

A New Freshwater Crab of the Genus *Flabellamon* Ng, 1996 (Crustacea, Decapoda, Brachyura, Potamidae) from Northwestern Thailand

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(Received 7 June 2019; accepted 26 June 2019)

Abstract A new freshwater crab of the genus *Flabellamon* Ng, 1996, *F. wanchaii*, is described from Tak Province, northwestern Thailand. It is a waterfall crab, having the rather flattened dorsal surface of the carapace, the sharp postfrontal and postorbital ridges, and the distinct epibranchial tooth, with general appearance of typical potamid crab, but the male first gonopod is characteristic in having the thickened and curled flap at median to basal part of the inner margin of the terminal segment. *Flabellamon wanchaii* is the second species of the genus *Flabellamon*, the type species of which is *F. pretzmanni* Ng, 1996 by the original designation and now known as *F. kuehnelti* (Pretzmann, 1963) from Tenasserim in southern Myanmar.

Key words: Freshwater crab, Potamidae, *Flabellamon*, new species, Thailand.

Introduction

During the field survey of freshwater crabs as lung fluke hosts in Tak Province, northwestern Thailand, the researchers encountered with unfamiliar crabs living under rock at waterfall in mountainous area. The crabs obtained were dissected to check the infection of metacercaria larvae of lung flukes, except for only one male crab which was kept for identification. The detailed examination of the specimen revealed that this waterfall crab represents a new species of the genus *Flabellamon* Ng, 1996 of the family Potamidae.

Thai freshwater crabs have been taxonomically studied in the late 20th and early 21st centuries by Prof. P. Naiyanetr of Chulalongkorn University based on the specimens not only from main country but also from the Peninsular provinces. Some of the new names created by him

were nomenclaturally *nomen nudum* or the descriptions were too short and imperfect for subsequent identification, but 5 species were validated by Naiyanetr (1992), and 21 species described between 1969 and 1992 were clarified and validated by Ng and Naiyanetr (1993), in which 4 new genera of 3 families Potamidae, Gecarcinucidae and Parathelphusidae were established, with 13 new species. Then, many new species were described by Naiyanetr (1993a, b, 1994, 1997, 2001a, b), Ng (1997), Ng & Naiyanetr (1995, 1997), Naiyanetr & Ng (1997), Yeo & Ng (1997), Yeo & Naiyanetr (1999, 2000), Leelawathanagoon *et al.* (2005, 2010), and Promdam *et al.* (2014). The family Potamidae from the Southwest Asia was revised by Yeo & Ng (1997), in which 91 former *Potamon* s.l. species and their allies were re-assigned to 8 known and 18 new genera.

Naiyanetr (1998) listed 48 species of 11 gen-

era in the family Potamidae, 24 species of 7 genera in the family Parathelphusidae and 6 species of 2 genera in the family Gecarcinucidae from Thailand. However, as the results of recent studies mentioned above, numbers of the species and genera of the Potamidae are increased to 61 species of 23 genera (Ng *et al.*, 2008, emended). These precedent studies made possible to describe a new potamid species from mountainous, poorly studied area in Tak Province, north-western Thailand.

In the following lines, the photographs and figures of the holotype male are provided, with their diagnostic and taxonomic notes. The breadth and length of the carapace are abbreviated as cb and cl, respectively, and the male first and second gonopods as G1 and G2, respectively.

The holotype specimen is deposited at the Tsukuba Research Departments of the National Museum of Nature and Science, Tokyo (NSMT). Some of the additional specimens collected in due time will be sent to the National Science Museum of Thailand.

Family POTAMIDAE Ortmann, 1896

Genus *Flabellamon* Ng, 1996

Flabellamon wanchaii sp. nov.

(Figs. 1–3)

Material examined. Tha Song Yang (17°32'43"N, 97°56'17"E), Tak Province, Thailand; 1 ♂ (Holotype, NSMT–Cr 26676; cb 48.1 × cl 35.9 mm), 27 July, 2017.

Diagnosis. Waterfall crab, with carapace, chelipeds and ambulatory legs of *Potamon-Indochinamon*-like appearance. Dorsal surface of carapace rather flat as a whole, weakly divided into regions, granulated at anterolateral parts, with thick epigastric and sharp postorbital ridges, and strong epibranchial tooth; anterolateral margin behind epibranchial tooth regularly convex outward, narrowly fringed with a line of granules. Exopod of third maxilliped slender, attaining to median part of merus, with flagellum equal to breadth of merus. G1 slender, terminal segment slightly less than one third as long as stem

segment; terminal segment equipped with a curled, thickened flap at median to basal part of inner margin; G2 straight, apparently longer than G1, weakly curved outward at distal part.

Description of holotype. Carapace (Fig. 1A) transversely ovoid, somewhat narrow in outline; anterolateral margins regularly convex, cristate, with a line of close-set granules; dorsal surface of carapace not convex dorsally, but rather flattened as a whole, with weakly deflexed anterior one third, nearly smooth, weakly rugose or scaly at anterior part of protogastric region and lateral part of branchial region along anterolateral margin of carapace; protogastric, mesogastric and cardiac regions weakly demarcated; anterior inner part of branchial region shallowly depressed; cervical groove deep between mesogastric and cardiac regions and along posterolateral margin of mesogastric region. Frontal margin (Figs. 1C, 2B) weakly sinuate, shallowly depressed along median part, but not distinctly divided into two lobes; frontal and supraorbital margins narrowly thickened, raised, beaded with close-set granules. Frontal region weakly convex dorsally, with 10 or more small depressed granules. Epigastric and postorbital ridges of both sides markedly strong, sharply cut medially by deep furrow of anterior extension of mesogastric region; each epigastric and postorbital ridges cut at outside of epigastric region, just behind level of inner angle of supraorbital margin; postorbital crest directly connected with epibranchial tooth; external orbital tooth directed forward, angulated at tip, outer margin nearly straight fringed with some granules; epibranchial tooth distinct, but not protruded from contour of carapace. Anterolateral margin of carapace (Fig. 1A) behind epibranchial tooth narrowly thickened, with posterior part curving shortly onto branchial region; more than 20 granules fringing anterolateral margin close-set, diminishing size posteriorly.

Third maxilliped (Fig. 1B) nearly smooth; length of ischium twice as long as merus, with a median longitudinal shallow furrow; merus quadrate, antero-inner angle truncated at articulation with carpus; main surface distinctly flat-

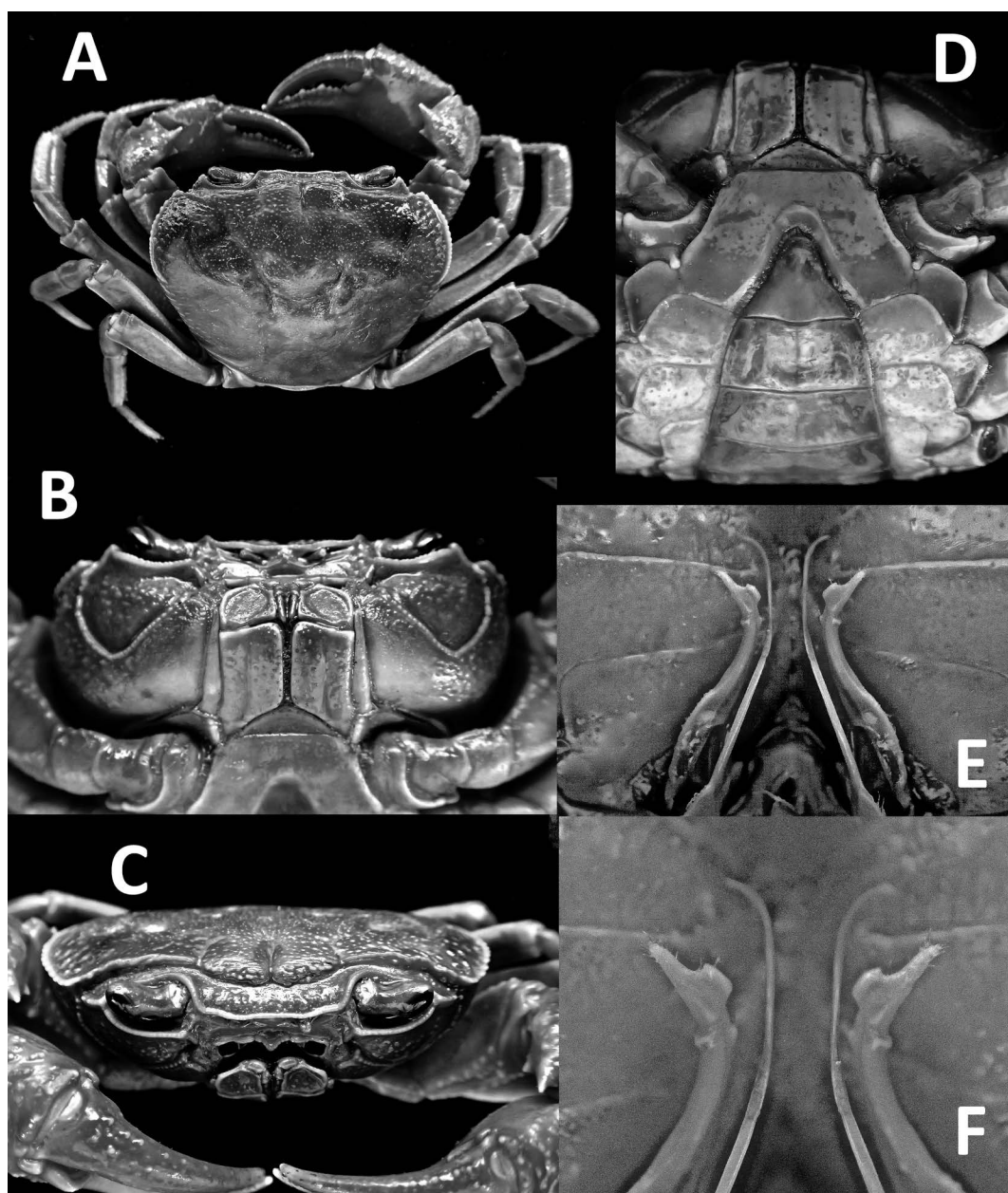


Fig. 1. *Flabellamon wanchaii* sp. nov., male (cb 48.1 × cl 35.9 mm), holotype, NSMT–Cr 26676. A: Habitus in dorsal view. B: Third maxillipeds and pterygostomial regions. C: Frontorbital region in frontal view. D: Abdomen. E, F: G1 and G2 *in situ*.

tened, surrounded by thickened margins; exopod slender, attaining to median part of merus, with flagellum as wide as merus.

Chelipeds (Fig. 2) heavy, unequal, the right being larger; outer surface of merus scaly, with

transverse short line of depressed granules; inner surface of merus wholly depressed, smooth; submarginal linear furrow surrounding distal margin of merus deep. Outer surface of carpus and palm scaly with transverse lines, depressed granules

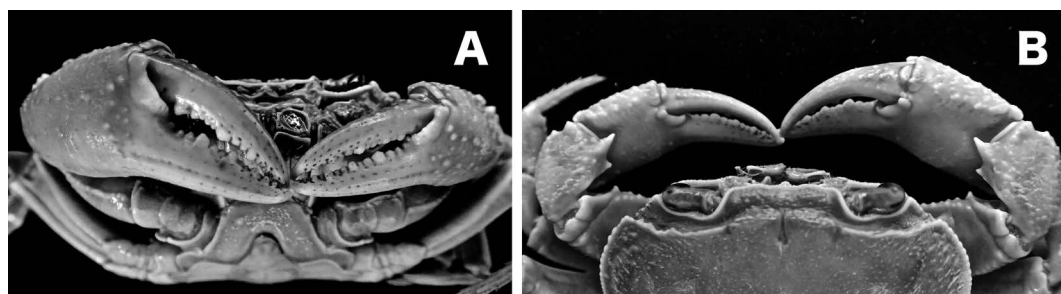


Fig. 2. *Flabellamon wanchaii* sp. nov., male (cb 48.1 × cl 35.9 mm), holotype, NSMT–Cr 26676. Chelipeds in outer (A) and upper (B) views.

and shallow furrows; inner upper angle of carpus armed with high strong tubercle; lower angle of carpus shortly tuberculate. Chelae comparatively long; fingers as long as palm, irregularly toothed along whole lengths in both fingers of both chelae, with some teeth larger than most of others.

Male abdomen (Fig. 1D) seven-segmented, wide, tapering regularly to lateral median part of terminal segment, then tapering rapidly toward rounded tip. G1 (Figs. 1E–F, 2A–B) slender, terminal segment slightly less than one third as long as basal segment; terminal segment equipped with a thickened, curled flap at median to basal part of inner margin; G2 (Figs. 1E–F, 2C) straight, apparently longer than G1, with distal part weakly curving outward.

Color in life. Carapace uniformly dark chocolate brown, with brick red orbital and anterolateral margins. Upper surfaces of chelipeds and ambulatory legs pale or grayish chocolate brown. Thoracic sternum, abdomen, outer and inner surfaces of chelipeds, and under surfaces of ambulatory legs creamy white.

Remarks. The new species is seemingly close to the species of the genus *Potamon* s.l. in the general carapace shape and armature, although the known 22 Thai *Potamon* species were transferred to many known or new genera by Yeo and Ng (1997) chiefly based on the G1 structure. Accordingly, it is difficult to refer this new species to the appropriate genus based only on the carapace features. In the new species, however, G1 is characteristic and quite different from those of the *Potamon* s.l. species, in which

the terminal segment is cylindrical and tapering toward the truncated tip. The G1 terminal segment of the new species is, as described above, equipped with a thickened, curled flap at median to basal part of inner margin, differing from the simply extended flap at the basal part of inner margin seen in such genera as *Thaipotamon* Ng & Naiyanetr, 1993, *Pudaengon* Ng & Naiyanetr, 1995, and *Rathbunomon* Ng, 1996. These species are the so-called terrestrial or land crabs living in hole, with thick body, differing from the waterfall crab living under stone at waterfall area, with flat body similar to the new species.

In the original definition of the new genus *Flabellamon*, Ng (1996) designated the new species, *F. pretzmanni* from Tenasserim, Myanmar, as the type species. It was one of the specimens reported by Bott (1970) as *Ranguna (Ranguna) turgidula* (Alcock, 1909), but Ng (1996) discussed in detail about the taxonomic status of *Potamon turgidulum* Alcock, 1909 and *P. kuehnelti* Pretzmann, 1963. Later, however, Brandis (2002) used Alcock's *P. turgidulum* in the sense of *F. pretzmanni*, which has the consequence of the synonymy of *Potamon kuehnelti* and *Flabellamon pretzmanni*, and the valid name is *F. turgidula*. Brandis (2002) extended the generic scope of *Flabellamon* based on the G2 morphology as described in the following lines.—Terminal part dorsoventrally flattened, fused zone of terminal tuber turning one and a half times round axis of terminal tuber; flexible zone short; terminal tube ending in distinct minutely curved tip. Brandis (2002) also transferred *Potamon turgidu-*

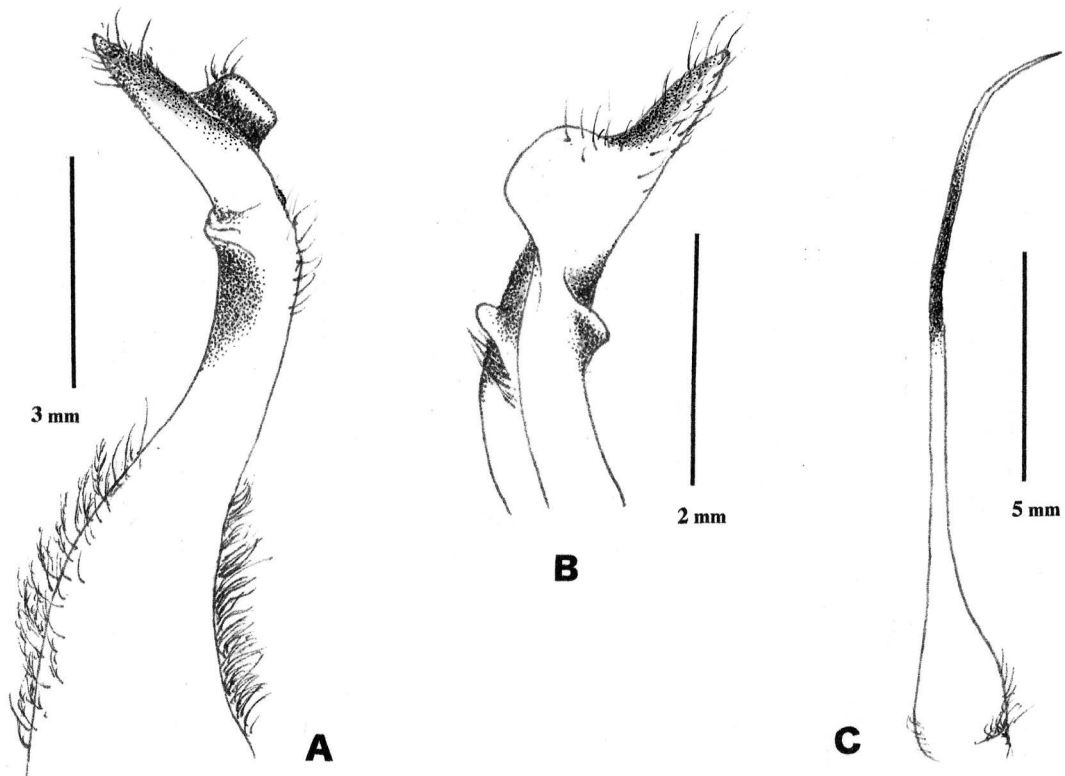


Fig. 3. G1 and G2 of *Flabellamon wanchaii* sp. nov., male (cb 48.1 × cl 35.9 mm), holotype, NSMT-Cr 26676. A: Left G1 in sternal (dorsal) view. B: Distal part of left G1 in ventral view. C: Left G2 in ventral view.

limana Alcock, 1910, *P. pruinatum* Alcock, 1909, *P. kanchanaburiense* Naiyanetr, 1992, and *P. erewanense* Naiyanetr, 1992 to *Flabellamon* based only on general agreement in the G2 morphology, but the characters other than G2, especially their G1s indicate some essentially different genera. Yeo and Ng (2007) established a new genus *Badistemon* for *Potamon* (*Potamon*) *turgidulum* Alcock, 1909, and the other three species, *Potamon turgidulimana*, *P. pruinatum*, *P. kanchanaburiense* and *P. erewanense* are known at present as the species of the genus *Stelomon* Yeo & Naiyanetr, 2000.

The monotypic species of the genus *Flabellamon*, *F. pretzmanni* Ng, 1996, which is currently considered as a junior synonym of *F. kuehnelti* (Pretzmann, 1963), was well represented by Pretzmann (1963, as *Potamon kuehnelti*), Ng (1996, as *Flabellamon pretzmanni*) and Brandis (2002, as *Flabellamon turgidula*). In the present

new species, the carapace is slightly more convex, uneven and weakly rugose with minute granules, the external orbital angle and the epi-branchial tooth are less prominent and blunt at the tips, and G1 is slender, with less specialized terminal segment. In *F. kuehnelti*, the distal half of the G1 terminal segment appears to be separated from the basal half like a small spearhead. The G1 terminal segment of the new species is simple rather than that of *F. kuehnelti*, but differs from the further simple flap of the species of the genera other than *Flabellamon*.

Etymology. This species is named after Prof. Wanchai Maleewong of Khon Kaen University for his kind guidance and encouragements during the studies of lung fluke parasitology in Thailand.

Acknowledgements

The authors wish to thank Dr. Peter K. L. Ng of the Lee Kong Chian Natural History Museum, Faculty of Science, National University of Singapore, for his suggestion about the genus to which the new species was referred. Drs. Hiroshi Yamasaki and Hiromu Sugiyama of the Department of Parasitology, National Institute of Infectious Diseases, Tokyo, for their arrangement of the specimen for study. Field survey for freshwater crabs as intermediate hosts of lung flukes was supported by the Distinguished Research Professor Grant, Thailand Research Fund (Grant no. DPG 6280002) to Prof. Wanchai Maleewong of Khon Kaen University.

References

- Alcock, A. 1909. Diagnoses of new species and varieties of freshwater crabs. Nos. 1–3. Records of the Indian Museum, 3: 243–252.
- Alcock, A. 1910. Catalogue of the Indian Decapod Crustacea in the Collection of the Indian Museum. Part I. Brachyura. Fasciculus II. The Indian Fresh-water Crabs —Potamonidae. Calcutta: Printed by Order of the Trustees of the Indian Museum, 135 pp., 14 pls.
- Bott, H. 1970. Die Süßwasserkrabben von Europa, Asien, Australien und ihre Stammesgeschichte. Abhandlungen der Senckenbergischen Naturforschenden Gesellschaft, 526: 1–338.
- Brandis, D. 2002. On the taxonomic status and biogeography of the Isolapotamidae Bott, 1970 (Decapoda, Brachyura). Journal of Natural History, 36: 1291–1339.
- Leelawathanagoon, P., V. Lheknim and P. K. L. Ng 2005. On a new species of freshwater crab of the genus *Johora* (Brachyura, Potamidae) from Peninsular Thailand. Crustaceana, 78: 59–66.
- Leelawathanagoon, P., V. Lheknim and P. K. L. Ng 2010. On a new species of freshwater crab of the genus *Terapopotamon* (Brachyura, Potamidae) from Peninsular Thailand. Crustaceana, 81: 49–59.
- Naiyanetr, P. 1992. Validation of five new species of Thai potamid crabs (Crustacea: Decapoda: Brachyura). Raffles Bulletin of Zoology, 40: 1–7.
- Naiyanetr, P. 1993a. Two new species of terrestrial crabs of the genus *Potamon* Savigny, 1816 from Thailand (Decapoda: Potamidae). International Senckenberg Symposium, Crustacea Decapoda, Abstract Volume, p. 44.
- Naiyanetr, P. 1993b. *Thaipotamon chulabhorn* n. sp., a new freshwater crab from Thailand (Decapoda, Brachyura, Potamidae). Crustaceana, 65: 1–7.
- Naiyanetr, P. 1994. On two species of terrestrial crabs of the genus *Dromothelphusa* Naiyanetr, 1992 (Crustacea: Decapoda: Brachyura: Potamidae) from Thailand. Raffles Bulletin of Zoology, 42: 689–694.
- Naiyanetr, P. 1997. *Dromothelphusa sangwan* n. sp., a new freshwater crab from Thailand (Decapoda, Brachyura, Potamidae). Crustaceana, 70: 385–393.
- Naiyanetr, P. 1998. Checklist of Crustacean Fauna in Thailand (Decapoda and Stomatopoda). OEPP (Office of Environmental Policy and Planning, Ministry of Science Technology and Environment) Biodiversity Series, 5: 161 pp.
- Naiyanetr, P. 2001a. *Potamon bhamibol* n. sp., a new giant freshwater crab from Thailand (Decapoda, Brachyura, Potamidae). Crustaceana, 74: 309–316.
- Naiyanetr, P. 2001b. *Potamon galyaniae* n. sp., a new freshwater crab from Thailand (Decapoda, Brachyura, Potamidae). Crustaceana, 74: 401–405.
- Naiyanetr, P. and P. K. L. Ng 1997. *Esanpotamon nam-som*, a new genus and species of potamid crab (Crustacea: Decapoda: Brachyura) from a waterfall in north-eastern Thailand. Proceedings of the Biological Society of Washington, 110: 417–421.
- Ng, P. K. L. 1996a. Establishment of two new genera for *Potamon lacunifer* Rathbun, 1904, and *Potamon laosensis* Rathbun, 1904 (Decapoda, Brachyura, Potamidae) from Laos. Crustaceana, 69: 898–906.
- Ng, P. K. L. 1996b. On a new genus and new species of potamid crab (Brachyura) from Burma. Crustaceana, 69: 1005–1013.
- Ng, P. K. L. 1997. On two new species of *Sayamia* and *Heterothelphusa* from southern Thailand. Crustaceana, 70: 710–719.
- Ng, P. K. L., D. Guinot and P. J. F. Davie 2008. Systema Brachyurorum: Part I. Annotated checklist of extant brachyuran crabs of the world. The Raffles Bulletin of Zoology, 17: 1–286.
- Ng, P. K. L. and P. Naiyanetr 1993. New and recently described freshwater crabs (Crustacea: Decapoda: Brachyura: Potamidae, Gecarcinucidae and Parathelphusidae) from Thailand. Zoologische Verhandlungen, 284: 1–117.
- Ng, P. K. L. and P. Naiyanetr 1995. *Pudaengon*, a new genus of terrestrial crabs (Crustacea: Decapoda: Brachyura: Potamidae) from Thailand and Laos, with descriptions of seven new species. Raffles Bulletin of Zoology, 43: 355–376.
- Ng, P. K. L. and P. Naiyanetr 1997. A revision of the genus *Siamthelphusa* Bott, 1968 (Crustacea: Decapoda: Brachyura: Parathelphusidae), with descriptions of five new species from Thailand. Journal of Natural History, 31: 1751–1784.
- Pretzmann, G. 1963. Über einige süd- und ostasiatische

- Potamoniden. Annalen des Naturhistorischen Museums Wien, 66: 361–372.
- Promdam, R., J. Nabhitabhata and P. K. L. Ng 2014. *Nakhonsion ramromensis*, a new genus and species of freshwater crab (Crustacea: Decapoda: Brachyura: Potamidae) from Nikhon Si Thammarat, Peninsular Thailand. Raffles Bulletin of Zoology, 62: 496–500.
- Yeo, D. C. J. and P. Naiyanetr 1999. Three new species of freshwater crabs from northern Laos, with a note on *Potamiscus (Ranguna) pealianoides* Bott, 1966 (Crustacea, Decapoda, Brachyura, Potamidae). Zoosystema, 21: 483–494.
- Yeo, D. C. J. and P. Naiyanetr 2000. A new genus of freshwater crab (Crustacea: Decapoda: Brachyura: Potamidae) from Thailand, with a description of a new species. Journal of Natural History, 34: 1625–1637.
- Yeo, D. C. J., P. Naiyanetr and P. K. L. Ng 1999. Revision of the waterfall crabs of the genus *Demanietta* (Decapoda: Brachyura: Potamidae). Journal of Crustacean Biology, 19: 530–555.
- Yeo, D. C. J. and P. K. L. Ng 1997. On a new genus of riverine crab (Crustacea: Decapoda: Brachyura: Potamidae) from northwestern Thailand, with descriptions of two new species. Hydrobiologia, 350: 179–188.
- Yeo, D. C. J. and P. K. L. Ng 2007. On the genus “*Potamon*” and allies in Indochina (Crustacea: Decapoda: Brachyura: Potamidae). The Raffles Bulletin of Zoology, Supplement, 16: 273–308.