Records of four mantis shrimp species (Crustacea: Stomatopoda) from the Ryukyu and Ogasawara islands, Japan

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Abstract: Four mantis shrimp species are recorded from the Ryukyu and Ogasawara islands, southern Japan: Gonodactylaceus ternatensis (De Man, 1902) (Gonodactylidae); Lysiosquilloides siamensis (Naiyanetr, 1980) (Lysiosquillidae); Alimopsoides tuberculatus Moosa, 1991 (Squillidae); and Busquilla plantei Manning, 1978 (Squillidae). This is the first specimen-based record of G. ternatensis and the first distributional records of the latter three species from Japan. The genus Lysiosquilloides Manning, 1977 is recorded for the first time from Japanese waters, and the genus Alimopsoides Moosa, 1991 is newly found from the northern hemisphere. Diagnoses, taxonomic remarks, ecological notes and new standard Japanese names are provided.

Key words: Stomatopoda, new to Japan, Ryukyu Islands, Ogasawara Islands

Introduction

The mantis shrimps (Stomatopoda) are marine predatory crustaceans inhabiting mainly shallow waters of tropics to temperate zones. Recent faunal surveys of the mantis shrimp have newly recorded several species from Japanese waters (Fujita et al. 2009; Ahyong 2012; Osawa & Fujita 2016; Nakajima & Naruse 2020). We examined a good number of specimens collected by recent extensive field works mainly in the Ryukyu Islands, southwestern Japan, as well as those deposited in the Ryukyu University Museum, Fujukan, Okinawa, Japan (RUMF). The present study deals with three more mantis shrimp species of the lysiosquilloid Lysiosquilloides siamensis (Naiyanetr, 1980) (Lysiosquillidae), and squilloid Alimopsoides tuberculatus Moosa, 1991 and Busquilla plantei Manning, 1978 (both Squillidae) representing new distributional records from Japanese waters. In addition, one poorly documented species from Japan, gonodactyloid Gonodactylaceus ternatensis (De Man, 1902) (Gonodactylidae), is also reported. New Japanese standard names are also provided for all the four species treated in this paper.

Materials & Methods

Morphological terminology follows Manning (1995), Ahyong (2001), Schram et al. (2013) and Nakajima & Naruse (2020). Total length (TL) was measured along the dorsal midline from the tip of the rostral plate to the apices of the submedian teeth of the telson. Carapace length (CL) was measured along the dorsal midline of the carapace and excludes the rostral plate. All specimen measurements were given in mm. Some of the specimens examined were photographed after frozen or anesthesia by clove. Specimens examined are deposited in the Ryukyu University Museum, Fujukan (RUMF); and Tsukuba Research Departments of the National Museum of Nature and Science, Tokyo (NSMT). Some specimens were stained with methylene blue solution in water for a detailed observation of the integument surface.

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Taxonomic account
Superfamily Gonodactyloidea Giesbrecht, 1910
Family Gonodactylidae Giesbrecht, 1910
Genus Gonodactylaceus Manning, 1995
Gonodactylaceus ternatensis (De Man, 1902)
(New Japanese standard name: Adeyaka-futoyubi-shako-modoki)
(Figs. 1, 2A, B)

Gonodactylus glabrous var. ternatensis De Man, 1902: 914 [part; not figured specimen] (type locality: Ternate, Molucca Islands, Indonesia).

Gonodactylus glabrous. —Bigelow 1931: 127, fig. 1 [part; specimens from Samoa?] [not Gonodactylus glabrous Brooks, 1886].

Gonodactylus falcatus. —Serène 1954: 6, 79, figs. 8, 13-6.

Gonodactylaceus ternatensis (De Man, 1902)

Material examined
RUMF-ZC-6741, 1 male (TL 14.6 mm, CL 2.8 mm), off west Geda, Iriomote Island, Ryukyu Islands, 24.407904, 123.858078, 5–15 m, from dead corals, coll. H. Nakajima & T. Naruse, 12 Sep. 2020; RUMF-ZC-6742, 1 male (TL 19.0 mm, CL 4.1 mm), Indabishi, Iriomote Island, Ryukyu

Fig. 1. Gonodactylaceus ternatensis (De Man, 1902), RUMF-ZC-6537, male (TL 32.4 mm). A, anterior cephalon, dorsal view. B, right raptorial claw, lateral view. C, right eye, lateral view. D, AS6, uropod and telson, dorsal view. E, right uropod, ventral view. Scale bar = 2 mm. Setae not drawn.
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Islands, 24.418548, 123.835977, 7 m, from dead corals, coll. H. Nakajima & T. Naruse, 12 Sep. 2020; RUMF-ZC-6899, 1 male (TL 20.9 mm), off east Omi-jya River, Iriomote Island, Ryukyu Islands, 24.404839, 123.859576, coll. T. Naruse, 7 Oct. 2020; RUMF-ZC-6537, 1 male (TL 32.4 mm, CL 7.4 mm), Ibaruma, Ishigaki Island, Ryukyu Islands, 3–6 m, from dead corals, coll. R. Yoshida, T. Naruse, D. Uyeno & Y. Endo, 2 Jun. 2015; RUMF-ZC-6539, 1 male (TL 16.7 mm, CL 3.6 mm), off Yamazaki-no-hana, Haha Island, Ogasawara Islands, 26.694020, 142.150625, 5–10 m, from dead corals, coll. R. Yoshida & T. Sasaki, 24 Feb. 2015.

Comparative material. *Gonodactylocus falcatus* (For-skål, 1775). RUMF-ZC-6917, 1 male (TL 40.4 mm, CL 9.2 mm), Indasaki, Iriomote Island, Ryukyu Islands, 24.4103635, 123.8309601, ca. 10 m, from dead corals, coll. T. Naruse & H. Nakajima, 7 Sep. 2020; RUMF-ZC-1243, 1 male (TL 31.9 mm, CL 7.5 mm), Kume Island, Ryukyu Islands, st. Dredge 52, 26.340150, 126.82792, 5.1 m–26.33363, 126.8204, 4.5 m, dead coral branches, rubble, coll. KUMEJIMA 2009, 17 Nov. 2009; RUMF-ZC-1245, 1 female (TL 18.3 mm, CL 4.4 mm), Kume Island, Ryukyu Islands, st. Dredge 55, 26.32403, 126.82018, 4.5 m to 26.32297, 126.81997, 9.5 m, coll. KUMEJIMA

Fig. 2. A, B, *Gonodactylocus ternatensis* (De Man, 1902): A, RUMF-ZC-6537, male (TL 32.4 mm); B, RUMF-ZC-6899, male (TL 20.9 mm). C, *Alimopsoides tuberculatus* Moosa, 1991, RUMF-ZC-2566, male (TL 42.4 mm), monochrome. D, E, *Busquilla plantei* Manning, 1978, RUMF-ZC-6491, male (TL 35.1 mm); D, dorsal view; E, left lateral view. F, burrow opening of *Busquilla plantei* (RUMF-ZC-6491). Scale bars, A–E = 5 mm.
Diagnosis

Eye not flattened anteriorly, cornea slightly broader than stalk in dorsal view. Ocular scales small, rounded, narrower than basal width of rostral spine. Rostral plate with long, slender median spine and short, broad, trapezoid basal portion; anterior margins of basal portion almost straight, horizontal. Mandibular palp present. Raptorial claw propodus without proximal movable spine on opposable margin in adults, but with one spine in small individuals. AS1–5 dorsal surface smooth, without transverse grooves. AS6 dorsal surface without median carinule. Telson slender, elongate, with 5 mid-dorsal carinae; MD carina low, MD and anterior SM carina each with posterior spine; LT teeth sharp, distinct; knob usually undivided but sometimes bilobed or dorsally-Indented; IM carina without accessory longitudinal carina on mesial margin; ventral surface with one low postanal carina and one low carina each on SM teeth. Uropodal protopod with one small lobe between terminal spines; margin of endopod with single row of setae.

Live coloration

Male (Fig. 2A, B): Basic color of body khaki to dark green. Setae on appendages red. Carapace with pale green spots anteriorly. Antennular peduncle pale blue. Antennal scale, endopods and exopods of pereiopods 1–3, and distal segment of uropodal exopod brilliant blue. Merus of raptorial claw basically light green, with three reddish transverse bands on lateral surface; mesial surface with a distinct orange meral spot in whitish distal portion. Merus also with a small black spot on proximal to joint with carpus. Posterior margins of TS6–8 and AS1–6 red. Protopods of pereiopods dark purple. AS6 and telson each with one pair of submedian small black spots near anterior margin. Posterior spines of AS6, teeth/denticles on telson, and movable spines on outer margin of proximal segment of uropodal exopod all red. Uropodal endpod and proximal segment of uropodal exopod bluish green.

Remarks

The genus Gonodactylaceus contains 11 species (Manning 1995). Gonodactylaceus ternatensis can be distinguished from congeners by its relatively long rostral spine (Serène 1954: fig. 13; Manning 1995: fig. 9); relatively low MD carina of the telson (Ahyong 2001: fig. 20H); slender and distinct LT teeth of the telson in adults (Serène 1954: pl. 9, figs. 1–4; Manning 1995: figs. 17, 18); and male coloration, especially an orange meral spot and brilliant blue A2 scale and distal segment of the uropodal exopod (Manning 1995: pl. 1).

The morphology of our on-hand specimens (all males, TL 14.6–32.4 mm) basically agree well with the descriptions of G. ternatensis by Manning (1978a; 1995) and Ahyong (2001). One of the diagnostic character of G. ternatensis is an undivided knob on the telson (Manning 1995), but Ahyong (2001), which indicated that some specimens from Cocos-Keeling Islands have a dorsally indented telson knob that gives them a bilobed appearance. Poupin et al. (2019) reported specimens from Mayotte with a divided telson knob. In our specimens (all males), three males (RUMF-ZC-6537, 6539, 6899) also possessed divided (or dorsally indented) telson knob (Fig. 1D), whereas two remaining males (RUMF-ZC-6741, 6742) possessed undivided telson knob. This is probably intraspecific variations. In addition, adults of Gonodactylaceus species are known to lack a proximal movable spine on the opposable margin of the propodus of the raptorial claw (Ahyong 2001), which was confirmed in the largest specimen examined (RUMF-ZC-6537, TL 32.4 mm), although small specimens (RUMF-ZC-6539, TL 16.7 mm; RUMF-ZC-6741, TL 14.6 mm; RUMF-ZC-6742, TL 19.0 mm; RUMF-ZC-6899, TL 20.9 mm) have the spine.

Serène (1954) studied the sexual dimorphism of Gonodactylaceus species in detail. He reported that relatively large specimens (e.g. TL 69 mm male, TL 81 mm female, Serène 1954: pl. 9, figs. 2, 4) of G. ternatensis (as Gonodactylus falcatus) tend to have the following dimorphisms: inflation of the carinae of AS6 and the telson are comparatively thicker in males (versus thinner in females); the upper surfaces of carinae of AS6 are rounded in males (versus flattened in females); and AS6 SM spines are proximally thickened and abruptly narrowed subproximally in males (versus tapering regularly in females). Serène (1954) revealed that relatively small individuals (e.g. TL 24 mm male, TL 40 mm female, Serène 1954: pl. 9, figs. 1, 3) have identical carinae on the telson and most of AS6, but slight sexual dimorphism was observed in the space between the carinae around MD of the telson (narrower in males versus wider in females) and a posteriorly swollen MD carina of the telson in males (versus narrow in females). Serène (1954) described the raptorial claw (see Bigelow 1931: fig. 1) dactylus as changing its shape in accordance with growth. Smaller individuals have distinct concavity at the distal half of the opposable margin (Serène 1954: pl. 9, figs. 5, 7, 8, 10) (versus with a less sinuous opposable margin in larger individuals; Serène 1954: pl. 9, figs. 6, 9), relatively short convexity on the proximal part of the extensor margin (Serène 1954: pl. 9, figs. 5, 7, 8, 10) (versus relatively long convexity in large individuals; Serène 1954: pl. 9, figs. 6, 9), and the degree of small terminal concavity on the in-
ner margin. All specimens examined in this study exhibit the conditions of small individuals.

In picture books of marine and freshwater invertebrates in Japan, Takeda (1975, 1982) introduced “Gonodactylus falcatus” without recording the exact location. This “G. falcatus” (TL 50 mm) has distinct LT and slender and long SM teeth on its telson; these characters and the coloration precisely correspond to large females of *G. ternatensis* (Serène 1954: pl. 9, figs. 1, 2; Manning 1978a: fig. 8b; Manning 1995: fig. 17; Ahyong 2001: fig. 20) than *G. falcatus* (Manning 1978a: fig. 1b; Ahyong 2001: fig. 17). We confirmed that *G. falcatus* (see comparative material, including similar-sized specimens, RUMF-ZC-6917, male, TL 40.4 mm; RUMF-ZC-6513, female TL 57.6 mm) has relatively less distinct LT and shorter and more inflated SM teeth of telson than those of Takeda’s (1975, 1982) photograph. It is suggested that Takeda’s (1975, 1982) “G. falcatus” are referable to *G. ternatensis*. Ahyong & Naiyanetr (2002) also included *G. ternatensis* in the geographical distribution of *G. ternatensis*, which was because they have noticed about the records by Takeda (1975, 1982) (Shane T. Ahyong, personal communication). The male specimen (RUMF-ZC-6537) of *G. ternatensis* is designated as the standard specimen for the new Japanese standard name (Adeyaka-futoyubi-shako-modoki) proposed here.

De Man (1902) described the coloration of the female lectotype of *G. ternatensis* as “greenish, with yellowish parts on the lateral parts of the carapace, telson between carinae, and uropods; one pair of black spots is present near the anterior margin of AS6 (between SM and IM carinae) and telson (near proximal ends of IM carinae) respectively.” The coloration agrees well with that of drawings of *G. ternatensis* from Viet Nam (Manning 1995: pls. 1, 2) and our specimens (Fig. 2A, B). Additionally, Manning’s (1995: pl. 1) and our specimens (Fig. 2A, B) are closely similar in having brilliant blue antennal scale, endopods and exopods of pereiopods, and distal segment of uropodal exopod. The drawings of *G. ternatensis* by Manning (1995: pls. 1, 2) show brighter greenish ground color (versus khaki to dark green in our specimen) and reddish mottled patterns on a light green ground color on the lateral surface of the merus of the raptorial claw (versus three reddish transverse bands on light green ground color in our specimens, which are similar to those of a female of *G. ternatensis* described by Manning 1995: pl. 2).

**Ecological note**

All examined specimens were collected from dead coral rubble or from beneath stones at 3–15 m depth. Ahyong (2001) stated *G. ternatensis* from crevices of live *Goniopora* coral at shallower than 5 m depth. Dingle et al. (1977) reported *G. ternatensis* is a relatively common stomatopod species in living corals (commonest in bases of *Pocillopora* spp.) at intertidal and subtidal zones at Phuket, Thailand.

**Distribution**

Mayotte; Cocos-Keeling Islands to eastern Australia; Ternate, Indonesia (type locality); Thailand; Vietnam; southern China; Ryukyu and Ogasawara islands, Japan; and Guam; 1–36 m depth (De Man 1902; Ahyong 2001; Ahyong & Erdmann 2003; Poupin et al. 2019; present study).

**Superfamily Lysiosquilloidea Giesbrecht, 1910**

**Family Lysiosquillidae Giesbrecht, 1910**

**Genus Lysiosquilloides Manning, 1977**

(New Japanese standard name: Nokoba-torafu-shako-zoku)

**Lysiosquilloides siamensis** (Naiyanetr, 1980)

(New Japanese standard name: Nokoba-torafu-shako)

(Figs. 3, 4)

*Lysiosquilla siamensis* Naiyanetr, 1980: 35–37, pl. 34. (type locality: Gulf of Thailand, Thailand)

*Lysiosquilloides siamensis* —Naiyanetr 1983: 393, 394, figs. 1, 3. —Ahyong 2001: 140, 141, fig. 68. —Ahyong 2004: 11. —Naiyanetr 2007: 19 (unnumbered fig.).

**Material examined.** RUMF-ZC-6499, 1 female (CL 15.0 mm, AS1–4 heavily damaged by predation of an octopus, *Callistocopus cf. aspilosomatis* (Norman, 1993)), Hamahiga Island, near Okinawa Island, Ryukyu Islands, 26.3276655, 127.9514015, sand flat, coll. H. Nakajima, 7 Mar. 2020.

**Diagnosis.** Cornea with rounded mesial lobe, not conical. Dorsal processes of A1 somite without acute spine, rounded. Rostral plate nearly cordiform, widest medially, with short median longitudinal sulcus anteriorly. A2 protopod (coxa+basis) dorsally with one mesial papilla near proximal corner of basis, and one mesiodorsal projection locating lateral of the mesial papilla, also with two ventral papillae each between basis and first article of endopod, and between first article and second article (Fig. 3D). A2 scale broad, length 2.4–2.7 times width. Raptorial claw dactylus with seven or eight teeth. Mandibular palp three-segmented. Sternal keel of TS8 rounded. AS6 with one longitudinal step-like surface laterally. Telson dorsal surface with one posteriorly-directed median spine; SM teeth with movable apices; 12–13 pairs of SM denticles present between two SM movable spines. Outer margin of proximal segment of uropodal exopod with seven or eight movable spines.

**Live coloration.** Female (RUMF-ZC-6499: Fig. 4): Entire body (except damaged parts) with yellow and black bands dorsally. Anterior cephalon with scattered black chromatophores (Fig. 4A). Raptorial claws with yellow and black bands; base of propodus, carpus and distal part of merus mottled with black chromatophores (Fig. 4B). Pereiopods 1–3 almost yellow. Telson with black base color and yellow patterns on proximo-median, base of pre-lateral spine and distosubmedian portions. Uropod also with black and yellow bands; anterior half of protopod,
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posterior half of endopod and median part of exopod black, remaining parts yellow (Fig. 4C).

**Remarks.** *Lysiosquilloides* includes three species: *L. aulacorhynchus* (Cadénat, 1957), *L. siamensis* (Naiyanetr, 1980) and *L. mapia* Erdmann & Boyer, 2003. Morphological characteristics and coloration of our specimen agrees well with *L. siamensis* description and figures of Naiyanetr (1980, 1983, 2007). *Lysiosquilloides siamensis* can be distinguished from *L. aulacorhynchus* by the cordiform rostral plate (versus triangular; Manning 1977: figs. 25a, 26g) and relatively broader antennal scale (length/width ratio 2.4–2.7 versus more than 2.9; Manning 1977: fig. 26h); and from *L. mapia* by the rounded mesial lobe of cornea (versus distinctly conical; Erdmann & Boyer 2003: fig. 1A), rounded sternal keel on TS8 (versus angular; Erdmann & Boyer 2003: fig. 1D), and dorsal yellow and black bands from the carapace to the telson (versus blight orange and black bands; Erdmann & Boyer 2003: fig. 3).

This is the first record of the genus *Lysiosquilloides* as well as *L. siamensis* from Japanese waters. The female specimen (RUMF-ZC-6499) is designated as the standard specimen for the new Japanese standard name (Nokobatorafu-shako) of the species. New Japanese standard name (Nokobatorafu-shako-zoku) is also proposed for the genus *Lysiosquilloides*.

**Ecological note.** The specimen examined in this study was collected when being preyed on by an octopus, *Callistoctopus cf. aspilosomatis* (Norman, 1993) (Fig. 4D), on
the intertidal zone at night. Ahyong (2004) noted that this species lives in shallow sublittoral zone.

**Distribution.** Gulf of Thailand, Thailand (type locality); Philippines; Ryukyu Islands, Japan; Australia; New Caledonia; to 50 m depth (Naiyanetr 1980; Ahyong 2001, 2004; Juncker & Poupin 2009; present study).

**Superfamily Squilloidea Latreille, 1802**

**Family Squillidae Latreille, 1802**

**Genus Alimopsoides Moosa, 1991**

(New Japanese standard name: Tsubu-arima-shako-zoku)

**Alimopsoides tuberculatus Moosa, 1991**

(New Japanese standard name: Tsubu-arima-shako)

(Figs. 2C, 5)

*Alimopsoides tuberculatus* Moosa, 1991: 191–193, fig. 11 (type locality: Chesterfield plate, Loop Island, New Caledonia). —Ahyong 2001: 193, fig. 94.

**Material examined.** RUMF-ZC-2566, 1 male (TL 42.4 mm, CL 9.6 mm), Awa, Nago Bay, Okinawa Island, Ryukyu Islands, 7–10 m, from under dead coral rubble, coll. D. Uyeno & N. Shirakawa, 8 Apr. 2012.

**Diagnosis.** Eye large, bilobed. Ocular scale widely separated. Dorsal process of A1 somite with acute projection. Rostral plate trapezoidal, dorsally with median carina. Carapace with MD carina; base of anterior bifurcation interrupted. Raptorial claw dactylus with six teeth; propodus with three movable spines on opposable margin; dorsal carina of carpus undivided. Mandibular palp present, three-segmented. MXP 1–4 each with epipod. TS5–8 with SM and IM carinae, carinae stronger in TS6–8. Lateral process strongly bilobed in TS5, slightly bilobed in TS6–7. MD carina short and low on AS2–5, long and reaching posterior end on AS6. Abdominal carinae spined posteriorly as follows: SM 5–6, IM 4–6, LT 3–6, MG 1–5. Some tubercles present between SM and IM carinae and between IM and LT carinae on AS2–6. Regions between SM and IM carinae of AS6 densely and irregularly covered with tubercles. Telson MD carina posteriorly forming acute spine, flanked by one pair of accessory carinae; regions outside accessory MD carinae densely and irregularly covered supplementary carinae and tubercles; SM teeth with fixed apices; denticles as follows: SM 6–7, IM 11–13, LT 1; outermost denticles of both SM and IM denticles rounded, not acute; postanal carina present. Uropodal protopod with two terminal spines, inner and outer terminal spines with proximo-outer lobe and proximo-inner lobe, respectively; inner margin of inner spine crenulate. Outer margin of proximal segment of uropodal exopod with six or seven movable spines.

**Live coloration.** Not known. Black pigmentation.
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Still remaining on following parts of preserved specimen (RUMF-ZC-2566, Fig. 2C, after more than 8-years preservation in ca. 75% ethanol): outer margin of raptorial claw, lateral view. C, TS5, right-lateral view. D, right side of TS5–8 lateral processes, dorsal view. E, AS5–6, uropod and telson, dorsal view (lateral part of AS5 (left) and median part between accessory MD and IM carinae of telson (left) damaged [indicated in broken lines]). F, right uropod, ventral view. Scale bar=3 mm. Setae not drawn.

**Remarks.** The monotypic genus *Alimopsoides* Moosa, 1991, closely resembles Paralimopsis Moosa, 1991 and *Alimopsis* Manning, 1977 in having a single or faintly bilobed lateral processes of TS6–7 and the presence of numerous dorsal carinae of the telson (Ahyong 2001). Ahyong (2005) conducted cladistic analysis of the superfamily Squilloidea Latreille, 1802, based on somatic morphology and found that Visaya Ahyong, 2004, is most closely related to *Alimopsis* Manning, 1977, *Alimopsoides* Moosa, 1991 and *Paralimopsis* Moosa, 1991. *Alimopsoides*, the monotypic genus, can be distinguished from the three other aforementioned genera by having six teeth on the dactylus of the raptorial claw (Fig. 5B) (versus five teeth), and the uropodal protopod with two lobes on proximo-outer part of inner spine and proximo-inner part of outer spine (Fig. 5).
The original description of *A. tuberculatus* noted that tubercles are present between SM and IM carinae and between IM and LT carinae of AS2–6 (Moosa, 1991). Our specimen from Okinawa Island slightly differs from Moosa's (1991: 191, fig. 11d) description and the photograph of the holotype (MNHN-IU-2014-23150, see https://science.mnhn.fr/institution/mnhn/collection/iu/item/2014-23150) in its fewer tubercles between SM and IM carinae of AS4–5 and between IM and LT carinae of AS6. In addition, subtle differences between our specimen and the holotype are the short and indistinct MD carina of AS6 (Fig. 5E), which does not reach posterior end of AS6 (versus AS6 MD carina reaches the posterior end of AS6 in the holotype), and the possession of a posterior spine on MG carina of AS (AS4–5 in our specimens versus AS1–5 in the holotype) (Moosa 1991: fig. 11d; MNHN-IU-2014-23150). Ahyong (2001) also reported fewer abdominal tubercles and less well-developed ornamentations lateral to the post-anal carina in his smaller specimens (TL 43–54 mm) and considered those differences to be referable to size differences. The subtle differences observed above can also be attributed to allometry.

This is the first record of *A. tuberculatus* from northern hemisphere as well as Japanese waters. The male specimen (RUMF-ZC-2566) is designated as the standard specimen for the new Japanese standard name (Tsubu-arima-shako) of the species. New Japanese standard name (Tsubu-arima-shako-zoku) is also proposed for the genus *Alimopsoides*.

**Ecological notes.** The examined specimen was col-
lected from under dead corals on coral rubble substratum, at 7–10 m depth. Ahyong (2001) recorded the species from depths of 78–82 m.

**Distribution.** Australian Northwest Shelf; Ryukyu Islands, Japan; New Caledonia (type locality); 7–82 m depth (Moosa 1991; Ahyong 2001; present study).

**Genus Busquilla** Manning, 1978

*Busquilla plantei* Manning, 1978 (New Japanese standard name: Chura-kakuo-shako) (Figs. 2D, E, F, 6)

*Busquilla plantei* Manning, 1978b: 23, 24, fig. 11 (type locality: Passe Lokobe, Madagascar). —Ahyong 2001: 204, fig. 99. —Ahyong 2002: 835, fig. 3. —Ahyong & Kumar 2018: 385, 386.

**Material examined.** RUMF-ZC-6491, 1 male (TL 35.1 mm, CL 6.1 mm), Indasaki, Funaura Bay, Iriomote Island, Ryukyu Islands, 24.409155, 123.83036, 22 m, by yabbie pump, coll. H. Nakajima & T. Naruse, 27 Jun. 2019; RUMF-ZC-6743, 1 male (TL 26.3 mm, CL 5.1 mm), Funakui Bay, Iriomote Island, Ryukyu Islands, 24.3230664, 123.7388541, 3–4 m, by yabbie pump, coll. H. Nakajima & T. Naruse, 8 Sep. 2020.

**Diagnosis.** Eye very large. Carorina strongly bilobed, set obliquely on stalk. Anterior margin of ophthalmic somite with apical spine. Rostral plate narrow, without dorsal carina. Carapace with short anterolateral spine. Mandibular palp present. MXP 1–4 each with epipod. Raptorial claw dactylus with five teeth; carpus dorsally with one longitudinal ridge, distally terminating in acute tooth, ridge undivided, without tubercles. TS5 lateral process obscurely bilobed. TS6–7 lateral processes slightly bilobed. Abdominal carina spined posteriorly as follows: SM 5–6, IM 3–6, LT (1)2–6, MG 1–5. Telson denticles as follows: SM 3–4, IM 7–9, LT 1; ventral surface with short postanal carina. Uropodal protopod with one lobe on proximo-outer margin of inner terminal spine; inner margin of inner spine corrugated. Outer margin of proximal segment of uropodal exopod with seven or eight movable spines.

**Live coloration.** Male (RUMF-ZC-6491: Figs. 2D, E): Basically beige. Carapace, Thoracic and abdominal somites dorsally with pale gray pigments scattered sparsely. A1 peduncle pale red. Raptorial claw merus laterally pale red; anterolateral margin with red spot. Posterior margins of TS6–7 and AS1–5 with dark pigmentation. Surface between LT and MG on AS1–4 pale red, while that on AS5 with dark pigmentation. AS5 lateral spine and posterior margin between IM and LT of AS6 clear red. Telson and uropod colorful; telson primary teeth, distal part of uropodal spines, movable spines of proximal segment of uropod and outer half of distal segment of uropodal exopod pale red. Posterior half of proximal segment of uropodal exopod and inner half of distal segment of uropodal exopod dark.

**Remarks.** The genus *Busquilla* Manning, 1978 includes two species: *B. plantei* Manning, 1978; *B. quadraticauda* (Fukuda, 1911). *Busquilla plantei* can be distinguished from *B. quadraticauda* by the following characters: rostral plate narrow, without dorsal carina (Fig. 6A) (versus rostral plate broad, with a dorsal carina in *B. quadraticauda*; Ahyong 2001: fig. 100); posterior half of proximal segment and inner half of distal segment of uropodal exopod dark (versus outer half of distal segment of uropodal exopod dark in *B. quadraticauda*; Ahyong et al. 2008: figs. 50, 51); and a dorsal ridge of raptorial claw carpus smooth or irregular in adult (Manning, 1978b: fig. 11d) (versus dorsal ridge tuberculated distally in *B. quadraticauda*; Ahyong et al. 2008: fig. 52d).

This is the first record of *B. plantei* from Japanese waters. The male specimen (RUMF-ZC-6491) is designated as the standard specimen for the new Japanese standard name (Chura-kakuo-shako) of the species.

**Ecological notes.** One of the specimens examined (RUMF-ZC-6491, male, TL 35.1 mm) was caught from sloped seabed with fine sand at the depth of 22 m (Fig. 2F, burrow opening). Another specimen (RUMF-ZC-6743, male, TL 26.3 mm) was caught from the depth of 3–4 m. This species has been recorded from the depths of 17–221 m (Ahyong 2002).

**Distribution.** Madagascar (type locality); India; Ryukyu Islands, Japan; Australia; Hawaii; 3–221 m depth (Ahyong 2001, 2002; Ahyong & Kumar 2018; present study).

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