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Deepwater decapod, stomatopod and lophogastrid Crustacea from Eastern Australia and the Great Australian Bight collected in 2015–2017: preliminary identifications of 191 species

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Abstract A collection of deepwater decapods systematically sampled from Australia's continental slope and abyssal plain (200–5000 m) is reported from the combined surveys of the Great Australian Bight (GAB) and south-east and central-east coast of Australia (ECA). This report documents 191 species (115 from the GAB and 108 from the ECA (with 33 shared species)) in 44 families: Dendrobranchiata (32 species), Caridea (57 species), Polychelida (10 species), Achelata (3 species), Astacidea (3 species), Axiidea (2 species), Anomura (52 species), Brachyura (32 species). Nineteen per cent (37) of all species are suspected to be undescribed, 11% (21) are recorded for the first time from Australia and a further 37% (70) are new to either the GAB or the south-east or central coast of Australia. Forty percent of species were known only from a single specimen. The GAB surveys comprise a simple comparison of depth, all sampled at similar latitudes, although targeting different topographical features and substrates. The east coast survey was designed to investigate latitudinal biodiversity patterns along the eastern Australian continental margin, comparing bathyal and abyssal communities at different latitudes from Tasmania (41°S) to Fraser Island, Queensland (24°S). A comparison of GAB and ECA bathyal (1000–3500 m) and abyssal (3500+ m) decapod communities showed a drop in diversity with depth of 75% and 77% respectively, although there was considerable overlap in bathyal and abyssal species with 19% of GAB and 15% of ECA bathyal species also recorded in the abyssal zone. There was a marked increase in species diversity with decreasing latitude along the ECA at the upper bathyal depths of 1000–1500 m (largely due to increasing numbers of crab species at the lower latitudes). Below 1500 m, however, there was no discernable trend of increasing diversity with decreasing latitudes –abyssal species numbers remained relatively stable between southern and northern stations.

Keywords Decapoda, Stomatopoda, Lophogastrida, abyssal, bathyal, latitudinal, bathymetric, species richness

Introduction

The deep sea is an extreme environment: uniformly cold and dark with immense hydrostatic pressures. Ocean temperatures decline rapidly between 200 m and 1000 m depth, forming a permanent thermocline, beneath which, from about 1000 m to the ocean floor, there is virtually no seasonal variation with temperatures around 0–2°C. Organisms in the abyssal zone have no access to sunlight and rely heavily on nutrients sinking from above (marine snow) and on food supplied by ocean currents. It is, therefore, (except around hydrothermal vents, cold seeps and the odd whale fall or wood fall), an extremely food-limited en-

vironment (Smith *et al.*, 2006, 2008, 2013). Despite this, the top sediments of the abyssal plains are colonised by very rich communities of macro- and meiofauna with surprisingly high biodiversity levels, especially of the meiofauna component (Snelgrove & Smith, 2002; Brandt *et al.*, 2007).

Most decapods are predators or scavengers of the sea-floor and are either benthic or epibenthic, although some, like the benthesicymids, are pelagic or benthopelagic. The Decapoda and Stomatopoda are most diverse in the shallow tropics but are nevertheless common in temperate shelf and slope waters (200–2500 m) and a few groups, such as the munidopsids, parapagurids, polychelids and several families of shrimps, have become deep-water specialists of bathyal and abyssal depths (2500–6000 m). A few species have even been found at hadal depths (6000–11,000 m). The deepest decapod record comes from a baited video lander deployed in the Japan Trench at 7703 m, where several specimens of *Benthesicymus crenatus* Bate, 1881 were observed to be feeding on scavenging amphipods attracted to the bait (Jamieson *et al.*, 2009). This species and *Acanthephyra* spp. have also been recorded from the Kermadec Trench (6890 m) and in the Marianas region of the north-west Pacific (5575 m) (Jamieson *et al.*, 2009). A few families of brachyurans have become deep-water specialists but these are generally confined to the continental slope at depths of 1000–2000 m. Indeed, few crabs are found in the abyss, although there are some rare exceptions such as the ethusids, which are common to depths of 5500 m, the bythograeids, which are found in high densities around hydrothermal vents of the mid-oceanic ridges between 2500–4000 m (Desbruyères *et al.*, 2006), and the Spiny Masking Crab *Teratomaia richardsoni* (Dell, 1960), which has been recorded at depths of 7150 m in the Kermadec Trench (Griffin & Tranter, 1986a). Many deep-sea decapods have broad geographic distributions, as has been shown for a number of deep-sea taxa, and are represented in deep oceans worldwide (Brandt *et al.*, 2007; McClain & Hardy, 2010). It is thought that deep-ocean circulation plays a major role in the distribution of these cosmopolitan species through the wide dispersal of pelagic eggs and larvae (Desbruyères *et al.*, 2006; Ramirez-Llodra *et al.*, 2010). Cold waters may also augment the naturally high dispersal capabilities of many deep-sea species by slowing larval metabolism and development (McClain & Hardy, 2010).

The deep sea is the largest but least explored environment on the Earth. It covers approximately 75% of the total ocean floor (60% of the Earth's surface). Only 5% of the deep sea has been explored with remote instruments and less than 0.001% of the deep sea-floor has been sampled and studied in detail (Stuart *et al.*, 2008). The earliest comprehensive effort to study the fauna of the deep sea comes from the Bristish *Challenger* Expedition (1873–1876), which investigated the distribution of organic life at different depths and on the deep seafloor. The *Challenger* crossed the Atlantic, Indian and Pacific oceans, passing around the southeast of Australia, and sampled 360 stations, including stations at abyssal depths. The deepest sample was obtained from a station in the southwest Pacific Ocean between Guam and Palau, reaching a remarkable 8,184 m (Murray, 1895). The Macrura Crustacea found on that voyage were reported by Bate (1888). Many other major deep-sea expeditions have been made since the *Challenger* voyage, including the Netherlands expedition to Indonesia (*Siboga* 1899–1900) (Weber, 1902; De Man, J. G., 1920), the German Deep Sea Expedition to the Atlantic, Indian and Antarctic Oceans (*Valdivia* 1898–1899), (Schott, 1902; Balss, 1925), the British India voyages (*Investigator* 1884–1897) (Alcock, 1898, 1901), the United States expedition to the South, Central and North Pacific (*Albatross* 1891–1905), (Faxon, 1895; Rathbun, 1907), the USA expedition to the Philippines (*Albatross* 1907–1910), (Chace, 1983, 1984, 1985, 1986; Baba, 1988), the Danish voyage to the Philippine Trench and western Indian Ocean (*Galathea* 1950–1952) (Brunn, 1951, 1957, 1959), the Russian expeditions to the Kurile-Kamtchata and Kermadec Trenches (*Vitjaz* 1952–1957) (Zenkevich *et al.*, 1955), the Australia and New Zealand survey of the Lord Howe Rise and Norfolk Ridge (NORFANZ –*Tangaroa* 2003), (Williams *et al.*, 2006) the German Antarctic benthic deep-sea biodiversity expeditions to the Southern Ocean and Weddel Sea (*Polarstern* 2002–2005) (Brandt *et al.*, 2007), the Russian/German expedition to the Sea of Japan (*Akademik M.A. Lavrentyev* 2010) (Malyutina & Brandt, 2013), and the German expedition to the Kuril-Kamchatka Trench and adjacent abyssal plain (*Sonne* 2012) (Brandt & Malyutina, 2015; Brandt *et al.*, 2015). Additionally, the MUSORSTOM program or Tropical Deep Sea Benthos program has made more than 50 cruises to the Indo-Pacific, the first to the Philippines in 1976 on the *Vauban*, and has discovered hundreds of new species (Richer de Forges, B. *et al.*, 2013). New technologies involving submersibles and Remotely Operated Vehicles (ROVs) have also focused on the deep sea, documenting the fauna living in and around hydrothermal vents and oceanic ridges, cold seeps, whale falls, wood falls and cold-water corals (Gage & Tyler, 1991; Desbruyères *et al.*, 2006; German *et al.*, 2008). Despite these more recent technologically advanced surveys, however, the deep sea is still mostly unexplored; the current discovery rates of both habitats and species remain high and the geographic distributions of abyssal species and large-scale patterns of biodiversity are poorly documented.

The deep-sea decapod fauna off Australia's conti-

nental margin is poorly known compared with that of coastal regions, primarily due to the great difficulty and high cost of sampling the deep sea. Most records of Australia's marine fauna are from less than 1000 m of which the majority are from less than 200 m. There have been several surveys of the continental slope of south-eastern Australia, including the Tasmanian Seamounts, which rise from water depths of between 1000 and 2000 m, (1984, 1986, 1989, 1994 and 1997 RV *Franklin* and FRV *Southern Surveyor*), mostly sampling in the upper bathyal zone between 120 and 1600 m (Richer de Forges, B., 1993; Poore *et al.*, 1998; Koslow *et al.*, 2001). The CIDARIS expeditions of 1986 also explored the deep-sea benthos off the Great Barrier Reef shelf and adjacent Coral Sea between 296 and 1609 m (Baba, 1994; Ahyong, 2012b). More recently, a detailed survey was completed of the continental margin of south-western and central Western Australia between 100 and 1000 m (FRV *Southern Surveyor*, 2005) (Poore *et al.*, 2008; McEnnulty *et al.*, 2011). However, knowledge of the Australian abyssal decapod fauna remains substantially undocumented.

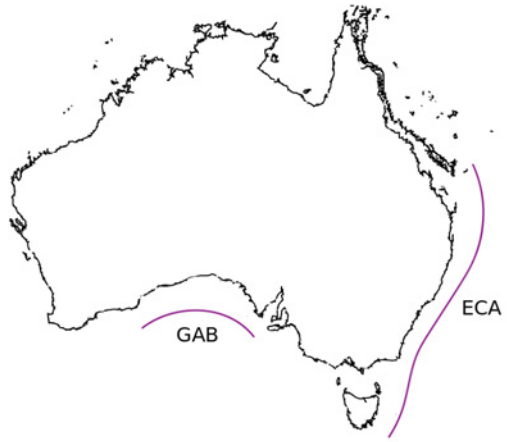

Figure 1: Map of survey areas: Great Australian Bight (GAB) and south east and central east of Austalia (ECA).

This report brings together the results of two major projects mounted largely by Museums Victoria and CSIRO Marine and Atmospheric Research (CMAR) / CSIRO Oceans and Atmosphere, both looking primarily at the benthic biodiversity of Australia's deep sea. The first was in the Great Australian Bight (GAB) and the second off the continental margin of the south-east and central east coast of Australia (ECA), (figure 1).

The Great Australian Bight is influenced by several large oceanic currents (Rintoul *et al.*, 2017). The Leeuwin current is a surface current that flows down the west coast of Australia. As it travels south, the current breaks into a series of southward and eastward flowing eddies and eventually dissipates in the Tasman Sea and Southern Ocean. The deeper Flinders Current flows from east to west along Australia's southern continental shelf. The even deeper Tasman Outflow (a residue of the East Australian Current), sweeps out of the Tasman Sea past Tasmania, along Australia's southern shelf before entering the Indian Ocean, and forms part of the "global conveyor belt" of deep ocean currents that control global climate (Ridgway & Dunn, 2007).

The east coast of Australia is primarily influenced by the East Australian Current (Rintoul *et al.*, 2017), which is the southward western boundary current that is formed from the South Equatorial Current, crossing the Coral Sea and reaching the eastern coast of Australia. At around 15 °S, near Fraser Island, the South Equatorial Current divides forming the southward flow of the East Australian Current. It is strongest off Cape Byron but begins to dissipate beyond 32°S; its remnants continue to drift southward until, off Tasmania, they swing eastward and begin to flow north as the Tasman Current. The majority of the East Australian Current that does not recirculate northwards moves eastward into the Tasman Front crossing the Tasman Sea just north of Cape Reinga, New Zealand. The remainder flows south on the East Australian Current Extension, eventually dividing to form the westward Tasman Outflow with the residue flowing into Antarctic Circumpolar Current. The East Australian Current potentially enables the transport of tropical marine fauna to habitats in sub-tropical regions along the south-east Australian coast. Eddies within the East Australian Current are thought to mix deeper thermocline layers with the surface layer, which may have implications for oceanic population connectivity and dispersal (Coleman *et al.*, 2013).

The east coast project "Sampling the Abyss" was initiated by Chief Scientist Dr Tim O'Hara from Museums Victoria and designed to document seafloor life in the abyss and to increase understanding of the environmental factors driving latitudinal and bathyal distribution patterns from eastern Tasmania to southern Queensland. Details of the voyage can be found at: `http://www.mnf.csiro.au/~/media/Files/Voyage-plans-and-summaries/Investigator/Voyage%20Plans%20summaries/2017/IN2017_V03%20Voyage%20Summary.ashx`.

The GAB surveys on the other hand, are direct results of research opportunities created by recent interest in deep-sea gas and oil exploration in the GAB.

Between 2013 and 2017, six surveys (all in conjunction with the oil exploration companies through "The Great Australian Bight Research Program" and "The Great Australian Bight Deepwater Marine Program") systematically targeted the benthic biota of the deep GAB, at depths of 200–4600 m, in order to document the biodiversity of the region before any mining proceeds. This was the first time that the Australian abyssal fauna had been sampled systematically (MacIntosh *et al.*, 2018).

The results from these two projects enable, for the first time, direct comparison of both latitudinal and longitudinal differences in bathyal and abyssal fauna around the Australian continent. This taxonomic and biogeographic information will help expand our knowledge and understanding of the origin and evolution of deep-sea faunal assemblages and the connectivity between different areas and regions. Here we present an illustrated and annotated checklist of deep-sea Decapoda from the two regions.

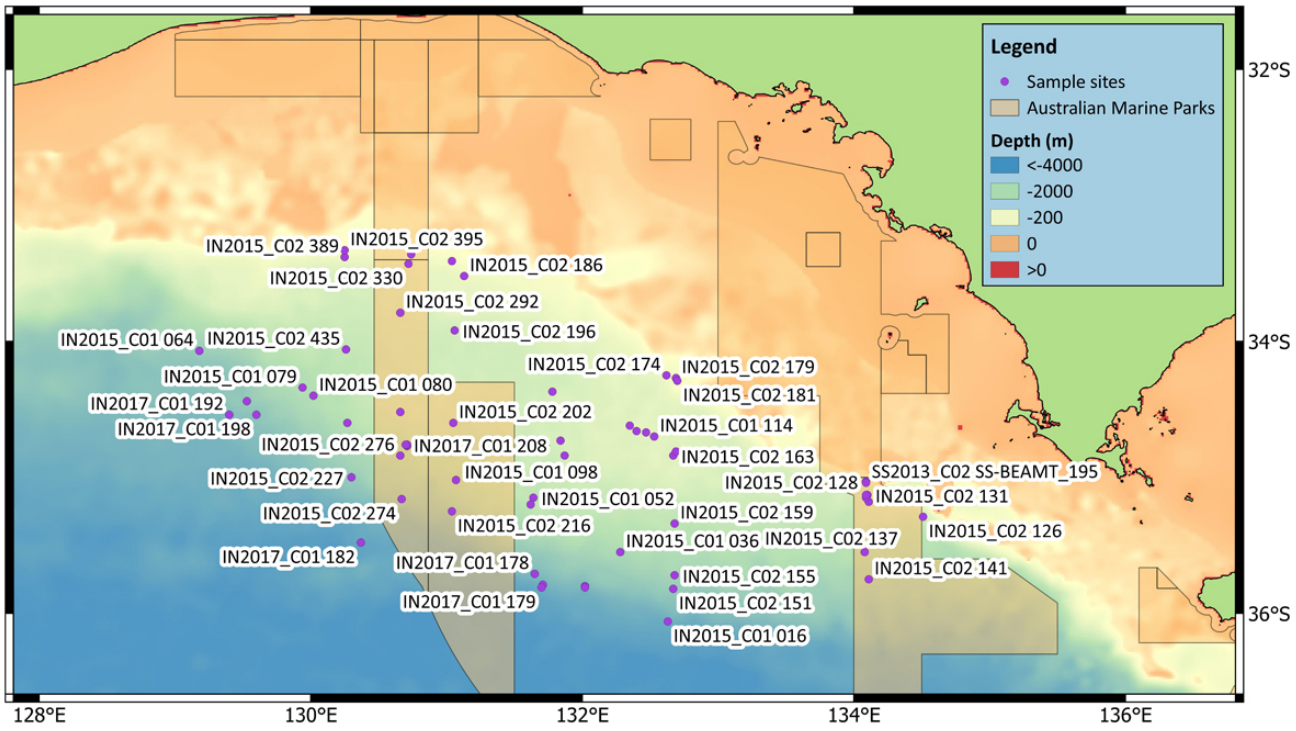

Figure 2: Map of the Great Australian Bight showing positions of sampling sites (purple dots) of surveys SS2013-C02, FU2013-01, IN2015-C01, IN2015-C02, IN2017-C01 and RE2017-C01.

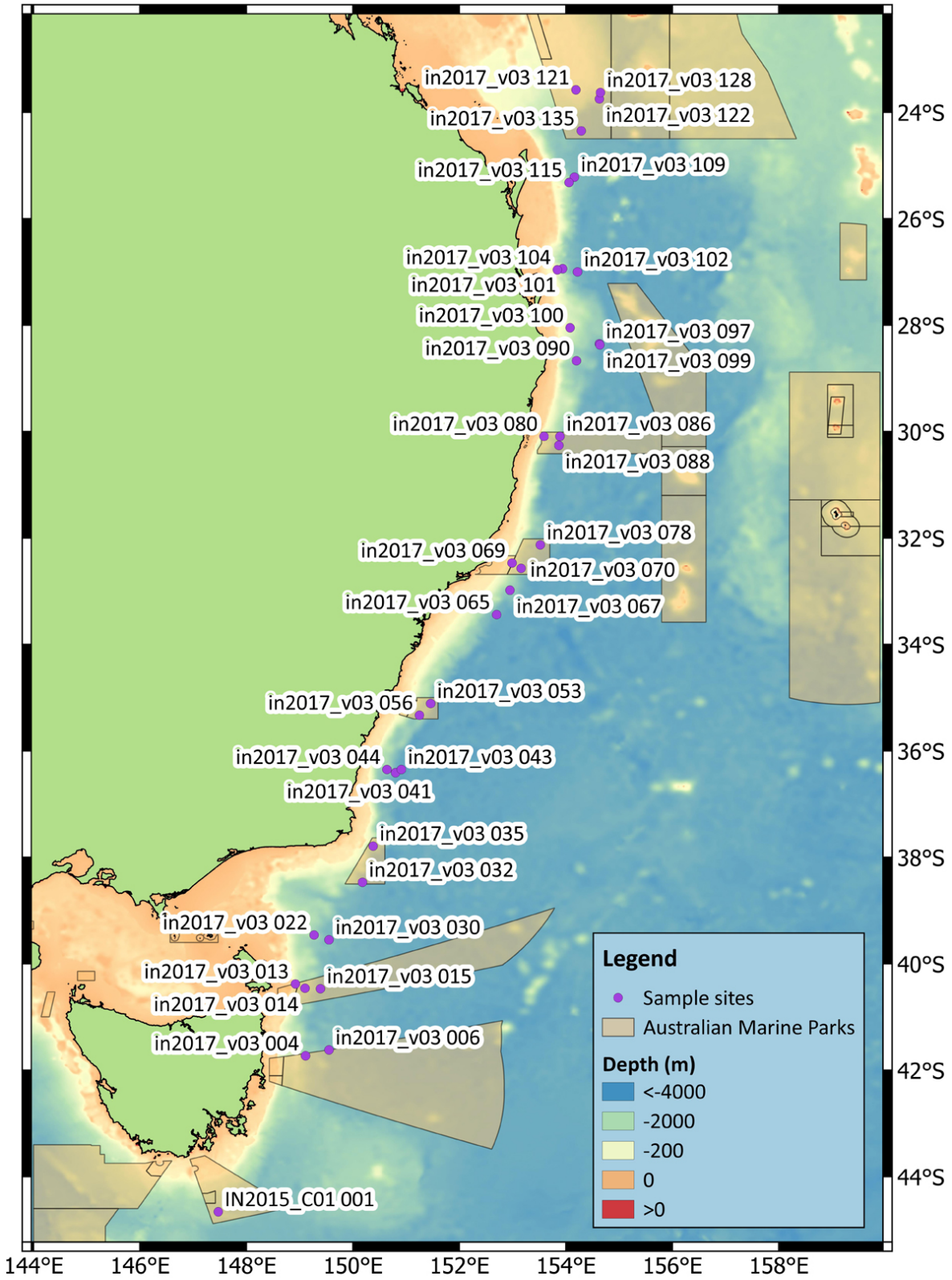

Figure 3: The IN2017-V03 survey area along the east coast of Australia showing positions of sampling sites (purple dots) between eastern Tasmania (24°S) and southern Queensland (42°S) along transect depths of 1000, 2500 and 4000 m.

Methods

The Great Australian Bight

Benthic invertebrates were collected on six offshore surveys by the RV *Southern Surveyor* (voyage SS2013-C02) and *Southern Supporter* (survey FU2013-01) in 2013; RV*Investigator* (surveys IN2015-C01 and IN2015-C02) in 2015 and (survey IN2017-C01) in 2017 and the industrial vessel REM *Etive* (survey RE2017-C01) in 2017. Surveys SS2013-C02 and IN2015-C02 sampled stations along five transects, at nominal depths of 200, 400, 1000, 1500, 2000 and 2800 m, whereas survey IN2015-C01 sampled from selected sites of geological interest such as volcanic seamounts, seep zones and canyons, down to 4600 m (figure 2). The RE2017-C01 survey also used two remotely operated vehicles (ROVs) to sample sites visited in IN2017-C01 for fine-scale habitat visualisation and collecting. Opportunistic pelagic sampling from 0–200 m was also done at several sites. Most biological samples were collected by the IN2015-C01 and IN2015-C02 surveys.

The eastern coast of Australia

A single survey by the RV *Investigator* (survey IN2017-V03) in 2017, obtained faunal samples from the sea floor along a south-north latitudinal transect of 18 degrees along eastern Australia, from 42°S to 24°S, at nominal depths of 1000 m (continental slope), 2500 m (lower bathyal) and 4000 m (abyssal) at 13 sites, sampling from seven Commonwealth Marine Reserves (figure 3). A complete list of operations can be found at the CSIRO voyage summary website given above

Sampling methods

Both the GAB and ECA survey sites were mapped before deployment using multibeam sonar and a high resolution video camera to identify targets of geological interest and areas suitable for trawling. The main sampling tool for obtaining larger epifaunal invertebrates (including most decapods) was the beam trawl, a CMAR-modified version of the French IRD design, 4.0 m wide × 0.5 m high and fitted with a 25 mm stretched-mesh net. A Brenke Sled and box corer were used to obtain smaller infaunal invertebrates and foraminifera. Samples from the beam trawl were put in iced seawater and then sorted into families or into smaller taxonomic groups by on-board scientists, before being labelled with provisional names and station and acquisition numbers. A representative of each taxonomic unit was photographed soon after collection (before preservation) with an aim to record the natural live colour of every species. Most of the decapods that were collected were already dead upon arrival at the surface, but many hermit crabs were still alive. These were immediately euthanized in a 0.25ml/l solution of clove oil, seawater and 95% ethanol. Most decapods were preserved on board directly in 95% ethanol, a few specimens were initially fixed in 5% formalin and a few specimens were frozen. At Museum Victoria, the specimens were all transferred to 70% ethanol.

Decapod specimens from the GAB were all lodged with the Australian Museum (except the SS2013 material which has been deposited in the South Australian Museum, Adelaide, whilst most of those from the ECA were lodged with Museums Victoria, with selected voucher specimens going to the Australian Museum.

Presentation of taxonomic results

For each family, the species found are summarised and the literature resources used cited. The higher taxonomy follows De Grave *et al.* (2009) and Tavares & Cleva (2010) (with addition of Trichopeltarioidea). Each species is listed by name with its authority when appropriate. Uncertain identifications and new species close to another known species are prefixed "cf." Probable new species are prefixed "sp. nov." Each species is assigned a unique Musems Victoria number (MoV number), which can be used as code names for uncertain or new species. Specimen records for each species are summarised as follows:
Records: the total number of specimens, with latitudinal range (to nearest minute) and depth range (in metres).
Distribution: a general comment on published distribution, plus information on whether the species is undescribed, new for the survey region or State, or for all of Australia. Australian States and Territories are abbreviated as follows: New South Wales (NSW), Northern Territory (NT), Queensland (Qld), South Australia (SA), Tasmania (Tas), Victoria (Vic), Western Australia (WA).
Reference: major bibliographic citations used for identification. Following the text for many species are coloured photographs. Those taken on board ship with their live, fresh coloration, before preservation, are by Karen Gowlett-Holmes. Photos of specimens taken at Museum Victoria after preservation and colour loss are by Caroline Farrelly, unless otherwise stated. The name of the survey and the station number is given for the specimen shown in each photograph.

Results and discussion

The GAB and ECA collections together amounted to over 4000 decapod specimens, representing 191 species (table 1) and is the first comprehensive characterisation of the deep-sea fauna off the continental margin of the Great Australian Bight and the southeast and central east coast of Australia. Of these, 33 (17%) were found in both the GAB and the ECA (table 2) which probably reflects the more cosmopolitan distribution of many deep-sea species. Thirty-seven (19%) are new to science and 21 (11%) are recorded for the first time from Australia. The Australian Faunal Directory currently lists 2515 marine decapods `http://www.environment.gov.au/sciencee/abrs/online-resources/fauna` with 263 of those species coming from the SS10-2005 survey of the continental margin off southwestern and central Western Australia (Poore *et al.*, 2008; McEnnulty *et al.*, 2011). The high number of new species from the Western Australian survey reflects both how little was known of this region prior to that survey and to the fact that sampling targeted shallower shelf and slope depths between 100–1000 m in warm temperate and subtropical waters, where diversity is significantly higher than in bathyal and abyssal waters. The combined GAB surveys collection of over 63,000 specimens comprised 2793 decapods, five stomatopods (one species) and 13 lophogastrids (two species). The decapods comprised 37 families, 77 genera and 115 species, all from taxa typical of the upper slope and deeper waters (tables 2, 3). Twenty-three species (20%) from the GAB are new to science (one of which has since been described (see Ahyong 2019; 40 (35%) represent new records for the GAB and four (3.5%) new records for Australia (Tables 1, 2). The single species of stomatopod collected (*Anchisquilloides mcneilli* (Stephenson, 1953)) is already known from southern Australia and the two lophogastridans (*Neognathophausia ingens* (Dohrn, 1870) and *Gnathophausia zoea* Willemoes-Suhm, 1875) are cosmopolitan at abyssal depths.

There was a notable drop in species diversity between the upper bathyal slope (200–1000 m), the mid-lower bathyal slope (1000–3500 m) and the abyssal floor (3500 + m), with 72 species in 33 families recorded from the upper bathyal slope, 59 species in 22 families recorded from mid-lower bathyal depths (representing a loss of 18% of species) and 15 species in 10 families from abyssal depths (representing a loss of 75% of species from bathyal to abyssal depths) (table 4). Seventy-two of 115 species from the GAB were recorded from depths less than 1000 m and 50 of these were recorded from less than 500 m. A total of 63 species was recorded from depths greater than 1000 m (compared to 108 recorded from similar depths from the ECA). Of these 63 species, 59 (94%) were bathyal and 15 (23%) were abyssal, with 11 species recorded from both bathyal and abyssal depths, representing a species overlap of 19% for bathyal decapods and 73% for abyssal decapods, ie. only 27% of the abyssal fauna were unique to the abyss. The level of diversity of the upper bathyal slope was 22% higher than that observed for the mid-lower bathyal slope. Additionally, the upper bathyal slope had a very different species composition, with only 17 species recorded from both upper and mid-lower bathyal slope depths and nearly all of these overlapping species were recorded in depths close to 1000 m.

The ECA survey collection of 42,747 specimens (epifauna and infauna) comprised 1261 decapods and one lophogastrid, (a known cosmopolitan species). No stomatopods were recorded in this survey. The decapods were represented by 31 families, 61 genera and 108 species, all from typical deepwater groups (table 2, table 3). Seventeen species from the ECA (16%) are new to science, 31 (29%) are new to the ECA and 17 (16%) represent new records for Australia.

The ECA was sampled from nominal depths of 1000 m, 2500 m and 4000 m. Again a significant drop in diversity was evident between the mid-bathyal slope (1000–1500 m), lower bathyal slope (1500–3500 m) and the abyss (3500 + m) (table 4). Ninety percent of all decapod specimens were collected from the bathyal zone and 10% from the abyss. Of the 108 species identified from the ECA, 64 (59%) were recorded from the mid-bathyal slope, 46 (43%) from the lower bathyal slope and 23 (21%) from the abyss. This represents a drop in diversity of 77% from bathyal to abyssal depths, as 76 species fall out below 3500 m. Fifteen of the 99 species recorded from bathyal depths were also recorded from the abyss; this represents a 15% overlap in species composition, *ie* 85% of bathyal species were found only down to bathyal depths but not beyond. Similarly, of the 23 species identified from the abyss, 15 (65%) were also found at bathyal depths with eight species (35% of abyssal species) occurring only in the abyss. Seven abyssal species were found in both the GAB and the ECA (47% of GAB abyssal species and 30% of ECA species), again highlighting the cosmopolitan nature of the abyssal community. The drop off in decapod diversity observed with increasing depth is fairly similar in both GAB and ECA (75% versus 77%).

Most new species from the GAB and ECA surveys were Caridea (10% and 8% respectively), closely followed by Anomura (6% and 5.5%) (table 3). The highest number of new Australian records was found in Anomura for the ECA (8%) and Caridea (3%) in the GAB. The highest number of new regional records was in the infraorder Caridea (11% ECA and 14% GAB).

The most diverse family in the GAB surveys was Sergestidae, containing eight species, closely followed by Pasiphaeidae, Crangonidae and Acanthephyridae (table 3). The most diverse families in the ECA were Munidopsidae and Polychelidae, with 11 and ten species, respectively, followed by aristeids and benthesicymids with seven species in each. Many species were rare. Forty-five species from the GAB (39%) and 43 species from the ECA (40%) were represented by a single specimen. A similar level of rarity (42%) was found in the Western Australian survey of 2005 (Poore *et al.* 2008). This is a common feature of deep-water exploration and suggests that further sampling would result in the discovery of many more species.

Fifty decapod species were recorded from the GAB at depths between 200–500 m. Here the dominant groups were Brachyura (table 4), comprising over 65%, followed by Anomura (13%) (mostly diogenids), pandalids (9.6%) and scyllarid lobsters (3.7%). These general patterns are consistent with those observed for continental slope decapods off Western Australia (Poore et al., 2008; McEnnulty et al., 2011). Several specimens of *Cymonomus delli* Griffin and Brown, 1976 were collected, the first since the holotype collected off Sydney in 1972 (Ahyong, 2019).

Only 24 species were recorded from the GAB between 500–1000 m (table 4). The decapod community here changed quite dramatically from the shallower water fauna, with a whole suite of taxa disappearing and new taxa taking its place. The only brachyran recorded was *Cymonomus soela* Ahyong & Brown, 2003. Diogenids, scyllarids, sicyoniids and penaeids, common in shallow water, were not collected. This zone is now dominated by aristeids (68.5%), nematocarcinids (10.1%) and sergestids (4.4%) and by increased numbers of parapagurids (7.3%).

Fifty-nine species were recorded from the GAB between 1000–3500 m (table 4). Here the bathyal sea floor was clearly dominated by the parapagurids (47.5%), followed by the nematocarcinids (12.1%), aristeids (10.2%), crangonids (8.0%), glyphocrangonids (5.1%) and pagurids (4.6%) (table 5). Other groups typical of deeper water are also present in increasing numbers such as the benthesicymids, polychelids and munidopsids (all comprising 2.5%). Several deep-water brachyurans were also recorded (*Cymonomus soela, Dorhynchus ramusculus* (Baker, 1906) and *Chaceon albus* Davie, Ng and Dawson, 2007).

A total of 15 species was recorded from the GAB abyssal sea floor (3500 + m). The numerically dominant decapods at abyssal depths were crangonids (30.6%), polychelids (30%), nematocarcinids (15.3%), benthesicymids (11.8%), followed by acanthephyrids (5.3%) and munidopsids (4.1%) (table 5). There was a significant drop in the presence of parapagurids in the abyss (dominant at bathyal depths) and other groups, including glyphocrangonids and pagurids. Brachyurans were notably absent.

Almost twice as many decapod species were recorded from the ECA bathyal sea floor (1000–3500 m) as from the GAB (99 species versus 59), though fewer specimens were collected from the ECA (table 4). This higher diversity along the ECA is probably a direct result of the wider latitudinal gradient and hence greater topographical and substrate variability across the ECA sampling sites compared with the GAB sites. The ECA fauna may also be influenced by localized eddies and up-wellings within the East Australian Current. Despite this, many similarities were observed in the faunal composition of the GAB and ECA bathyal sea floor (table 5). Between 1000–1500 m the ECA bathyal see floor was dominated by polychelids (16.6%), parapagurids (13.4%), benthesicymids (7.4%) and nematocarcinds (5.7%) with nephropids, pandalids and glyphocrangonids comprising around 4–5%. More brachyurans were recorded from this depth than in the GAB, comprising 11% of the fauna, with representative species in Cyclodorippidae, Cymonomidae, Homolidae, Ethusidae, Goneplacidae, Inachidae and Geryonidae. Between 1500 –3500 m, the ECA bathyal sea floor was largely dominated by parapagurids (53.1%), followed by nematocarcinids, (9.7%), munidopsids (8.5%), crangonids (7.0%), polychelids (5.1%) and pagurids (4.2%). One family of brachyurans was represented at this depth (Ethusidae) and comprised 2.4% of the fauna.

A total of 23 species was recorded from the abyssal sea floor of the ECA (3500 + m) (table 4). The higher species diversity observed in the ECA abyss than in the GAB abyss (23 species versus 15) is again likely to be a result of the effects of wider latitudinal sampling (greater topographical and substrate variability). However, if ECA stations of similar latitude to the GAB are compared (Freycinet to Jervis Bay: 41°36'S–35°13'S) it is clear that the GAB has a very similar level of species richness to the ECA (GAB 15 species in ten families vs ECA 13 species in eight families). The slightly higher numbers recorded in the GAB are likely to be a result of a sampling bias as fewer samples were collected from these ECA stations than in the GAB. The ECA abyssal fauna was found to be very similar in composition to that of the GAB and was dominated by the same groups: nematocarcinids (25.4%), crangonids (19.5%), benthesicymids (16.9%), munidopsids (16.1%), acanthephyrids (10.2%) and aristeids (4.2%) (table 5). There are significantly fewer parapagurids, polychelids and sergestids at abyssal depths and other groups such as the brachyurans, nephropids, glyphocrangonids, chirostylids and pagurids appear to have dropped out altogether. The munidopsids

were also much more dominant in the ECA abyssal fauna than in the GAB fauna (16.1% versus 4.1%), whilst the GAB abyss had much higher proportions of polychelids and crangonids.

The mid-bathyal slope of the ECA (1000–1500 m) was only sampled from the Hunter region (32°19′S) to the Coral Sea (23°59′S) but showed a marked increase in species richness between these latitudes (table 6). Hunter stations recorded 18 species in 12 families, whilst the Coral Sea recorded 33 species in 19 families. Many species such as *Benthesicymus investigatoris* Alcock and Anderson, 1899, *Prehensilosergia prehensilis* (Bate, 1881), *Nematocarcinus undulatipes* Bate, 1888, *Acanthphyra eximia* Smith, 1884, *Heterocarpus dorsalis* Bate, 1888, *Plesionika bifurca* Alcock and Anderson, 1894 and *Pentacheles laevis* Bate, 1878, are widespread and were found from Hunter to the Coral Sea. But the highest diversity of brachyurans, anomurans and polychelids is found off Byron Bay and the Coral Sea, where many more species are recorded than in the more southern stations.

In contrast, the ECA survey data of the lower bathyal slope (1500–3500 m) show no clear pattern of increasing diversity with decreasing latitude (table 6). Eleven species were recorded from Freycinet and 13 from the Coral Sea, with apparent hotspots off East Gippsland and Jervis where species numbers were 18 and 15 respectively. Several species, such as *Prehensilosergia prehensilis*, *Nematocarcinus productus* Bate, 1888, *N. sigmoideus* Macpherson, 1984, *Systellaspis debilis* (A. Milne-Edwards, 1881), *Pentacheles obscurus* Bate, 1878, and all three species of *Parapagurus* Smith, 1879, have wide distributions and in this study were found from Freycinet to the Coral Sea. *Ethusina castro* Ahyong, 2008, was one of only two brachyurans recorded from lower bathyal waters and was found from Bermagui to the Coral Sea; the other *Homologenus levii* Guinot and Richer de Forges, 1995, was recorded off Moreton Bay.

A comparison of abyssal floor Decapoda across latitude also show no discernible increase in diversity from south to north, with four species recorded from Freycinet and three from the Coral Sea (table 6). Benthesicymids and sergestids were both found from Freycinet to Fraser/Coral Sea, with aristeids recorded from Bermagui to Fraser; crangonids from Jervis to Fraser; acanthephyrids from Flinder to Fraser and oplophorids from Bass to Byron. Only one species of *Nematocarcinus* was recorded (*N. sigmoideus*) from the southern stations (Freycinet to Bermagui). The lower bathyal and abyssal environment is very stable and remote and it appears that changes in latitude have little effect on these deep-water communities.

Six species (5.5%) from the ECA survey are endemic to Australia and five of these (4.6%) were endemic to the east coast of Australia. The majority of species are widespread: 75% (81 species) have an Indo-West Pacific affinity; 10% (11 species) have broader Southern Ocean or subantarctic affinity and 28% (30 species) are cosmopolitan in their distribution (having both an Atlantic and Indo-Pacific distribution). At least 16% (17 species) are new species records for Australia and 29% (31 species) represent the first records for the south-east and central-east coast of Australia. Three pagurid hermit crab species also represented new generic records for Australia: *Catapaguroides microps*, A. Milne-Edwards and Bouvier, 1892, *Chanopagurus atopos*, Lemaitre, 2003 and *Icelopagurus crosnieri*, McLaughlin, 1997 and the three species of *Ethusina* are the first identified species of this genus recorded in Australia (Ahyong & Farrelly, 2018). The 17 new Australian records from the ECA represent significant range extension with most of these species nearest previous records from New Zealand or the near Indo-West Pacific, including New Caledonia, Vanuatu, Wallis and Fatuna Islands and Indonesia, although several species were found more distantly from Taiwan (*Chanopagurus atopos* Lemaitre, 2003), the Philippines and the Bay of Bengal (*Munidopsis arietina* Alcock and Anderson, 1894). Closest records were those from the Lord Howe Rise (*Gordonella kensleyi* Crosnier, 1988; *Glyphocrangon tasmanica* Komai, 2004), the Tasman Sea and New Zealand (*Neolithodes bronwynae* Ahyong, 2010; *Munidopsis crassa* Smith, 1885). Of the 30 new records for the ECA, 12 were new to Queensland or the Coral Sea, 22 were new to NSW, five were new to Tasmania, and two to Victoria. Most of these represent range extensions from adjacent regions to the north or south, or west from the Lord Howe Rise and Norfolk Ridge; five species, previously known only from Western Australia were also recorded.

The GAB survey data reveals a high proportion of Australian endemics 25% (29 species) (mostly crabs collected from 200–500 m), which is similar to that recorded in the SS10-2005 survey of Western Australia (21%) (McEnnulty *et al.*, 2011) and is a direct reflection of the higher rate of endemism in shallower compared with deeper water. Only two of these species were endemic to the GAB, four species were previously recorded only from Western Australia and 19 endemic to southern Australian temperate waters. The majority of the GAB species have widespread distributions: 44% (51 species) have an Indo-West Pacific affinities; 24% are circumglobal (Atlantic and Indo-West distribution); 11% (13 species) have Southern Ocean or sub-Antarctic affinities and 14% (16 species) had previously been recorded only from New Zealand. Relatively few (4%) represent new distributional records for Australia whilst 35% (40 species) are recorded for the first time from the Great Australian Bight. Many

of these new GAB records (15 species) were previously known from both Western Australia and eastern states (Tasmania, Victoria and New South Wales). GAB sampling has joined many of these discontinuous distributions, which were clearly a reflection of the collection effort rather than a real distribution. The four new Australian records for the GAB represent significant range extension: *Heterogenys microphthalma* (Smith, 1885) —cosmopolitan, nearest previous record from New Zealand; *Parapagurus furici* Lemaitre, 1999 —previously known from tropical Indo-West Pacific including New Caledonia and the Lord Howe Rise; *Munidopsis arietina* Alcock and Anderson, 1894 —previously known from the Bay of Bengal and Taiwan; *Pasiphaea japonica* Omori, 1976 —previously known from the Indo-West Pacific (Japan, Taiwan, South Africa, Madagascar, Reunion and Indonesia) and *Glyphocrangon dimorpha* Komai, 2004 —previously recorded from New Caledonia (and now also recorded in the ECA survey).

All of the undescribed species from both the GAB and ECA belong to genera already recorded from Australian waters, although their nearest congeners may not be Australian. For example, the nearest relatives of three new species of squat lobsters (*Munida* sp., *Munidopsis* sp. and *Gastroptychus* sp.,) occur farther afield in the Indo-West Pacific (Baba *et al.*, 2008), *Glyphocrangon* cf. *ferox* Komai, 2004, whose closest relative is from Madagascar (Komai, 2004) and *Lebbeus* cf. *profundus* (Rathbun, 1906), whose nearest congeners are from Hawaii and New Zealand (Rathbun, 1906; Ahyong, 2010b).

Significant extensions in depth ranges were found for 12 species, seven from the GAB (two dendrobranchiates, four carideans and one stomatopod) and eight from the ECA (five dendrobranchiates, two carideans and one munidopsid). Three species achieved depth records in both GAB and ECA surveys. The deepest record was *Nematocarcinus sigmoideus* (ECA: 4037 m; GAB: 5081 m), where the previous maximum recorded depth had been 1440 m.

Table 1: List of all species of Decapoda, Stomatopoda and Lophogastrida for the Great Australian Bight (GAB) and eastern Australia (ECA). Dendrobranchiata are listed first and infraorders of Pleocyemata follow (Caridea, Polychelida, Achelata, Atacidea, Axiidea, Anomura and Brachyura). Non decapods (Stomatopoda and Lophogastrida) are shown last. A species name in bold indicates a new Australian record. A bold "1" indicates a range extension for that species. Depth ranges are inclusive of both regions.

Higher taxon				
Family	**Species**	**ECA**	**GAB**	**depth–range m**
Decapoda				
Dendrobranchiata				
Penaeoidea				
Aristeidae	*Aristaeopsis edwardsiana*	1		1006–1006
	Aristeus mabahissae	1	**1**	1021–1021
	Austropenaeus nitidus	1	1	986–1021
	Cerataspis monstrosus	**1**		2346–4441
	Hemipenaeus carpenteri	1		1053–1053
	Hemipenaeus cf. *spinidorsalis* MoV 7218		1	4022–4022
	Hepomadus tener	**1**		2474–4006
	Pseudoaristeus sibogae	**1**		1006–1006
Benthesicymidae	*Benthesicymus howensis*	**1**	**1**	1766–4441
	Benthesicymus investigatoris	1	**1**	996–1021
	Benthesicymus urinator	1		4441–4441
	Benthesicymus sp. nov. MoV 7132	1		4269–4269
	Benthesicymus sp. nov. MoV 7136	1		1053–1053
	Gennadus gilchristi	1	1	1005–4165
	Gennadus kempi	1	1	1553–4167
Penaeidae	*Funchalia woodwardii*		**1**	0–400
Sicyoniidae	*Sicyonia australiensis*		**1**	199–199

Table 1 (continued)

Higher taxon Family	Species	ECA	GAB	depth–range m
Solenoceridae	***Gordonella kensleyi***	1		2535–2535
	Hymenopenaeus halli	1		1021–1021
	Hymenopenaeus neptunus	**1**		1053–1226
	Hymenopenaeus propinquus	1		3954–3954
Sergestoidea				
Sergestidae	*Allosergestes sargassi*	1	1	1766–2037
	Deosergestes corniculum	**1**	1	996–3993
	Deosergestes disjunctus		1	996–1478
	Deosergestes sp. nov. MoV 7222		1	987–2241
	Eusergestes antarcticus	1	1	1042–2460
	Parasergestes armatus		1	2241–2241
	Petalidium foliaceum		1	2114–3510
	Phorcosergia potens		1	1006–2078
	Prehensilosergia prehensilis	1	1	987–4269
	Scintillosergia scintillans	1		2460–2460
	Sergia laminata	1		2786–4165
Caridea				
Alpheoidea				
Hippolytidae	*Leontocaris bulga*		**1**	1365–1365
Thoridae	*Eualus* sp. nov. MoV 7243		1	987–987
	Eualus sp. nov. MoV 7244		1	987–990
	Lebbeus clarehannah		**1**	412–412
	Lebbeus cf. *profundus* MoV 7208	1		1226–1226
	Lebbeus sp. nov. MoV 7245		1	1842–1842
	Lebbeus sp. nov. MoV 7246		1	1015–1015
Campylonotoidea				
Bathypalaemonellidae	*Bathypalaemonella* sp. nov. MoV 7135	1		1053–1053
Crangonoidea				
Crangonidae	*Aegaeon lacazei*		**1**	189–218
	Lissoabinea lynseyae		**1**	199–388
	Metacrangon sp. nov. MoV 7211	1		1042–1226
	Parapontophilus cf. *difficilis* MoV 7210	1	1	388–4269
	Parapontophilus sp. nov. MoV 7260		1	375–375
	Parapontophilus sp. nov. MoV 7256	1		2734–2734
Glyphocrangonidae	*Glyphocrangon dimorpha*	1	1	1961–2460
	Glyphocrangon elephas		1	412–426
	Glyphocrangon cf. *ferox* MoV 7152	1	1	2078–2726
	Glyphocrangon cf. *fimbriata* MoV 7259		1	1492–2826
	Glyphocrangon sp. nov. MoV 7154	1		1006–1006
	Glyphocrangon tasmanica	1		1006–1006
Nematocarcinoidea				
Lipkiidae	*Lipkius holthuisi*	1		1042–1042

Table 1 (continued)

Higher taxon Family	Species	ECA	GAB	depth–range m
Nematocarcinidae	*Nematocarcinus productus*	**1**	1	996–3305
	Nematocarcinus proximatus	**1**		2575–2575
	Nematocarcinus sigmoideus	**1**	**1**	1015–5081
	Nematocarcinus sp. nov. MoV 7248		1	987–987
	Nematocarcinus sp. nov. MoV 7212	1		2479–2479
	Nematocarcinus undulatipes	**1**		1006–1226
Oplophoroideae				
Acanthephyridae	*Acanthephyra acutifrons*		**1**	2725–3510
	Acanthephyra brevirostris	1		4269–4269
	Acanthephyra eximia	**1**		1024–1053
	Acanthephyra quadrispinosa	1	**1**	996–4269
	Acanthephyra sica		**1**	1527–4607
	Acanthephyra sp. nov. MoV 7251		1	1005–2004
	Acanthephyra tenuipes	**1**		4005–4005
	Heterogenys microphthalma		1	2241–3305
	Hymenodora gracilis	**1**	**1**	2725–3510
Oplophoridae	*Oplophorus novaezeelandiae*		1	2114–2114
	Oplophorus spinosus	**1**		1006–4165
	Systellaspis debilis	1	1	1105–4607
Pandaloidea				
Pandalidae	*Chlorotocus novaezealandiae*		1	189–218
	Dorodotes reflexus	**1**		1766–1766
	Heterocarpus dorsalis	**1**		1006–1053
	Plesionika bifurca	1		1006–1226
	Plesionika edwardsii		**1**	199–209
	Plesionika martia	1	**1**	388–1042
	Plesionika semilaevis		**1**	1021–1021
	Stylopandalus richardi		**1**	800–800
Pasiphaeoidea				
Pasiphaeidae	*Alainopasiphaea australis*		**1**	200–400
	Leptochela sydniensis		1	212–212
	Parapasiphae sulcatifrons		**1**	996–2014
	Pasiphaea barnardi		**1**	1021–1021
	Pasiphaea japonica		1	200–400
	Pasiphaea cf. *longitaenia* MoV 7253		1	2037–2037
	Pasiphaea cf. *oshoroae* MoV 7254		1	2241–2241
	Pasiphaea sp. nov. MoV 7215	1		1766–1766
Stylodactyloidea				
Stylodactylidae	*Bathystylodactylus bathyalis*	1		4006–4006
	Stylodactylus licinus	**1**		1006–1006
Polychelida				
Polychelidae	*Pentacheles laevis*	1	1	1006–2786
	Pentacheles obscurus	**1**		1766–2803
	Pentacheles validus	1	1	1226–2786
	Polycheles kermadecensis	1		1021–1021
	Stereomastis nana	1		1006–1226
	Stereomastis sculpta	1		1053–1105

Table 1 (continued)

Higher taxon Family	Species	ECA	GAB	depth–range m
	Stereomastis surda	1	**1**	1027–1053
	Willemoesia forceps	**1**		2474–2474
	Willemoesia leptodactyla	1		4165–4165
	Willemoesia pacifica	**1**	1	2474–4013
Achelata				
Scyllaridae	*Antarctus mawsoni*		1	199–410
	Crenarctus crenatus		**1**	200–400
	Ibacus alticrenatus		1	189–410
Astacidea				
Nephropidae	*Metanephrops velutinus*		1	412–412
	Nephropsis acanthura	1	**1**	987–1105
	Nephropsis suhmi		**1**	987–1553
Axiidea				
Axiidae	*Ambiaxius franklinae*	**1**		1226–1226
Micheleidae	*Tethisea indica*		**1**	204–437
Anomura				
Chirostyloidea				
Chirostylidae	*Gastroptychus* cf. *brevipropodus* MoV 7226		1	189–221
	Uroptychus australis	1		1021–1021
	Uroptychus babai	1		1105–1105
	Uroptychus flindersi		1	410–412
	Uroptychus nigricapillis	**1**		1006–1053
Galatheoidea				
Munididae	*Munida endeavourae*		**1**	990–1007
	Munida haswelli		1	199–199
	Munida magniantennulata	**1**		2474–2474
	Munida cf. *magniantennulata* MoV 7227	1		1766–1766
	Munida cf. *manqingae* MoV 7228		1	1779–1779
	Munida sp. nov. MoV 5661		1	204–204
Munidopsidae	*Galacantha rostrata*	1	**1**	1769–2826
	Munidopsis arietina	1	1	1836–3852
	Munidopsis centrina	1		2643–2643
	Munidopsis cidaris	1		1053–1053
	Munidopsis crassa	1		3852–4441
	Munidopsis crenatirostris		**1**	383–383
	Munidopsis edwardsii	1		2535–2643
	Munidopsis cf. *edwardsii* MoV 7229		1	5081–5081
	Munidopsis cf. *granosa* MoV 7230	1	1	2460–4741
	Munidopsis kensleyi	**1**		1053–1053
	Munidopsis cf. *marginata* MoV 7231	1		2803–2803
	Munidopsis nitida	**1**		1006–1006
	Munidopsis subsquamosa	**1**		2460–4800
	Munidopsis cf. *subsquamosa* MoV 7232		1	2726–3061
Lithodoidea				
Lithodidae	***Neolithodes bronwynae***	1		2460–2643
	Neolithodes flindersi		1	987–1332

Table 1 (continued)

Higher taxon Family	Species	ECA	GAB	depth–range m
Paguroidea				
Diogenidae	*Dardanus arrosor*		1	189–283
	Paguristes aciculus		1	189–412
	Strigopagurus elongatus		1	283–283
Paguridae	*Bythiopagurus macrocolus*		**1**	1381–1381
	Catapaguroides microps	1		1006–1766
	Chanopagurus atopos	1		1021–1053
	Gorepagurus poorei	1	**1**	1021–1042
	Icelopagurus crosnieri	1		1006–1053
	Lophopagurus (Lophopagurus) nanus		1	209–283
	Michelopagurus chacei	1		1006–1105
	Pagurodes inarmatus	**1**	1	1332–2786
	Propagurus haigae		**1**	412–426
Parapaguridae	*Oncopagurus cidaris*	1		1053–1053
	Oncopagurus cf. *elongatus* MoV 7234	1		1006–1053
	Oncopagurus indicus	1		1006–1006
	Oncopagurus minutus	1		1006–1226
	Oncopagurus sp. nov. MoV 7235		1	996–1027
	Parapagurus bouvieri		1	410–2014
	Parapagurus furici	1	1	1006–3021
	Parapagurus latimanus	**1**	1	987–3002
	Parapagurus richeri	1	**1**	996–3305
	Sympagurus acinops	1		1006–1226
	Sympagurus burkenroadi	1		1006–1006
	Sympagurus sp. nov. MoV 7189	1		1006–1006
	Sympagurus sp. nov. MoV 7214	1		1006–1006
Brachyura				
Dromioidea				
Dromiidae	*Austrodromidia incisa*		**1**	189–218
	Austrodromidia insignis		1	189–218
	Austrodromidia octodentata		1	209–209
	Stimdromia lateralis		1	189–221
Homoloidea				
Homolidae	***Homologenus levii***	1		1006–2548
Latreilliidae	*Eplumula australiensis*		**1**	189–209
Cyclodorippoidea				
Cyclodorippidae	*Krangalangia spinosa*	1		1053–1053
	Tymolus similis		1	218–412
Cymonomidae	*Cymonomus delli*		**1**	383–426
	Cymonomus soela	**1**	**1**	987–1105
	Cymonomus triplex		1	388–388
Dorippoidea				
Ethusidae	***Ethusina castro***	1		1766–2803
	Ethusina robusta	1		1006–1226

Table 1 (continued)

Higher taxon Family	Species	ECA	GAB	depth–range m
	Ethusina rowdeni	1		1226–1226
Goneplacoidea				
Goneplacidae	*Menoplax longispinosa*	**1**		1006–1053
	Pycnoplax meridionalis		1	199–212
	Pycnoplax victoriensis		1	218–426
Leucosioidea				
Leucosiidae	*Ebalia tuberculosa*		1	189–426
	Merocryptus lambriformis		1	199–283
Majoidea				
Epialtidae	*Rochinia mosaica*		1	189–189
Inachidae	*Cyrtomaia maccullochi*		1	383–412
	Dorhynchus ramusculus		1	189–1027
	Platymaia wyvillethomsoni		1	189–426
	Vitjazmaia latidactyla	1		1226–1226
Majidae	*Choniognathus granulosus*		1	189–199
	Leptomithrax globifer		1	189–209
	Prismatopus spatulifer		1	189–218
	Teratomaia richardsoni		**1**	426–426
Palicoidea				
Palicidae	*Pseudopalicus macromeles*		**1**	189–283
Portunoidea				
Geryonidae	*Chaceon albus*		**1**	1027–1873
	Chaceon bicolor	1		1006–1006
Trichopeltarioidea				
Trichopeltariidae	*Trichopeltarion* sp. nov. MoV 5135		1	358–412
Total decapod species		**108**	**115**	
Stomatopoda				
Squillidae	*Anchisquilloides mcneilli*		1	189–1027
Lophogastrida				
Gnathophausiidae	*Fagegnathophausia gracilis*	1		3993–3993
	Gnathophausia zoea		1	1021–1863
	Neognathophausia ingens		1	1006–2241
Total stomatopod and lophogastrid species		**1**	**3**	

Table 2: Summary of numbers of families, genera and species in each infraorder for the GAB and ECA, including new Australian records, range extensions and new species. Three of the new brachyuran records from the ECA have been reported by Ahyong & Farrelly (2018), and one new brachyuran species from the GAB is now described: *Cymonomus triplex* Ahyong 2019.

All decapod taxa	**Families**		**Genera**		**species**				**Aust. records**			**range ext.**			**new species**		
	ECA	GAB	ECA	GAB	Total	shared	ECA	GAB	Total	ECA	GAB	Total	ECA	GAB	Total	ECA	GAB
Dendrobranchiata	4	5	17	13	32	9	24	17	1	1	0	11	6	5	4	2	2
Caridea	11	9	17	20	57	10	29	37	5	2	2	28	12	16	19	9	12
Polychelida	1	1	4	3	10	4	10	4	1	1	0	3	3	1	0	0	0
Achelata	0	1	0	3	3	0	0	3	0	0	0	1	0	1	0	0	0
Astacidea	1	1	1	2	3	1	1	3	0	0	0	2	0	2	0	0	0
Axiidea	1	1	1	1	2	0	1	1	0	0	0	2	1	1	0	0	0
Anomura	6	7	14	16	52	8	34	26	10	9	2	14	7	7	12	6	7
Brachyura	7	12	7	19	32	1	9	24	4	4	0	9	2	7	2	0	2
Total Taxa	**31**	**37**	**61**	**77**	**191**	**33**	**108**	**115**	**21**	**17**	**4**	**70**	**31**	**40**	**37**	**17**	**23**

Table 3: Summary of numbers of genera and species in each family, including Australian records, range extensions and new species.

	Genera			Species				New Aust. records			range extensions			new species		
	Total	ECA	GAB	Total	Both	ECA	GAB	Total	ECA	GAB	Total	ECA	GAB	Total	ECA	GAB
Dendrobranchiata																
Aristeidae	7	7	3	8	2	7	3	0	0	0	4	3	1	1	0	1
Benthesicymidae	2	2	2	7	4	7	4	0	0	0	3	1	2	2	2	0
Penaeidae	1	0	1	1	0	0	1	0	0	0	1	0	1	0	0	0
Sicyoniidae	1	0	1	1	0	0	1	0	0	0	1	0	1	0	0	0
Solenoceridae	2	2	0	4	0	4	0	1	1	0	1	1	0	0	0	0
Sergestidae	9	6	6	11	3	6	8	0	0	0	1	1	0	1	0	1
All Dendrobranchiata	22	17	13	32	9	24	17	1	1	0	11	6	5	4	2	2
Caridea																
Hippolytidae	1	0	1	1	0	0	1	0	0	0	1	0	1	0	0	0
Thoridae	2	1	2	6	0	1	5	0	0	0	1	0	1	5	1	4
Bathypalaemonellidae	1	1	0	1	0	1	0	0	0	0	0	0	0	1	1	0
Crangonidae	4	2	3	6	1	3	4	0	0	0	2	0	2	4	3	2
Glyphocrangonidae	1	1	1	6	2	4	4	1	1	0	1	1	1	3	2	2
Lipkiidae	1	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0
Nematocarcinidae	1	1	1	6	2	5	3	0	0	0	5	4	1	2	1	1
Acanthephyridae	3	2	3	9	3	5	6	3	1	1	7	3	3	1	0	1
Oplophoridae	2	2	2	3	1	2	2	0	0	0	1	1	0	0	0	0
Pandalidae	5	3	3	8	1	4	5	0	0	0	6	2	4	0	0	0
Pasiphaeidae	4	1	4	8	0	1	7	1	0	1	3	0	3	3	1	2
Stylodactylidae	2	2	0	2	0	2	0	0	0	0	1	1	0	0	0	0
All Caridea	27	17	20	57	10	29	37	5	2	2	28	12	16	19	9	12
Polychelida																
Polychelidae	4	4	3	10	4	10	4	1	1	0	3	3	1	0	0	0
All Polychelida	4	4	3	10	4	10	4	1	1	0	3	3	1	0	0	0
Achelata																
Scyllaridae	3	0	3	3	0	0	3	0	0	0	1	0	1	0	0	0
All Achelata	3	0	3	3	0	0	3	0	0	0	1	0	1	0	0	0
Astacidea																
Nephropidae	2	1	2	3	1	1	3	0	0	0	2	0	2	0	0	0
All Astacidea	2	1	2	3	1	1	3	0	0	0	2	0	2	0	0	0
Axiidea																
Axiidae	1	1	0	1	0	1	0	0	0	0	1	1	0	0	0	0
Micheleidae	1	0	1	1	0	0	1	0	0	0	1	0	1	0	0	0
All Axiidea	2	1	1	2	0	1	1	0	0	0	2	1	1	0	0	0
Anomura																
Chirostylidae	2	1	2	5	0	3	2	1	0	0	1	1	0	1	0	1
Munididae	1	1	1	6	0	2	4	0	0	0	2	1	1	3	1	2
Munidopsidae	2	2	2	14	3	11	6	2	2	1	5	3	2	4	2	3
Lithodidae	1	1	1	2	0	1	1	1	1	0	0	0	0	0	0	0
Diogenidae	3	0	3	3	0	0	3	0	0	0	0	0	0	0	0	0
Paguridae	9	6	5	9	2	6	5	4	4	0	4	1	3	0	0	0
Parapaguridae	3	3	2	13	3	11	5	2	2	1	2	1	1	4	3	1
All Anomura	21	14	16	52	8	34	26	10	9	2	14	7	7	12	6	7
Brachyura																
Dromiidae	2	0	2	4	0	0	4	0	0	0	1	0	1	0	0	0
Homolidae	1	1	0	1	0	1	0	1	1	0	0	0	0	0	0	0
Latreilliidae	1	0	1	1	0	0	1	0	0	0	1	0	1	0	0	0
Cyclodorippidae	2	1	1	2	0	1	1	0	0	0	0	0	0	0	0	0
Cymonomidae	1	1	1	3	1	1	3	0	0	0	3	1	2	1	0	1
Ethusidae	1	1	0	3	0	3	0	3	3	0	0	0	0	0	0	0
Goneplacidae	2	1	1	3	0	1	2	0	0	0	1	1	0	0	0	0
Leucosiidae	2	0	2	2	0	0	2	0	0	0	0	0	0	0	0	0
Epialtidae	1	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0
Inachidae	4	1	3	4	0	1	3	0	0	0	0	0	0	0	0	0
Majidae	4	0	4	4	0	0	4	0	0	0	1	0	1	0	0	0
Palicidae	1	0	1	1	0	0	1	0	0	0	1	0	1	0	0	0
Geryonidae	1	1	1	2	0	1	1	0	0	0	1	0	1	0	0	0
Trichopeltariidae	1	0	1	1	0	0	1	0	0	0	0	0	0	1	0	1
All Brachyura	24	7	19	32	1	9	24	4	4	0	9	2	7	2	0	2
All taxa	105	61	77	191	33	108	115	21	18	4	70	31	40	37	17	23

Table 4: Numbers of decapod specimens, species and families with depth (many species are found in more than one depth zone).

	Great Australian Bight			Eastern coast of Australia		
Depth (m)	**Specimens**	**Species**	**Families**	**Specimens**	**Species**	**Families**
Upper Bathyal (200–1000)	1080	72	33	–	–	–
Mid-Lower Bathyal (1000–3500)	1543	59	22	1143	99	31
Mid Bathyal (1000–1500)	–	–	–	476	64	28
Lower Bathyal (1500–3500)	–	–	–	667	46	15
Abyssal (3500 +)	170	15	10	118	23	12

Table 5: Family representation (%) recorded from bathyal and abyssal depths in each of the survey areas.

	Great Australian Bight				Eastern coast of Australia		
Depth (m):	**200–500**	**500–1000**	**1000–3500**	**3500 +**	**1000–1500**	**1500–3500**	**3500 +**
Aristeidae	–	68.5	10.2	0.6	2.3	1.5	4.2
Benthesicymidae	–	0.8	2.5	11.8	7.4	2.4	16.9
Penaeidae	0.1	–	–	–	–	–	–
Sicyoniidae	0.1	–	–	–	–	–	–
Solenoceridae	–	–	–	–	2.3	0.1	0.8
Sergestidae	–	4.4	1.1	0.6	11.8	1.3	1.7
Hippolyitidae	–	–	0.1	–	–	–	–
Thoridae	0.1	1.6	0.1	–	0.2	–	–
Bathypalaemonellidae	–	–	–	–	0.2	–	–
Crangonidae	1.6	0.8	8.0	30.6	1.5	7.0	19.5
Glyphocrangonidae	1.9	–	5.1	–	3.6	0.4	–
Lipkiidae	–	–	–	–	0.2	–	–
Nematocarcinidae	–	10.1	12.1	15.3	5.7	9.7	25.4
Acanthephyridae	–	0.4	1.1	5.3	2.3	0.7	10.2
Oplophoridae	–	–	0.2	1.2	1.5	1.8	–
Pandalidae	9.6	0.4	0.6	–	4.6	0.1	–
Pasiphaeidae	0.5	0.8	0.6	–	–	0.1	–
Stylodactylidae	–	–	–	–	0.2	–	0.8
Polychelidae	–	–	2.5	30.0	16.6	5.1	1.7
Scyllaridae	3.7	–	–	–	–	–	–
Nephropidae	0.1	1.2	0.3	–	4.8	–	–
Axiidae	–	–	–	–	0.2	–	–
Micheleidae	0.4	–	–	–	–	–	–
Chirostylidae	1.0	–	–	–	6.7	–	–
Munididae	0.2	1.2	0.1	–	–	0.9	–
Munidopsidae	0.1	–	2.3	4.1	0.6	8.5	16.1
Lithodidae	–	0.8	–	–	–	0.3	–
Diogenidae	8.9	–	–	–	–	–	–
Paguridae	1.0	–	4.6	–	2.9	4.2	–
Parapaguridae	2.6	7.3	47.5	0.6	13.4	53.1	0.8
Dromiidae	3.7	–	–	–	–	–	–
Homolidae	–	–	–	–	4.2	–	–
Latreilliidae	0.2	–	–	–	–	–	–
Cyclodorippidae	20.9	–	–	–	0.4	–	–
Cymonomidae	1.4	1.6	0.1	–	2.1	–	–
Ethusidae	–	–	–	–	1.7	2.4	–
Goneplacidae	2.2	–	–	–	2.1	–	–
Leucosiidae	11.5	–	–	–	–	–	–
Epialtidae	0.5	–	–	–	–	–	–
Inachidae	20.9	–	0.1	–	0.2	–	–
Majidae	2.2	–	–	–	–	–	–
Palicidae	3.7	–	–	–	–	–	–
Geryonidae	–	–	0.4	–	0.2	–	–
Trichopeltariidae	0.7	–	–	–	–	–	–

Table 6: Number of all species versus latitude and depth zone.

transect	**Latitude °S**	**Upper Bathyal 1000–1500 m**	**Lower Bathyal 1500–3500 m**	**Abyssal 3500 +**
Freycinet	41°37′	–	11	4
Flinders	40°25′	–	4	2
Bass	39°26′	–	14	5
East Gippsland	38°10′	–	18	2
Bermagui	36°23′	–	10	5
Jervis	35°13′	–	15	3
Newcastle	33°14′	–	13	3
Hunter	32°19′	18	10	3
Central East	30°12′	19	13	4
Byron	28°23′	35	6	3
Moreton	26°58′	12	6	5
Fraser	25°8′	–	6	6
Coral Sea	23°59′	33	13	3

Taxonomic treatment

Dendrobranchiata

This suborder is divided into two superfamilies, the Penaeoidea and the Sergestoidea and comprises around 500 species worldwide, with Australia hosting around 158. Keys to the families and genera are provided by (Pérez Farfante & Kensley, 1997), supplemented by treatments by (Dall, 2001, 2005; Crosnier, 1990; Vereshchaka, 2000, 2009). Thirty-two species were recorded, 24 from the ECA and 17 from the GAB with nine species recorded from both ECA and GAB. There were five new records for the GAB, three for QLD, four for NSW and one for Australia. There were two possible new species from the ECA and two from the GAB.

Figure 4: *Aristaeopsis edwardsiana* (Johnson, 1868), ECA, IN2017-V03 stn 100, lateral view (upper), cephalothorax (lower).

Superfamily Penaeoidea

Aristeidae

Aristeids typically live in waters of the continental shelf down to abyssal depths. Nine genera are recognized and the Australian fauna is represented by all nine genera and 13 species. Seven species were recorded from the ECA and three species from the GAB, two were recorded from both the ECA and GAB. Two species were new to NSW and one new to Qld. There was one probable new species from the GAB and one new record.

Aristaeopsis edwardsiana (Johnson, 1868)

Figure 4
MoV sp. 7125
ECA Records: 2 specimens, 28°05′S, 154°05′E, 1006 m.
Distribution: Cosmopolitan including Arafura Sea, Australia (NSW, Qld, WA).
References: Kensley *et al.* (1987); Pérez Farfante & Kensley (1997); Dall (2001).

Aristeus mabahissae Ramadan, 1938

Figure 5
MoV sp. 7126

ECA Records: 1 specimen, 32°30′S, 153°E, 1021 m.
GAB Records: 101 specimens, 34°38′S, 132°21′E to 34°40′S, 132°29′E, 1015–1027 m.
Distribution: Indo-West Pacific Oceans, including Australia (NSW and WA; first record for GAB).
References: Crosnier (1978); Dall (2001).

Figure 5: *Aristeus mabahissae* Ramadan, 1938, lateral view: ECA IN2017-V03 stn 069, adult male (upper); GAB, IN2015-C02 stn 110, adult female (lower)

***Austropenaeus nitidus* (Barnard, 1947)**

Figure 6
MoV sp. 7127
ECA Records: 6 specimens, 28°05'S, 153°E to 32°30'S, 154°05'E,1006–1021 m.
GAB Records: 227 specimens, 33°31'S, 130°16'E to 35°21'S, 134°07'E, 986–1553 m.
Distribution: South Atlantic and Indo-West Pacific, Australia (NSW, SA, Vic, WA).
References: Crosnier (1990); Pérez Farfante & Kensley (1997); Dall (2001).

Figure 6: *Austropenaeus nitidus* (Barnard, 1947), GAB, IN2015-C01: stn 096, lateral view (upper), cephalothorax (lower).

***Cerataspis monstrosus* Gray, 1828**

Figure 7
MoV sp. 7130

ECA Records: 13 specimens, 23°46'S, 150°55'E to 36°22'S, 154°38'E, 2346–4441 m.
Distribution: Atlantic and Indo-Pacific Oceans, Lord Howe Rise, Australia (Qld; first record for NSW).
Reference: Dall (2001).

Figure 7: *Cerataspis monstrosus* Gray, 1828, ECA, IN2017-V03 stn 086, lateral view.

***Hemipenaeus carpenteri* Wood-Mason and Alcock, 1891**

Figure 8
MoV sp. 7128
ECA Records: 1 specimen, 23°36'S, 154°12'E, 1053 m.
Distribution: W Atlantic Ocean Indo-Pacific Oceans, Australia (Qld, WA).
Reference: Dall (2001).

Figure 8: *Hemipenaeus carpenteri* Wood-Mason and Alcock, 1891, ECA, IN2017-V03 stn 121, lateral view.

***Hemipenaeus* cf. *spinidorsalis* Bate, 1881**

MoV sp. 7218
GAB Records: 1 specimen, 35°43'S, 131°39'E, 4022 m.
Distribution: Cosmopolitan. First record for Australia.
References: Wasmer (1972); Crosnier (1985); Pérez Farfante & Kensley (1997).

***Hepomadus tener* Smith, 1884**

Figure 9
MoV sp. 7129
ECA Records: 2 specimens, 25°14'S, 153°53'E to 30°07'S, 154°11'E, 2474–4006 m.
Distribution: W and E Atlantic Ocean, Zanzibar, Madagascar, Reunion, Bay of Bengal, Wallis Is., Lord Howe Province, Australia (WA; first record for Qld).
References: Dall (2001, 2005).

Figure 9: *Hepomadus tener* Smith, 1884, ECA, IN2017-V03 stn 086, lateral view (upper), cephalothorax (lower) (tip of rostrum broken).

***Pseudaristeus sibogae* (De Man, 1911)**

Figure 10
MoV sp. 5468
ECA Records: 1 specimen, 28°05′S, 154°05′E 1006 m.
Distribution: Indian Ocean (from South Africa to Indonesia), Arafura Sea, Australia (SA and WA; first record for NSW).
Reference: Dall (2001).

Figure 10: *Pseudaristeus sibogae* (De Man, 1911), ECA, IN2017-V03 stn 100, preserved, lateral view.

Benthesicymidae

This family of deep water pelagic shrimps is comprised of five genera worldwide. Twelve species in two genera are found in Australian waters. Seven species were recorded in this study, seven from the ECA and four from the GAB; four were common to both regions. The seven ECA records included four already known species, one new record for NSW and two probable new species. The four GAB records include two previously known species and two new records. Key references are Kikuchi & Nemoto (1991); Dall (2001).

***Benthesicymus howensis* Dall, 2001**

Figure 11
MoV sp. 7133
ECA Records: 17 specimens, 23°39′S, 152°41′E to 33°26′S, 154°39′E, 1766–4441 m.
GAB Records: 39 specimens, 34°21′S, 129°32′E to 35°50′S, 132°41′E, 2079–4022 m.
Distribution: Australian endemic: Lord Howe Province and Norfolk Island; new record for ECA and GAB. Previous maximum depth record 1325 m.
References: Dall (2001, 2005).

Figure 11: *Benthesicymus howensis* Dall (2001), GAB, IN2017-C01 stn 197, lateral view (upper), cephalothorax (lower).

***Benthesicymus investigatoris* Alcock and Anderson, 1899**

Figure 12
MoV sp. 5469
ECA Records: 34 specimens, 23°36'S, 153°E to 32°30'S, 154°12'E, 1006–1021 m.
GAB Records: 4 specimens, 33°31'S, 130°16'E to 35°08'S, 134°06'E, 996–1021 m.
Distribution: Lord Howe Rise, Indo-West Pacific Oceans, Australia: NSW (SE oceanic), Qld (NE oceanic), WA; first record for GAB.
Reference: Dall (2001).

Figure 12: *Benthesicymus investigatoris* Alcock and Anderson, 1899, ECA, IN2017-V03 stn 069, lateral view (upper), cephalothorax (lower).

***Benthesicymus urinator* Burkenroad, 1936**

MoV sp. 7134
ECA Records: 1 specimen, 30°17'S, 153°51'E, 4441 m.
Distribution: Indo-West Pacific, Australia (Qld).
Reference: Dall (2001).

***Benthesicymus* sp. nov.**

MoV 7132
ECA Records: 1 specimen (poor condition), 27°02'S, 154°13'E, 4269 m.
Distribution: ECA, possible new species.

***Benthesicymus* sp. nov.**

Figure 13
MoV 7136
ECA Records: 5 specimens, 23°36'S, 154°12'E, 1053 m.
Distribution: ECA, possible new species.

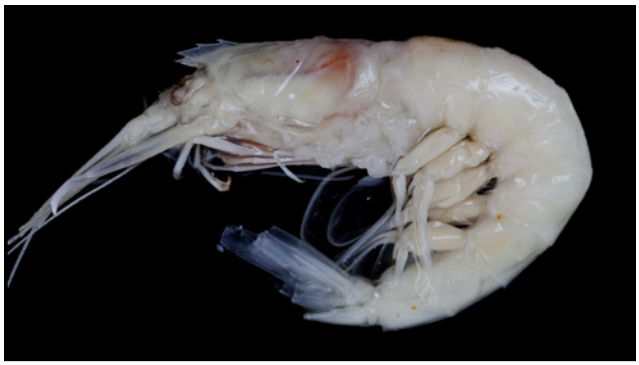

Figure 13: *Benthesicymus* sp. MoV 7136, ECA, IN2017-V03 stn 121, preserved, lateral view.

***Gennadas gilchristi* Calman, 1925**

Figure 14
MoV sp. 7137
ECA Records: 3 specimens, 23°39´S, 149°34´E to 41°39´S, 154°39´E, 1766–4165 m.
GAB Records: 15 specimens, 33°31´S, 130°16´E to 35°08´S, 134°06´E, 1005–3684 m.
Distribution: SE Atlantic, S Indian Ocean, New Zealand, Tasman Sea, New Caledonia, and subtropical and subantarctic zones of Southern Ocean, Australia: off south-eastern Australia between 33°and 42°S (Norfolk Island, SA) Previous maximum depth record 3400 m.
References: Kensley (1972); Kensley *et al.* (1987); Dall (2001).

Figure 14: *Gennadas gilchristi* Calman, 1925, GAB, IN2015-C01 stn 123, lateral view.

***Gennadas kempi* Stebbing, 1914**

Figure 15
MoV sp. 7138
ECA Records: 8 specimens, 39°31´S, 149°34´E to 41°39´S, 149°35´E, 4037–4167 m.
GAB Records: 3 specimens, 34°04´S, 129°57´E to 34°37´S, 130°17´E, 1553–2079 m.
Distribution: South Africa; SE Atlantic, S Indian Ocean, Tasman Sea, New Zealand, Southern Ocean, Australia: southern Australia between 33°S and 42°S (NSW, Qld, SA, Tas). Previous maximum depth record 3400 m.
Reference: Dall (2001).

Figure 15: *Gennadas kempi* Stebbing, 1914, ECA, IN2017-V03 stn 030, preserved, lateral view.

Penaeidae

Penaeids are of great commercial interest and are typically caught by trawl, swimming above the bottom in the muddy waters of shallow bays and estuaries, mostly in the tropics and subtropics. They predominantly live in depths of less than 100 m, although a few inhabit deeper waters or are pelagic. Penaeidae currently comprise some 32 genera with over 200 species worldwide. The Australian fauna is represented by 70 species in 18 genera. One pelagic species was recorded from the GAB and is recorded from South Australia for the first time.

***Funchalia woodwardi* Johnson, 1867**

Figure 16
MoV sp. 7219
GAB Records: 1 specimen, 33°33´S, 130°37´E, 200–400 m [unsighted; photo record only].
Distribution: Atlantic and Indo-West Pacific region including Australia (NSW, WA; new record for SA).
Reference: Poore (2004).

Figure 16: *Funchalia woodwardi* Johnson, 1867, GAB, IN2015-C02 stn 354, lateral view (upper), cephalothorax (lower).

Sicyoniidae

This family contains a single genus, *Sicyonia*, with 52 species worldwide and 12 species in Australian waters. Most are tropical to subtropical benthic species, typically inhabiting the muddy bottoms of bays and coastal waters from sublittoral to continental slope and shelf depths of 936 m. One species was identified and represents a new record for the GAB. Hanamura & Wadley (1998) and Crosnier (2003) provide keys to the Indo-West Pacific species.

***Sicyonia australiensis* Hanamura and Wadley, 1998**

MoV sp. 7220
GAB Records: 1 specimen, 33°22´S, 130°45´E, 199 m.
Distribution: Australian endemic (Tas, Eastern Bass Strait; a new record for the GAB).
Reference: Hanamura & Wadley (1998).

Solenoceridae

The Solenoceridae typically inhabit offshore waters at mid-continental shelf to continental slope depths (several hundred to over 1000 m). Some are meso- to bathypelagic while others are benthic. Ten genera are recognised, with 29 species in eight genera in the Australian fauna. Four species were identified from the ECA using Dall (1999): two already known from the ECA, one a new record for NSW and one new to

Australia. None were recorded from the GAB.

***Gordonella kensleyi* Crosnier, 1998**

MoV sp. 7204
ECA Records: 1 specimen, 32°36´S, 153°09´E, 2535 m.
Distribution: SE Atlantic off Cape of Good Hope, south of Mozambique, New Caledonia, Lord Howe Rise; a new record for Australia (NSW).
Reference: Dall (1999).

***Hymenopenaeus halli* Bruce, 1966**

Figure 17
MoV sp. 5461
ECA Records: 2 specimens, 32°30´S, 153°00´E, 1021 m.
Distribution: Indo-West Pacific, Australia (central WA, NSW, southern Qld).
Reference: Dall (1999).

Figure 17: *Hymenopenaeus halli* Bruce, 1966, ECA, IN2017-V03 stn 069, lateral view (upper), cephalothorax (lower).

***Hymenopenaeus neptunus* (Bate, 1881)**

Figure 18
MoV sp. 5318
ECA Records: 9 specimens, 23°36´S, 153°35´E to 30°07´S, 154°12´E, 1053–1226 m.
Distribution: Indo-West Pacific (Bay of Bengal, Indonesia, Philippines, NE Australia, Tasman Sea, Australia (Qld; first record for NSW).
Reference: Dall (1999).

Figure 18: *Hymenopenaeus neptunus* (Bate, 1881), ECA, IN2017-V03 stn 104, lateral view (upper), cephalothorax (lower).

***Hymenopenaeus propinquus* (De Man, 1907)**

Figure 19
MoV sp. 5319
ECA Records: 1 specimen, 35°06´S, 151°28´E, 3954 m.
Distribution: Indo-West Pacific including Australia (NSW, NT, Qld, WA); previous maximum depth recorded 1200 m.
Reference: Dall (1999).

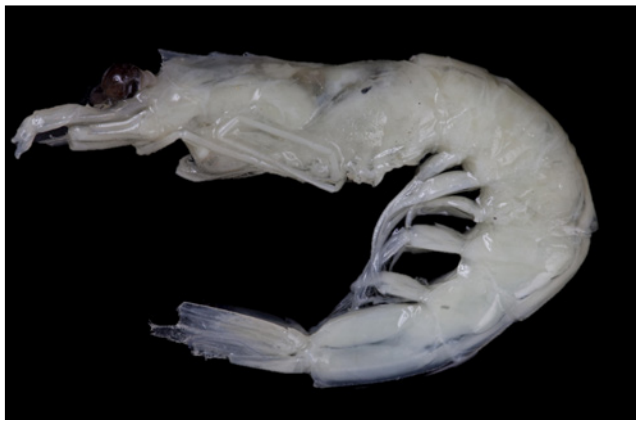

Figure 19: *Hymenopenaeus propinquus* (De Man, 1907), ECA, IN2017-V03 stn 054, preserved specimen with broken rostrum, lateral view.

Superfamily Sergestoidea

Sergestidae

Sergestids are mostly small tropical to subtropical shrimp. Some species form large swarms in estuaries but most are oceanic and occur in meso- to bathypelagic depths. They produce light and undergo nocturnal migrations to the surface. Australia has 19 species in nine genera. Eleven species were recorded in our surveys, six from the ECA and eight from the GAB. Three species occurred in both the ECA and GAB. One species from the GAB is probably new and another species could not be identified because the specimens were incomplete. One ECA species is recorded for the first time from Queensland.

Allosergestes sargassi (Ortmann, 1893)

Figure 20
MoV sp. 7201
ECA Records: 1 specimen, 23°39′S, 154°39′E, 1766 m.
GAB Records: 1 specimen, 34°37′S, 130°17′E, 2037 m.
Distribution: Atlantic, Mediterranean Sea, Indo-Pacific region, Australia (Australian Antarctic Territory, NSW (SE oceanic), SA (Great Australian Bight).
References: Judkins & Kensley (2008); Vereshchaka (2009).

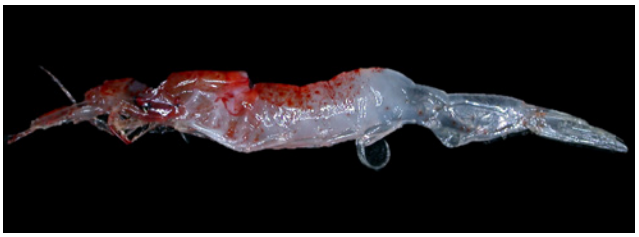

Figure 20: *Allosergestes sargassi* (Ortman, 1893), ECA, IN2017-V03 stn 128, lateral view.

Deosergestes corniculum (Krøyer, 1855)

Figure 21
MoV sp. 7200
ECA Records: 1 specimen, 25°06′S, 154°09′E, 3993 m.
GAB Records: 7 specimens, 33°31′S, 130°16′E, 996 m.
Distribution: Tropical and subtropical Atlantic between 40-45°N and 40-45°S, SW Indian Ocean between 20°S and 40°S, and in the South Pacific between 25°S and 35°S and 164°E and 135°W, including Australia (NSW, SA, Vic; a new record for Qld).
Reference: Vereshchaka (2009).

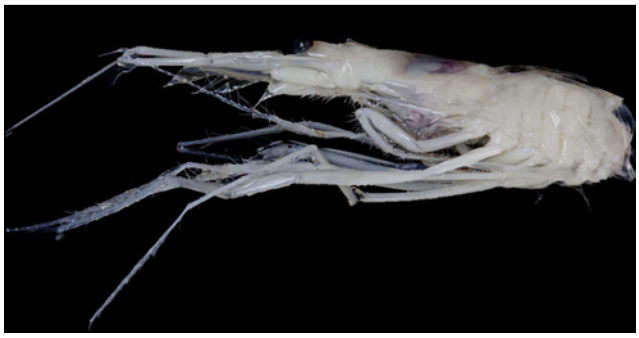

Figure 21: *Deosergestes corniculum* (Krøyer, 1855), ECA, IN2017-V03 stn 120, preserved, lateral view of cephalothorax.

Deosergestes disjunctus (Burkenroad, 1940)

MoV sp. 7221
GAB Records: 7 specimens, 33°31′S, 130°16′E to 34°40′S, 132°25′E, 996–1478 m.
Distribution: SE Atlantic, South Africa, New Zealand, Australia (NSW, SA and WA).
Reference: Vereshchaka (2009).

Deosergestes sp. nov.

Figure 22
MoV 7222
GAB Records: 5 specimens, 34°21′S, 129°57′E to 35°33′S, 132°32′E, 987–2241 m.
Distribution: GAB, possible new species.

Figure 22: *Deosergestes* sp. MoV 7222. GAB specimen IN2015-C02: stn 036, lateral view (upper), cephalothorax (lower).

***Eusergestes antarcticus* (Vereshchaka, 2009)**

Figure 23
MoV sp. 7199
ECA Records: 3 specimens, 37°48´S, 148°58´E to 41°31´S, 150°22´E, 1042–2460 m.
GAB Records: 1 specimen, 34°46´S, 130°42´E, 1842 m.
Distribution: Southern temperate and subpolar waters, Drake Passage and NW of S Georgia; western Antarctic region, off South Africa, Chile, New Zealand and Australia (NSW, SA, Tas, WA).
Reference: Vereshchaka (2009).

Figure 23: *Eusergestes antarcticus* (Vereshchaka, 2009), ECA, IN2017-V03 stn 001, preserved, lateral view.

***Parasergestes armatus* (Krøyer, 1855)**

Figure 24
MoV sp. 5619
GAB Records: 1 specimen, 35°33´S, 132°17´E, 2241 m.
Distribution: S oceanic, Atlantic, SW Indian Ocean, north of the Crozet Islands, E Indian Ocean from south of Australia, west and central Pacific, Tasman Sea, Australian Antarctic Territory, Australia (NSW, SA, WA).
Reference: Kensley (1972).

Figure 24: *Parasergestes armatus* (Krøyer, 1855), GAB, IN2015-C01 stn 036, lateral view (upper), cephalothorax (lower).

***Petalidium foliaceum* Bate, 1881**

MoV sp. 7223
GAB Records: 2 specimens, 34°25´S, 129°36´E to 34°33´S, 130°01´E, 2114–3510 m.
Distribution: South Atlantic and S Indian Ocean off South Africa, Australian Antarctic Territory, southern circumpolar, Australia (SA, Tas).
Reference: Kensley (1972); Wasmer (1993).

***Phorcosergia potens* (Burkenroad, 1940)**

MoV sp. 5620
GAB Records: 3 specimens, 34°21´S, 129°57´E to 34°49´S, 132°42´E, 1006–2079 m.
Distribution: South Africa, Mozambique in the Indian Ocean, SE Indian Ocean south of Australia, off New Zealand, Australia (SA, WA, Australian Antarctic Territory).
Reference: Kensley (1972); Wasmer (1993); Vereshchaka (2000).

***Prehensilosergia prehensilis* (Bate, 1881)**

Figure 25
MoV sp. 5311
ECA Records: 67 specimens, 23°36´S, 148°58´E to 41°31´S, 154°12´E, 1006–4269 m.
GAB Records: 2 specimens, 34°04´S, 129°11´E to 34°42´S, 132°32´E, 987–2726 m.
Distribution: SE Atlantic Ocean, off South Africa, S Indian Ocean off Mozambique, NW Pacific off Japan, west and central Pacific Ocean, Australia (NSW, SA, Vic, WA).
References: Kensley (1972); Vereshchaka (2000).

Figure 25: *Prehensilosergia prehensilis* (Bate, 1881), ECA, IN2017-V03 stn 100, lateral view (upper), cephalothorax (lower).

***Scintillosergia scintillans* (Burkenroad, 1940)**

Figure 26
MoV sp. 7202
ECA Records: 1 specimen, 37°48´S, 150°22´E, 2460 m.
Distribution: Central Pacific, off Hawaii, off Baja California, South Africa, Japan, W Sumatra, Australia (Australian Antarctic Territory, NSW, SA, WA).
References: Kensley (1972); Vereshchaka (2000).

Figure 26: *Scintillosergia scintillans* (Burkenroad, 1940), ECA, IN2017-V03 stn 035, preserved, lateral view.

***Sergestidae* sp.**

GAB Records: 2 incomplete specimens, 35°09´S, 131°39´E, 1863 m.

***Sergia laminata* (Burkenroad, 1940)**

MoV sp. 5618
ECA Records: 2 specimens, 39°31´S, 149°08´E to 41°46´S, 149°35´E, 2786–4165 m.
Distribution: Atlantic and Indo-West Pacific, Australia (NSW, SA, WA) (previous maximum depth record 2500 m).
References: Kensley (1972); Vereshchaka (2009).

Caridea – Shrimp

Caridea currently comprise over 3400 species, across 38 families, making it the second most speciose infraorder in Decapoda (De Grave & Fransen, 2011). Over 700 species occur in Australia representing 186 genera in 28 families. Twelve families were represented in our study with 55 species in 27 genera: 30 from the ECA and 35 from the GAB (ten from both regions). Sixteen (29%) are new species (eight from the ECA and ten from the GAB, two from both regions), five represent new records for Australia, 11 are new to the ECA and 17 are new to the GAB.

Superfamily Alpheoidea

Hippolytidae

***Leontocaris bulga* Taylor and Poore, 1998**

Figure 27
MoV sp. 2624
GAB Records: 1 specimen, 34°48´S, 131°46´E, 1365 m.
Distribution: Australian endemic (Tasmanian Seamounts; a new record for SA).
Reference: Taylor & Poore (1998).

Figure 27: *Leontocaris bulga* Taylor and Poore, 1998, GAB, RE2017-C01 stn 123, lateral view.

Thoridae

Thoridae was resurrected by De Grave *et al.* (2014) to include 8 genera previously placed in the polyphyletic Hippolytidae. In Australia, Thoridae is represented by 13 species in five genera. Six species were identified, five from the GAB and one from the ECA. Four of the GAB species appear to be undescribed and one recorded for the first time from South Australia. The ECA species was a first record for New South Wales. Key references used for identification were Chace (1997); Poore *et al.* (1998); Poore (2004); Hanamura (2008); Nye *et al.* (2013).

***Eualus* sp. nov.**

MoV 7243
GAB Records: 1 specimen, 34°43´S, 132°32´E, 987 m.
Distribution: GAB, new species.

***Eualus* sp. nov.**

MoV 7244
GAB Records: 3 specimens, 34°42´S, 132°31´E to 34°43´S, 132°32´E, 987–990 m.
Distribution: GAB, new species.

***Lebbeus clarehannah* McCallum and Poore, 2010**

Figure 28
MoV sp. 5425
GAB Records: 1 specimen, 33°26´S, 130°44´E, 412 m.
Distribution: Australia (WA, SA new record).
Reference: McCallum & Poore (2010).

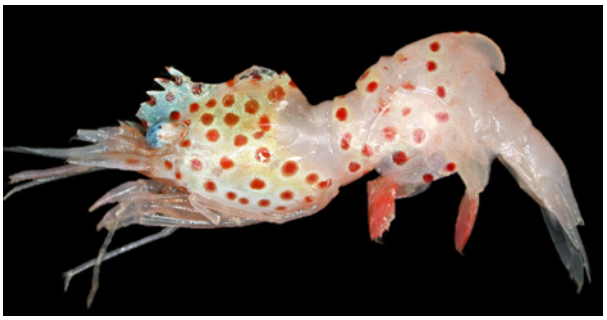

Figure 28: *Lebbeus clarehannah* McCallum and Poore, 2010, GAB, IN2015-C02 stn 330, lateral view.

***Lebbeus* cf. *profundus* (Rathbun, 1906)**

Figure 29
MoV sp. 7208
ECA Records: 1 specimen, 30°07´S, 153°35´E, 1226 m.
Distribution: ECA, possible new species.
Reference: Rathbun (1906).

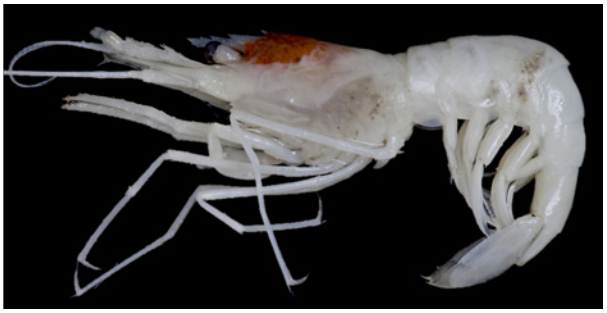

Figure 29: *Lebbeus* cf. *profundus* MoV sp. 7208 (Rathbun, 1906), ECA, IN2017-V03 stn 080, preserved, lateral view.

***Lebbeus* sp. nov.**

MoV 7245
GAB Records: 1 specimen, 34°46´S, 130°42´E, 1842 m.
Distribution: GAB, new species.

***Lebbeus* sp. nov.**

MoV 7246
GAB Records: 1 specimen, 34°41´S, 132°29´E, 1015 m.
Distribution: GAB, new species.

Superfamily Campylonotoidea

Bathypalaemonellidae

Bathypalaemonellids are rare deep-sea pelagic shrimp, comprising two genera and are found in tropical and subtropical seas at depths of between 308–1463 m. The Australian fauna is represented by only two species, both from Western Australia (Bruce, 1986). A single specimen was recorded from the east coast, which may be undescribed (unfortunately missing the major chela). This is the first record of this family for the east coast of Australia. Chace (1997) and Cleva (2001) provided keys for identification.

***Bathypalaemonella* sp. nov.**

Figure 30
MoV 7135
ECA Records: 1 specimen, 23°36´S, 154°12´E, 1053 m.
Distribution: ECA, possible new species.

Figure 30: *Bathypalaemonella* sp. MoV 7135, ECA, IN2017-V03 stn 121, preserved, lateral view.

Superfamily Crangonoidea

Crangonidae

The Crangonidae is a cosmopolitan group of small shrimp that are found from the littoral zone down to abyssal depths of 5852 m (Chace, 1984). They comprise 23 genera with some 300 species and in Australia are represented by 37 species in 11 genera. Five species were identified, three from the ECA and three from the GAB. All three species from the ECA are new to science, of which one was also found in the GAB. The remaining two species from the GAB are both new records for South Australia. Key references for *Metacrangon* and *Parapontophilus* were Komai (2008); Komai & Taylor (2010); Komai & Ahyong (2011).

***Aegaeon lacazei* (Gourret, 1887)**

Figure 31
MoV sp. 1873
GAB Records: 9 specimens, 33°20´S, 130°16´E to 33°25´S, 131°02´E, 189–218 m.
Distribution: Central Indo-West Pacific, eastern Atlantic, Australia (NSW, WA; new record for SA).
Reference: Chan (1996).

Figure 31: *Aegaeon lacazei* (Gourret, 1887), GAB, IN2015-C02 stn 395, dorsal view (upper panel), lateral view (lower panel).

***Lissosabinea lynseyae* Taylor and Collins, 2009**

MoV sp. 5421
GAB Records: 2 specimens, 33°22´S, 130°45´E to 35°18´S, 134°31´E, 199–388 m.
Distribution: Australian endemic (WA; new record for SA).
References: Komai (2006); Taylor & Collins (2009).

***Metacrangon* sp. nov.**

Figure 32
MoV 7211
ECA Records: 7 specimens, 30°07´S, 148°56´E to 40°23´S, 153°35´E, 1042–1226 m.
Distribution: ECA, new species.

Figure 32: *Metacrangon* sp. MoV 7211, ECA, IN2017-V03 stn 013, lateral view (upper), dorsal view (lower).

Parapontophilus* cf. *difficilis

Figure 33
MoV 7210
ECA Records: 66 specimens, 25°14´S, 149°16´E to 39°28´S, 154°38´E, 2643–4269 m.
GAB Records: 179 specimens, 33°31´S, 129°24´E to 35°50´S, 134°31´E, 388–4022 m.
Distribution: ECA and GAB, new species.
Reference: Komai (2008).

Figure 33: *Parapontophilus* cf. *difficilis* sp. nov. MoV 7210, ECA, IN2017-V03 stn 022, dorsal view (upper); GAB, IN2015-C01 stn 052, lateral view (middle), cephalothorax (lower).

***Parapontophilus* sp. nov.**

Figure 34
MoV 7260
GAB Records: 1 specimen, 35°02´S, 134°05´E, 375 m.
Distribution: GAB, probable new species.

Figure 34: *Parapontophilus* sp. nov. MoV 7260, GAB, SS2013-C02 stn 024, preserved, lateral view (photo: Anna McCallum).

***Parapontophilus* sp. nov.**

Figure 35
MoV 7256
ECA Records: 4 specimens, 39°28´S, 149°16´E, 2734 m.
Distribution: ECA, probable new species.

Figure 35: *Parapontophilus* sp. nov. MoV 7256, ECA, IN2017-V03 stn 023, preserved, lateral view (upper) cephalothorax, dorsal view (lower).

Glyphocrangonidae

This family comprises a single genus of more than 100 species of highly sculptured shrimp that are typically pelagic, found from upper slope depths down to abyssal depths of 6364 m (Komai, 2004). The Australian fauna is currently represented by 12 species. Six species were identified in our study, four from the ECA (one of which is undescribed) and four from the GAB. Two new species were found from both the ECA and GAB, one of which was recorded from both regions. One species was a new record for both the ECA and GAB and one was a new record for Australia. Most identifications were made using the keys of Komai (2004).

***Glyphocrangon dimorpha* Komai, 2004**

Figure 36
MoV sp. 7151
ECA Records: 2 specimens, 37°48´S, 149°08´E to 40°27´S, 150°22´E, 2392–2460 m.
GAB Records: 15 specimens, 34°37´S, 130°17´E to 35°33´S, 134°05´E, 1961–2037 m.
Distribution: New Caledonia; Tasman Sea; Australia (northern Qld; a new record for Vic and South Australia).
Reference: Komai (2004).

Figure 36: *Glyphocrangon dimorpha* Komai, 2004, ECA, IN2017-V03 stn 035, dorsal view (upper), lateral view (middle), cephalothorax (lower).

***Glyphocrangon elephas* Komai, 2005**

Figure 37
MoV sp. 7247
GAB Records: 16 specimens, 33°23´S, 130°15´E to 33°26´S, 130°44´E, 412–426 m.
Distribution: Australian endemic (SA).
Reference: Komai (2005).

Figure 37: *Glyphocrangon elephas* Komai, 2005, GAB, IN2015-C02 stn 330, dorsal view (upper), lateral view (middle), ventral view (lower).

***Glyphocrangon* cf. *ferox* Komai, 2004**

Figure 38
MoV sp. 7152
ECA Records: 1 specimen, 37°48´S, 150°22´E, 2460 m.
GAB Records: 42 specimens, 34°04´S, 129°11´E to 35°33´S, 132°17´E, 2079–2726 m.
Distribution: GAB and ECA, new species.
Reference: Komai (2004).

Figure 38: *Glyphocrangon* cf. *ferox* Komai, 2004; GAB, IN2015-C01 stn 064, dorsal view (upper), lateral view (middle), cephalothorax (lower).

***Glyphocrangon* cf. *fimbriata* Komai and Takeuchi, 1994**

Figure 39
MoV sp. 7259
GAB Records: 22 specimens, 34°46´S, 130°42´E to 35°46´S, 134°07´E, 1492–2826 m.
Distribution: GAB, new species.
Reference: Komai & Takeuchi (1994).

Figure 39: *Glyphocrangon* cf. *fimbriata*, Komai and Takeuchi, 1994 GAB, IN2015-C01 stn 052, dorsal view (upper), lateral view (lower).

***Glyphocrangon* sp. nov.**

Figure 40
MoV 7154
ECA Records: 14 specimens, 28°05´S, 154°05´E, 1006 m.
Distribution: ECA, new species.

Figure 40: *Glyphocrangon* sp. MoV 7154, ECA, IN2017-V03 stn 100, dorsal view (upper panel), lateral view (lower panel).

***Glyphocrangon tasmanica* Komai, 2004**

Figure 41
MoV sp. 7153
ECA Records: 3 specimens, 28°05´S, 154°05´E, 1006 m.
Distribution: Tasman Sea; new record for Australia.
Reference: Komai (2004).

Figure 41: *Glyphocrangon tasmanica* Komai, 2004, ECA, IN2017-V03 stn 100, dorsal view (upper), lateral view (lower).

Superfamily Nematocarcinoidea

The nematocarcinoids comprise five families, four of which occur in Australia.

Lipkiidae

This family of mesopelagic shrimp comprises two monotypic genera, both from the southern oceanic province in depths from 400 to 1889 m.

Lipkius holthuisi Yaldwyn, 1960

Figure 42
MoV sp. 5621
ECA Records: 1 specimen, 40°23´S, 148°56´E, 1042 m.
Distribution: SW Pacific Ocean, New Zealand (Chatham Rise; Cook Strait), Australia (NSW SE oceanic).
References: Yaldwyn (1960); Hanamura (1989); Webber *et al.* (1990).

Figure 42: *Lipkius holthuisi* Yaldwyn, 1960. ECA, IN2017-V03, stn 013, lateral view, rostrum broken.

Nematocarcinidae

The nematocarcinids are large deep-water demersal shrimps, characterized by their finely toothed rostrums and long, delicate legs. They occur in all tropical and temperate seas, as far south as 71°S in the Weddell Sea off Antarctica and range from the continental slope to the abyss (300–5477 m) (Burukovsky, 2011). There are five genera worldwide, with about 56 species. The Australian fauna is represented by nine species all in the genus *Nematocarcinus*. Identifications were made using Burukovsky (2012) and Chace (1986). Six species were identified, five from the east coast and three from the GAB, two were found in both survey regions. Four represent new records for the east coast and one for South Australia, with a possibly new species from both the ECA and GAB.

Nematocarcinus productus Bate, 1888

Figure 43
MoV sp. 5450
ECA Records: 29 specimens, 23°46´S, 149°08´E to 41°46´S, 154°38´E, 2349–2803 m.
GAB Records: 172 specimens, 33°31´S, 129°11´E to 35°50´S, 134°07´E, 996–3305 m.
Distribution: Indo-West Pacific (Mozambique, Philippines, Indonesia, New Caledonia), Australia (SA; WA; a new record for NSW, Qld, Tas and Vic).
References: (Chace, 1986; Burukovsky, 2012).

Figure 43: *Nematocarcinus productus* Bate, 1888, ECA, IN2017-V03 stn 022, lateral view (upper), cephalothorax (lower).

Nematocarcinus proximatus Bate, 1888

Figure 44
MoV sp. 7170
ECA Records: 1 specimen, 28°42´S to 154°12´E, 2575 m.
Distribution: Eastern Pacific off Chile, Japan and Indo-Pacific, Australia (NT Arafura Sea; a new record for NSW).
References: (Chace, 1986; Burukovsky, 2012).

Figure 44: *Nematocarcinus proximatus* Bate, 1888, ECA, IN2017-V03 stn 090, preserved, lateral view (upper), cephalothorax (lower).

Figure 45: *Nematocarcinus sigmoideus* Macpherson, 1984, GAB, IN2015-C01 stn 016, lateral view (upper), cephalothorax (lower).

***Nematocarcinus* sp. nov.**

MoV 7248
GAB Records: 4 specimens, 34°43´S, 132°32´E, 987 m.
Distribution: GAB, possible new species.

***Nematocarcinus* sp. nov.**

Figure 46
MoV 7212
ECA Records: 1 specimen, 30°07´S, 153°53´E, 2479 m.
Distribution: ECA, possible new species.

Figure 46: *Nematocarcinus* sp. MoV 7212, ECA, IN2017-V03 stn 087, preserved, cephalothorax, lateral view.

***Nematocarcinus sigmoideus* Macpherson, 1984**

Figure 45
MoV sp. 2768
ECA Records: 47 specimens, 23°39´S, 149°08´E to 41°46´S, 154°39´E, 1766–4037 m.
GAB Records: 62 specimens, 34°21´S, 129°57´E to 36°04´S, 132°38´E, 1015–5081 m; previous depth record 1440 m.
Distribution: SE Atlantic, South Africa, Australia (Tas, Vic; new records for NSW, Qld and SA).
References: Hanamura (1989); Burukovsky (2012).

***Nematocarcinus undulatipes* Bate, 1888**

Figure 47
MoV sp. 7171

ECA Records: 27 specimens, 23°36´S, 153°00´E to 32°30´S, 154°12´E, 1006–1226 m.
Distribution: Indo-West Pacific, Australia (NSW; new record for Qld Coral Sea).
References: Chace (1986); Burukovsky (2012).

Figure 47: *Nematocarcinus undulatipes* Bate, 1888, ECA, IN2017-V03 stn 100, lateral view (upper), cephalothorax (lower).

Superfamily Oplophoroidea

Both oplophoroid families are well represented in Australia.

Acanthephyridae

Acanthephyrids are typically mesopelagic and occur in most oceanic waters. They comprise eight genera with some 60 species. The Australian fauna is represented by 19 species in five genera. Of the nine species identified, five were from the east coast and six were from the GAB, with two species occurring in both survey regions. The six species from the GAB included one possible new species, one new record for Australia and four new records for South Australia. The five species from the east coast included one new record for Australia, two new records for NSW and one for Victoria (Bass Strait).

Acanthephyra acutifrons Bate, 1888

MoV sp. 7249
GAB Records: 2 specimens, 34°33´S, 129°36´E to 35°50´S, 132°41´E, 2725–3510 m.
Distribution: Cosmopolitan including Australia (NSW; new record for SA).
References: Chace (1940); Crosnier & Forest (1973); Kensley *et al.* (1987).

Acanthephyra brevirostris Smith, 1885

MoV sp. 7173
ECA Records: 1 specimen (badly damaged), 27°02´S, 154°13´E, 4269 m.
Distribution: North and South Atlantic, SW Indian Ocean, tropical easern Pacific; a new record for Australia.
References: Kensley (1968, 1972); Chace (1986).

Acanthephyra eximia Smith, 1884

Figure 48
MoV sp. 7174
ECA Records: 6 specimens, 23°36´S, 153°00´E to 32°30´S, 154°12´E, 1021–1053 m.
Distribution: Indo-West Pacific from East Africa to Japan, Hawaii and Australia (WA; a new record for NSW and Qld Coral Sea).
References: Chace (1940, 1986); Kensley (1972).

Figure 48: *Acanthephyra eximia* Smith, 1884, ECA, IN2017-V03 stn 069, lateral view.

Acanthephyra quadrispinosa Kemp, 1939

Figure 49
MoV sp. 1840
ECA Records: 18 specimens, 23°36´S, 149°25´E to 40°28´S, 154°12´E, 1052–4269 m.
GAB Records: 8 specimens, 33°31´S, 129°43´E to 35°43´S, 132°41´E, 996–4022 m.
Distribution: South Atlantic, Indo-Pacific, Australia (NSW, Tas, WA; a new record for SA).
References: Chace (1986); Poore (2004).

Figure 49: *Acanthephyra quadrispinosa* Kemp, 1939, ECA, IN2017-V03: stn 015, lateral view.

***Acanthephyra sica* Bate, 1888**

Figure 50
MoV sp. 7250
GAB Records: 11 specimens, 34°04´S, 129°11´E to 36°04´S, 134°07´E, 1527–4607 m.
Distribution: Southern circumpolar, South oceanic, Australia (NSW, Tas; new record for SA); previous maximum recorded depth 675 m.
References: Webber *et al.* (1990); Poore (2004).

Figure 50: *Acanthephyra sica* Bate, 1888, GAB, IN2015-C01 stn 023, lateral view.

***Acanthephyra* sp. nov.**

MoV 7251
GAB Records: 2 specimens, 33°48´S, 130°40´E to 34°51´S, 130°40´E, 1005–2004 m.
Distribution: GAB, possible new species.

***Acanthephyra tenuipes* Bate, 1888**

Figure 51
MoV sp. 7175
ECA Records: 1 specimen, 32°10´S, 153°32´E, 4005 m.
Distribution: Cosmopolitan, including Australia (Qld; new record for NSW).
References: Bate (1888); Crosnier (1987).

Figure 51: *Acanthephyra tenuipes* Bate, 1888, ECA, IN2017-V03 stn 078, preserved, lateral view.

***Heterogenys microphthalma* (Smith, 1885)**

Figure 52
MoV sp. 7252
GAB Records: 2 specimens, 34°27´S, 129°32´E to 35°33´S, 132°17´E, 2241–3305 m.
Distribution: Cosmopolitan in tropical and temperate seas, first record for Australia.
References: Chace (1986); Holthuis (1993).

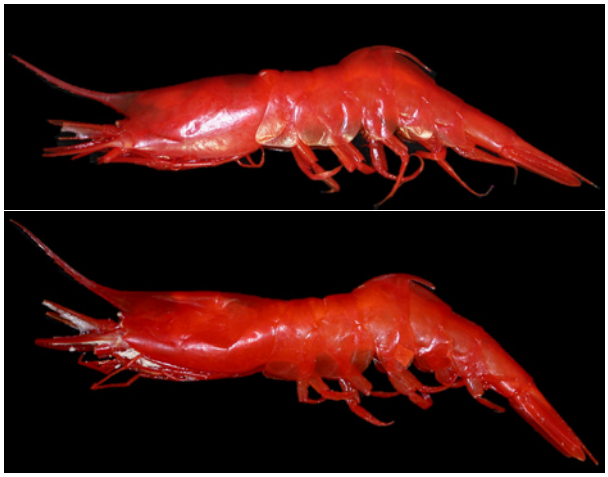

Figure 52: *Heterogenys microphthalma* (Smith, 1885), lateral view, GAB, IN2015-C01 stn 036 (upper) & 197 (lower).

***Hymenodora gracilis* Smith, 1886**

Figure 53
MoV sp. 7176
ECA Records: 1 specimen, 39°28´S, 149°16´E, 2726 m.
GAB Records: 2 specimens, 34°33´S, 129°36´E to 35°50´S, 132°41´E, 2725–3510 m.
Distribution: Indo-Pacific, Atlantic, Southern Ocean, Australia (Tas; new record for SA and Vic, Bass Strait).

References: Chace (1940, 1985); Hanamura (1989); Poore (2004).

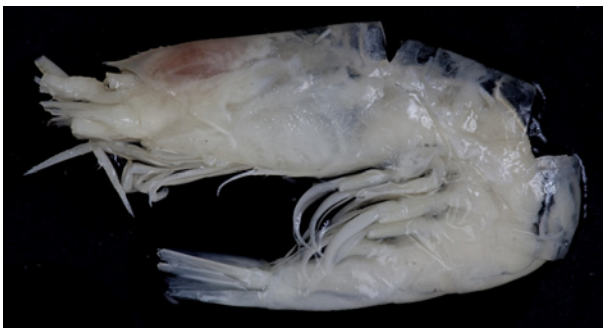

Figure 53: *Hymenodora gracilis* Smith, 1886, ECA, IN2017-V03 stn 022, preserved, lateral view.

Oplophoridae

The Oplophoridae are typically mesopelagic in depths of 315 to 5300 m (Chace, 1986). They comprise three genera with 16 species; the Australian fauna is represented by all three genera and seven species. This study found three species: two from the ECA and two from the GAB (one species occurred in both regions). One species was a new record for Tasmania.

Oplophorus novaezeelandiae (de Man, 1931)

Figure 54
MoV sp. 1845
GAB Records: 1 specimen, 34°25´S, 130°01´E, 2114 m.
Distribution: Cosmopolitan, including Australia (NSW, SA, WA); previous maximum depth recorded 725 m.
References: Chace (1986); Kensley *et al.* (1987); Poore (2004).

Figure 54: *Oplophorus novaezeelandiae* (de Man, 1931), GAB, IN2015-C01 stn 080, lateral view.

Oplophorus spinosus (Brullé, 1839)

Figure 55
MoV sp. 1842
ECA Records: 8 specimens, 26°59´S, 149°25´E to 41°34´S, 154°05´E, 1006–4165 m.
Distribution: Cosmopolitan, including Australia (NSW, Qld, WA; new record for Tas).
References: Chace (1986); Kensley *et al.* (1987); Poore (2004).

Figure 55: *Oplophorus spinosus* (Brullé, 1839), ECA, IN2017-V03 stn 030, lateral view.

Systellaspis debilis (A. Milne-Edwards, 1881)

Figure 56
MoV sp. 1841
ECA Records: 13 specimens, 23°39´S, 149°08´E to 41°46´S, 154°39´E, 1105–3790 m.
GAB Records: 4 specimens, 34°45´S, 129°43´E to 36°04´S, 132°38´E, 1863–4607 m.
Distribution: Cosmopolitan, including Australia (NSW, SA, WA).
References: Chace (1986); Kensley *et al.* (1987); Hanamura & Evans (1994); Poore (2004).

Figure 56: *Systellaspis debilis* (A. Milne-Edwards, 1881), lateral view: ECA, IN2017-V03 stn 022 (upper); GAB, IN2015-C02 stn 043 (lower).

Superfamily Pandaloidea

Pandalidae

The pandalids are cosmopolitan and occupy a variety of habitats from the littoral to pelagic zones, to depths of more than 3000 m. Some 23 genera are recognised with the Australian fauna comprising 45 species in seven genera. Eight species were collected: four were from the ECA and five from the GAB, with one species recorded from both regions. Of the four ECA species, one represents a new record and one a significant southwards range extension. Of the five GAB species, four represent new records for South Australia. Keys for identification are provided by Chace (1985); Crosnier & Forest (1973); Hanamura & Evans (1996); Hanamura & Takeda (1987); Kensley *et al.* (1987).

***Chlorotocus novaezealandiae* (Borradaile, 1916)**

Figure 57
MoV sp. 3869
GAB Records: 50 specimens, 33°20´S, 130°16´E to 33°25´S, 131°02´E, 189–218 m.
Distribution: New Zealand and Australia (NSW, Qld, SA).
References: Kensley *et al.* (1987); Webber *et al.* (1990); Poore (2004).

Figure 57: *Chlorotocus novaezealandiae* (Borradaile, 1916), GAB, IN2015-C02 stn 395, lateral view (upper), cephalothorax (lower).

***Dorodotes reflexus* Bate, 1888**

Figure 58
MoV sp. 7183
ECA Records: 1 specimen, 23°39´S, 154°39´E, 1766 m.
Distribution: Arabian Sea, Bay of Bengal, South China Sea, Philippines, Indonesia and Australia (northern Qld; range extension southwards to the Coral Sea).
Reference: Chace (1985).

Figure 58: *Dorodotes reflexus* Bate, 1888, ECA, IN2017-V03 stn 128, lateral view (upper), cephalothorax (lower).

***Heterocarpus dorsalis* Bate, 1888**

Figure 59
MoV sp. 5365
ECA Records: 3 specimens, 23°36´S, 153°00´E to 32°30´S, 154°12´E, 1006–1053 m.
Distribution: Indo-West Pacific: South Africa to Indonesia, Philippines, Japan, New Caledonia, Western Samoa and Australia (Qld, WA; first record for NSW).
References: Chace (1985); Hanamura & Evans (1996).

Figure 59: *Heterocarpus dorsalis* Bate, 1888, ECA, IN2017-V03 stn 069, lateral view (upper), cephalothorax (lower).

***Plesionika bifurca* Alcock and Anderson, 1894**

Figure 60
MoV sp. 5444
ECA Records: 12 specimens, 23°36´S, 153°00´E to 32°30´S, 154°12´E, 1006–1226 m.
Distribution: Eastern Africa to Indonesia, South China Sea, south of Japan and Australia (NSW, Qld, WA).
References: Hanamura & Takeda (1987); Kensley *et al.* (1987).

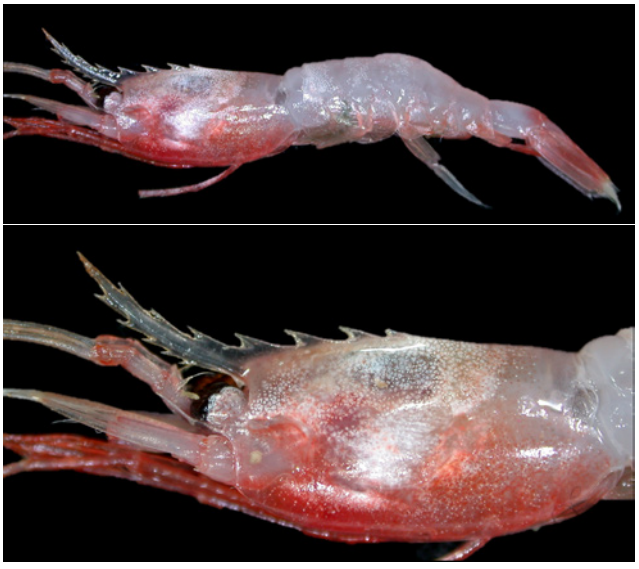

Figure 60: *Plesionika bifurca* Alcock and Anderson, 1894, ECA. IN2017-V03 stn 069, lateral view (upper), cephalothorax (lower).

***Plesionika edwardsii* (Brandt, 1851)**

Figure 61
MoV sp. 5368
GAB Records: 27 specimens, 33°22´S, 130°45´E to 34°17´S, 132°42´E, 199–209 m.
Distribution: Mediterranean Sea, Atlantic Ocean, Indo-Pacific, including Australia (NSW, Qld, WA; a new record for SA).
References: Crosnier & Forest (1973); Chace (1985); Kensley *et al.* (1987).

Figure 61: *Plesionika edwardsii* (Brandt, 1851), GAB, IN2015-C02, stn 181, lateral view (upper), cephalothorax (lower).

***Plesionika martia* (A. Milne-Edwards, 1883)**

Figure 62
MoV sp. 1798
ECA Records: 6 specimens, 32°30´S, 148°56´E to 40°23´S, 153°00´E, 1021–1042 m.
GAB Records: 3 specimens, 35°18´S, 134°31´E, 388 m.
Distribution: Cosmopolitan: Atlantic and throughout the Indo-West Pacific, including Australia (NSW, Qld, WA; a new record for SA).
References: Crosnier & Forest (1973); Chace (1985); Kensley *et al.* (1987).

Figure 62: *Plesionika martia* (A. Milne-Edwards, 1883), ECA, IN2017-V03 stn 069, preserved, lateral view.

***Plesionika semilaevis* Bate, 1888**

MoV sp. 5372
GAB Records: 10 specimens, 35°08´S, 134°06´E, 1021 m.
Distribution: Indo-West Pacific, including Philippines, Indonesia, Japan, South and East China Seas and Australia (NSW, NT, Qld, WA; first record for SA).
References: Chace (1985); Hanamura & Evans (1996).

***Stylopandalus richardi* (Coutière, 1905)**

Figure 63
MoV sp. 1800
GAB Records: 1 specimen, 35°04´S, 130°41´E, 800–800 m [unsighted, specimen apparently lost; photo record only].
Distribution: Cosmopolitan, including Australia (NSW; first record for SA).
References: Chace (1985); Kensley *et al.* (1987).

Figure 63: *Stylopandalus richardi* (Coutière, 1905), GAB IN2015-C02 stn 254, lateral view (upper), cephalothorax (lower).

Superfamily Pasiphaeoidea

Pasiphaeidae

The pasiphaeids are typically pelagic, from surface waters to abyssal depths of 5000 m. They comprise eight genera with some 102 species worldwide; the Australian fauna is represented by 25 species in seven genera. Eight species were recorded, one from the ECA which is new and seven from the GAB, which included two new species, one new record for Australia and three new records for South Australia. Species were identified using keys from Kensley *et al.* (1987), Poore (2004) and Hayashi (2006).

***Alainopasiphaea australis* (Hanamura, 1989)**

Figure 64
MoV sp. 1895
GAB Records: 1 specimen, 33°44´S, 130°40´E 200–400 m [unsighted; photo record only].
Distribution: Australian endemic (Tas, WA; first record for SA).
References: Hanamura (1989), Hayashi (2004), Poore (2004).

Figure 64: *Alainopasiphaea australis* (Hanamura, 1989), GAB, SS2013-C02 stn 016, lateral view (upper), cephalothorax (lower).

***Leptochela sydniensis* Dakin and Colefax, 1940**

Figure 65
MoV sp. 723
GAB Records: 1 specimen, 34°15´S, 132°40´E, 212 m.
Distribution: Indo-West Pacific, including Australia

(NSW, NT, SA, Tas, Vic, WA).
References: Chace (1976), Hayashi (1996).

Figure 65: *Leptochela sydniensis* Dakin and Colfax, 1940, GAB, SS2013-C02 stn 020, preserved, lateral view (photo: Anna McCallum).

***Parapasiphae sulcatifrons* Smith, 1884**

Figure 66
MoV sp. 1820
GAB Records: 3 specimens, 33°31´S, 130°16´E to 35°02´S, 131°05´E, 996–2014 m.
Distribution: Cosmopolitan, including Australian Antarctic Territory, Australia (NSW, Tas; first record for SA); previous maximum depth record 438 m.
References: Kensley *et al.* (1987); Wasmer (1993); Poore (2004).

Figure 66: *Parapasiphae sulcatifrons* Smith, 1884, GAB, IN2015-C02 stn 276, lateral view (upper), cephalothorax (lower).

***Pasiphaea barnardi* Yaldwyn, 1971**

Figure 67
MoV sp. 1821
GAB Records: 1 specimen, 34°38´S, 132°21´E, 1021 m.
Distribution: Cosmopolitan, including Australia (NSW, Vic, WA; first record for SA).
References: Kensley *et al.* (1987); Hanamura & Evans (1994); Poore (2004).

Figure 67: *Pasiphaea barnardi* Yaldwyn, 1971, GAB, IN2015-C01 stn 110, lateral view (upper), cephalothorax (lower).

***Pasiphaea japonica* Omori, 1976**

Figure 68
MoV sp. 7255
GAB Records: 1 specimen, 36°27´S, 136°04´E, 200–400 m [unsighted; photo record only].
Distribution: Indo-West Pacific (Japan, Taiwan, South Africa, Madagascar, Réunion and Indonesia (Kai Islands); a new record for Australia.
References: Omori (1976); Komai *et al.* (2012).

Figure 68: *Pasiphaea japonica* Omori, 1976, GAB, IN2015-C02 stn 075, lateral view (upper), cephalothorax (lower).

Figure 69: *Pasiphaea* sp. MoV 7215, ECA, IN2017-V03 stn 128, preserved, lateral view.

Pasiphaea cf. *longitaenia* Kensley, Tranter and Griffin, 1987

MoV sp. 7253
GAB Records: 4 specimens, 34°37´S, 130°17´E, 2037 m.
Distribution: GAB, new species.
Reference: Kensley *et al.* (1987).

Pasiphaea cf. *oshoroae* Komai and Amaoka, 1993

MoV sp. 7254
GAB Records: 1 specimen, 35°34´S, 132°17´E, 2241 m.
Distribution: GAB, new species.
References: Komai & Amaoka (1993), Hayashi (2006).

Pasiphaea sp. nov.

Figure 69
MoV 7215
ECA Records: 1 specimen, 23°39´S, 154°39´E, 1766 m.
Distribution: ECA, probable new species.

Superfamily Stylodactyloidea

Stylodactylidae

This is a small family of mostly tropical and subtropical shrimps that are found in depths from 3 to 3515 m. Five genera and 32 species are recognised; 11 species representing all five genera are known from Australia. Two species were recorded, both from the east coast, one of which represents a new record for NSW. Keys for identification are provided by Chace (1983) and Cleva (1994).

Bathystylodactylus bathyalis (Cleva, 1994)

Figure 70
MoV sp. 7205
ECA Records: 1 specimen, 25°14´S, 154°11´E, 4006 m.
Distribution: Australian endemic (Qld); previous maximum depth recorded 3515 m.
Reference: Cleva (1994).

Figure 70: *Bathystylodactylus bathyalis* (Cleva, 1994), ECA, IN2017-V03 stn 109, rostrum broken, lateral view (upper), cephalothorax (lower).

***Stylodactylus licinus* Chace, 1983**

Figure 71
MoV sp. 7206
ECA Records: 1 specimen, 28°05´S, 154°05´E, 1006 m.
Distribution: Philippines, Japan, New Caledonia, Chesterfield Islands, Fiji, Australia (Qld, WA; first record for NSW).
References: Chace (1983); Cleva (1994).

Figure 71: *Stylodactylus licinus* Chace, 1983, ECA, IN2017-V03 stn 100, preserved, lateral view, broken rostrum.

Polychelata

Polychelida – deep sea lobsters

The Polychelida comprise one extant family and are found in depths of 200 to 5000 m. They are often referred to as "blind lobsters" due to their greatly reduced and unpigmented eyes. Twenty species in four of the six recognised genera in the Polychelidae occur in Australian waters (Ahyong, 2012b).

Polychelidae

Ten species from four genera were identified from the east coast and four of these species were also recorded from the Great Australian Bight. Three are newly recorded from NSW, one for Tasmania and one for South Australia. One species from the ECA represents a new record for Australia.

***Pentacheles laevis* Bate, 1878**

Figure 72
MoV sp. 3980
ECA Records: 37 specimens, 23°36´S, 149°08´E to 41°46´S, 154°12´E, 1006–2786 m.
GAB Records: 1 specimen, 34°37´S, 132°21´E, 1021 m.
Distribution: Cosmopolitan, western and eastern Atlantic, the Indo-West Pacific, eastern Pacific, including the Norfolk Ridge and Lord Howe Rise, New Caledonia, New Zealand and Australia (NSW; Qld, Tas, SA, Vic, WA).
References: Ahyong & Brown (2002); Ahyong (2007).

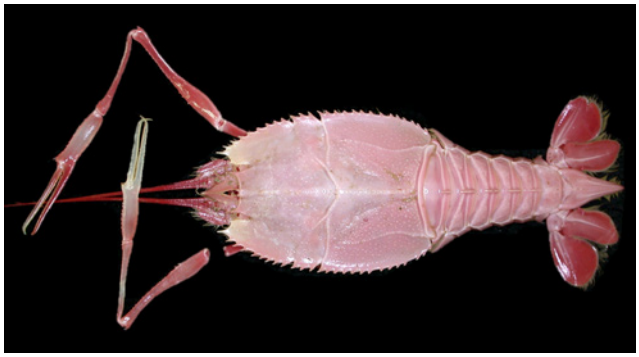

Figure 72: *Pentacheles laevis* Bate, 1878, ECA, IN2017-V03 stn 069, dorsal view.

***Pentacheles obscurus* (Bate, 1878)**

Figure 73
MoV sp. 7190
ECA Records: 10 specimens, 23°39´S, 149°08´E to 41°46´S, 154°39´E, 1766–2803 m.
Distribution: Madagascar, Gulf of Aden to Papua New Guinea, the Moluccas (Indonesia), Wallis and Fatuna, New Caledonia and Australia (Qld; new records for NSW and Tas).
References: Galil (2000); Ahyong (2012b).

Figure 73: *Pentacheles obscurus* (Bate, 1878), ECA, IN2017-V03 stn 035, dorsal view.

***Pentacheles validus* A. Milne-Edwards, 1880**

Figure 74
MoV sp. 7191
ECA Records: 23 specimens, 30°07´S, 149°08´E to 41°46´S, 153°35´E, 1226–2786 m.
GAB Records: 8 specimens, 34°36´S, 130°43´E to 35°43´S, 134°07´E, 1335–1961 m.
Distribution: Cosmopolitan; Atlanto-East Pacific and Indo-West Pacific including New Caledonia, New Zealand and Australia (NSW, SA, Tas).
References: Galil (2000); Ahyong & Brown (2002).

Figure 74: *Pentacheles validus* A. Milne-Edwards, 1880, ECA, IN2017-V03 stn 035, dorsal view.

***Polycheles kermadecensis* (Sund, 1920)**

Figure 75
MoV sp. 7193
ECA Records: 1 specimen, 32°30´S, 153°00´E, 1021 m.
Distribution: New Zealand and Australia (NSW, Qld).
References: Ahyong & Brown (2002).

Figure 75: *Polycheles kermadecensis* (Sund, 1920), ECA, IN2017-V03 stn 069, preserved, dorsal view (upper), lateral view (lower).

***Stereomastis nana* (Smith, 1884)**

Figure 76
MoV sp. 7192
ECA Records: 38 specimens, 23°36´S, 153°35´E to 30°07´S, 154°12´E, 1006–1226 m.
Distribution: Atlantic and Indo-West Pacific, Lord Howe Rise, New Zealand and Australia (NSW, Qld, Tas).
References: Galil (2000); Ahyong (2012b).

Figure 76: *Stereomastis nana* (Smith, 1884), ECA, IN2017-V03 stn 080, dorsal view (photo: Rob Zugaro).

***Stereomastis sculpta* (Smith, 1880)**

Figure 77
MoV sp. 7194
ECA Records: 2 specimens, 23°36´S, 153°51´E to 26°59´S, 154°12´E, 1053–1105 m.
Distribution: Atlantic and Indo-West Pacific, including Vanuatu, New Zealand, Lord Howe Rise and Australia (NSW, Qld).
References: Galil (2000); Ahyong (2009).

Figure 77: *Stereomastis sculpta* (Smith, 1880), ECA, IN2017-V03 stn 121, preserved, dorsal view (upper), lateral view (lower).

***Stereomastis surda* Galil, 2000**

Figure 78
MoV sp. 7195
ECA Records: 1 specimen, 23°36´S, 154°12´E, 1053 m.
GAB Records: 1 specimen, 33°56´S, 131°04´E, 1027 m.
Distribution: Hawaii, French Polynesia and the Nazca Ridge, south-east Pacific, Madagascar, Mozambique, Indonesia, New Caledonia, New Zealand and Australia (NSW, Qld, Vic; first record for SA).
References: Ahyong & Brown (2002); Poore (2004).

Figure 78: *Stereomastis surda* Galil, 2000, ECA, IN2017-V03 stn 121, preserved, dorsal view (upper), lateral view (lower).

***Willemoesia forceps* A. Milne-Edwards, 1880**

Figure 79
MoV sp. 7196
ECA Records: 1 specimen, 30°07´S, 153°53´E, 2474 m.
Distribution: Western Africa, Azores, Sargasso Sea to the Caribbean Sea and Australia (northern Qld; new record for NSW).
References: Galil (2000); Ahyong (2012b).

Figure 79: *Willemoesia forceps* A. Milne-Edwards, 1880, ECA, IN2017-V03 stn 086, preserved, dorsal view (upper), lateral view (lower).

***Willemoesia leptodactyla* (Thomson, 1873)**

Figure 80
MoV sp. 7197
ECA Records: 2 specimens, 39°31´S, 149°35´E, 4165 m.
Distribution: Cosmopolitan: east and west Atlantic (Jamaica to Venezuela), Indo-West Pacific (Philippines, Bay of Bengal, Madagascar, South Africa and New Zealand); new record for Australia (Bass Strait).
References: Galil (2000); Ahyong (2012b).

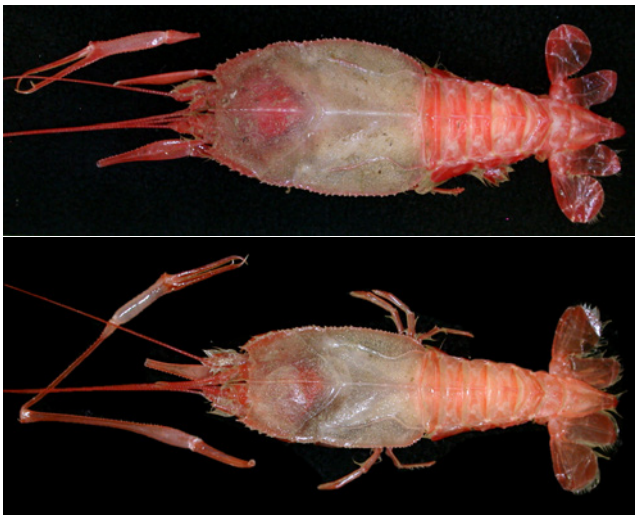

Figure 80: *Willemoesia leptodactyla* (Thomson, 1873), ECA, IN2017-V03 stn 030, dorsal view of two specimens.

Figure 81: *Willemoesia pacifica* Sund, 1920, GAB, IN2015-C01 stn 064, dorsal view of adult and juvenile (upper), lateral view of adult (lower).

***Willemoesia pacifica* Sund, 1920**

Figure 81
MoV sp. 7198
ECA Records: 1 specimen, 30°07´S, 153°53´E, 2474 m
GAB Records: 79 specimens, 34°04´S, 129°11´E to 35°55´S, 134°07´E, 2725–4013 m.
Distribution: Southern Ocean; South Africa, Juan Fernandez Island, Kermadec Trench, New Zealand and Australia (SA; new record for NSW).
References: Ahyong & Brown (2002); Poore (2004).

***Eryoneicus* sp. [unidentified larva]**

Figure 82
ECA Records: 1 specimen, 35°06´S, 151°27´E, 3982 m.
Distribution: Species unknown.
References: Barnard (1950); Bernard (1953); Kensley (1968).

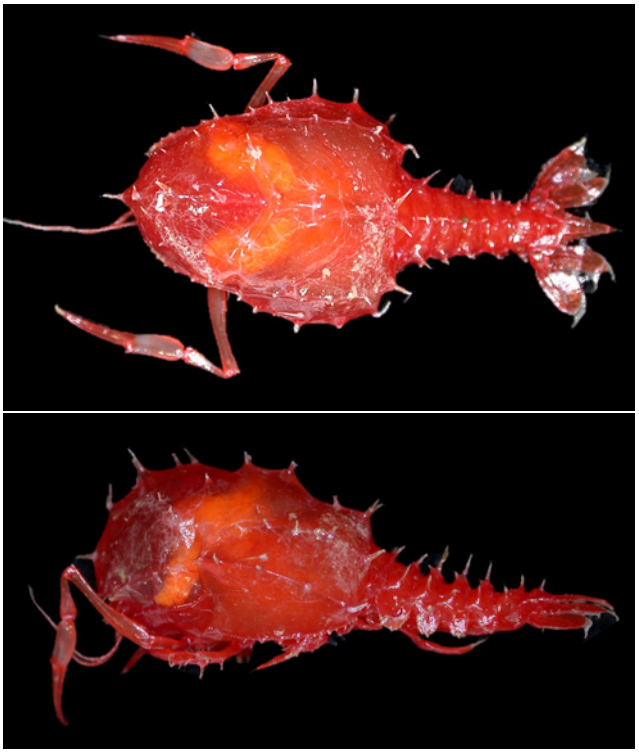

Figure 82: *Eryoneicus* sp. [unidentified larva], ECA, IN2017-V03 stn 053, dorsal view (upper), lateral view (lower).

Figure 83: *Antarctus mawsoni* (Bage, 1938), GAB, SS2013-C02 stn 024, dorsal view (upper), lateral view (lower).

Achelata

This group includes the spiny lobsters (Palinuridae) and the slipper lobsters (Scyllaridae). Four species of syllarids were identified, all from the GAB, which included trawls less than 500 m. None were recorded from the ECA where the shallowest trawl was 1000 m.

Scyllaridae

The scyllarids are typically benthic and are found from shallow inshore waters to the continental slope, down to depths of 500 m. One species of *Ibacus* and three smaller scyllarids were recorded from the GAB; two were recorded for the first time from South Australia.

Antarctus mawsoni (Bage, 1938)

Figure 83
MoV sp. 7225
GAB Records: 9 specimens, 33°22´S, 130°45´E to 35°02´S, 134°06´E, 199–410 m.
Distribution: Australian endemic (NSW, SA, Tas, Vic).
References: Holthuis (2002); Poore (2004).

Crenarctus crenatus (Whitelegge, 1900)

Figure 84
MoV sp. 4974
GAB Records: 1 specimen, 35°31´S, 132°40´E, 200–400 m [unsighted; photo record only].
Distribution: New Zealand, Australia (NSW, Qld, WA; a new record for SA).
References: Holthuis (2002); Poore (2004); Chan *et al.* (2013).

Figure 84: *Crenarctus crenatus* (Whietelegge, 1900), puerulus, GAB, SS2013-C02 stn 004, dorsal view.

***Ibacus alticrenatus* Bate, 1888**

Figure 85
MoV sp. 3873
GAB Records: 21 specimens, 33°20´S, 130°15´E to 35°18´S, 134°31´E, 189–410 m.
Distribution: New Zealand, Australia (NSW, Qld, SA, Vic, WA).
References: Holthuis (1985, 2002).

Figure 85: *Ibacus alticrenatus* Bate, 1888, GAB, IN2015-C02 stn 126, dorsal view with extended abdomen and tail fan (upper), dorsal view with folded abdomen (lower).

Astacidea

The Astacidea include the freshwater crayfish and clawed lobsters and comprise four superfamilies: the Astacoidea and Parastacoidea (freshwater crayfish), Enoplometopoidea (reef lobsters) and Nephropoidea (deep water marine lobsters). They are represented in these collections by only one family, the Nephropidae, which can be found in depths from 150–1893 m.

Nephropoidea

Nephropidae

The Australian fauna is represented by 14 species in five genera. Three species in two genera were identified: three from the GAB, one from the ECA, and one from both regions. Two of the GAB species represent new records for South Australia.

***Metanephrops velutinus* Chan and Yu, 1991**

Figure 86
MoV sp. 5077
GAB Records: 1 specimen, 33°26´S, 130°44´E, 412 m.
Distribution: Philippines, Indonesia and Australia (Qld, SA, WA).
References: Holthuis (1991); Poore (2004).

Figure 86: *Metanephrops velutinus* Chan and Yu, 1991, GAB, IN2015-C02 stn 330, dorsal view (upper), lateral view (lower).

***Nephropsis acanthura* Macpherson, 1990**

Figure 87
MoV sp. 4968
ECA Records: 23 specimens, 23°36´S, 154°05´E to 28°05´S, 154°12´E, 1006–1105 m.
GAB Records: 2 specimens, 33°31´S, 130°16´E to 34°43´S, 132°32´E, 987–996 m.
Distribution: Indo-West Pacific (Madagascar, Philippines, Indonesia, Coral Sea), Australia (NSW, Qld, WA; new record for SA).
Reference: Poore (2004).

Figure 87: *Nephropsis acanthura* Macpherson, 1990, ECA, IN2017-V03 stn 100, dorsal view (upper), lateral view (lower).

***Nephropsis suhmi* Bate, 1888**

Figure 88
MoV sp. 7240
GAB Records: 5 specimens, 34°04´S, 130°16´E to 34°43´S, 133°32´E, 987–1553 m.
Distribution: Indo-West Pacific, Lord Howe Rise, W Tasman Sea, Australia (NSW, Qld, WA; new record for SA).
Reference: Poore (2004).

Figure 88: *Nephropsis suhmi* Bate, 1888, GAB, IN2015-C01 stn 110, dorsal view (upper), lateral view (lower).

Axiidea

The Axiidea or sponge shrimps comprise nine families and are found worldwide in both tropical and temperate waters from the intertidal zone down to at least 2500 m depth. Two families were recorded in our surveys.

Axiidae

The Australian fauna is represented by 36 species in 23 genera. One species was identified from the ECA (a new record for NSW).

Ambiaxius franklinae Sakai, 1994

Figure 89
MoV sp. 7131
ECA Records: 1 specimen, 30°07´S, 153°35´E, 1226 m.
Distribution: Australian endemic (WA; new record for NSW).
References: Sakai (1994); Poore & Collins (2009).

Figure 89: *Ambiaxius franklinae* Sakai, 1994, ECA, IN2017-V03 stn 080, dorsal view (upper), lateral view (lower).

Micheleidae

This small family of benthic shrimps is represented in Australia by seven species in three genera. One species (*Tethisea indica* Poore, 1994) was identified from the GAB and represents a new record for South Australia. A key to the genera is provided by Poore (1994). A recent review of the Indo-West Pacific species by Poore (in press) synonomises *Tethisea mindoro*, Poore, 1997 with *Tethisea indica*, Poore, 1994.

***Tethisea indica* Poore, 1994**

Figure 90
MoV sp. 5662
GAB Records: 3 specimens, 33°25´S, 131°04´E to 34°19´S, 132°40´E, 204–437 m.
Distribution: Mozambique, La Réunion, Philippines, Indonesia, New Caledonia and north-western Australia; a new record for SA).
References: Poore (1994, 1997, in press).

Figure 90: *Tethisea indica* Poore, 1994, GAB, SS2013-C02 stn 019, preserved, lateral view (photo: Anna McCallum).

Anomura – Squat lobsters, king crabs and hermit crabs

Families of this diverse group are divided into seven superfamilies, Aegloidea, Chirostyloidea, Galatheoidea, Hippoidea, Lithodoidea, Lomisoidea and Paguroidea. See (Ahyong *et al.*, 2009).

Superfamily Chirostyloidea

The superfamily Chirostyloidea comprises four families, Chirostylidae, Eumunididae, Kiwaidae and Sternostylidae (Baba *et al.*, 2018). One of three families known from Australian waters was recorded in our surveys.

Chirostylidae

Thirty-eight species in four genera are presently represented in the Australian fauna. Five species of chirostylids were identified three of which were recorded from the ECA and two from the GAB; one is probably undescribed.

***Gastroptychus* cf. *brevipropodus* sp. nov.**

Figure 91
MoV sp. 7226
GAB Records: 6 specimens, 33°20´S, 130°16´E to 35°02´S, 134°06´E, 189–221 m.
Distribution: GAB, new species.
References: Ahyong & Poore (2004a); Baba (2018).

Figure 91: *Gastroptychus* cf. *brevipropodus* sp. nov. MoV 7226, GAB, IN2015-C02 stn 128, dorsal view.

***Uroptychus australis* (Henderson, 1885)**

Figure 92
MoV sp. 5249
ECA Records: 11 specimens, 32°30´S, 153°00´E, 1021 m.
Distribution: New Zealand, Indonesia and the Solomon Islands to New Caledonia, Australia (NSW, Tas, Vic, WA).
References: Ahyong & Poore (2004a); Baba (2018).

Figure 92: *Uroptychus australis* (Henderson, 1885), ECA, IN2017-V03 stn 069, preserved, dorsal view (upper), cephalothorax (lower).

***Uroptychus babai* Ahyong and Poore, 2004**

Figure 93
MoV sp. 7141
ECA Records: 1 specimen, 26°59´S, 153°51´E, 1105 m.
Distribution: Madagascar, New Caledonia and the Solomon Islands, Australia (NSW).
References: Ahyong & Poore (2004a); Baba (2018).

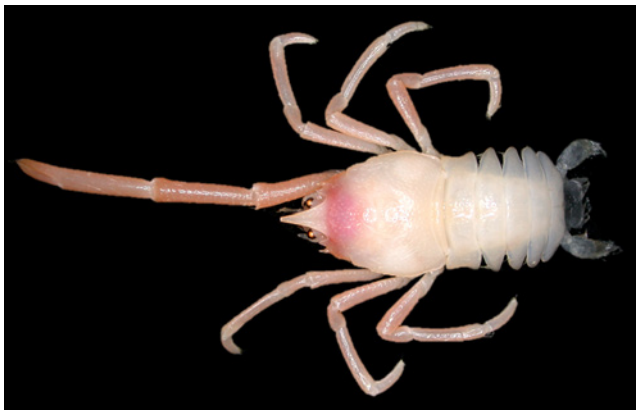

Figure 93: *Uroptychus babai* Ahyong and Poore, 2004, ECA, IN2017-V03 stn 104, dorsal view.

***Uroptychus flindersi* Ahyong and Poore, 2004**

Figure 94
MoV sp. 5247
GAB Records: 2 specimens, 33°26´S, 130°44´E to 34°15´S, 132°37´E, 410–412 m.
Distribution: Australian endemic (SA, Tas, WA).
References: Ahyong & Poore (2004a).

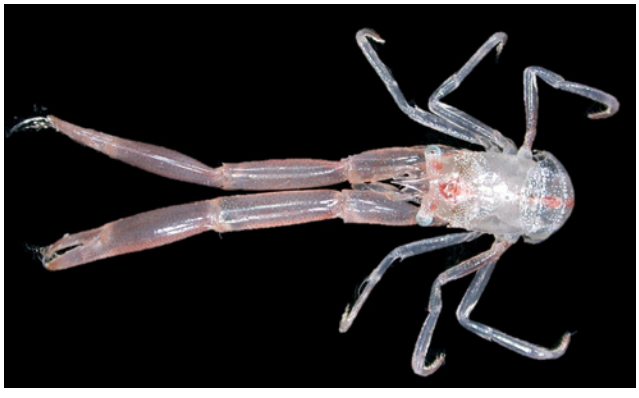

Figure 94: *Uroptychus flindersi* Ahyong and Poore, 2004, GAB, IN2015-C02 stn 330, dorsal view.

***Uroptychus nigricapillis* Alcock, 1901**

Figure 95
MoV sp. 5565
ECA Records: 20 specimens, 23°36´S, 153°00´E to 32°30´S, 154°12´E, 1006–1053 m.
Distribution: Western Indian Ocean to South China Sea and New Caledonia including Australia (WA, NSW and Qld Coral Sea).
References: Baba (2018).

Figure 95: *Uroptychus nigricapillis* Alcock, 1901, ECA, IN2017-V03 stn 069, dorsal view.

Superfamily Galatheoidea

The Galatheoidea comprise four families: Galatheidae, Munididae, Munidopsidae and Porcellanidae (Ahyong *et al.*, 2010; Schnabel *et al.*, 2011). Two of these families were represented in the study area (six munidids and 14 munidopsids).

Munididae

The Australian fauna is represented by 62 species in 12 genera. Six species were identified, four from the GAB and two from the ECA. Two represent new records (one for NSW and one for South Australia) and three are probable new species (two from the GAB and one from the ECA).

***Munida endeavourae* Ahyong and Poore, 2004**

MoV sp. 5604
GAB Records: 4 specimens, 34°39´S, 132°27´E to 34°42´S, 132°31´E, 990–1007 m.
Distribution: Northern New Zealand and south-eastern Australia (NSW, Tas, Vic; new record for the GAB).
Reference: Ahyong & Poore (2004b).

***Munida haswelli* Henderson, 1885**

Figure 96
MoV sp. 3859
GAB Records: 1 specimen, 33°22´S, 130°45´E, 199 m.
Distribution: Australian endemic (NSW, SA, Tas, Vic, WA).
Reference: Macpherson (1994).

Figure 96: *Munida haswelli* Henderson, 1885, GAB, IN2015-C02 stn 398, dorsal view.

***Munida magniantennulata* Baba and Türkay, 1992**

Figure 97
MoV sp. 7159
ECA Records: 5 specimens, 36°07´S, 153°53´E, 2474 m.
Distribution: Western Pacific Ocean (Lau Basin) and Australia (Qld, new record for NSW).
Reference: Baba & Türkay (1992).

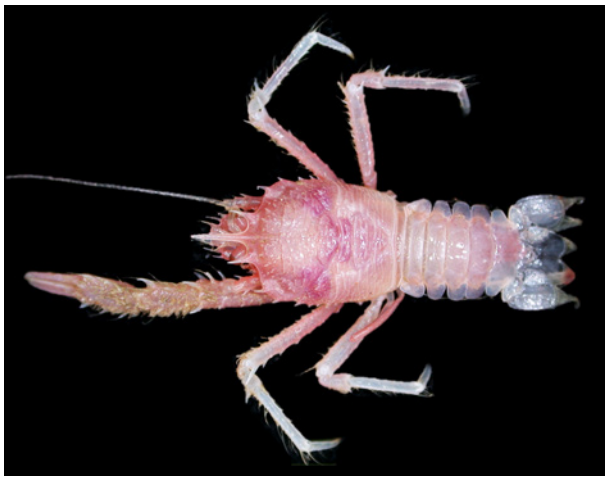

Figure 97: *Munida magniantennulata* Baba and Türkay, 1992, ECA, IN2017-V03 stn 086, dorsal view.

***Munida* cf. *magniantennulata* Baba and Türkay, 1992**

Figure 98
MoV sp. 7227
ECA Records: 1 specimen, 23°39´S, 154°39´E, 1766 m.
Distribution: ECA, possible new species.
Reference: Baba & Türkay (1992).

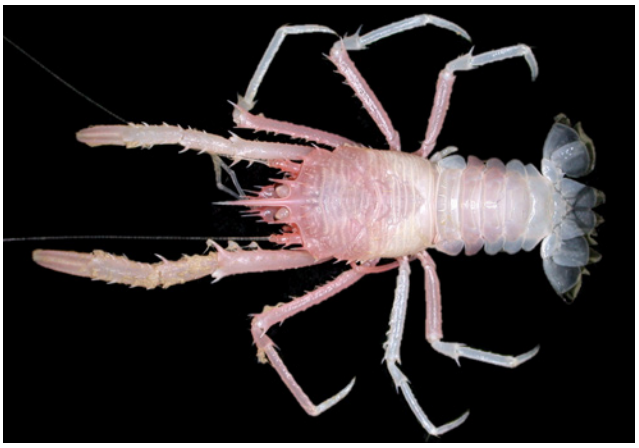

Figure 98: *Munida* cf. *magniantennulata* Baba and Türkay, 1992, ECA, IN2017-03 stn 128, dorsal view.

***Munida* cf. *manqingae* Liu, Lin and Huang, 2013**

Figure 99
MoV sp. 7228
GAB Records: 1 specimen, 35°23´S, 132°19´E, 1779 m.
Distribution: GAB, probable new species.
Reference: Liu *et al.* (2013).

Figure 99: *Munida* cf. *manqingae* Liu, Lin and Huang, 2013, GAB, IN2015-C01 stn 042, dorsal view.

***Munida* sp. nov.**

Figure 100
MoV 5661
GAB Records: 1 specimen, 33°25´S, 131°03´E, 204 m.
Distribution: GAB, new species.

Figure 100: *Munida* sp. MoV 5661, GAB, SS2013-C02 stn 019, preserved, dorsal view (upper), lateral view (lower) (photo: Anna McCallum).

Munidopsidae

The Australian fauna is represented by 31 species in three genera. Fourteen species were identified, 11 species from the ECA and six species from the GAB, three species were recorded from both ECA and GAB. Two represent new records for Australia, two are newly recorded from South Australia, with one new record each for NSW, Qld and Tasmania. Four are probably new species: two from the ECA and three from the GAB with one new species recorded from both GAB and ECA.

***Galacantha rostrata* A. Milne Edwards, 1880**

Figure 101
MoV sp. 7160
ECA Records: 20 specimens, 33°00´S, 150°39´E to 36°20´S, 152°56´E, 2643–2803 m.
GAB Records: 29 specimens, 34°21´S, 129°57´E to 35°46´S, 134°07´E, 1769–2826 m.
Distribution: Atlantic, Southern oceans and Indo-Pacific, including Zanzibar, the Arabian Sea, Indonesia, Japan, New Caledonia, New Zealand and Australia

(NSW, Qld, a new record for SA).
References: Baba & Poore (2002); Ahyong & Poore (2004b); Taylor *et al.* (2010).

Figure 101: *Galacantha rostrata* A.Milne Edwards, 1880, ECA, IN2017-V03 stn 044, dorsal view (upper), lateral view (lower).

Figure 102: *Munidopsis arietina* Alcock and Anderson, 1894, GAB, IN2015-C01 stn 054, dorsal view (upper), lateral view (lower).

***Munidopsis arietina* Alcock and Anderson, 1894**

Figure 102
MoV sp. 7161
ECA Records: 7 specimens, 32°36´S, 150°11´E to 38°28´S, 153°09´E, 2535–3852 m.
GAB Records: 4 specimens, 34°21´S, 129°57´E to 35°12´S, 131°38´E, 1836–2079 m.
Distribution: Bay of Bengal and Taiwan; first record for Australia (NSW, SA and Vic). Previous maximum depth record 2935 m.
References: Baba (2005); Osawa *et al.* (2008).

***Munidopsis centrina* Alcock and Anderson, 1894**

Figure 103
MoV sp. 7162
ECA Records: 1 specimen, 35°20´S, 151°14´E, 2643 m.
Distribution: Bay of Bengal, Lord Howe Rise, Australia (Tasman Sea, eastern Australia).
References: Ahyong & Poore (2004b); Baba (2005).

Figure 103: *Munidopsis centrina* Alcock and Anderson, 1894, ECA, IN2017-V03 stn 056, preserved, dorsal view.

***Munidopsis cidaris* Baba, 1994**

Figure 104
MoV sp. 7163
ECA Records: 1 specimen, 23°36´S, 154°12´E, 1053 m.
Distribution: Philippines, Solomon Islands, Taiwan, Australia (Qld).
References: Baba (1994); Baba *et al.* (2008).

Figure 104: *Munidopsis cidaris* Baba, 1994, ECA IN2017-V03 stn 121, dorsal view.

***Munidopsis crassa* Smith, 1885**

Figure 105
MoV sp. 7164
ECA Records: 3 specimens, 30°17´S, 150°11´E to 38°28´S, 153°51´E, 3852–4441 m.
Distribution: Atlantic and western Pacific (Tasman Sea, off southern New Zealand); new record for Australia.
Reference: Baba (2005).

Figure 105: *Munidopsis crassa* Smith, 1885, ECA, IN2017-V03 stn 032, dorsal view.

***Munidopsis crenatirostris* Baba, 1988**

Figure 106
MoV sp. 5251
GAB Records: 1 specimen, 33°32´S, 131°08´E, 383 m.
Distribution: Philippines, Indonesia, Australia (WA, first record for SA).
References: Baba (1988, 2005); Taylor *et al.* (2010).

Figure 106: *Munidopsis crenatirostris* Baba, 1988, GAB, IN2015-C02 stn 186, dorsal view.

***Munidopsis edwardsii* (Wood-Mason, 1891)**

Figure 107
MoV sp. 7165
ECA Records: 3 specimens, 28°42´S, 151°14´E to 35°20´S, 154°12´E, 2535–2643 m.
Distribution: Taiwan, Bay of Bengal, southwest of Sri Lanka, Australia (NSW).
References: Baba & Poore (2002); Taylor *et al.* (2010).

Figure 107: *Munidopsis edwardsii* (Wood-Mason, 1891), ECA, IN2017-V03 stn 090, dorsal view.

Figure 108: *Munidopsis* cf. *granosa* Alcock, 1901, GAB, IN2017-C01 stn 178, dorsal view (upper), lateral view (lower).

***Munidopsis* cf. *edwardsii* (Wood-Mason, 1891)**

MoV sp. 7229
GAB Records: 1 specimen, 35°29´S, 130°23´E, 5081 m.
Distribution: GAB, probable new species.
References: Baba (2005); Taylor *et al.* (2010).

***Munidopsis* cf. *granosa* Alcock, 1901**

Figure 108
MoV sp. 7230
ECA Records: 22 specimens, 27°02´S, 150°22´E to 37°48´S, 154°13´E, 2460–4269 m.
GAB Records: 6 specimens, 34°42´S, 129°42´E to 36°04´S, 132°38´E, 3714–4741 m.
Distribution: ECA, probable new species.
Reference: Baba (2005).

***Munidopsis kensleyi* Ahyong and Poore, 2004**

Figure 109
MoV sp. 5254
ECA Records: 1 specimen, 23°36´S, 154°12´E, 1053 m.
Distribution: Southern Africa and Australia (NSW and WA; new record for the Coral Sea, Qld).
References: Ahyong & Poore (2004b); Taylor *et al.* (2010).

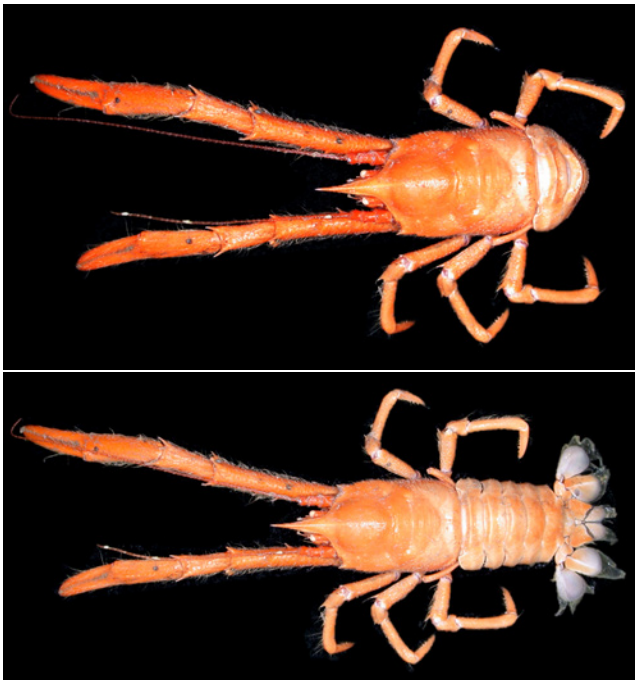

Figure 109: *Munidopsis kensleyi* Ahyong and Poore, 2004, ECA, IN2017-V03 stn 121, dorsal view, abdomen folded (upper), abdomen extended (lower).

***Munidopsis* cf. *marginata* (Henderson, 1885)**

Figure 110
MoV sp. 7231
ECA Records: 1 specimen, 33°00´S, 152°56´E, 2803 m.
Distribution: ECA, probable new species.
Reference: Baba (2005); Taylor *et al.* (2010).

Figure 110: *Munidopsis* cf. *marginata* (Henderson, 1885), ECA, IN2017-V03 stn 067, preserved, dorsal view.

***Munidopsis nitida* (A. Milne Edwards, 1880)**

Figure 111
MoV sp. 7168
ECA Records: 1 specimen, 28°05´S, 154°05´E, 1006 m.
Distribution: Eastern and western Atlantic, the Gulf of Panama, Indo-Pacific from Madagascar and Mozambique to the Bay of Bengal, Japan, Philippines, Indonesia, the Solomon Islands, New Caledonia and Australia (NE Qld, new record for NSW).
References: Baba (2005); Taylor *et al.* (2010).

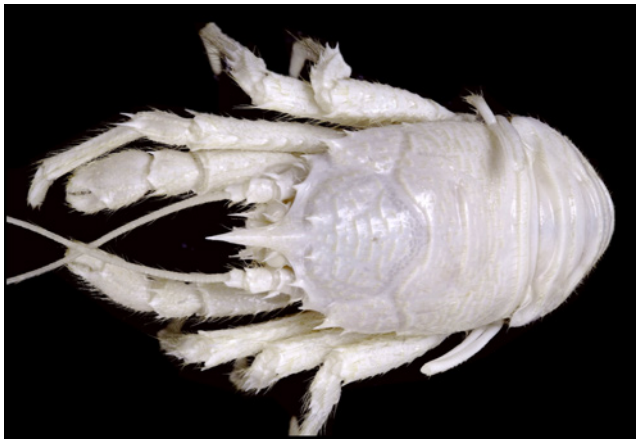

Figure 111: *Munidopsis nitida* (A. Milne Edwards, 1880), ECA, IN2017-V03 stn 100, preserved, dorsal view.

***Munidopsis subsquamosa* Henderson, 1885**

Figure 112
MoV sp. 7169
ECA Records: 19 specimens, 35°20´S, 149°08´E to 41°46´S, 151°14´E, 2460–4800 m.
Distribution: Japan, Namibia and Australia (NSW, Qld, new record for Tas).
References: Ahyong & Poore (2004b); Taylor *et al.* (2010).

Figure 112: *Munidopsis subsquamosa* Henderson, 1885, dorsal view: ECA, IN2017-V03 stn 004 (upper) and 043 (lower).

Figure 113: *Munidopsis* cf. *subsquamosa* Henderson, 1885, GAB, RE2017-C01 stn 217, dorsal view (upper), lateral view (lower).

***Munidopsis* cf. *subsquamosa* Henderson, 1885**

Figure 113
MoV 7232
GAB Records: 2 specimens, 34°04´S, 129°10´E to 35°03´S, 130°54´E, 2726–3061 m.
Distribution: GAB, probable new species.
References: Baba (2005); Taylor *et al.* (2010).

Superfamily Lithodoidea

This superfamily is divided into two families, the Hapalogastridae and the Lithodidae or "King Crabs". Most lithodids are from benthic continental slope and shelf depths down to abyssal depths, except in polar and subpolar seas. They are most diverse and abundant in the North Pacific, where they form the basis of an important fishery but are much less common in southern oceans. The Hapalogastrida are mostly intertidal species from the Northern Pacific.

Lithodidae

The Australian fauna is represented by 13 species in three genera. Two species were identified, one from the ECA and one from the GAB. *Neolithodes bronwynae* is recorded for the first time from Australia.

***Neolithodes bronwynae* Ahyong, 2010**

Figure 114
MoV sp. 7158
ECA Records: 2 specimens, 35°20´S, 150°22´E to 37°48´S, 151°14´E, 2460–2643 m.
Distribution: New Caledonia, New Zealand and the Lord Howe Rise; new record for Australia.
Reference: Ahyong (2010a).

Figure 114: *Neolithodes bronwynae* Ahyong, 2010, ECA, IN2017-V03 stn 035, dorsal view (upper) and frontal view (lower).

***Neolithodes flindersi* Ahyong, 2010**

Figure 115
MoV sp. 7233
GAB Records: 7 specimens, 33°31´S, 131°04´E to 34°47´S, 132°32´E, 987–1332 m.
Distribution: Australian endemic (NSW, SA, Tas, Vic).
Reference: Ahyong (2010a).

Figure 115: *Neolithodes flindersi* Ahyong, 2010, GAB, IN2015-C02 stn 099, dorsal view (upper) and ventral view (lower).

Superfamily Paguroidea

The Paguroidea comprise six families, the Coenobitidae, Diogenidae, Paguride, Parapaguridae, Pylochelidae and Pylojacquesidae. Three families were represented among the 24 species that were identified. McLaughlin (2003a) provides keys to families and genera.

Diogenidae

The Diogenidae is the second largest family of marine hermit crabs worldwide but is the dominant hermit crab family in Australia, with 92 species in 11 genera. They are found from intertidal to outer shelf depths but not typically the deep sea. As a result, specimens were only recorded from the GAB cruises, which included samples from less than 500 m (all ECA sampling was from deeper than 1000 m).

***Dardanus arrosor* (Herbst, 1796)**

Figure 116
MoV sp. 1709
GAB Records: 9 specimens, 33°20´S, 130°16´E to 34°18´S, 132°42´E, 189–283 m.
Distribution: Indo-West Pacific, E Atlantic Oceans, Mediterranean Sea, Red Sea, West Africa, South Africa, Japan, Philippines, Taiwan, New Zealand and Australia (NSW, Qld, SA, Vic, WA).
Reference: Poore (2004).

Figure 116: *Dardanus arrosor* (Herbst, 1796), GAB, IN2015-C02 stn 191, dorsal view.

***Paguristes aciculus* Grant, 1905**

Figure 117
MoV sp. 5279
GAB Records: 64 specimens, 33°20´S, 130°16´E to 35°18´S, 134°31´E, 189–412 m.
Distribution: Australian endemic (NSW, new record for SA).
Reference: Poore (2004).

Figure 117: *Paguristes aciculus* Grant, 1905, GAB, IN2015-C02 stn 330, dorsal view.

***Strigopagurus elongatus* Forest, 1995**

MoV sp. 1707
GAB Records: 1 specimen, 34°18´S, 132°42´E, 283 m.
Distribution: Australian endemic (SA, Vic, WA).
Reference: Poore (2004).

Paguridae

The Paguridae is the most diverse group of "hermit crabs" worldwide yet in Australia is represented by only 49 species in 19 genera (almost half the number of diogenids). They are found in all oceans and from a variety of habitats and depths, including the deep sea. Nine species were identified, six from the ECA and five from the GAB with two species found in both regions. Four of the six species identified from the ECA are newly recorded from Australia and another is recorded for the first time from NSW. Of the five species identified from the GAB three are newly recorded from South Australia.

***Bythiopagurus macrocolus* McLaughlin, 2003**

MoV sp. 2683
GAB Records: 2 specimens, 34°48´S, 131°45´E, 1381 m.
Distribution: Australian endemic (Tas; new record for SA).
Reference: McLaughlin (2003b).

***Catapaguroides microps* A. Milne-Edwards and Bouvier, 1892**

Figure 118
MoV sp. 7177
ECA Records: 3 specimens, 23°39´S, 154°05´E to 28°05´S, 154°39´E, 1006–1766 m.
Distribution: western Atlantic from North Carolina, Gulf of Mexico and Caribbean to off the northern coast of São Paulo, Brazil; eastern Atlantic from Finistère coast in France, Spain and Portugal, to Morocco, including the Azores; western Pacific from Indonesia; new record for Australia.
References: Komai & Rahayu (2013); Lemaitre & Tavares (2015).

Figure 118: *Catapaguroides microps* A. Milne-Edwards and Bouvier, 1892, ECA, IN2017-V03 stn 128, preserved, dorsal view.

***Chanopagurus atopos* Lemaitre, 2003**

Figure 119
MoV sp. 7178
ECA Records: 2 specimens, 23°36´S, 153°00´E to 32°30´S, 154°12´E, 1021–1053 m.
Distribution: Taiwan, South China Sea; new record for Australia.
Reference: Lemaitre (2003).

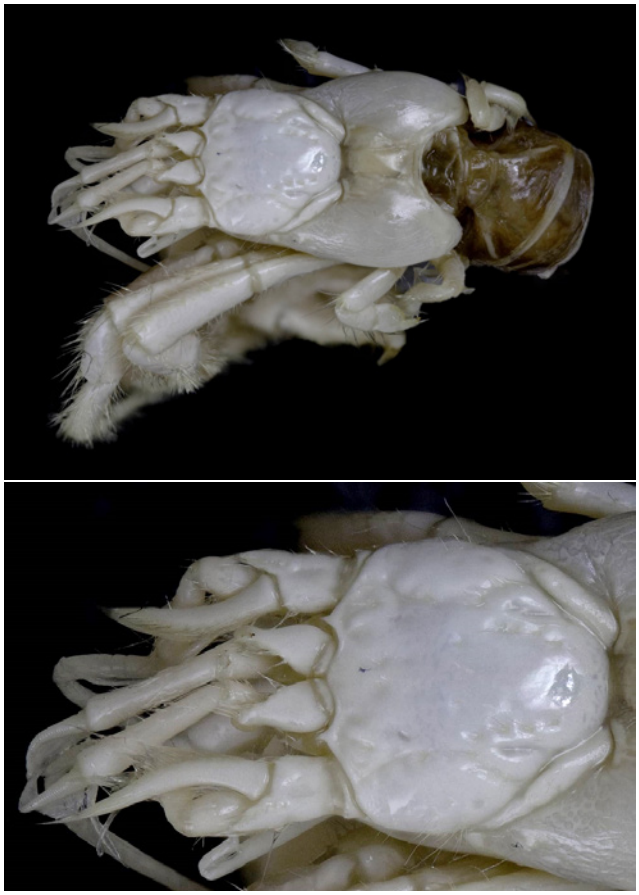

Figure 119: *Chanopagurus atopos* Lemaitre, 2003, ECA, IN2017-V03, stn 069, preserved, dorsal view (upper), cephalohorax (lower).

***Goreopagurus poorei* Lemaitre and McLaughlin, 2003**

Figure 120
MoV sp. 2684
ECA Records: 1 specimen, 40°23´S, 148°56´E, 1042 m.
GAB Records: 1 specimen, 35°08´S, 134°07´E, 1021 m.
Distribution: New Zealand, Australia (Tas; new record for SA).
References: Lemaitre & McLaughlin (2003); Poore (2004).

Figure 120: *Goreopagurus poorei* Lemaitre and McLaughlin, 2003, ECA, IN2017-V03 stn 013, dorsal view.

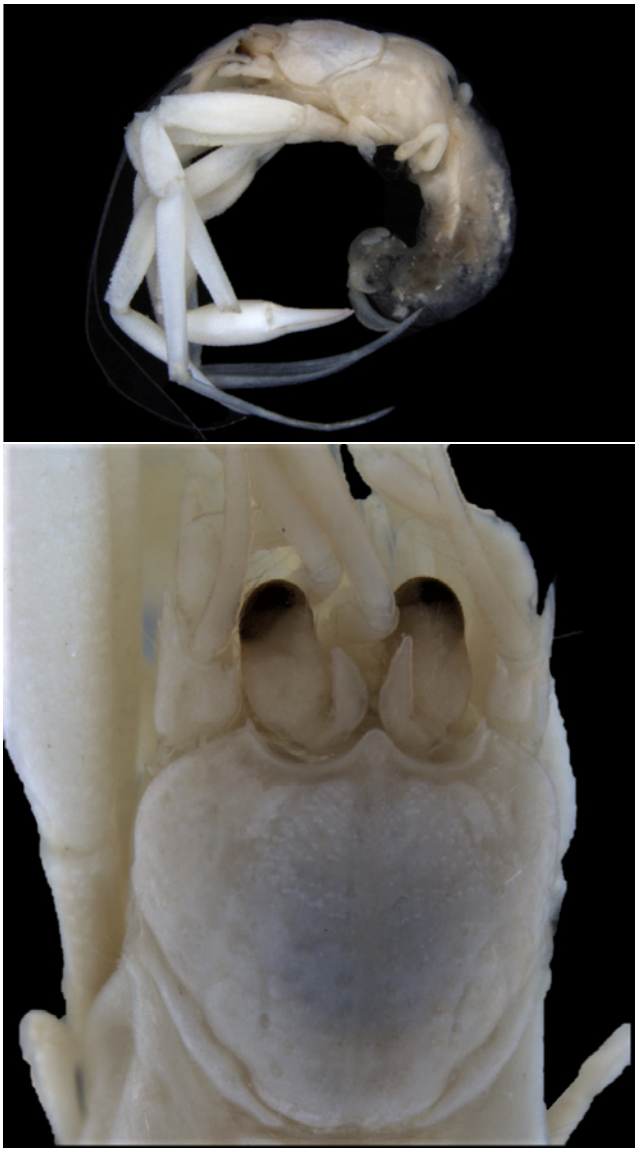

Figure 121: *Icelopagurus crosnieri* McLaughlin, 1997, ECA, IN2017-V03 stn 121, preserved, lateral view (upper), cephalothorax (lower).

***Icelopagurus crosnieri* McLaughlin, 1997**

Figure 121
MoV sp. 7179
ECA Records: 3 specimens, 23°36´S, 154°05´E to 28°05´S, 154°12´E, 1006–1053 m.
Distribution: Tanimbar Islands, Indonesia; new record for Australia.
Reference: McLaughlin (1997).

***Lophopagurus (Lophopagurus) nanus* (Henderson, 1888)**

MoV sp. 1591
GAB Records: 4 specimens, 34°17´S, 132°42´E to 35°02´S, 134°06´E, 209–283 m.
Distribution: Australian endemic (NSW, SA, Tas, Vic, WA).
References: McLaughlin & Gunn (1992); Poore (2004).

***Michelopagurus chacei* McLaughlin, 1997**

Figure 122
MoV sp. 7180
ECA Records: 7 specimens, 26°59´S, 153°00´E to 32°30´S,

153°51´E, 1006–1105 m.
Distribution: Kai Islands, Indonesia; new record for Australia.
Reference: McLaughlin (1997).

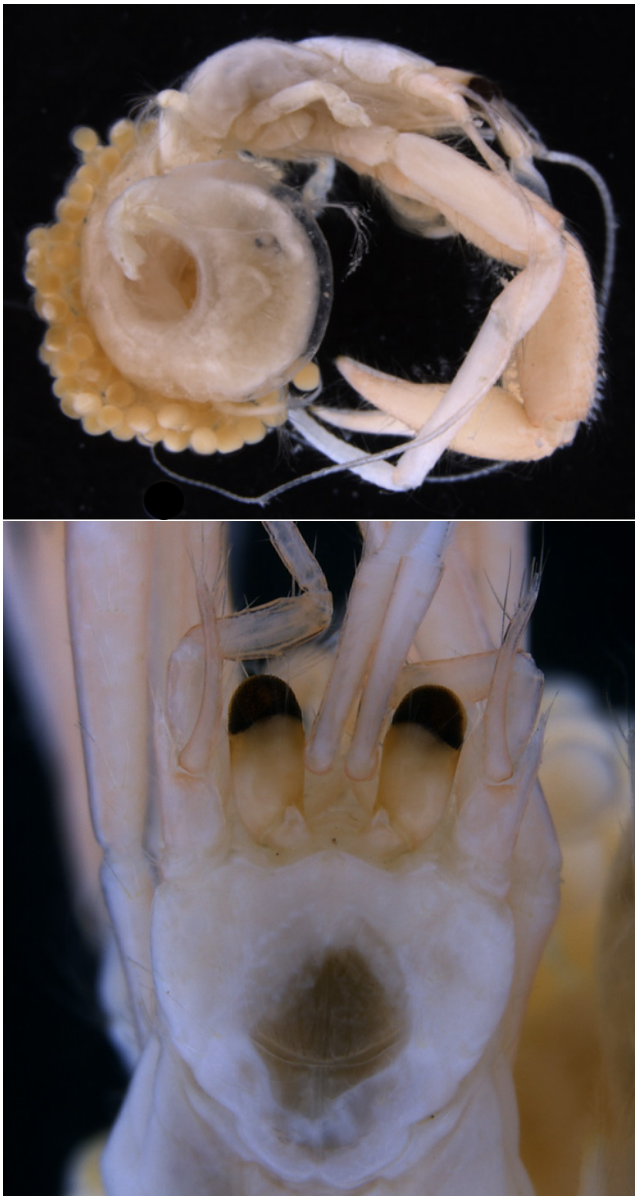

Figure 122: *Michelopagurus chacei* McLaughlin, 1997, ECA, IN2017-V03 stn 100, preserved, lateral view (upper), cephalothorax (lower).

Pagurodes inarmatus Henderson, 1888

Figure 123
MoV sp. 7181
ECA Records: 26 specimens, 32°36´S, 149°08´E to 41°46´S, 153°09´E, 2535–2786 m.
GAB Records: 68 specimens, 34°04´S, 130°01´E to 35°43´S, 134°07´E, 1332–2114 m.
Distribution: Eastern New Zealand (North and South Islands), Chatham Islands, western Indian Ocean, southern Indian Ocean (Marion Island), Australia (SA and Tas; new record for NSW).
Reference: de Saint Laurent & McLaughlin (2000).

Figure 123: *Pagurodes inarmatus* Henderson, 1888, GAB, IN2017-C01 stn 189, dorsal view.

Propagurus haigae (McLaughlin, 1997)

Figure 124
MoV sp. 5333
GAB Records: 4 specimens, 33°23´S, 130°15´E to 33°26´S, 130°44´E, 412–426 m.
Distribution: Indonesia, New Caledonia and Australia (Qld, Vic, WA; a new record for SA).
References: McLaughlin & de Saint Laurent (1998); Poore (2004).

Figure 124: *Propagurus haigae* (McLaughlin, 1997), GAB, IN2015-C02 stn 330, dorsal view.

Parapaguridae

Parapagurids are found in all oceans from continental shelf and slope depths down to 5000 m. They are found in both gastropod and scaphopod shells and often have one or more anthozoan polyps attached to the shell. Many species are found living in shelters formed by zoanthids. The Australian fauna is represented by 22 species in five genera. We identified 13 species, 11 from the ECA and five from the GAB (three were recorded from both the ECA and GAB). Of the 13 ECA species, three are new species, two represent new records from Australia (one of these also recorded from the GAB) and one represents a new record for the Queensland Coral Sea. There was one new species from the GAB and one new record for South Australia. Identifications were made using Lemaitre (1989, 1996, 1999, 2004, 2014).

Figure 125: *Oncopagurus cidaris* Lemaitre, 1996, ECA, IN2017-V03 stn 121, preserved, dorsal view (upper), cephalothorax (lower).

***Oncopagurus cidaris* Lemaitre, 1996**

Figure 125
MoV sp. 7184
ECA Records: 3 specimens, 23°36´S, 154°12´E, 1053 m.
Distribution: Australian endemic (NSW, Qld).
References: Lemaitre (1996, 2014).

***Oncopagurus* cf. *elongatus* Lemaitre, 2014**

Figure 126
MoV sp. 7234
ECA Records: 4 specimens, 23°36´S, 154°05´E to 28°05´S, 154°12´E, 1006–1053 m.
Distribution: ECA, probable new species.
Reference: Lemaitre (2014).

Figure 126: *Oncopagurus* cf. *elongatus* Lemaitre, 2014, ECA, IN2017-V03 stn 100, preserved, dorsal view (upper), cephalothorax (lower).

Figure 127: *Oncopagurus indicus* (Alcock, 1905), ECA, IN2017-V03 stn 100, preserved, dorsal view (upper), cephalothorax (lower).

***Oncopagurus indicus* (Alcock, 1905)**

Figure 127
MoV sp. 5336
ECA Records: 1 specimen, 28°05′S, 154°05′E, 1006 m.
Distribution: Indo-West Pacific (east Africa to Indonesia, Philippines, Hawaiían Islands) and Australia (NSW, Qld, WA).
References: Lemaitre (1996, 2014).

***Oncopagurus minutus* (Henderson, 1896)**

Figure 128
MoV sp. 5337
ECA *Records:* 15 specimens, 23°36′S, 153°35′E to 30°07′S, 154°12′E, 1006–1226 m.
Distribution: Indo-West Pacific Oceans (Maldives, Indonesia), Australia (NSW, WA).
References: Lemaitre (1996, 2014).

Figure 128: *Oncopagurus minutus* (Henderson, 1896), ECA, IN2017-V03 stn 100 & 121, preserved, dorsal view (upper), cephalothorax (lower).

Figure 129: *Parapagurus bouvieri* Stebbing, 1910, GAB, IN2015-C02 stn 330, dorsal view.

***Oncopagurus* sp. nov.**

MoV sp. 7235
GAB Records: 80 specimens, 33°31´S, 130°16´E to 35°08´S, 134°06´E, 996–1027 m.
Distribution: GAB, new species.

***Parapagurus bouvieri* Stebbing, 1910**

Figure 129
MoV sp. 7236
GAB Records: 30 specimens, 33°26´S, 130°16´E to 35°02´S, 132°37´E, 410–2014 m.
Distribution: SE Atlantic (from Angola to South Africa and north to Natal), Indo-West Pacific, SW Indian Ocean, New Zealand and Australia (NSW, Qld, SA).
References: Lemaitre (1999).

***Parapagurus furici* Lemaitre, 1999**

Figure 130
MoV sp. 7185
ECA Records: 94 specimens, 23°39´S, 149°08´E to 41°46´S, 154°39´E, 1006–2803 m.
GAB Records: 63 specimens, 34°04´S, 129°11´E to 35°31´S, 132°08´E, 1335–3021 m.
Distribution: Indo-West Pacific (Arabian Sea, Indonesia, South China Sea, Philippines, New Caledonia, Vanuatu, Wallis and Fatuna Islands and Lord Howe Province); new record for Australia (NSW, Qld, Vic, Tas and SA).
References: Lemaitre (1999).

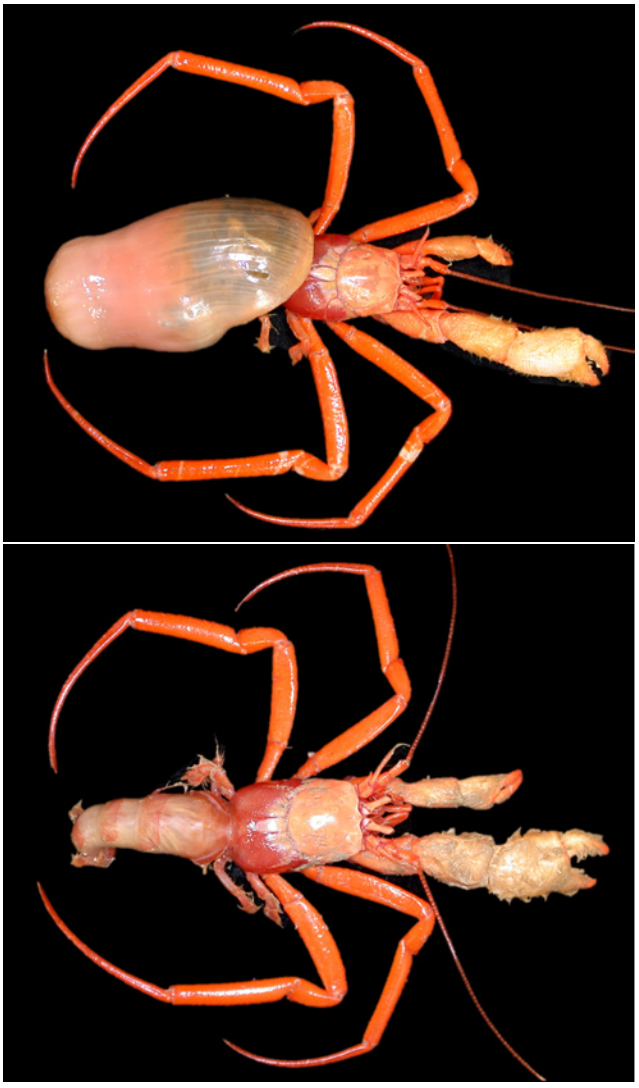

Figure 130: *Parapagurus furici* Lemaitre, 1999: GAB, IN2015-C01 stn 064 (upper, dorsal view of specimen in zoanthid shelter); ECA, IN2017-V03 stn 022 (lower, dorsal view, shelter removed).

Figure 131: *Parapagurus latimanus* Henderson, 1888: GAB, IN2015-C02 stn 123, dorsal view.

***Parapagurus latimanus* Henderson, 1888**

Figure 131
MoV sp. 5341
ECA Records: 51 specimens, 23°39′S, 149°08′E to 41°46′S, 154°39′E, 1226–2803 m.
GAB Records: 350 specimens, 33°55′S, 129°57′E to 35°50′S, 134°07′E, 987–3002 m.
Distribution: Indo-West Pacific: Kenya, Japan, Indonesia, New Caledonia region, New Zealand and Australia (NSW, SA, Tas, WA, new record for Qld Coral Sea).
References: Lemaitre (1999).

***Parapagurus richeri* Lemaitre, 1999**

Figure 132
MoV sp. 7186
ECA Records: 237 specimens, 23°39′S, 149°08′E to 41°46′S, 154°39′E, 1006–2786 m.
GAB Records: 251 specimens, 33°31′S, 129°11′E to 35°50′S, 134°06′E, 996–3305 m.
Distribution: Indo-West Pacific: South Africa to South China Sea, east to Wallis and Fatuna Islands, and south along the Lord Howe Rise, Australia (NSW, Qld, a new record for SA).
References: Lemaitre (1999).

Figure 132: *Parapagurus richeri* Lemaitre, 1999: ECA, IN2017-V03 stn 090, preserved, removed from scaphopod shell, dorsal view (upper); GAB, IN2015-C01 stn 197, dorsal view, removed from gastropod shell (lower).

Figure 133: *Sympagurus acinops* Lemaitre, 1989, ECA, IN2017-V03 stn 080, preserved, dorsal view.

***Sympagurus acinops* Lemaitre, 1989**

Figure 133
MoV sp. 7187
ECA Records: 7 specimens, 23°36´S, 153°35´E to 30°07´S, 154°12´E, 1006–1226 m.
Distribution: Western Atlantic (Tongue of the Ocean, Bahamas), Eastern Atlantic (Canary Islands) and Indo-West Pacific including New Caledonia. New record for Australia (NSW and Qld Coral Sea).
References: Lemaitre (1989, 2004).

***Sympagurus burkenroadi* Thompson, 1943**

Figure 134
MoV sp. 7188
ECA Records: 5 specimens, 28°05´S, 154°05´E, 1006 m.
Distribution: Indo-West Pacific: Mozambique Channel, Madagascar, Japan, South China Sea, New Caledonia, Indonesia and Australia (south east transition, NSW, Vic).
References: Lemaitre (2004).

Figure 134: *Sympagurus burkenroadi* Thompson, 1943, ECA, IN2017-V03 stn 100, preserved, dorsal view.

***Sympagurus* sp. nov.**

Figure 135
MoV 7189
ECA Records: 1 specimen, 28°05´S, 154°05´E, 1006 m.
Distribution: ECA, possible new species.

Figure 135: *Sympagurus* sp. MoV 7189. Thompson, 1943, ECA, IN2017-V03 stn 100, preserved, dorsal view (upper), cephalothorax (lower).

***Sympagurus* sp. nov.**

Figure 136
MoV 7214
ECA Records: 1 specimen, 28°05´S, 154°05´E, 1006 m.
Distribution: ECA, possible new species.

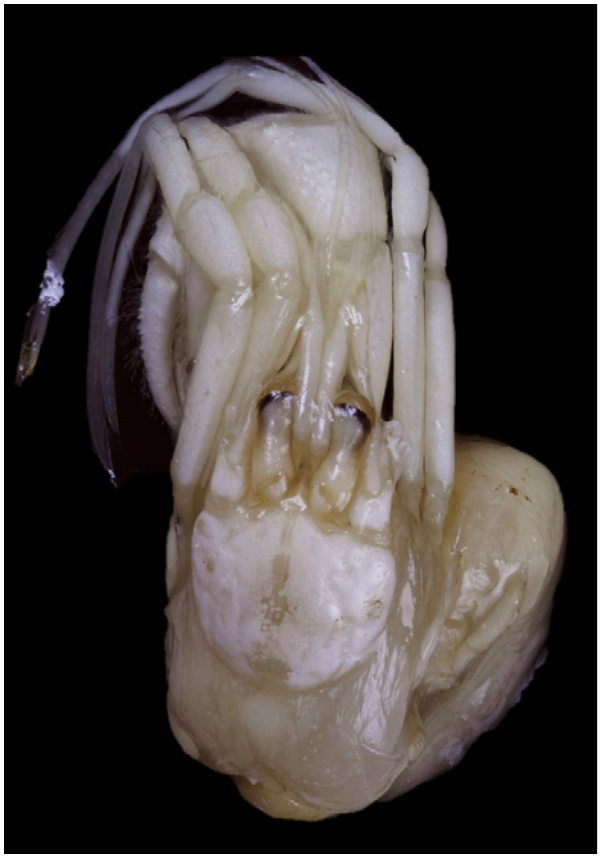

Figure 136: *Sympagurus* sp. MoV 7214. Thompson, 1943, ECA, IN2017-V03 stn 100, preserved, dorsal view.

Brachyura – crabs

The Brachyura is the most species-rich taxon in the Australian decapod fauna, and comprises over 1000 species (most of which are tropical) in 67 families. In the present surveys, 14 families were represented by 32 species in 24 genera. Twenty-four species were identified from the GAB (mostly from trawls less than 500 m deep) and nine from the ECA (all deep water species), with only one species recorded from both survey regions. The 24 GAB species included seven new records for South Australia and two probable new species. The nine ECA species included four new records for Australia and two new records for the ECA. Most were identified using Poore (2004).

The classification of Brachyura follows De Grave *et al.* (2009) and Tavares & Cleva (2010) (with recognition of Trichopeltarioidea).

Dromiacea

Superfamily Dromioidea

Dromiidae

The Dromiidae, commonly called "sponge crabs" occur in tropical and warm temperate seas of all major oceans. They are mostly shallow water species although a few occur down to depths of 500 m. The Australian fauna is represented by 29 species in 17 genera. Four species were recorded, all from the GAB, which included trawls less than 1000 m. One species represents a new record for South Australia.

Austrodromidia incisa (Henderson, 1888)

MoV sp. 7239
GAB Records: 6 specimens, 33°20´S, 130°16´E to 33°25´S, 131°02´E, 189–218 m.
Distribution: Australian endemic (NSW; new record for SA).
References: McLay (1993); Poore (2004).

Austrodromidia insignis (Rathbun, 1923)

Figure 137
MoV sp. 3856
GAB Records: 17 specimens, 33°20´S, 130°16´E to 33°25´S, 131°02´E, 189–218 m.
Distribution: Australian endemic (NSW, SA, Vic, WA).
References: McLay (1993).

Figure 137: *Austrodromidia insignis* (Rathbun, 1923), GAB, IN2015-C02 stn 395, dorsal view.

Austrodromidia octodentata (Haswell, 1882)

Figure 138
MoV sp. 3855
GAB Records: 1 specimen, 34°17´S, 132°42´E, 209 m.
Distribution: Australian endemic (NSW, SA, Vic, WA).
References: McLay (1993); Poore (2004).

Figure 138: *Austrodromidia octodentata* (Haswell, 1882), GAB, IN2015-C02 stn 178, dorsal view (upper), ventral view (lower).

Stimdromia lateralis (Gray, 1831)

Figure 139
MoV sp. 3858
GAB Records: 7 specimens, 33°20´S, 130°16´E to 35°02´S, 134°06´E, 189–221 m.
Distribution: New Zealand, Australia (NSW, Qld, SA, Vic, WA).
References: McLay (1993); Poore (2004).

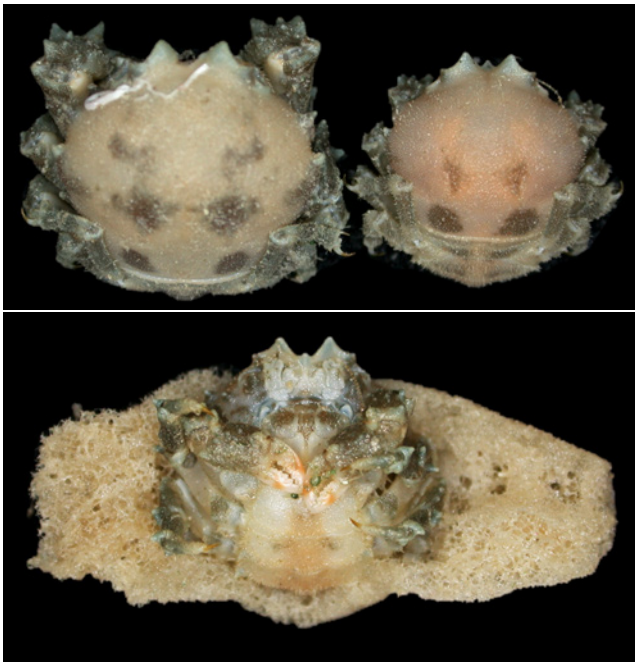

Figure 139: *Stimdromia lateralis* (Gray, 1831), GAB, IN2015-C02 stn 128, dorsal view of adult and juvenile (upper), ventral view of specimen carrying sponge (lower).

Figure 140: *Homologenus levii* Guinot and Richer de Forges, 1995, ECA, IN2017-V03 stn 069, dorsal view (upper), carapace lateral view (lower).

Superfamily Homoloidea

Homolidae

Homolids are typically deep water benthic crabs, mostly occurring in depths greater than 200 m. They have the common name of "Deepwater Carrier Crabs" as they use their last pair of legs to hold a piece of protective sponge. The Australian fauna is represented by 11 species in nine genera. Only one species was recorded, from the ECA, and was a new record for Australia.

Homologenus levii Guinot and Richer de Forges, 1995

Figure 140
MoV sp. 7157
ECA Records: 20 specimens, 23°36´S, 153°00´E to 32°30´S, 154°12´E, 1006–2548 m.
Distribution: Indo-West Pacific: New Caledonia, Chesterfield and Loyalty Islands; a new record for Australia.
Reference: Guinot & Richer de Forges (1995).

Latreilliidae

This is a small group of benthic deep-water crabs found in mostly tropical and sub-temperate waters worldwide, to depths of 700 m. Latreilliidae is represented in Australian waters by two genera and two species. Only one previously known species was recorded from the Great Australian Bight with none from the ECA.

Eplumula australiensis (Henderson, 1888)

Figure 141
MoV sp. 5040
GAB Records: 2 specimens, 33°20´S, 130°16´E to 34°17´S, 132°42´E, 189–209 m.
Distribution: New Caledonia, New Zealand and Australia (NSW, Moreton Bay Qld, Tas, Vic, WA; a new record for SA).
References: Castro & Williams (2003); Poore (2004).

Figure 141: *Eplumula australiensis* (Henderson, 1888), GAB, IN2015-C02 stn 395, dorsal view (upper), carapace lateral view (lower).

Cyclodorippoida

Superfamily Cyclodorippoidea

Cyclodorippidae

The Australian fauna is represented by two species in two genera.

***Krangalangia spinosa* (Zarenkov, 1970)**

Figure 142
MoV sp. 5024
ECA Records: 2 specimens, 23°36'S, 154°12'E 1053 m.
Distribution: Wallis and Fatuna, New Caledonia and northern Australia (Qld, WA).
Reference: Zarenkov (1970).

Figure 142: *Krangalangia spinosa* (Zarenkov, 1970), ECA, IN2017-V03 stn 121, dorsal view.

***Tymolus similis* (Grant, 1905)**

Figure 143
MoV sp. 5023
GAB Records: 174 specimens, 33°25'S, 130°44'E to 35°18'S, 134°31'E, 218–412 m.
Distribution: Australian endemic (NSW, Qld, Tas, Vic, WA).
Reference: Tavares (1993).

Figure 143: *Tymolus similis* (Grant, 1905), GAB, SS2013-C02 stn 024, dorsal view.

Cymonomidae

Cymonomids are small cryptic crabs that occur in deeper waters of the continental shelf and slope. One genus and nine species have been recorded from Australia (Ahyong, 2019). Three species were recorded in present surveys from the GAB and one from the ECA, all of which are the basis of the first records for the respective regions.

***Cymonomus delli* Griffin and Brown, 1975**

Figure 144
MoV sp. 7238
GAB Records: 11 specimens, 33°23′S, 130°15′E to 35°18′S, 134°31′E, 383–426 m.
Distribution: Australian endemic (NSW, new record for SA).
References: Griffin & Brown (1976); Ahyong (2019).

Figure 144: *Cymonomus delli* Griffin and Brown, 1975, GAB, IN2015-C02 stn 126, dorsal view.

***Cymonomus soela* Ahyong and Brown, 2003**

Figure 145
MoV sp. 7145
ECA Records: 14 specimens, 23°36′S, 153°00′E to 32°30′S, 154°12′E, 1006–1105 m.
GAB Records: 5 specimens, 33°31′S, 130°16′E to 35°08′S, 134°06′E, 987–1021 m.
Distribution: Australian endemic (Tas; new record for NSW, Qld Coral Sea, and SA).
Reference: Ahyong & Brown (2003); Ahyong (2019).

Figure 145: *Cymonomus soela* Ahyong and Brown, 2003 GAB, IN2015-C02 stn 382, dorsal view: female (upper), male (lower).

***Cymonomus triplex* Ahyong, 2019**

MoV sp. 7237
GAB Records: 1 specimen, 35°02′S, 134°04′E, 388 m.
Distribution: WA, GAB.
Reference: Ahyong & Ng (2017); Ahyong (2019). Figured by Poore *et al.* (2008) from southwestern Australia as *Cymonomus* sp. MoV 5001.

Eubrachyura

Superfamily Dorippoidea

Ethusidae

Ethusids use their elevated, hooked back legs to carry bivalve shells or other objects on their backs for camouflage. Most inhabit deep water and are rarely collected. Ethusidae (previously part of Dorippidae) includes just four genera and were first recorded in Australia recently (Poore *et al.* 2008 and Ahyong & Farrelly 2018), mostly from material in the IN2017-V03 survey.

***Ethusina castro* Ahyong, 2008**

Figure 146
MoV sp. 7146
ECA Records: 18 specimens, 23°39′S, 153°09′E to 36°20′S, 154°12′E, 1766–2803 m.
Distribution: New Zealand and eastern Australia
References: Ahyong (2008); Ahyong & Farrelly (2018).

Figure 146: *Ethusina castro* Ahyong, 2008, ECA, IN2017-V03 stn 044, dorsal views of male (upper) and female (lower).

***Ethusina robusta* (Miers, 1886)**

Figure 147
MoV sp. 7147
ECA Records: 7 specimens, 23°36′S, 153°35′E to 30°07′S, 154°12′E, 1006–1226 m.
Distribution: Western India to Indonesia, the Solomon Islands, New Caledonia, Vanuatu, Taiwan, Fiji, eastern and western Australia.
References: Ng & Ho (2003); Castro (2005); Ahyong & Farrelly (2018).

Figure 147: *Ethusina robusta* (Miers, 1886), ECA, IN2017-V03 stn 100, dorsal view of juvenile. Legs of juveniles are more deeply pigmented than in adults.

***Ethusina rowdeni* Ahyong, 2008**

Figure 148
MoV sp. 7148
ECA Records: 1 specimen, 30°07′S, 153°35′E, 1226 m.
Distribution: New Zealand and eastern Australia.
References: Ahyong (2008); Ahyong & Farrelly (2018).

Figure 148: *Ethusina rowdeni* Ahyong, 2008, ECA, IN2017-V03 stn 100, preserved, dorsal view.

Superfamily Goneplacoidea

Goneplacidae

The Goneplacidae, revised by Castro (2007) includes benthic crabs, many of which inhabit relatively deep waters. In Australia they are found on both the continental shelf and slope down to depths of 765 m. The Australian fauna is represented by eight species in six genera. Three species were identified herein, one from the ECA (as a new record for NSW) and two from the GAB.

***Menoplax longispinosa* Chen, 1984**

Figure 149
MoV sp. 7156
ECA Records: 10 specimens, 23°36′S, 154°05′E to 28°05′S, 154°12′E, 1006–1053 m.
Distribution: Indo-West Pacific: East and South China Seas, Madagascar, Philippines, Indonesia, Solomon Islands, Vanuatu and Chesterfield Islands, New Caledonia, Tonga, and Australia (off NE Qld and northern WA; a new record for NSW and southern Qld).
References: Castro (2007).

Figure 149: *Menoplax longispinosa* Chen, 1984, ECA, IN2017-V03 stn 100, male, dorsal view (upper), ventral view (lower).

***Pycnoplax meridionalis* (Rathbun, 1923)**

Figure 150
MoV sp. 3862
GAB Records: 4 specimens, 33°22′S, 130°45′E to 35°50′S, 132°41′E, 199–212 m.
Distribution: New Zealand and Australia (NSW, SA, Tas, Vic, WA).
References: Castro (2007); Ahyong (2008).

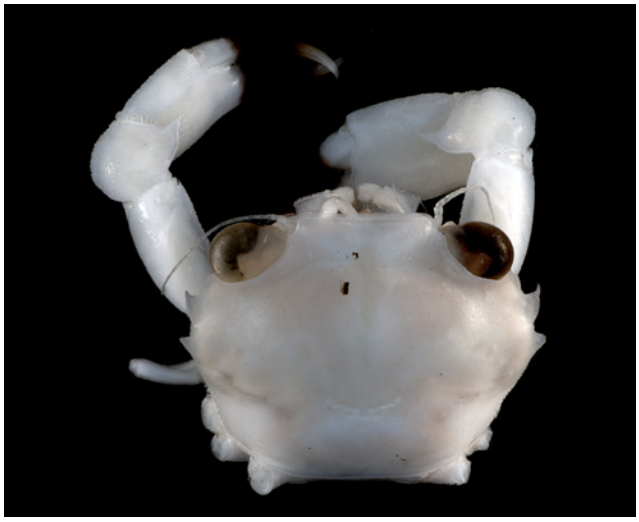

Figure 150: *Pycnoplax meridionalis* (Rathbun, 1923), GAB, SS2013-C02 stn 020, preserved juvenile, dorsal view (photo: Anna McCallum).

***Pycnoplax victoriensis* (Rathbun, 1923)**

Figure 151
MoV sp. 5031
GAB Records: 14 specimens, 33°23′S, 130°15′E to 33°32′S, 131°08′E, 218–426 m.
Distribution: New Zealand and Australia (NSW, Tas, SA, Vic and WA).
References: Castro (2007); Ahyong (2008).

Figure 151: *Pycnoplax victoriensis* (Rathbun, 1923), GAB, IN2015-C02 stn 186, dorsal view.

Superfamily Leucosioidea

Leucosiidae

These small crabs, commonly known as nut or pebble crabs, are found on soft sediments from the intertidal shore to shelf and slope depths. They are most speciose in the tropical Indo-Pacific. The leucosiids have undergone major revision in recent years (Galil, 2001a,b, 2003a,b, 2005a,b, 2006a,b, 2009) and currently

comprise three subfamilies with up to 73 genera and over 300 species. Australia has at least 31 genera and 93 species. Two common species were identified from the GAB, both from shallower trawls.

***Ebalia tuberculosa* (A. Milne-Edwards, 1873)**

Figure 152
MoV sp. 710
GAB Records: 89 specimens, 33°20′S, 130°15′E to 35°18′S, 134°31′E, 189–426 m.
Distribution: Indo-West Pacific (South Africa to Japan, Hawaií, New Zealand and Australia (NSW, SA, Vic, WA).
References: Poore (2004); Ahyong (2008).

Figure 152: *Ebalia tuberculosa* (A. Milne-Edwards, 1873), GAB, SS2013-C02 stn 024, dorsal view.

***Merocryptus lambriformis* A. Milne-Edwards, 1873**

Figure 153
MoV sp. 3864
GAB Records: 7 specimens, 33°22′S, 130°45′E to 35°02′S, 134°08′E, 199–283 m.
Distribution: Western Pacific Ocean (Japan, East China Sea, Samoa, New Zealand, New Caledonia and Australia (NSW, Qld, SA, Vic, WA).
Reference: Poore (2004).

Figure 153: *Merocryptus lambriformis* A. Milne-Edwards, 1873, GAB, IN2015-C02 stn 128, dorsal view.

Superfamily Majoidea

Majoids are commonly known as "spider crabs" or "decorator crabs" and are found from low intertidal to depths of more than 7000 m (Griffin & Tranter, 1986a,b). They are especially diverse in tropical Indo-Pacific waters, with the Australian fauna currently numbering 70 genera and 175 species. The higher classification of the majoids is currently unstable (e.g., Števčić, Z. (2005, 2013); Ng *et al.* (2008); Windsor & Felder (2014); herein, we follow De Grave *et al.* (2009).

Epialtidae

The Australian fauna is represented by 71 species in 28 genera. One previously known species was recorded from a shallow water trawl of the GAB.

***Rochinia mosaica* (Whitelegge, 1900)**

Figure 154
MoV sp. 3866
GAB Records: 4 specimens, 33°20′S, 130°16′E, 189 m.
Distribution: Australian endemic (NSW, Qld, SA, Vic).
Reference: Poore (2004).

Figure 154: *Rochinia mosaica* (Whitelegge, 1900), GAB, IN2015-C02 stn 395, dorsal view.

Inachidae

The inachids are a diverse group of mostly small, shallow water reef species, although some genera such as *Cyrtomaia*, *Platymaia* and *Vitjazmaia* are found in large numbers in the deeper waters of the continental shelf and continental slope, down to depths of 500 m or more. The Australian fauna presently numbers 16 genera and 40 species. Four previously known species were identified in our study, three from the GAB and one from the ECA.

***Cyrtomaia maccullochi* Rathbun, 1918**

Figure 155
MoV sp. 5146
GAB Records: 25 specimens, 33°26′S, 130°44′E to 35°18′S, 134°31′E, 383–412 m.
Distribution: South China Sea, Australia (SA, WA).
Reference: Poore (2004).

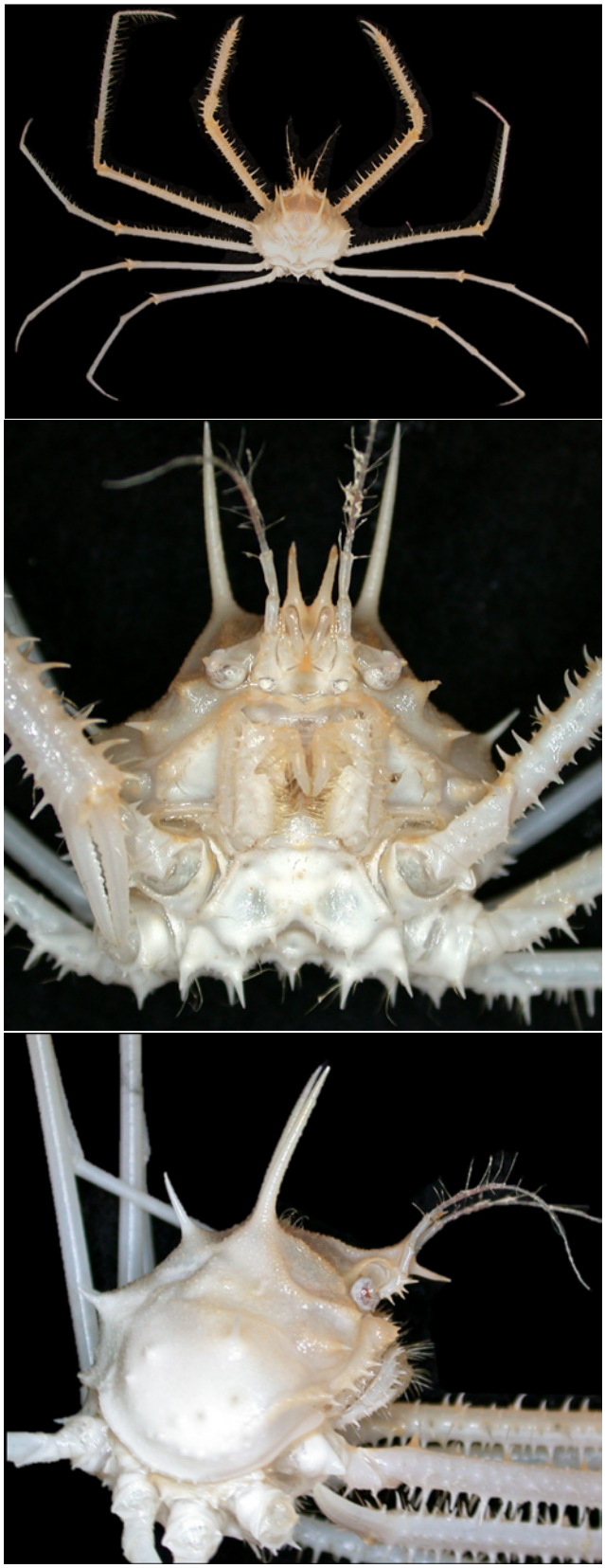

Figure 155: *Cyrtomaia maccullochi* Rathbun, 1918, GAB, IN2015-C02 stn 126, dorsal view (upper), anterior cephalothorax (middle), lateral carapace (lower).

***Dorhynchus ramusculus* (Baker, 1906)**

Figure 156
MoV sp. 5159
GAB Records: 109 specimens, 33°20′S, 130°16′E to 35°18′S, 134°31′E, 189–1027 m.
Distribution: New Zealand and Australia (SA, WA).
References: Poore (2004); Ahyong (2008).

Figure 156: *Dorhynchus ramusculus* (Baker, 1906), GAB, IN2015-C02 stn 128, dorsal view (upper), carapace dorsal view (lower).

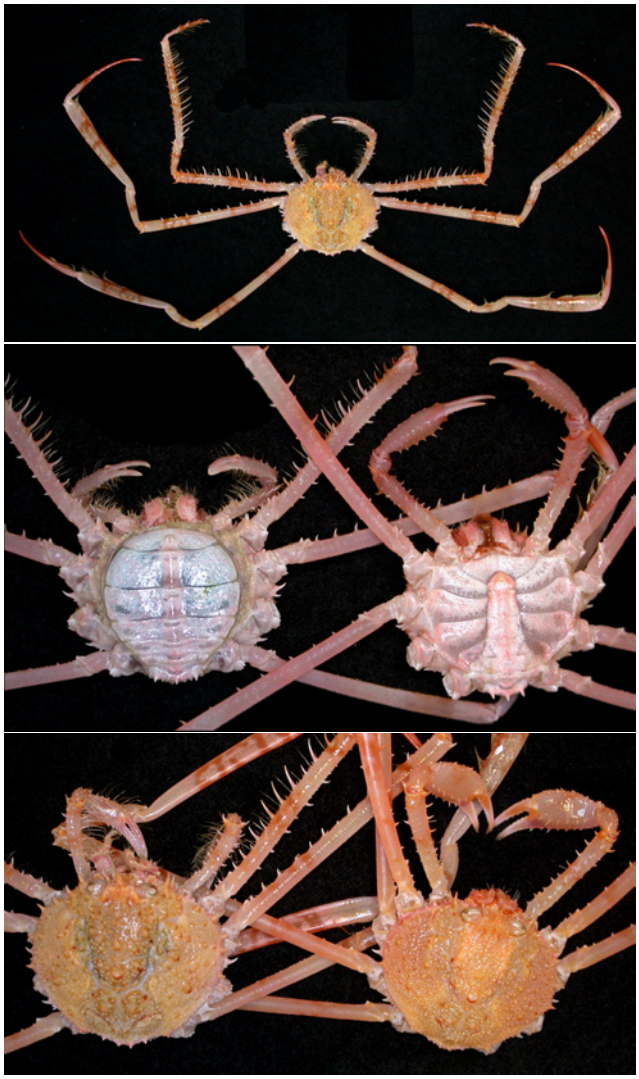

Figure 157: *Platymaia wyvillethomsoni* (Whitelegge, 1900), GAB, IN2015-C02 stn 174: dorsal view (upper); ventral view of female and male, respectively (middle); carapace dorsal view of female and male, respectively (lower).

***Platymaia wyvillethomsoni* (Whitelegge, 1900)**

Figure 157
MoV sp. 5157
GAB Records: 42 specimens, 33°20′S, 130°15′E to 34°15′S, 132°37′E, 189–426 m.
Distribution: Western Pacific (Indonesia to Philippines and Japan), Australia (NSW, Qld, SA, WA).
Reference: Poore (2004).

***Vitjazmaia latidactyla* Zarenkov, 1994**

Figure 158
MoV sp. 5629
ECA Records: 1 specimen, 30°07′S, 153°35′E, 1226 m.
Distribution: Western Indian Ocean, New Zealand, Tasman Sea, Australia (NSW, Tas).
Reference: Webber & Richer de Forges (1995).

Figure 158: *Vitjazmaia latidactyla* Zarenkov, 1994, ECA, IN2017-V03 stn 080, dorsal view (upper), carapace dorsal view (middle), carapace lateral view (lower).

Majidae

Australia has 25 genera and 63 species. Four species were identified, all from shallow water trawls from the GAB (< 500 m). One species represents a new record for South Australia.

***Choniognathus granulosus* (Baker, 1906)**

Figure 159
MoV sp. 7241
GAB Records: 3 specimens, 33°20'S, 130°16'E to 33°22'S, 130°45'E, 189–199 m.
Distribution: Australian endemic (SA).
Reference: Poore (2004).

Figure 159: *Choniognathus granulosus* (Baker, 1906), GAB, IN2015-C02 stn 395, dorsal view.

***Leptomithrax globifer* Rathbun, 1918**

Figure 160
MoV sp. 5144
GAB Records: 5 specimens, 33°20'S, 130°16'E to 34°17'S, 132°42'E, 189–209 m.
Distribution: Australian endemic (Qld, SA, Tas, WA).
Reference: Poore (2004).

Figure 160: *Leptomithrax globifer* Rathbun, 1918, GAB, IN2015-C02 stn 179, dorsal view (upper), carapace dorsal view (lower).

Figure 161: *Prismatopus spatulifer* (Haswell, 1881), GAB, IN2015-C02 stn 128, dorsal view (upper) & 395, carapace (lower).

***Prismatopus spatulifer* (Haswell, 1881)**

Figure 161
MoV sp. 705
GAB Records: 9 specimens, 33°20′S, 130°16′E to 33°25′S, 131°02′E, 189–218 m.
Distribution: Australian endemic (NSW, SA, Tas, Vic, WA).
Reference: Poore (2004).

***Teratomaia richardsoni* (Dell, 1960)**

Figure 162
MoV sp. 5598
GAB Records: 1 specimen, 33°23′S, 130°15′E, 426 m.
Distribution: New Zealand and Australia (Tas, Vic; a new record for SA).
Reference: Poore (2004).

Figure 162: *Teratomaia richardsoni* (Dell, 1960), GAB, IN2015-C02 stn 389, dorsal view (upper), carapace (lower).

Superfamily Palicoidea

The palicoids comprise two families, the Palicidae and the Crossotonotidae (both previously subfamilies of the Palicidae).

Palicidae

Most palicids inhabit soft sediments in relatively deep water, although some occur in shallow water on coral reefs. They are most diverse in the tropical Indo-West Pacific (Castro, 2000). The Australian fauna currently numbers nine genera and 12 species (Castro & Davie, 2003). One species was recorded from the GAB and is recorded for the first time from South Australia.

Pseudopalicus macromeles Castro, 2000

Figure 163
MoV sp. 5056
GAB Records: 4 specimens, 33°20′S, 130°16′E to 35°03′S, 134°06′E, 189–283 m.
Distribution: Australian endemic (WA, a new record for SA).
References: Castro (2000); Poore (2004).

Figure 163: *Pseudopalicus macromeles* Castro, 2000, GAB, IN2015-C02 stn 128, dorsal view.

Superfamily Portunoidea

The Portunoidea, mostly swimming crabs, currently comprises eight families but this is under constant revision with recent molecular phylogenetic studies suggesting a more conservative classification of only three families (Evans, 2018).

Geryonidae

Geryonids are mostly large deep-sea crabs found in all oceans at depths exceeding 100 m. Two Australian species of geryonids were recorded, one from the GAB (a new record) and one from the ECA.

Chaceon albus Davie, Ng and Dawson, 2007

Figure 164
MoV sp. 7242
GAB Records: 6 specimens, 33°55′S, 130°40′E to 35°11′S, 134°07′E, 1027–1873 m.
Distribution: Australian endemic (WA, a new record for SA).
Reference: Davie *et al.* (2007).

Figure 164: *Chaceon albus* Davie, Ng and Dawson, 2007, GAB, IN2017-C01 stn 281, dorsal view (upper); IN2015-C02 stn 208, dorsal view (middle), ventral view (lower).

Figure 165: *Chaceon bicolor* Manning and Holthuis, 1989, ECA, IN2017-V03 stn 100, dorsal view.

Superfamily Trichopeltarioidea

Trichopeltariidae

This small family (Tavares & Cleva, 2010) is represented in Australian waters by a single genus and two named species from depths of several hundred metres. One undescribed species was recorded from the GAB and appears similar to that reported by Poore *et al.* (2008) from Western Australia (MoV 5135). Descriptions of Australian species were provided by Ahyong (2008) and Dell (1968).

Chaceon bicolor Manning and Holthuis, 1989

Figure 165
MoV sp. 7150
ECA Records: 1 specimen, 28°05′S, 154°05′E, 1006 m.
Distribution: Western Pacific (New Caledonia and Loyalty Islands), Australia (NSW, Qld).
References: Manning & Holthuis (1989); Poore (2004).

Trichopeltarion sp. MoV 5135

Figure 166
GAB Records: 6 specimens, 33°26′S, 130°44′E to 35°18′S, 134°31′E, 358–412 m.
Distribution: Australian endemic, WA and now SA.
Reference: Poore *et al.* (2008).

Figure 166: *Trichopeltarion* sp. MoV 5135, GAB, SS2013-C02 stn 024, dorsal view of juvenile (upper); IN2015-C02 stn 126, carapace of adult (lower).

Stomatopoda – Mantis Shrimps

Squilloidea

Squillidae

Squillids are typically shallow water species that occupy burrows in soft substrates and actively forage at night, although a few are found on the continental shelf down to depths of 1250 m (Ahyong, 2013). They are a highly species rich family with 49 genera recognised worldwide (mostly from the Indo-West Pacific and Australia). Sixty-two species in 27 genera are known from Australia. Only one species was recorded from the GAB. Ahyong (2001) provided keys to all squilloid genera and species in Australia.

***Anchisquilloides mcneilli* (Stephenson, 1953)**

Figure 167
MoV sp. 3988
GAB Records: 5 specimens, 33°20'S, 130°16'E to 33°55'S, 130°45'E, 189–1027 m.
Distribution: New Zealand, Australia (Qld, NSW, SA, WA); previous maximum depth record 630 m.
References: Ahyong (2001, 2012a).

Figure 167: *Anchisquilloides mcneilli* (Stephenson, 1953), GAB, IN2015-C02 stn 191, dorsal view.

Lophogastrida

Gnathophausiidae

The Gnathophausiidae is a small family of meso- to bathypelagic shrimp that are distributed throughout the world's oceans, feeding mainly on zooplankton. Three genera and ten species are recognised with the Australian fauna represented by three species in two genera. We recorded three species, one known species from the ECA and two from the GAB, including one first record for Australia and one new record for South Australia.

***Fagegnathophausia gracilis* (Willemoes-Suhm, 1875)**

Figure 168
MoV sp. 7155
ECA Records: 1 specimen, 25°06'S, 154°09'E, 3993 m.
Distribution: Tropical Atlantic and Indo-Pacific including Australia (Qld).
References: Haithcock Pequegnat (1965); Lowry & Stoddart (2003) Meland & Aas (2013).

Figure 168: *Fagegnathophausia gracilis* (Willemoes-Suhm, 1875), ECA, IN2017-V03 stn 120, lateral view.

Gnathophausia zoea Willemoes-Suhm, 1873

MoV sp. 7258
GAB Records: 7 specimens, 34°38′S, 130°43′E to 35°09′S, 132°21′E, 1021–1863 m.
Distribution: Cosmopolitan; first record for Australia.
References: Haithcock Pequegnat (1965); Meland & Aas (2013).

Neognathophausia ingens (Dohrn, 1870)

Figure 169
MoV sp. 7257
GAB Records: 6 specimens, 34°38′S, 130°43′E to 35°33′S, 132°42′E, 1006–2241 m.
Distribution: Cosmopolitan, including Australia (NSW, Tas, WA; a new record for SA).
References: Haithcock Pequegnat (1965); Hanamura & Evans (1994); Meland & Aas (2013).

Figure 169: *Neognathophausia ingens* (Dohrn, 1870), GAB: IN2015-C01 stn 036, male, dorsal and lateral view (upper panel); SS2013-C02 stn 025, female, dorsal and lateral view (lower panel).

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