine. AS6 with low IM and LT carinae, armed posteriorly; posterior margin unarmed. Telson with 5–6 SM denticles either side of midline forming inverted 'V' in posterior view. Dorsal surface median elevation laterally with 3–4 rows of irregular carinae or tubercles; upper posterior margin laterally with 1 acute, triangular spine and 1 short, triangular or rounded lobe. Uropodal exopod proximal segment outer margin with 6 movable spines.

Colour in alcohol. Faded in all species accounts (Kemp, 1911; 1913; Barnard, 1950; Moosa, 1986; Manning, 1991; Ahyong, 2001; 2002a). Colour in life unknown.

Measurements. Male (n = 1) TL 42 mm. Ahyong (2002a) reported the largest known specimen at TL 94 mm.

Distribution and Habitat. Widely distributed From South Africa and Madagascar to Australia, Philippines, Vietnam, Central Pacific, Hawaii, French Polynesia, eastern Pacific, and Galapagos at depths below 100 m. The South African specimens were collected at 274–460 m on sandy and muddy substrates. A depth range of 275–510 m has been previously recorded in southern African waters (Manning, 1991).

Remarks. One of three deep water species collected off the coast of South Africa. No specimen was available in the Iziko collection for examination. However, two specimens of *Heterosquilloides insignis* are known from South African waters (Barnard, 1950; Manning, 1991), both from localities surrounding Durban. While Manning's specimen is housed at the Zoological Museum, Copenhagen (Manning, 1991), Barnard's specimens could not be found in the Iziko collection of stomatopod fauna and must be considered lost. In his account of the species from Australia, Ahyong (2001) remarks on the similarity in rostral plate morphology to the South African specimens illustrated by Manning (1991). Both South African and Australian specimens have convex margins of the rostral plate, rather than the straight margins illustrated by Kemp (1911) for the holotype. Furthermore, Barnard (1950) describes the rostral plate as bearing 'feebly sinuous margins', which agrees with Ahyong's (2001) observation.

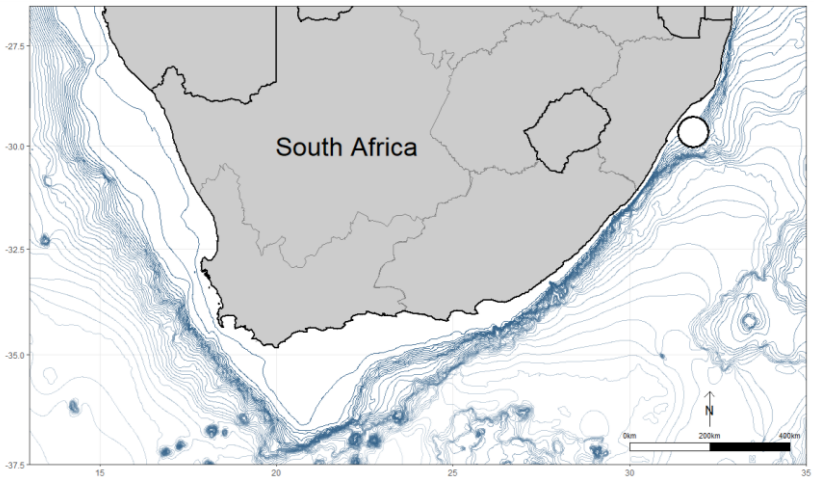

Figure 1.41. South African distribution of *Heterosquilloides insignis* (Kemp, 1911)**.** White circle indicating vague locality records from deep water around Durban.

SQUILLOIDEA Latreille, 1802

Diagnosis. Cornea with 2 rows of hexagonal mid-band ommatidia. MXP3–4 with propodi ovate, neither ribbed nor beaded ventrally. Body depressed, articulation compact. Raptorial claw with terminal ischiomeral articulation; dactylus not inflated basally. Telson with distinct MD carina; SM teeth with movable or fixed apices, other primary teeth with fixed apices. Uropodal protopod with at most two primary spines; articulation of exopod segments terminal.

Composition. Squillidae Latreille, 1802

Remarks. Only a single family, Squillidae, is included in this superfamily.

SQUILLIDAE Latreille, 1802

Diagnosis. See superfamily.

Composition. *Alima* Leach, 1817; *Alimopsis* Manning, 1977b*; Alimopsoides* Moosa, 1991; *Anchisquilla* Manning, 1968b; *Anchisquilloides* Manning, 1977b; *Anchisquillopsis* Moosa, 1986; *Areosquilla* Manning, 1976; *Belosquilla* Ahyong, 2001; *Busquilla* Manning, 1978a; *Carinosquilla* Manning, 1968b; ***Clorida*** Eydoux and Souleyet, 1842; *Cloridina* Manning, 1995; *Cloridopsis* Manning, 1968b; *Crenatosquilla* Manning, 1984b; *Dictyosquilla* Manning, 1968b; *Distosquilla* Manning, 1977b; *Erugosquilla* Manning, 1995; *Fallosquilla* Manning, 1995; *Fennerosquilla* Manning and Camp, 1983; *Gibbesia* Manning and Heard, 1997; ***Harpiosquilla*** Holthuis, 1964; *Humesosquilla* Manning and Camp, 2001; *Kaisquilla* Ahyong, 2002b; ***Kempella*** Low and Ahyong, 2010; *Lenisquilla* Manning, 1977b; *Leptosquilla* Miers, 1880; *Levisquilla* Manning, 1977b; *Lophosquilla* Manning, 1968b; *Meiosquilla* Manning, 1968b; *Michalisquilla* Van Der Wal and Ahyong, 2017; ***Miyakella*** Ahyong and Low, 2013; ***Natosquilla*** Manning, 1978c*; Neclorida* Manning, 1995; *Neoanchisquilla* Moosa, 1991; ***Oratosquilla*** Manning, 1968b; *Oratosquillina* Manning, 1995; *Paralimopsis* Moosa, 1991; *Parvisquilla* Manning, 1973; *Pontiosquilla* Manning,

1995; ***Pterygosquilla*** Hilgendorf, 1890; ***Quollastria*** Ahyong, 2001; ***Rissoides*** Manning and Lewinsohn, 1982; *Schmittius* Manning, 1972b; *Squilla* Fabricius, 1787; *Squilloides* Manning, 1968b*; Triasquilla* Ahyong, 2013; *Tuleariosquilla* Manning, 1978a; *Visaya* Ahyong, 2004; *Vossquilla* Van Der Wal and Ahyong, 2017.

Remarks. The most diverse family of Stomatopoda with currently 48 known species and represented by eight genera in South African waters. Two species from two genera*, Alima neptuni* and *Lenisquilla lata*, have previously been misrepresented to be present in South African waters, although there is a high probability of their occurrence, as both species are reported from southern Mozambique (Manning, 1969a). Two species, *Leptosquilla schmeltzii* and *Erugosquilla woodmasoni* are added as new species and genera records for Mozambique in chapter 2, neither of which have yet been found in South Africa. These four genera are added in the key below.

Key to the southern African [South African in bold] genera of Squillidae

1. Raptorial claw (Fig. 1.47B) with occlusal margin of propodus lined with slender, erect spines. Carapace with posterolateral margins (Fig. 1.47A) deeply excavate.....***Harpiosquilla***

– Raptorial claw with occlusal margin of propodus pectinate. Carapace with posterolateral margins rounded or angled, not deeply excavate……..2

2. TS5 with lateral process single or obsolete.....3

– TS5 with lateral process bilobed.....8

3. Carapace with MD carina (Fig. 1.49A) .....***Kempella***

– Carapace without MD carina 4

4. A1 somite greatly elongate, extending anteriorly well beyond apex of rostral plate…….*Leptosquilla*

– A1 somite not greatly elongate, not extending beyond apex of rostral plate……5

5. Cornea broader than stalk; stalk less than 3 times length of cornea……*6*

– Cornea (Figs. 1.43B, 1.45A) narrower than widest part of stalk; stalk 4 or more times length of cornea……***Clorida***

6. SM teeth of telson with fixed apices .....*Lenisquilla*

– SM teeth of telson with movable apices.....7

7. Carapace with anterolateral spines (Fig. 1.58A).....***Pterygosquilla***

– Carapace without anterolateral spines (Fig. 1.61A).....***Rissoides***

8. Telson without prelateral lobe.....*Alima*

– Telson with prelateral lobe 9

9 Carapace with MD carina not interrupted at base of anterior bifurcation…….....10

– Carapace with MD carina interrupted at base of anterior bifurcation (branches of bifurcation present or absent)……..11

10 Anterior bifurcation of MD carina of carapace opening anterior to dorsal pit. PLP1 endopod with posterior endite .....***Oratosquilla***

– Anterior bifurcation of MD carina of carapace (Figs. 1.51C, 1.53C) opening posterior to dorsal pit. PLP1 endopod without posterior endite……***Miyakea***

11 Carapace anterior width about 0.60 carapace length. Anterior margin of ophthalmic somite with median spinule or tubercle (Dorsal surface smooth)……..12

– Carapace anterior width about 0.50 carapace length or less. Anterior margin of ophthalmic somite rounded or medially emarginate .....***Quollastria***

12 Eye with cornea less than 0.33 carapace length in adults. Raptorial claw dactylus with 6 or 7 teeth.....*Erugosquilla*

– Eye large, cornea (Fig. 1.55B, C) 0.33 or more carapace length in adults. Raptorial claw dactylus (Fig. 1.55A) with 10–18 teeth……***Natosquilla***

Clorida Eydoux and Souleyet, 1842

Clorida Eydoux and Souleyet, 1842: 264. [Type species *Clorida latreillei* Eydoux and Souleyet, 1842, by subsequent designation by Fowler (1912: 302). Gender feminine].

Diagnosis. Eye small, pyriform, cornea bilobed, narrower than stalk; stalk short, strongly inflated laterally, medially flattened for at least proximal half. Ocular scales fused. Rostral plate broader than long. Carapace with or without anterolateral spines; without MD and IM carinae; with reflected MG and reduced LT carinae, distinct posteriorly only; posterolateral margin rounded. Raptorial claw dactylus with 4 or 5 teeth; carpus dorsal carina undivided; merus without outer inferodistal spine. Mandibular palp present or absent. MXP1–4 with epipod. PLP1 endopod in adult with posterior endite; hook process with distal point. TS5–7 lateral processes single. AS1–6 with or without SM carinae. Telson inflated, dorsolateral surface with rows of denticles or tubercles, without rows of shallow pits; prelateral lobe present; SM teeth usually with movable apices. Uropodal protopod inner margin armed with slender spines.

Composition. ***Clorida albolitura*** Ahyong and Naiyanetr, 2000; *C. bombayensis* (Chhapgar and Sane, 1967); C. daviei Ahyong, 2001; *C. decorata* (Wood-Mason, 1875); *C. depressa* (Miers, 1880); *C. denticauda* (Chhapgar and Sane, 1967); *C. gaillardi* Moosa, 1986; *C. granti* (Stephenson, 1953b); *C. japonica* Manning, 1978a; *C. javanica* Moosa, 1974; ***C. latreillei*** Eydoux and Souleyet, 1842; *C. obtusa* Ahyong, 2001; *C. rotundicauda* (Miers, 1880); *C. seversi* Moosa, 1973; *C. wassenbergi* Ahyong, 2001.

Remarks. *Clorida* is most similar to genus *Cloridina,* but can be distinguished by eye morphology (Ahyong, 2001). In the specimens of *Clorida* examined herein, the inner proximal half of the eye is flat, so that the eyes meet in the midline. In *Cloridina,* the inner eye margin is sinuous to convex, and the eyes do not fit together at the midline. Two groups of *Clorida* are known, based on the presence of the mandibular palp. The first group represent species that lack a mandibular palp, lack submedian carinae on AS1–5, lack a spine ventral to the lateral process of TS5, lack a distinct notch on the outer proximal margin of the dactylus and have four teeth on the dactylus of the raptorial claw. The second group include species with a mandibular palp, SM carinae on AS1–5, a distinct spine under the lateral process of TS5, a distinct notch on the outer proximal margin of the dactylus and usually five teeth on the dactylus of the raptorial claw. Two species of *Clorida* occur in South African waters, both belonging to the second group. One, *C. albolitura*, is a new species record for the region.

Key to the South African species of *Clorida*

1. Telson with short postanal carina (Fig. 1.45H), not exceeding half distance between anal pore and posterior margin. TS5 lateral process (Fig. 1.45D) produced to an acute triangular spine. In life, telson MD carina without large white median patch……..***C. latreillei***

– Telson with long postanal carina (Fig. 1.43G, H), extending beyond half distance between anal pore and posterior margin. TS5 lateral process (Fig. 1.43E) produced to a slender spine. In life, telson MD carina with large white median patch……..***C. albolitura***

Clorida albolitura Ahyong and Naiyanetr, 2000, **new record**

Figures 1.42 – 1.43(A–J)

Squilla latreillei. –Ingle, 1963: 14, figs. 2, 33 (not *C. latreillei* Eydoux and Souleyet, 1842).

Clorida latreillei. –Blumstein, 1974: 116, fig. 3. –Makarov, 1979: 47–48. –Manning, 1995: 189–191, fig. 119 (not *C. latreillei* Eydoux and Souleyet, 1842).

Clorida albolitura Ahyong and Naiyanetr, 2000: 317–320, fig. 2 (type locality Ang Sila, Gulf of Thailand, Thailand). –Ahyong, 2001: 217–219, fig. 105. –Ahyong and Galil, 2006: 191–193, fig. 1. –Galil, 2007: 303 [list]. –R. Liu, 2008: 1267 [list]. –Zenetos *et al*. 2010: 401, table 2 [list].

Material examined. KZN: SAMC–A079464 1 female (TL 22 mm), 29°19'48.0"S 31°26'12.1"E, 10 Sep 1964, 38 m; SAMC–A079439 2 females (TL 53 and 47 mm), 29°10.9'S 31°42.8'E, 25 May 1976, 40 m, beam trawl, stat. SM114, RV *Meiring Naude*.

Diagnosis. A1 somite dorsal processes with short, triangular apices. A2 peduncle segment 1 extending anteriorly beyond eyes. Carapace with anterolateral spines. Raptorial claw dactylus with 5 teeth; outer proximal margin with basal notch. Mandibular palp 3-segmented. TS5 lateral process a short slender lobe, apex spiniform, with small ventral spine. TS6 lateral process broadly rounded. TS7 lateral process subtruncate; anterolateral and posterolateral angles obtusely rounded. AS(1)2-5 with low SM carinae. AS6 with distinct SM carinae. Abdominal carinae spined as follows: SM6, IM 5–6, LT 5–6, MG (4)5. Telson dorsolateral surface with widely spaced rows of tubercles; margin of IM and LT teeth faintly crenulate to strongly tuberculate; denticles SM 4–6, IM 5–8, LT 1; ventral surface with long postanal carina, extending beyond half distance between anal pore and posterior margin. Uropodal protopod outer margin crenulate to serrate (smooth in one example); inner margin with 3–6 slender spines. Uropodal exopod proximal segment outer margin with 6–8 movable spines; distal segment longer than proximal segment; with black patch at articulation of exopod segments.

Colour in alcohol. Mostly faded from dark brown to pale amber, appearing mottled grey-brown in most recently collected specimen. Uropodal exopod with darker patch at articulation of proximal and distal segments.

Colour in life (Ahyong and Naiyanetr, 2000). Dorsal colour brown while ventral surface translucent white. The median large white patch of the telson median carina and white posterior telson margin considered a diagnostic feature of the species.

Measurements. Male (n = 1) TL 64 mm, female (n = 5) TL 22–53 mm. A1 peduncle 0.780–1.18CL. A2 scale 0.45–0.49CL. The largest specimen at TL 75 mm recorded for Australia (Ahyong, 2001).

Distribution and Habitat. Mediterranean coast of Israel, Gulf of Suez, Andaman Sea, Gulf of Thailand, Vietnam, Taiwan, Australia and Madagascar. Recorded from South Africa [KZN] for the first time. Only recorded for offshore habitats on sand or mud substrates; 31–110 m (Ahyong, 2001).

Remarks. *Clorida albolitura* is most similar to *C. latrellei* Eydoux and Souleyet, 1842 in that they share triangular apices of the dorsal processes of the antennular somite, submedian carinae on AS1–5 and a ventral spine or tubercle under the lateral process of TS5. Both species also bear 5 teeth on the dactylus of the raptorial claw and possess a post-anal carina. The most apparent diagnostic feature of *C. albolitura* is the presence of a large white patch on the median carina of the telson in live specimens. However, no live specimens were available for examination in the present study. The present series of *C. albolitura* is distinguished from *C. latrellei* by the long post-anal carina of the telson viewed ventrally relative to the short carina observed for *C. latrellei*. Other characteristic features of *C. albolitura* include more pyriform eyes, no SM carinae on TS6–8 and a sharper and slenderer TS5 lateral process. Sexual dimorphism has been well-illustrated for *C. latreillei* with the telson carinae becoming inflated in males. Carinae inflation is thought to be less pronounced in *C. albolitura* male specimens (Ahyong and Naiyanetr, 2000). The postanal carina appears more pronounced in the female specimens examined in the present series, however, examination of more material is needed before this comment can be established as significant. South African species specimens present in the Iziko collection were previously misidentified as *C. latrellei*. However, both species occur in South African waters.

The South African specimens agree in most respects with the accounts given for holotypic material from the Gulf of Thailand (Ahyong and Naiyanetr, 2000) as well as with Australian material (Ahyong, 2001). The fixed apices of the SM teeth of the telson recorded for almost half of the material examined by Ahyong (2001) is reflected in the illustrated specimens herein. Furthermore, all specimens exhibited a three-segmented mandibular palp, agreeing with Ahyong (2001), whereas Ahyong and Naiyanetr (2000) recorded a two-segmented mandibular palp for 21 specimens from Vietnam and Phuket.

A previously unreported and unusual variation in the South African specimens is the uropodal protopod outer margin being crenulate (Fig. 1.43F, I) instead of relatively smooth. Much confusion has already been attributed to the high variability in characters considered diagnostic in the differentiation of *Clorida* species (Ahyong and Naiyanetr, 2000). In the present series, only one specimen examined follows previous species accounts (Ahyong, 2001; Ahyong and Naiyanetr, 2000; Manning, 1995; Makarov, 1979) and exhibits a smooth outer margin (Fig. 1.43J). Considering the history of feature variability within *Clorida* and the varying degrees of uropodal protopod margin articulation, this feature is regarded as an addition to the list of variable features for *C. albolitura* within the *Clorida* complex.

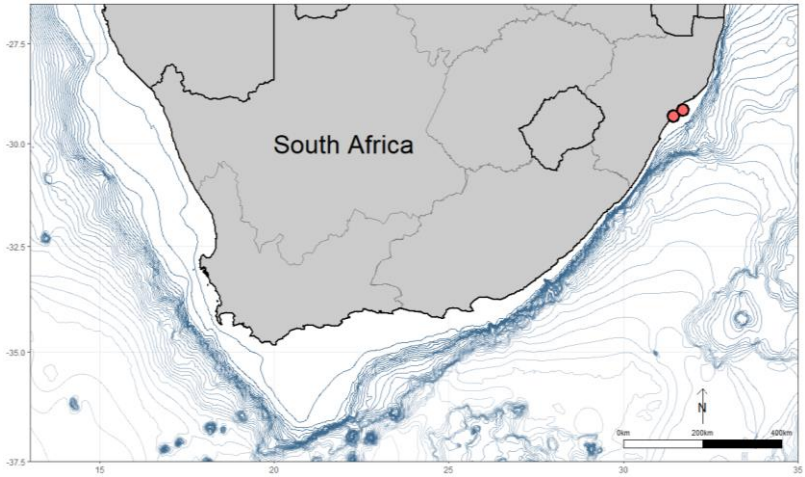

Figure 1.42. South African distribution of C*lorida albolitura* Ahyong and Naiyanetr, 2000.

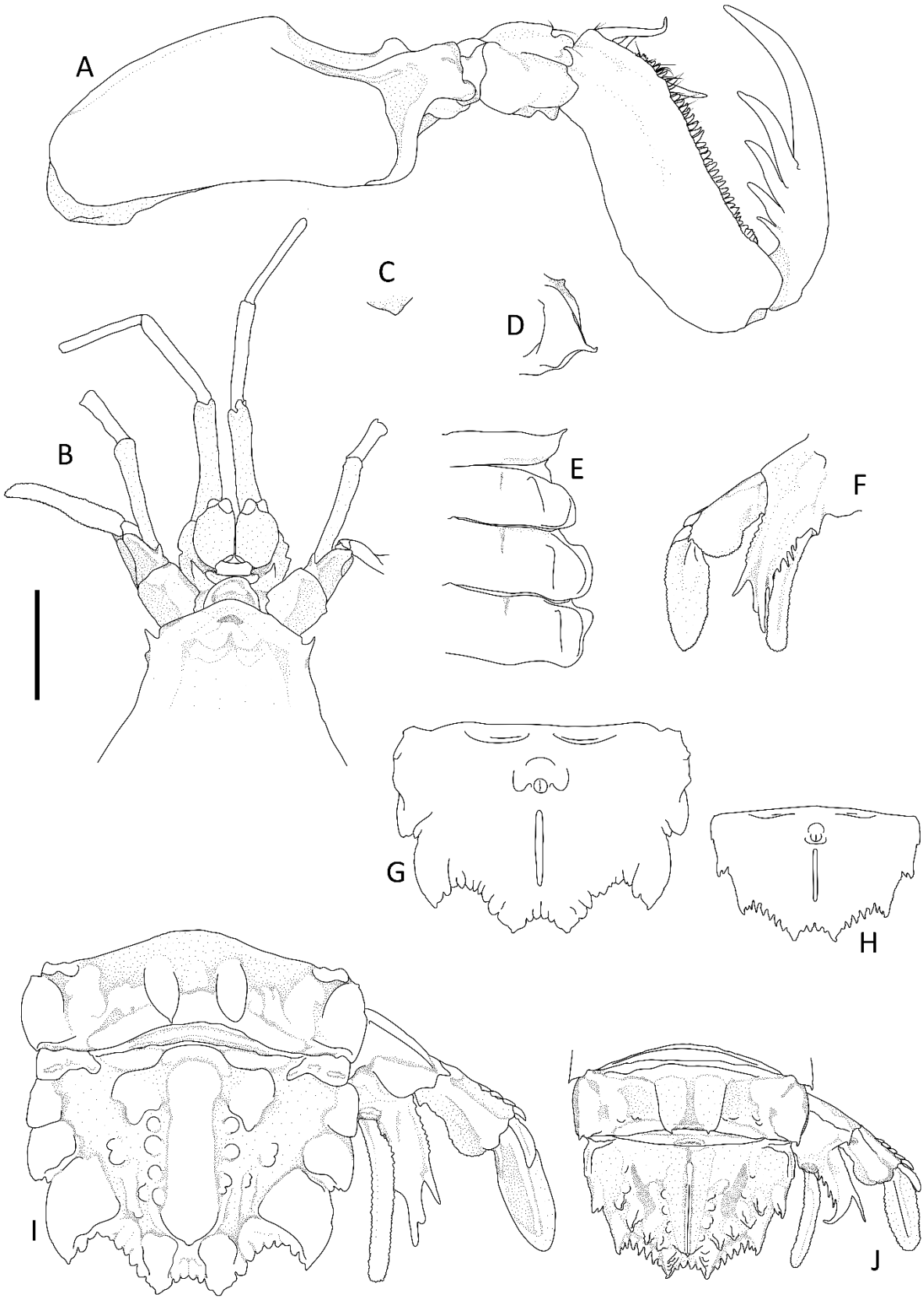

Figure 1.43. *Clorida albolitura* Ahyong and Naiyanetr, 2000, **A–B, G, I** male, 64 mm, SAMC–A006796; **C–F, H, J** female, 53 mm, SAMC–C079439. **A,** right raptorial claw, lateral; **B,** anterior cephalothorax, dorsal; **C,** TS8 sternal keel, right lateral; **D,** TS5 lateral process, left posterior; **E,** TS5–8, left dorsal; **F**, right uropod, ventral; **G–H**, telson, ventral; **I–J**, telson and right uropod, dorsal. Scale **A–J** = 5 mm

Clorida latreillei Eydoux and Souleyet, 1842

Figures 1.44 – 1.45(A–H)

Clorida latreillei Eydoux and Souleyet, 1842: 265, pl. 5: figs. 2–5 [type locality Pattani, Gulf of Thailand by neotype selection (Ahyong and Naiyanetr, 2000)]

Squilla latreillei. –Wood-Mason, 1895: 6, pl. 4: figs. 6–13. –Kemp, 1913: 24-27, pl. 1: figs. 1–4. –Barnard, 1950: 845, fig. 1e.

Clorida latreillei. –Manning, 1969a: 7–8. –Moosa, 1975: 11. –Manning, 1990: 100; 1991: 9–10, fig. 9. –Naiyanetr, 1980: 19–21, 42, figs. 13a-d. –Tirmizi *et al.* 1994: 136, fig. 10. –Naiyanetr, 1998: 126. –Ahyong and Naiyanetr, 2000: 314–317, fig. 1. –R. Liu, 2008: [list].

Material examined. KZN: SAMC–A019336 1 female (TL 78 mm), Durban Bay, 29°53'05.3"S 31°00'00.6"E, 20 Aug 1946, depth unknown, dredge, stat. NA 176C, UCT Ecological Survey, det. R.B. Manning.

Diagnosis. A1 somite dorsal processes with short, triangular apices. Carapace with anterolateral spines. Raptorial claw dactylus with 5 teeth; outer, proximal margin with basal notch. Mandibular palp 3-segmented. TS8 with SM carinae. TS5 lateral process short, triangular, with apex spiniform, slightly inclined anterolaterally; with small ventral spinule. TS6–7 lateral processes lacking posterolateral spine. AS1–5 each with SM carinae. Telson with margin of IM teeth crenulate; dorsolateral surface with widely spaced rows of low course tubercles coarse in females. Telson ventral surface with short postanal carina, not extending posteriorly to mid-length between anal pore and posterior margin.

Measurements. Female (n = 1) TL 78 mm. CL 14 mm. Anterior carapace width 0.57CL. A1 peduncle 1.2CL. A2 scale 0.43CL. This is the largest recorded specimen of *C. latreillei*.

Colour in alcohol. Overall dorsal and ventral colour chestnut brown. Brown to black on propodus of raptorial claw and margins of carapace, as well as medially on AS1–2 and 5. Dactylus pale yellow to white. Raptorial claw with yellow band on dorsal distal margin of meral depression.

Colour in Life (Ahyong, 2000). Overall dorsal colour pale green, ventral surface translucent white. Carapace with dark brown outline; with diffuse, dark brown patch medially. TS6–8 and AS1–6 with black-brown posterior margin. Uropodal exopod proximal segment with dark brown patch distally; distal segment with dark diffuse infusion in inner proximal quarter.

Distribution and Habitat. Western Indian Ocean from South Africa, Mozambique, India and Pakistan to Gulf of Thailand and southwestern Indonesia. Associated with coarse sand and mud substrata in shallow water.

Remarks. *Clorida latrellei* most resembles *C. albolitura* and the morphological similarities are explained under remarks of the latter. Some feature variation is known for AS1–5 marginal carinae spination, raptorial claw teeth number of dactylus (usually 5 but occasionally 4) and the distinctness of the TS5 ventral spinule, which can often be an indistinct tubercle. Prior to this study, *C. latreillei* was the only species of the genus known from South Africa, recorded from the nearshore (38 m) off Durban (Manning, 1969a; Day and Morgan, 1956). However, more detailed examination of the present material revealed that within specimens previously identified as *C. latreillei* there were several specimens of a different species, *C. albolitura* Ahyong and Naiyanetr, 2000. The

confusion in this group also stems from the holotype being lost and generally poor taxonomic documentation. In 2000, Ahyong and Naiyanetr revised the '*C. latreillei* complex' and erected a neotype from newly collected material from the Gulf of Thailand.

The large specimen examined herein agrees in most respects with the recent description of *C. latrellei*. The present specimen has the intermediate teeth of the telson with a crenulate margin. Ahyong and Naiyanetr (2000) identified this feature as usually smooth and occasionally crenulate for both the intermediate and lateral teeth margins. Unfortunately, no male specimen of *C. latreillei* was available for examination, but sexual dimorphism has been previously recorded in large males with rounded and inflated instead of course tubercles for the telson dorsolateral surface (Ahyong, 2000).

Although morphologically identifiable as *C. latrellei*, the present material differs in overall colouration to the described neotype. The preserved materials' overall colour is recognisable as brown, which disagrees with the pale green described for the neotype, although this kind of colour change might also be alcohol-induced. Barnard's (1950) account of a Mozambican specimen of *C. latreillei* agrees with the present study, describing his specimen from Maputo Bay as 'Brownish or pinkish' (Barnard, 1950). This difference in colour morphology might prove important pending further investigation.

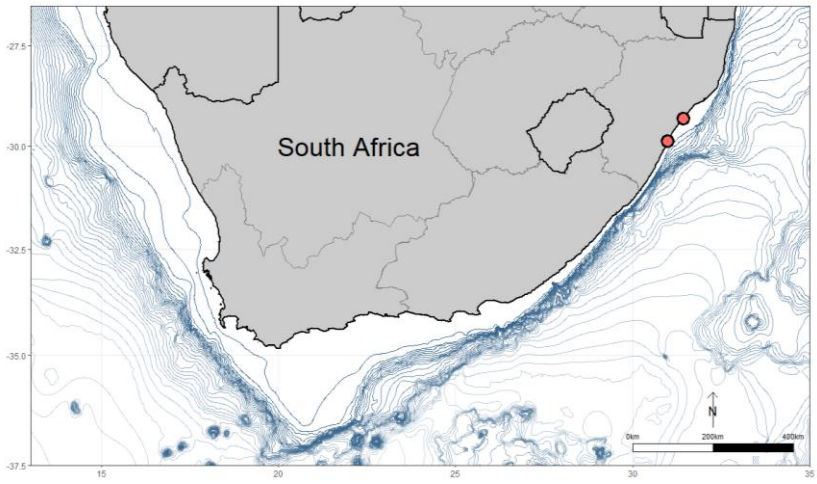

Figure 1.44. South African distribution of C*lorida latrellei* (Eydoux and Souleyet, 1842).

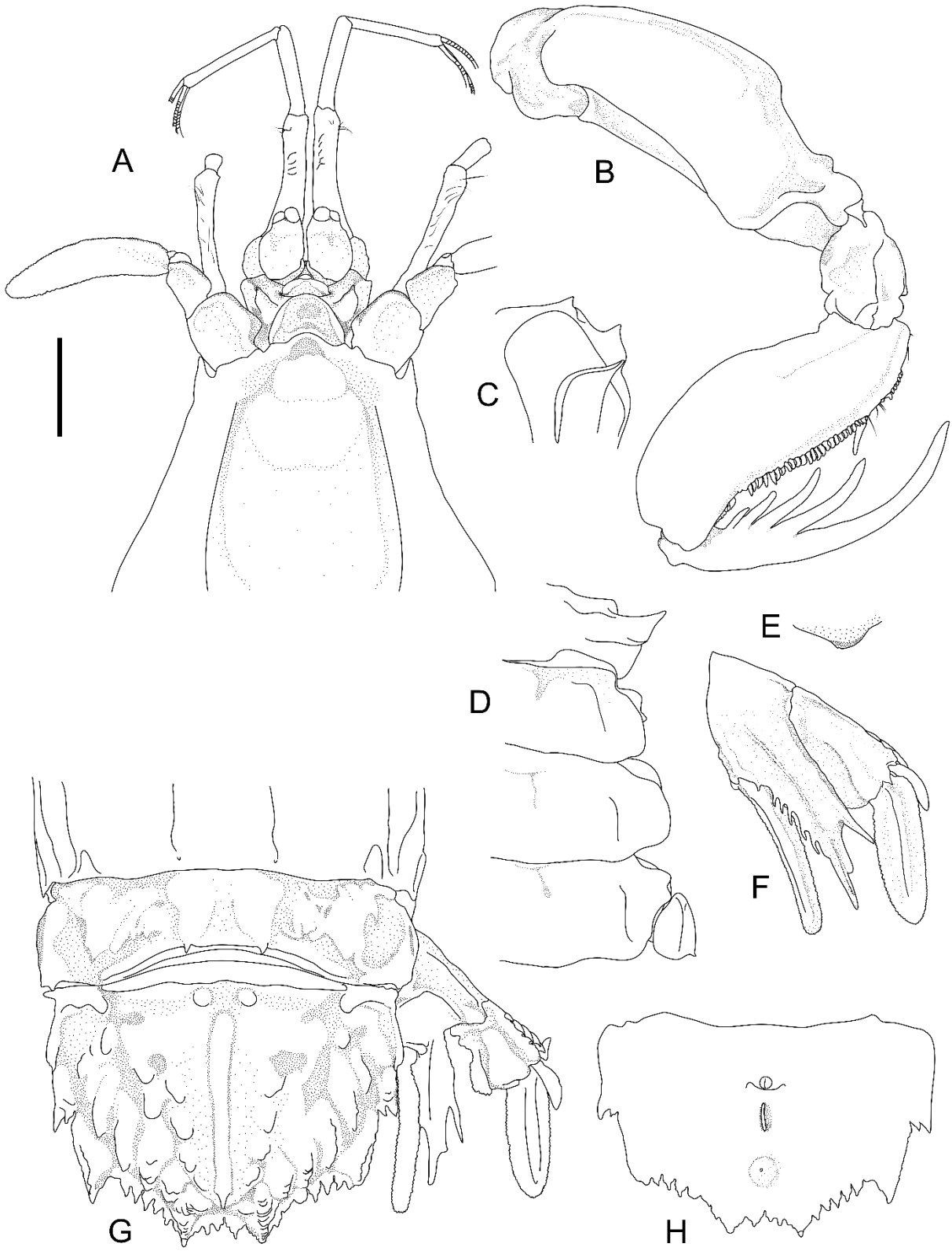

Figure 1.45. *Clorida latreillei* Eydoux & Souleyet, 1842, female TL 78 mm, SAMC–A019336. **A,** anterior cephalothorax, dorsal; **B,** right raptorial claw, lateral; **C,** TS5 ventral spine, right lateral; **D,** TS5–8 and AS1, right dorsal; **E,** TS8 sternal keel, right lateral; **F,** left uropod, ventral; **G,** AS5–6, telson and right uropod, dorsal; **H,** telson, ventral. Scale **A–D, F–H** = 5 mm, **E** = 2.5 mm.

Harpiosquilla Holthuis, 1964

Harpiosquilla Holthuis, 1964: 140. [Type species *Squilla harpax* de Haan, 1844, by original designation. Gender feminine].

Diagnosis. Eye large, T-shaped, cornea width less than 0.30 CL, strongly bilobed, distinctly broader than and set transversely on stalk. Ocular scales broad, rounded or truncate; separate. A1 somite not greatly elongate; dorsal processes slender, with acute apices, directed anterolaterally. Carapace with anterolateral spines; with normal complement of carinae, or without MD carina; MD carina interrupted, anterior bifurcation absent; posterolateral margin deeply excavate. Raptorial claw dactylus with 7–9 teeth; carpus dorsal carina absent; merus without outer inferodistal spine. Mandibular palp 3-segmented. MXP1–5 each with epipod. PLP1 endopod in adult males with posterior endite; hook process with distal point. TS6–8 with IM and usually with SM carinae. TS5 lateral process single; ventral process directed ventrally. TS6–7 lateral processes single or bilobed. AS1–5 usually with normal complement of carinae, or without SM carinae. Telson SM teeth with fixed apices in adults; prelateral lobe present; dorsolateral surface without supplementary longitudinal carinae. Uropodal protopod inner margin crenulate.

Composition. *Harpiosquilla annandalei* (Kemp, 1911); ***H. harpax*** (de Haan, 1844); *H. indica* Manning, 1969d; *H. japonica* Manning, 1969d; *H. melanoura* Manning, 1968a; *H. raphidea* (Fabricius, 1798); *H. sinensis* Liu and Wang, 1998; *H. stephensoni* Manning, 1969d.

Remarks. Of the eight species of *Harpiosquilla*, only one is known from South African waters. High variability was found in features thought by Ahyong (2001) to be diagnostic for species of *Harpiosquilla*. Variation of the apical spine of the rostral plate is confirmed by the present study. The relative lengths of the marginal and lateral carinae were also found to be variable in all species examined and reported on from Australia, with *H. harpax* having the lateral carina varying from 0.33 to 0.50 the length of the marginal carina (Ahyong, 2001).

Harpiosquilla harpax (de Haan, 1844)

Figures 1.46 – 1.47(A–K)

Squilla harpax de Haan, 1844 (atlas): pl. 51, fig. 1 [type locality Japan]; 1849: 222 (text). –Tiwari and Biswas, 1952: 358, figs. 3b, d, f.

Squilla raphidea. –Barnard, 1950: 851, fig. 1c, g. –Stephenson, 1952: 4, 5; 1953a: 43. –Stephenson and McNeill, 1955: 239–240 (not *Squilla raphidea* Fabricius, 1787).

Harpiosquilla harpax. –Manning, 1968a: 15–18, fig. 4; 1969a: 7; 1969d: 6, 25–33, figs. 28–38; 1991: 8; 1995: 148, 153–158, pl. 28, figs. 90a, 92b, 93, 95, 96. –Yamaguchi and Baba, 1993: 179–180, fig. 11. –Ahyong and Norrington, 1997: 106. –Ahyong *et al*., 1999: 38, 41, fig. 2a–d. –Ahyong and Ebach, 1999: 227–228.

Harpiosquilla japonica Manning, 1969d: 15–17, figs. 10–11 [type locality Wakanoura, Kii, Japan]. –Garcia, 1978: 236; 1981: 14–16. –Manning, 1995: 158–160, figs. 87b, d, 88b, 91b, 92a, e, 94b.

Harpiosquilla intermedia Manning and Michel, 1973: 113–116, figs. 1, 2b [type locality Baie de Ducos, New Caledonia]. –Garcia, 1978: 236; 1981: 13–14.

Harpiosquilla malagasiensis Manning, 1978a: 30, fig. 15 [type locality Tamatave, Madagascar].

Harpiosquilla paradipa Ghosh, 1987: 306–308, fig. 1 [type locality Paradip, India].

Material examined. KZN: SAMC–A001339 1 female (TL 200 mm), Durban, 29°52'59.9"S 31°00'00.0"E, depth and date unknown; SAMC–A019338 1 female (TL 152 mm), Durban Bay, 29°52'59.9"S 31°00'00.0"E, 30 Aug 1946, depth unknown, dredge, NA 176B, UCT ecological survey, det. R.B. Manning; SAMC–A019447 1 male (TL 147 mm), ex. Transvaal Museum No. 3383, Durban Bay, 29°52'59.9"S 31°00'00.0"E, depth unknown, Oct 1918, coll. H.W. Bell-Marley. SAMC–A079409 1 male (TL 153 mm), Durban, Oct 1901, depth unknown, coll. V. Kennard; SAMC–A079479 1 female (TL 178 mm), Durban, 29°51'18.1"S 31°03'26.0"E, 30 Aug 1945, depth unknown.

Diagnosis. Rostral plate longer than broad; triangular to cordiform; usually with slender median projection; margins usually sinuous, apex blunt. Carapace with MD carina. Raptorial claw dactylus with 8 teeth, outer margin strongly angular in adult male. TS5 IM carinae low, irregular; ventral process triangular, apex acute, posterior margin slightly convex. TS6–8 with SM and IM carinae, unarmed posteriorly. TS8 sternal keel rounded, inclined posteriorly. AS1–5 with low or near absent SM carinae. Abdominal carinae spined as follows: SM 6, IM(1–2) 3–6(usually 2– 6), LT 1–6, MG 1–5. Telson MD carina proximally with diffuse dark patch on either side of midline; with MG carina less than to greater than twice LT carina length, usually exceeds twice LT carina length; denticles SM 4–6, IM 9–14, LT 1; postanal carina extending midway between anal pore and posterior margin. Uropodal exopod proximal segment outer margin with 8–10 movable spines; exopod distal segment dark on inner half only.

Colour in alcohol. Overall colour reddish brown to completely faded. Dark spots on either side of MD carina on the telson visible in most specimens. A2 scale with outer distal margin black and 0.66 dark brown distally. Uropodal exopod almost completely brown to black distally.

Colour in life (Ahyong 2001). Overall dorsal colour light grey-brown with slightly mottled appearance. Carinae and grooves of carapace, and posterior margins of body somites black-brown. AS6 with dark green carinae. Telson with MD carina and carinae of primary teeth green; MD carina with proximal pair of dark spots. Uropodal endopod black-brown distally. Uropodal exopod with inner half black-brown, but with demarcation between inner and outer halves diffuse. A2 scale with outer distal margin black. Raptorial claw with depression of merus yellow, flanked proximally by scattered black crescent.

Measurements. Male (n = 2) TL 147–153 mm, female (n = 3) TL 152–200 mm. CI 300–343. A1 peduncle 0.86–0.97CL. A2 scale 0.63–0.73CL. Ahyong (2001) reported the largest known specimen at TL 262 mm from the east coast of Australia.

Distribution and Habitat. Indo-West Pacific from South Africa [KZN], Madagascar and Red Sea to Taiwan, Philippines, Vietnam, Japan, New Caledonia and Australia. Associated with sand and mud substrates from shallow coastal waters to estuaries; shore to 93 m.

Remarks. First recorded for South Africa by Barnard (1950) as *Harpiosquilla raphidae* Fabricius, 1798. Subsequently, Barnard (1955) rectified his previous identification for a specimen of *H. harpax* from Durban Bay. Although the accounts by Manning (1995) and Ahyong (2001) describe colour in life for *H. harpax* to include green, no preserved specimens examined herein show signs of green colouration. The retained colour is more a dark reddish-brown and appears faded where the green colouration is known to show.

Features thought to be diagnostic, such as the rostral plate and the length of the lateral carinae of the telson relative to the marginal carinae, have been found to be variable (Ahyong, 2001). Like the variation described by Ahyong (2001) for Australian specimens, the length and distinctiveness of the apical spine of the rostral plate is variable in South African specimens. The rostral plate of the lectotype bears a slender apical projection and usually sinuous margins. Although all South African specimens examined have an apical projection, the slenderness of the projection and the length of the base varies, showing intermediate rostral plate morphologies (Fig. 1.47C–E) like those found in Australian specimens. No variability was found in the relative length of the lateral carina to the marginal carina of the telson, as the lateral carina was distinctly less than a half of the marginal carina in all the specimens examined (Fig. 1.47J). The lateral carina has been previously recorded to exceed half the marginal carina by Ahyong (2001) for specimens from Australian waters.

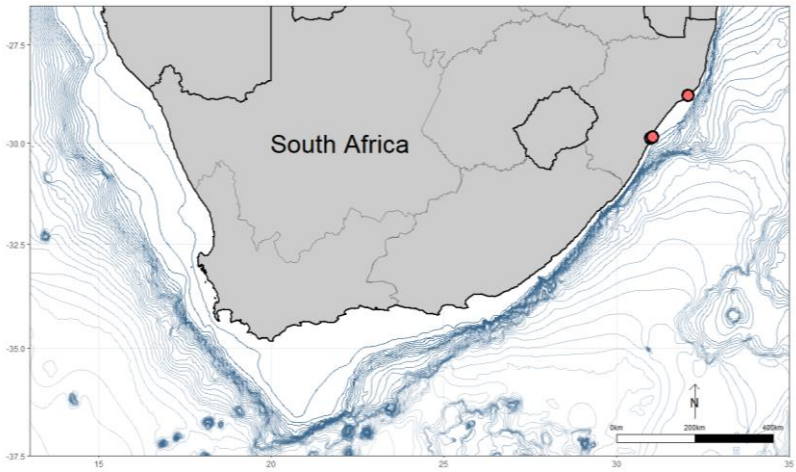

Figure 1.46. South African distribution of *Harpiosquilla harpax* (de Haan, 1844).

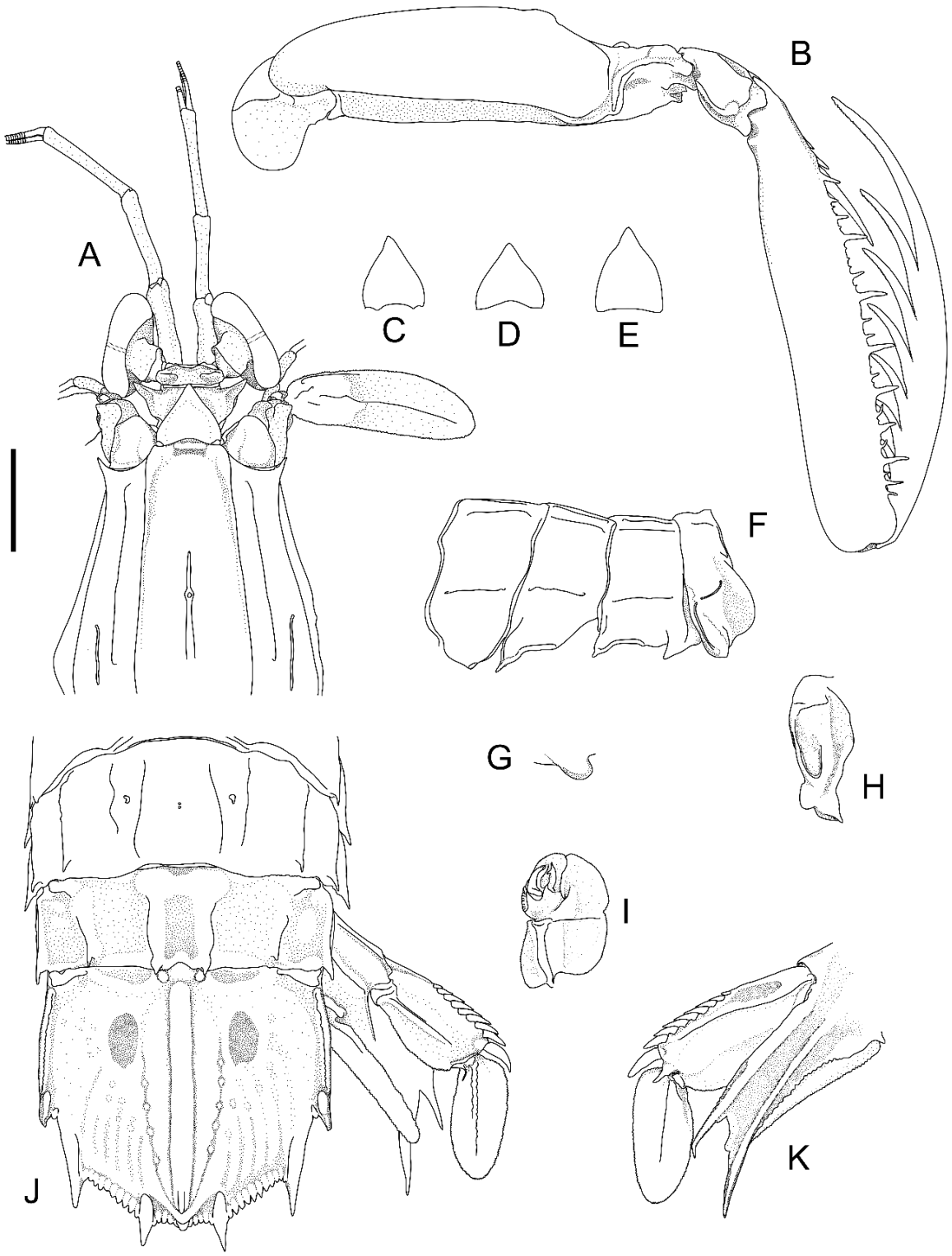

Figure 1.47. *Harpiosquilla harpax* (de Haan, 1844) **A–B, D, F–H, J–K** female TL 152 mm, SAMC–A019338; **E, I** male TL 147 mm, SAMC–A019447; **C** female TL 200 mm, SAMC–A001339. **A,** anterior cephalothorax, dorsal; **B,** right raptorial claw, lateral; **C–E,** rostrum variations, dorsal; **F,** TS5–8, right lateral; **G,** TS8 sternal keel, left lateral; **H**, TS5 lateral process, dorsal; **I,** right pleopod 1 endopod, anterior; **J,** AS5–6, telson and right uropod, dorsal; **K**, right uropod, ventral. Scale **A–K** = 10 mm.

Kempella Low and Ahyong, 2010

Kempella Low and Ahyong, 2010: 68. [Type species *Squilla mikado* Kemp and Chopra, 1921, by typification of replaced name]

Diagnosis. Dorsal integument pitted, rugose. Eye small, cornea strongly bilobed, width less than 0.30 CL. Carapace with anterolateral spines; with normal complement of carinae; MD carina distinct, uninterrupted at base of anterior bifurcation, branches of anterior bifurcation distinct, opening anterior to dorsal pit; posterolateral margin angular. Raptorial claw dactylus usually with 6 teeth; carpus dorsal carina undivided; merus without outer inferodistal spine. Mandibular palp 3-segmented. MXP1–4 with epipod. PLP1 endopod in adult males with posterior endite; hook process with distal point. TS5 lateral process a single slender spine directed laterally; ventral spine slender, directed ventrolaterally. TS6–7 lateral processes distinctly bilobed. AS1–6 with normal complement of carinae. AS1–5 with LT carinae bicarinate. Telson SM teeth with fixed apices; prelateral lobe present; dorsolateral surface without supplementary longitudinal carinae. Uropodal protopod inner margin crenulate.

Composition. ***Kempella mikado*** (Kemp and Chopra, 1921); *K. stridulans* (Wood-Mason, in Alcock, 1894).

Remarks. Both species of *Kempella* occur in the Indo-West Pacific but only one, *K. mikado,* is known from South Africa.

Kempella mikado (Kemp and Chopra, 1921)

Figures 1.48 – 1.49(A–I)

Squilla stridulans Kemp, 1913: 78 (Japanese specimens only, not *S. stridulans* Wood-Mason, 1895).

Squilla mikado Kemp and Chopra, 1921: 301, fig. 2 [type locality Misaki, Japan]. –Komai, 1927: 320. –Manning, 1965: 257–259, 262, pl. 12: fig. a.

Squilla zanzibarica Chopra, 1939: 143–148, figs. 2, 4 [type locality Zanzibar].

Oratosquilla mikado. –Manning, 1971b: 3.

Kempina zanzibarica. –Manning, 1981: 298–300, fig. 1.

Kempina mikado. –Manning, 1978c: 40, fig. 23a–c. –Moosa, 1986: 400–402, fig. 10. –Manning, 1991: 14; 1995: 24, 208. –Graham *et al.* 1993a: 24, 64; 1993b: 73.

Kempina cf mikado. –Cannon *et al.* 1987: 63.

Kempella mikado. –Low and Ahyong, 2010: 68.

Material examined. KZN: SAMC–A019343 1 female (TL 83 mm), off Kwadukuza, 29°34'00.0"S 31°39'00.0"E, 9 Sep 1964, 118 m, stat. NAD 40 P, UCT Ecological Survey, det. R.B. Manning; SAMC–A092090 1 male (TL 141 mm) 1 female (TL 138 mm), off Durban, 29°44'12.0"S 31°22'36.0"E, 22 August 1988, 154 m, stat. 30-08 Icelandic trawl, R. S. *Benguela* Natal Survey.

Other material examined. Mozambique: SAMC–A019450 1 female (TL 156 mm), Mozambique, depth unknown, donated 1949, ex. Lourenco Marques Museum, det. K. H. Barnard. SAMC–A041712 2 females (TL 183–187 mm), Mozambican Channel, 25°14'00.0"S 33°55'00.0"E, 6 Oct. 1994, depth unknown, stat. C00808-014-006-2193.

Diagnosis. Rostral plate with MD carina. Carapace with undivided portion of MD carina anterior to dorsal pit about 0.33 to 0.20 distance between dorsal pit and anterior margin. TS6 lateral process anterior lobe broad, trapezoid, apex acute; posterior lobe broad, triangular, anterior margin straight to slightly convex, apex acute. TS7 lateral process anterior lobe slender, trapezoid to spiniform, apex acute; posterior lobe broad, triangular, anterior margin straight to slightly convex, apex acute. Abdominal carinae spined as follows: SM 5–6, IM (1–2)3–6, LT 1–6, MG 1–5. Telson denticles SM 5–6, IM 12–16, LT 1. Uropodal exopod proximal segment with 10–13 movable spines on outer margin.

Colour in alcohol. Overall dorsal colour faded brown. AS2 with dark brown mid-dorsal patch. AS5 with pair of dark brown patches. Uropodal endopod dark distally.

Colour in life (Ahyong, 2001). Overall dorsal colour light brown. Carapace grooves and posterior margin on TS and AS somites dark brown. Carapace with orange posteromedian margin. AS2 with dark brown mid-dorsal patch. AS5 with pair of dark brown patches. Telson with carinae infused with pale orange. Uropodal protopod and exopod with orangish margins; exopod with dark brown proximal segment extending onto distal segment proximally.

Measurements. Male (n = 1) TL 141 mm, female (n = 5) TL 83–187 mm. CI 468–600. A1 peduncle 0.950–1.03CL. A2 scale 0.83–0.90CL.

Distribution and Habitat. From Zanzibar, Mozambique and South Africa in the Western Indian Ocean to Vietnam, Japan, Philippines, New Caledonia and Australia. Found on level sandy or muddy substrates in the nearshore to outer continental shelf. Recorded previously from depths of 30–804 m.

Remarks. Barnard (1950) reported on *Kempella mikado* (as *Squilla mikado*) from Mozambique, with the suggestion that the species would occur in South Africa waters. The species was first reported from South Africa by Manning (1969a), commenting on several differences from the Japanese specimen described by Manning (1965). Manning's (1969a) specimen is re-examined herein, and the suggested differences fall into the scope of variation described by Ahyong (2001) for specimens studied from Australia and Japan.

The present specimens agree well with Ahyong's (2001) recent account from Australia. The species can be distinguished from the similar *Kempella stridulans* by the presence of a MD carina for the rostral plate (Fig. 48B; 49A) and two dark patches on AS5. The present study is the first record of a spined IM carina on AS1, thereby, adding to the variation in abdominal carinae spination already documented for the IM carinae. Adults of *K. mikado* mature at a relatively large size. In specimens smaller than 55 mm TL, the anterior angles of the carapace and the mandibular palp are small and underdeveloped (Ahyong, 2001). However, in males the petasma only appears mature at sizes 65–80 mm. No juvenile specimens were examined in the present study.

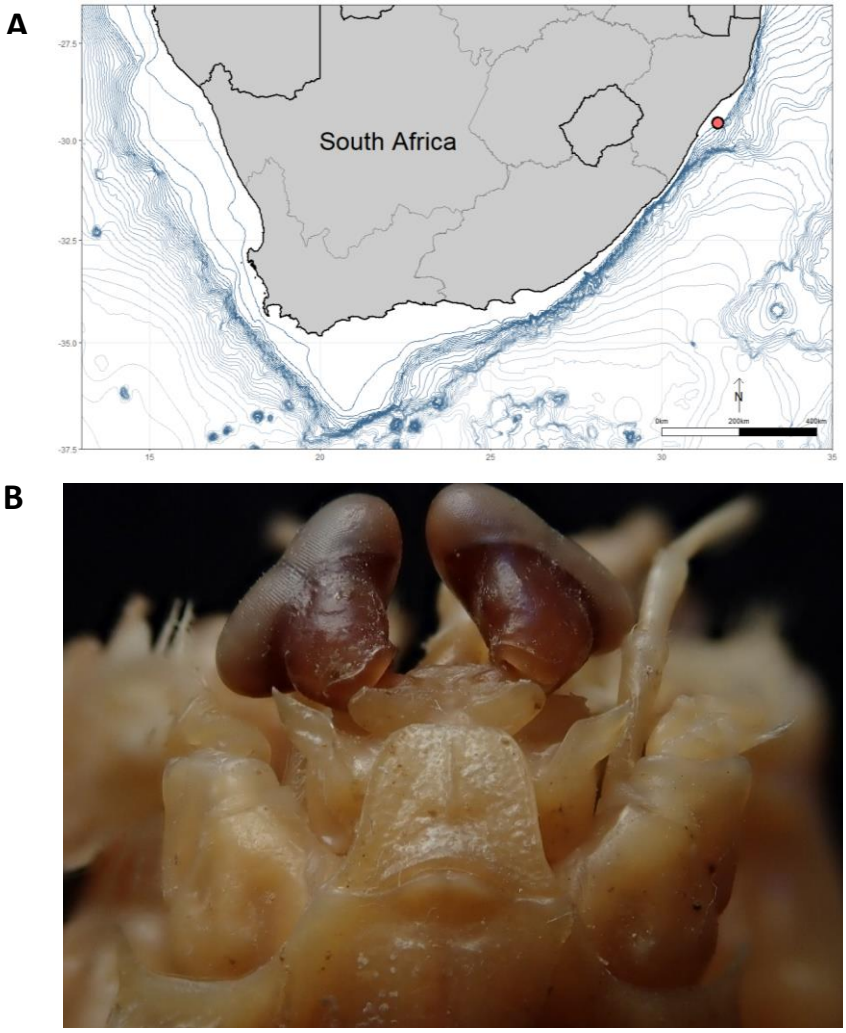

Figure 1.48. *Kempella mikado* (Kemp and Chopra, 1921). **A,** South African distribution; **B,** anterior cephalothorax showing median carina of rostrum, male TL 141 mm, SAMC–A092090.

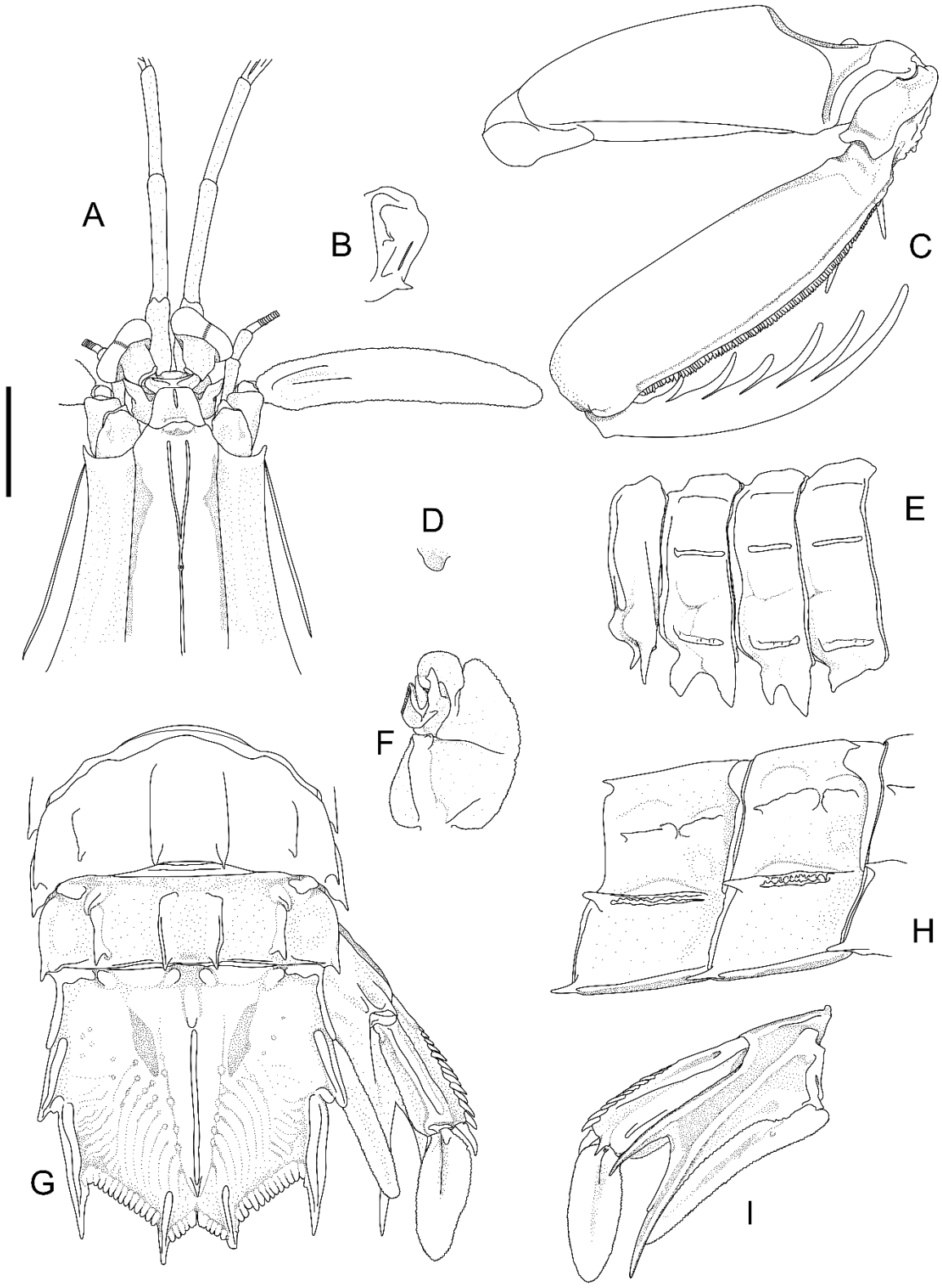

Figure 1.49. *Kempella mikado* (Kemp & Chopra, 1921) male TL 141 mm, SAMC–A092090. **A**, anterior cephalothorax, dorsal; **B**, TS5 right lateral process, anterior; **C,** right raptorial claw, lateral; **D,** TS8 sternal keel, left lateral; **E,** TS5–8, left lateral; **F**, right pleopod 1 endopod, anterior; **G,** AS5–6, telson and right uropod, dorsal; **H,** AS5–6, right lateral; **I,** right uropod, ventral. Scale **A–I** = 10 mm.

Miyakella Ahyong and Low, 2013

Miyakella Ahyong and Low, 2013: 99–100. [Type species *Squilla nepa* Latreille, in Latreille, Le Peletier, Serville and Guérin, 1828 by original designation. Gender feminine].

Diagnosis. Dorsal integument pitted, rugose. Eye with cornea bilobed, width less than 0.30 CL. Ocular scales separate. Carapace with anterolateral spines; with normal complement of carinae; MD carina distinct, uninterrupted at base of anterior bifurcation; branches of anterior bifurcation distinct, opening posterior to dorsal pit; posterolateral margin rounded. Raptorial claw dactylus with 6 teeth; carpus dorsal carina sinuous or with low irregular tubercles; merus outer surface with inferodistal spine. Mandibular palp 3-segmented. MXP1–4 with epipod. PLP1 endopod in adult male without posterior endite; hook process distally blunt. TS6–8 with distinct SM and IM carinae. TS5–7 lateral processes bilobed. AS1–6 with normal complement of carinae. Telson SM teeth with fixed apices; prelateral lobe present; dorsolateral surface without supplementary longitudinal carinae.

Composition. ***Miyakella holoschista*** (Kemp, 1911); ***M. nepa*** (Latreille, in Latreille, Le Peletier, Serville and Guérin, 1828).

Remarks: Species in the genus *Miyakella* are most similar to species of *Oratosquilla* and *Oratosquillina* that share a normal complement of carinae on the carapace and body (Fig. 1.3), the lateral processes of TS5–7 are bilobed and have a raptorial claw dactylus with six teeth and an outer inferodistal spine on the merus. Species of *Miyakella* differ from species of both these genera in having a dorsal pit enclosed by the branches of the median carina on the carapace and in lacking the posterior endite of pleopod 1 endopod in males. *Natosquilla* is the only other squillid genus known from South Africa to lack the posterior endite on the endopod of pleopod 1 in males. Both species of *Miyakella* are known from the Indo-West Pacific and occur on the east coast of South Africa.

Key to the South African species of *Miyakella*

1. Carapace with portion of MD carina between cervical groove and anterior bifurcation (Fig. 1.53C) simple, not bicarinate. AS4 with SM carinae (Fig. 1.53I) usually armed posteriorly.....***M. nepa***

– Carapace with portion of MD carina between cervical groove (Fig. 1.51C) finely bicarinate. AS4 with SM carinae (Fig. 1.51F) unarmed posteriorly……***M. holoschista***

Miyakella holoschista (Kemp, 1911)

Figures 1.50 – 1.51 (A–F)

Squilla holoschista Kemp, 1911: 97 [type locality Madras intertidal]. –Kemp, 1913: 64, pl. 4, figs. 50–53. –Barnard, 1950: 849, fig. 2b.

Oratosquilla holoschista. –Manning, 1969a: 15.

Miyakea holoschista. –Manning, 1995: 214, figs. 130c, d, 131a–c. –Ahyong, 2001: 279 (list).

Miyakella holoschista. –Ahyong and Low, 2013: 99–100.

Material examined. KZN: SAMC–A001326 1 female (TL 61 mm), off south head of Tugela River, 29°13'59.9"S 31°30'00.0"E, 16 Jan 1901, 22–26 m, stat. PF 11428, S.S. *Pieter Faure*, det. K. H. Barnard (1950); SAMC–A019342 1 female (TL 75 mm), Durban, stat. NAD 40W, 29°34'00.0"S 31°39'00.0"E, 9 Sep 1961, 118 m, UCT Ecological Survey, det. R. B. Manning (1969a).

Diagnosis. Carapace with portion of MD carina between cervical groove and anterior bifurcation finely bicarinate, not simple. AS4 SM carinae unarmed posteriorly. Abdominal carinae spined as follows: SM 5-6, IM 3–6, LT (1–2) 3–6, MG 1–5. Telson denticles SM 2–3, IM 9–11, LT 1. Uropodal exopod proximal segment outer margin with 8–10 movable spines.

Colour in alcohol. Completely faded.

Colour in Life. Overall green colouration, closely resembling *M. nepa* being grey-green (Kemp, 1913). Carinae and grooves of carapace, carinae and posterior margins of abdominal somites dark green. Telson with median carina and carinae of primary teeth dark green. Uropodal exopod proximal segment yellow.

Measurements. Female (n = 2) TL 61–75 mm. CI 660–705. A1 peduncle 0.74–0.80CL. A2 scale length 0.55–0.56CL. Anterior carapace width 0.48–0.52CL.

Distribution and Habitat. The Indo-West Pacific from South Africa to the east coast of India, Sri Lanka, Sunda Straits, and Vietnam. Found in shallow water on level sand or mud substrates; 22–118 m (present study).

Remarks. Both specimens of *M. holoschista* examined have been included in Barnard's (1950) and Manning's (1969a) reviews of stomatopod fauna. The present specimens agree in most respects with Kemp's (1911; 1913) accounts. Manning (1969a) describes several differences to the original species description. These differences include a larger eye, and structural differences in the raptorial claw carpus and the lateral processes of TS5 and 6 and these observations are confirmed in the present study. The cornea of the South African specimens appears larger than in the Indian specimens examined by Kemp (1913) with corneal index 660–705, compared to 800–900 in Kemp's large specimens. Two tubercules are present on the carpus of the raptorial claw and while the posterior lobe of the TS5 lateral process appears slenderer, the anterior lobe of TS6 lateral process appears more truncate.

Misidentifications of *Miyakella holoschista* as *M. nepa* are common throughout the literature (Stebbing, 1917; Gravier, 1937; Manning, 1995). *Miyakella holoschista* can be distinguished by the form of the MD carina of the carapace being finely bifurcate anteriorly in front of the cervical groove. The species also has never been recorded to have spined SM carinae of AS4 which is a diagnostic feature of *M. nepa*. In living material, the presence of the dark patches on AS2 and 5 aids in distinguishing the two species. *Miyakella nepa* is frequently observed with these patches, while in *M. holoschista* they are always absent (Kemp, 1913). No male collected from South African waters was available for examination. Both female specimens examined herein did not exhibit abdominal spination of LT carinae on AS1, as previously recorded. The proximal segment of the uropodal exopod displayed 9 movable spines in the present series.

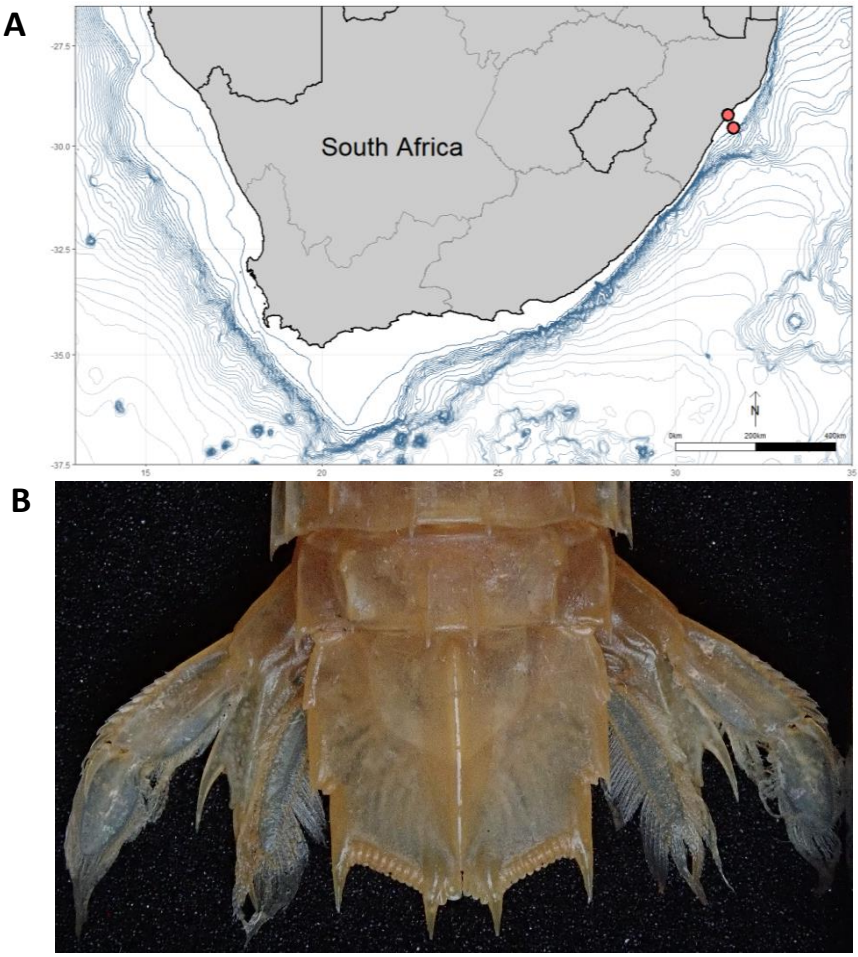

Figure 1.50. *Miyakella holoschista* (Kemp, 1911). **A,** South African distribution; **B,** telson SM teeth variation, dorsal, female TL 75 mm, SAMC–A019342.

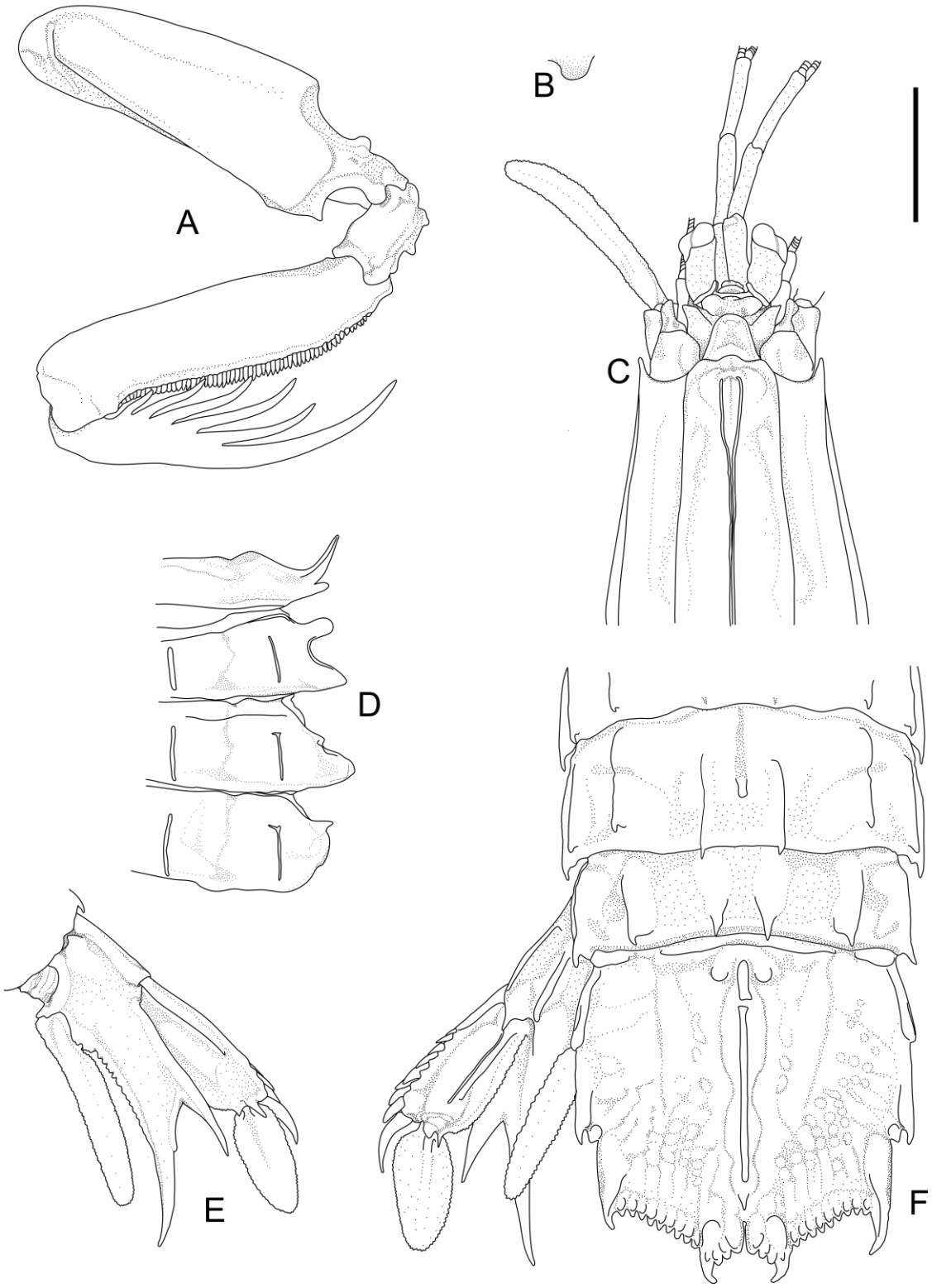

Figure 1.51. *Miyakella holoschista* (Kemp, 1911) female TL 61 mm. SAMC–A001326. **A,** right raptorial claw, lateral; **B,** TS8 sternal keel, right lateral; **C,** anterior cephalothorax, dorsal; **D,** TS5–8, right dorsal; **E,** left uropod, ventral; **F,** AS5–6, telson and left uropod, dorsal. Scale **A–F** = 5 mm.

Miyakella nepa (Latreille, in Latreille, Le Peletier, Serville and Guérin, 1828)

Figures 1.52 – 1.53(A–I)

Squilla nepa Latreille, in Latreille, Le Peletier, Serville and Guérin, 1828: 471 [type localities in Xiamen, China, by neotype selection (Ahyong, 2001)]. –Haswell, 1882: 208–209. – Kemp, 1913: 3, 10, 22, 30, 195, pl. 4: fig. 49. – Holthuis, 1941: 245–246. –Stephenson, 1953a: 41. –Stephenson and McNeill, 1955: 243. –Manning, 1968a: 31–32, fig. 10.

Squilla Edwardsi Giebel, 1861: 320 [type locality Insel Banka, Indonesia].

Squilla laevis. –Stephenson, 1960: 61 (not *Squilla laevis* Hess, 1865).

Squilla wood-masoni. –Stephenson and McNeill, 1955: 244 (not *Squilla woodmasoni* Kemp, 1911).

Oratosquilla nepa. –Manning, 1968a: 31–32, fig. 10; 1971b: 3. –Moosa, 1986: 410; 1991: 212. –Manning, 1991: 12.

Miyakea nepa. –Manning, 1995: 216, figs. 130a, b, 131d, e, 132–134, pl. 37. –Ahyong *et al*. 1999: 47, 52, fig. 6a–d. –Ahyong, 2001: 279–281, fig. 136.

Miyakella nepa. –Ahyong and Low, 2013: 99–100.

Material examined. KZN: SAMC–A019449 1 female (TL 75 mm), Durban, 29°53’05.5”S 30°59’59.9”E, depth and date unknown, ex. Albany Museum Collection No. 255, coll. R.A. Hunter. **Eastern Cape**: SAMC–A079461 1 male (TL 160 mm), banks of Mtakatya River, 31°51’03.6”S 29°16’24.5”E, Oct 1975, river bank, coll. Mr. J. Gardiner Alexandria.

Diagnosis. Carapace with portion of MD carina between cervical groove and anterior bifurcation simple, not finely bicarinate. AS4 with SM carinae posteriorly spined. Abdominal carinae spined as follows: SM (3–4)6 (usually 4–6), IM 3–6, LT (1–2)3–6, MG 1–5. AS2 and 5 with dark transverse mid-dorsal patch. Telson denticles SM 2–3, IM 7–11, LT 1. Uropodal exopod outer margin with 8–10 movable spines.

Colour in alcohol. Completely faded.

Colour in life (Ahyong, 2001). Overall dorsal colour olive grey-green. Carinae and grooves of carapace, carinae and posterior margins of body somites dark green. Telson with MD carina and carinae of primary teeth dark green with dark transverse band medially. Uropodal protopod with terminal spines pink; exopod distal segment dark blue-green distally; exopod proximal segment yellow with dark inner proximal infusion.

Measurements. Female (n = 1) TL 75 mm. CI 550. A1 peduncle 0.91CL. A2 scale 0.58CL. Anterior carapace width 0.55CL. Kemp (1913) reported specimens up to TL 166 mm.

Distribution and Habitat. South Africa and Mozambique through to Vietnam, Taiwan, Philippines, New Caledonia, French Polynesia, and Australia. Found predominantly on level sandy to mud substrate in shallow water, shore to 37 m.

Remarks. The specimens from South Africa agree well with the newly erected neotype (Ahyong, 2001), as well as previously published accounts (Kemp, 1913; Manning, 1968a; 1995). Although not visible on the present

ethanol stored material, the dark transverse patches positioned mid-dorsally on abdominal somites 2 and 5 are a diagnostic feature which can distinguish *M. nepa* from *M. holoschista* (Kemp, 1911).

There is a discrepancy in colour accounts between Barnard's (1950) first record of the species from South Africa and more recent species accounts from Madagascar (Manning, 1968a) and Australia (Ahyong, 2001). While Manning (1968a) agrees with Ahyong's (2001) colour description, Barnard (1950) records overall dorsal colour to be pale biscuit with orange to red on carapace keels, abdominal somites and telson. A similar colour combination is mentioned in Kemp's (1913) account of the species, where a small portion of the specimens from Thoothukudi, India, preserved in formalin showed a similarly positioned 'rosy red' to purple colouration.

The variation in rostral plate shape and abdominal spination for *M. nepa* is well-documented (Manning, 1968a; Ahyong, 2001). The rostral plate has been recorded to be either subtruncate or triangular with a rounded or transverse apex for Madagascan specimens (Manning, 1968a). Both specimens examined herein have a subtruncate rostrum with rounded apex (Fig. 1.53). The presence of spines on the SM carina of AS3 has only been recorded for specimens of *M. nepa* from Madagascar (Manning, 1968a) and some specimens from Singapore (Ahyong, 2001). All other accounts, including the present series, do not report such spination. Further variation in abdominal spination has been observed for Australian material, where the SM carina of AS4 is unarmed or spines are only present on one side of the AS4 (Ahyong, 2001).

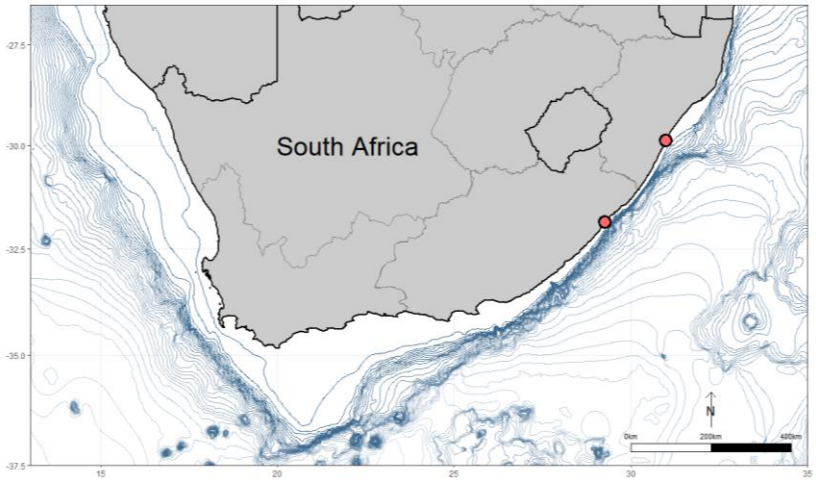

Figure 1.52. South African distribution of *Miyakella nepa* (Latreille, in Latreille, Le Peletier, Serville and Guérin, 1828).

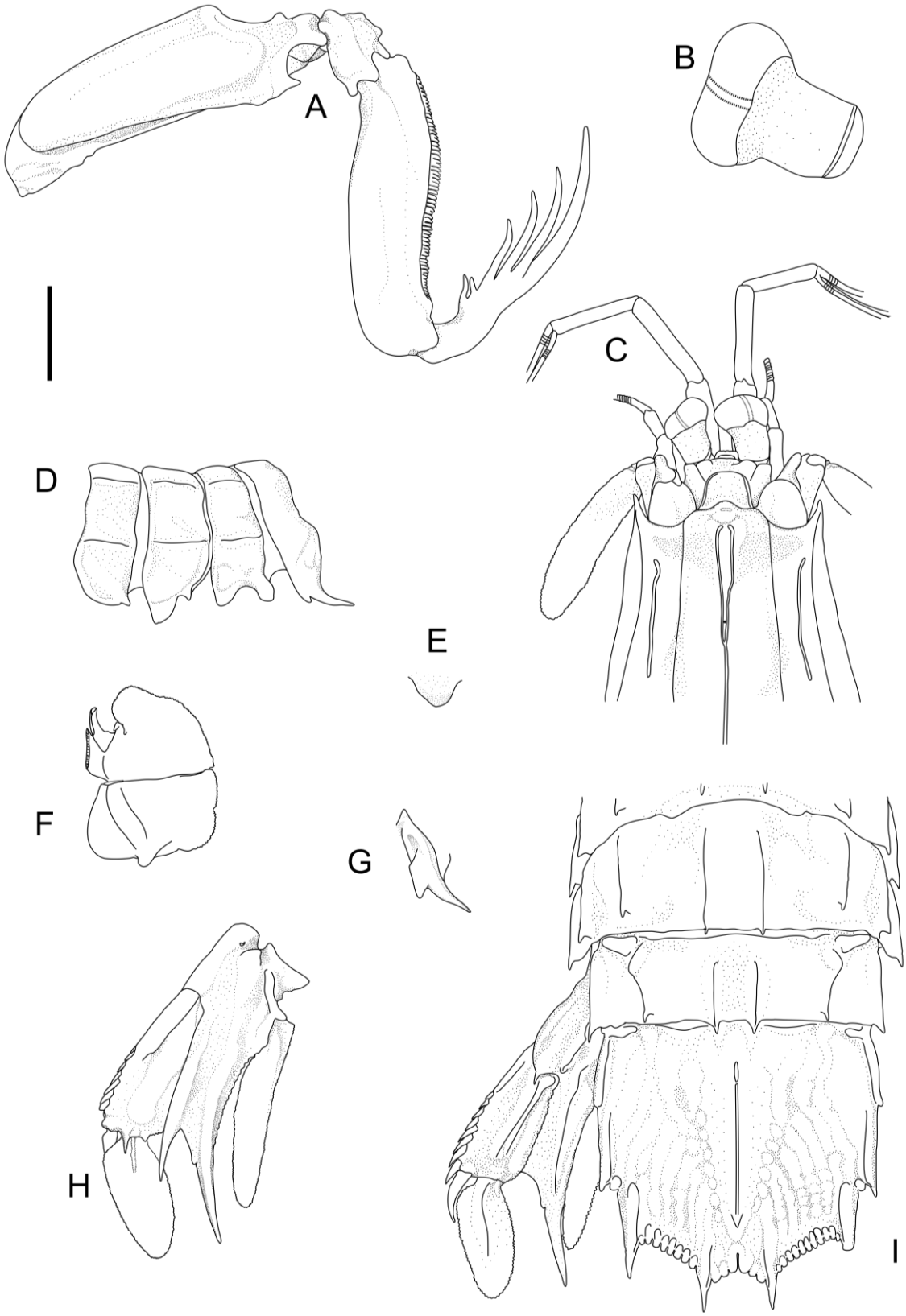

Figure 1.53. *Miyakella nepa* (Latreille in Latreille, Le Peletier, Serville & Guérin, 1828) **B, E–F** male TL 160 mm, SAMC–A079461; **A, C–D, G–I** female TL 75 mm, SAMC–A019449. **A,** right raptorial claw, lateral; **B**, left eye, lateral; **C,** anterior cephalothorax, dorsal; **D**, TS5–8, right lateral; **E,** TS8 sternal keel, left lateral; **F**, right pleopod 1 endopod, anterior; **G,** TS5 lateral process, dorsal; **H,** right uropod, ventral; **I**, AS4–6, telson and left uropod, dorsal. Scale **A–I** = 5 mm.

Natosquilla Manning, 1978c

Natosquilla Manning, 1978c: 40–41, fig. 25. [Type species *Natosquilla investigatoris* Lloyd, 1907 by original designation]

Diagnosis. Dorsum smooth. Cornea bilobed, width at least 0.28 CL in adults, set obliquely on stalk. Anterior margin of ophthalmic somite usually forming three denticles. Carapace broad with normal complement of carinae; suppressed or indistinct anterior bifurcation of MD carina; anterolateral spines of carapace small, not extending past base of rostral plate. Rostral plate as long as basal width, occasionally with small apical spine. Mandibular palp present. 4 epipods present. PLP1 endopod in adult males without posterior endite. Raptorial claw dactylus with 10–18 teeth; carpus dorsal carina strongly tuberculate. TS5 lateral process bilobed; anterior lobe an anterolaterally curved spine; posterior lobe a small spine directed laterally. TS6–7 lateral processes bilobed; anterior lobe much smaller than posterior lobe. AS1–5 each with normal complement of carinae, abdominal spination as follows: SM 5–6, IM 3–6, LT 2–6. Telson with SM teeth with fixed apices; denticles as follows: SM 3–8, IM 8–11, LT 1; prelateral lobe longer than margin of LT teeth; dorsolateral surface without supplementary LT carinae. Uropodal protopod with inner margin distinctly tuberculate or crenulate, occasionally smooth.

Composition. ***Natosquilla investigatoris*** (Lloyd, 1907).

Natosquilla investigatoris (Lloyd, 1907)

Figures 1.54 – 1.55(A–H)

Squilla investigatoris Lloyd, 1907: 7, 10–11 [type locality southeast coast of Arabia 200 m]. –Kemp, 1913: 80, pl. 6, figs. 67, 68. –Kemp and Chopra, 1921: 298. –Chopra, 1939: 151, fig. 6. –Barnard, 1950: 849–859.

Natosquilla investigatoris. –Manning, 1978c: 40–41, fig. 25.

Material examined. Western Cape: SAMC–A008485 4 females (TL 82–89 mm), 2 males (TL 90–91 mm), False Bay, 28 Dec 1944, surface collection, coll. Dr. Molteno and Roux, det. K.H. Barnard.

Other material examined. Tanzania: SAMC–A079523 6 females (TL 71–77 mm), 6 males (TL 65–77 mm), east of Jibondo Island, 8°06'37.2"S 39°58'47.4"E, 30 Jul 2003, depth unknown, stat. Alg 122 M001, coll. Kerry Sink.

Diagnosis. See genus above.

Colour in alcohol. Amber brown, fresher specimens are dark to tan-brown. Barnard (1950) described same specimens as overall grey, keels dark, telson dark brown. Uropodal endopod, protopod and proximal half of distal segment of exopod dark brown to black. Distal half of the distal segment of the uropodal exopod red.

Colour in life. Described by Lloyd (1907) as very variable; overall “sand colour with minute black spots”. Telson and uropods show “a blue-black colouration irregular in its distribution”.

Measurements. Male (n = 8) TL 71–91 mm, female (n = 10) TL 65–89 mm. CI 280–340.

Distribution and Habitat. South coast of Arabia, Persian Gulf, Zanzibar, Seychelles, South Africa and now from off mainland Tanzania; 183–220 m.

Remarks. First described by Lloyd (1907) from the south coast of Arabia at depths around 200 m, Barnard reported large numbers from Table Bay on the west coast of South Africa. The South African specimens examined herein were examined and reported on by Barnard (1950). The recently collected specimens from the coast of Tanzania agree well with the South African specimens, as well as with Lloyd's original description and Manning's (1978c) diagnosis of the genus *Natosquilla*. *Natosquilla* most closely resembles the genera *Erugosquilla* and *Busquilla* but is easily distinguished by the number of teeth on the dactylus of the raptorial claw being 10–18, instead of 5 or 6–7.

The variation in number of teeth on the dactylus of the raptorial claw has been well-documented as a characteristic feature of the genus (Barnard, 1950). Among the six South African specimens examined the teeth number ranged between 11 and 18. Moreover, three of the females exhibit an asymmetrical teeth number having 15/16, 17/16 and 18/16 teeth on the left and right dactyli respectively. The present Tanzanian specimens ranged in teeth number between 12 and 17 with four specimens with asymmetrical teeth number having 14/12, 17/16, 16/17, 16/17 on the dactyli. The small apical spine on the rostral plate observed in a single female of TL 88 mm (Fig. 1.55D) is the first record of this variation for the species.

The eye is another distinguishing feature of the genus (Fig. 1.55B, C). Ahyong (2001) uses the relative lengths of the cornea to the carapace to distinguish *Eugosquilla* from *Natosquilla*, the former having an eye with cornea less than third carapace length in adults, while *Natosquilla* is supposed to have the cornea greater than or equal to a third carapace length. Although the present study found one specimen with cornea width 0.28 CL, all other examined specimens of *N. investigatoris* agreed with Ahyong's (2001) account of the genus. The large eye has been speculated to be adapted for surface swarming behaviour (Manning, 1978c). The known species behaviour of forming pelagic swarms is corroborated by the account given in Barnard (1950) of "during darkness the surface was swarming with them" from northwest of Table Bay, Western Cape, South Africa.

The species appears to mostly inhabit the north-western Indian Ocean, so that the single report from Table Bay on the west coast of South Africa represents an extraordinary distributional outlier with no other records from the South African south and east coasts. Table Bay is a part of the transitional zone between the Indian and Atlantic Oceans and experiences anticyclic eddies called Agulhas rings which retroflects at the point of the Agulhas Current, transporting Indian Ocean water in a north-westerly direction into the Benguela Current system along the west coast of South Africa (Sink *et al.* 2019). This process could facilitate the occupation of Table Bay by the typically tropical species. It would be interesting to investigate how far up the west coast of Africa the *N. investigatoris* population extends.

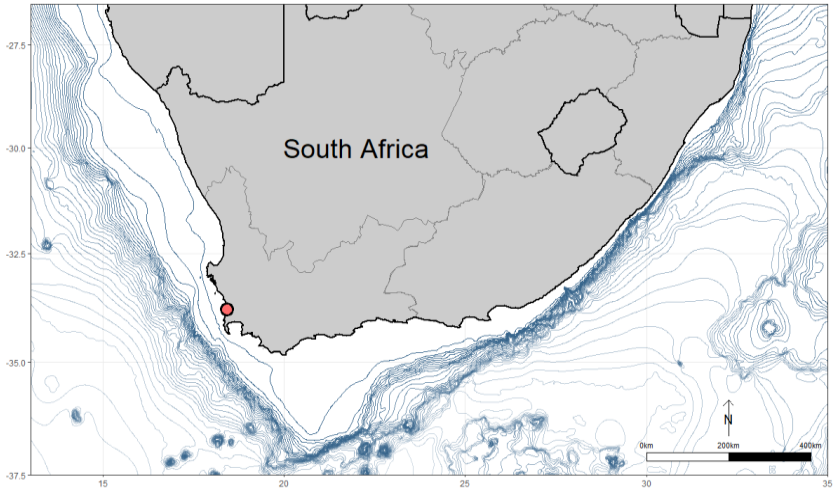

Figure 1.54. South African distribution of *Natosquilla investigatoris* (Lloyd, 1907).

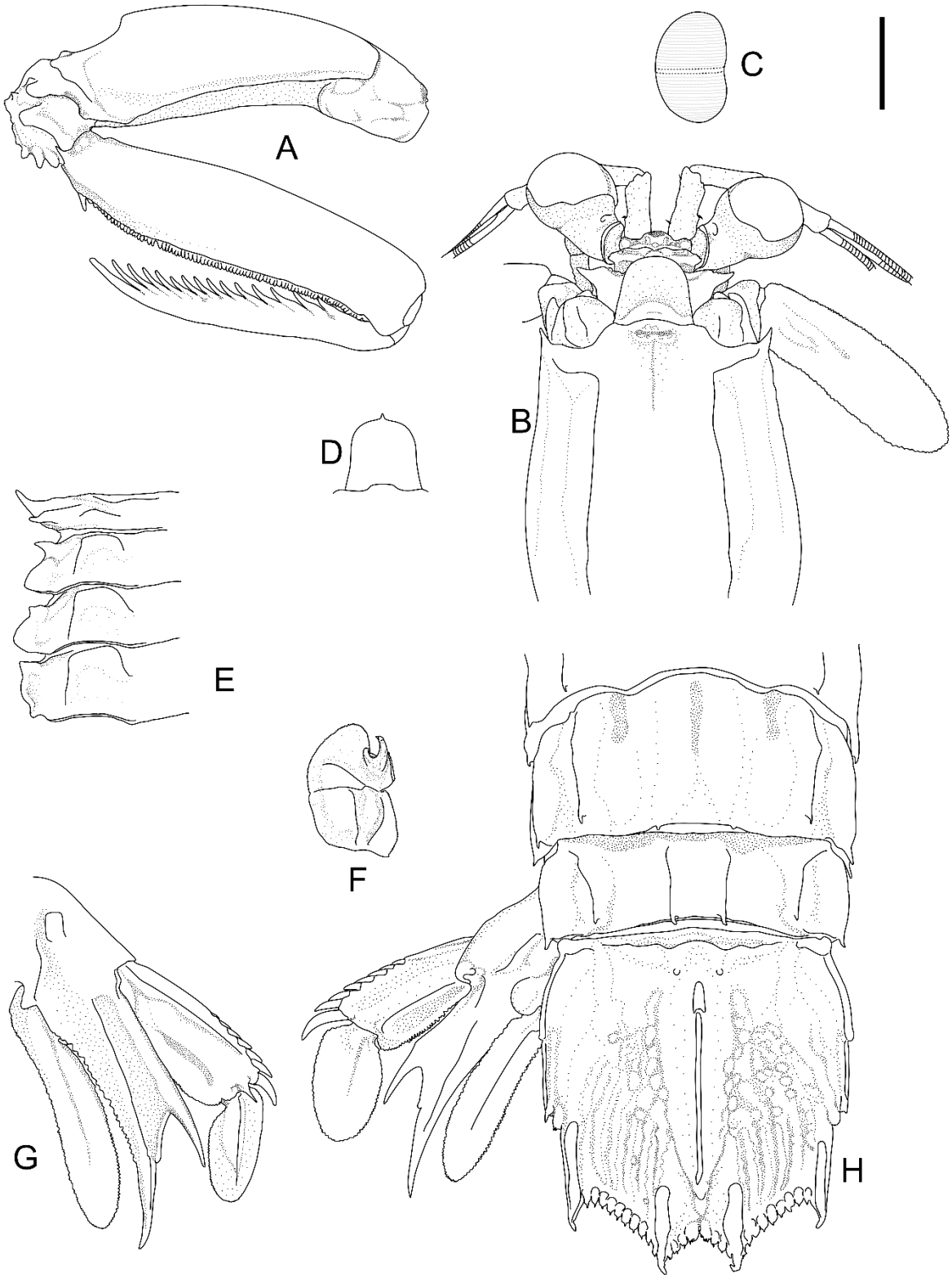

Figure 1.55. *Natosquilla investigatoris* (Lloyd, 1907) **A–B, E, G–H** female TL 89 mm, SAMC–A008485; **C, D, F** male TL 75 mm, SAMC–A079523. **A,** left raptorial claw, lateral; **B,** anterior cephalothorax, dorsal; **C,** left eye, anterior; **D,** rostrum variation, dorsal; **E,** TS5–8, left dorsal; **F,** left pleopod 1 endopod, anterior; **G,** left uropod, ventral; **H,** AS5–6, telson and left uropod, dorsal. Scale **A–H** = 5 mm.

Oratosquilla Manning, 1968b

Oratosquilla Manning, 1968b: 120, 133. [Type species *Squilla oratoria* De Haan, 1844, by original designation. Gender feminine].

Diagnosis. Dorsal integument scattered with pits. Eye with cornea strongly bilobed, distinctly broader than stalk and set obliquely, cornea width less than 0.30 CL. Ocular scales separate. Carapace with anterolateral spines; with MD, LT, MG and reflected marginal carinae; MD carina distinct, usually uninterrupted at base of anterior bifurcation (variable in *O. fabricii*); branches of anterior bifurcation distinct, opening anterior to dorsal pit; posterolateral margin rounded. Raptorial claw dactylus with 6 teeth, outer margin without basal notch; carpus dorsal carina bi- or tri-tuberculate; merus outer inferodistal angle with or without spine. Mandibular palp present. MXP1–4 with epipod. PLP1 endopod in adult males with posterior endite; hook process blunt distally. TS6–8 with SM and IM carinae. TS5–6 lateral processes bilobed. AS1–5 with SM, IM, LT and MG carinae. Telson SM teeth with fixed apices; prelateral lobe present; dorsolateral surface with curved rows of shallow pits; without supplementary LT carinae; ventrolateral stridulatory carinae present. Uropodal protopod inner margin crenulate.

Composition. *Oratosquilla fabricii* (Holthuis, 1941); ***O. mauritiana*** (Kemp, 1913); *O. oratoria* (De Haan, 1844).

Remarks. One species occurs in South African waters, but no material was available to the present study.

Oratosquilla mauritiana (Kemp, 1913), **literature record**

Figure 1.56

Squilla mauritiana Kemp, 1913: 68 [type locality Mauritius]. –Manning, 1968a: 28–29, fig. 9.

Squilla juxtaoratoria Ward, 1942: 55.

Oratosquilla mauritiania. –Manning, 1968b: 135 (list). –Ahyong, 2001: 283 (key).

Material examined. No material available for study.

Previously examined South African material. Eastern Cape: SAMC–A018815 2 females (TL 130 mm) Algoa Bay, 11–29 m, stat. TBD.PM 3 and 137, coll. R.V. Thomas B. Davie.

Diagnosis. Dorsum smooth, not punctate. A1 somite dorsal processes triangular, apices acute, directed anterolaterally. Rostral plate appearing elongate, slightly broader than long with upturned lateral margins; apex rounded. Carapace with anterior bifurcation of MD carina uninterrupted basally and opening anterior to the dorsal pit. Raptorial claw merus with outer inferodistal spine; dactylus with 6 teeth. Mandibular palp present. 4 epipods present. TS6 lateral process distinctly bilobed: anterior lobe slender and short; triangular; apex sharp; posterior lobe broad and long, triangular; apex sharp. TS7 lateral process bilobed with anterior lobe small, obtuse, apex blunt; posterior lobe much larger, triangular, apex blunt. Abdominal carinae spined as follows: SM 4–6, IM 2–6, LT 1–6, MG 1–5. Telson longer than broad with prelateral lobe present; denticles rounded SM 4–5, IM 7–8, LT 1. Uropodal exopod proximal segment outer margin with 9 movable spines.

Colour in alcohol. Madagascan specimens described as largely faded except for dark colouration of uropods; uropodal exopod with proximal segment distal half dark, inner margin on distal segment with proximal half dark; endopod distal half dark (Manning, 1968a). Colour in life unknown.

Measurements. Female (n = 2) TL 130 mm. The specimen recorded from South Africa (Kensley and Buxton, 1984) is the largest reported specimen of the species at TL 130 mm.

Distribution. Only known from Western Indian Ocean: Madagascar, Europa Island, Mauritius and South Africa; shore to 29 m (present study).

Remarks. Distinguished from other species in the genus by the combination of smooth dorsum, armed SM carinae of AS4–6, armed outer inferodistal margin of merus of raptorial claw and blunt anterior lobe of TS7 lateral process. Manning (1968a) first described *O. mauritiana* from a Madagascan specimen which shared features with two Mauritian specimens originally thought to be of *O. oratoria* Kemp, 1913. Furthermore, Ward's (1942) species description of *Squilla juxtaoratoria* from Mauritius was found to be a synonym of *O. mauritiana* (Manning, 1968a).

The only South African record of *O. mauritiana* by Kensley and Buxton (1984) is a sparse account merely stating that the species is a new record for South Africa. While it is possible that the identification is correct, given previous distributional records of the species from the Western Indian Ocean, the account remains doubtful. The specimen deposited in the South African Iziko Museum as the basis of record could not be found and must be considered lost.

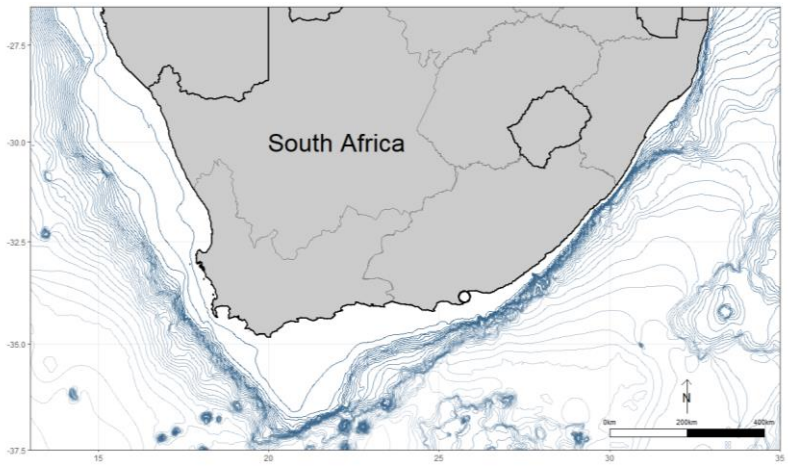

Figure 1.56. South African distribution of *Oratosquilla mauritiania* (Kemp, 1913). Species record not verified in present study indicated by the white circle.

Pterygosquilla Hilgendorf, 1890

Pterygosquilla Hilgendorf, 1890: 172. [Type species *Pterygosquilla laticauda* Hilgendorf, 1890, by monotypy].

Diagnosis. Eye with cornea strongly bilobed, width less than 0.30 CL. A1 somite dorsal processes with short slender apices, directed anterolaterally. Ocular scales present as short anteriorly directed spines or rounded projections. Carapace with anterolateral spines; dorsal carinae reduced, with reflected MG and reduced LT carinae; median posterior margin straight or slightly concave; posterolateral margin rounded. Raptorial claw dactylus with 6 or more teeth; carpus with short undivided dorsal carina; merus without outer inferodistal spine. Mandibular palp absent. MXP1–4 with epipod. PLP1 endopod in adult males with posterior endite; hook process with distal point. TS5–7 lateral process single. AS1–5 with or without SM carina; with IM, LT and MG carinae. AS6 with SM, IM, LT carinae. Telson subquadrate; dorsolateral surface with low SM swelling; SM teeth with movable apices; IM and LT teeth distinct; prelateral lobe absent; ventrolateral carinae absent. Uropodal protopod inner margin crenulate.

Composition. *Pterygosquilla armata* (H. Milne Edwards, 1837); ***P. capensis*** Manning 1969a; *P. gracilipes* (Miers, 1881); *P. schizodontia* (Richardson, 1953).

Remarks. Until now, *Pterygosquilla* was distinguished from other members of the Squillidae by the combination of reduced carapace carinae, movable apices of the SM teeth of the telson and spiniform ocular scales. However, the present series of *Pterygosquilla capensis* found some variation in ocular scale morphology. As some specimens exhibit rounded ocular scales, the spiniform morphology can no longer be used as a feature to distinguish the squillid *Pterygosquilla*. The genus is most similar to *Meiosquilla* Manning, 1968b, *Distosquilla* Manning, 1977b and *Squilloides* Manning, 1968b, sharing reduced carapace carination, a telson with indistinct MG carina and lacking a prelateral lobe, ventrolateral carina of the telson and a mandibular palp. *Pterygosquilla* is distinguished from the Squillidae genera from within South Africa that have the cornea broader than stalk, share a single process on TS5, lack a MD carina on the carapace and telson SM teeth with movable apices by having anterolateral spines of the carapace. Species of *Pterygosquilla* are restricted to the temperate waters of the southern hemisphere, occurring in South Africa, New Zealand and southern South America.

Pterygosquilla capensis Manning, 1969a

Figures 1.57(A–B) – 1.58(A–K)

Squilla armata. –Stebbing, 1902: 45; 1910:.405. –Tattersall, 1913: 879. –Balss, 1916: 51. –Calman, 1923: 1. –Barnard, 1950: 845, fig. 1d, f. –Lebour, 1954: 231, fig. 6 [larvae].

Squilla armutus. –Stebbing, 1914: 257, 300.

Pterygosquilla armata capensis Manning, 1969a: 8–13, figs. 2, 3.

Pterygosquilla capensis. –Ahyong, 2012: 92 (key).

Material examined. Northern Cape: SAMC–A079447 1 male (TL 55 mm), off Holgatrivier mouth, 28°59.90’S 16°38.87’E, 18 Jun 1986, 56 m, bottom trawl, SFI. SAMC–A079477 1 female (TL 49 mm), west coast, 31°09'00.0"S 17°19'60.0"E, 28 June 1987, 177 m, stat. A5901-054-037-2317. **Western Cape**: SAMC–A019431, 1 female (TL 138 mm), False Bay, 33°52'59.9"S 18°27'00.0"E, depth and date unknown, coll. Duminy; SAMC–A001343, 1 male (TL 155 mm), Cape Town docks, 33°52'59.9"S 18°22'59.9"E, depth unknown, Oct 1911, coll. L. Peringuey; SAMC–

A079593, 2 females (TL 80 mm), False Bay 34°23'17.9"S 18°40'18.1"E, 31 Jan 1959, stat. FAL 351F; SAMC–A045105, 1 female (TL 66), 4 males (TL 47–72 mm), 32°04'59.9"S 18°06'00.0"E, 21 Sep 1960, rock dredge at 108 m, coll. R. B. Manning; SAMC–A012008, 1 male (TL 126 mm), Paarden Island, 34°02'59.6"S 23°03'00.0"E, depth unknown, Aug 1963, coll. K. Emerson; SAMC–A079438 1 female (TL 110 mm) Paarden Eiland Power Plant outlet, Cape Town, Jul 1973, shore; SAMC–A079407 1 female (TL 115 mm) Table Bay power plant, 33°54'14.7"S 18°27'37.4"E, 26 June 1974, shore; SAMC–A079522 1 female (TL 74 mm), Table Bay, 33°49'00.1"S 18°27'00.0"E, 23rd May 1980, depth unknown, stat. TBD 74, dredge; SAMC–A079403 1 female (TL 96 mm), Oliphantsbos Beach, 34°15'25.5"S 18°22'52.1"E, 1981, shore, coll. W. R. Liltved; SAMC–A079405 6 males (TL 36–71 mm), 5 females (TL 32–64 mm), Danger Bay, Saldanha, 33°00'12.0"S 17°53'12.0"E, 22 May 1983, 0–50 m, stat. A 009-54-01, RMT-8, DSF; SAMC–A079417 2 males (TL 41 mm), 1 female (TL 35 mm), Saldanha, 33°02'26.4"S 17°46'28.8"E, 22 May 1983, 0–100 m, stat. A 009-54-02, RMT 8 and Neuston, SFI. SAMC–A79471 1 male (TL 80 mm), off Saldanha, 33°07'00.0"S 17°59'24.0"E, 23 May 1983, 40 m, stat. A 009-56-01A, RMT 8, DSF; SAMC–A079402 1 male (TL 81 mm), Misty Cliffs, Cape Town, 34°11'57.6"S 18°17'13.2"E, 26 May 1983, 100 m, stat. A 009-72-02, RMT 8 and Neuston, SFI; SAMC–A079408 1 female (TL 82 mm), off Hout Bay, 34°02'48.0"S 18°15'41.4"E, 26 May 1983, depth unknown, stat. A 009-70-01, SFI; SAMC–A079406 1 male (TL 78 mm), off Hout Bay, 34°05'19.2"S 18°13'00.0"E, 26 May 1983, 100 m, stat. A 009-70-02, SFI; SAMC–A079419 1 male (TL 76 mm), Saldanha Bay, 33°07'00.0"S 17°59'24.0"E, 23 May 1983, 40 m, stat. A 009-56-01, RMT-8, SFI; SAMC–A077772 female (TL 79 mm), off De Hoop Nature Reserve, 35°43'00.0"S 20°55'00.0"E, 2 Jun 1988, 105 m, stat. A722; SAMC–A079478 1 male (TL 150 mm), off the Western and Eastern Cape border, 31°15'06.0"S 17°39'30.0"E, 6 Aug 1989, depth unknown, stat. A9053-075-039-2331, SFI; SAMC–A079481 4 males (TL 100–140 mm) 4 females (TL 88–130 mm), off Elands Bay, 32°13'60.0"S 18°13'60.0"E, 68 m, stat. A10434-084-041-1070; SAMC–A079458 4 males (TL 135–161 mm), 31°30'00.0"S 17°56'00.0"E, 6 Aug 1989, 98 m, midwater trawl, stat. A9055-075-040-1058, RV *Africana*, West coast Hake biomass survey; SAMC–A079459 3 males (TL 76–125 mm) 1 female (TL 86 mm), 31°15'00.0"S 17°30'00.0"E, 6 Aug 1989, 145 m, stat. A 9052-075-038-2324, RV *Africana*, West coast Hake biomass survey; SAMC–A079480 4 males (TL 49–94 mm) 7 females (TL 48–89 mm), off Elands Bay, 32°27'60.0"S 17°49'00.0"E, 25 Jul 1990, 139 m, stat. A10431-084-038-3456; SAMC–A079473 3 males (TL 158–176 mm), off Standfontein, 31°51'00.0"S 17°58'00.0"E, 27 Jul 1990, 111 m, stat. A10438-084-043-2393. SAMC–A079506 1 male (TL 92 mm), 25 Sept 1991, off George, 34°04'00.0"S 23°10'00.0"E, 64 m, stat. A12056-095-050-2262. **Eastern Cape:** SAMC–A079404 3 males (TL 85–90 mm), 1 female (TL 100 mm), Tsitsikamma National Park MPA, 34°04'00.0"S 23°51'00.0"E, 12 Apr 2004, 121 m, stat. A23068-028-1054, bottom trawl. **Unknown location:** SAMC–A079460 1 male (TL 108 mm) 1 female (TL 90 mm), 6th Nov. 1984, 33 m, stat. 24-02A, DSF; SAMC–A079455 1 male (TL 77 mm), stat. A2935-036-017, shark gut; SAMC–A079487 1 male (TL 69 mm), stat. SL 11; SAMC–A079456 2 males (TL 70–97 mm), stat. A2936-036-018, shark gut.

Diagnosis. Rostral plate triangular to linguiform; apex narrowly rounded. Distance between SM carinae one-fourth distance between IM carinae. SM carinae of AS1–5 present in juveniles and small adults, indistinct to absent in specimens exceeding TL 90 mm. Posterior margin of AS5 usually without accessory spinules. Telson with postanal carina, can be faint in smaller specimens.

Colour in alcohol. Closely resembles Barnard's (1950) colour description as overall "horny amber" with cornea green and dactylus pale. However, specimens can appear dusky to salmon pink while still exhibiting the white dactylus Barnard described. Several specimens with squarish dark brown spot on each abdominal segment between IM and LT carinae and on AS2 between LT and MG carinae. Posterior margin of AS1–4 dark brown as

well as tips of all pleopods, uropodal exopod and endopod and antennal scales. Mid-marginal brown strip on carapace. Dark dots distally positioned by articulation of pereopod segments on pereopods 1–3. Dark red outlining anterior SM tubercles of telson.

Colour in life. Two colour morphs observed in regional guides. Overall honey coloured with pereopods and dactylus white; uropodal exopod distal segments and telson posterior margin bright yellow for several individuals found on the south and east coasts. The second and more common colouration can be pinkish purple (Fig. 1.57B) to grey and maroon with abdominal and telson carinae as well as telson posterior margin trimmed with orange-red to maroon; all limbs pale.

Measurements. Male (n = 48) TL 36–176 mm, female (n = 30) TL 32–138 mm.

Distribution and Habitat. Only known from southern Africa, Namibia to southern KwaZulu-Natal. While abundant on the west coast of South Africa, specimens have been collected from off Namibia as far up as Walvis Bay. Several specimens reported as being collected from shark and tuna stomachs of unspecified species. Associated with level sand or mud substrates suitable for their burrowing lifestyle. Recorded depths between 34–584 m, with most specimens collected from around 100 m (unpublished).

Remarks. Commonly known as the Cape Mantis shrimp, this species is the only mantis shrimp species known from the west coast north of St. Helena Bay in South Africa and spanning the entire coast of Namibia (Abelló and Macpherson, 1990). High abundances of *P. capensis* have been reported in certain coastal areas between St. Helena Bay and the South African border with Namibia and the species is known as an important prey species of many predatory fish and seabirds (Griffiths and Blaine, 1988). As one of just three species of mantis shrimp known from the west coast of South Africa, *P. capensis* is the one frequently caught in large numbers during trawl and dredge surveys. In their investigation into mantis shrimp distribution and population biology, Griffiths and Blaine (1988) found *P. capensis* to be the only stomatopod species collected by trawl surveys along the west coast of South Africa between Port Nolloth and Cape Agulhas, with the highest concentration of individuals at St Helena Bay. The present study reports on the large number of *Pterygosquilla* specimens collected between 1875 and 2004 and housed in the Iziko South African Museum.

Pterygosquilla armata, *P. capensis*, *P. gracilipes*, and *P. schizodontia* make up the four species of *Pterygosquilla* currently recognised. Manning (1969a) defined three subspecies of *Pterygosquilla armata*: *P. a. armata* (H. Milne Edwards, 1837) from southern South America; *P. a. schizodontia* (Richardson, 1953) from New Zealand and *P. a. capensis* Manning, 1969a, from South Africa. Subsequently, during his study of *P. schizodontia*, Ahyong (2012) recognised the subspecies of *P. armata* as three separate species substantiated by their characteristic morphologies, as well as their distinct geographical distributions. For specimens TL ≥ 100 mm, Manning (1969a) distinguished his subspecies, *Pterygosquilla armata capensis*, by the size of the lobe between the terminal spines of the uropodal protopod, the degree of definition for the abdominal SM carinae and distance between the abdominal SM carinae. Ahyong (2012) found Manning's use of the former character to be unreliable but validated the use of the distinctiveness of and distance between the abdominal SM carinae as features with which to distinguish *P. schizodontia* from *P. armata*.

The present series examined herein agrees with Manning (1969a) and the distance between the abdominal SM carinae is consistent as a diagnostic feature. *Pterygoquilla capensis* is distinguished from *P. schizodontia* by the distance between SM carinae being one-fourth rather than one-third the distance between IM carinae. Distinctions between *P. armata* and *P. capensis* are more subtle and are based on size-related characteristics for both species. Meanwhile, morphological variation in *P. capensis* is prominent, especially in the number of teeth

on the dactylus of the raptorial claw and condition of the IM denticles of the telson. Ranging in number from 6 to 11 teeth on the dactylus of the raptorial claw, the majority of examined specimens had 7 or 8 teeth with five specimens exhibiting differing teeth numbers on either dactylus: 7 and 9, 9 and 10, 10 and 9 and two specimens with 7 and 8 teeth of the right and left dactyli of the raptorial claw respectively. As previously recorded in *P. armata* and *P. schizodontia*, at least one IM denticle of the telson is usually secondarily bifurcated with no obvious pattern in number or orientation. An unusual feature never recorded for *Pterygosquilla* is the addition of a small apical spine on the rostral plate illustrated herein for *P. capensis* (Fig. 1.58J) and observed for several specimens. Other minor variation includes varying shapes of the rostral plate from the length being slightly longer or shorter than the width and the sternal keel of the TS8 with an apex ranging from rounded to sharp.

The most accessible and utilized method to define the species of *Pterygosquilla* is via their distinct distributions: *P. armata* from southern South America, *P. gracilipes* from the west coast of Patagonia, *P. schizodontia* from New Zealand and *P. capensis* from South Africa (Ahyong, 2012). However, the variation of certain features found in the present material calls into question the use of distinct population localities to identify *P. capensis*. The species not taken into consideration by Manning (1969a) in his revision of *P. armata* is the highly understudied *Pterygosquilla gracilipes* Miers, 1881 from Chile. After its original description, *P. gracilipes* has been revisited only once and briefly by Kemp (1913). In his key to the genus, Ahyong (2012) distinguished *P. gracilipes* via the absence of a postanal carina, as well as the presence of more than 18 SM denticles on the telson. However, in the present study the distinctness of the postanal carina varies from a well-defined ridge to a faintly raised line and in one specimen the postanal carina is absent. No comment can be made of how the variation of this feature compares between the two species as the holotype of *P. gracilipes* housed in The Natural History Museum, United Kingdom, could not be examined. However, the incongruity of the features found in the present series of *P. capensis* casts some doubt on the validity of the feature.

The second feature used to distinguish *P. gracilipes* is the greater number of triangular to spinular SM denticles (>18) of the telson compared to other species in the genus (1 or 2 rounded to subquadrate denticles and occasionally up to 10 tiny spinules) (Ahyong, 2012). However, multiple specimens of the present series exhibited more than 18 SM denticles of the telson and appear spinular in structure (Fig. 1.59I, K). Overall, 12 of the 78 specimens examined were found to have more than 18 SM denticles, accounting for 15 % of the present material. These specimens are all a similar midrange size (62–108 mm TL) and were collected in the 1980s during surface and midwater trawl surveys between Saldanha Bay and the Cape Peninsula.

The species of *Pterygosquilla* are distinguished from other Squillidae genera by their ocular scales being produced into strong anteriorly directed spines. However, 13 (roughly 17%) of the 78 specimens of *Pterygosquilla* examined displayed rounded ocular scales (Fig. 1.58G). Moreover, this feature is usually observed in combination with the other varying characters mentioned above. Specimens with rounded ocular scales were usually found to exhibit more than 18 denticles between the SM teeth of the telson [9 of the 13 had >18 SM denticles]. As previously mentioned, this feature is considered characteristic to *P. gracilipes*. Furthermore, this feature combination was observed in specimens with a greater number of teeth on the dactylus of the raptorial claw (9–11 teeth). The specimens with rounded ocular scales were stored in assorted jars containing *P. capensis* material with the 'normal' complement of characteristics. This variation observed for a genus defining feature puts into question the stability of the feature as diagnostic.

The high variation found in this local species suggests that a global revision of *Pterygosquilla* is required. The variation in *P. capensis* raises the question of whether there are cryptic species in this highly abundant and perhaps most common South African stomatopod. Such questions should be explored by future genetic studies.

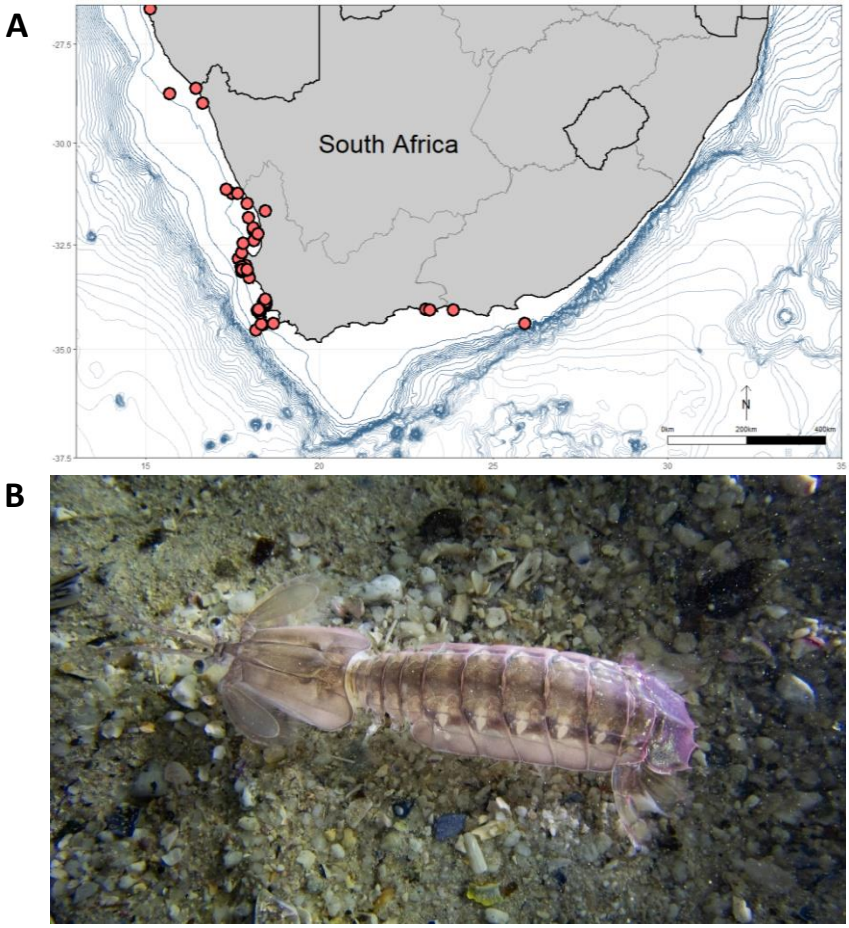

Figure 1.57. *Pterygosquilla capensis* Manning, 1969a **A,** southern African distribution; **B,** dorsal habitus of live specimen collected from Kommetjie, Cape Town [WC] (Photo taken by Jannes Landschoff).

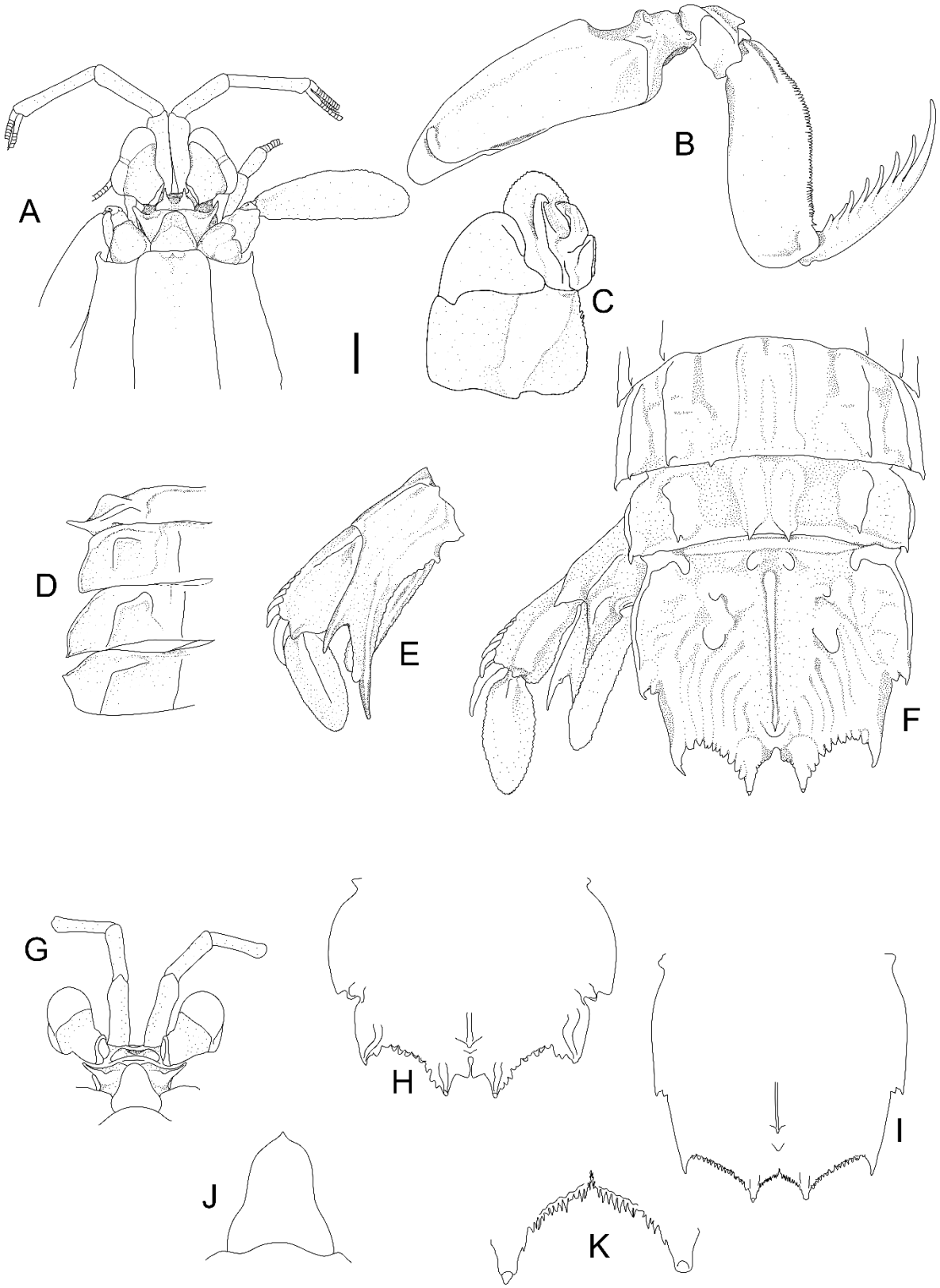

Figure 1.58. *Pterygosquilla capensis* Manning, 1969a, **A–F** male TL 72 mm, SAMC–A045105; **G, I, K** female TL 82 mm, SAMC–A079408; **H** male TL 155 mm, SAMC–A001343; **J** male TL 150 mm, SAMC–A079470. **A,** anterior cephalothorax, dorsal; **B,** right raptorial claw, lateral; **C,** left pleopod 1 endopod, anterior; **D,** TS5–8, left dorsal; **E,** right uropod, ventral; **F,** AS4–6, left uropod and telson, dorsal; **G,** ocular scale variation, dorsal; **H–I,** telson variations, dorsal; **J,** rostrum variation, dorsal; **K,** SM denticle variation, dorsal. Scale **A–B, D–F** = 2 mm; **C** = 1 mm; **H** = 4 mm; **K** = 0.5 mm.

Quollastria Ahyong, 2001

Quollastria Ahyong, 2001: 300–312. [Type species *Quollastria capricornae* Ahyong, 2001, by original designation. Gender masculine].

Diagnosis. Dorsal integument rugose, pitted. Cornea width less than 0.3 CL, strongly bilobed. A1 somite not greatly elongate; dorsal processes triangular, directed anterolaterally. Carapace anterior width less than or slightly exceeding half median length; with anterolateral spines; with normal complement of carinae; MD carina distinct, interrupted at base of anterior bifurcation; branches of anterior bifurcation opening anterior to dorsal pit; posterolateral margin rounded. Raptorial claw dactylus with 5 or 6 teeth; carpus dorsal carina undivided; merus without outer inferodistal spine. Mandibular palp 3-segmented. MXP1–4 with epipod (2–3 in *Q. imperialis*). PLP1 endopod in adult males with posterior endite; hook process blunt distally. TS5–7 lateral processes distinctly bilobed. Telson SM teeth with fixed apices; prelateral lobe present; dorsolateral surface with or without supplementary longitudinal carinae. Uropodal protopod inner margin crenulate.

Composition. *Quollastria capricornae* Ahyong, 2001; *Q. fossulata* (Moosa, 1986); ***Q. gonypetes*** (Kemp, 1911); *Q. kapala* Ahyong, 2001; *Q. imperialis* (Manning, 1965); *Q. ornata* (Manning, 1971b); *Q. simulans* (Holthuis, 1967b); *Q. striata* (Manning, 1978c); *Q. subtilis* (Manning, 1978c).

Remarks. Comprised of Manning's (1995) 'gonypete' group of *Oratosquillina*, *Quollastria* is distinguished from *Oratosquillina* in lacking the outer inferodistal spine on the merus of the raptorial claw (Ahyong, 2001). Only one species is known from South African waters, but no material was available in the present series.

Quollastria gonypetes (Kemp, 1911), **literature record**

Figure 1.59

Squilla gonypetes Kemp, 1911: 96 [type locality restricted to vicinity of Cheduba Islands, Burma, by lectotype selection (Manning, 1978c)]. –Kemp, 1913: 3, 10, 22, 54, pl. 4, figs. 42–44 (part). –Stephenson, 1962: 35. –Manning, 1965: 250–253, pl. 11: fig. b.

Oratosquilla gonypetes. –Manning, 1971b: 14; 1978c: 7, 12–14, fig. 5. –Graham *et al*., 1993a: 24, 64.

Oratosquillina gonypetes. –Manning, 1995: 25, 228.

Quollastria gonypetes. –Ahyong, 2001: 304–306, fig. 147. –R. Liu, 2008: (list).

Material examined. No material available for study.

Previous records of South African material. KZN: 1 male (TL 52 mm), off Durban, 29°34'00.0"S 31°39'00.0"E, 9 Sep 1964, 118 m, NAD 40 P, UCT Ecological Survey, det. Manning (1969a).

Diagnosis (Ahyong, 2001). Dorsal integument evenly pitted, rugose. A1 somite dorsal processes with spiniform apices, directed anterolaterally. Carapace with branches of anterior bifurcation of MD carina distinct in adults. Raptorial claw dactylus usually with 5 teeth (occasionally with 6 or 7). MXP1–4 each with epipod. TS8 sternal keel rounded, distinct to near obsolete. AS5 with mid-dorsal pair of large dark squares. Abdominal carinae

spined as follows: SM 5– 6, IM (2)3–6, LT (1)2–6, MG 1–5. Telson prelateral lobe as long as (in juveniles) or shorter than (in adults) margin of LT tooth; LT carina long, extending to or slightly beyond mid-length of prelateral lobe in adults; dorsolateral surface without accessory MD carina but with curved rows of pits, pits combined in adults to form longitudinal grooves with low intervening carinae; denticles SM 3–4, IM 5–9, LT 1. Uropodal protopod with rounded lobe on outer margin of inner terminal spine. Uropodal exopod proximal segment outer margin with 7–10 movable spines; distal segment slightly longer than proximal segment; dark on inner half only.

Colour in alcohol. Faded, but with dark patches still visible on AS2–5 (Manning, 1969a).

Colour in life (Ahyong, 2001). Overall dorsal colour light brown with scattered dark chromatophores over entire surface. Rostral plate with orange-red margins. Carapace with dark carinae and grooves; median carina, gastric grooves and median posterior margin red. TS5–8 and AS1–5 with red median tubercles and submedian carinae. AS1–5 with IM carinae red medially. AS2 with diffuse black, transverse rectangular bar overlain by red. AS5 with black square lateral to each SM carina. Telson with carinae of primary teeth red, that of LT tooth red to level of apex of prelateral lobe; MD carina with red posterior spine. Uropodal protopod with terminal spines and carinae red; endopod white-yellow with distal 0.5 black; exopod proximal segment black distally, outer spines red; exopod distal segment black on inner 0.75, remainder yellow. A1 peduncle segment 1 dark-brown laterally, segments 2 and 3 with narrow dark-brown band distally. A2 protopod dark-brown laterally. A2 scale with scattered brown chromatophores anteriorly and posteriorly; distal margin yellow. Raptorial claw merus with dark-brown dorsolateral margin.

Measurements. Male (n = 1) TL 52 mm. Ahyong (2001) records the largest known specimen at TL 104 mm.

Distribution and Habitat. Indo-West Pacific, known with certainty from the Western Indian Ocean, India, Australia, Indonesia, Philippines, Vietnam to Japan. Associated with sandy mud bottom substrates at moderate depths between 40–110 m.

Remarks. Several diagnostic features of *Quollastria gonypetes* undergo a high level of variability with size (Manning, 1978c; Ahyong, 2001). In his extensive study of the species from Australia, Ahyong (2001) found that the distinguishing branches of the anterior bifurcation of the MD carina of the carapace are hardly visible in small specimens (<55 mm) and become more distinct with size. Other features found to vary with size include width of the lateral processes of TS6, distinctiveness of the telson carinae and lobe size between the spines of the uropodal protopod. Further variation was found in number of teeth on the dactylus of the raptorial claw; most specimens bear 5 teeth on the dactylus, but occasionally specimens from Australia and Taiwan have 6 teeth on one or both claws (Ahyong, 2001).

In his review of the species that constituted *Oratosquilla* at the time, Manning (1978c) re-examined specimens from various localities, finding four different species represented in the material previously considered to be *Quollastria gonypetes*. The account of *Q. gonypetes* from Madagascar (Manning, 1968a; 1970a), while first referred to as *O. turbata* (Manning, 1978c), was subsequently corrected to *Q. subtilis* (Ahyong, 2001). All records of *O. turbata* are now considered synonyms of *Q. subtilis* (Ahyong, 2001).

As remarked by Manning (1978c), the species identification of specimens from the limits of the distribution of *Quollastria gonypetes,* such as Japan and South Africa, is not resolved and the record from Durban requires

confirmation. Kemp (1911) and Manning (1965) commented on the differences of the spination of the IM (AS3–6) and LT (AS2–6) carinae of the abdominal somites of this 52 mm male specimen. Although within the range of variation previously recorded (Manning, 1978c; Ahyong, 2001), re-examination would be desirable. Unfortunately, neither the original specimen, nor newly collected material, of *Q. gonypetes* is present in the Iziko collection.

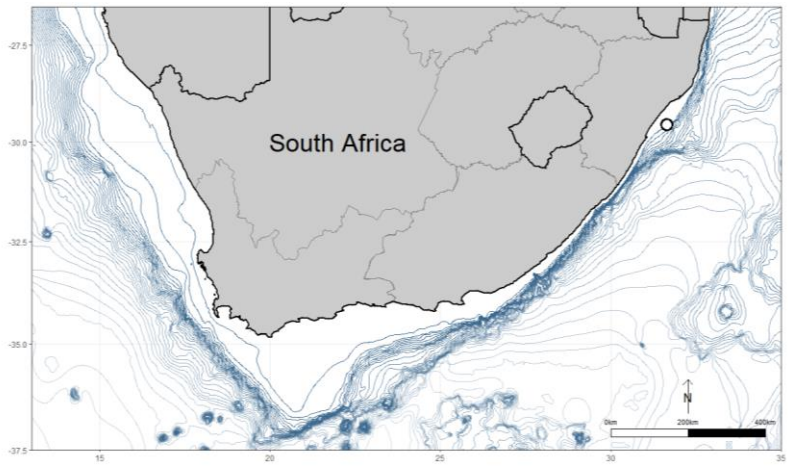

Figure 1.59. South African distribution of *Quollastria gonypetes* (Kemp, 1911). Species record not verified in present study indicated by the white circle.

Rissoides Manning and Lewinsohn, 1982

Rissoides Manning and Lewinsohn, 1982: 352–353. [Type species *Squilla desmaresti* Risso, 1816 by original designation].

Diagnosis. Body smooth, compact, size small to moderate. Cornea bilobed, distinctly broader than stalk; ocular scales separate. Carapace without anterolateral spines; dorsal carinae reduced, with at most reflected marginals and posterior part of each LT carina present; median posterior margin evenly concave, posterolateral margins broadly rounded. Raptorial claw with dactylus of 5 teeth, outer margin evenly convex; carpus with dorsal ridge indistinct; ischiomeral articulation terminal. Mandibular palp absent. 4 epipods present. TS5 with lateral process an inconspicuous diagonal or flattened lobe, a ventral spine present on each side; TS6–7 lateral processes not bilobed, evenly rounded. AS1–5 with or without SM carina; with IM, LT and MG carina. AS6 with SM, IM, LT carinae. Telson broad, MD present, supplemental carinae absent; IM, LT teeth present, SM with movable apices; prelateral lobe absent; postanal carina, if present, low. Uropodal protopod inner margin crenulate as low tubercles or short denticles.

Composition. *Rissoides africanus* (Manning, 1974); ***R. barnardi*** (Manning, 1975a); *R. calypso* (Manning, 1974); *R. desmaresti* (Risso, 1816); *R. pallidus* (Giesbrecht, 1910).

Remarks. Genus includes five species. Excluding *R. barnardi*, the other four species all occur in the eastern Atlantic, while two, *R. africana* and *R. calypso,* only occur off the west coast of Africa (Manning, 1977a).

Rissoides barnardi (Manning, 1975a)

Figures 1.60 – 1.61(A–J)

Squilla desmarestii. –Barnard, 1950: 842, fig. 1a.

Meiosquilla desmarestii. –Manning, 1969a: 13.

Meiosquilla barnardi Manning 1975a: 363–366, fig. 1 [type locality KwaZulu-Natal, South Africa]

Rissoides barnardi. –Manning and Lewinsohn, 1982: 353 (list).

Material examined. KZN: SAMC–A079426 1 male (TL 37.5 mm), off Port Edward, 31°06'48.0"S 30°17'48.0"E, 8 Jul 1985, 120–125 m, coll. G. C. Williams.

Diagnosis. Cornea bilobed, set almost transversely on stalk. Ocular scales subtruncate. A1 peduncle subequal to, or slightly longer than, carapace. Rostral plate cordiform, apex rounded. Carapace smooth, lacking carinae except for short, reflected MG and posterior LT carinae. Raptorial claw dactylus with 5 teeth; propodus not distinctly tapering distally. Mandibular palp absent. 4 epipods present. TS5 lateral process with slender, oblique, laterally-projecting lobe, rounded laterally. TS6–8 with IM carina; TS6 and 7 lateral processes broadly rounded posteriorly; TS8 sternal keel slender with rounded apex. AS1–5 with IM, LT and MG carina; AS6 with distinct SM, IM and LT carinae. Abdominal carinae spined as follows: SM6, IM 5–6, LT 5–6, MG 4–5. Telson stout with primary teeth bases swollen in male holotype; SM teeth with movable apices; IM and LT teeth slightly inwardly curved, apices sharp; denticles pointed, SM 6–10, IM 10–15, LT 1. Uropodal exopod proximal segment with 4–5 movable spines on outer margin, distalmost not extending beyond midway distal segment; protopod with inner margin crenulate.

Colour in alcohol. Completely faded. Cornea dark grey-brown. Colour in life unknown.

Measurements. Male (n = 1) TL 37.5 mm. CI 386. A1 peduncle 1.11CL. A2 scale 0.510CL. PLDI 308. The present specimen represents the largest specimen recorded for the species.

Distribution and Habitat. Only previously known from South African waters around Durban and now Port Edward, KZN. Associated with sandy and muddy substrata, depth 120–200 m (present study).

Remarks. Originally recorded from South Africa as the Mediterranean species *Rissoides desmarestii* Risso, 1816 (Barnard, 1950; Manning 1969a), *R. barnardi* is distinguished from *R. desmarestii* by the form of the propodus of the raptorial claw. In *R. barnardi*, the propodus does not become distinctly narrower distally, as it does for *R. desmarestii*. When compared to *R. desmarestii, R. barnardi* also appears to mature at a smaller size with Manning's (1975a) male holotype exhibiting swellings at the bases of the telson's primary teeth at TL 30 mm. This secondary sexual characteristic is known to only occur in *R. desmarestii* specimens at least 50 mm in total length (Manning, 1975a).

The holotypic and paratypic material of *R. barnardi* deposited in the Iziko South African Museum is no longer present. This is concluded after searching the stomatopod collection at Iziko to find the holotype as well as all paratypes of *R. barnardi* listed on the museum system missing. The present specimen was found among unidentified specimens of the museum collection and is the largest specimen recorded for the species. The male

specimen agrees well with early accounts given by Barnard (1950) and Manning (1969a) and with the description of *R. barnardi* (as *Meiosquilla barnardi*) by Manning (1975a).

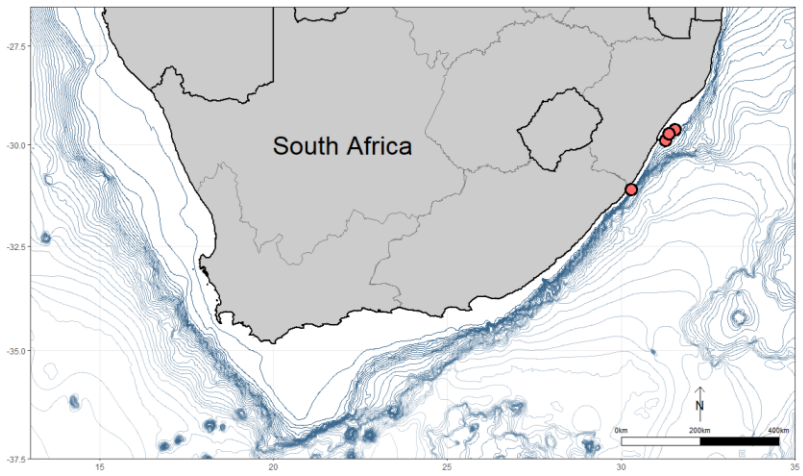

Figure 1.60. Distribution of the South African endemic *Rissoides barnardi* (Manning, 1975a).

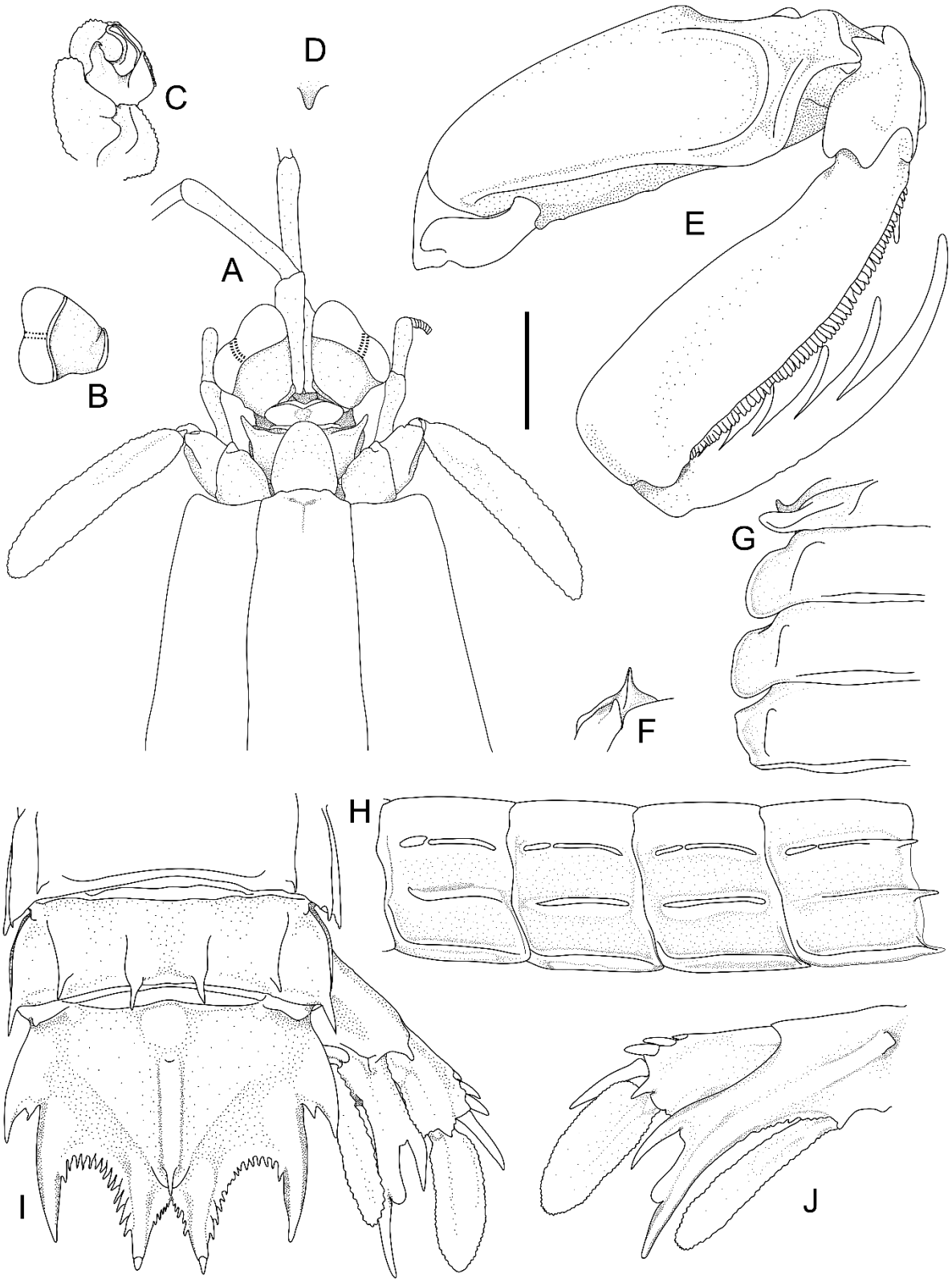

Figure 1.61. *Rissoides barnardi* (Manning, 1975a) male TL 13.5 mm, SAMC–A079426. **A,** anterior cephalothorax, dorsal; **B,** right eye, lateral; **C**, left pleopod 1 endopod, anterior; **D,** TS8 sternal keel, right lateral; **E**, right raptorial claw, lateral; **F,** TS5 lateral process, right lateral; **G,** TS5–8, left dorsal; **H,** AS3–6 left lateral; **I,** AS6, telson and right uropod, dorsal; **J,** right uropod, ventral. Scale **A–J** = 2 mm.

DISCUSSION

The Stomatopoda known from South Africa now include 31 species from four superfamilies, nine families and 20 genera. Barnard (1950) listed 13 species from South Africa based on his own observations, as well as records by early crustacean taxonomists (Krauss, 1843; Hansen, 1895; Stebbing, 1902; 1908; 1910; 1917). Further species additions by Manning (1969a; 1975a) and later Kensley and Buxton (1984) increased the number of stomatopods to 17 species from South African waters, although not all records were correctly attributed or can be corroborated herein. The most recent study by Ahyong (2005) brought the known number of mantis shrimp species to 26, with one species described as new to science. Since Barnard's (1950) catalogue listing 13 mantis shrimps from South African waters, the number of South African stomatopod species has more than doubled (Fig. 1.62). However, since Barnard (1950), there has also been no holistic treatment of the group from South African waters. The present study adds five new species records and brings the known number of mantis shrimp species to 31, increasing the total species listed by 16 % over the past 17 years (Fig. 1.62). The present study is also the first comprehensive taxonomic treatment that provides a fully illustrated guide to the stomatopod fauna of South Africa.

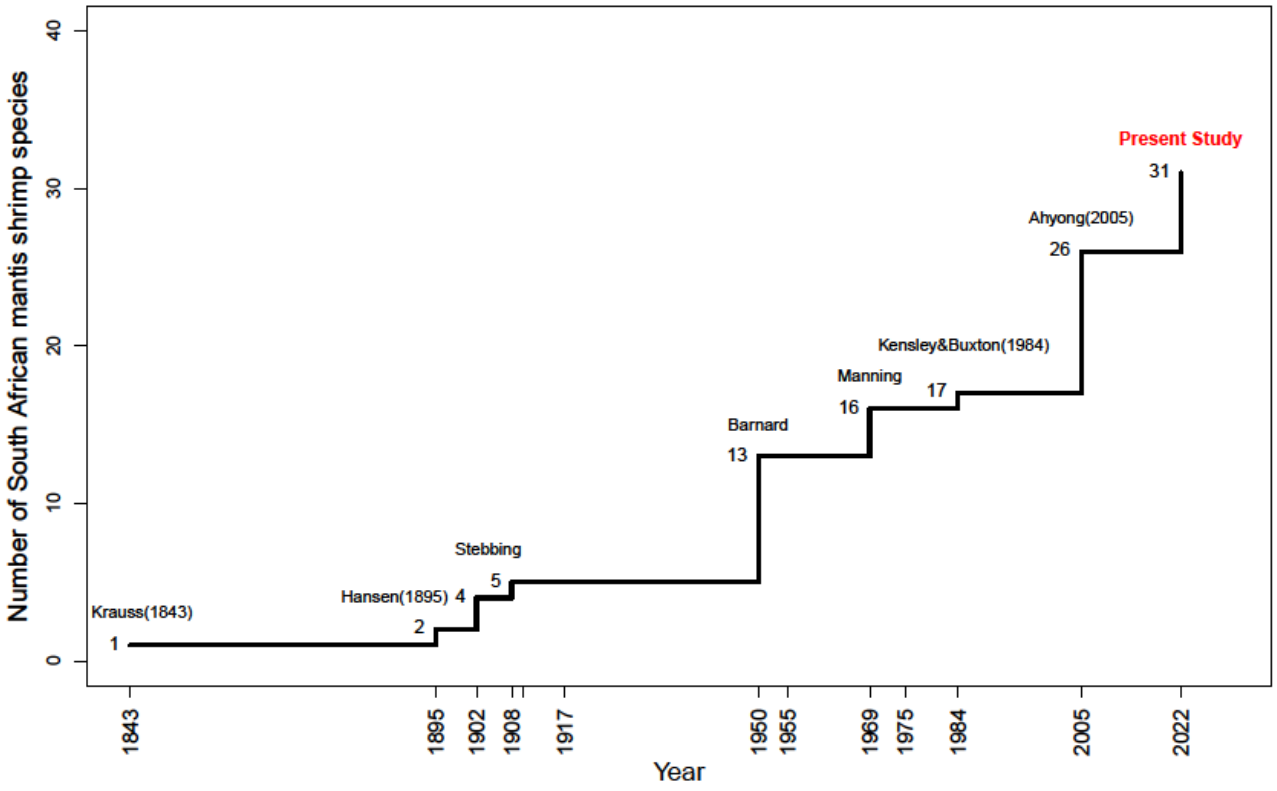

Figure 1.62. **Accumulation curve of mantis shrimp species added and revised to the South African faunal list over time, with contributions of major authors detailed.** In total, 5 new species records are added to the stomatopod fauna of South Africa, accounting for 16 % of all national species.

The 31 species presented herein are primarily based on examination of preserved material housed in the Iziko South African Museum, Cape Town, as well as previous accounts in the literature. Of the four superfamilies known from South Africa, the gonodactyloids were the most diverse group represented in the museum collection and included several species about which very little is known. The lysiosquilloids required the most attention, with all museum specimens identified more than 50 years ago and thus in need of taxonomic updating when compared with modern species definitions. The squilloid species *Pterygosquilla capensis* numerically dominated the museum collection with 78 specimens examined herein (Appendix B) and while the majority of squilloid species have undergone name changes, the group is the most reported stomatopod superfamily in South Africa (Barnard, 1950; 1955; Manning, 1969a).

Stomatopods are notoriously difficult to collect due to their agile and defensive nature. They also inhabit a wide range of habitat types from soft sediments to coral reefs, where they inhabit burrows to crevices. Therefore, a diverse range of sampling methods is needed to accurately estimate their regional diversity. Collection methods include trawling, dredging, spearing, traps and pumping as well as manual excavation of burrows and noosing individuals (Ahyong *et al*. 2017). Historically in South Africa, unspecified bulk sampling of Crustacea from the late 19th century to the present has resulted in an abundant collection of squilloids and lysiosquilloids in museum collections (Fig. 1.63). Exclusively collected by trawl herein, most lysiosquilloids and squilloids were collected from level, soft substrata. Meanwhile, the introduction of targeted sampling of stomatopods by hand and the utilization of SCUBA diving in the 1960s and 70s allowed for the collection of the more inconspicuous gonodactyloids (Fig. 1.63). For example, in 1976, R. Winterbottom of the J. L. B. Smith Institute undertook the targeted collection of coral reef related stomatopods from Sodwana Bay, which were later examined and reported on by Ahyong (2005) and now make up a large proportion of the gonodactyloid specimens at the Iziko South African Museum.

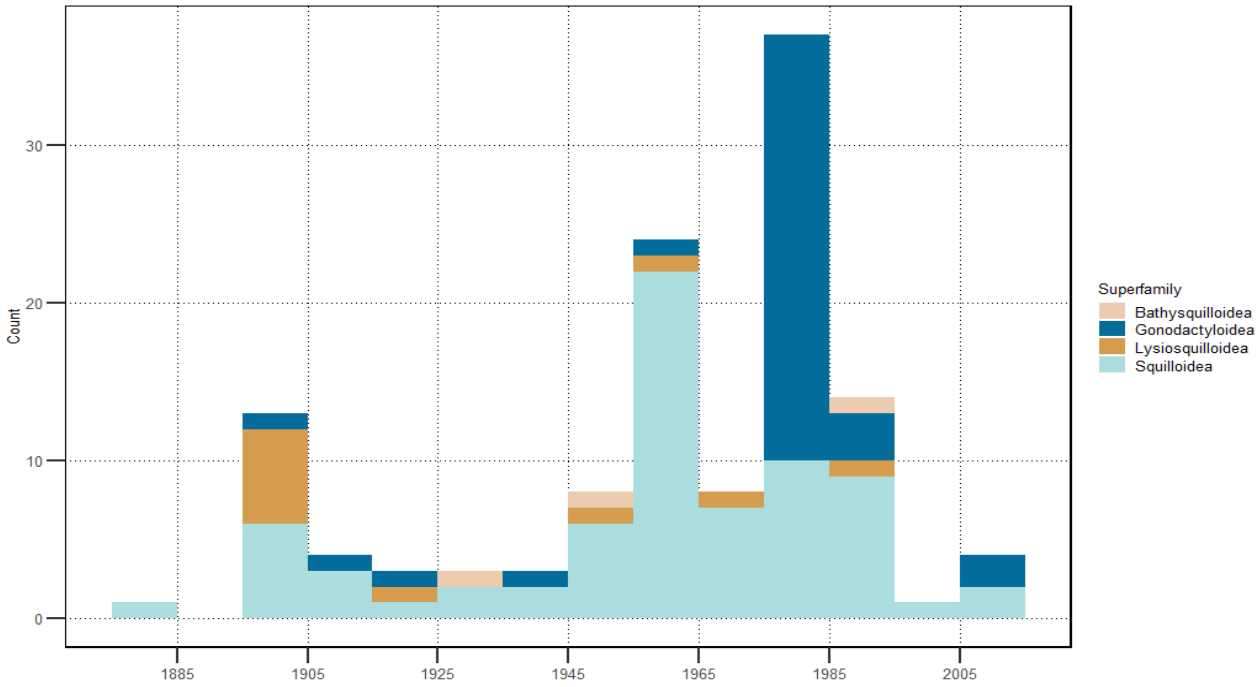

Figure 1.63. Collection dates for stomatopod specimens examined by the present study and presented by superfamily.

Several records of species previously reported from within South African national waters could not be authenticated from existing material, as the corresponding specimens are either lost from the Iziko collection or could not be traced. Four species previously documented from South Africa, *Raoulserenea komaii* Moosa, 1991, *Heterosquilloides insignis* Kemp, 1911, *Oratosquilla mauritiana* Kemp, 1913 and *Quollastria gonypetes* Kemp, 1911*,* lack material for examination herein. Of these, the record *of R. komaii* is the only contemporary species record (Ahyong, 2005) and while the specimens are extant in the Iziko collection, the sample is unfortunately damaged to an extent that it cannot be identified. Although included herein, it is suggested that the historical records of the other three unverified species require sampling of new material for confirmation of species occurrence in South Africa.

Several previously suspected species records could be confirmed to occur in South Africa. The record of *Gonodactyllelus demanii* Henderson, 1893, in Barnard (1950) (as *Gonodactylus demanii*) and all specimens in the Iziko collection previously identified as *G. demanii* are now considered to represent *G. lanchesteri,* which was first reported from South Africa by Ahyong (2005). First suggested by Barnard (1950) and reiterated by Manning (1969a), the presence of *Odontodactylus scyllarus* is confirmed for South Africa for the first time. However, four species listed to occur in Mozambican waters by Barnard (1950; 1958) and Manning (1969a) are still not yet recorded in South Africa. These are *Alima neptuni* Linnaeus, 1768 (as *Squilla hierogliphica*), *Gonodactylaceus falcatus* Forskål, 1775 (as *Gonodactylus glabrous*), *Keppelius hystricotelson* (Barnard, 1958) (as *Lysiosquilla hystricotelson*) and *Lenisquilla lata*, Brooks, 1886 (as *Squilloides lata*).

The South African Stomatopoda represented in the Iziko collection include a widespread tropical species component, as well as species associated with temperate waters. Twenty-one species recorded here have comparatively widespread distributions in the Indo-West Pacific (*Bathysquilla crasisspinosa*, *Gonodactylellus lanchesteri*, *Gonodactylus botti*, *Gonodactylus chiragra*, *Gonodactylus smithii*, *Odontodactylus hansenii*, *O. scyllarus, Chorisquilla spinosissima, Raoulserenea komaii*, *R. ornata, R. oxyrhyncha, Lysiosquilla maculata*, *L. tredecimdentata, Heterosquilloides insignis*, *Clorida albolitura*, *C. latrellei*, *Harpiosquilla harpax*, *Kempella mikado*, *Miyakella holoschista*, *M. nepa* and *Quollastria gonypetes*), while most of the remaining species are restricted to the Western Indian Ocean (*Gonodactylellus crosnieri*, *Gonodactylolus paulus*, *Mesacturoides fimbriatus*, *Natosquilla investigatoris* and *Oratosquilla mauritiania*). In general, the species that occur in the subtropical parts of the country also occur in Mozambique and Madagascar (Table 3.2), a trend visible across other taxonomic groups. Fifteen stomatopod species from South Africa are shared with Madagascar, while only ten are shared with Mozambique (Appendix B), of which *G. botti* and *C. albolitura* are recorded for the first time from Mozambique in Chapter 2. For a list of South African species shared with other localities in the Western Indian Ocean see Appendix B.

Six marine ecoregions are currently recognised around South Africa and summarised by Sink *et al.* (2019) (Fig. 1.1). The coastline is divided into four ecoregions: The cold temperate *Southern Benguela*, the warm temperate *Agulhas*, and the subtropical *Natal* and *Delagoa* ecoregions. The *Agulhas* ecoregion spans from Cape Point to the Mbashe river in the Eastern Cape and includes several reef systems and the eastern and central Agulhas Bank. The *Natal* ecoregion is influenced by subtropical water masses between the Mbashe River mouth and Cape Vidal at the southern end of the Mozambican Channel. This ecoregion includes two regions: the Southern KwaZulu-Natal region between Durban and Port Edward and the Wild Coast region north of the Mbashe River. The *Delagoa* shelf ecoregion extends north of Cape Vidal into Mozambique and is considered a transitional region between subtropical and tropical coastal waters. Meanwhile, the continental shelf is defined by two ecoregions. The productive *Southern Benguela* ecoregion extending from Namibia to Cape Point characterised by the cold Benguela Current and intensive upwelling and offshore it includes the western Agulhas Bank.

Regions within this ecoregion include the cool temperate Namaqua region spanning south of Namibia to Donkin Bay, South Africa, and the highly variable Cape region with its inshore break at Cape Point to Cape Agulhas. The *Southwest Indian Deep Ocean* ecoregion extends from the shelf break of the *Southern Benguela* including the continental slope deep-water habitats along the entire east coast of South Africa.

Of the South African Stomatopoda, only three species; *Lysiosquilla capensis*, *L. colemani* and *Pterygosquilla capensis*, are associated with cold temperate water. Arguably the most notable range extension, *L. colemani* is now recorded from both sides of the Indian Ocean. This species has only recently been separated from other species of *Lysiosquilla* and described from moderate to deep water from southeastern Australia (Ahyong, 2001). Discussed above is some controversy in morphological features between Ahyong's (2001) and the present study specimens. However, the absence of the mandibular palp is considered an important diagnostic feature which is unique to *L. colemani* within the genus. All specimens of *L. colemani* were collected from the *Agulhas* ecoregion, but one specimen is noted to be collected on the proposed southwestern limit with the *Southern Benguela* ecoregion (Fig 1.35). The *Agulhas* ecoregion contains a series of rocky reef systems on the Agulhas Bank and the Agulhas shelf ecoregion is known to be highly variable with the greatest number of South African endemics. The Mbashe River boundary with the *Natal* ecoregion marks the distribution limit of several important commercial groups such as the east coast rock lobster, line fish and abalone (Sink *et al.* 2019). However, the barrier does not seem to limit the population of *L. capensis* as this study found a specimen from Coffee Bay, north of the Mbashe boundary.

Excluding *L. colemani,* the essentially temperate water South African stomatopod species are the endemics *L. capensis* and *P. capensis*. Last studied by Manning (1969a), the large collection of *P. capensis* specimens at Iziko South African Museum allowed for a more detailed investigation of the species. The high variation found in the identification characters of both the species and the genus as a whole revealed that *Pterygosquilla* is in need of a global revision beyond the scope of this study. It is possible that the observed variation is due to the presence of a cryptic species and that *P. capensis* is a species complex. The species is frequently caught in the demersal fishery survey trawls off the south and west coasts and any future study should make use of this accessibly to fresh material for genetic analysis. The present study found the diagnostic characters used by Manning (1969a) and Ahyong (2012) to be stable, however, to properly consider the findings herein, *P. gracilipes* from Chile should be investigated. *Pterygosquilla capensis* is the most abundant stomatopod species on the west coast and is considered the only species known to occupy the continental waters of South Africa south of the Namibian border to St. Helena Bay. However, the present study extends the species range further east, to within the mixing zone on the south coast (Appendix A).

Meanwhile, the majority of tropical squilloid species widespread in the Indo-West Pacific were found to occur along a short stretch of the east coast between Durban and St. Lucia Bay (*Clorida albolitura*, *C. latrellei*, *Harpiosquilla harpax*, *Kempella mikado*, *Miyakella holoschista*, *Quollastria gonypetes*, and *Rissoides barnardi*) with *M. nepa* being the only squillid species to range south from KwaZulu-Natal into the Eastern Cape. This area holds South Africa's only commercial crustacean trawl fishery (Sink *et al*. 2019), likely explaining the high abundance of species records and museum specimens collected from this area. Two lysiosquillids (*Lysiosquilla maculata* and *L. tredecimdentata*) and a bathysquilloid (*Bathysquilla crasisspinosa*) also share this stretch of coastline. As previously mentioned, mantis shrimp taxa are known to favor rather specific habitat types (Ahyong *et al*. 2017) with lysiosquillids and squillids generally inhabiting level mud and sand habitats, into which they burrow. Historically, earlier sampling efforts would target certain areas and habitats, especially False Bay and Table Bay in the Western Cape, Algoa Bay in the Eastern Cape, and Durban Bay in KwaZulu-Natal (Griffiths, 1999), nearly exclusively using trawlers on soft substrates, but leaving those stomatopod species with deep

burrows and coral reef associated lifestyles largely unsampled and overlooked. As gonodactyloids are generally associated with coral or rocky reef systems, such as the ones just south of Mozambique, the limited historical sampling resulted in them being vastly underrepresented until the rise of SCUBA diving and targeted collection in under-sampled habitats in the 1970s.

The gonodactyloids recorded herein are restricted to the stretch of coastline that is influenced by warm temperate to subtropical waters just south of Durban to the Mozambican border. These species are typically associated with coral reef and rubble habitats, and they include three of the five new species records for South Africa (*Gonodactylellus crosnieri*, *Odontodactylus hansenii* and *O. scyllarus*). The majority of gonodactylids represented herein are collected from the subtropical reef systems in the northernmost region of the east coast, just south of Mozambique. Most of these records are reported on by Ahyong (2005) for stomatopods from Sodwana Bay and its immediate surroundings including the iSimangaliso reef system. Other coral associated stomatopods from this area are the protosquillid *Chorisquilla spinosissima*, the takuidid *Mesacturoides fimbriatus* and the four pseudosquillids. Meanwhile, the southernmost distribution of *Gonodactylus chiragra* corresponds with the Aliwal shoals reef system and localities associated with the reef systems of the KwaZulu-Natal Bight off St. Lucia. Excluding *G. chiragra*, species of *Odontodactylus* and *Gonodactylus* are exclusively collected from north of Cape Vidal in the coastal waters of the *Delagoa* ecoregion. This region is known for its thriving soft coral communities (Sink *et al*. 2019).

Two species from the east coast are currently considered South African endemics and both species are restricted to the warm temperate and subtropical waters on the coast of KwaZulu-Natal. *Pseudosquillisma kensleyi* inhabits the subtropical coral reefs in the far north, while *Rissoides barnardi* is rather associated with the deeper habitats of sand or mud substrates between Port Edward and Durban. However, both *P. kensleyi* and *R. barnardi* are reported herein from singular preserved specimens, leaving their true distribution greatly unknown. It is possible that these species extend further up into the Indian Ocean.

Overall, taxonomic accounts of the 31 stomatopod species presented in this study collate and expand the knowledge of the South African Stomatopoda. However, despite the coverage of the present work, numerous species remain poorly sampled, leaving many unanswered questions of distribution and taxonomy to be investigated. As emphasised, most specimens examined were collected a considerable number of years ago using non-targeting methods such as trawling and dredging. The mobile and inconspicuous nature of the group also suggests that their abundance and diversity is underrepresented in the existing collections. Habitat-specific sampling targeting mantis shrimps would undoubtfully find many new species records and perhaps new species to science.

CHECKLIST OF SOUTH AFRICAN STOMATOPODA

Superfamily BATHYSQUILLOIDEA Manning 1967a

Family Bathysquillidae Manning, 1967a
Bathysquilla crassispinosa (Fukuda, 1909)

Superfamily GONODACTYLOIDEA Giesbrecht, 1910

Family GONODACTYLIDAE Giesbrecht, 1910
Gonodactylellus crosnieri (Manning, 1968a), **new record**
Gonodactylellus lanchesteri (Manning, 1967b)
Gonodactylolus paulus Manning 1970b
Gonodactylus botti Manning, 1975b
Gonodactylus chiragra (Fabricius, 1781)
Gonodactylus smithii Pocock, 1893

Family ODONTODACTYLIDAE Manning, 1980
Odontodactylus hansenii (Pocock, 1893), **new record**
Odontodactylus scyllarus (Linnaeus, 1758), **new record**

Family PROTOSQUILLIDAE Manning, 1980
Chorisquilla spinosissima (Pfeffer, 1888)

Family PSEUDOSQUILLIDAE Manning, 1977
Pseudosquillisma kensleyi Ahyong, 2005
Raoulserenea komaii (Moosa, 1991)
Raoulserenea ornata (Miers, 1880)
Raoulserenea oxyrhyncha (Borradaile, 1898)

Family TAKUIDAE Manning, 1995
Mesacturoides fimbriatus (Lenz, 1905)

Superfamily LYSIOSQUILLOIDEA Giesbrecht, 1910

Family LYSIOSQUILLIDAE Giesbrecht, 1910
Lysiosquilla capensis Hansen, 1895
Lysiosquilla colemani Ahyong, 2001, **new record**
Lysiosquilla tredecimdentata Holthuis, 1941
Lysiosquilla maculata (Fabricius, 1793)

Family TETRASQUILLIDAE Manning and Camp, 1993
Heterosquilloides insignis (Kemp, 1911)

Superfamily SQUILLOIDEA Latreille, 1802

Family SQUILLIDAE Latreille, 1802

Clorida albolitura Ahyong and Naiyanetr, 2000, **new record**
Clorida latreillei Eydoux and Souleyet, 1842
Harpiosquilla harpax (de Haan, 1844)
Kempella mikado (Kemp and Chopra, 1921)
Miyakella holoschista (Kemp, 1911)
Miyakella nepa (Latreille in Latreille, Le Peletier, Serville and Guérin, 1828)
Natosquilla investigatoris (Lloyd, 1907)
Oratosquilla mauritiana (Kemp, 1913)
Pterygosquilla capensis Manning, 1969a
Quollastria gonypetes (Kemp, 1911)
Rissoides barnardi Manning 1975a

Chapter 2: New and notable stomatopods (Crustacea: Stomatopoda) from Mozambique

ABSTRACT:

The stomatopod crustaceans of Mozambique are reported on, based on existing material housed in the Iziko South African Museum. Seven species are reported for the first time from Mozambican waters, bringing the total known Mozambican stomatopod fauna to 22 species comprising 17 genera and eight families. Taxonomic accounts of eight species are given, seven of these representing the new species records, while the eighth species is an account of the previously poorly documented *Erugosquilla woodmasoni*, reported on from new material. The new record of *Manningia australiensis* represents the first record of the family Eurysquillidae from southern Africa.

INTRODUCTION:

Mantis shrimps or stomatopods (Order Stomatopoda) are an important group of malacostracan crustaceans in the marine environment. They are mobile, specialised predators that occupy a wide range of continental shelf habitats, but are most common in shallow water environments, where they inhabit burrows in mud or sand substrates, or can be found dwelling within crevices in coral reef systems. Some species are known to leave their dens and venture great distances and are often caught in mid- to bottom- trawl and dredge surveys. However, many appear to be less mobile and ambush prey from their dens. The taxonomy of the mantis shrimps has received much global attention as they are both biologically and visually intriguing animals. However, to date and despite being an important group in the benthos, the stomatopod fauna of Mozambique remains poorly known.

The current state of knowledge for Mozambican mantis shrimps is scattered across the literature of broader studies on the crustacean fauna entire of southern Africa (Hilgendorf, 1879; Barnard, 1950; 1955; 1958; 1962). While no exclusive treatment of the stomatopod fauna of Mozambique exists, species accounts from within the Mozambican Exclusive Economic Zone (EEZ) are usually included in early catalogues or taxonomic revisions of the mantis shrimps of southern Africa. The first such consolidating account by Barnard (1950) listed 17 species from along the coast of southern Africa and included nine species from Mozambican waters. Four species were added in subsequent studies (Barnard 1958, 1962; Kalk, 1958) for specimens prominently collected from Maputo Bay and Inhaca Island, southern Mozambique. Subsequently, Manning (1969a) reported on 13 species of mantis shrimps from South Africa and Mozambique, based on a small mantis shrimp collection from the University of Cape Town Ecological Surveys and during the R. V. *Anton Bruun*, Cruise VII. This resulted in the addition of one new species record, that of *Lenisquilla lata* (as *Squilloides lata*) from southern Mozambique. Lastly, a new species, *Faughnia profunda* Manning and Makarov, 1978, was described from off the Xai-Xai distinct, bringing the current species known to occur in Mozambican waters to 15 species.

Half a century later, the majority of these species have undergone taxonomic changes and the global state of taxonomic knowledge as well as the number of species descriptions has increased considerably. Furthermore,

continued sampling surveys off the South African and Mozambican coasts have resulted in the accumulation of unidentified material in the Iziko South African Museum, Cape Town, that requires examination. The aim of the present study is to update and collate the taxonomic knowledge of the mantis shrimps of Mozambique by reporting on the new species records in the accumulated material housed in the Iziko South African Museum collection.

METHOD AND MATERIALS:

The species reported on herein are based on the examination of preserved stomatopod material housed in the Iziko South African Museum, Cape Town (SAMC). The majority of records are from the previously unidentified specimens, however, some accounts are based on misidentified specimens that are corrected by the present study. All specimens are preserved in 70% ethanol. The stomatopod collection dates between 1900 and 2017, sampled using a range of methods, the most common being bottom and mid-water trawling and dredging. The study area is restricted to localities within the Mozambican Exclusive Economic Zone (EEZ).

Species synonyms are listed in accordance with the most recent literature. Style and form follow Ahyong (2001; 2012). Preserved specimens of each species were photographed and traced to produce drawings in Inkscape Project (2020). The figures show features considered most characteristic. Each account also consists of the sections *Material examined*, *Diagnosis* (in full, either copied or adapted), *Measurements*, *Colour in Alcohol*, *Colour in Life* (adapted), *Distribution* (local and global) and *Remarks*. The live colouration of specimens could only be reported from previous species accounts, where available. However, some more recently collected samples did exhibit faded but still recognizably characteristic colouration and are defined under *Colour in Alcohol*.

Where information concerning habitat type was available for specimens, this is documented under *Distribution and Habitat*. Furthermore, Mozambican provincial distribution is given in [] under *Distribution*. Station coordinates are presented as Degrees Decimals Minutes. However, some of the more aged samples use descriptive or pre-rounded data. Other abbreviations or acronyms used to describe locality data are collected (coll.); determined (det.), station name or number (stat.); SFI-RS *Africana* Anchovy recruitment cruise (SFI).

In general, taxonomic terminology and size descriptors follow Ahyong (2012) with additional species-specific terminology taken from the cited literature. The basic mantis shrimp morphology and terminology can be found in **Chapter 1**. For *Material examined* measurements are in mm for total length (TL), which was measured along the midline from rostrum apex to the midpoint between the apices of the submedian teeth of the telson. Carapace length (CL) was measured along the midline and excludes the rostral plate. Other abbreviations include abdominal somite (AS) and thoracic somite (TS). Further measurements and abbreviations include the corneal index (CI) given by 100CL/corneal width; and the abdominal-width carapace-length index (AWCLI), or the relative width of the abdomen given by 100(AS5 width)/CL. Measurements of the antennule (A1) and antenna (A2) are expressed as proportionate to the carapace length (CL), unless specified otherwise. The relative lengths of the uropodal exopod segments are useful for identifying some species, for which length is measured at the greatest length for the proximal and distal segments. The representation of spination of the abdominal carinae follows Ahyong's (2012) system. For example, 'SM 6, IM (4)5–6, LT 1–6, MG 1–5' means that the submedian carinae are posteriorly spined on AS6; the intermediate carinae may or may not be spined on AS4 but are always spined on AS5–6; the lateral carinae are spined on AS1–6 and the marginal carina are spined on AS1–5.

SYSTEMATICS

Family EURYSQUILLIDAE Manning 1977a

Genus *Manningia* Serène, 1962

Manningia australiensis Manning, 1970c, **new record**

Figure 2.1(A–F)

Manningia australiensis Manning, 1970c: 78–81, fig. 1 [type locality off Gillett Cay, Swain Reefs, Australia]. –Makarov, 1978: 183. –Moosa, 1991: 154. –Manning, 1995: 19, 34. –Ahyong, 1997: 331, 332. –Debelius, 1999: 291. –Ahyong, 2001: 23–24, fig. 11. –R. Liu, 2008: (list).

Manningia vinogradovi Makarov, 1978: 183, fig. 4 [type locality Gulf of Tonkin, Vietnam].

Manningia thorsoni Naiyanetr, 1987: 239, figs. 2, 3 [type locality Phuket, Thailand].

Material examined. IIOE2MOZ125 1 male (TL 30 mm), Sofala Province, Mozambican channel, 20°13'10.0"S 35°55'23.4"E, 22 Oct 2017, 66–67 m, dredge, RV *Agulhas II*, stat. IIOE2M205 INV264A.

Diagnosis. A2 protopod with 1 ventral papilla; with blunt dorsal tooth and anteriorly-directed ventral spine. Rostral plate cordiform to subpentagonal; apex acute; rounded laterally. Raptorial claw merus without outer inferodistal spine. TS6–8 without carinae. AS1–5 with MG carina and submarginal sulcus; unarmed posterolaterally. AS6 with armed SM, IM, and LT carinae. Telson dorsolateral surface with distinct MD carina and 3 longitudinal carinae in addition to MG carina as follows: accessory MD carina interrupted, composed of 4 or 5 posteriorly directed spines; anterior IM carina uninterrupted, armed posteriorly; LT carina sinuous and recurved proximally terminating in 1 or 2 spines. Telson posterior margin with 3 broad horizontal lobes between SM and IM teeth, inner lobe with inner IM denticle on margin; with 2 broad horizontal lobes between IM and LT teeth. Telson ventral surface with depressed outer IM and LT denticles only. Uropodal protopod inner margin with 8–10 slender spines; exopod outer margin with 6–8 movable spines; endopod without carinae.

Colour in alcohol. Mostly faded, but with dorsal mottling of dark brown pigment. Telson carinae with traces of dark colouration and dark brown along lateral margins of primary teeth. The holotypic account (Manning, 1970c) of preserved material agrees with the present material. Colour in life unknown.

Measurements. Male (n = 1) TL 30 mm. A1 peduncle 0.94CL. A2 scale 0.43CL. Largest known specimen at TL 32 mm for Queensland, Australia (Ahyong, 2001).

Distribution and Habitat. Vietnam, Thailand, New Caledonia, Papua New Guinea, Australia and now the Western Indian Ocean from Mozambique [Sofala]. Fine to coarse sand or shell substrates in depths 20–93 m.

Remarks. This is the first record from the Western Indian Ocean as well as the first record of the family Eurysquillidae from southern Africa. The depth and habitat profile of the species matches that described for specimens from Australia and New Caledonia (Manning, 1970c; Moosa, 1991; Ahyong, 2001). Makarov's (1978) specimen of *Manningia vinogradovi* from Vietnam and Naiyanetr's (1987) *M. thorsoni* described from Thailand have subsequently been found to be indistinguishable from *M. australiensis* and are now considered synonyms of the species (Ahyong, 2001). These species synonyms expanded the species range, which is now further extended across the Indian Ocean to the Mozambican Channel.

Manningia australiensis is distinguished from other *Manningia* species by the shape of the rostral plate being cordiform or heart-shaped to subpentagonal with rounded lateral margins and a small apical spine (Fig. 2.1B). The present specimen agrees well with previous accounts. The number of spines of the accessory median carina, as well as the outer margin of the uropodal exopod and the inner margin of the uropodal protopod for the specimen herein lie within the range of previously noted variation in telson and uropodal spination (Moosa, 1991; Ahyong, 2001). The present specimen exhibits eight movable spines on the outer margin of the uropodal exopod as well as eight spines on the inner margin of the uropodal protopod (Fig. 2.1F). Four spines adorn the accessory median carina (Fig. 2.1E).

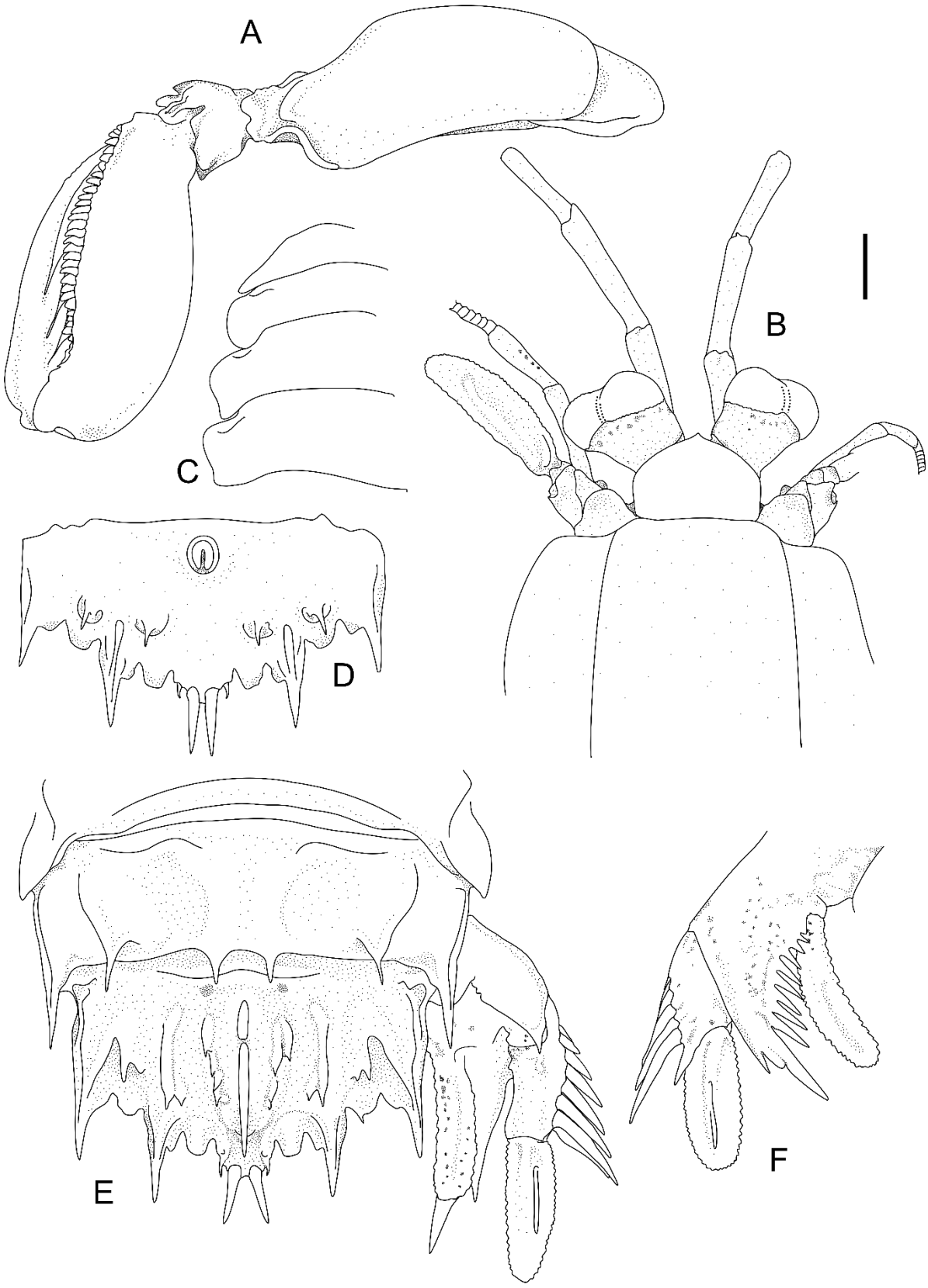

Figure 2.1. *Manningia australiensis* Manning, 1970c, male, TL 30mm, IIOE2MOZ125. **A**, left raptorial claw, lateral; **B,** anterior cephalothorax, dorsal; **C,** TS5–8, left dorsal; **D,** telson, ventral; **E,** telson and left uropod, dorsal; **F,** left uropod, ventral. Scale **A–F** = 1mm

Family SQUILLIDAE Latreille, 1802

Genus *Clorida* Eydoux and Souleyet, 1842

Clorida albolitura Ahyong and Naiyanetr, 2000, **new record**

Squilla latreillei. –Ingle, 1963: 14, figs. 2, 33 (not *C. latreillei* Eydoux and Souleyet, 1842).

Clorida latreillei. –Blumstein, 1974: 116, fig. 3. –Makarov, 1979: 47–48. –Manning, 1995: 189–191, fig. 119 (not *C. latreillei* Eydoux and Souleyet, 1842).

Clorida albolitura Ahyong and Naiyanetr, 2000: 317–320, fig. 2 [type locality Ang Sila, Gulf of Thailand]. –Ahyong, 2001:217–219, fig. 105. –Ahyong and Galil, 2006: 191–193, fig. 1. –Galil, 2007: 303 (list). –R. Liu, 2008: 1267 (list). –Zenetos *et al*. 2010: 401, table 2.

Material examined. SAMC–A006796 2 females (TL 47, 53 mm) 1 male (TL 64 mm), Mozambique [exact location data unavailable], 1924, depth unknown, coll. J.D.F. Gilchrist.

Measurements. Male (n = 1) TL 64 mm, female (n = 2) TL 47–53 mm. A1 peduncle 1.05–1.18CL. A2 scale 0.46–0.49CL.

Colour in alcohol. Mostly faded from dark brown to pale amber. Uropodal exopod with darker patch at articulation of proximal and distal segments.

Colour in life (Ahyong, 2000). Dorsal colour brown while ventral surface translucent white. The medial large white patch of the telson median carina and white posterior telson margin is considered a diagnostic feature of the species.

Distribution and Habitat. Mediterranean coast of Israel, Gulf of Suez, Andaman Sea, Gulf of Thailand, Vietnam, Taiwan, Australia, Madagascar and South Africa (previous chapter). Recorded from Mozambique [unknown] for the first time. Associated with offshore habitats on level sand or mud substrates, depths to at least 47 m (Ahyong, 2001).

Remarks. This sample was collected a century ago and it is only after the recent taxonomic study by Ahyong (2000) of the '*Clorida* complex' that this species could be distinguished from the similar species *C. latrellei* and recognised from Mozambique. The present specimens were distinguished by the length of the postanal carina of the telson extending beyond half the distance between the anal pore and posterior margin.

Genus *Leptosquilla* Miers, 1880

***Leptosquilla schmeltzii*,** (A. Milne-Edwards, 1873), **new record**

Figure 2.2(A–I)

Squilla schmeltzii A. Milne-Edwards, 1873: 11, pl. Ⅱ, fig. 7 [type locality 'habite Upolu', Samoa islands, Pacific Ocean]. –Hansen, 1926: 10. –Holthuis, 1941: 257, fig. 2.

Leptosquilla schmeltzii. –Miers, 1880: 13. –Holthuis, 1967b, 13. –Manning, 1968b: 121–122, fig. 5b. –Manning, 1970a: 1433–1344.

Material examined. SAMC–A092092 1 female (TL 34 mm), Morrumbene Estuary, 23°42'34.7"S 35°23'03.4"E, 21 Jan 1954, depth unknown, stat. MOR.49.H., UCT Ecological Survey; SAMC–A092093 1 male (TL 26 mm), Morrumbene Estuary, 23°42'34.7"S 35°23'03.4"E, 19 Jul 1954, depth unknown, stat. MOR.203C., UCT Ecological Survey.

Diagnosis. Eyes elongated; cornea subglobular. A1 somite significantly elongate, extending anteriorly well beyond apex of rostral plate. Carapace with anterolateral spines. Mandibular palp absent. 2 epipods present. Raptorial claw with 6 or 7 teeth on dactylus. TS5 lateral process an obliquely rounded lobe. Telson broader than long with SM teeth with movable apices. Uropodal exopod outer margin with 4 movable spines, distal two spines spatulate; protopod with 2 lobes between terminal spines, inner margin with 5–6 spines.

Measurements. Male (n = 1) TL 26 mm, female (n = 1) TL 34 mm. CI 423–483. AWCLI 836–860.

Colour in alcohol. Stained pinkish amber. Body covered in black spots most visible on eyes and uropods.

Colour in life. Light grey with small black spots described as star-shaped in original description (A. Milne-Edwards, 1873).

Distribution and Habitat. Indo-West Pacific from Samoa, Lesser Sanda Islands, Andaman Islands and Red Sea. Localities from southern Africa include Madagascar (Manning, 1970a), Mauritius (Miers, 1880) and now southern Mozambique [Inhambane]. Associated with mud to coarse shell substrata; 7–77 m.

Remarks. The only species of its genus, *Leptosquilla schmeltzii* is recorded for the first time from southern Mozambique. The present specimen agrees in all aspects with the most recent account of *L. schmeltzii* from Madagascar (Manning, 1970a). The unaccepted second *Leptosquilla* species represented by Hansen's (1926) account of *L. schmeltzii* is distinct in bearing a single lobe between the terminal spines of the uropodal protopod, but this addition was rejected as a product of a stylized illustration of the uropod. The present study material agrees with the species accounts by Holthuis (1941) and Manning (1968b; 1970a) in having two lobes present between the terminal spines of the uropodal protopod (Fig. 2.2H). Sexual dimorphism in the form of a more inflated median carina of the telson has been reported in large males exceeding 15 mm total length (Holthuis, 1941) and is confirmed for the male specimen examined herein. The female specimen has six teeth on the left dactylus of the raptorial claw and seven on the right, while the male has seven teeth on both dactyli.

As corrected in Manning (1970a), the present specimens were found to have two epipods instead of the four previously recorded in Manning's (1968b) revision of the family Squillidae. While Hansen (1926) reported 1 epipod present, the material examined herein reflected Manning's (1970a) representation of the species from Madagascar with 2 epipods present. In Ahyong's (2001) most recent key of family Squillidae, the genus *Leptosquilla* is still distinguished via the presence of epipods on maxillipeds 1–4. This error is corrected herein.

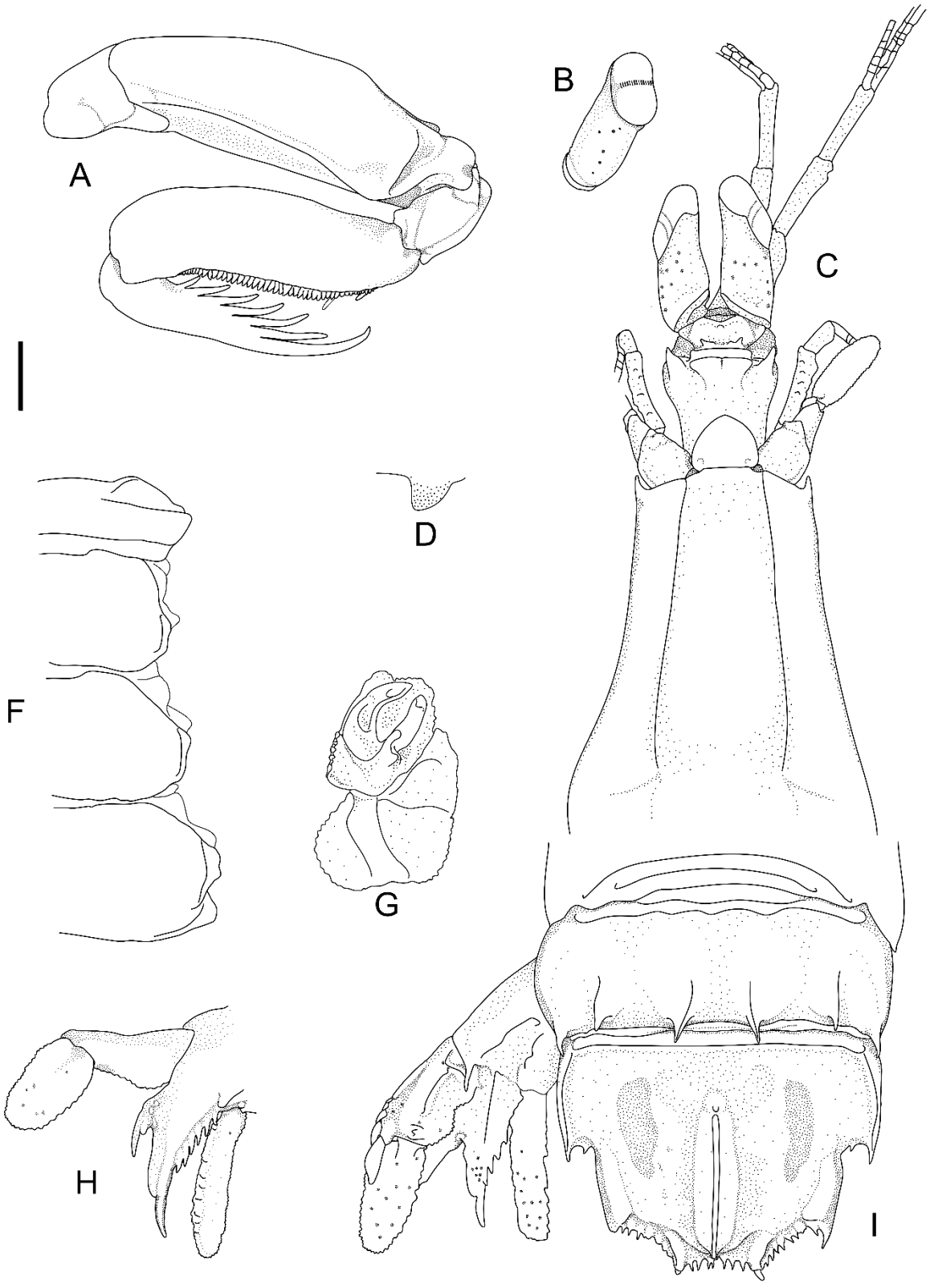

Figure 2.2. *Leptosquilla schmeltzii* (A. Milne-Edwards, 1873) **A–C, F, H–I** female TL 34mm, SAMC–A092092; **D, G** male TL 26mm, SAMC–A092093. **A,** right raptorial claw, lateral; **B,** eye right, lateral; **C,** anterior cephalothorax, dorsal; **D**, TS8 sternal keel, left lateral; **F,** TS5–8, right dorsal; **G**, right pleopod 1 endopod, anterior; **H,** right uropod, ventral; **I**, AS6, telson and left uropod, dorsal. Scale **A–C, F, H–I** = 1mm, **D, G** = 0.5mm.

Genus *Erugosquilla* Manning, 1995

Erugosquilla woodmasoni (Kemp, 1911)

Figure 2.3(A–G)

Squilla wood-masoni Kemp, 1911: 99; 1913: 74–76, pl. V: figs. 63–65 [type locality Madras, India, by lectotype selection (Ahyong, 2001)]. –Stephenson, 1952: 5–6. –Stephenson and McNeill, 1955: 243–244 (part).

Squilla woodmasoni. –Stephenson, 1953a: 42. –Barnard, 1962: 244 (list). –Manning, 1966: 100–101, fig. 5.

Oratosquilla woodmasoni. –Manning, 1971b: 11; 1978c: 36–39, figs. 21–22; 1991: 12–13. –Cannon *et al.*, 1987: 63.

Oratosquilla tweediei Manning, 1971b: 11–14, fig. 4 [type locality Singapore].

Oratosquilla jakartensis Moosa, 1975: 13–17, fig. 1 [type locality Jakarta Bay, Indonesia].

Erugosquilla woodmasoni –Manning, 1995: 200–204, pl. 36, figs. 123b, 124–126, 136k–m. –Ahyong and Manning, 1998: 661. –Ahyong, 2001: 251–253, fig. 123. –R. Liu, 2008: (list).

Material examined. SAMC–A041711 1 male (TL 119 mm), Mozambican Channel, 19°49'00.0"S 36°05'00.0"E, 14 Jun 1994, bottom trawl, 54 m, RV *Algoa* Mozambique SCAD survey, SFI; SAMC–A041709 1 male (TL 115 mm), Mozambican Channel, 17°56'00.0"S 37°42'00.0"E, 17 Jun 1994, bottom trawl, 65 m, same as above.

Diagnosis. Ophthalmic somite anterior margin broadly rounded, with median spinule. A1 somite dorsal processes with obtuse apices, directed anterolaterally. Rostral plate short, broader than long, subtrapezoid. Raptorial claw dactylus with 6 teeth; merus outer inferodistal angle acutely angled or produced to a spine. Abdominal spination as follows SM (4)5–6, IM 3–6, LT 2–6, MG 1–5. Telson MD carina not flanked by rows of tubercles; prelateral lobe length subequal to margin of LT tooth; denticles SM 2–4, IM 7–10, LT 1. Uropodal protopod terminal spines with lobe on outer margin of inner spine rounded to spiniform; exopod proximal segment outer margin with 7–10 movable spines.

Colour in alcohol. Mostly faded, but with definite hints of overall grey-green colouration. Carinae and grooves of carapace, SM and IM carina of body dark. A1 distal segments dark appearing maroon in colour on outer margin. Posterior margins of body somites appear purple. Telson with MD carina and carinae of primary teeth maroon. Uropodal protopod spine appearing dark purple and endopod almost completely dark distally; distal half of proximal segment of exopod and inner half of distal segment dark.

Colour in life (Ahyong, 2001). Overall body colour is generally a uniform pale grey-green, but some specimens bear diffuse concentrations of chromatophores mid-dorsally on the abdominal somites, giving a slightly mottled to somewhat banded appearance. Mid-dorsal surface of telson maroon. Uropodal exopod blue; distal segment dark blue medially, pale blue or clear laterally. A2 protopod red-maroon.

Measurements. Male (n = 2) TL 115–119 mm. CI 363–369. A1 peduncle 0.93–0.98CL. A2 scale 0.66–0.70CL. The largest specimen known at TL 153 mm from Australia (Ahyong, 2001).

Distribution and Habitat. Indonesia, Vietnam, Philippines, Taiwan, Japan and Australia to Western Indian Ocean and now confirmed from Mozambique [Sofala and Zambezia]. Associated with level habitats usually on sandy mud substrates and in sheltered coastal areas; 20–93 m.

Remarks. The present specimens represent the first verifiable record of *Erugosquilla woodmasoni* from the Mozambican Channel. Previously, Barnard (1962) examined a specimen of *E. woodmasoni* collected from Inhaca Island, Maputo Bay, by Dr. W. Macnae and Mrs. M. Kalk, University of Witwatersrand. Barnard's (1962) listing of *E. woodmasoni* included no account of the specimen or justification of the identification other than the species name and named location. As Barnard supplied very little information on this species record and no mention or documentation of the record is found in any relevant literature, an account of *E. woodmasoni* from Mozambican waters is herein given.

The specimens examined by the present study fall within the range of morphological variation documented in Ahyong's (2001) recent account of the species from Australia. In the one specimen the anterior bifurcation of the median carina of the carapace is faintly visible, while in the other it is completely absent (Fig. 2.3B). Both Mozambican specimens exhibited the median spinule on the anterior margin of the ophthalmic somite, but this feature has been found to be absent in previous descriptions of the species (Ahyong, 2001). The shape of the outer inferodistal angle of the merus of the raptorial claw has been recorded to vary from acute to forming a spine, while the specimens examined herein both showed acutely angled outer inferodistal angles of the merus (Fig. 2.3A). The lobe between the spines of the uropodal protopod can be triangular, however, the Mozambican material showed a more rounded lobe (Fig. 2.3F). Ahyong (2001) lists some specimens from Australia and Malaysia with armed SM carina on AS4, but most agree with the present study material and have spines on the SM carinae of AS5–6 (Fig. 2.3G).

Erugosquilla woodmasoni can be distinguished from similar species in the genus by the broad and rounded shape of the anterior margin ophthalmic somite and the acutely shaped outer inferodistal margin of the merus of the raptorial claw. Both features have been previously recorded to vary. However, the anterior margin of the ophthalmic somite is trapezoid to broadly triangular and the outer inferodistal margin of the merus of the raptorial claw is obtusely angled in other species of *Erugosquilla*. Otherwise, the present study material for *E. woodmasoni* agrees in all features and measurements with previous accounts of the species (Manning, 1995; Ahyong, 2001) with 3 SM and 9 and 10 IM telson denticles and 9 movable spines on the outer margin of the uropodal exopod proximal segment. Moreover, at 54 m and 65 m the present specimens represent the deepest collection record of the species. Manning (1995) records the highest abundance of the species from shallow depths of 15–25 m in Cauda and Nha trang Bays, Vietnam. Ahyong (2001) documents specimens found in the shore to around 50 m which most closely resembles the depth distributional recorded herein.

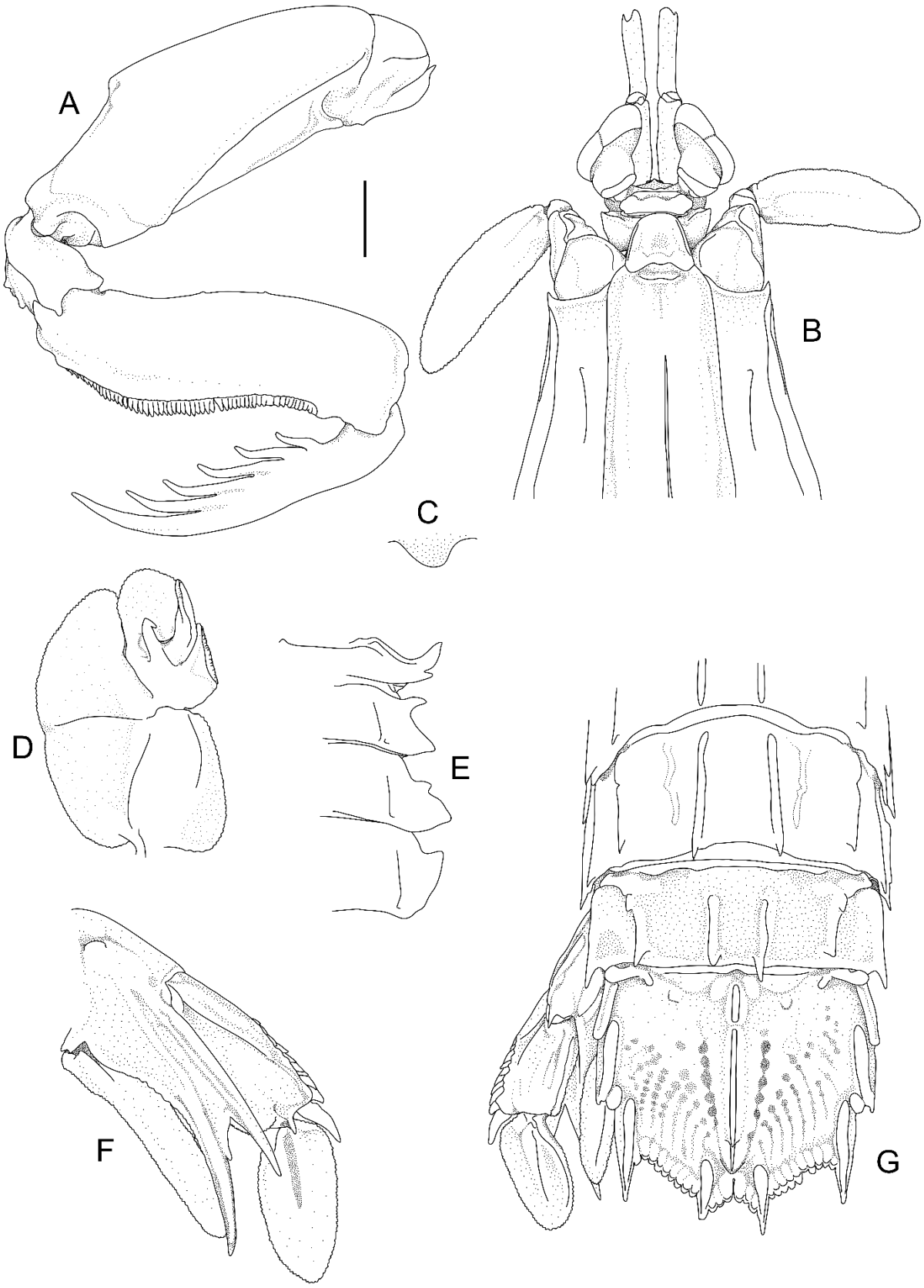

Figure 2.3. *Erugosquilla woodmasoni* (Kemp, 1911), **A, D** male TL 115 mm, SAMC–A041709; **B–C, E–G** male TL 119 mm, SAMC–A041711. **A,** left raptorial claw, lateral; **B,** anterior cephalothorax, dorsal; **C,** TS8 sternal keel, left lateral; **D,** left pleopod 1 endopod, anterior; **E,** TS5–8, right dorsal; **F,** left uropod, ventral; **G**, AS5–6, telson and left uropod, dorsal. Scale **A–B, E–G** = 5 mm, **C–D** = 2.5 mm

Family GONODACTYLIDAE Giesbrecht, 1910

Genus *Gonodactylellus* Manning, 1995

Gonodactylellus choprai (Manning, 1967b), **new record**

Figure 2.4(A–F)

Gonodactylus demani espinosus. –Chopra, 1939: 176. –Ingle, 1963: 28, figs. 26, 56.

Gonodactylellus choprai Manning, 1967b: 16–18, fig. 6 [type locality off Somalia].; 1995: 56 and 57. –Ahyong, 2001: 44, 45.

Material examined. 110E2MOZ475 1 male (TL 17 mm), south of Tofo, Inhambane Province, 24°19'57.4"S 35°26'53.2"E, 20 Oct 2017, 68–91 m, dredge, stat. IIOE2TD2 INV78, RV *Agulhas II*; 110E2MOZ467 1 male (TL 14 mm), Sofala Province, 20°48'35.3"S 35°45'23.8"E, 21 Oct 2017, 61–93 m, dredge, stat. IIOE2M106 INV165, RV *Agulhas II*; 110E2MOZ460 1 male (TL 12.6 mm), stat. IIOE2M106 INV191, same as above.

Diagnosis. Ocular scales small, rounded, separate. Rostral plate anterolateral angles rounded, anterior margins transverse. Mandibular palp 2-segmented. 5 epipods present. TS6–7 lateral process subtruncate, width subequal with TS6 being slightly greater. AS1–4 without posterolateral spine. AS5 with swollen but unarmed carinae; armed posterolaterally. Telson broader than long with SM teeth well-developed with numerous (12–16) denticles present; IM teeth indistinctly formed with 2 or 3 denticles; LT teeth barely present as a faint indentation on lateral margin. Telson without spinules over surface of mid-dorsal carinae. Telson MD carina strongly inflated, tapering posteriorly, and flanked by accessory MD carina that fuse posteriorly with MD carina, accessory MD carina separated from MD carina by a groove in large specimens. SM carina and IM carina present. Uropodal exopod proximal segment without fixed distal spine ventrally; distal segment and the inner margin of proximal segment fringed with setae. Uropodal endopod with inner margin completely fringed with setae, margin serrate for insertion of setae.

Measurements. Male (n = 3) TL 12.6–17.0 mm. A2 scale 0.41–0.55CL. AWCLI 750–880. The largest specimen recorded by Chopra (1939) at TL 22 mm.

Distribution and Habitat. Known only from the north-western Indian Ocean; Red Sea, South Arabian coast (Chopra, 1939), Somalia (Manning, 1967b), and now from Mozambique [Inhambane and Sofala]. Recorded for depths 70–82 m. Chopra (1939) recorded much shallower depths of 29–38 m for the species associated with thalloid red algae.

Remarks. This is the first record of *Gonodactyellus choprai* from Mozambique as well as southern Africa. The most recent report on this species is Manning's (1967b) description from Somalia which suggests that this species is inconspicuous or possibly quite rare. However, three specimens from three separate locations were collected on a cruise along the coast of Mozambique and northward into Tanzania in 2017–2018. This species is relatively small, the largest specimen was recorded by Chopra (1939) at 22 mm in total length, while the largest specimen documented herein was only 17 mm.

The three specimens examined in the present series agree well with the holotype presented by Manning (1967b). Some variation in telson carinae form was observed for the present specimens compared to the holotypic illustration. All examined specimens had accessory median carinae that were fused posteriorly with the median carina and flanked by small inner bumps posteriorly (Fig. 2.4F, G). This variation has yet to be

described for the species. *Gonodactyellus choprai* can be distinguished from all other *Gonodactylellus* by the absence of the fixed distal spine on the proximal segment of the uropodal exopod. It can easily be identified from other species of *Gonodactylellus* recorded for South Africa as it is also the only species to have a 2-segmented mandibular palp and that lacks the numerous spines dorsally on the telson.

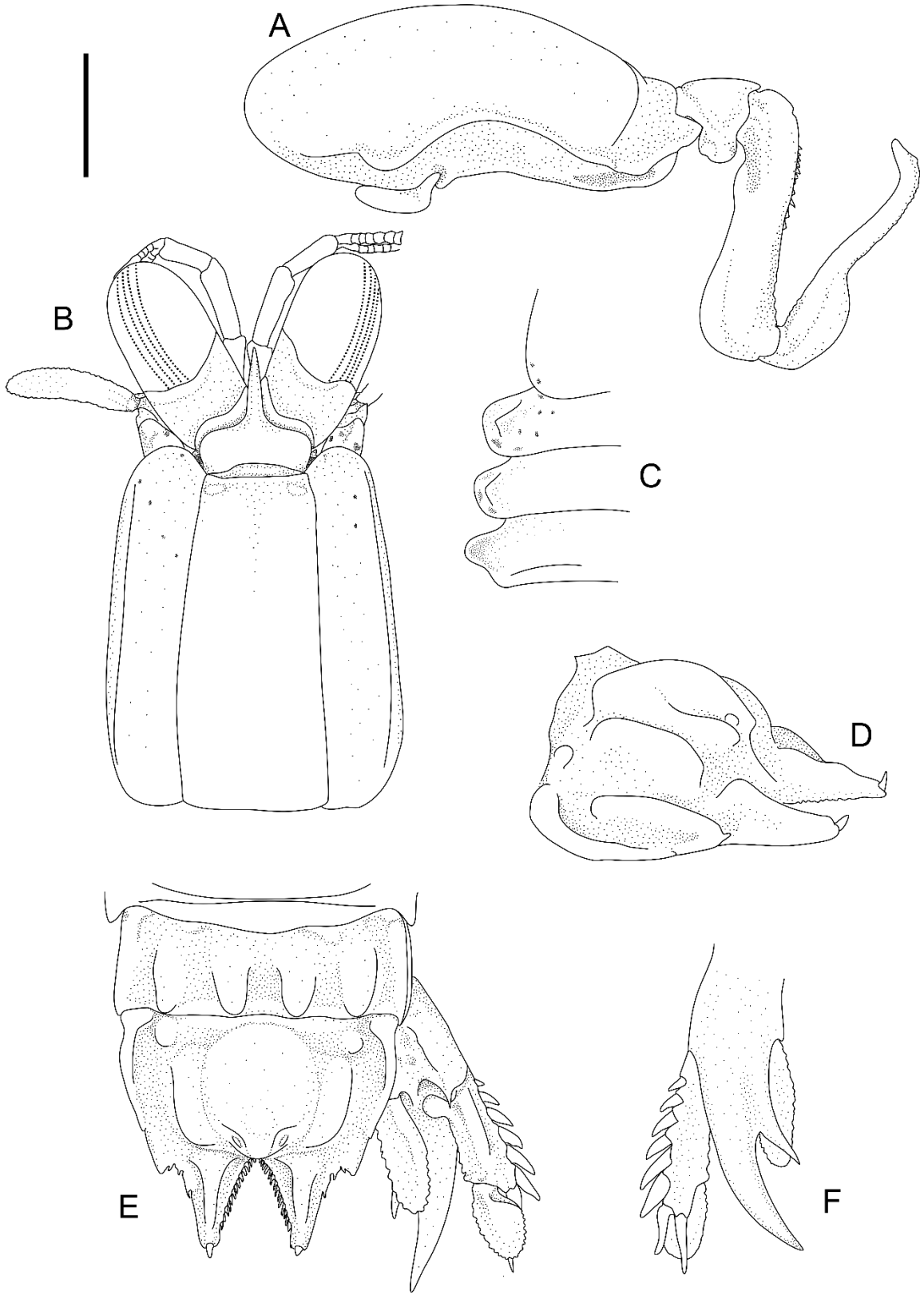

Figure 2.4. *Gonodactylellus choprai* (Manning, 1967b), male TL 14mm, 110E2MOZ467. **A**, right raptorial claw, lateral; **B**, anterior cephalothorax, dorsal; **C**, AS6–8, left dorsal; **D**, telson, right lateral; **E**, AS6, telson and right uropod, dorsal; **F**, right uropod, ventral. Scale **A–F** = 1mm

Genus *Gonodactylus* Berthold, 1827

Gonodactylus botti Manning, 1975b, **new record**

Gonodactylus chiragra. –Holthuis, 1967b: 26, 41 (list), fig. 7a. –Tirmizi and Manning, 1968: 21, fig. 7. [not *G. chiragra* (Fabricius 1781)].

Gonodactylus botti Manning, 1975b: 289, fig. 1 [type locality: Jakarta, Indonesia]. –Manning and Lewinsohn, 1986: 5, 15 (list), fig. 3. –Manning, 1990: 97, 104 (key). –Cappola and Manning, 1995: 274–275.

Not *Gonodactylus botti*. –Moosa, 1991: 155 [*Gonodactylellus affinis* (de Man, 1902)].

Material examined. SAMC–A019434, 1 male (TL 53 mm) 1 female (TL 40 mm), Coconut Bay, 24°00'21.6"S 35°30'28.7"E, 17 May 1973, depth unknown, event no. 19730517.

Colour in alcohol. Faded yellow, but with scattered blue pigment on all limbs and uropods. Dactylus of raptorial claw white. Raptorial claw with 'meral spot' also white. Colour in life unknown.

Measurements. Male (n = 1) TL 53 mm. A1 peduncle 6.0CL. A2 scale 0.58CL. AWCLI 755.

Distribution and Habitat. Indonesia to the Western Indian Ocean from Pakistan, Red Sea, Persian Gulf, Somalia, South Africa and now Mozambique [Inhambane]. Found in coral reef systems. Both sandy and rocky tidal pools at the base of dead coral in shallow water; shore to 13.5 m (Ahyong, 2005).

Remarks. As *Gonodactylus botti* is presently understood, historical species records are restricted to localities west of Pakistan (Ahyong, 2005). First recorded from southern African by Ahyong (2005) for the coral reefs of Sodwana Bay, South Africa [KZN]. This single male specimen from Coconut Bay is the first account of the species from Mozambique.

Family ODONTODACTYLIDAE Manning, 1980

Genus *Odontodactylus* Bigelow, 1893

Odontodactylus japonicus (de Haan, 1844), **new record**

Figure 2.5(A–F)

Gonodactylus japonicus de Haan, 1844, pl. 51: fig. 7 [type locality Japan]; 1849: 255 [text]. –Miers, 1880: 116.

Gonodactylus edwardsii Berthold, 1845: 48.

Odontodactylus japonicus. –Alexander, 1916: 10. –Holthuis, 1941: 276. –Stephenson and McNeill, 1955: 248–249. –Stephenson, 1960: 61. –Manning, 1965: 260; 1967c: 7–10, fig. 2. –Graham *et al.* 1993b: 73. –Yamaguchi and Baba, 1993: 176–178, fig. 9. –Manning, 1995: 20, 82. –Ahyong and Norrington, 1997: 103. –Moosa, 2000: (list). –Ahyong, 2001: 81–83, fig. 39. –R. Liu, 2008: 1267 (list).

Material examined. SAMC–A041710 1 female (TL 110 mm), north of Beire, 19°49'00.0"S 36°05'00.0"E, 14 Jun 1994, 54 m, bottom trawl, coll. RV *Algoa* Mozambique Scad Survey, SFI.

Diagnosis. Ocular scales oblique to bodyline, appressed medially. A2 scale with anterior margin smooth, without setae in adults. Rostral plate triangular but appearing trapezoid dorsally; lateral margins sinuous; apex deflexed. Raptorial claw dactylus with 5–8 teeth on inner margin; proximal margin strongly inflated; without basal notch. AS1–5 posterolateral angles rounded, unarmed in adults. Telson mid-dorsal surface with distinct MD carina and 4 longitudinal carinae either side of midline (double accessory MD; anterior SM; carina of inner IM denticle) in addition to carinae of primary teeth. Uropodal exopod proximal distinctly longer than distal segment; outer margin with 10–12 movable spines, distalmost evenly tapering (juveniles) to spatulate with blunt or minute spinular apex (adults).

Colour in alcohol. Faded to creamy yellow with telson still retaining salmon colour of live specimen. Eyes green. Uropod exopod distal segment dark and proximal segment with distal third dark. Uropodal protopod, exopod proximal segment and endopod covered in dark speckles.

Colour in life. Overall colour salmon (Ahyong, 2001) or males' bright salmon red; females' salmon red anteriorly and blue, green posteriorly (Manning, 1967c). A2 scale salmon proximally, pink distally. Uropods yellow; exopod with outer movable spines yellow orange with blue posterior margin; endopod and distal segment of exopod with red setae.

Measurements. Female (n = 1) TL 110 mm. CI 404. A1 peduncle 0.60CL. A2 scale 0.98CL. Uropod exopod distal segment length 1.69 times proximal segment length. The largest specimen is reported from Australia at TL 175 mm (Ahyong, 2001).

Distribution and Habitat. Indo-West Pacific; Australia and Japan to Western Indian Ocean from Seychelles, Madagascar, and now southern Mozambique [Sofala]. Associated with flat sandy or shelly substrata from depths 30–100 m.

Remarks. This is a new record for the Mozambican Channel, however, *Odontodactylus japonicus* has been reported from Madagascar not far from the locality recorded herein. The Madagascan specimen described by Manning (1967c) was collected from Ambovombe's southern coast in shallow water at around 60 m, a similar depth to the female specimen collected from the Mozambican channel at 54 m. The present specimen agrees in all aspects with Manning's (1967c) diagnosis of the species, as well as the most recent report by Ahyong (2001) of *O. japonicus* from Australia.

Only *O. scyllarus* and *O. hawaiiensis* Manning, 1967c share the appressed ocular scales and the double accessory MD carinae either side of MD carina of telson with *O. japonicus*. *Odontodactylus japonicus* is distinguished from these similar species in having the longitudinal carina extending anteriorly from the inner IM denticle of the telson (Fig. 2.5E), as well as the absence of a posterolateral spine on AS5 in adults (Fig. 2.5C). In addition, the number of teeth on the dactylus of the raptorial claw differs between the species; while *O. scyllarus* has two or three teeth, *O. hawaiiensis* and *O. japonicus* have more than five teeth. *Odontodactylus hawaiiensis* has not yet been recorded off the main continent of southern Africa.

Postlarvae settle at sizes of 19–20 mm. Along with the juveniles of *Odontodactylus japonicus,* the postlarvae differ from adult specimens in the following characteristics diagnostic for the species: the antennal scale bears setae on its anterior margin and a posterolateral spine on AS(3)4–5, the distal movable spines on the proximal segment of the uropodal exopod are spiniform instead of spatulate and the second accessory MD carina of the telson is underdeveloped (Manning, 1967c; Ahyong, 2001). Specimens above TL 60 mm are considered adult and exhibit 'adult' diagnostic features (Fig. 2.5A–F). No juvenile specimens were available to the present study.

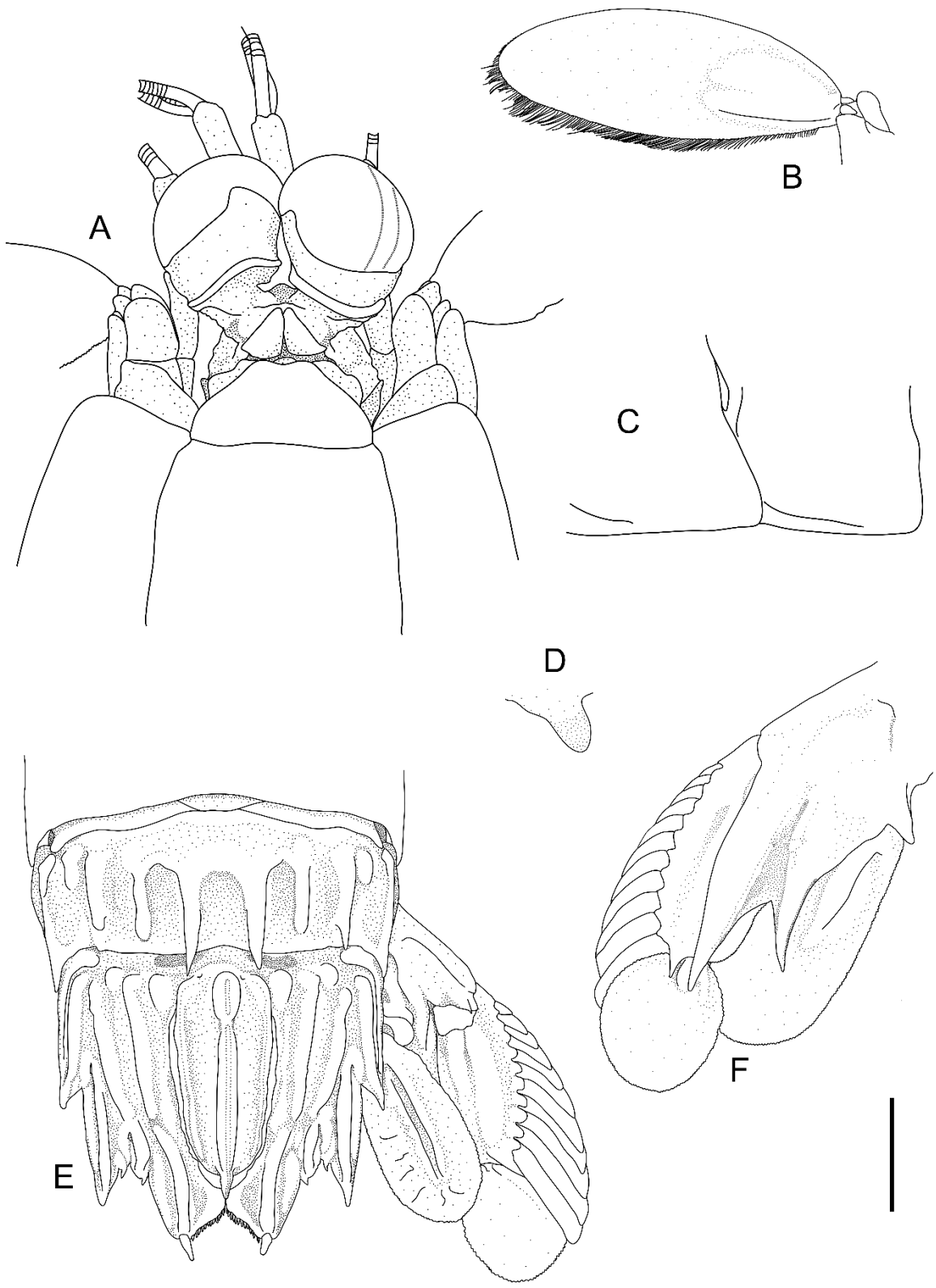

Figure 2.5. *Odontodactylus japonicus* (de Haan, 1844), female TL 110mm, SAMC–A041710. **A,** anterior cephalothorax, dorsal; **B,** right antennal scale, dorsal; **C**, AS4–5, left lateral; **D**, TS8 sternal keel, left lateral; **E,** AS6, telson and right uropod, dorsal; **F**, right uropod, ventral. Scale **A, C, F–E** = 5 mm, **B** = 10 mm, **D** = 2.5 mm.

Odontodactylus latirostris Borradaile, 1907, **new record**

Figure 2.6(A–F)

Odontodactylus latirostris Borradaile, 1907: 212, pl. 22: figs. 3, 3a [type locality Amirante Islands, Seychelles]; –Debelius, 1999:280–281. –Ahyong, 2001: 83–85, fig. 40. –Ahyong *et al.* 2020: 6 [chart].

Odontodactylus southwelli Kemp, 1911: 94; 1913: 142, pl. 9: figs. 103–106 [type locality Andaman Island].

Odontodactylus japonicus. –Stephenson, 1962: 35 [not *Odontodactylus japonicus* (de Haan, 1844)].

Odontodactylus brevirostris. –Manning, 1967c: 23. –Moosa, 1991: 161–162 [not *O. brevirostris* (Miers, 1884)].

Material examined. SAMC–A079415 1 male (TL 52 mm), Maputo Bay, 1–7 Nov 1900, depth unknown, coll. R. Trott.

Diagnosis. Ocular scales separated by deep concavity, margins truncate. A2 scale posterior and at most anterior distal 0.33 setose in smallest specimens; anterior setae becoming reduced with size, absent in adults. Rostral plate ovoid, apex rounded. Raptorial claw dactylus with 7 or 8 teeth on inner margin. TS6–7 lateral margins rounded, that of TS6 slightly broader and flatter than that of TS7. AS(4)5 with posterolateral spine. Telson mid-dorsal surface with distinct MD carina and 2 longitudinal carinae either side of midline (accessory MD; anterior SM) in addition to carinae of primary teeth. Uropodal exopod proximal segment entirely or almost entirely black, outer margin with 9 or 10 movable spines; exopod distal segment subequal to or longer than proximal segment; endopod with 2 subequal dorsal carinae and 1 ventral carina.

Colour in alcohol. Base dorsal colour dark brown but with faint blue colouration laterally on carapace and posterior margin of abdominal somites. Definite suggestions of blue distal colouration on all primary teeth of telson and on movable spines of exopod proximal segment. Uropod with black band across proximal segment of exopod, adjacent to protopod and endopod.

Colour in life. According to Ahyong (2001), overall colour is a mottled light brown on white-cream, with darker brown mid-dorsal surface of TS6–7 white with tan-brown mottling dorsally. Uropod with black band across proximal segment of exopod, adjacent protopod and endopod; exopod distal segment and A2 scale pink.

Measurements. Male (n = 1) TL 52 mm. Uropodal exopod distal segment length 1.05 times proximal segment length. The largest known specimen at TL 77 mm reported from Western Australia (Ahyong, 2001).

Distribution: Amirante Islands to Andaman Sea, Indonesia, New Caledonia, Australia, and now southern Mozambique [Maputo]; depths previously recorded between 20–147 m.

Remarks. Morphologically the Mozambican specimen agrees well with Ahyong's (2001) account of the species, as well as his designated lectotype [locality Amirante Islands, Seychelles; TL 53 mm]. *Odontodactylus latirostris* is distinguished from other similar species in the 'brevirostris complex' in having reduced setation of the anterior margin of the antennal scale, the absence of a posterolateral spine on AS3, as well as an almost entirely or entirely black proximal segment of the uropodal exopod and in having the distal segment exceed in length the proximal segment of the uropodal exopod.

Some allometric variation has been recorded for the degree of antennal scale setation, the presence of a posterolateral spine on AS4 (missing in large specimens) and the relative lengths of the uropodal exopod segments. In juvenile specimens (TL 17 mm) the antennal scale was fully setose, while in larger specimens only

posteriorly setose (Ahyong, 2001). As specimens grow larger, the uropodal exopod distal segment increases in relative size and can be shorter than the proximal segment in juveniles and only subequal in length in midrange specimens (TL 45 mm) to distinctly longer in large specimens (Ahyong, 2001). The present specimen (TL 52 mm) from Maputo Bay, Mozambique, exhibited the typical *O. latirostris* antennal setation; only posterior setose present with anterior setae absent (Fig. 2.6B). Furthermore, the posterolateral spine was present on AS3 and the relative lengths of the proximal and distal segments of the uropodal exopod were subequal with the distal segment only slightly longer than the proximal (Fig. 2.6E, F). The dactylus of the raptorial claw has eight teeth and the outer margin of the uropodal exopod proximal segment shows ten movable spines (Fig. 2.6F).

However, live colour according to Ahyong (2001) only partly agrees with the observations of the Mozambican specimen presented herein and no other documentation of live colouration is available. According to the lectotype designated by Ahyong (2001), no blue colouration is recorded for the species. As the present study only examined preserved material it is possible that the blue tint is due to some unknown discolouration since its collection in 1900.

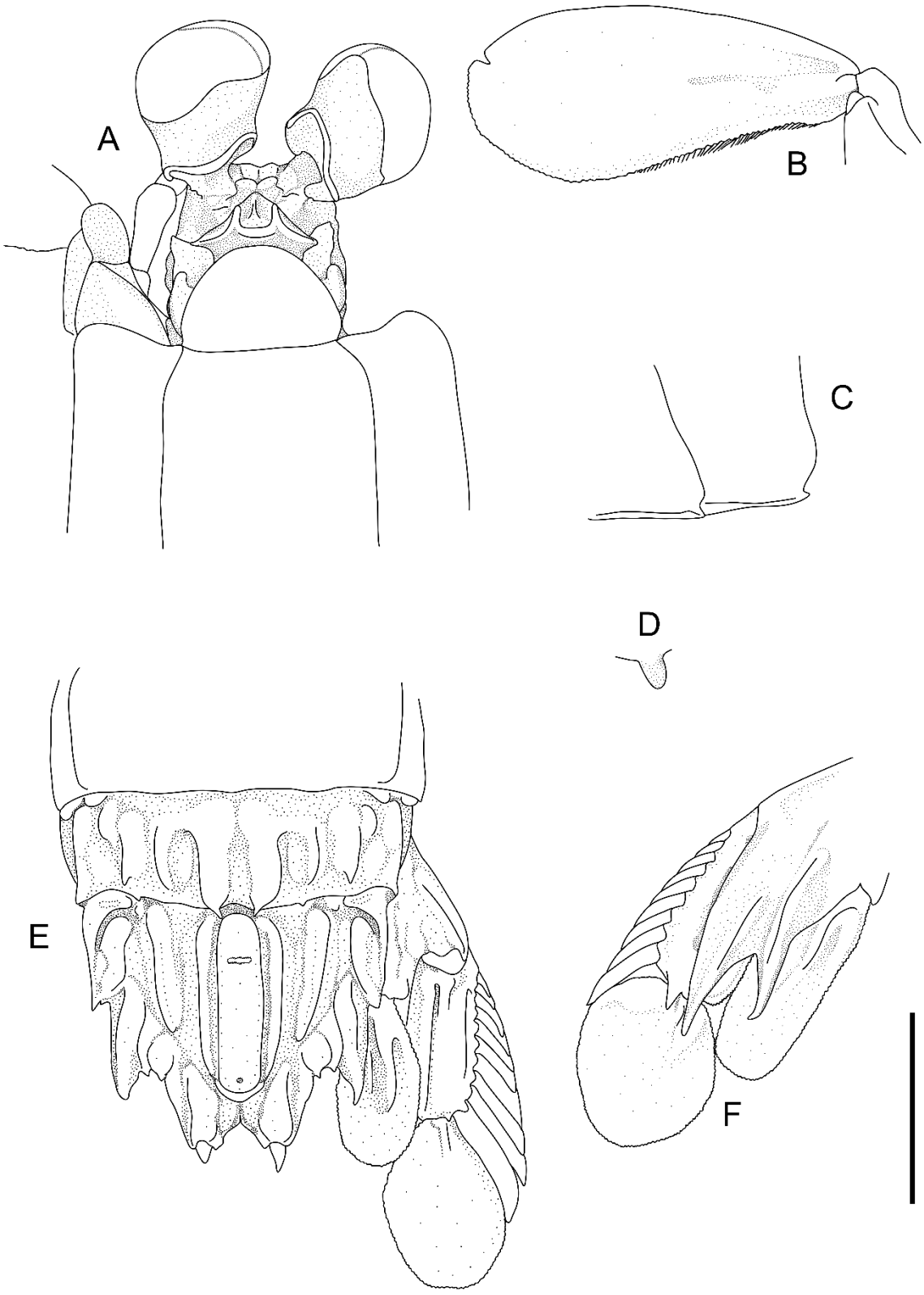

Figure 2.6. *Odontodactylus latirostris* Borradaile, 1907, male TL 52 mm, SAMC–A079415. **A,** Anterior cephalothorax, dorsal; **B**, right antennal scale, dorsal; **C,** AS4–5, left lateral; **D**, TS8 sternal keel, left lateral; **E,** AS5–6, telson and right uropod, dorsal; **F,** right uropod, ventral. Scale **A–F** = 5 mm.

DISCUSSION

Eight species of mantis shrimp are reported on, representing seven new species records and one notable record from within the Mozambican Exclusive Economic Zone (EEZ). These records represent seven genera and four families (Table 2.1). *Manningia australiensis*, reported here from the Mozambique Channel, is also the first record of the family Eurysquillidae for southern Africa. Three of the seven new species additions are from the family Squillidae. Of these, *Clorida albolitura* is recorded for the first time from Mozambique and has also recently been recorded for the first time from South Africa (previous chapter). Two new species records of Gonodactylidae are reported on, now bringing the total members of this family known to five species occurring in Mozambican waters. Two new records were added for the family Odontodactylidae, now consisting of three known species recorded. With the present addition of the seven new species records, 22 species in 17 genera and eight families are now known from Mozambique (Table 2.1).

While the global taxonomic knowledge of stomatopods has dramatically improved over the course of the last century, the continued accumulation of unidentified or misidentified stomatopod material in the Iziko South African Museum revealed several interesting discoveries. For example, the specimen of *O. latirostris* examined herein was collected in 1900 and had been stored in the Iziko South African Museum for over a century before being identified. This *O. latirostris* specimen was collected by R. Trott from Maputo Bay in 1900, before the species was even described by Borradaile in 1907. This highlights the necessity of continuing the taxonomic work on our growing biological collections.

Examination of the present study material found new species records to be predominantly gonodactyloids (*Gonodactylellus choprai*; *Gonodactylus botti*, *Odontodactylus japonicus* and *O. latirostris*). In general, species of *Odontodactylus* are widely distributed in the Indo-West Pacific and are associated with rocky or coral reef habitats in tropical waters. Difficult to differentiate, recent work by Ahyong (2001) on the so called '*brevirostris* complex' has elevated six more mantis shrimps to species rank. One of these newly distinguished species, *O. latirostris,* is now recognised from Maputo Bay, Mozambique. Globally the genus *Odontodactylus* is well-studied (Manning, 1967c; 1995; Ahyong, 2001; 2002; 2012) and the species reported herein are comparatively well-known in the Indo-West Pacific. *Gonodactylellus* is much less well-documented, probably due to its small size (< 25 mm) and inconspicuous nature. The examined species *G. choprai* was previously only recorded from the Northern Indian Ocean (Manning, 1967b), thus, this study extends the species range into the Western Indian Ocean. Another noteworthy range extension is *Manningia australiensis*, which had previously never been documented from the African continent. This species appears to be widespread with a distribution extending from Mozambique and the north and east Indian Ocean to the Western Pacific.

The two species of the family Squillidae, *Leptosquilla schmeltzii* and *Clorida albolitura,* are also both widespread in the Indo-West Pacific and have been previously recorded from the Western Indian Ocean, as well as from Madagascar. Therefore, it is not surprising that both species occur off Mozambique, as confirmed herein. Both species of Squillidae have similar burrowing lifestyles and substrate preferences for soft bottoms of muddy sand. Although no specimen of *L. schmeltzii* has yet been found in South Africa, the species recorded proximity to the South African border suggests *L. schmeltzii* probably also occurs in South African waters.

It is apparent that some species and genera represented in the present series have needed revision and illustration for some time. Stylized drawings from historical publications have caused some confusion of diagnostic features for such species as *L. schmeltzii* from the monotypic genus *Leptosquilla*. An error in epipod

count of four epipods instead of two by Hansen (1926) and Manning (1968b) was reiterated for *Leptosquilla* in the latest key of family Squillidae (Ahyong, 2001). Although temporarily corrected by Manning (1970a), this error is herein rectified with the correct number of two epipods present for the maxillipeds of *L. schmeltzii*. Moreover, in a single and short entry, Barnard (1962) recorded *Erugosquilla woodmasoni* (as *Squilla woodmasoni*) from off Inhaca Island, Maputo Bay, Mozambique. However, the record consisted of only the species name and location and thus the species account could not be verified without supporting habitat and specimen description data. Furthermore, without collection data it is unclear where Barnard's specimen was deposited, as no specimen fitting Barnard's account of the species was found in the Iziko South African Museum collection. The two specimens illustrated herein represent new records and confirms the species occurrence from the Western Indian Ocean and the Mozambican Channel.

Overall, the species additions of the stomatopod fauna in this study are mostly of recognizable and well-documented species. However, it is more than apparent that the Mozambican mantis shrimps remain particularly under-sampled and underrepresented in scientific literature. The lack of biodiversity knowledge for Mozambique is evident in the limited sampling effort and comparing the species number of only 22 reported species from a highly diverse country to other areas in the world. The present study consolidates and updates our knowledge using already collected and preserved material from the Iziko South African Museum. A more targeted and extensive sampling effort would have the potential to greatly increase the diversity knowledge of the local fauna of Mozambique.

Table 2.1. **Summary of Mozambican stomatopod fauna giving previous and present species records.** Species treated in the present study given in bold and new species records represented by *****. Provinces given **[]** for localities in the Mozambican Channel. **In total, seven new species records are added to the stomatopod fauna of Mozambique, accounting for 30 % of all known national species**.

Updated family and species	**Location**	**Reference**	**Recorded as**
EURYSQUILLIDAE			
Manningia australiensis Manning, 1970c *****	Mozambican Channel [Sofala]	**Present study**	
GONODACTYLIDAE			
Gonodactylaceus falcatus (Forskål, 1775)	Maputo Bay	Barnard (1950)	*Gonodactylus glabrous* Brooks, 1886
Gonodactylellus choprai (Manning, 1967b) *****	Mozambican Channel [Inhambane; Sofala]	**Present Study**	
Gonodactylellus lanchesteri (Manning, 1967b)	Maputo Bay Vilankulos Mozambican islands Magaruque Island	Barnard (1950) **Present study**	*Gonodactylus demanii* Henderson, 1893

Gonodactylus botti Manning, 1975b *****	Coconut Bay	**Present study**	
Gonodactylus chiragra (Fabricius, 1781)	Unknown	Hilgendorf (1879)	
ODONTODACTYLIDAE			
Odontodactylus scyllarus (Linnaeus, 1758)	Inhaca Island	Barnard (1958)	
Odontodactylus japonicus *(de Haan, 1844)* *****	Mozambican Channel [Sofala]	**Present Study**	
Odontodactylus latirostris *Borradaile, 1907* *****	Maputo Bay	**Present Study**	
PSEUDOSQUILLIDAE			
Pseudosquilla ciliata (Fabricius, 1787)	Maputo Bay	Barnard (1950)	
	Inhaca Island	**Present study**	
LYSIOSQUILLIDEA			
Lysiosquilla maculata (Fabricius, 1793)	Maputo Bay	Barnard (1950)	
	Inhaca Island	Kalk (1958)	
PARASQUILLIDEA			
Faughnia profunda Manning and Makarov, 1978	Maputo Bay	Manning and Makarov (1978)	
NANNOSQUILIDAE			
Bigelowina phalangium	Inhaca Island	Barnard (1962)	*Lysiosquilla acanthocarpus* (Claus, 1871)
Keppelius hystricotelson (Barnard, 1958)	Maputo Bay	Barnard (1958)	
SQUILLOIDEA			
Alima neptuni (Linnaeus, 1768)	Maputo Bay	Barnard (1950)	*Squilla hieroglyphica* Kemp, 1911
Clorida albolitura Ahyong and Naiyanetr, 2000 *****	Unknown	**Present study**	
Clorida latreillei Eydoux and Souleyet, 1842	Maputo Bay	Barnard (1950)	*Squilla latreillei* (Eydoux and Souleyet, 1842)
Erugosquilla woodmasoni (Kemp, 1911)	Inhaca Island,	Barnard (1962)	*Squilla woodmasoni* Kemp, 1911
	Mozambican Channel [Sofala; Zambezia]	**Present study**	
Kempella mikado (Kemp and Chopra, 1921)	Mozambican Channel [unknown]	Barnard (1950)	*Squilla mikado* Kemp and Chopra, 1921
		Present study	

Leptosquilla schmeltzii, (A. Milne-Edwards, 1873) *****	Morrumbene Estuary	**Present study**	
Lenisquilla lata (Brooks, 1886)	Mozambican Channel [Gaza]	Manning (1969a)	*Squilla lata* Brooks, 1886
Miyakella nepa (Latreille in Latreille, Le Peletier, Serville and Guérin, 1828)	Maputo Bay	Barnard (1950)	*Squilla nepa* Latreille, 1828

Conclusion

The overall aim of this thesis was to examine the accumulated stomatopod material housed in the Iziko South African Museum collection, Cape Town, in order to document additional species records and produce an illustrated guide to the South African stomatopod fauna. As the collection also contains material from Mozambique this was also examined, new species records reported on and an updated taxonomic listing of the Stomatopod fauna of Mozambique presented. **Chapter 1** is the main taxonomic treatment of this thesis as it investigates the South African Stomatopoda in the form of a guide to the regional fauna produced from both examined museum specimens and literature accounts for the region. **Chapter 2** is an account of the new and notable species records for Mozambique represented in the museum collection and includes an updated national list of the Mozambican stomatopod fauna.

Despite being an important part of the marine benthos, the taxonomic treatment of mantis shrimps in South Africa has been minimal, with the last descriptive summary of the group being that by Barnard (1950). The last 70 years has seen a scattering of species additions and revisions, but no complete synthesis of the group. As a result, field identification has been difficult, perhaps resulting in a limited number of new species records and the underrepresentation of the group's diversity in biological research. Furthermore, there has been a recent push to generate up-to-date foundational knowledge on marine species, especially invertebrates, thereby, informing national marine assessments to effectively analyse South African marine biodiversity.

The main product of this study is the fully illustrated identification guide to the South African stomatopod fauna presented in **Chapter 1**. Detailed taxonomic data are recorded for all known stomatopod species, increasing the number of officially reported species from 26 to 31. For these 31 species, taxonomic drawings were provided for 27 for which material was available. Point-locality distribution maps were produced showing the South African distributions of each species, including geographical range extensions and new records. Taxonomic accounts are given for superfamily, family, genera and species for each regional species account to provide a reference for the identification of South African stomatopods.

Of the new South African species records, the little-known *Gonodactylellus crosnieri* and *Odontodactylus hansenii* were previously only known from the Western Indian Ocean and the present study extends their distributions southward to the east coast of South Africa, off the coast of KwaZulu-Natal. Both species are considered tropical species and therefore, South Africa is most likely their southeastern distributional limit. The same is expected of the distributional limits of *O. scyllarus*, a species known to be widespread in the Indo-West Pacific, but officially recorded for the first time from South Africa in the present study. Meanwhile, the global distribution of *Clorida albolitura,* which is widespread in the Indo-West Pacific and has recently been extended to include the Mediterranean, is now further expanded to include South Africa and Mozambique.

A remarkable range extension from the eastern Indian Ocean to South Africa is reported for *Lysiosquilla colemani* reported herein from the temperate waters of the South African south coast. Only previously recorded for Australia, this species identification is in some doubt and the specimens should be compared to the Australian holotypic material. With further study, it is possible that these specimens will be found to represent a new species of *Lysiosquilla* for South Africa. Within South Africa, the recorded range of the endemic *Lysiosquilla capensis* is extended northward from the south coast to the east coast as far north as Coffee Bay in the Eastern Cape. This species exhibits a remarkably wide distribution within South Africa, extending to include three of the six defined ecoregions.

The highly abundant west and south coast endemic, *Pterygosquilla capensis*, is reviewed and compared to other *Pterygosquilla* species. Considerable morphological variation was found and illustrated for characteristics diagnostic for species of *Pterygosquilla,* as well as the genus within Squillidae. The species is highly abundant in the museum collection, yet the knowledge on the species is very poor and requires major taxonomic attention in the future.

Chapter 2 reports on the stomatopod fauna of Mozambique. A brief summary of the known stomatopods from Mozambique is given and taxonomic accounts of new or notable species records presented. Based on specimens housed in the Iziko South African Museum, full accounts of seven species are given as first-time records, bringing the known number of stomatopods from Mozambique to 22 species. The eighth species record is an account of the poorly documented *Eruogosquilla woodmasoni*, which is fully reported on and illustrated from new material. The Mozambican record of *Manningia australiensis* is the first record of that species from the Western Indian Ocean and the first record of family Eurysquillidae from southern Africa. New variation in telson ornamentation is recorded for specimens *Gonodactylellus choprai* and the reported number of two epipods for the maxillipeds is corrected and fixed for the monotypic genus *Leptosquilla*.

Comparing the species diversity of southern African stomatopods with those of well-sampled and better studied marine regions, strongly suggests that the true diversity of these animals is under-represented in South African museum collections. Much remains to be studied for the southern African stomatopod fauna, and even more so for the rest of the African continent. The specimens examined herein were predominantly collected during the last century using non-specific methods, such as offshore trawling and dredging on soft sediments. However, the inconspicuous nature of certain groups of stomatopods, means that the abundance and diversity of these animals is sure to be much greater than that represented in the Iziko South African Museum collection. The future introduction of habitat-specific sampling for targeted groups of stomatopods will most likely produce many more species from the waters off both South Africa and Mozambique. The sampling of fresh material would also have the advantage of documenting species colouration, which is currently not available for many regional species. Colour in life is known to be an important diagnostic tool for certain genera, most obvious in features like the ‘eye-spots’ on the carapace in *Raoulserenea*. While this study will hopefully make it much easier for regional researchers to accurately identify stomatopods, much remains to be done before the regional fauna can be considered well-described.

REFERENCES

Abelló, P., Macpherson, E. 1990. Influence of environmental conditions on the distribution of *Pterygosquilla armata capensis* (Crustacea: Stomatopoda) off Namibia. *South African Journal of Marine Science*, 9(1), 169–175.

Adkison, D.L., Hopkins, T.S. 1984. *Tectasquilla lutzae*, new genus and species (Crustacea: Stomatopoda: Lysiosquillidae) from the Gulf of Mexico. *Proceedings of the Biological Society of Washington,* 97(3), 532–537.

Ahyong, S.T. 1997. A new species of *Manningia* (Crustacea: Stomatopoda) from Irian Jaya, Indonesia, with remarks on the genus. *Raffles Bulletin of Zoology,* 45(2), 327–333.

Ahyong, S.T. 2001. Revision of the Australian Stomatopod Crustacea. *Records of the Australian Museum*, supplement 26, 1–326.

Ahyong, S.T. 2002a. A new species and new records of Stomatopoda from Hawaii. *Crustaceana*, 75(6), 827–840.

Ahyong, S.T. 2002b. Stomatopoda (Crustacea) from the Marquesas Islands: results of the MUSORSTOM 9. *Zoosystema*, 24(2), 347–372.

Ahyong, S.T. 2002c. A new mantis shrimp of the genus *Chorisquilla* Manning, 1969 from French Polynesia (Crustacea: Stomatopoda: Protosquillidae). *Proceedings of the Biological Society of Washington,* 115 (4), 737–740.

Ahyong, S.T. 2004. New species and new records of stomatopod Crustacea from the Philippines. *Zootaxa,* 793, 1–28.

Ahyong, S.T. 2005. Coral reef mantis shrimps from the vicinity of Sodwana Bay, South Africa (Crustacea: Stomatopoda). *Proceedings of the Biological Society of Washington,* 118(1), 158–164.

Ahyong, S.T. 2007. Shallow water Stomatopoda of New Caledonia (0–100 m). In: Payri, C.E., Richer de Forges, B. (eds.). *Compendium of marine species of New Caledonia* Vol. 2(7). Documentation Scientifique et Technique. IRD Nouméa, Nouméa, New Caledonia, pp. 333–335.

Ahyong, S.T. 2008. Stomatopod Crustacea of the Dampier Archipelago, Western Australia. *Records of the Western Australian Museum*, 73, 41–55.

Ahyong, S.T. 2010a. A new genus and two new species of mantis shrimp from the western Pacific (Stomatopoda: Gonodactyloidea: Protosquillidae). *Journal of Crustacean Biology,* 30, 141–145.

Ahyong, S.T. 2010b. New species and new records of Caridea (Hippolytidae, Pasiphaeidae) from New Zealand. *Zootaxa*, 2372, 341–357.

Ahyong, S.T. 2012. The marine fauna of New Zealand: mantis shrimps (Crustacea: Stomatopoda). *NIWA Biodiversity Memoir*, 125, 1–111.

Ahyong, S.T. 2013. Stomatopoda collected primarily by the Philippine AURORA expedition (Crustacea, Squilloidea). *Tropical Deep-Sea Benthos,* 27, 85–106.

Ahyong, S.T. 2014. Stomatopod Crustacea of Christmas Island and the Cocos (Keeling) Islands. *Raffles Bulletin of Zoology*, supplement 30, 246–254.

Ahyong, S.T. 2016. Results of the Comprehensive Marine Biodiversity Survey International Workshops 2012 and 2013: Stomatopod Crustacea. *Raffles Bulletin of Zoology,* supplement 34, 455–469.

Ahyong, S.T. 2017. Stomatopod Crustacea of the Austral and Gambier Islands, French Polynesia. *Zootaxa*, 4286(4), 555–564.

Ahyong S.T. 2021. *Gonodactylellus spiridonovi* sp. n., a new species of coral reef mantis shrimp from the Red Sea (Crustacea: Stomatopoda: Gonodactylidae). *Arthropoda Selecta,* 30(3), 295–298.

Ahyong, S.T., Caldwell, R.L. 2017. The mantis shrimps of the genus, *Raoulserenea* Manning, 1995 (Crustacea: Stomatopoda: Pseudosquillidae) from French Polynesia, with description of a new species and notes on its reproduction. *Journal of Crustacean Biology*, 37(5), 608–614.

Ahyong, S.T., Caldwell, R.L., Erdmann, M.V. 2017. Collecting and processing stomatopods. *The Journal of Crustacean Biology*, *37*(1), 109–114.

Ahyong, S. T., Chan, T.-Y., Liao, Y.-C. 2008. *A catalogue of the mantis shrimps (Stomatopoda) of Taiwan*. National Taiwan Ocean University, Keelung, pp. 191.

Ahyong, S.T., Chu, K.H., Chan, T. -Y., Chen, Q.C. 1999. Stomatopoda of the Zhujiang estuary between Hong Kong and Macau. *Crustaceana,* 72(1), 37–54.

Ahyong, S.T., Davie, P.J.F. 2002. Hoplocarida. In: Davie, P.J.F. (ed.). *Crustacea: Malacostraca: Phyllocarida, Hoplocarida, Eucarida (Part 1).* Zoological Catalogue of Australia. CSIRO Publishing, Melbourne, pp. 31–90.

Ahyong, S.T., Ebach, M. 1999. First occurrence of a subfossil stomatopod crustacean from Australia. *Alcheringa,* 3/4, 227–228.

Ahyong, S.T., Erdmann, M.V. 2003. The stomatopod Crustacea of Guam. *Micronesica*, 35–36, 315–352.

Ahyong, S.T., Erdmann, M.V. 2007. Two new species of *Gonodactylellus* from Indonesia. *Raffles Bulletin of Zoology,* 58, 89–95.

Ahyong, S.T., Galil, B.S. 2006. First Mediterranean record of the Indo-West Pacific mantis shrimp, *Clorida albolitura* Ahyong & Naiyanetr, 2000 (Stomatopoda, Squillidae). *Aquatic Invasions,* 1(3), 191–193.

Ahyong, S.T., Lin, C.-W. 2022. Phylogenetic appraisal of Lysiosquillidae Giesbrecht, 1910, and a new species of *Lysiosquilloides* Manning, 1977, from Taiwan (Crustacea: Stomatopoda: Lysiosquilloidea). *Zoological Studies,* 61, 12, 1–14.

Ahyong, S.T., Low, M.E.Y. 2013. *Miyakella* nom. nov., a replacement name for *Miyakea* Manning, 1995, (Crustacea: Stomatopoda: Squillidae), preoccupied by *Miyakea* Marumo, 1933 (Insecta: Lepidoptera: Crambidae). *Zootaxa,* 3616(1), 99–100.

Ahyong, S.T., Manning, R.B. 1998. Two new species of *Erugosquilla* from the Indo-West Pacific (Crustacea: Stomatopoda: Squillidae). *Proceedings of the Biological Society of Washington,* 111(3), 653–662.

Ahyong, S.T., Naiyanetr, P. 2000. Revision of the *Clorida latreillei* species complex with description of a new species (Squillidae: Stomatopoda). *Raffles Bulletin of Zoology,* 48(2), 313–325.

Ahyong, S.T., Norrington, S.F. 1997. Stomatopod Crustacea in the Macleay Museum, University of Sydney. *Proceedings of the Linnean Society of New South Wales,* 118, 97–110.

Ahyong, S.T., Porter, M.L., Caldwell, R.L. 2020. The leopard mantis shrimp, *Ankersquilla pardus*, a new genus and species of eurysquillid from Indo-West Pacific coral reefs. *Records of the Australian Museum,* 72(1), 1–8.

Ahyong, S.T., Randall, J.E. 2001. *Lysiosquillina lisa*, a new species of stomatopod crustacean from the Indo-West Pacific (Stomatopoda: Lysiosquillidae). *Journal of South Asian Natural History,* 5, 167–172.

Ahyong, S.T., Wassenberg, T.J. 2015. The rare mantis shrimp *Areosquilla indica* (Hansen, 1976) (Crustacea, Stomatopoda) from the Great Barrier Reef: first Australian records of the genus and species. *Zootaxa*, 4000(4), 492–496.

Alcock, A. 1894. On the results of the deepsea dredging during the season 1890–91 (concluded). Natural history notes from H.M. Marine Survey Steamer "Investigator," Commander R.F. Hoskyn, R.N., late commanding, series 2, no. 1. *The Annals and Magazine of Natural History*, series 6, 13, 400–411.

Alexander, W.B. 1916. Further notes on W.A. stomatopods. *Journal and Proceedings of the Royal Society of Western Australia,* 1, 9–10.

Balss, H. 1916. Stomatopoda. Crustacea III. In: Michaelsen, W. (ed.) *Beiträge zur Kenntnis der Meeresfauna Westafrikas*, Vol. 2. L. Friederichsen & Co., Hamburg, pp. 47–52.

Barber, P., Boyce, S.L. 2006. Estimating diversity of Indo-Pacific coral reef stomatopods through DNA barcoding of stomatopod larvae. *Proceedings of the Royal Society of London B*, 273, 2053–2061.

Barnard, K.H. 1950. Descriptive list of South African stomatopod Crustacea (Mantis Shrimps). *Annals of the South African Museum,* 38, 838–864.

Barnard, K.H. 1955. Additions to the fauna-list of South African Crustacea and Pycnogonida. *Annals of the South African Museum*, 43(1), 1–107.

Barnard, K.H. 1958. Further additions to the crustacean fauna-list of Portuguese East Africa. *Memdrias do Museu Dr. Alvaro de Castro*, 4, 3–23.

Barnard, K.H. 1962. New records of marine Crustacea from the East Africa region. *Crustaceana*, 3(3), 239–245.

Berthold, A.A. 1827. Latreille's natürliche Familien des *Thierreichs, aus dem Französischen mit Anmerkungen und Zusätzen*. Herzoglich-Sächsisch Privilegirtes Landes-Industrie-Comptoir, Weimar, pp. 606.

Berthold, A.A. 1845. *Über verschiedene neue oder seltene Reptilien aus Neu-Granada und Crustaceen aus China*. Königliche Gesellschaft der Wissenschaften*,* Dieterische Buchhandlung, Göttingen*,* 37–48 (dated 1845, published 1846).

Bigelow, R.P. 1893. Preliminary notes on the Stomatopoda of the Albatross collections and on other specimens in the National Museum. *Johns Hopkins University Circulars,* 12(106), 100–102.

Bigelow, R.P. 1931. Stomatopoda of the southern and eastern Pacific Ocean and the Hawaiian Islands. *Bulletin of the Museum of Comparative Zoölogy, Harvard University,* 72(4), 105–191.

Blumstein, R. 1974. Stomatopod crustaceans from the Gulf of Tonkin with the description of new species. *Crustaceana,* 26(2), 112–126.

Boone, L. 1934. Crustacea: Stomatopoda and Brachyura. Scientific results of the world cruise of the yacht "Alva", 1931, William K. Vanderbilt, commanding. *Bulletin of the Vanderbilt Marine Museum,* 5, 1–210.

Borradaile, L.A. 1898. On some crustaceans from the South Pacific—Part I: Stomatopoda. *Proceedings of the Zoological Society of London,* 32–38.

Borradaile, L.A. 1900. On the Stomatopoda and Macrura brought by Dr Willey from the South Seas. In: Willey, A. (ed.). *Zoological Results based on the material from New Britain, New Guinea, Loyalty Islands and elsewhere, collected during the years 1895, 1896, and 1897*, Vol. 4. Cambridge University Press, pp. 395–428.

Borradaile, L.A. 1907. Stomatopoda from the western Indian Ocean. The Percy Sladen Trust Expedition to the Indian Ocean in 1905, under the leadership of J. Stanley Gardiner. *Transactions of the Linnean Society of London* (2, Zoology), 12, 209–216.

Boyko, C.B. 2000. The rise and fall of *Lysiosquilla desaussurei* and description of *L. manningi* n. sp.: the tale of the type. *Journal of Crustacean Biology,* 20(special number 2), 48–55.

Brooks, W.K. 1886. Report on the Stomatopoda collected by H.M.S. *Challenger* during the years 1873–76. *The Voyage of the H.M.S. Challenger, Zoology,* 16, 1–116.

Bruce, A.J. 1985. *Altosquilla soelae*, new genus, new species, a bathysquillid stomatopod from the Australian Northwest Shelf. *Journal of Crustacean Biology,* 5(3), 468–475.

Bruce, A.J. 1988. Two mantis shrimps new to the Australian fauna (Crustacea: Stomatopoda: Bathysquillidae). *The Beagle,* 5(1), 87–96.

Brullé, G.A. 1837–1839. Crustacés. In: Barker-Webb, P., Berthelot, S. (eds.). *Histoire naturelle des Iles Canaries, Zoologie,* Vol. 2 (2, Entomologie), pp. 13–18 (1839), atlas (1837).

Caldwell, R.L., Dingle, H. 1976. Stomatopods. *Scientific American,* 234(1), 80–89.

Caldwell, R.L., Manning, R.B. 2000. A new dwarf pseudosquillid of the genus *Raoulserenea* from French Polynesia (Crustacea, Stomatopoda). *Zoosystema,* 22, 101–106.

Calman, W.T. 1923. Preliminary report on Crustacea procured by the S. S. *Pickle*. Number VI in *Union of South Africa Fisheries and Marine Biological Survey,* report number 3, pp. 1 (dated 1922, published 1923).

Cappola, V., Manning, R.B. 1995. Crustacea stomatopoda. Research on the coast of Somalia. *Tropical Zoology*, 7(2), 271–291 (dated 1994, published 1995).

Cannon, L.R.G., Gordon, G.B., Campbell, P. 1987. Community patterns revealed by trawling in the inter-reef regions of the Great Barrier Reef. *Memoirs of the Queensland Museum,* 25(1): 45–70.

Chhapgar, B.F., Sane, S.R. 1967. Two new species of *Squilla* (Stomatopoda) from Bombay. *Crustaceana,* 12(1): 1–8.

Chopra, B. 1939. Stomatopoda. *John Murray Expedition Scientific Reports,* 6(3), 137–181.

Coleman, N. 1987. *Australian Sea Life South of 30°S.* Doubleday, New York, pp. 288.

Dana, J.D. 1852–1855. Crustacea, Part 1. *United States Exploring Expedition during the years 1838, 1839, 1840, 1841, 1842, under the command of Charles Wilkes, U.S.N.*, 13, 1–685.

Day, J. H., Morgan, J. F. C. 1956. The ecology of South African estuaries, Part 7: The biology of Durban Bay. *Annals of the Natal Museum*, 13(3), 259–312.

Debelius, H. 1999. *Crustacea Guide of the World*. Hollywood Import & Export Inc. Gainesville, pp. 321.

De Haan, W. 1833–1850. Crustacea. In: von Siebold, P.F. (ed.). *Fauna Japonica sive descriptio animalium, quae in itinere per Japoniam, Jussu et Auspiciis superiorum, qui summum in India Batava Imperium tenent, suscepto, Annis 1823–1830 collegit, notis, observationibus et adumbrationibus illustravit, 1833–1850*. Lugduni-Batavorum, Leiden, pp. 243.

de Man, 1888. Report on the podophthalmous Crustacea of the Mergui Archipelago, collected for the trustees of the Indian Museum, Culcutta, by Dr. John Anderson, F.R.S., superintendent of the museum. *The Journal of the Linnean Society, London, (Zoology),* 22, 1–312.

de Man, J.G. 1898. Bericht über die von Herrn Schiffscapitän Storm zu Atjeh, an den westlichen Küsten von Malakka, Borneo und Celebes sowie in der Java-See gesammelten Decapoden und Stomatopoden, part 6. *Zoologische Jahrbücher, Abtheilung fur Systematik, Geographie und Biologie der Thiere,* 10, 677–709.

de Man, J.G. 1902. Die von Herrn Professor Kükenthal im Indischen Archipel gesammelten Dekapoden und Stomatopoden. *In: W. Kükenthal Ergebnisse einer zoologischen Forschungsreise in den Molukken und Borneo, im Auftrage der senckenbergischen naturforschenden Gesellschaft,* 25, 465–929.

de Vis, C.W. 1883. Description of a species of squill from Moreton Bay. *The Proceedings of the Linnean Society of New South Wales,* 7, 321–322.

Erdmann, M.V., Manning, R.B. 1998. Preliminary descriptions of nine new stomatopod crustaceans from coral reef habitats in Indonesia and Australia. *Raffles Bulletin of Zoology,* 46(2), 615–626.

Eydoux, F., Souleyet, L.F.A. 1842. Crustacés. In: *Voyage autour du Monde exécuté pendant les Années 1836 et 1837 sur la Corvette La Bonite commandée par M. Vaillant, Capitaine de Vaiseau, Zoologie*, Vol. 1, pp. 219–272.

Fabricius, J.C. 1781. *Species insectorum exhibentes eorum differentias specificas, synonyma auctorum, loca Natalia, metamorphosin adiectis, observationibus, descriptionibus,* Vol. 1. Hamburgi et Kilonii, Hafniae, pp. 552.

Fabricius, J.C. 1787. *Mantissa insectorum sistens eorum species nuper detectas: adjectis characteribus genericis, differentiis specificis, emendationibus, observationibus*, Vol. 1. Impensis C. G. Proft, Hafniae, pp. 348.

Fabricius, J.C. 1793. *Entomologia systematica emendata et aucta. Secundum classes, ordines, genera, species. Adjectis synonimis, locis, observationibus, descriptionibus*, Vol. 2. Proft et Storch, Hafniae, pp. 519.

Fabricius, J.C. 1798. *Supplementum Entomologiae Systematicae*. Proft et Storch, Hafniae, pp. 572.

Forskål, P. 1775. *Descriptiones animalium, avium, amphibiorum, piscium, insectorum, vermium,* ex officina Mölleri, Hauniae (= Copenhagen), pp. 19–164.

Fowler, H.W. 1912. The Crustacea of New Jersey. *Annual Report of the New Jersey State Museum*, Part II, 29–650 (dated 1911, published 1912).

Fukuda, T. 1909. Japanese Stomatopoda. *Dobutsugaku Zasshi,* 21, 54–62, 167–174 (in Japanese 1909, published in English, 1910).

Fukuda, T. 1910. Report on the Japanese Stomatopoda with descriptions of two new species. *Annotationes Zoologicae Japonenses,* 7(3), 139–152.

Galil, B. 2007. Seeing red: alien species along the Mediterranean coast of Israel. *Aquatic Invasions,* 2(4), 281–312.

Garcia, R.G. 1978. *Harpiosquilla philippina*, a new stomatopod crustacean from the Philippines. *Kalikasan,* 7(3), 231–237.

Garcia, R.G. 1981. Inventory of the littoral fauna of Tayabas Bay—Crustacea: Stomatopoda. *National Museum Manila, Philippines, Zoological Papers,* 6, 1–33.

Giebel, C. 1861. Neue Squilla von der Insel Banka. *Zeitschrift für die gesammten Naturwissenschaften,* 18, 319–320.

Giesbrecht, W. 1910. Monographie: Stomatopoden. Erster theil. Fauna und Flora des Golfes von Neapel und der angrenzenden Meeres-Abschnitte*. Zoologische Station zu Neapel*, 33, 1–239.

Ghosh, H.C. 1987. Stomatopoda: Crustacea. Fauna of Orissa. *State Fauna Series* 1, 305–318

Ghosh, H.C. 1990. Stomatopoda: Crustacea. Fauna of Lakshadweep. *State Fauna Series 2*, 199–212.

Gordon, I. 1935. On two new species of Crustacea from Christmas Island. *Annals and Magazine of Natural History,* series 10, 16, 629–627.

Gosliner, T.M., Behrens, D.W., Williams, G.C. 1996. *Coral Reef Animals of the Indo-Pacific*. Sea Challengers, Monterey, California, pp. 314.

Graham, K.J., Liggins, G.W., Wildfoster, J., Kennelly, S.J. 1993a. Kapala Cruise Report. *NSW Fisheries Research Institute*, 110, 1–69

Graham, K.J., Liggins, G.W., Wildfoster, J., Kennelly, S.J. 1993b. Kapala Cruise Report. *NSW Fisheries Research Institute,* 12, 1–74.

Gravier, Ch. 1937. Stomatopodes des côtes d'IndoChine. *Annales de l'Institut oéanographique, Monaco*, new series, 17(3), 175–211.

Griffiths, C.L. 1999. Crustacean systematics in South Africa—status and historical overview. *Transactions of the Royal Society of South Africa*, 54(1), 43–52.

Griffiths, C.L., Blaine, M.J. 1988. Distribution, population structure and biology of stomatopod Crustacea off the west coast of South Africa. *South African Journal of Marine Science*, *7*(1), 45–50.

Griffiths, C.L., Robinson, T.B., Lange, L. and Mead, A. 2010. Marine biodiversity in South Africa: an evaluation of current states of knowledge. *PloS one*, 5(8), p. e12008, 1–13.

Hale, H.M. 1929. Crustacea from Princess Charlotte Bay, north Queensland. The Isopoda and Stomatopoda. *Transactions of the Royal Society of South Australia,* LIII, 33–36.

Hansen, H.J. 1895. Isopoden, Cumacean und Stomatopoden der Planktonexpedition. *Ergebnisse der Plankton-Expedition der Humboldt-Stiftung,* 2: 1–105.

Hansen, H.J. 1926. The Stomatopoda of the Siboga Expedition. *Siboga-Expedite, monographe,* 35, 1–48.

Haswell, W. 1882. *Catalogue of the Australian stalk- and sessile-eyed Crustacea*. The Australian Museum, Sydney, pp. 324.

Henderson, J.R. 1893. A contribution to Indian Carcinology. *Transactions of the Linnean Society of London, series 2 (Zoology),* 5(10), 325–458.

Herklots, J.A. 1851. *Addimenta ad Faunam Carcinologicum Africae Occidentalis, sive descriptiones specierum novarum e crustaceorum ordine, quas in Guinea collegit vir strenuus H.S. Pel, praefectus residentiis in littore guineae.* Lugduni-Batavorum, Leiden, pp. 28.

Hess, W. 1865. Beiträge zur Kenntniss der Decapoden-Krebse Ost-Australiens. *Archiv fur Naturgeschichte,* 31(1), 127–173.

Hilgendorf, F. 1879. Die von Herrn Peters in Moçambique gesammelten Crustaceen. *Monatsbericht de Königlich Preussischen Akademie der Wissenschaften zu Berlin 1878*, 782–851.

Hilgendorf, F. 1890. Eine neue Stomatopoden-Gattung *Pterygosquilla*. *Sitzungsberichte der Gesellschaft naturforschender Freunde zu Berlin,* 172–177.

Holthuis, L.B. 1941. The Stomatopoda of the *Snellius* Expedition. Biological results of the *Snellius* Expedition XII. *Temminckia,* 6, 241–294.

Holthuis, L.B. 1964. Preliminary note on two new genera of Stomatopoda. *Crustaceana,* 7(2), 140–141.

Holthuis, L.B. 1967a. Stomatopoda I. Fam. Lysiosquillidae et Bathysquillidae. *Crustaceorum Catalogus 1*, 1–28.

Holthuis, L.B. 1967b. The stomatopod Crustacea collected by the 1962 and 1965 Israel South Sea Expeditions. The second Israel South Red Sea Expedition, 1965, report no. 1. *Israel Journal of Zoology,* 16, 1–45.

Hwang, H.-S., Ahyong, S. T., Kim, W. 2018. A new species of *Chorisquilla* Manning, 1969 (Stomatopoda: Protosquillidae) from Korea and Japan with redescription of *C. mehtae* Erdmann & Manning, 1998. *Zootaxa,* 4483(2), 365–374.

Ingle, R.W. 1963. Crustacea Stomatopoda from the Red Sea and Gulf of Aden. Contributions to knowledge of the Red Sea, Number 26. *Bulletin, Sea Fisheries Research Station (Haifa),* 33, 1–69.

Ingle, R.W., Merrett, N. 1971. A stomatopod Crustacean from the Indian Ocean*, Indosquilla manihinei* gen. et sp. nov. (Family Bathysquillidae) with remarks on *Bathysquilla crassispinosa* (Fukuda, 1910). *Crustaceana,* 20(2), 192–198.

Inkscape Project. 2020. *Inkscape*. Available at: https://inkscape.org.

Kalk, M. 1958. The Crustacea of Inhaca Shores. In: Macnae, W., Kalk, M. (eds.). *A Natural History of Inhaca Island, Mocambique*. Witwatersrand University Press, Johannesburg, 192–163.

Kemp, S. 1911. Preliminary descriptions of new species and varieties of Crustacea Stomatopoda in the Indian Museum. *Records of the Indian Museum,* 6, 93–100.

Kemp, S. 1913. An account of the Crustacea Stomatopoda of the Indo-Pacific region, based on the collection in the Indian Museum. *Memoirs of the Indian Museum,* 4, 1–217.

Kemp, S., Chopra, B. 1921. Notes on Stomatopoda. *Records of the Indian Museum,* 22, 297–311.

Kensley, B., Buxton, C.D., 1984. Inshore small-mesh trawling survey of the Cape south coast. Part 5. Crustacea, Stomatopoda, Isopoda and Decapoda. *African Zoology*, 19(3), 189–193.

Komai, T. 1927. Stomatopoda of Japan and adjacent localities. *Memoirs of the College of Science, Kyoto Imperial University (B)*, 3(3), 307–354.

Krauss, F. 1843. *Die südafrikanischen Crustaceen. Eine Zusammenstellung aller bekannten Malacostraca, Bermerkungen über deren Lebensweise und geographische Verbreitung, nebst Beschreibung und Abbildung mehrer neuer Arten.* E. Schweizerbartsche Verlagsbuchhandlung, Stuttgart, 1–68.

Lamarck, J.B.P.A. 1818. *Histoire naturelle des animaux sans vertèbres présentant les caractères généraux et particuliers de ces animaux, leur distribution, leur classes, leurs familles, leurs genres, et la citation des principales espèces qui s'y rapportent; précédée d'une introduction offrant la détermination des caractères essentiels de l'animal, sa distinction du végétal et des autres corps naturelles, enfin, l'exposition des principes fondamentaux de la zoologie.* Deterville, Paris, 5, 1–612.

Lanchester, W.F. 1903. Stomatopoda, with an account of the varieties of *Gonodactylus chiragra*. Marine Crustaceans VIII. In: Gardiner, J.S. (ed.). *The fauna and geography of the Maldive and Laccadive Archipelagoes: being the account of the work carried on and of the collections made by an expedition during the years 1899 and 1900*, Vol. 1, pp. 444–459.

Latreille, P.A. 1802. *Histoire naturelle, générale et particulière, des Crustacés et des Insectes,* F. Dufart, Paris, 3, 467.

Latreille, P.A. 1828. Squille, *Squilla*. *Encyclopédie Méthodique.Entomologie ou Histoire naturelle des Crustacés, des Arachnides et des Insectes,* Agasse, Paris, 10, 467–475.

Leach, W.E. 1817–1818. A general notice of the animals taken by Mr John Cranch, during the expedition to explore the source of the River Zaire. Appendix 4. 407–419 (1818), 1 (1817). In: Tuckey, J.K. (ed.). *Narrative of an expedition to explore the River Zaire, usually called the Congo, in South Africa, in 1816, under the direction of Captain J.K. Tuckey, R.N., to which is added the journal of Professor Smith, some general observations on the country and its inhabitants, and an appendix, containing the natural history of that part of the Kingdom of Congo through which the Zaire flows*, John Murray, London, pp. 498.

Lebour, M.V. 1954. The planktonic decapod Crustacea and Stomatopoda of the Benguela Current. Part I in First Survey, R.R.S. *William Scoresby*, March 1950, *Discovery Reports*, 27, 219–233.

Legall N., Poupin, J. 2022. Internet - CRUSTA: Database of Crustacea (Decapoda and Stomatopoda), with special interest for those collected in French overseas territories. http://crustiesfroverseas.free.fr/.

Lenz, H. 1905. Ostafrikanische Dekapoden und Stomatopoden gesammelt von Herrn Prof. Dr. A. Voeltzkow. In: Voeltzkow, A. (ed.). *Wissenschaftliche Ergebnisse der Reisen in Madagaskar und Ostafrika in den Jahren 1889–95, Abhandlungen der Senckenbergischen naturforschenden Gesellschaft,* 27(4): 341–392.

Linnaeus, C. 1758. *Systema naturae per regna tria naturae, secundum classes, ordines, genera, species, cum characteribus, differentiis, synonymis, locis*, 10th Edition, Vol. 1. Laurentii Salvii, Holmiae (= Stockholm), pp. 824.

Linnaeus, C. 1768. *Systema naturae per regna tria naturae, secundum classes, ordines, genera, species, cum characteribus, differentiis, synonymis locis*, 12th Edition, Vol. 3. Laurentii Salvii, Holmiae (= Stockholm), pp. 236.

Liu, J.-Y. 1975. On a collection of stomatopod Crustacea from the Xisha Islands, Guangdong Province, China. *Studia Marina Sinica,* 10, 183–197.

Liu, R. 2008. Checklist of marine biota of China seas. *China Science Press,* Beijing, pp. 1281.

Liu, J.-Y., Wang, Y. 1998. On two new species of the Squillidae and Harpiosquillidae (Crustacea Stomatopoda) from the South China Sea. *Oceanologia et Limnologia Sinica,* 29(6), 588–592 (In Chinese), 592–596 (In English).

Lloyd, R.E. 1907. Contributions to the fauna of the Arabian Sea, with descriptions of new fishes and Crustacea. *Records of the Indian Museum,* 1, 1–12.

Low, M.E.Y., Ahyong, S.T. 2010. *Kempella* nom. nov., a replacement name for *Kempina* Manning, 1978 (Crustacea: Stomatopoda: Squillidae), preoccupied by *Kempina* Roewer, 1911, a junior synonym of Zaleptus Thorell, 1877 (Arachnida: Opiliones: Sclerosomatidae). *Zootaxa,* 2642, 68.

Makarov, R.R. 1978. New data on crustaceans of the families Lysiosquillidae and Gonodactylidae (Crustacea, Stomatopoda) from Tonkin Bay (Vietnam). *Zoologicheskii Zhurnal*, Moscow 57, 176–189 (in Russian).

Makarov, R.R. 1979. A collection of stomatopod crustaceans of the genus *Clorida* Eydoux & Souleyet, 1842, from Tonkin Bay, Vietnam. *Crustaceana,* 37(1), 39–56.

Manning, R.B. 1961. A new deepwater species of *Lysiosquilla* (Crustacea: Stomatopoda) from the Gulf of Mexico. *Annals and Magazine of Natural History series 13*, 3, 693–697.

Manning, R.B. 1962a. Stomatopod Crustacea collected by the Yale Seychelles Expedition, 1957–1958. *Postilla, Yale Peabody Museum,* 68, 1–15.

Manning, R.B. 1962b. Seven new species of stomatopod crustaceans from the northwestern Atlantic. *Proceedings of the Biological Society of Washington,* 75, 215–222.

Manning, R.B. 1963a. Preliminary revision of the genera *Pseudosquilla* and *Lysiosquilla* with descriptions of six new genera. *Bulletin of Marine Science of the Gulf and Caribbean*, 13(2), 308–328.

Manning, R.B., 1963b. A new species of *Lysiosquilla* (Crustacea, Stomatopoda) from the northern Straits of Florida. *Bulletin of Marine Science of the Gulf and Caribbean,* 13(1), 54–57.

Manning, R. B. 1964. A new west American species of *Pseudosquilla* (Stomatopoda). *Crustaceana,* 6(4): 303–308.

Manning, R.B. 1965. Stomatopoda from the collection of his majesty the emperor of Japan. *Crustaceana,* 9(3), 249–262.

Manning, R.B. 1966. Notes on some Australian and New Zealand stomatopod Crustacea, with an account of the species collected by the Fisheries Investigation Ship *Endeavour*. *Records of the Australian Museum,* 27(4), 79–137.

Manning, R.B. 1967a. Preliminary account of a new genus and a new family of Stomatopoda. *Crustaceana,* 13(2), 238–239.

Manning, R.B. 1967b. Notes on the *demanii* section of the genus *Gonodactylus* Berthold with descriptions of three new species. *Proceedings of the United States National Museum,* 123, 1–27.

Manning, R.B. 1967c. Review of the genus *Odontodactylus* (Crustacea: Stomatopoda). *Proceedings of the United States National Museum,* 123, 1–35.

Manning, R.B. 1968a. Stomatopod Crustacea from Madagascar. *Proceedings of the United States National Museum,* 124, 1–61.

Manning, R.B. 1968b. A revision of the family Squillidae (Crustacea, Stomatopoda), with the description of eight new genera. *Bulletin of Marine Science,* 18, 105–142.

Manning, R.B. 1969a. Notes on some stomatopod Crustacea from southern Africa. *Smithsonian Contributions to Zoology,* 1, 1–17.

Manning, R.B. 1969b. *Stomatopod Crustacea of the western Atlantic*. Studies in Tropical Oceanography no. 8, Miami, pp. 380.

Manning, R.B. 1969c. Notes on the *Gonodactylus* section of the family Gonodactylidae (Crustacea, Stomatopoda), with descriptions of four new genera and a new species. *Proceedings of the Biological Society of Washington,* 82, 143–166.

Manning, R.B. 1969d. A revision of the genus *Harpiosquilla* (Crustacea, Stomatopoda), with descriptions of three new species. *Smithsonian Contributions to Zoology,* 36, 1–41.

Manning, R.B. 1970a. Some stomatopod crustaceans from Tuléar, Madagascar. *Bulletin du Muséum national d'Histoire naturelle, Paris, series 2,* 41(6), 1429–1441 (dated 1969, published 1970).

Manning, R.B. 1970b. A new genus and species of stomatopod crustacean from Madagascar. *Bulletin du Muséum national d'Histoire naturelle, Paris, series 2*, 42(1), 206–209.

Manning, R.B. 1970c. Two new stomatopod crustaceans from Australia. *Records of the Australian Museum,* 28(4), 77–85.

Manning, R.B. 1971a. Two new species of *Gonodactylus* (Crustacea, Stomatopoda) from Eniwetok Atoll, Pacific Ocean. *Proceedings of the Biological Society of Washington,* 84, 73–80.

Manning, R.B. 1971b. Keys to the species of *Oratosquilla* (Crustacea: Stomatopoda), with descriptions of two new species. *Smithsonian Contributions to Zoology,* 71, 1–16.

Manning, R.B. 1971c. *Lysiosquilla panamica*, a new stomatopod crustacean from the eastern Pacific region. *Proceedings of the Biological Society of Washington,* 84, 225–230.

Manning, R.B. 1972a. Two new species of *Pseudosquilla* (Crustacea, Stomatopoda) from the Pacific Ocean. *American Museum Novitates,* 2484, 1–11.

Manning, R.B. 1972b. Notes on some stomatopod Crustaceans from Peru. *Proceedings of the Biological Society of Washington,* 85, 297–308.

Manning, R.B. 1973. Preliminary definition of a new genus of Stomatopoda. *Crustaceana,* 23 (3), 299–300.

Manning, R.B. 1974. A new stomatopod crustacean from Mauritius. *Revue Suisse de Zoologie,* 81(1), 69–72.

Manning, R.B. 1975a. A new species of *Meiosquilla* (Crustacea: Stomatopoda) from Southern Africa. *Annals of the South African Museum*, 67 (9), 363–366.

Manning, R.B. 1975b. *Gonodactylus botti*, a new stomatopod crustacean from Indonesia. *Senckenbergiana Biologica,* 56(4/6), 289–291.

Manning, R.B. 1975c. Two new species of the Indo-West Pacific genus *Chorisquilla* (Crustacea, Stomatopoda), with notes on *C. excavata* (Miers). *Proceedings of the Biological Society of Washington,* 88, 253–261.

Manning, R.B. 1976. Redescriptions of Oratosquilla indica (Hansen), with accounts of a new genus and two new species (Crustacea, Stomatopoda). *Beaufortia*, 25(318), 1–13.

Manning, R.B. 1977a. A monograph of the West African stomatopod Crustacea. *Atlantide Report,* 12, 25–181.

Manning, R.B., 1977b. Preliminary accounts of five new genera of stomatopod crustaceans. *Proceedings of the Biological Society of Washington,* 90(2), 420–423.

Manning, R.B. 1978a. New and rare stomatopod Crustacea from the Indo-West Pacific region. *Smithsonian Contributions to Zoology,* 264, 1–36.

Manning, R.B. 1978b. A new genus of stomatopod crustacean from the Indo-West Pacific region. *Proceedings of the Biological Society of Washington,* 91(1), 1–4.

Manning, R.B. 1978c. Further observations on *Oratosquilla*, with accounts of two new genera and nine new species (Crustacea: Stomatopoda: Squillidae). *Smithsonian Contributions to Zoology,* 272, 1–44.

Manning, R.B. 1978d: Synopses of the Indo-West-Pacific species of *Lysiosquilla* Dana, 1852 (Crustacea: Stomatopoda: Lysiosquillidae). *Smithsonian Contributions to Zoology,* 259, 1–16.

Manning, R.B. 1980. The superfamilies, families, and genera of recent stomatopod Crustacea, with diagnoses of six new families. *Proceedings of the Biological Society of Washington,* 93(2), 362–372.

Manning, R.B. 1981. First record of *Kempina zanzibarica* (Chopra 1939) from the Red Sea, with notes on *Lenisquilla gilesi* (Kemp 1911) (Crustacea: Stomatopoda). *Senckenbergiana Biologica,* 61(3/4), 297–303.

Manning, R.B. 1984a. *Gonodactyloideus cracens* n. gen., n. sp., a new stomatopod crustacean from Western Australia. *The Beagle, Occasional Papers of the Northern Territory Museum of Arts and Sciences,* 1, 83–86.

Manning, R.B. 1984b. *Crenatosquilla*, a new genus of stomatopod crustacean from the East Pacific. *Proceedings of the Biological Society of Washington,* 97(1), 191–193.

Manning, R.B. 1990. Stomatopod Crustacea from the Persian Gulf, with the description of a new *Manningia*. *Steenstrupia,* 16(6), 93–108.

Manning, R.B. 1991. Stomatopod Crustacea collected by the *Galathea* Expedition, 1950–1952, with a list of Stomatopoda known from depths below 400 meters. *Smithsonian Contributions to Zoology,* 521, 1–18.

Manning, R.B. 1995. Stomatopod Crustacea of Vietnam: the legacy of Raoul Serène*. Crustacean Research,* 4, 1–339.

Manning, R.B., Camp, D.K. 1983. F*ennerosquilla*, a new genus of stomatopod crustacean from the northwestern Atlantic. *Proceedings of the Biological Society of Washington,* 96(2), 317–322.

Manning, R.B., Camp, D.K. 1993. Erythrosquilloidea, a new superfamily and Tetrasquillidae, a new family of stomatopod crustaceans. *Proceedings of the Biological Society of Washington,* 106(1), 85–91.

Manning, R.B., Camp, D.K. 2001. A new genus of stomatopod from the Caribbean Sea (Stomatopoda: Squillidae). *Journal of Crustacean Biology,* 21, 202–204.

Manning, R.B., Chace, F.A.Jr. 1990. Decapod and stomatopod Crustacea from Ascension Island, South Atlantic Ocean. *Smithsonian Contributions to Zoology,* 503, 1–91.

Manning, R.B., Heard, R. 1997. Stomatopod Crustaceans from the Carolinas and Georgia, Southeastern United States. *Gulf Research Reports,* 9(4), 303–320.

Manning, R.B., Kropp, R.K., Dominguez, J. 1990. Biogeography of deep-sea Crustacea, family Bathysquillidae. *Progress in Oceanography,* 24, 311–316.

Manning, R.B., Lewinsohn, Ch. 1982. *Rissoides*, a new genus of stomatopod Crustacean from the East Atlantic and South Africa. *Proceedings of the Biological Society of Washington,* 95(2), 352–353.

Manning, R.B., Lewinsohn, Ch. 1986. Notes on some stomatopod Crustacea from the Sinai Peninsula, Red Sea. *Smithsonian Contributions to Zoology*, 433, 1–19.

Manning, R.B., Makarov, R.R. 1978. A new species of *Faughnia* from the western Indian Ocean (Crustacea, Stomatopoda). *Bulletin du Muséum national d'Histoire naturelle, Paris,* 517–523.

Manning, R.B., Michel, A. 1973. *Harpiosquilla intermedia*, a new stomatopod Crustacean from New Caledonia. *Proceedings of the Biological Society of Washington,* 86(9), 113–116.

Manning, R.B., Struhsaker, P. 1976. Occurrence of the Caribbean stomatopod, *Bathysquilla microps*, off Hawaii, with additional records for *B. microps* and *B. crassispinosa*. *Proceedings of the Biological Society of Washington,* 89(38), 439–450.

McNeill, F.A. 1926. The biology of North-West Islet, Capricorn Group, (J) Crustacea. *Australian Zoologist,* 4(5), 299–318.

McNeill, F.A. 1968. Crustacea, Decapoda and Stomatopoda. *Scientific Reports of the Great Barrier Reef Expedition 1928–29,* 7(1), 1–98.

Miers, E.J. 1880. On the Squillidae. *Annals and Magazine of Natural History,* 5, 1–30, 108–127.

Miers, E.J. 1881. On a collection of Crustacea made by Baron Hermann-Maltzam at Goree Island, Senegambia. *Annals and Magazine of Natural History series 5*, 8, 204–220, 259–281, 364–377.

Miers, E.J. 1884. Crustacea. In: *Report on the zoological collections made in the Indo-Pacific Ocean during the voyage of H.M.S. "Alert," 1881–2.* British Museum, Department of Zoology, London, pp. 178–322, 513–575.

Milne-Edwards, A. 1868. Observations sur la faune carcinologique des Iles du Cap Vert. *Nouvelles Archives du Muséum d'Histoire Naturelle, Paris*, 4: 49–69.

Milne-Edwards, A. 1873. Description de quelques Crustacés nouveaux ou peu connus provenant du Musée de M. C. Godeffroy. *Journal des Museum Godeffroy,* 1: 253–264.

Milne Edwards, H. 1837. Histoire Naturelle des Crustacés, Comprenant l´Anatomie, la Physiologie et la Classification de ces Animaux. *Encyclopédique Roret, Paris*, 2, 1–532.

Moosa, M.K. 1973. The stomatopod Crustacea collected by the Mariel King memorial expedition in Malaku waters. *Marine Research in Indonesia,* 13, 1–30.

Moosa, M.K. 1974. On a new and rare species of Stomatopoda (Crustacea) from Indonesian waters. *Treubia,* 28(3), 73–82.

Moosa, M.K. 1975. Notes on stomatopod Crustacea from Seribu Islands and adjacent waters with a description of a new species. *Marine Research in Indonesia (Penelitian Laut di Indonesia),* 15, 1–20.

Moosa, M.K. 1984. Notes on stomatopod Crustacea from La Réunion and Mauritius. *Résultats de campagnes océanographiques du M.S. "Marion Dufresne" et de prospections littorales de la Vedette "Japonaise". Comité National Français des Researches Antarctiques*, 55, 37–40.

Moosa, M.K. 1986. Stomatopod Crustacea. Résultats du Campagnes MUSORSTOM I & II, Philippines, 2. *Mémoires du Muséum national d'Histoire naturelle, Paris, series A, Zoologie* 133, 367–414.

Moosa, M.K. 1991. The Stomatopoda of New Caledonia and Chesterfield Islands. In: Richer de Forges, B. (ed.) *Le benthos de fonds meubles des lagons de Nouvelle-Calédonie* Vol. 1*,* Editions de l'ORSTOM, Paris, pp. 149–219.

Moosa, M.K. 2000. Marine biodiversity of the South China Sea: a checklist of stomatopod Crustacea. *Raffles Bulletin of Zoology*, supplement 8, 405–457.

Moosa, M.K., Cleva, R. 1984. Sur une collection de Stomatopodes (Crustacea: Hoplocarida) provenant des iles Seychelles. *Bulletin du Muséum national d'Histoire naturelle, Paris, series 4*, 6 (section A, no. 2), 421–429.

Naiyanetr, P. 1980. Stomatopoda of Thailand. *Chulalongkorn University, Bangkok*, 1–195.

Naiyanetr, P. 1987. Two new stomatopod crustaceans from Thailand with a key to the genus *Manningia* Serène, 1962. *Crustaceana,* 53(3), 237–242.

Naiyanetr, P. 1989. *Siamosquilla hyllebergi*, a new genus and new species of stomatopod crustacean from Thailand. In: Ferrero, E.A. (ed.) *Biology of Stomatopods. Selected symposia and monographs, U.Z.I*. Mucchi, Modena, 3, 281–284.

Naiyanetr, P. 1998. Checklist of Crustacean Fauna in Thailand (Decapoda and Stomatopoda). *OEPP Biodiversity Series*, 5: 1–161.

Nobili, G. 1899. Contribuzioni alla conoscenza della fauna carcinologica della Papuasia, della Molucche e dell'Australia. *Annali del Museo Civico di Storia Naturale Giacomo Doria, Genoa*, 40 (= series 2, 20), 230–282 (1–53 on separate).

Odhner, T. 1923. Indopazifiche Stomatopoden. *Göteborgs kungliga Vetenskaps -och Vitterhets-Sämhalles Handlingar,* 27(4), 1–16.

Parisi, B. 1922. Elenco degli stomatopodi del Museo di Milano. *Atti Societd Italiana di Scienze Naturali*, 61,91–114.

Patek, S.N., Caldwell, R.L. 2005. Extreme impact and cavitation forces of a biological hammer: strike forces of the peacock mantis shrimp (Odontodactylus scyllarus). *Journal of Experimental Biology*, 208, 3655–3664.

Patek, S.N., Korff W.L., Caldwell, R.L. 2004. Biomechanics: deadly strike mechanism of a mantis shrimp. *Nature,* 428, 819–820.

Paulson, O. 1875. *Studies on Crustacea of the Red Sea with notes regarding other seas. Part 1 Podophthalmata and Edriophthalmata (Cumacea).* Tipografiia S.V. Kul'zhenko, 1875, Kiev, 1–144. (in Russian).

Pfeffer, G. 1888. Übersicht der von Herrn Dr. Franz Stuhlmann in Ägypten, auf Sansibar und dem gegenüberliegenden Festlande gesammelten Reptilien, Amphibien, Fische, Mollusken und Krebse. *Mitteilungen aus dem Hamburgischen Zoologischen Museum und Institut,* 6, 28–35.

Pocock, R.I. 1893. Report upon the stomatopod crustaceans obtained by P.W. Bassett-Smith, Esq., Surgeon R.N., during the cruise, in the Australian and China seas, of H.M.S. "*Penguin*," Commander W.U. Moore. *Annals and Magazine of Natural History*, series 6, 11, 473–479.

Poupin, J. 2009. *Crustacés de la Réunion, Décapodes et Stomatopodes*. IRD Editions, Marseille, pp. 140.

Poupin, J. 2010. *Biodiversité de l'Indo-Pacifique tropical français 2514 espèces de crustacés décapodes et stomatopodes* (Doctoral dissertation, IRENav, Institut de Recherche de l'Ecole Navale), pp. 76.

Poupin, J., Cleva, R., Bouchard, J., Dinhut, V., Dumas, J. 2019. Stomatopod Crustaceans from Mayotte Island (Crustacea, Hoplocarida). *Atoll Research Bulletin,* 624, 1–14.

Richardson, L.R. 1953. Variation in *Squilla armata* M. Edw. (Stomatopoda) suggesting a distinct form in New Zealand waters. *Transactions of the Royal Society of New Zealand,* 81(2), 315–317.

Risso, A. 1816. *Histoire Naturelle des Crustacés des Environs de Nice*. Librairie Grecque-Latine-Allemande, Paris, pp. 175.

Roxas, H.A., Estampador, E. 1930. Stomatopoda of the Philippines. *Natural and Applied Science Bulletin, University of the Philippines*, 1: 93–131.

RStudio Team. 2022. RStudio: Integrated Development Environment for R. RStudio, PBC, Boston, MA URL http://www.rstudio.com/.

Schmitt, W.L. 1940. The stomatopods of the west coast of America, based on collections made by the Allan Hancock Expedition, 1933–38. *Allan Hancock Pacific Expeditions,* 5, 129–225.

Schmitt, W. 1965. *Crustaceans*. University of Michigan Press, Ann Arbor, pp. 204.

Serène, R. 1950. Deux nouvelles espèces Indo Pacifiques de Stomatopodes. *Bulletin du Muséum national d'Histoire naturelle, Paris, series 2*, 22(5), 571–572.

Serène, R. 1954. Observations biologiques sur les stomatopodes. *Mémoires de l'Institut Océanographique de Nha trang,* 8, 1–93.

Serène, R. 1962. Révision du genre *Pseudosquilla* (Stomatopoda) et définition de genres nouveaux. *Bulletin de l'Institut océanographique de Monaco,* 1241, 1–27.

Sink, K.J., van der Bank, M.G., Majiedt, P.A., Harris, L.R., Atkinson, L.J., Kirkman, S.P., Karenyi, N. 2019. *South African National Biodiversity Assessment 2018 Technical Report Volume 4: Marine Realm.* South African National Biodiversity Institute, Pretoria, South Africa, pp. 555.

Smith, S.I. 1881. Preliminary notice of the Crustacea dredged, in 64 to 325 fathoms, off the south coast of New England, by the U.S. Fish Commission in 1880. *Proceedings of the United States National Museum,* 3, 413–452.

Souverbie, S.M. 1869. Diagnoses de mollusques inédits provenant de la Nouvelle Calédonie. *Journal de Conchyliologie,* 17(4), 416–421.

Stebbing, T.R.R. 1902. South African Crustacea, Part II. *Marine Investigations in South Africa. Department of Agriculture, Cape Town,* 2, 1–92.

Stebbing, T.R.R. 1908. South African Crustacea, Part IV. *Annals of the South African Museum*, 6, 1–96.

Stebbing, T.R.R. 1910. General Catalogue of South African Crustacea. Part V in South African Crustacea, for the Marine Investigations in South Africa. *Annals of the South African Museum,* 6(4), 281–293.

Stebbing, T.R.R. 1914. Stalk-eyed Crustacea Malacostraca of the Scottish National Antarctic Expedition. *Transactions of the Royal Society of Edinburgh,* 50(2(9)), 253–307.

Stebbing, T.R.R. 1917. The Malacostraca of Natal, I. *Annals of the Durban Museum,* 2(1), 1–33.

Stephenson, W. 1952. Faunistic records from Queensland. Part I— General Introduction. Part II—Adult Stomatopoda (Crustacea). *Zoology Papers of the University of Queensland* 1(1), 1–15.

Stephenson, W. 1953a. Notes on the Australian Stomatopoda (Crustacea) in the collections of the Queensland Museum. *Memoirs of the Queensland Museum,* 13(1), 40–49.

Stephenson, W. 1953b. Three new Stomatopoda (Crustacea) from eastern Australia*. Australian Journal of Marine and Freshwater Research,* 4(1), 201–218.

Stephenson, W. 1960. Notes on Queensland Stomatopoda (mantis prawns). *Queensland Naturalist,* 16(3–4): 61.

Stephenson, W. 1962. Some interesting Stomatopoda—mostly from Western Australia. *Journal of the Royal Society of Western Australia,* 45(2), 33–43.

Stephenson, W., McNeill, F. 1955. The Australian Stomatopoda (Crustacea) in the collections of the Australian Museum, with a check list and key to the known Australian species. *Records of the Australian Museum,* 23(5), 239–265.

Sun, X., Yang, S. 1998. Studies on stomatopod Crustacea from Nansha Islands, China. Part 1, Protosquillidae and Pseudosquillidae, with descriptions of a new genus and two new species. *Studies on marine fauna and flora and biogeography of the Nansha Islands and neighbouring waters,* 3, 142–155.

Sun, X., Wang, J., Yang, S. 1998. Stomatopod Crustacea (II) – Gonodactyloidea, Lysiosquilloidea and Squilloidea in the collections of the Beijing Natural History Museum. *Memoirs of Beijing Natural History Museum*, 57, 1–36.

Tattersall, W.M. 1913. The Schizopoda, Stomatopoda, and non-Antarctic Isopoda of the Scottish National Antarctic Expedition. *Transactions of the Royal Society of Edinburgh,* 49, part 4(16), 865–894.

Tirmizi, N.M., Kazmi, Q.B., Manning, R.B. 1994. An illustrated key to the Malacostraca (Crustacea) of the northern Arabian Sea Part II: Stomatopoda. *Pakistan Journal of Marine Science,* 3(2), 125–169.

Tirmizi, N.M., Manning, R.B. 1968. Stomatopod Crustacea from West Pakistan. *Proceedings of the United States National Museum,* 125, 1–48.

Tiwari, K.K., Biswas, S. 1952. On two new species of the genus *Squilla* Fabr., with notes on other stomatopods in the collections of the Zoological Survey of India. *Records of the Indian Museum,* 49(3–4), 349–363.

Trivedi, J.N., Ahyong, S.T., Vachhrajani, K.D., Kumar, A.B. 2020. An annotated checklist of the mantis shrimps of India (Crustacea: Stomatopoda). *Zootaxa*, 4768(2), 221-238.

Van Der Wal, C., Ahyong, S.T. 2017. Expanding diversity in the mantis shrimps: two new genera from the eastern and western Pacific (Crustacea: Stomatopoda: Squillidae). *Nauplius*, 25: e2017012.

Wang, J.W., T.H. Chiou. 2017. Three new records of Nannosquillidae from Taiwan with notes on their ecology (Crustacea, Stomatopoda, Lysiosquilloidea). *ZooKeys*, 721, 33–43.

Ward, M. 1942. Notes on the Crustacea of the Desjardins Museum, Mauritius Institute, with descriptions of new genera and species. *Mauritius Institute Bulletin,* 2(2), 49–113.

White, A. 1847. *List of the Species of Crustacea in the Collection of the British Museum.* order of the Trustees [E. Newman]*,* London, pp. 143.

White, A. 1851. Descriptions of two species of Crustacea in the British Museum. *Proceedings of the Zoological Society of London,* 18, 95–97, (dated 1850, published 1851).

Wood-Mason, J. 1875. On new or little-known crustaceans. *Proceedings of the Asiatic Society of Bengal*, 230–232.

Wood-Mason, J. 1895. *Figures and descriptions of nine species of Squillidae from the collection in the Indian Museum.* Indian Museum, Culcutta, pp. 11.

Yamaguchi, T., Baba, K. 1993. Crustacean specimens collected in Japan by Ph.F. von Siebold and H. Bürger and held by the Nationaal Natuurhistorisch Museum in Leiden and other museums. In: Yamaguchi, T. (ed.). *Ph.F. von Siebold and Natural History of Japan Crustacea.* The Carcinological Society of Japan, Shimoda Printing, Kumamoto, pp. 731.

Zenetos, A., Gofas, S., Verlaque, M., Cinar, M., Garcia Raso, J., Bianchi, C., Morri, C., Azzurro, E., Bilecenoglu, M., Froglia, C., Siokou, I., Violanti, D., Sfriso, A., San Martin, G., Giangrande, A., Katagan, T., Ballesteros, E., Ramos-Espla, A., Mastrototaro, F., Ocana, O., Zingone, A., Gambi, M., Streftaris, N. 2010. Alien species in the Mediterranean Sea by 2010. A contribution to the application of European Union's Marine Strategy Framework Directive (MSFD). Part I. Spatial distribution. *Mediterranean Marine Science,* 11(2), 381–493.

Appendix A. **Historical and updated distributions of stomatopod fauna within South Africa.** South African province given as Northern Cape [NC], Western Cape [WC], Eastern Cape [EC] and KwaZulu-Natal [KZN]. Endemic species in bold. Authors of previous records in the literature given under Reference. Updated records all from the present study.

Family and Species	**Previous Records**		**Updated records**		**Expansion**	**Reference**
	Location	**Depth (m)**	**Location**	**Depth (m)**		
BATHYSQUILLIDAE						
Bathysquilla crassispinosa (Fukuda, 1909*)*	Durban [KZN]	240 – 270	North of Durban [KZN]	325	Eastward offshore	Barnard (1950) Manning (1991)
GONODACTYLIDAE						
Gonodactylellus crosnieri (Manning 1968a)	-	-	Kosi Bay [KZN]	45–47	South and westward	Present study
Gonodactylellus lanchesteri (Manning, 1967b)	Sodwana Bay [KZN]	0–3.5	-	-	-	Ahyong (2005)
Gonodactylus botti Manning, 1975b	Sodwana Bay [KZN]	0–3.5	Coconut Bay, Mozambique	0	New record for Mozambique.	Ahyong (2005)
Gonodactylus chiragra (Fabricius, 1781)	Kosi Bay to Mtwalume River estuary [KZN]	Shore	Sodwana [KZN]	0	New record for Sodwana Bay.	Barnard (1950) Manning (1969a)
Gonodactylus smithii Pocock, 1893	Sodwana Bay [KZN]	0–13.5	-	-	-	Ahyong (2005)
Gonodactylolus paulus Manning, 1970b	Sodwana Bay [KZN]	0–13.5	-	-	-	Ahyong (2005)
ODONTODACTYLIDAE						
Odontodactylus hansenii (Pocock, 1893)	-	-	Sodwana Bay to Kosi Bay [KZN]	70 – 74	Southwards from Réunion Island	Present study
Odontodactylus scyllarus (Linnaeus, 1758)	-	-	Sodwana Bay [KZN]	-	Southward from southern Mozambique	Present study

PROTOSQUILLIDAE						
Chorisquilla spinosissima (Pfeffer, 1888)	Sodwana Bay [KZN]	0–14	-	-	-	Ahyong (2005)
Pseudosquillidae						
Pseudosquillisma kensleyi Ahyong, 2005	Sodwana Bay [KZN]	0	-	-	-	Ahyong (2005)
Raoulserenea komaii (Moosa, 1991)	Sodwana Bay [KZN]	0–3.5	-	-	-	Ahyong (2005)
Raoulserenea ornata (Miers, 1880)	Sodwana [KZN]	0–18	-	-	-	Ahyong (2005)
Raoulserenea oxyrhyncha (Borradaile, 1898)	Sodwana Bay [KZN]	0–3.5	-	-	-	Ahyong (2005)
Takuidae						
Mesacturoides fimbriatus (Lenz, 1905)	Sodwana Bay [KZN]	0–3.5	-	-	-	Ahyong (2005)
LYSIOSQUILLIDAE						
Lysiosquilla capensis Hansen, 1895	From the south coast; False Bay [WC] to Gqeberha [EC]	18–88	Coffee Bay [EC]	-	Northward	Barnard (1950) Manning (1969a)
Lysiosquilla colemani Ahyong, 2001	-	-	St. Sebastian Bay [WC] to Jeffery's Bay [EC]	71 – 88	Westwards from southern Australia	Present study
Lysiosquilla maculata (Fabricius, 1793)	Durban [KZN]	?	Banks of Umsunduzi River [KZN]	0	Inland	Barnard (1950)
Lysiosquilla tredecimdentata Holthuis, 1941	Durban [KZN]	9	Durban [KZN]	-	-	Manning (1969a)
TETRASQUILLIDAE						
Heterosquilloides insignis (Kemp, 1911)	Durban [KZN]	274–460	-	-	-	Barnard (1950) Manning (1991)

SQUILLIDAE

Clorida albolitura Ahyong and Naiyanetr, 2000	-	-	North of Durban [KZN] into Mozambique	40	Southward from Madagascar	Present study
Clorida latreillei Eydoux and Souleyet, 1842	Durban [KZN]	38	-	-	-	Day and Morgan (1956) Manning (1969a)
Harpiosquilla harpax (de Haan, 1844)	Durban to Richard's Bay estuary [KZN]	Shore	-	-	-	Day and Morgan (1956) Manning (1969a)
Kempella mikado (Kemp and Chopra, 1921)	Durban [KZN]	118	Durban [KZN]	154	Offshore, deeper water	Manning (1969a)
Miyakella holoschista (Kemp, 1911)	Durban north to Tugela River mouth [KZN]	22–118	-	-	-	Barnard (1950) Manning, 1969a)
Miyakella nepa (Latreille in Latreille, Le Peletier, Serville and Guérin, 1828)	Durban [KZN]	?	Banks of Mtakatya River [EC]	0	Southward	Barnard (1950)
Natosquilla investigatoris (Lloyd, 1907)	Table Bay [WC]	183–220	-	-	-	Barnard (1950)
Oratosquilla mauritiana (Kemp, 1913)	South coast from Mossel [WC] to Algoa Bay [EC]	11–29	-	-	-	B. F. Kensley and Buxton (1984)
Pterygosquilla capensis Manning, 1969	Lüderitzbucht, Namibia to Algoa Bay [EC], South Africa	44–182	-	-	-	Barnard (1950) Manning (1969a)
Quollastria gonypetes (Kemp,	Durban [KZN]	16–109	-	-	-	Manning (1969a)

1911)

Rissoides barnardi (Manning, 1975a)	Durban [KZN]	155–200	Port Edward [KZN]	120 – 125	Southward	Barnard (1950) Manning (1969a)

Appendix B. **Distribution of known South African stomatopod species shared with the Western Indian Ocean** from Mozambique, Madagascar, Mauritius or Réunion Islands, Tanzania or Zanzibar and Somalia. Number of specimens examined in the present series given in []. Presence (+). Absence (-). Species considered endemic to South Africa and the surrounding waters showed in bold.

	South Africa [# examined]	**Mozambique**	**Madagascar**	**Mauritius or Réunion Islands**	**Tanzania or Zanzibar**	**Somalia**
Bathysquilla crassispinosa (Fukuda, 1909)	+ [2]	-	+	-	-	-
Gonodactylellus crosnieri (Manning, 1968a)	New record [2]	-	+	-	-	-
Gonodactylellus lanchesteri (Manning, 1967b)	+ [17]	+ [7]	+	-	-	+
Gonodactylus botti Manning, 1975b	+ [30]	New record [2]	-	-	-	+
Gonodactylus chiragra (Fabricius, 1781)	+ [6]	+ [2]	+	+	-	-
Gonodactylus smithii Pocock, 1893	+ [6]	-	+	+	-	+
Gonodactylolus paulus Manning, 1970b	+ [5]	-	+	+	-	+
Odontodactylus hansenii (Pocock, 1893)	New record [2]	-	-	+	-	-
Odontodactylus scyllarus (Linnaeus, 1758)	New record [1]	+ [1]	+	+	+	-
Chorisquilla spinosissima (Pfeffer, 1888)	+ [3]	-	+	-	-	-
Pseudosquillisma kensleyi Ahyong, 2005	+ [1]	-	-	-	-	-
Raoulserenea komaii (Moosa, 1991)	+	-	-	-	-	-
Raoulserenea ornata (Miers, 1880)	+ [1]	-	-	+	-	-
Raoulserenea oxyrhyncha (Borradaile, 1898)	+ [2]	-	-	-	-	-

Mesacturoides fimbriatus (Lenz, 1905)	+ [1]	-	-	-	+	+
Lysiosquilla capensis Hansen, 1895	+ [3]	-	-	-	-	-
Lysiosquilla colemani Ahyong, 2001	New record [3]	-	-	-	-	-
Lysiosquilla maculata (Fabricius, 1793)	+ [3]	+	+	+	-	-
Lysiosquilla tredecimdentata Holthuis, 1941	+ [2]	-	+	-	-	-
Heterosquilloides insignis (Kemp, 1911)	+	-	+	-	-	-
Clorida albolitura Ahyong and Naiyanetr, 2000	New record [3]	New record [3]	+	-	-	-
Clorida latreillei Eydoux and Souleyet, 1842	+ [1]	+	-	-	-	-
Harpiosquilla harpax (de Haan, 1844)	+ [5]	+	+	-	-	-
Kempella mikado (Kemp and Chopra, 1921)	+ [3]	+ [3]	-	-	-	-
Miyakella holoschista (Kemp, 1911)	+ [2]	-	-	-	-	-
Miyakella nepa (Latreille in Latreille, Le Peletier, Serville and Guérin, 1828)	+ [2]	+	+	-	-	-
Natosquilla investigatoris (Lloyd, 1907)	+ [6]	-	-	-	+ [6]	-
Oratosquilla mauritiana (Kemp, 1913)	+	-	+	+	-	-
Pterygosquilla capensis Manning, 1969a	+ [78]	-	-	-	-	-
Quollastria gonypetes (Kemp, 1911)	+	-	+	-	-	-
Rissoides barnardi (Manning, 1975a)	+ [1]	-	-	-	-	-