

***Neorhynchoplax yaeyamaensis*, a new false spider crab (Decapoda: Brachyura: Hymenosomatidae) from the Yaeyama Group, the Ryukyu Islands, Japan**

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Abstract

A new false spider crab, *Neorhynchoplax yaeyamaensis* (Decapoda: Brachyura: Hymenosomatidae) is described from the Yaeyama Group, the Ryukyu Islands, Japan. *Neorhynchoplax yaeyamaensis* is morphologically close to *N. exigua* and *N. aspinifera*, however, *N. yaeyamaensis* is easily differentiated from the latter two species by the dentition of the ambulatory dactyli, and the shapes of the carapace, male abdomen, and G1. *Neorhynchoplax okinawaensis*, also found in the Ryukyu Islands, differs from *N. yaeyamaensis* by the presence of a posterior lateral tooth, and the shape of the carapace, male abdomen, and G1.

Key words: *Neorhynchoplax yaeyamaensis*, new species, Hymenosomatidae, *Neorhynchoplax okinawaensis*, taxonomy

Introduction

Among hymenosomatid crabs, *Neorhynchoplax* species are common in brackish to freshwater environments; but in the Ryukyu Islands the genus has been represented by only a single species, *Neorhynchoplax okinawaensis* (Nakasone & Takeda, 1994). Recently the authors discovered an undescribed species of *Neorhynchoplax* from Ishigaki and Iriomote Islands, which is here described and compared with its congeners.

Materials and Methods

Specimens are deposited in the National Science Museum, Tokyo, Japan (NSMT), the Ryukyu University Museum, Fujukan, Okinawa, Japan (RUMF), and the Zoological Reference Collection, Raffles Museum of Biodiversity Research, National University of Singapore, Singapore (ZRC). The terminology essentially follows Lucas (1980) and Ng and Chuang (1996). The abbreviations CW and G1 are used for carapace width and male first gonopod, respectively. Sizes of eggs were calculated by using a profile projector (Nikon Profile Projector V-12) and a digital slide-caliper (Mitsutoyo CD-20C) to the nearest 0.01mm. Other characters were measured using stereomicroscope (Nikon SMZ-10) and eyepiece micrometer to the nearest 0.1mm. The single ovigerous female (RUMF-ZC-134, CW 3.6 mm), had been preserved in 5% formalin for about five months.

Taxonomy

Neorhynchoplax Sakai, 1938

Neorhynchoplax yaeyamaensis, new species

(Figs. 1, 2)

Neorhynchoplax okinawaensis — Ng & Chuang, 1996: 77 (part).

Material examined. Holotype. 1 male, CW 3.5 mm, RUMF-ZC-24, Tsuru River, Ishigaki Island, coll. Tohru Naruse & Takashi Nagai, 21 Dec. 2004.

Paratypes. 1 male, CW 2.3 mm, RUMF-ZC-132, Shiira River, Iriomote Island, coll. Natsuki Okuda, 24 July 2003; 1 male, CW 1.8 mm, 3 females, CW 1.9–2.9 mm, RUMF-ZC-133, data same as RUMF-ZC-132; 1 female, CW 3.6 mm, RUMF-ZC-134, Shiira River, Iriomote Island, coll. Natsuki Okuda, 22 July 2003; 2 females, CW 2.7, 3.1 mm, NSMT-Cr. 15954, NSMT-Cr. 15955, data same as RUMF-ZC-132; 1 male, CW 2.1 mm, NSMT-Cr. 15956, mangrove tide pool, Fukari River, Iriomote Island, coll. Takeshi Kawahara, 23 Sept. 2002; 1 female, CW 4.4 mm, RUMF-ZC-23, data same as holotype; 1 male, CW 3.4 mm, RUMF-ZC-25, Tsuru River, Ishigaki Island, coll. Tohru Naruse & Takashi Nagai, 21 Dec. 2004; 2 females, CW 2.5, 2.8 mm, RUMF-ZC-26, Shira River, Iriomote Island, coll. Tohru Naruse & Takashi Nagai, 22 Dec. 2004; 2 males, CW 2.0, 2.2 mm, 2 females, CW 2.8, 2.9 mm, RUMF-ZC-27, Urauchi River, Iriomote Island, coll. Tohru Naruse & Takashi Nagai, 23 Dec. 2004; 5 males, CW 1.9–2.2, 1 female, CW 2.4 mm, 2 juveniles, CW 1.4, 1.5 mm, ZRC 1994.4246, Shiira River, Iriomote Island, coll. K. Nakamura.

Comparative material. *Neorhynchoplax okinawaensis* (Nakasone & Takeda, 1994): 1 female, CW 3.2 mm, RUMF-ZC-135, mouth of Nagura River, Ishigaki Island, coll. Yoshihisa Fujita, Akane Ito & Takeshi Kawahara, 14 May 2003; 2 females, CW 3.4, 4.2 mm, RUMF-ZC-136, Awase intertidal flat, Okinawa Island, coll. Tohru Naruse, 2 Jul.

2003; 2 males, CW 2.2, 2.8 mm, 1 female, CW 3.0 mm, RUMF-ZC-28, Oura River, Okinawa Island, coll. Tohru Naruse, 8 Dec. 2004; 1 female, CW 4.2 mm, RUMF-ZC-29, Nakama River, Iriomote Island, coll. Masayuki Osawa, 17 Jun. 1995; 1 male, 1 juvenile, ZRC 1994.4248, Goga, Okinawa Island, coll. T. Kosuge, 16 Aug. 1993.

General Description. Carapace (Figs. 1a–c, 2a) oval; dorsal surface flat, gastro-cardiac grooves clearly delineated, bordered by continuous subcircular rim, anterolateral border slightly concave, no anterior or posterior lateral teeth, branchiostegite somewhat swollen laterally. Rostrum trilobed, basally fused, median lobe longest, placed slightly below lateral lobes in frontal view. Epistome relatively wide longitudinally; lower border widely projecting medially.

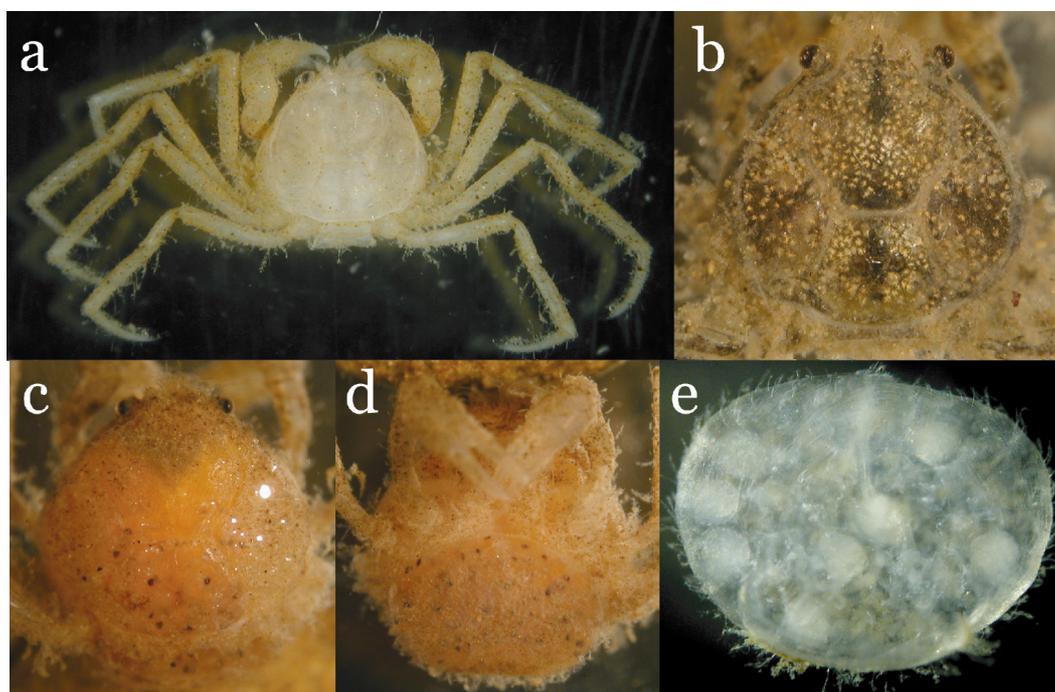


FIGURE 1. *Neorhynchoplax yaeyamaensis*, new species. a, dorsal view; b, colour in life; c, dorsal view of ovigerous female; d, ventral view of ovigerous female; e, eggs within internal abdominal brood cavity, dorsal view. a, RUMF-ZC-132 (paratype, male, CW 2.3 mm); b, NSMT-Cr. 15954 (paratype, female, CW 2.7 mm); c–e, RUMF-ZC-134, (paratype, female, CW 3.6 mm).

Eye (Fig. 2a) with well developed cornea, eyestalk short.

Third maxilliped (Fig. 2d) with relatively narrow ischium and merus, leaving wide medial gape when closed, inner margin of merus lined with strong setae; palp long, reaching proximal margin of merus when folded backwards; exopod with developed flagellum.

Chelipeds stouter than ambulatory legs; merus and carpus without teeth; chelae symmetrical; manus (Fig. 2b) thick, high, cutting edges of fingers with alternating strong triangular teeth.

Ambulatory legs long, slender, elliptical in cross-section, anterior 3 pairs subequal in length, with short to long sparse setae. Dactylus (Fig. 2c) of all ambulatory legs weakly incurved, apex sharply pointed, incurved, first leg with 1 subterminal large spine, sometimes followed by 0–7 (median, 0; n=15) smaller spine(s), second to fourth leg with 1 subterminal large spine and 0–7 (median, 4; n=48) smaller spine(s).

Abdomen (Fig. 2e) with first segment, second segment and telson fully, broadly convex, abruptly narrowed over distal 2/3.

G1 (Fig. 2f), in situ, curved towards mid-line of thoracic sternum over proximal 2/3, distal 1/3 directed anteriorly; distal margin blunt, with row of long setae extending to dorsal surface.

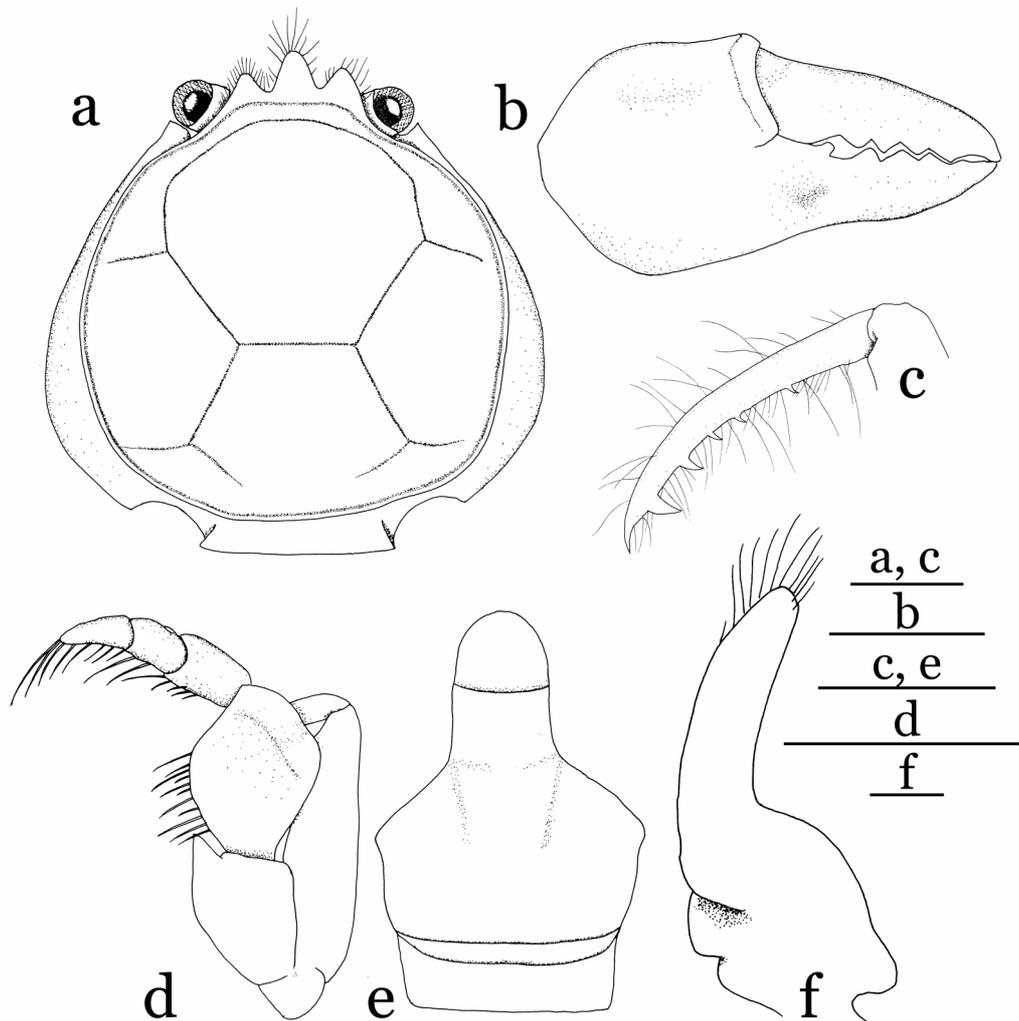


FIGURE 2. *Neorhynchoplax yaeyamaensis*, new species. a, carapace; b, chela, right; c, dactylus of second ambulatory leg, left; d, third maxilliped, left; e, male abdomen; f, G1, left. a, b, RUMF-ZC-132 (paratype, male, CW 2.3 mm); c, RUMF-ZC-24 (holotype, male, CW 3.5 mm); d–f, RUMF-ZC-133 (paratype, male, CW 2.1 mm). Scales, a–e, 0.5 mm; f, 0.1 mm.

Brooding habit. Females of several species of *Elamenopsis* A. Milne Edwards, 1873, *Neorhynchoplax* Sakai, 1938, and *Crustaenia* Ng & Chuang, 1996, have been observed to brood their eggs inside a cephalothorax brood cavity (e.g. Lucas, 1980; Lucas & Davie 1982, Ali *et al.* 1995, Ng & Chuang 1996, Davie & Richer de Forges 1996). *Neorhynchoplax yaeyamaensis* also possesses such an internal brood cavity. The single ovigerous female (RUMF-ZC-134, CW 3.6 mm) has a swollen dorsal surface, branchiostegites, and abdomen, and eggs are visible through both dorsal and abdominal surfaces (Fig. 1c, d). When the abdomen of the preserved ovigerous female was opened, more than 10 zoeae were released from the pseudovulvae. The remaining eggs at the back of the brood cavity had not yet hatched, and this might suggest ovovivipary, as Ng & Chuang (1996) had reported for *N. mangalis*. But it is also possible that the eggshells of the “hatched” zoeae had in fact been dissolved by formalin. In any case, rearing experiment are necessary to confirm whether *N. yaeyamaensis* is indeed ovoviviparous in the sense of Ng & Chuang (1996). Mean of egg sizes is 0.53 mm (S. D. 0.015) by 0.47 mm (S. D. 0.015), and there was a total of 166 eggs and zoeae.

Habitat. *Neorhynchoplax yaeyamaensis* is found on pebbly bottoms in upper estuarine basins (Dr. Natsuki Okuda, pers. comm.). One individual (NSMT-Cr. 15956, male, CW 2.4 mm) was caught from a tide pool in a *Kandelia obovata* forest on the Fukari River.

Distribution. *Neorhynchoplax yaeyamaensis* is currently known only from Ishigaki Island and Iriomote Island, the Yaeyama Group, the Ryukyu Islands, Japan.

Etymology. The new species is named after its distributional area, the Yaeyama Group.

Remarks. Lucas (1980) regarded *Neorhynchoplax* Sakai, 1938, as a junior subjective synonym of *Elamenopsis* A. Milne Edwards, 1873. Subsequently Ng and Chuang (1996) resurrected *Neorhynchoplax*, and among other characters, commenting that it can be easily distinguished from *Elamenopsis* by the shape of the dorsal surface of the carapace. We follow their action here.

Neorhynchoplax yaeyamaensis is easily assigned to *Neorhynchoplax* because of the subcircular shape of the carapace, the presence of distinct grooves on the dorsal surface, presence of a trilobed rostrum, the narrow third maxillipeds, and the slender ambulatory legs.

From 25 known congeners (Ng & Chuang 1996, Rahayu & Ng 2004), *N. yaeyamaensis* can easily be recognised by its more circular carapace, the absence of anterior and posterior lateral teeth, and the trilobed rostrum. *Neorhynchoplax yaeyamaensis* is perhaps closest to *N. exigua* in the similar shape of the rostrum, and also to *N. aspinifera* with regards to the similar male abdomen. *Neorhynchoplax yaeyamaensis* can be distinguished from *N. exigua* by the dentition of the inner margin of the ambulatory dactyli (one large subterminal spine and 0–7 following smaller spines vs. 3–9 exceptionally and equally large spines) (Kemp 1917: 261, fig. 10). *Neorhynchoplax yaeyamaensis* can be differentiated from *N. aspinifera* by the presence of the spines on the inner margin of the ambula-

tory legs (absent in *N. aspinifera*), and the shape of the distal end of the G1 (blunt vs. narrow with uniform thickness) (Lucas 1980: 195, figs. 3I, 6R, 10G). *Neorhynchoplax yaeyamaensis* may be allied to *N. octagonalis*, but the former can be easily distinguished from the latter by the shape of the trilobed rostrum (basally fused vs. isolated in dorsal view), the absence of posterior lateral tooth (present in *N. octagonalis*), the shape of the dorsal surface of carapace (subcircular vs. octagonal), and the dentition of the inner margin of the ambulatory dactyli (one large and 0–7 smaller spines vs. no spine on first leg and one spine on second to fourth legs) (Kemp 1917: 256, fig. 5).

Neorhynchoplax okinawaensis was originally described from Okinawa Island. Recently *N. okinawaensis* has been found living on the same island with *N. yaeyamaensis*. *Neorhynchoplax yaeyamaensis* is easily distinguished from *N. okinawaensis* by: the absence of the posterior lateral tooth (present in *N. okinawaensis*); the shape of the dorsal surface of the carapace (subcircular vs. subcircular with carapace widening posteriorly); the shape of the male abdomen (fused segments abruptly narrowed over distal 2/3 vs. gradually narrowed over distal 1/2), the dentition of the ambulatory inner margin of dactyli (one subterminal large spine followed by 0–7 smaller spines vs. only a single subterminal spine), and the shape of the G1 (blunt vs. tapered). Ng & Chuang (1996) recorded several specimens (ZRC 1994.4246, ZRC 1994.4248) from the Ryukyus as *N. okinawaensis*. We have rechecked this material and there are two species. All the specimens from ZRC 1994.4246 from Iriomote (5 males, 1 female, 2 juveniles, CW 1.4–2.4 mm) lack a posterior lateral tooth, which is one of the most important characters of *N. okinawaensis*. We have on hand a small male of *N. okinawaensis* (RUMF-ZC-28, CW 2.2 mm) which already possesses distinct posterior lateral teeth, and it is thus clear that this character is not associated with size. With regards to the relative carapace shape, ambulatory leg dentition and G1 structure, they also differ; and as such these specimens should now be referred to *N. yaeyamaensis*. The one specimen from ZRC 1994.4248 from Okinawa has a lateral tooth and is regarded here as true *N. okinawaensis*.

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References

- Ali, M.H., Salman, S.D. & Al-Adhub A.Y. (1995) Population dynamics of the hymenosomatid crab *Elamenopsis kemp* in a brackish subtidal region of Basrah, Iraq. *Scientia Marina*, 59 (1), 1–13.
- Davie, P.J.F. & Richer de Forges, B. (1996) Two new species of false spider crabs (Crustacea: Brachyura: Hymenosomatidae) from New Caledonia. *Memoirs of the Queensland Museum*, 39(2), 257–262.
- Kemp, S. (1917) Notes on Crustacea Decapoda in the Indian Museum. X. Hymenosomatidae. *Records of the Indian Museum*, 13, 243–279.
- Lucas, J.S. (1980) Spider crabs of the family Hymenosomatidae (Crustacea; Brachyura) with particular reference to Australian species: systematics and biology. *Records of the Australian Museum*, 33(4), 148–247
- Lucas, J.S. & Davie P.J.F. (1982) Hymenosomatid crabs of Queensland estuaries and tidal mud flats, including descriptions of four new species of *Elamenopsis* A. Milne-Edwards and a new species of *Amarinus*. *Memoirs of the Queensland Museum*, 20(3), 401–419.
- Milne Edwards, A. (1873) Recherches sur la Faune Carcinologique de la Nouvelle-Calédonie. *Nouvelles archives du Muséum d'histoire naturelle*, 9, 155–322, pls. 4–18.
- Nakasone, Y. & Takeda, M. (1994) A new hymenosomatid crab, *Elamenopsis okinawaensis*, n. sp. (Crustacea: Hymenosomatidae), from Okinawa, the Ryukyu Islands, Japan. *Pacific Science*, 48(2), 158–160.
- Ng, P.K.L. & Chuang, C.T.N. (1996) The Hymenosomatidae (Crustacea: Decapoda: Brachyura) of Southeast Asia, with notes on other species. *Raffles Bulletin of Zoology, supplement*, 3, 1–82.
- Rahayu, D. L. & Ng, P. K. L. (2004) The Hymenosomatidae (Crustacea, Decapoda, Brachyura) of Timika (Irian Jaya, Indonesia). *Zoosystema*, 26(1), 87-94.
- Sakai, T. (1938) *Studies on the crabs of Japan. III. Brachygnatha, Oxyrhyncha*. Yokendo, Tokyo. 193–364 pp., Pls. 20–41.