

10/15/86

***Terrapotamon* gen. nov., a new genus of freshwater crabs from Malaysia and Thailand, with description of a new species, *Terrapotamon aipooae* sp. nov. (Crustacea: Decapoda: Brachyura: Potamidae)**

PETER K. L. NG

*Department of Zoology, National University of Singapore, Kent Ridge Campus, Singapore 0511, Republic of Singapore*

(Accepted 19 July 1985)

A new genus, *Terrapotamon* gen. nov., is established to accommodate two species of freshwater crabs, *Potamon abbotti* Rathbun, 1898 from southern Thailand, and a new species, *Terrapotamon aipooae* sp. nov. from West Malaysia. Members of this genus are characterized by their inflated carapaces, very acutely triangular external orbital angles, and structure of their first male gonopods.

**Introduction**

Recently, the author had an opportunity to examine several specimens of freshwater crabs collected from the state of Pahang in West Malaysia by Mr E. O. Shebberre, the one-time chief gamewarden of the Straits Settlements (Singapore) and Federated Malay States (Malaysia). Further studies showed that they not only represented a new species, but also a new genus. Through the kindness of Professor Phaibul Naiyanetr of the Department of Biology, Chulalongkorn University (Bangkok, Thailand), the author was able to compare Shebberre's specimens with a male and a female of *Potamon abbotti* Rathbun, 1898, a species reassigned by the late Dr Richard Bott (1970) to the genus *Stoliczia* Bott, 1966. This material of *S. abbotti* and that of the specimens collected by Mr Shebberre have sufficiently distinctive features to warrant assigning them to a new genus, *Terrapotamon*. The name is derived from the terrestrial habits of the type species, *T. abbotti*.

In this paper, the abbreviations G1 and G2 refer to the first and second male gonopods respectively. All materials examined are deposited in the Zoological Reference Collection (ZRC), National University of Singapore.

**Systematics**

***Terrapotamon* gen. nov.**

*Type-species. Terrapotamon abbotti* (Rathbun, 1898)

*Diagnosis.* Branchial and sub-branchial regions inflated, external orbital angle acutely triangular, with outer margin almost equal in length to inner. Flagellum on exopod of third maxilliped distinct (not reaching half width of merus) or vestigial. Male abdomen triangular, first few segments broad, G1 stout, terminal segment about one-third length of gonopod, tapered, conically shaped, dorsal and ventral folds appressed, groove for G2 dorsomarginal.

*Terrapotamon abbotti* (Rathbun, 1898) comb. nov.

(Fig. 2)

*Potamon abbotti* Rathbun, 1898: 27, pl. 1; de Man, 1898: 411.*Potamon (Potamon) abbotti* Rathbun, 1904: 311, pl. 14, fig. 6.*Stoliczia (Stoliczia) abbotti* Bott, 1970: 179, pl. 58, figs 92, 96.*Stoliczia abbotti* Naiyanetr, 1978 a: 9; 1978 b: 34; 1980: 51.*Type locality.* Trang, southern Thailand (7°35'23"N, 99°30'46"E)*Size.* (LECTOTYPE Male): 45.0 × 35.0 mm (United States National Museum of Natural History, Washington, DC, USNM no. 20641).*Diagnosis.* G1 terminal segment short, conically shaped, dorsal and ventral folds tightly appressed; distal portion of penultimate segment with bulbous swelling. Branchial and sub-branchial regions distinctly inflated. Outer margin of external orbital angle slightly longer than inner. Exopod of third maxilliped with vestigial flagellum.

Material examined. 1♂, 34.9 × 26.8 mm, 1♀, 36.5 × 28.2 mm, ZRC nos 198. 7717–7718, Surat Thani Province, southern Thailand (8°25'N, 99°58'E), coll. P. Naiyanetr, 16.ix.1983.

*Remarks.* The description and figures provided by Rathbun (1898) are excellent, and further description is unnecessary except for the G1 terminal segment of the present male specimen that is figured here in some detail and agrees very well with that of the holotype male (cf. Bott 1970). Bott (1970) referred this species to the genus *Stoliczia* Bott, 1966, but the unusual G1 that has the folds of the terminal segment tightly appressed, inflated branchial and sub-branchial regions of the carapace, and acutely triangular external orbital angles is considered sufficiently distinctive to remove it from this genus.The author agrees with Bott (1970) that a female specimen in the Paris Museum collection referred to this species by Rathbun (1904) is almost certainly *Ranguna longipes* (A. Milne Edwards, 1869). Rathbun (or the collector) probably confused the localities of these two species since there is a town near Pulau (Island) Coudore (8°39'39"N, 106°36'55"E), the type locality of *R. longipes*, at the river mouth of the Mekong River named 'Tra-On' (9°58'28"N, 105°57'51"E) which sounds very similar (hence easily misspelled and confused) to the type-locality of *T. abbotti*—Trang (7°35'23"N, 99°30'46"E), which is in southern Thailand. Trang is more than 700 km south-west of Pulau Coudore and separated by the Gulf of Thailand. Although *R. longipes* is similar to *T. abbotti* externally, and has only a vestigial flagellum on the exopod of the third maxillipeds, its branchial and sub-branchial regions are not distinctly inflated, and its G1 is quite different in structure from those of the genus *Terrapotamon* (cf. Bott and Türkay 1977). *Terrapotamon abbotti* is basically a terrestrial species (Naiyanetr 1978 a, b), hiding in deep burrows during the day. They are occasionally caught by local villagers; not for food, but for sale as pets (P. Naiyanetr, personal communication).*Terrapotamon aipooae* sp. nov.

(Figs 1, 3)

*Diagnosis.* G1 terminal segment tapered, conically shaped, with dorsal and ventral folds tightly appressed; distal portion of penultimate segment not swollen. Branchial and sub-branchial regions distinctly inflated. Outer margin of external orbital angle slightly longer than inner. Exopod of third maxilliped with distinct flagellum.

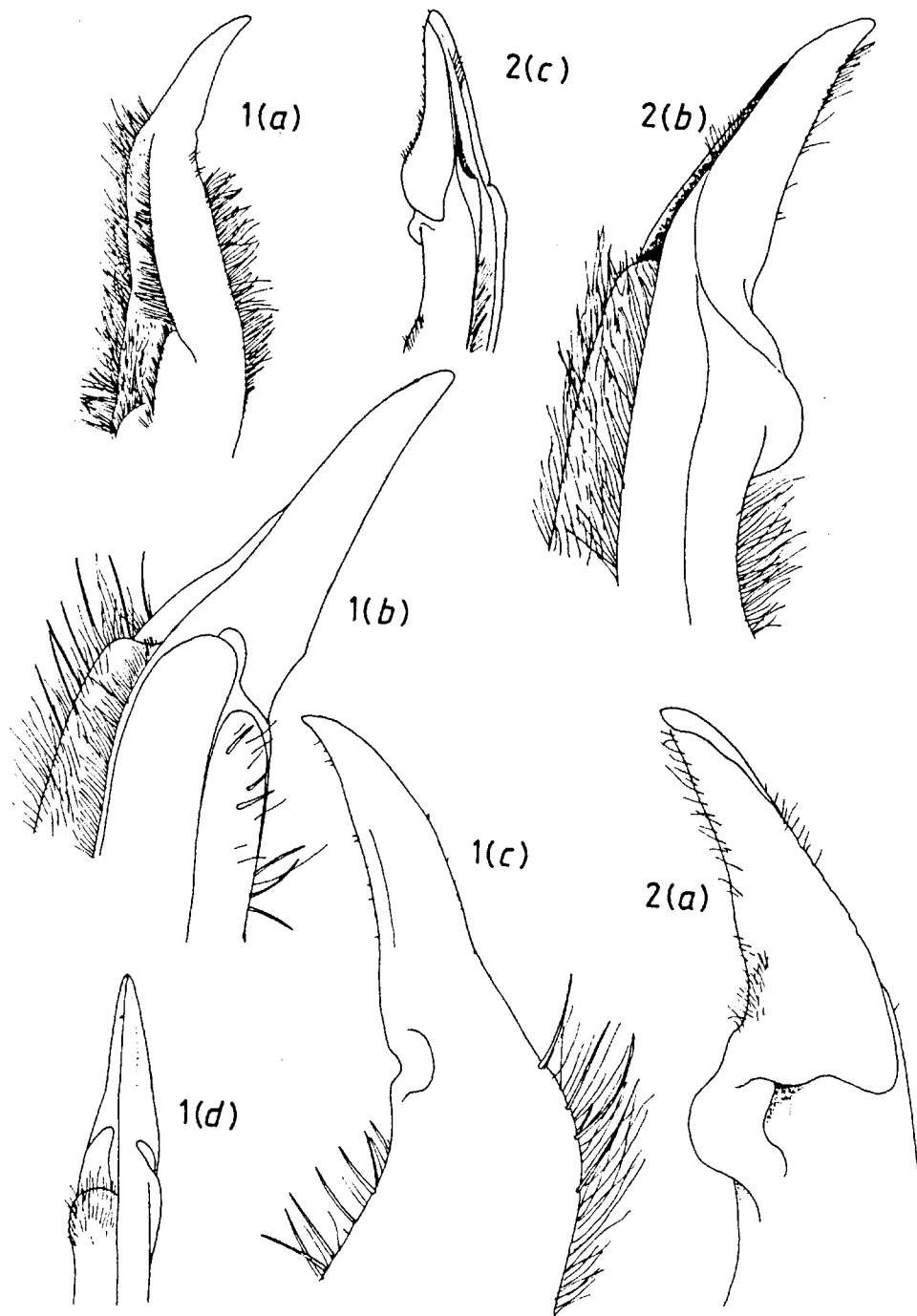


FIG. 1. (a)-(d) *Terrapotamon aipooae* sp. nov. holotype male, G1.

FIG. 2. (a) (c) *Terrapotamon abbotti* (Rathbun, 1898) comb. nov., G1.

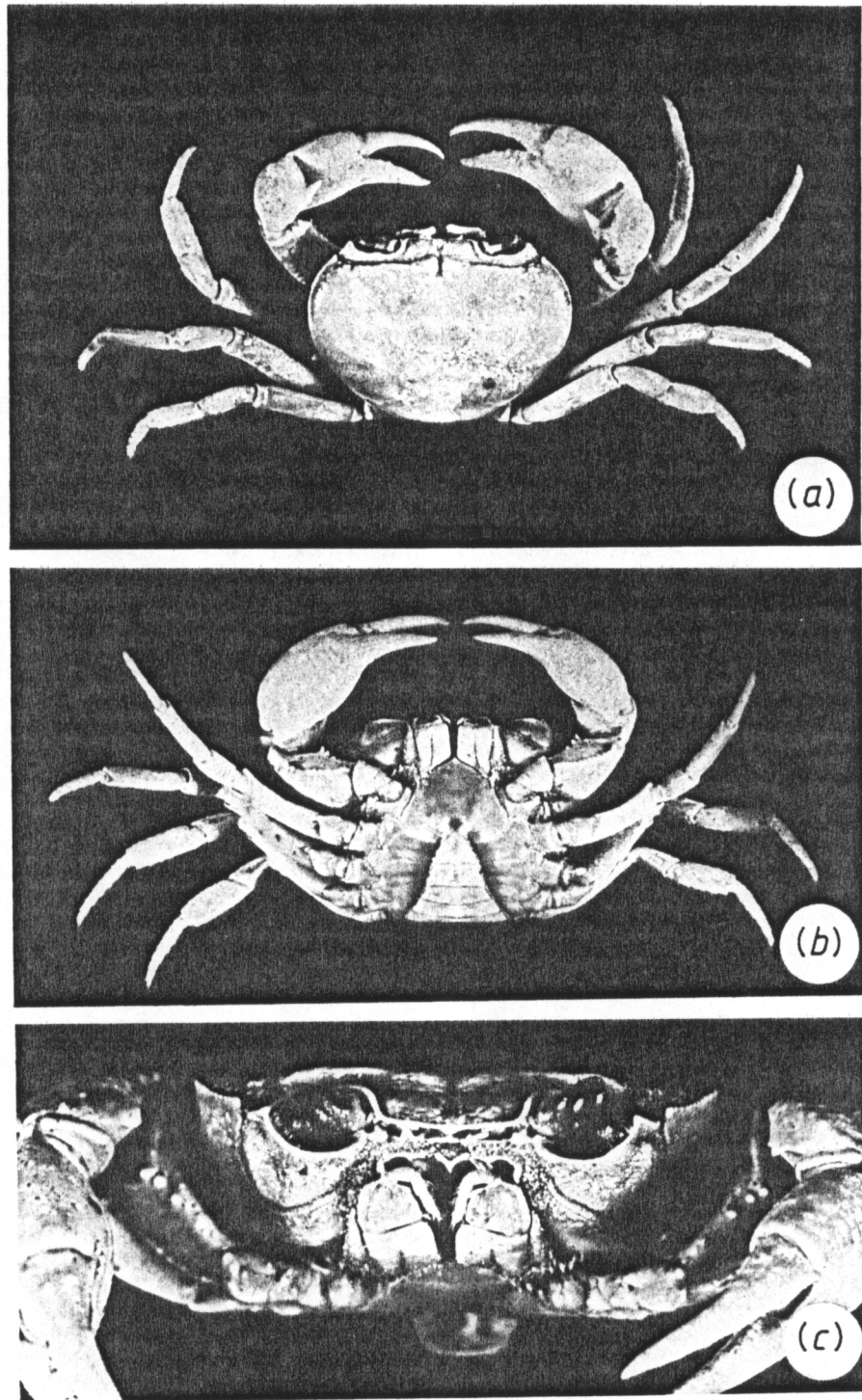


FIG. 3. *Terrapotamon aipooae* sp. nov. holotype male, 33.8 × 28.1 mm. (a) Dorsal view; (b) ventral view; (c) frontal view.

*Material examined.* HOLOTYPE, 1♂, 33.8 × 28.1 mm, ZRC no. 1984.503, Pahang, West Malaysia, coll. E. O. Shebberre, x.1947. PARATYPES, 1♂, 30.3 × 25.1 mm, 1♀, gravid, 35.4 × 28.2 mm, 1♀, 30.5 × 24.6 mm, ZRC nos 1984.504–506, same data as holotype.

*Male HOLOTYPE description.* Carapace smooth, glabrous. Frontal margin relatively straight, deflexed slightly. Post-frontal cristae prominent, margins uneven, joins sharply with epigastric cristae, but not separated by notch, continues to just below epibranchial tooth. Epigastric lobes small, but distinct, forward, separated by a notch that extends forwards and backwards as a relatively broad depression, giving front 'bilobed' appearance. Epibranchial tooth short, sharp, marking beginning of lightly serrated, slightly crested, strongly convex anterolateral margin. Posterolateral margins convex, converging. Branchial regions swollen. H-shaped central depression and cervical grooves broad, shallow. External orbital angle prominent, acute, outer margins slightly longer than inner. Supra- and infra-orbital margins smooth. Outer surfaces of third maxillipeds slightly setose, covered with small inconspicuous granules. Ischium with deep median sulcus. Exopod with short flagellum which extends to about half the width of merus. Terminal segment of mandibular palp simple. Anterior margin of epistome smooth, posterior with prominent median tooth. Inner portion of lateral margin straight, separated from concave outer portion (bordering efferent opening) by obtusely triangular angle. Sub-orbital, sub-branchial and pterygostomial regions glabrous, covered with very small granules. Sub-branchial regions distinctly swollen, carapace appearing inflated. Sternal and abdominal surfaces smooth, glabrous.

Chelipeds unequal, right larger. Fingers longer than palm, tips curved. Outer surfaces of palm, carpus and merus strongly rugose. Dorsal proximal margin of both dactyli with two rows of forward-pointing granules. Dactylus with two rows of pits, fixed finger with three. Cutting edges with well-developed teeth, not forming gap when closed. Carpus with one long sharp spine on inner angle, merus with two shorter ones.

Ambulatory legs unarmed, smooth. Lateral regions of carpus and propodus with long lightly serrated ridge. Margin of dactylus with sharp forward-pointing spines and scattered very short stiff hairs.

Abdomen 7-segmented, triangular in shape. First segment narrow. Segments 2 to 7 progressively broader. Seventh segment slightly longer than sixth, tip rounded, margins straight. G1 curves outward, terminal segment short, tapered, conically shaped, dorsal and ventral folds tightly appressed. G2 with long flagellum, almost as long as basal segment.

*Remarks.* *Terrapotamon aipooae* sp. nov. closely resembles *T. abbotti*, but several prominent characters, namely, presence of a distinct flagellum on the exopod of the third maxilliped, absence of a swelling on the distal portion of the G1 penultimate segment, less rugose and granulose frontal, anterolateral, post-orbital, sub-orbital, branchial, sub-branchial, pterygostomial and chelipedal surfaces, shorter fingers (relative to palm), and a less strongly convex carapace, easily distinguish it from *T. abbotti*.

This species is named after Miss Lim Ai Poo, in appreciation of her kindness, help and encouragement during the course of my studies, and for being such a special friend over the years.

#### General remarks

The characteristic structure of the G1 terminal segment and inflated branchial and sub-branchial regions easily distinguishes *Terrapotamon* from related genera in the

same area. *Terrapotamon abbotti* is known to be a terrestrial species, and the inflated branchial and sub-branchial regions are clearly an adaptation for this. *Terrapotamon aipooae* is also likely to have similar habits.

Not considering the distinctly inflated branchial and sub-branchial regions, *Terrapotamon* is perhaps closest to the genera *Potamon* Savigny, 1816 and *Potamiscus* Alcock, 1909 (both sensu. Bott, 1970), especially with regards to the acutely triangular external orbital angle and strongly convex anterolateral margins. In *Potamon*, however, the anterolateral margins are not as strongly convex as those of *Terrapotamon*, and, whereas the posterolateral margins of *Potamon* are slightly convex or straight, those of *Terrapotamon* are distinctively convex. The later margins of the male abdomen in *Potamon* also appear more parallel, giving the abdomen a somewhat quadro-triangular shape. In *Terrapotamon*, however, the lateral margins are distinctly converging, and the abdomen assumes a more triangular shape. The G1 terminal segments of *Terrapotamon* are tapered, conically shaped, with the groove for the G2 in a dorsomarginal position, whereas in the genera *Potamon* and *Potamiscus* the terminal segments are usually cylindrically shaped. The groove for the G2 in *Potamon* is also always ventral in position.

It is interesting to note that whereas *T. abbotti* has only a vestigial flagellum on the exopod of the third maxilliped, *T. aipooae* has a prominent one. Of the potamids known from the Malayan peninsula (including southern Thailand), only *Ranguna mani* (Rathbun, 1904) and members of the genus *Johora* Bott, 1966 have distinct flagella on the exopods of their third maxillipeds. All the other known species from this region have either vestigial or no flagella. Although *T. aipooae* possesses a prominent flagellum, this is still comparatively shorter than those of the genus *Johora* which extend beyond the width of the merus of the third maxilliped. The intermediate length of the flagellum in *T. aipooae* and the presence of a vestigial one on *T. abbotti* suggests that the direction of evolution of the flagellum in the genus is from long to short. This is also likely to be true for the potamids as a whole. Similar observations have also been made for the South American freshwater crabs of the family Pseudothelphusidae (Rodriguez 1982).

The progressive shortening of this flagellum in the genus *Terrapotamon* suggests that any classification using only single characters like flagellum length (as in Alcock's (1909) system) will prove unsatisfactory. The author is also not convinced that the singular importance given to the structure of the G1 by Bott (1970) will help resolve the matter (cf. Ng, 1985, Ng and Yang, 1985). These features will only prove useful when used in conjunction with other morphological characters (e.g. carapace and male abdomen shape), as well as ecological (e.g. habitat) and geographical factors. Only through the careful study of these aspects can we hope to establish a more phylogenetic (and hopefully less confusing) classification for the potamids.

#### Acknowledgments

The author is grateful to Professor Phaibul Naiyanetr of the Department of Biology, Chulalongkorn University, Bangkok, Thailand, for his gift of the two specimens of *T. abbotti*, and his generous remarks concerning the biology of this species. Thanks are also due to Mrs C. M. Yang, curator of the Zoological Reference Collection, National University of Singapore for her help and permission to use her facilities. The photographs in Fig. 3 were taken by Mr H. K. Yip of the Department of Zoology, National University of Singapore. This study was supported by a research grant (RTF 006/84) to the author from the Singapore Institute of Biology.

## References

- BOTT, R., 1970, Die Süßwasserkrabben von Europa, Asien, Australien und ihre Stammesgeschichte. Eine Revision der Potamoidea und Parathelphusoidea. (Crustacea, Decapoda), *Abhandlungen der Senckenbergischen Naturforschenden Gesellschaft, Frankfurt*, **526**, 1-338, pls. 1-58.
- BOTT, R., and TÜRKAY, M., 1977, 1. Nachtrag zur revision der Süßwasserkrabben von Europa, Asien und Australien. Die verwandtschaftlichen Beziehungen von *Ranguna longipes* (A. Milne-Edwards 1869) (Crustacea: Decapoda: Potamidae), *Senckenbergiana biologica, Frankfurt*, **58** (1/2), 93-96.
- MAN, J. G., DE, 1898, Viaggio di Leonardo Fea in Birmania e regioni vicini. LXXXI. Note sue quelques espèces des genres *Parathelphusa* H. M.-E. et *Potamon* Sav., recueillies par M. Leonardo Fea pendant son voyage en Birmanie. *Annali del Museo Civico di Storia Naturale de Genova*, ser. 2a, **19** (39), 384-440, pls. 4-6.
- NAIYANETR, P., 1978 a, *Freshwater Crabs as the Intermediate Host of Paragonimus and their Distribution in Thailand* (Bangkok, Thailand: Department of Biology, Chulalongkorn University), pp. 1-16.
- 1978 b, The geographic distribution of freshwater crabs in Thailand, *Geographical Journal, Geographical Association of Thailand, Bangkok*, **3** (3), 24-43.
- 1980, *Crustacean Fauna of Thailand (Decapoda and Stomatopoda)* (Bangkok, Thailand: Department of Biology, Chulalongkorn University), 73 pp. (mimeographed).
- NG, P. K. L., 1985, Freshwater decapod crustaceans from Pulau Tioman, West Malaysia. *Zoologische Mededelingen, Leiden*, **59** (14), 149-162.
- NG, P. K. L., and YANG, C. M., 1985, On three new species of freshwater crabs from Singapore and West Malaysia (Crustacea, Decapoda, Brachyura), *Malayan Nature Journal, Kuala Lumpur*, **39** (1), 57-73.
- RATHBUN, M. J., 1898, Descriptions of three new species of freshwater crabs of the genus *Potamon*. *Proceedings of the Biological Society of Washington*, **12**, 27-30, 2 pls.
- 1904, Les crabes d'eau douce. *Nouvelles Archives du Muséum d'Histoire Naturelle, Paris*, ser. 4, **6**, 225-312, pls. 9-18.
- RODRIGUEZ, G., 1982, Les crabes d'eau douce d'Amérique. *Office de la Recherche Scientifique et Technique Outre-Mer, Faune Tropicale, Paris*, **22**, 1-223.