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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.

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-
Deepwater decapod, stomatopod and lophogastrid Crustacea

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 benthescyimids, 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 bythograeads, 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 British 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 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 (Galatheae 1950–1952) (Brunn, 1951, 1957, 1959), the Russian expeditions to the Kurile-Kamchatka 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 (Some 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-
continental 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.

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 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 Museums 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/science/abrso/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 (Anchisquillioides mcneilli (Stephenson, 1953)) is already known from southern Australia and the two lophogastrids (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 (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 (Ahhyong, 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 brachyuran recorded was Cymonomus soela Ahyong & Brown, 2003. Diogenids, scyllarids, sicyoniids and peneaids, 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) (table 4). 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 nematocarcinids (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, Cyomonidae, Homolidae, Etheridae, Gonoplacidae, 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), Nematomaricus undulatipes Bate, 1888, Acanthophyra 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 (Bate, 1881), Nematomaricus undulatipes Bate, 1888, Acanthophyra 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.

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 Nematomaricus 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 atopus, Lemaire, 2003 and Iceopagurus crosnieri, McLaughlin, 1997 and the three species of Ethusinus 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 atopus Lemaire, 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 bronzwynae 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 congener 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 congener 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, Acheleata, Atacidea, Axidea, 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.
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Deepwater decapod, stomatopod and lophogastrid Crustacea

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<tr>
<td>Total stomatopod and lophogastrid species</td>
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</table>
Deepwater decapod, stomatopod and lophogastrid Crustacea

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.

<table>
<thead>
<tr>
<th>All decapod taxa</th>
<th>Families</th>
<th>Genera</th>
<th>species</th>
<th>Aust. records</th>
<th>range ext.</th>
<th>new species</th>
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<td>ECA GAB</td>
<td>ECA GAB</td>
<td>Total</td>
<td>ECA GAB</td>
<td>ECA GAB</td>
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<td>32</td>
<td>9 24 17</td>
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<td>9</td>
<td>17</td>
<td>20</td>
<td>57</td>
<td>10 29 37</td>
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<td>4 10 4 1 1 0</td>
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<td><strong>191</strong></td>
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<td>ECA</td>
<td>CAB</td>
<td>Total</td>
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<td>CAB</td>
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</table>

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

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

<table>
<thead>
<tr>
<th>Depth (m)</th>
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<th></th>
<th>Eastern coast of Australia</th>
<th></th>
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</thead>
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<td></td>
<td>Specimens</td>
<td>Species</td>
<td>Families</td>
<td>Specimens</td>
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<tr>
<td>Mid-Lower Bathyal (1000–3500)</td>
<td>1543</td>
<td>59</td>
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<td>1143</td>
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<tr>
<td>Mid Bathyal (1000–1500)</td>
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<td>–</td>
<td>476</td>
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<tr>
<td>Lower Bathyal (1500–3500)</td>
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<td>–</td>
<td>667</td>
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<tr>
<td>Abyssal (3500 + )</td>
<td>170</td>
<td>15</td>
<td>10</td>
<td>118</td>
</tr>
</tbody>
</table>
Table 5: Family representation (%) recorded from bathyal and abyssal depths in each of the survey areas.

<table>
<thead>
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<th>Depth (m):</th>
<th>Great Australian Bight</th>
<th>Eastern coast of Australia</th>
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<td></td>
<td>200–500  500–1000  1000–3500 3500 +</td>
<td>1000–1500  1500–3500 3500 +</td>
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<td>Aristeidae</td>
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<tr>
<td>Benthescymidae</td>
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<tr>
<td>Penaeidae</td>
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</tr>
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<td></td>
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<tr>
<td>Solenoceridae</td>
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<td>Sergestidae</td>
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<td>Thoridae</td>
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<td>Pandalidae</td>
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<td>Pasiphaeidae</td>
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<td>Styloactylidae</td>
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<td>Polychelidae</td>
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<td>Trichopeltariidae</td>
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</table>
Deepwater decapod, stomatopod and lophogastrid Crustacea

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

<table>
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<th>Latitude °S</th>
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<th>Lower Bathyal 1500–3500 m</th>
<th>Abyssal 3500 +</th>
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</thead>
<tbody>
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<td>Flinders</td>
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<tr>
<td>Bass</td>
<td>39°26’</td>
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<td>14</td>
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<td>East Gippsland</td>
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<td>Bermagui</td>
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<td>5</td>
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<td>Jervis</td>
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<tr>
<td>Newcastle</td>
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<td>13</td>
<td>3</td>
</tr>
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<td>Hunter</td>
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<td>Central East</td>
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<td>Byron</td>
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<td>Moreton</td>
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<td>Fraser</td>
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</table>
**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.

**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. Seventeen 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.

*Arístaeopsis 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).

*Arísteus 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).
Deepwater decapod, stomatopod and lophogastrid Crustacea

*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).

*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).

*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).

*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).
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.
Distribution: Australian endemic: Lord Howe Province and Norfolk Island; new record for ECA and GAB. Previous maximum depth record 1325 m.

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

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).

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

Figure 9: Hepomadus tener Smith, 1884, ECA, IN2017-V03 stn 086, lateral view (upper), cephalothorax (lower) (tip of rostrum broken).
Deepwater decapod, stomatopod and lophogastrid Crustacea

**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.

**Benthesicymus sp. nov.**

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

**Benthesicymus urinatar Burkenroad, 1936**

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

**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).

**Benthesicymus sp. nov.**

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

**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.

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°22´S, 130°45´E, 199 m.
Distribution: Australian endemic (Tas, Eastern Bass Strait; a new record for the GAB).

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).

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
Deepwater decapod, stomatopod and lophogastrid Crustacea

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).  

**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).  

**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).  

**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.  
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.

*Allossergestes 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).  

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

*Deosergestes corniculum* (Krøyer, 1855)

**Figure 21**

MoV sp. 7220  
*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).  

**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:* 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).
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*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).

**Petalidium foliaceum** Bate, 1881

**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).

**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).
**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).

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**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).

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**Caridea – Shrimp**

Caridea currently comprise over 3400 species, across 38 families, making it the second most speciose infraclass 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.

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**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).

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**Eualus sp. nov.**

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

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**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).


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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.

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**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).

**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.

**Parapontophilus cf. difficilis**

Figure 33
MoV 7210
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.
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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).
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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.

*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.

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).
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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.

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).

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 eastern 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).

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).
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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.

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

*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).

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).

**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).
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).

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).

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).
Superfamily Pasiphaeoida

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).

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
Caroline A. Farrelly and Shane T. Ahyong


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

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).
Deepwater decapod, stomatopod and lophogastrid Crustacea

**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.

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*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.  

*Pasiphaea* sp. nov.

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

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**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).
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).

**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).

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).
Deepwater decapod, stomatopod and lophogastrid Crustacea

**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).

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

**Polycheles kermadecensis** (Sund, 1920)

Figure 75
MoV sp. 7192
*ECA Records:* 1 specimen, 32°30′S, 153°35′E, 1021 m.
*Distribution:* New Zealand and Australia (NSW, Qld, Tas).
*References:* Galil (2000); Ahyong (2012b).

**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. 7193
*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).

**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](image1)

**Stereomastis surda** Galil, 2000

Figure 78
MoV sp. 7195  
*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 78](image2)

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

Figure 79
MoV sp. 7196  
*ECA 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:* Galil (2000); Ahyong (2009).

![Figure 79](image3)
Deepwater decapod, stomatopod and lophogastrid Crustacea

**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.](image)

**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).

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

**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).
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. 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).
Deepwater decapod, stomatopod and lophogastrid Crustacea

*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).

**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).
**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).


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**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.

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**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).
Deepwater decapod, stomatopod and lophogastrid Crustacea

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) synonymises *Tethisea mindoro* Poore, 1997 with *Tethisea indica*, Poore, 1994.

**Tethisea indica** Poore, 1994

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. breviproductus** sp. nov.

Figure 91: *Gastroptychus cf. breviproductus* sp. nov. 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).
**Caroline A. Farrelly and Shane T. Ahyong**

**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).


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

**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).

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**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).


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**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).


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**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).

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**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).

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**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).


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**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).


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**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).


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

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

**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.  

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.

**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.
Deepwater decapod, stomatopod and lophogastrid Crustacea

(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).

*Munidopsis arietina* Alcock and Anderson, 1894

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

Figure 103: *Munidopsis centrina* Alcock and Anderson, 1894

MoV sp. 7162

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 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 105: 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.

Figure 106: 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 107: 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).
Deepwater decapod, stomatopod and lophogastrid Crustacea

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

*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).

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

*Munidopsis cf. granosa* Alcock, 1901

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.

*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).
Deepwater decapod, stomatopod and lophogastrid Crustacea

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

*Munidopsis cf. subsquamosa* Henderson, 1885

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

**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.

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).
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).

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).

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).
Deepwater decapod, stomatopod and lophogastrid Crustacea

*Dardanus arrosor* (Herbst, 1796)

Figure 116
MoV sp. 1709
*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).

*Paguristes aciculus* Grant, 1905

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).

**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).
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).

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.

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).
Deepwater decapod, stomatopod and lophogastrid Crustacea

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

Icelopagurus crosnieri McLaughlin, 1997

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.

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).

Michelopagurus chacei McLaughlin, 1997

MoV sp. 7180
ECA Records: 7 specimens, 26°59´S, 153°00´E to 32°30´S,
Caroline A. Farrelly and Shane T. Ahyong

153°51' E, 1006–1105 m.

Distribution: Kai Islands, Indonesia; new record for Australia.

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°15’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).


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).


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).

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).

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

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

MoV sp. 5336

**ECA Records:** 1 specimen, 28°05´S, 154°05´E, 1006 m.

**Distribution:** Indo-West Pacific (east Africa to Indonesia, Philippines, Hawaiian Islands) and Australia (NSW, Qld, WA).

**References:** Lemaitre (1996, 2014).

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**Oncopagurus minutus** (Henderson, 1896)

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

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).
Deepwater decapod, stomatopod and lophogastrid Crustacea

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

*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.

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

*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).


*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).

Parapagurus furici 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).

Parapagurus latimanus Henderson, 1888

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

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).

Parapagurus richeri Lemaitre, 1999

Figure 132: Parapagurus richeri Lemaitre, 1999

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).
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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).

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).
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).

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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).

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).

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).

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

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).
Deepwater decapod, stomatopod and lophogastrid Crustacea

**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).

**Tymolus similis** (Grant, 1905)

Figure 143
MoV sp. 5023

**Cynomonomidae**

Cynomonomids 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.

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

**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).

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

**Cymonomus triplex** Ahyong, 2019

MoV sp. 7237
*GAB Records:* 1 specimen, 35°02’S, 134°04’E, 388 m.
*Distribution:* WA, GAB.

**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.
Deepwater decapod, stomatopod and lophogastrid Crustacea

_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).

_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).

_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).

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).

**Pycnoplax meridionalis** (Rathbun, 1923)

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

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

**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).

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
Deepwater decapod, stomatopod and lophogastrid Crustacea

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).

![Ebalia tuberculosa](image1.png)

**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).

![Merocryptus lambriformis](image2.png)

**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).
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).
Deepwater decapod, stomatopod and lophogastrid Crustacea

*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).](image)

**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).

![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).](image)

**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).  
Caroline A. Farrelly and Shane T. Ahyong

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).

**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).
Deepwater decapod, stomatopod and lophogastrid Crustacea

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

**Prismatopus spatulifer** (Haswell, 1881)

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

**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).

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).

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).
Deepwater decapod, stomatopod and lophogastrid Crustacea

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

![Chaceon bicolor](image1)

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

*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).


Trichopeltarion sp. MoV 5135

![Trichopeltarion sp.](image2)

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).
Squilloidea – Mantis Shrimps

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 squillloid 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.

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).
Deepwater decapod, stomatopod and lophogastrid Crustacea

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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