Memoirs of Museum Victoria 73: 1–11 (2015) Published 2015

ISSN 1447-2546 (Print) 1447-2554 (On-line)
http://museumvictoria.com.au/about/books-and-journals/journals/memoirs-of-museum-victoria/

Oceanic Shoals Commonwealth Marine Reserve survey reveals new records of xanthid crabs (Crustacea: Brachyura: Xanthidae) from northern Australia

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Abstract

Iwasa-Arai, T., McCallum, A.W. and Taylor, J. 2015. Oceanic Shoals Commonwealth Marine Reserve survey reveals new records of xanthid crabs (Crustacea: Brachyura: Xanthidae) from northern Australia. *Memoirs of Museum Victoria* 73: 1–11.

Sampling in 2012 (SOL5650 and SS2012t07) by the RV *Solander* and RV *Southern Surveyor* resulted in a small collection of decapod crustaceans, including brachyuran crabs. The surveys were undertaken on the shelf off northern Australia, including within the Oceanic Shoals Commonwealth Marine Reserve as part of the Australian Government's National Environmental Research Program Marine Biodiversity Hub. Here we report on nine species of Xanthidae collected during these surveys, including specimens from the subfamilies Actaeinae, Euxanthinae, Liomerinae and Zosiminae. Two species are reported for the first time in Australian waters (*Acteodes mutatus* (Ortmann, 1894) and *Atergatopsis granulata* A. Milne Edwards, 1865).

Keywords

Crustacea, Decapoda, Xanthidae, Timor Sea, Australia, taxonomy

The crab family Xanthidae Macleay, 1838, is one of the largest families of Brachyuran crabs in the world, comprising more than 123 genera and 570 species (De Grave *et. al.,* 2009; Ahyong *et al*., 2011). Xanthids are the most diverse of the crab families in Australian waters represented by more than 168 species and 50 genera (Davie, 2002; Poore, 2004). Although Xanthidae share some diagnostic features such as shape of the carapace, dorsal surface, shape of anterolateral margins, cheliped and ambulatory legs, such characters are the result of convergence (Thoma *et al*., 2013). Recent studies show that the Xanthidae is polyphyletic and a major revision is required (Lai *et al*., 2011; Thoma *et al*., 2013).

Recently, the Australian government established a system of offshore marine reserves. These reserves consist of protected areas of the ocean that are managed for the conservation of their marine life, and include examples of different marine ecosystems and habitats (Department of Environment, 2013). It is difficult to describe the biodiversity within many of these reserves because there has been little biological sampling.

Thus, in late 2012 two surveys were undertaken in the Timor Sea by the RV *Solander* (SOL5650) and RV *Southern Surveyor* (SS2012T07). The RV *Solander* surveyed the proposed Oceanic Shoals Commonwealth Marine Reserve, describing the fauna to increase the understanding of species within the reserve and contributing to the knowledge base of Australian tropical shelf habitats. This area includes a variety of seabed geomorphic features from depths of 30 to 180 m, including carbonate banks, terraces and pinnacles, recognised in the North and North-West Marine Region Plans as a Key Ecological Feature with potential biodiversity hotspot (Nichol *et. al*., 2013).

The second survey was undertaken as part of the transit of the RV *Southern Surveyor* between Darwin and Cairns in October 2012 (Przeslawski *et. al*., 2013). Brachyuran crabs were not the primary taxa of interest during these surveys but some species were encountered. Here we report on these collections of xanthid crabs in Australian waters of the Timor Sea.

Material and methods

Specimens were collected by staff from the Australian Institute of Marine Science (AIMS), Geoscience Australia (GA), University of Western Australia (UWA) and the Museum & Art Gallery of the Northern Territory (MGNT), aboard the RV *Solander* and during a transit leg aboard the RV *Southern Surveyor* and immediately fixed and preserved in 95% ethanol.

Morphological terminology generally follows Serène (1984) and Ng *et. al.* (2008). Carapace length (Cl) is measured along the dorsal midline from the rostral apex to the posterior margin of the carapace, and carapace breadth (Cb) is the largest measurement between anterolateral teeth along the dorsal line. Specimens are deposited in Museum Victoria (NMV) and comparative material was examined from the Queensland Museum (QM). Other abbreviations: G1 is the first male gonopod; G2 is the second male gonopod; acq. refers to the sample number allocated to the specimen on board the vessel at the time of collection. Photos of specimens were taken at Museum Victoria using an SLR Nikon D300S digital camera with 60 mm Nikkon lens for large specimens, and a Leica DFC500 camera and microscope M205 high resolution digital camera system with Auto Montage software for small specimens. Some photographs of live specimens were taken during the survey.

Systematics

Family **Xanthidae** MacLeay, 1838

Subfamily **Actaeinae** Alcock, 1898

Actaeodes mutatus Guinot 1976

(Figure 1A)

Actaea areolata Dana, 1852b: 162.—Dana, 1855: pl. 8 fig. 1.—A. Milne Edwards, 1865: 264 (not *Actaeodes areolatus* Dana, 1852a: 77).

Actaea areolata? Miers, 1884: 209.—Rathbun, 1924: 16.

Actaeodes areolatus; Guinot, 1967: 561.—Sakai, 1976: 449.

Actaeodes mutatus Guinot, 1976: 247.—Serène, 1984: 133 (key) 134 (key).—Morgan, 1990: 41.—Davie, 2002: 513.

Material examined. NMV J46921, 1 female (Cb = 18.1 mm, Cl = 11.5 mm), northern Australia, Arafura Sea, Survey SS2012t07 Stn 12 (acq. 272), 10°57.76–57.79'S, 136°48.03–48.03'E, 60.6–62.8 m, benthic sled, 18 Oct 2012.

Colour in preservative. Carapace reddish brown with orange granules on the lobes. Ambulatory legs brown with beige setae. Chelipeds reddish brown with orange granules on the lobes dorsally, and beige ventrally, fingers black. Abdomen brown with beige setae.

Remarks. *Acteodes mutatus* occurs across tropical Australia and the Indo-West Pacific. It is similar to *Acteodes semoni* (Ortmann, 1894) but can be distinguished by the basal antennal segment which fills the orbital hiatus that is normally open, whereas in *A. semoni* the basal antennal segment is excluded from the orbit. Another character used to define *A. mutatus* is the subdivision of 3M into three parts. In our specimen this subdivision is not well defined. However, it is likely this character is variable within the species.

Distribution. Indo-west Pacific (Mergui Archipelago, to southern Japan, and east to French Polynesia) (Davie, 2002).

Paractaea rufopunctata plumosa Guinot, in Sakai, 1976

(Figure 1B)

Paractaea rufopunctata forma *plumosa* Guinot, 1969: 248, fig. 21.

Paractaea rufopunctata plumosa Sakai, 1976a: 450, fig. 240b, pl. 159, fig. 1. .—Muraoka, 1998: 42.

Paractaea rufopunctata f. *plumosa* Serène, 1984: 121(key), 122(key), pl. 16C.

Material examined. NMV J46922, 1 male (Cb=29.1 mm, Cl=19.7 mm), northern Australia, Arafura Sea, Survey SS2012t07 Stn 08 (acq. 204), 11°13.32–13.38'S, 134°45.12–45.12'E, 27.7–27.9 m, benthic sled, 17 Oct 2012; NMV J54546, 1 female (Cb=27.2 mm, Cl=18.1 mm), off Ningaloo North, SS10/2005 153, 21°59.17–59.79'S, 113°49.2–49.14'E, 165–166 m, beam trawl, 11 Dec 2005; NMV J61124, 1 ovigerous female (Cb=11.9 mm, Cl=8.5 mm), 1 female (Cb=13.1 mm, Cl=9.1 mm) north-western Australia, SS05/2007 188, 12°26.7–26.96'S, 123°36.05–36.59'E, 95–95 m, beam trawl, 6 July 2007; NMV J17772, 2 females (Cb=15.3–15.5 mm, Cl=10.2–10.4 mm), Australia, Queensland, Tryon island (Capricorn Group) 23°14'S, 151°46'E, 1 m, Sep 1970.

Colour in preservative. Carapace dark brown with orange lobes; medial lobe of subdivided 2M, top of 3M, 1P, and inside parts of 5L highlighted with dark orange granules. Ambulatory legs pale brown with patch of orange granules on the dorso-medial region of merus and propodus, beige ventrally. Chelipeds dark brown with orange and dark orange patches; fingers black. Abdomen beige with orange patches between segments.

Remarks. Guinot (1969) described a number of "formes" of this species but only a few are currently considered valid subspecies. The Arafura sea specimen most closely resembles the subspecies *P. rufopunctata plumosa* as the cardiac region is not subdivided into 2 parts, and the black colouration of the fixed finger of the male chelipeds extends onto the palm (Guinot, 1976; Serene 1984). Specimens from Western Australia reported as *Paractea rufopunctata* (see Poore *et. al.* 2008) also fit the description of *P. rufopunctata plumosa*.

Distribution. Indo-Pacific Oceans including northern Australia (Guinot, 1976; Sakai, 1976; Serène, 1984). Depth range: shallow waters–130 m.

Subfamily **Euxanthinae** Alcock, 1898

Euxanthus sp.

(Figures 1C, 2A–F)

Material examined. NMV J46923, 1 juvenile male (Cb=7.9 mm, Cl=5.6 mm), northern Australia, Timor Sea, Oceanic Shoals Commonwealth Marine Reserve, Survey SOL5650 station unknown (acq. 20052), 12 Sep–6 Oct 2012.

Description. Carapace (Figs. 2A; 2B) about 1.4 times as broad as long, regions well defined, convex, strongly areolated, smooth; 2M entirely divided longitudinally; 3M and 3L distinct, entire; 1L indistinct; 4M fused with 3M; 4L merging with third anterolateral tooth; 2L partially divided transversely with shallow groove on medial margin; 2P distinct; 1R

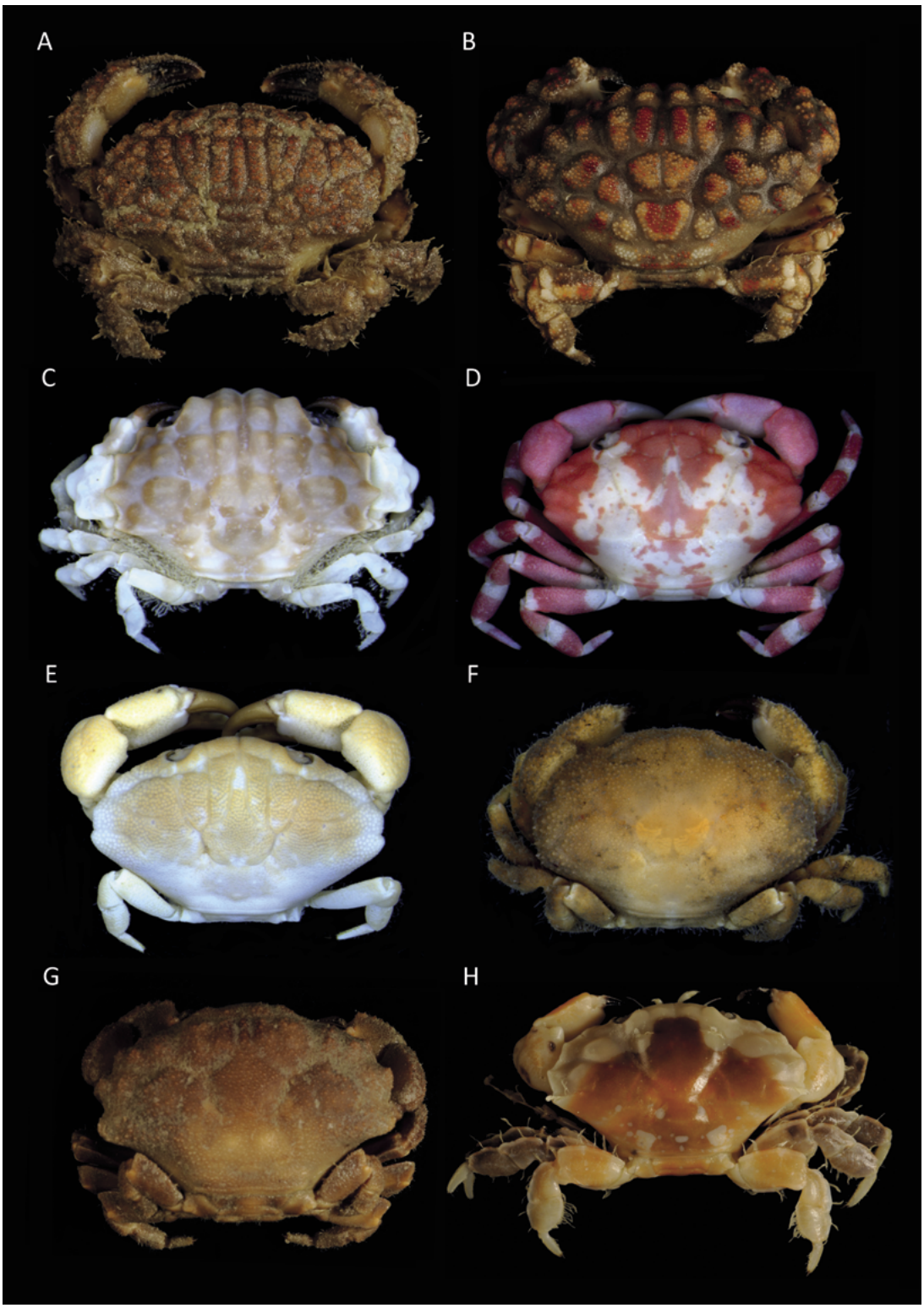

Figure 1. A, *Actaeodes mutatus* Guinot 1976, female, 18.1 X 11.5 mm (NMV J46921); B, *Paractaea rufopunctata plumosa* Guinot, in Sakai, 1976, male, 29.1 X 19.7 mm (NMV J46922); C, *Euxanthus* sp., male, 8.12 X 5.83 mm (NMV J46923); D, *Liomera edwardsi* Kossmann, 1877, male, 9.37 X 5.83 mm (NMV J46927); E, *Liomera margaritata*, male, 16.3 X 9.8 mm (NMV J46928); F, *Atergatopsis granulata* A. Milne Edwards, 1865, female, 19.6 X 12.9 mm (NMV J46929); G, *Atergatopsis alcocki*, male, 32.4 X 22.4 mm (NMV J46930); H, *Lophozozymus dodone* (Herbst, 1801), male, 16.7 X 10.4mm (NMV J46931). Photos: T. Iwasa-Arai.

separated from 2R by indistinct transverse granular ridge, 2R, 3R indistinct. Pterygostomial region setose, tuberculate. Front (Fig. 2C) about 0.3 times carapace width, bilobed, distinctly produced beyond internal orbital angle; lobes separated by V-shaped cleft, which continues on frontal region as shallow groove. Supraorbital margin indistinctly granular, with no clear external orbital tooth. Orbits relatively small, width about 0.2 times carapace width. Eyes with short stalks, smooth; corneas well developed. Anterolateral margin with 4 broadly triangular teeth: first rounded, apices of third tooth at the point of maximum carapace width. Posterolateral margin concave, convergent posteriorly. Median part of posterior carapace margin almost straight.

Antennules folding transversely. Basal antennal segment large, smooth, subrectangular, occupying entire space between antennular fossa, internal orbital angle, filling orbital hiatus; flagellum arising from distal margin, not reaching outer edge of orbit. Posterior margin of epistome with median projection.

Outer surface of third maxillipeds smooth (Fig. 2D). Merus subquadrate, median length about half that of ischium, with 2 shallow depressions on either side of low, submedian, smooth ridge. Margins smooth, anterior, internal and external margins slightly concave. Ischium subrectangular, inner margin with short, stiff setae; with shallow, longitudinal submedian groove. Exopod smooth, tapering toward distal end, falling short of anterior edge of merus; flagellum long.

Surface of thoracic sternum smooth, anterior region elongate. Sternites 1–2 completely fused to form triangular plate. Sternites 3–4 completely fused, with suture visible at sternite edges and represented by a transverse furrow; sternite 4 with oblique depression on either side of median. Intersternal sutures depressed, giving sternites 5–7 a raised appearance. Sterno-abdominal cavity deep; anterior limit reaching to imaginary line joining posterior edges of cheliped coxae; tubercle for abdominal locking mechanism on sternite 5 slightly nearer to suture with sternite 4.

Chelipeds similar, subequal. Fingers (Fig. 2F) shorter than palm, cutting edges with 4 teeth, brown, tips pointed. Dactylus slightly curved, with 3 granulate ridges and deep submarginal groove along length, stiff short setae on upper margin. Fixed finger slightly deflexed with 3 smooth ridges and broad submarginal groove continuing from palm. Palm outer surface with 4 large nodules, with 2 irregular rows of granules near convex proximal-lower margin; inner surface relatively smooth. Carpus short, dorsal and ventral surface smooth, outer surface with 2 prominent round expansions, upper margin with 2 small nodules. Inner surface of fingers, palm and carpus coapted against pterygostomial/hepatic region of carapace. Merus rugose, ventral surface tuberculose, slightly longer than carpus, with rectangular, ventro-distal tooth apposed against carpus.

Ambulatory legs (Fig. 2E) smooth, edges with setae; second leg longest, coxa-to-dactylus length about 0.8 times carapace width. Merus subrectangular and flattened in cross-section. Dorsal surface of carpus with one large nodule and serrated anterior edge. Propodus subquadrate, with two smaller nodules on the dorsal surface, short setae; terminates distally in curved chitinous claw.

External surface of male abdomen, telson smooth.

Abdominal somites 1–2 subtrapezoidal, with two shallow longitudinal grooves on either side of central raised region. Somites 3–5 immovably fused, with a transverse depression between somites 3 and 4; lateral margins slightly concave. Somite 6 quadrangular, central region slightly raised, lateral margins slightly concave. Telson subtriangular with rounded tip, lateral margins relatively straight, median length about 0.7 times basal width, about 0.7 times shorter than penultimate somite.

G1 not observable, G2 very reduced in size, without setae or spines.

Colour in preservative. Carapace pale rose with pale orange patches in lateral part of 5L, 1R, bottom of 4M, medial part of 2M and 2L, and the anterolateral edges of anterolateral teeth; ambulatory legs, chelipeds and abdomen pale rose.

Remarks. As the material described herein is limited to a single small juvenile male, we hesitate to describe it as a new species at this stage. *Euxanthus* sp. is similar to *Euxanthus ruali* Guinot, 1971 and *Euxanthus herdmani* Laurie, 1906 which both have four teeth on the anterolateral margin of the carapace and a smooth dorsal surface. The material is most similar to *E. herdmani* described from the Philippines (see figure 1D, Mendoza and Ng, 2010), but can be distinguished by: the carapace shape which is narrower in *E. herdmani* (Cb/Cl holotype= 1.33) than *Euxanthus* sp. (Cb/Cl= 1.41); anterolateral teeth that are acute and noticeably larger in *Euxanthus* sp. than *E. herdmani*; the frontal part of the carapace, in which the frontal and orbital lobes are of similar size in *E. herdmani*, while in *Euxanthus* sp. the frontal lobes are distinctly larger than the orbital lobes. *Euxanthus* sp. can be distinguished from *E. ruali* from New Caledonia and Japan, by the anterolateral teeth which are unequal in size (last two larger) in *E. ruali*, and subequal in *Euxanthus* sp.

Subfamily **Liomerinae** Sakai, 1976

Liomera edwardsi Kossmann, 1877

(Figure 1D)

Liomera edwardsi Kossmann, 1877: 28.

Carpilodes edwardsi.—Miers, 1886: 133(part).—Odhner, 1925: 13, pl. 1, fig. 5.—Holthuis, 1953: 13.—Serène & Luom, 1960: 176 (key).

Carpilodes laevis.—Milne-Edwards, Nobili, 1906b: 215 (part).—Michel, 1964: 23 (not A. Milne-Edwards, 1873).

Carpilodes sayademalhensis Rathbun, 1911: 211, pl. 17, fig. 5.—Ward, 1942: 83.

Liomera edwardsi.— Guinot, 1967: 266.—Serène, 1968: 72.—Sakai, 1976: 393, fig. 209a, pl. 139, fig. 5.—Muraoka, 1998: 38. —Davie, 2002: 543.

Liomera (Liomera) edwardsi.—Serène, 1984: 49 (key), 54 (key), 58, pl. 5C.

Material examined. NMV J46927, 1 male, Cb=9.4 mm, Cl=5.8 mm (acq. 10282) Survey SOL5650, Stn 014 BS002, 12°4.133'–4.133'S, 127°26.164'–26.164'E, 36–34 m, Benthic sled, 17/09/2012; NMV J46926, 1 female Cb=14.2 mm, Cl=9.2 mm (acq. 10100) Survey SOL5650, Stn 019 GR026, 12°4.842, 127°25.815'E, 49 m, Smith Mac, 18/09/2012; NMV J46924, 1 female, Cb=10.8 mm, Cl=7.1 mm (acq. 10327) Survey SOL5650, Stn 016 BS004, 12°4.491'S, 127°25.742'E,

45 m, Benthic sled, 17/09/2012; NMV J46925, 1 male, Cb=15.6 mm, Cl=9.8 mm (acq. 20251) Survey SOL5650, Stn 074 BS022, 12°4.49'–4.52'S, 127°26.62–26.62'E, 59–66 m, Benthic sled, 03/10/2012.

Colour in preservative. Carapace crimson with white patches mostly on 3R, sometimes extending to 5L and 2L Ambulatory legs crimson with bands of white at the distal and proximal ends; chelipeds crimson with black fingers. Abdomen mostly white with crimson patches. All specimens presented crimson and white colouration, but differ in proportion of white.

Remarks. *Liomera edwardsi* was the only species with more than one specimen collected during the Timor Sea Oceanic Shoals survey. *Liomera edwardsi* is very similar to *L. tristis* (Dana, 1852), *L. laevis* (A. Milne-Edwards, 1873), *L. sagamiensis* (Sakai, 1939) and *L. nigropunctata* (Serène & Van Luom, 1960), but can be distinguished by a projecting areole well separated from 2M and 1F (Serène, 1984) on the dorsal surface. This species was previously recorded in Australia by Odhner (1925) from one specimen collected from Holothuria Bank, Northwest Australia.

Distribution. Comoro Islands (Mayotte), Madagascar (Tulear), Djibouti and Red Sea, South China Sea, Japan (Kii Peninsula), Solomon Islands (Peros Bankos), Northwest Australia, Australia (Holothuria Bank) (Odhner, 1925; Sakai, 1976; Serène, 1984). Depth range 15–59 m.

Liomera margaritata (A. Milne-Edwards, 1873)

(Figure 1E)

Carpilodes margaritatus Milne-Edwards A., 1873: 182, pl. 5, fig. 2.—Henderson, 1893: 353. —Whitelegge, 1897: 131.—Alcock, 1898: 85.—Odhner, 1925: 24, pl. 2, fig. 4.—Gravely, 1927: 146, pl. 21, fig. 26. —de Man, 1929a: 1. —de Man, 1929b: 2.—Chopra & Das, 1937: 395, fig. 5.—Sakai, 1939: 476, fig. 36.—Lin, 1949: 22.—Serène & Luom, 1960: 174, 178(key), 185, fig. 2F, pl. 2D.—Buitendijk, 1960: 261, fig. 3b.—McNeill, 1968: 74.

Liomera margaritata.—Sakai, 1965b: 144, pl. 72, fig. 3.—Guinot, 1967: 266. —Serène, 1968: 72. —Sakai, 1976: 396, fig. 211. —Dai & Yang, 1991: 271, fig. 145 (2), pl. 34 (2).—Yu et al., 1996. —Jeng, 1997.—Davie, 2002: 543.

Liomera (Liomera) margaritata.—Serène, 1984: 63, fig. 23, pl. 7A.

Chlorodius exiguus Targioni Tozzetti, 1877: 48, pl. 4, figs 1-5, 9.—Odhner, 1925: pl. 5, figs 8, 8a.

Carpilodes striatus de Man, 1887: 232, pl. 8, fig. 1.

Carpilodes ruber.—Ortmann, 1893: 468. (not A. Milne Edwards, 1865)

Carpilodes diodoreus Nobili, 1906a: 403.—Nobili, 1906b: 216, pl. 10, fig. 9.—Klunzinger, 1913: 138.

Not *Carpilodes rugipes* (Heller, 1861).—Rathbun, 1910: 351.

Not *Carpilodes margaritatus*.—Lanchester, 1900b: 731.= aff. *Atergatopsis amoyensis* de Man, 1879.

Material examined. NMV J46928, 1 male, Cb=16.3 mm, Cl=9.8 mm (acq. 292) Survey SS2012t07, Stn 11, 10°57.66'–57.73'S, 136°47.68'–47.94'E, 108.8–92.8 m, Benthic sled, 18/10/2012. NMV J10923, 1 female, Cb=9.1 mm, Cl=5.7 mm, Australia, Queensland, Dingo Beach. Coll. 08/08/1971.

Comparative material examined. QM W36046, 1 male, Cb=14.6 mm, Cl=9.4 mm, Great Barrier Reef Seabed Diversity Survey. Site id: 2731: 22°2.7'S, 150°36.3'N, 53.4 m, RV *Lady Basten*, 23/09/2004; QM W37911, 1 male, Cb=21.6 mm, Cl=13.4 mm, Site id: 2126: 22°59.7'S, 149°58.5'N, 52.9 m, RV *Lady Basten*, 29/09/2004.

Colour in life. Carapace orange with white anterolateral margins, 1P, 2P and 3R white. Ambulatory legs orange. Chelipeds orange dorsally and white ventrally with dark brown fingers. Abdomen white (Fig. 5).

Colour in preservative. Carapace pale orange with white anterolateral margins, 1P, 2P and 3R white. Ambulatory legs light orange. Chelipeds orange dorsally and white ventrally with dark brown fingers. Abdomen white.

Remarks. Within the genus *Liomera*, this species is characterised by a completely divided 2M region, which makes it similar to, *Liomera monticulosa* (A. Milne-Edwards, 1873), *Liomera rugipes* (Heller, 1861), and *Liomera rubra* (A. Milne-Edwards, 1865). It differs from the latter three species, which have 1M separated from the interior part of 2M. Serene (1984) describes *L. margaritata* with well-defined regions 4L, 5L, and 6L, but in our specimens these regions are fused and not well defined. Also, colour in live specimens are different, described as uniformly pale violet by Serene (1984), while our specimens are orange colour with white anterolateral margins. As the G1 morphology agrees well with illustrations of *L. margaritata* provided by Serene (1984), we conclude that the variation described above is likely to be intra-specific.

Distribution. Queensland (Great Barrier Reef, NE coast); Indo-west central Pacific Oceans (Madagascar and Red Sea to Japan, New Guinea, Samoa, New Caledonia). Depth range subtidal–107 m.

Subfamily **Zosiminae** Alcock, 1898

Atergatopsis alcocki (Laurie, 1906)

(Figure 1G)

Actaea alcocki Laurie, 1906: 403.—Odhner, 1925: 43, pl. 3, fig. 4.—Balss, 1938b: 54, pl. 2, figs 3-4.

Xantho bowensis.—Rathbun, 1923:103, pl. 20, figs 1-3.

Atergatopsis alcocki.—Guinot, 1969: 232, fig. 15a-c.—Sakai, 1976: 413, fig. 218.—Serène, 1984: 141 (key), 142 (key).

Aff. *Atergatopsis alcocki*.—Serène, 1984: 143 (list), pl. 20 E.

Material examined. NMV J46930, 1 male, Cb=32.4 mm, Cl=22.4 mm (acq. 118) Survey SS2012t07, Stn 02, 11°13.78'–13.78'S, 134°44.47'–44.44'E, 23.3 m, Benthic sled, 17/10/2012.

Colour in preservative. Carapace brown, darker in the first half, until last anterolateral tooth; ambulatory legs brown/orange; chelipeds brown with black chelae; abdomen beige.

Remarks. The specimen from the Timor Sea agrees well with the description in Laurie (1906). The holotype is described by Laurie as yellowish with a circular brown patch in the gastric region in live specimens. The single male specimen from the Timor Sea lacked the brown patch as does the specimen described by Rathbun (1923, plate 20) collected in Queensland, Australia.

Distribution. Sri Lanka, Singapore, Japan (Kii Peninsula), Australia (Queensland and Northern Australia) (Laurie, 1906; Rathbun, 1923; Sakai, 1976). Depth range 15–35 m.

Atergatopsis granulata A. Milne-Edwards, 1865

(Figure 1F)

Atergatopsis granulatus A. Milne-Edwards, 1865: 255, pl 13, figs 2, 2b.—Kossmann, 1877: 22.—Cano, 1889b: 190.—Nobili, 1906b:235.—Klunzinger, 1913: 156(60).—Balss, 1935: 137; 1938: 55, pl. 3, fig.3.—Monod, 1938:122, fig. 14.—Buitendijk, 1960: 283.—Guinot, 1964: 14, fig. 2a, b; 1967c: 262; 1971: 1074.— Serène, 1968: 74.—Ribes, 1978: 126.— Serène, 1984: 143, fig 83, pl. 20b.

Not *Atergatopsis granulatus*.—Miers 1884b: 529 = not *Atergatopsis,* according to Buitendijk (1960).

Not *Atergatopsis granulatus*.—Miers 1886: 123 = *Atergatopsis tweediei* Balss, 1938b, according to Buitendijk (1960).

Not *Atergatopsis granulatus*.—Balss, 1924 a: 6, fig. 1 = *Banareia parvula* (Krauss, 1843).

Material examined. NMV J46929, 1 female, Cb=19.6 mm, Cl=12.9 mm (acq. 10327) Survey SOL5650, Stn 016 BS004, 12°4.8'–12°4.8'S, 127°25.74–127°25.77, 45–46 m, Benthic sled, 17/09/2012.

Colour in preservative. Carapace pale orange with a pair of dark orange spots anterior to 5L. Ambulatory legs same colour as carapace. Chelipeds pale orange with black fingers. Abdomen beige.

Remarks. While this is the first record of this species in Australian waters, the species has previously been recorded from across the Indian Ocean and as far as the South China Sea. It is very similar to *Atergatopsis tweediei* Balss, 1938 described from the Seychelles, South-East Asia, and Papua New Guinea. Both species have chelipeds with chisel-shaped fingers, and a single large subproximal tooth on the pollex. According to Serène (1984) the two species can be distinguished by the amount of granulation on the carapace. *Atergatopsis tweediei* is entirely smooth on most of its median carapace, with granules only on the anterolateral margins. While the carapace of *A. granulata* is entirely covered in granules, they are smaller and less numerous in the median and posterior parts. In our specimen, region 3M of the carapace is almost smooth but all other regions are granular.

Distribution. Madagascar, Zanzibar, Pakistan (Karachi), Aldabra, South China Sea and New Guinea (Sèrene, 1984). Depth range: 26–46 m.

Lophozozymus dodone (Herbst, 1801)

(Figure 1H)

Cancer dodone Herbst, 1801: 37, pl. 52, fig. 5.

Xantho radiatus Milne-Edwards H., 1834: 398.

Xantho lamelligera White, 1848: 225.

Atergatis lateralis White, 1848: 225.—Adams & White, 1848: 39, pl. 8, fig. 1.

Xantho nitidus Dana, 1852a: 74.—Dana, 1852b: 166.—Dana, 1855: pl. 8, fig. 4a-b.

Atergatis elegans Heller, 1862: 519.—Heller, 1865: 7, pl. 1, fig. 3.

Lophozozymus radiatus Milne-Edwards A., 1873: 206 (part).

Lophozozymus dodone Hilgendorf, 1879: 789 (nomen nudum).—Miers, 1884: 517, 527.—Henderson, 1893: 361.—Ortmann, 1893: 457.—Ortmann, 1894b: 50.—Alcock, 1898: 108.—Calman, 1900: 6.—Borradaile, 1902: 361.—Laurie, 1906: 399.—Rathbun, 1907: 39.—Rathbun, 1911: 214.—Bouvier, 1915: 289.—Odhner, 1925: 82.—Balss, 1938a: 39.—Ward, 1942: 85.—Tweedie, 1950: 115.—Barnard, 1950: 218, fig. 39f, g.—Buitendijk, 1960: 294, fig. 7b.—Edmondson, 1962: 230, fig. 3f.—Michel, 1964: 27.—Sakai, 1965a: 45, pl. 6, fig. 6.—Sankarankutty, 1966: 50.—Guinot, 1967: 266.—Garth, 1973: 319.—Sakai, 1976: 407, pl. 146, fig. 2.—Serène, 1977: 50.—Guinot, 1979: 64, pl. 8, fig. 1-1a.—Kensley, 1981: 44.—Serène, 1984: 168 (key), 169 (key), 170, pl. 24E.—Sakai K., 1999: 34, pl. 18B. —Davie, 2002: 543.

Lophozozymus Dodone.—de Man, 1887: 270, pl. 10, fig. 2.

Not *Lophozozymus dodone* —Rathbun, 1906: 846, pl. 8, figs 2, 2a.= *Lophozozymus rathbunae* Ward, 1942.

Not *Lophozozymus dodone* —Forest & Guinot, 1961: 54, fig. 39.= *Lophozozymus glaber* Ortmann, 1893.

Material examined. NMV J46931, 1 male, Cb=16.7 mm, Cl=10.4 mm (acq. 20921) Survey SOL5650, Stn 063 BS020, 11°23.83'–23.81'S, 126°54.49'–54.46'E, 88–85 m, Benthic sled, 01/10/2012.

Colour in preservative. Front and anterolateral margins of carapace beige, with remnants brownish orange Ambulatory legs pale orange, patches of 3R and 1P and 6L beige. Chelipeds pale orange in dorsal view and beige in ventral view with black fingers. Abdomen beige with segments 1 and 2 brownish orange.

Remarks: Widely distributed in tropical Australia, *L. dodone* is distinctive in the genus by its rugosities and punctuations on the carpus and external face of the cheliped palm of the male (Serène, 1984). *Lophozozymus dodone* was compared with images available of specimens collected from the central Pacific (Legall and Poupin, accessed 2013) and it seems that *L. dodone* can have different colour patterns also in life, varying from the carapace being dark brown with the front and anterolateral margins beige to the carapace being vivid red with anterolateral margins white, differing also in the amount of white/beige on the front and anterolateral margins, sometimes with white patches that can extend until the second half of the carapace.

Lophozozymus dodone was previously only known from shallow waters (7–8 m) but is recorded here from a depth of 88 m.

Distribution. Hawaii, Tahiti, Fiji, Cocos-Keeling, South Africa, Japan (Amami Group and Ishigaki Island), Andaman Sea, and Australia (Northern Australia) (Sakai, 1976) Depth range 7–88 m.

Acknowledgments

We are grateful to Chris Rowley and Melanie Mackenzie (Museum Victoria) for collection management support, the staff from the Australian Institute of Marine Science (AIMS), Geoscience Australia (GA), University of Western Australia (UWA) and the Museum and Art Gallery of the Northern Territory (MGNT), who collected specimens during the surveys.

Surveys were undertaken by the National Environmental Research Program (NERP) program, an Australian Government initiative. The NERP Marine Biodiversity Hub is a collaborative partnership between the Charles Darwin University, University of Tasmania, University of Western Australia, CSIRO, Geoscience Australia, Australian Institute of Marine Science and Museum Victoria.

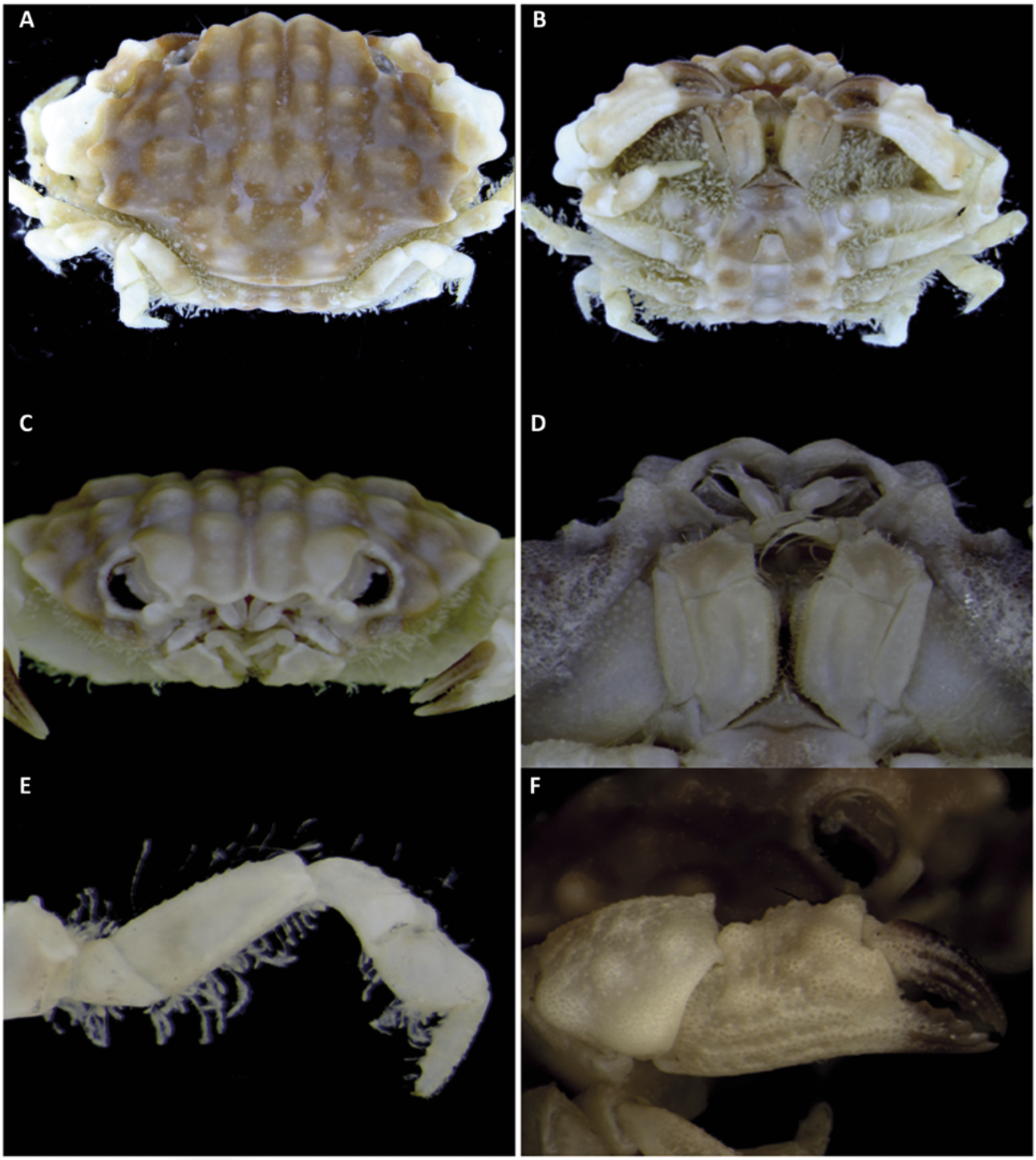

Figure 2. *Euxanthus* sp., male (NMV J46923) (7.9 X 5.6mm): A, carapace, dorsal view; B, carapace, ventral view; C, frontal view; D, third maxilliped ; E, fourth right leg; F, right cheliped.

We also thank Mark Elgar (University of Melbourne) for his support, and Peter Davie (Queensland Museum) for taxonomic advice and the loan of comparative material.

Finally, we thank the Program *Science Without Borders*, Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq), Brazil.

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