Description of a new genus and a new species of the family Camptandriidae Stimpson, 1858 (Crustacea: Decapoda: Brachyura) from Lower Kinabatangan-Segama Wetlands, Sabah, Malaysia

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Abstract. A new genus and new species of the family Camptandriidae Stimpson, 1858, are described from Lower Kinabatangan-Segama Wetlands, Sabah, Malaysia. *Exagorium fidelisi*, new genus & species, can be distinguished from known camptandriid genera and species by the characters of the carapace, male abdomen and male first gonopod.

Key words. Taxonomy, new genus and species, Camptandriidae, Sabah, Malaysia

INTRODUCTION

The brachyuran family Camptandriidae Stimpson, 1858, currently includes 22 genera and 40 species (Ng et al., 2008, 2009, 2010; Ng & Clark, 2012; Ahyong, 2014). Members of this family share a distinct condition in the male first gonopod, in which the distal part is bent or twisted over the proximal base by about 180°, producing a strongly recurved structure.

A scientific expedition was organised by the Sabah Forestry Department in the Lower Kinabatangan-Segama Wetlands (LKSW), Sabah in 16–26 June 2014, and based at Tundon Bohangin. LKSW is Malaysia’s largest Ramsar site, encompassing approximately 80,000 hectares of mangrove and peat swamp forests in eastern Sabah (Sabah Biodiversity Centre, 2010). During the expedition, some interesting crustaceans were sampled, mainly from the mangrove forests and adjacent brackish waters. The present study describes an interesting new crab genus and species belonging in Camptandriidae.

Material examined are deposited in the Institut Penyelidikan Marin Borneo (IPMB), University of Malaysia Sabah, Kota Kinabalu; the Ryukyu University Museum, Fujukan (RUMF), University of the Ryukyus, Okinawa, Japan; and the Zoological Laboratory, Kyushu University, Fukuoka, Japan (ZLKU) (specimens that have been transferred to the Kitakyushu Museum of Natural History and Human History, Fukuoka, Japan). Measurements provided are of the median carapace length (CL) × maximum carapace width (CW) in millimetres. Abbreviations used are as follows: G1, male first gonopod; juv., juvenile; ovig., ovigerous; P2–5, pereopods 2–5.

TAXONOMY

Superfamily Ocypodoidea Rafinesque, 1815

Family Camptandriidae Stimpson, 1858

*Exagorium*, new genus

Type species. *Exagorium fidelisi*, new species, by present destination. Gender neuter.

Diagnosis. Carapace hexagonal, CW 1.24–1.40 times CL. Regions poorly defined, epigastric region with one pair of weak convexities, H-shaped gastric groove shallow. Frontal, supraorbital, anterolateral margins connected by rounded, granular ridge; similar ridges present on posterolateral margins (short, oblique), metabranchial regions (short, horizontal), and on intestinal region (long, transverse) just anterior to posterior margin with either end reaching posterior margin of carapace. Orbit laterally bordered by low, thin ridge on upper half, lined with long setae, lower half open. Infraorbital crista sinuous, lined with granules, convex dorsally at middle, mesial end forming high triangular inner orbital tooth. Suborbital ridge gently arcuate, lined with small granules, granules becoming longer laterally, ridge lateral to orbit directed downwards, without granules. Posterior margin of pterygostomial region rimmed, lined with granules, arcuate anteriorly, forming distinct Milne-Edwards aperture. Antennule folded obliquely. Antenna entering into orbit, with long flagellum. Eyes weakly compressed dorsoventrally. Third maxillipeds filling entire buccal cavern; ischium wider than long, short, about third length of merus; carpus, propodus, dactylus articulating end to end; exopod narrow, reaching distal third of merus. Thoracic sternum...
relatively wide. In male, sterno-abdominal cavity deep, long, reaching posterior border of buccal cavern. In female, vulvae horizontally elongated, oblong, entire, placed close to each other at mesial to suture 5/6. Male abdomen with all somites free, somite 1 short, very wide, laterally reaching and partially covering P5 coxae. Female abdomen with all sutures distinct, somites 2–6 functionally fused; telson triangular, proximal portion embraced by distal margin of abdominal somite 6. G1 q-shaped, bent 180°. Distally with two terminal processes, tips pointed. G2 shorter than terminal processes of G1.

Etymology. The genus name “Exagorium” is derived from an arbitrary combination of hexagonal shape of the carapace of the type species (L. exagonum) and a suffix for the type genus of the family Camptandriidae “-rium”.

Remarks. Exagorium, new genus, is distinct from other known camptandriid genera by the combination of the following characters: hexagonal carapace outline (Fig. 1), male abdomen that covers the G1 completely when closed (Fig. 2b), male abdominal somite 1 that reaches and partially covers P5 coxae (Fig. 3a), and the G1 with two terminal processes.

Material examined. All type specimens were collected from Sungai [= River] Kulamba, Tundon Bohangin, Sabah, Malaysia. Holotype: Male (7.6 × 10.6 mm) (IPMB-Cr. 08.1), 5°35.188' N 118°37.391' E, coll. T. Naruse & F. Koret, 18 June 2014. Paratypes: 1 ovig. female (5.7 × 7.9 mm) (IPMB-Cr. 08.2), same data as holotype; 2 males (4.9 × 6.5, 5.4 × 7.2 mm) (RUMF-ZC-3680) 5°35.010' N 118°37.545' E, coll. T. Naruse & F. Koret, 20 June 2014; 1 male (5.9 × 7.7 mm), 1 female (4.9 × 6.6 mm) (RUMF-ZC-3682), same data as RUMF-ZC-3680; 1 male (5.9 × 7.7 mm), 1 female (4.9 × 6.6 mm) (RUMF-ZC-3681), 5°35.188’ N 118°37.391’ E, coll. T. Naruse & F. Koret, 19 June 2014; 1 juv. (2.8 × 3.7 mm) (IPMB-Cr. 08.3), 5°35.530’ N 118°36.894’ E, coll. T. Naruse & F. Koret, 19 June 2014; 1 juv. (2.5 × 3.1 mm) (IPMB-Cr. 08.4), 5°36.021’ N 118°35.588’ E, coll. T. Naruse & F. Koret, 20 June 2014.
Comparative material. 

_Cleistostoma dilatatum_ (De Haan, 1833): 1 male (13.4 × 19.1 mm) (ZLKU 11072), river mouth of Nakdong-gang, Busan, Korea, coll. Y. Ishii, 13 September 1996; 2 females (11.8 × 16.4, 12.1 × 17.4 mm) (ZLKU 429–431), near Hakomatsu Elementary School, Umi River, Kyushu, Japan, coll. S. Miyake et al., 15 July 1954.

_Deiratonotus cristatum_ (De Man, 1895): 2 ovig. females (4.3 × 5.9, 4.7 × 6.8 mm) (RUMF-ZC-298), Sumiyo River, Amami-ohshima Island, Ryukyu Islands, Japan, coll. S. Shokita et al., 24–27 December 2001; 1 male (4.2 × 5.7 mm) (RUMF-ZC-3688), Tekebu, Kasari, Amami-ohshima Island, Ryukyu Islands, Japan, coll. T. Maenosono, 25 April 2012.

_Deiratonotus japonicum_ (Sakai, 1934): 1 ovig. female (6.4 × 8.2 mm) (RUMF-ZC-295), Oura River, Okinawa Island, coll. T. Naruse & C.-C. Han, 23 May 2002; 3 females (4.4 × 5.6 – 7.2 × 9.1 mm) (RUMF-ZC-296), Hentona River, Okinawa Island, Ryukyu Islands, Japan, coll. T. Naruse et al., 10 January 2004; 3 males (2.6 × 3.4 – 4.3 × 5.0 mm), 3 females (2.9 × 3.6 – 3.5 × 4.5 mm), 1 ovig. female (5.4 × 7.2 mm) (RUMF-ZC-297), Tima River, Okinawa Island, Ryukyu Islands, Japan, coll. T. Naruse et al., 25 December 2004; 5 males (4.0 × 4.7 – 5.2 × 6.3 mm), 8 females (3.5 × 1.45 – 6.4 × 8.1 mm), 1 ovig. female (7.4 × 9.3 mm) (RUMF-ZC-3687), Konase, Setouchi, Amami-ohshima Island, Ryukyu Islands, Japan, coll. T. Maenosono, 26 April 2012. 

_Ilyogynnis microcheirum_ (Tweedie, 1937): 11 males (5.0 × 5.9 – 7.3 × 8.3 mm), 3 females (4.7 × 5.5 – 5.6 × 7.0 mm), 6 ovig. females (4.6 × 5.3 – 5.6 × 6.8 mm) (RUMF-ZC-357) Sungei Buloh East, Singapore, coll. T. Naruse et al., 13 September 2001. 

_Moguai aloutos_ Tan & Ng, 1999: 1 ovig. female (6.8 × 5.9 mm) (IPMB-Cr. 08.6), Sepilok Laut Reception Center, Sabah, Malaysia, coll. T. Naruse, F. Koret & J. Aribin, 4 March 2014; 1 male (4.8 × 4.3 mm) (RUMF-ZC-3683), Sungai Kulamba, Tundon Bohangin, Sabah, Malaysia, 5°35.530’
Fig. 5. *Exagorium fidelisi*, new genus & species. Holotype, IPMB-Cr 08.1, 7.6 × 10.6 mm. a, left third maxilliped; b, posterior portion of carapace, abdomen and telson; c, left G1; d, left G2. Scales, a, c, d, 1 mm; b, 5 mm.

Moguai elongatum (Rathbun, 1931): 1 male (2.7 × 2.4 mm), 2 females (2.3 × 2.1, 3.3 × 3.0 mm) (RUMF-ZC-32), Motonagura, Ishigaki Island, Ryukyu Islands, Japan, coll. T. Naruse & T. Nagai, 3 August 2005; 1 juv. (2.9 × 4.0 mm) (RUMF-ZC-3689), Udara River, Iriomote Island, Ryukyu Islands, Japan, coll. T. Naruse & T. Nagai, 20 March 2005. 

Mortensenella forceps (Serène & Moosa, 1971): 2 males (3.5 × 3.6, 4.0 × 4.2 mm), 2 females (4.6×4.9, 5.3 × 5.8 mm), 3 ovig. females (5.1 × 5.3 – 6.7 × 7.8 mm), 1 juv. (2.3 × 2.3 mm) (IPMB-Cr. 08.5), Sungai Kulamba, Tundon Bohangin, Sabah, Malaysia, 5°35.010’ N 118°37.545’ E, coll. T. Naruse & F. Koret, 20 June 2014; 1 male (2.9 × 3.0 mm), 1 ovig. female (5.2 × 5.5 mm) (RUMF-ZC-3685) Sungai Kulamba, Tundon Bohangin, Sabah, Malaysia, 5°35.010’ N 118°37.545’ E, coll. T. Naruse & F. Koret, 18 June 2014; 1 male (2.9 × 3.1 mm) (RUMF-ZC-3686), Sungai Kulamba, Tundon Bohangin, Sabah, Malaysia, 5°35.188’ N 118°37.391’ E, coll. T. Naruse & F. Koret, 18 June 2014; 1 male (3.7 × 4.0 mm), 1 female (3.7 × 4.0 mm) (RUMF-ZC-302) Udara River, Iriomote Island, Ryukyu Islands, Japan, coll. T. Naruse & T. Nagai, 23 November 2004.

Description. Carapace (Fig. 1) hexagonal, CW 1.24–1.40 times CL (mean 1.33, n = 9), dorsal surface gently convex longitudinally, transversely, entirely punctate. Regions poorly defined, epigastric region with one pair of weak convexities, H-shaped gastric groove shallow. Frontal, supraorbital, anterolateral margins connected by rounded, granular ridge; similar ridges present on posterolateral margins (short, oblique), metabranchial regions (short, horizontal), and on intestinal region (long, transverse) just anterior to posterior margin with either end reaching posterolateral corner of carapace. Supraorbital margin slightly convex dorsally, weakly concave above cornea, with triangular ventral projection between mesial margin of orbit and antennular fossa (Fig. 2a). Exorbital angle rounded, smoothly continuous with anterolateral margin. Orbit (Fig. 2a) laterally bordered by low, thin ridge on upper half, lined with long setae, lower half open. Infrorbital crista sinuous, lined with granules, convex dorsally at middle, mesial end forming high triangular inner orbital tooth. Suborbital ridge gently arcuate, lined with small granules, granules becoming longer laterally, ridge lateral to orbit directed downwards, without granules. Suborbital, pterygostomial regions (Fig. 2b) punctate, posterior margin of pterygostomial region rimmed, lined with granules, arcuate anteriorly, forming distinct Milne-Edwards aperture. Epistome (Fig. 2a) trilobate, median lobe triangular, long, sharp. Antennular fossa (Fig. 2a) relatively high, antennule folded obliquely. Antenna entering into orbit, with long flagellum. Eyes (Fig. 2a) weakly compressed dorsoventrally, dumbbell-shaped, enlarged at distal and proximal ends; cornea placed in disto-internal portion (when retracted), outer-lower portion of eyestalk punctate, outer-upper portion granular. Male thoracic sternum (Fig. 2b) shiny, punctate around sutures, episternite of sternites 4–6, posterior half of sternite 7, entire sternite 8. Sterno-abdominal cavity deep, long, reaching posterior border of buccal cavern. Sternal press-button for locking mechanism placed close to suture 4/5 at slope of sterno-abdominal cavity of sternite 5. Third maxillipeds (Figs. 2b, 5a) filling entire buccal cavern. Ischium wider than long, short, about third length of merus, ischium, merus punctuate; merus wider than ischium, anterolateral margin arcuate; carpus, propodus, dactylus articulated by end to end. Exopod narrow, reaching distal third of merus. Chelipeds symmetrical (Fig. 1), female chelipeds smaller than those of males. Merus simple, slightly granular on outer surface, upper, lower-mesial margins lined with long setae. Carpus rhomboid in upper view, with inner angle, surface smooth. Palm of chela (Fig. 2b) gently swollen downwards and inwards. Movable finger with single oblong tooth subproximally; with double line of granules distal to this tooth and also on cutting margin of immovable finger, continuing to proximal ends of horseshoe-shaped, corneous fingertips.

Fig. 6. Habitat of Exagorium fidelisi, new genus & species, beside Nypa fruticans forest.
Ambulatory legs (Fig. 1) stout, short, combined length of merus to dactylus of P4 ca. 0.97 times CW, punctate, setose especially near margins. Merus with long granular ridge on upper, lower posterior margins of P2–5 and upper, lower, anterior margins of P3–5. P4 propodus with mat of setae on inner surface. Dactylus stout proximally, but strongly sharpened, with thin, long conocephal tip.

Male abdomen (Figs. 2b, 5b) with all somites free, punctate on first to third somites and margin of telson. Somite 1 short, very wide, laterally reaching P5 coxae (Fig. 3a); somite 2 about two-thirds width of somite 1, as wide as somite 3, somite 3 to telson gradually tapering.

G1 (Fig. 5c) q-shaped, bent 180°, outer margin lined with setae from subproximal portion to bent portion, with small projection just distal to bent portion on outer margin. Distally with two terminal processes, tips of both pointed; process from inner side sparsely lined with four distally curved long bristles; inner process longer than outer one. G2 (Fig. 5d) shorter than outer process of G1.

**Female characters.** Sterno-abdominal cavity reaching posterior border of buccal cavern (Fig. 4). Vulvae (Fig. 4) horizontally elongated, oblong, entire, placed close to each other at mesial to suture 5/6. Abdomen with all sutures distinct, somites 2–6 functionally fused; telson triangular, proximal portion embraced by distal margin of abdominal somite 6.

**Colouration.** The carapace and the pereopods are light brown, but the cheliped carpus and chela are with paler colour (Fig. 1). This is probably because the cheliped carpus and chela are smoother and therefore do not attract as much dirt and mud as the other parts.

**Etymology.** The species name is dedicated to Fidelis Edwin Bajau, Deputy Director (Development) of the Sabah Forestry Department, who has facilitated and encouraged the authors’ study to a great extent.

**Ecological note.** *Exagorium fidelisi*, new species, was pulled up by a yabbie pump from small vertical burrows that were observed on the surface of muddy sediment with depths of 10–30 cm during low tide. It was found beside the Kulamba River, dominated by the clump-forming palm, *Nypa fruticans* (Fig. 6).

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**LITERATURE CITED**


