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***Ryukyum*, a new genus of terrestrial crab from the Ryukyu Islands (Brachyura: Potamidae)**

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Abstract. — A new genus, *Ryukyum*, is established for the terrestrial potamid crab from Ishigaki and Iriomote Islands, the southern Ryukyus, Japan, *Nanhaipotamon yaeyamense* Minei, 1973. The new genus differs from *Nanhaipotamon* s. str. in the structure of the sternum, third maxilliped, male abdomen, and male first and second gonopods.

Introduction

Fourteen species of freshwater and terrestrial crabs of the family Potamidae are known from Japan. They belong to three genera — *Geothelphusa* Stimpson, 1858, *Candidiopotamon* Bott, 1968, and *Nanhaipotamon* Bott, 1968. Most of the species occur in the Ryukyu Islands, the southern islands of Japan (Minei, 1973).

In the genus *Nanhaipotamon*, two species have been reported from Japan, both from the Ryukyus — *N. globosum* (Parisi, 1916) and *N. yaeyamense* Minei, 1973. *Nanhaipotamon globosum* was supposedly described from Okinawa Island, but the species has never been reported from the Ryukyus despite the many studies which have been done there. Bott's (1970) records of *N. globosum* from Hong Kong are in error (Ng & Dudgeon, 1992: 743). Ng & Dudgeon (1992: 744) suggested that *N. globosum* is not a species of *Nanhaipotamon* and should be referred to the genus *Potamon*. Whether *N. globosum* is actually found in Okinawa is not known. *Nanhaipotamon yaeyamense* was described from Ishigaki and Iriomote Islands by Minei (1973). The taxonomic po-

sition of this terrestrial crab had been questioned by Ng & Dudgeon (1992) and Ng & Takeda (1992), who suggested that it should be transferred to its own genus. *Nanhaipotamon yaeyamense* is here formally referred to its own genus, *Ryukyum* new genus. The diagnosis of this new genus and its taxonomy forms the basis of the present paper.

The terms G1 and G2 are used for the male first and second gonopods respectively. All measurements are of the width and length respectively. Specimens are deposited in the National Science Museum, Tokyo (NSMT) and the Zoological Reference Collection (ZRC), Department of Zoology, National University of Singapore.

Taxonomy

Potamidae

Ryukyum new genus

Type species. — *Nanhaipotamon yaeyamense* Minei, 1973, by present designation.

Diagnosis. — Carapace inflated laterally and longitudinally, dorsal surfaces smooth. Epigastric cristae very low; postorbital cristae distinct but not sharp, progressively stronger as it approaches lateral margin, confluent with epibranchial teeth. External orbital angle acutely triangular; separated from anterolateral margin by distinct cleft. Anterolateral margins strongly arcuate, epibranchial tooth distinct, blunt. Exopod of third maxilliped with vestigial flagel-

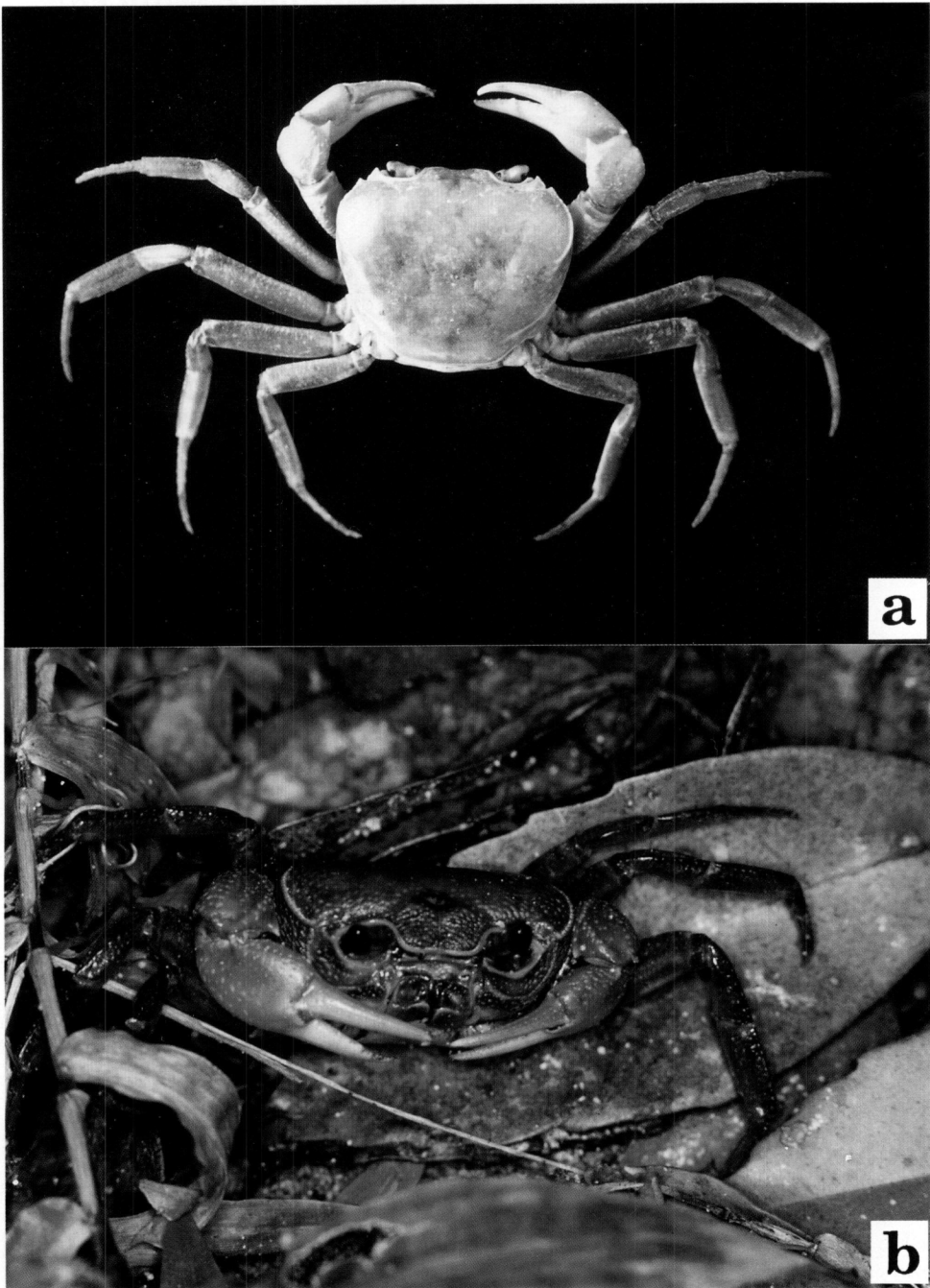


Fig. 1. *Ryukyum yaeyamense*. Male, 41.7 by 33.9 mm (ZRC 1994.4452): a, colour when freshly dead (photograph J.Y. Shy); b, living colours.

lum. Suture between sternites 2 and 3 hardly discernible; all other sutures not visible; male abdomen reaching beyond an imaginary line joining bases of coxae of chelipeds. Male abdomen broadly triangular; telson slightly longer than segment 6. G1 relatively stout, gently sinuous; terminal segment short, ca. 0.2 times length of subterminal segment, gently curved outwards; base of terminal segment with bulbous structure on ventral surface; synovial membrane dorsal, broad. G2 with long distal segment, ca. 0.3 times length of basal segment.

Etymology. — The genus name is derived from the name of the Ryukyu Islands. Gender neuter.

Remarks. — The genus *Nanhaipotamon* Bott, 1968, was established (as a subgenus of *Isolapotamon* Bott, 1968) for three species of freshwater and terrestrial crabs from Japan, Taiwan and the Philippines (Bott, 1968, 1970). All are characterised by a short, stout G1 with a flattened terminal segment. New species from mainland China and southern Japan were subsequently referred to this genus (Dai *et al.*, 1979; Dai & Chen, 1979, 1987; Minei, 1973). Ng & Dudgeon (1992), Ng & Takeda (1992) and Dai & Ng (1994) however, re-evaluated the generic position of the constituent species, and most have been transferred to other genera, with *Nanhaipotamon* s. str. now containing only two species from Hong Kong, mainland China and Taiwan (see Ng & Dudgeon, 1992). The Philippine species (*N. balssi* Bott, 1968) was referred to *Mindoron* Ng & Takeda, 1992, while most of the species from mainland China (see Dai *et al.*, 1979; Dai & Chen, 1979, 1987) were referred to *Huananpotamon* Dai & Ng, 1994.

The single *Nanhaipotamon* species described from the Yaeyama Islands in southern Japan, *N. yaeyamense* Minei, 1973, while it has the general swollen physiognomy of *Nanhaipotamon* s. str., differs markedly in many aspects from *N.*

formosanum (Parisi, 1916), the type species of *Nanhaipotamon*. In fact, Ng & Dudgeon (1992: 744) noted "... that *N. yaeyamense* is closer to crabs of the genus *Geothelphusa* Stimpson, 1858, especially with regards to the general form of the G1, and that it should be referred to a new genus". The present specimens of *N. yaeyamense* examined confirm that it should be referred to a separate genus. The external similarities between *N. yaeyamense* and *N. formosanum* are probably the result of convergence.

The presence of a well developed synovial membrane on the G1 clearly allies *Ryukyum* with *Geothelphusa* Stimpson, 1858. The G1s of *Nanhaipotamon*, *Mindoron* and *Huananpotamon* all lack synovial membranes. While the G1 of *Ryukyum* is much stouter than that known for any *Geothelphusa* species, it nevertheless has the general form and structure (cf. Bott, 1967, 1970; Minei, 1973; Shy *et al.*, 1994). Its structure certainly differs markedly from those of *Nanhaipotamon*, *Mindoron* and *Huananpotamon*. Many species of *Geothelphusa* also have inflated carapaces like *Ryukyum*. The absence of a flagellum on the exopod of the third maxilliped of *R. yaeyamense* (present in all known *Geothelphusa* species) is probably associated with the terrestrial habits of the species. The flagellum on the exopod of the third maxilliped in species of *Mindoron* and *Huananpotamon* species are well developed, reaching the width of the merus. In *Nanhaipotamon*, the flagellum is short, but still several times longer than that on *Ryukyum*. The abdomen of *Ryukyum* is the broadest and most rectangular shaped of all these genera.

Ryukyum yaeyamense also bears a superficial resemblance to *Geothelphusa levicervix* Rathbun, 1898, from Okinawa, especially with regards to the swollen carapace. *Ryukyum yaeyamense* differs markedly however in the form of the carapace (hardly or no epibranchial tooth



Fig. 2. *Ryukyum yaeyamense*. Male (41.7 by 33.9 mm) (ZRC 1994.4452): a, dorsal view; b, frontal view.

present in *G. levicervix*), distinctly longer ambulatory dactyli and the much stouter G1 with a very short terminal segment (cf. Minei, 1973; unpublished data).

Ryukyum yaeyamense (Minei, 1973)
 new combination
 (Figs. 1–3)

Nanhaipotamon yaeyamense Minei, 1973: 222, figs. 14, 15G, H; Minei, 1981: 80, pl. 4 (below); Sakai, 1976: 565, text-figs. 308a, c, c'; Miyake, 1983: 244; Shokita, 1990: 313; Shokita, 1991: 400.

Material examined. — 2 ♀ (larger 42.0 by 34.2 mm) (ZRC 1994.4451), 4 ♀ (largest 33.7 by 28.8 mm) (NSMT), Omoto-

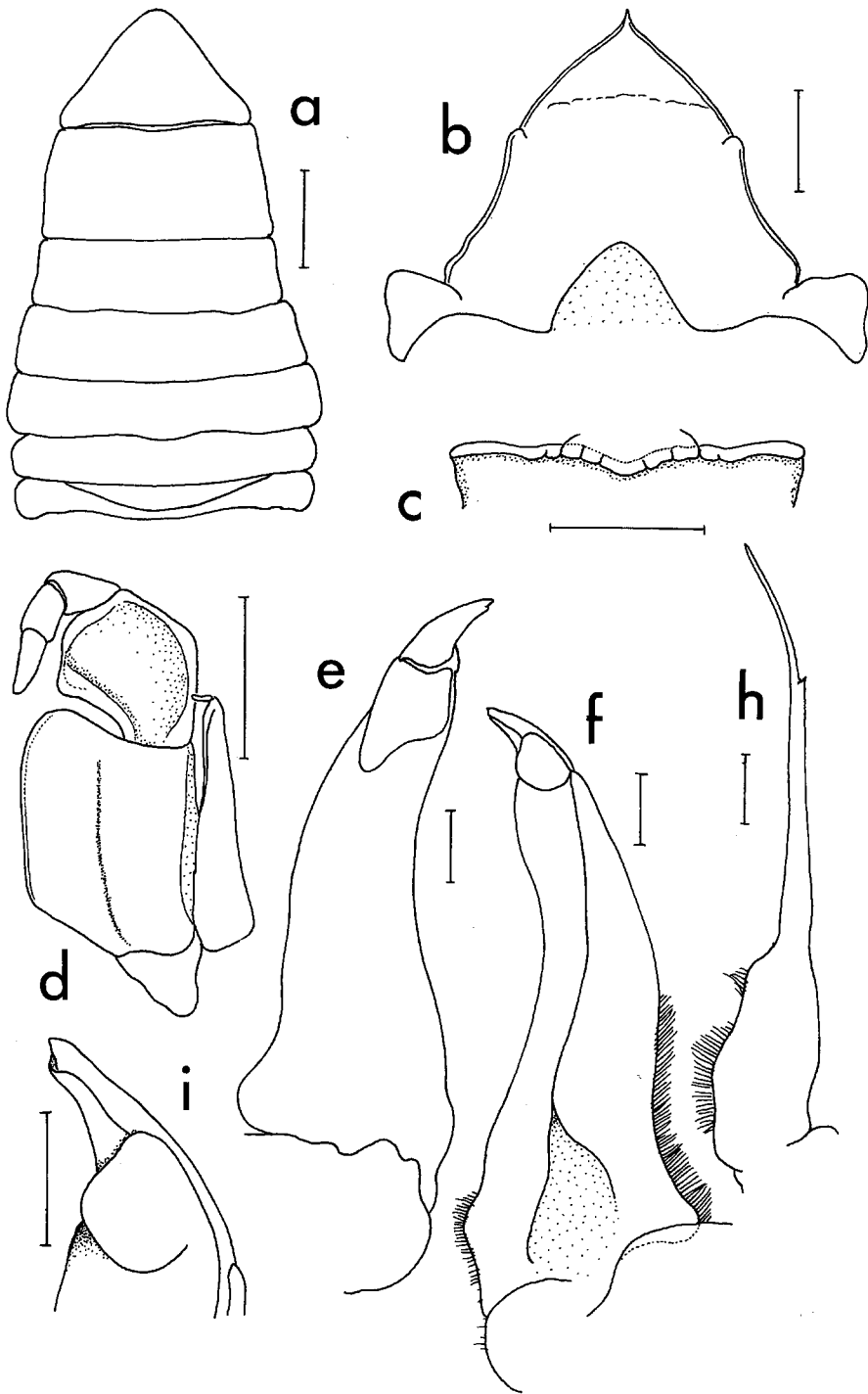


Fig. 3. *Ryukyum yaeyamense*. Male (41.7 by 33.9 mm) (ZRC 1994.4452): a, abdomen; b, anterior sternites; c, posterior margin of epistome; d, left third maxilliped; e, f, right G1; g, terminal segment of right G1; h, right G2. e, dorsal view; f, g, ventral view. Scales: a-d = 5.0 mm; e-h = 1.0 mm.

dake, Ishigaki Island, Yaeyama Islands, the Ryukyus, Japan, coll. H. Kasai, 28 August 1982. — 1 ♂ 41.7 by 33.9 mm (ZRC 1994.4452), upper reaches of the Miyara River, Ishigaki Island, Yaeyama Islands, the Ryukyus, Japan, coll. S. Shokita, June 1983.

Remarks. — Minei's (1973) description is quite detailed and there is no need to elaborate on it here. Minei (1973: 222) also reported on two males from the nearby Iriomote Island, but we have not examined specimens from there and cannot confirm if they are conspecific. *Ryukyum yaeyamense* is a relatively large species, reaching sizes of over 40 mm in carapace width. Females smaller than 30 mm carapace width are still immature.

Ecology. — *Ryukyum yaeyamense* is a terrestrial crab and does not occur in the water itself. In Ishigaki Island, *R. yaeyamense* occurs from the banks of the upper reaches of the Miyara and Nagura Rivers almost to the top of the mountain. The swollen carapace is probably adapted for air-breathing like many land crabs of the family Gecarcinidae. The crab can sometimes be found in wet terrestrial areas during the breeding season. The physiognomy of *R. yaeyamense* is similar to that of *Geothelphusa levicervix* from the Okinawa Group of islands. Gima & Shokita (1980), in a study of ecological distribution of four potamid crabs on Okinawa Island, showed that *G. levicervix* inhabits mainly terrestrial habitats but sometimes occurs in wet terrestrial areas as well. *Ryukyum yaeyamense* probably has very similar habits.

The eggs are spherical in shape when they are in their advanced developmental stages, and have a volume of about 6.0 cubic millimetres on average. The number of eggs carried by a female varies from seven to 13 (average 10).

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