

**A NEW GENUS AND SPECIES OF CAVERNICOLOUS CRAB (BRACHYURA :  
POTAMIDAE) FROM KANCHANABURI, THAILAND, WITH COMMENTS ON THE  
GENERA *TIWARIPOTAMON* BOTT, 1970 AND *LARNAUDIA* BOTT, 1966**

by

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### I - INTRODUCTION

The author recently received from Louis DEHARVENG, an unusual potamid crab collected from a cave in Kanchanaburi Province in Thailand. This crab had been collected by a French speleological team and proved to represent a genus and species, both new.

There has been only one other report of cavernicolous freshwater crabs in Thailand (NG, 1988 a) in which a new gecarcinucid, *Phricotelphusa deharvengi* was described from Phangnga, southwester Thailand. He also recorded *Potamon andersonianum* (WOOD-MASON, 1871) from a cave in Mae Hong Son province. The latter species however, appeared to have entered the caves by accident.

The present new genus and species, here named *Phaibulamon stilipes*, appears to be adapted to living in caves, possessing very long legs covered with numerous sensory hairs. The description of this new taxon, together with a discussion of its affinities, form the context of the present paper. The taxonomic problems as they relate to the genera *Tiwaripotamon* Bott, 1970, and *Larnaudia* Bott, 1966, are also briefly discussed.

The author is most grateful to Louis DEHARVENG for sending the interesting specimen to me and his helpful correspondance. Laurent APEL and Florence GUILLOT (Kwai Expedition 1990) kindly provided information regarding the habitat and live coloration of the new species. Thanks is also due to Professor Phaibul NAIYANETR for permission to examine his specimens and sharing his observations of other potamids with him.

### II - MATERIAL AND METHODS

The abbreviations G1 and G2 are used for the male first and second pleopods respectively. Measurements of the carapace are of the width, length and height respectively. The carapace height is measured from the gastric region to the suture between the second and third sternites. The following abbreviations are used for the various pereopod segments - IB = ischio-basis, M = merus, C = carpus ; P = propodus, D = dactylus, CH = chela (including fingers). All measurements are in millimetres. Terminology used essentially follows that used by NG (1988 b). The type specimen is deposited in the Zoological Reference Collection, Department of Zoology, National University of Singapore.

### III - DESCRIPTIONS

#### *Phaibulamon*, new genus

**Diagnosis.** Epigastric cristae low, very rugose ; postorbital cristae very low, rugose, separated from epigastric cristae by very shallow groove. External orbital angle acutely triangular, outer margin straight, gently serrated, more than twice length of inner margin. Third maxilliped exopod without flagellum, just reaching upper edge of ischium. Cheliped with relatively elongate merus. Ambulatory legs very long, second leg 2.9 times length of carapace, with dense short stiff hairs along ventral margin of merus and both margins of propodus. Sutures between sternites 3 and 4 shallow but visible. G1 short, relatively stout, bent 90° outwards. G1 terminal segment 0.3 times length of subterminal segment, proximal surface of ventral margin covered with numerous small, sharp tubercles. G2 distal segment longer than half length of basal segment.

**Type species.** *Phaibulamon stilipes*, new species, designated herein.

**Etymology.** The new genus is named in honour of Professor Phaibul NAIYANETR of the Department of Biology, Chulalongkorn University, Bangkok, Thailand, in recognition of his many contributions to Thai carcinology, and in appreciation for the help he has given the author over the years. The name is used in conjunction with the generic name *Potamon*. *Phaibulamon* is neuter.

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**Remarks.** *Phaibulamon*, new genus, appears to be closest to *Potamiscus* s.str. Alcock, 1909 (nec sensu BOTT, 1966, 1970) in general features and the exopod of the third maxilliped in both genera also completely lack flagella. *Phaibulamon*, however, differs in several important respects, viz. the sutures between the third and fourth sternites are still clearly discernible (not visible in *Potamiscus*, the surfaces of these two segments being smooth); the short exopod which just reaches the upper edge of the ischium (reaches to the merus in *Potamiscus*); the very long ambulatory legs; and the strongly bent G1. The bristles on the inner margins of the third maxilliped merus and ischium are also sparse and very stiff, unlike that of other Thai potamids.

*Phaibulamon* also appears to have affinities with *Terrapotamon* Ng, 1986. The carapace features are similar, as is the form of the third maxilliped. The exopod of *Terrapotamon* is however, longer with a vestigial flagellum still present. The G1 of *Terrapotamon* is stout but not strongly bent outwards as in *Phaibulamon* (see NG, 1988 b).

There is no known *Potamiscus* species which has ambulatory legs as long as those of *Phaibulamon*. The legs are not only long, the propodus and dactylus (especially the former) also possess numerous short stiff hairs along the margins and surfaces, to an extent not known for any Thai potamid. There are few potamids which possess legs as long or longer than those of *Phaibulamon*. The general carapace features and length of the legs allies *Phaibulamon* perhaps most closely with the genus *Tiwaripotamon*. BOTT (1970) established *Tiwaripotamon* for species which have long legs and an upcurved G1 terminal segment. Three of the species he included in the genus and his key however, contradict the first character (they have short legs instead); and only the form of the G1 appeared to be constant. The genus *Tiwaripotamon*, as conceived by BOTT, is certainly heterogeneous (see comments on the genus later). *Tiwaripotamon* s.str. however, can be easily separated from *Phaibulamon* in usually having a broader and more transverse carapace and a third maxilliped exopod extending beyond the length of the ischium and possessing a well developed flagellum. *Geothelphusa tenuimana* (MIYAKE and MINEI, 1965) from Okinawa, Japan, also has very long legs. BOTT (1970 : 155 ; in addendum) regarded this species as a synonym of *G. levicervix* Rathbun, 1898, but MINEI (1973) argued for its separation, a view supported by present author. Members of the genus *Geothelphusa* however, have a very different G1 structure and the third maxilliped exopod has a long flagellum. The only other potamid genus with long legs is the troglobitic *Cerberusa* Holthuis, 1979, with two species from Borneo. One species, *C. tipula* Holthuis, 1979, has the longest legs of any known potamid (second leg 3.7 times length of carapace).

The general form of the carapace and long legs of *Phaibulamon* also resemble some Madagascan potamonautids, notably species of *Madagapotamon* BOTT, 1965. Of the three recognised species, two, *M. humberti* BOTT, 1965 and *M. golhardi* BOTT, 1965, have elongated legs and chelipeds. *Madagapotamon golhardi* in particular, bears a strong resemblance to Asiatic taxa like *Tiwaripotamon*, even to the extent of the upcurved G1 terminal segment (see BOTT, 1965). The remarkable degree of general similarity, almost certainly arising from convergent evolution, between two such different taxa strongly suggests caution in using gonopods alone in delineating supraspecific taxa. There is also evidence to suggest that a separate genus is warranted for *M. humberti*, a species which is very different from its presumed congeners. Although the distal part of the G1 in *M. humberti* is upcurved, the terminal and subterminal segments are not at all demarcated like the other species. The male abdomen of *M. humberti* is also very broad and significantly different, and the form of the carapace quite distinctive.

*Phaibulamon* has, proportionately, the shortest third maxilliped exopod of any known Southeast Asian potamid. This suggests that it may be more terrestrial, similar to some of the South American Pseudothelphusidae in which the exopod is strongly reduced or even vestigial (RODRIGUEZ, 1982). Moreover, the inner distal margin of the third maxilliped exopod of *Phaibulamon* completely lacks a triangular tooth. This structure is probably present in the related genus *Tiwaripotamon* s. str. DAI *et al.* (1980) figured the third maxilliped for what she believed was "*Ranguna annamense*" (see later), clearly depicting a well developed inner distal triangular tooth and a short flagellum, whose length does not exceed the width of the merus. BALSS' (1914) figure of the third maxilliped of *T. annamense* is too schematic to discern this structure. The monotypic Chinese genera *Tenuipotamon* DAI, 1990 (type-species : *Tenuipotamon purpura* DAI, 1990) and *Parapotamoides* DAI, 1990 (type-species : *Potamon (Parathelphusa) endymion* DE MAN, 1906) both have very short third maxilliped exopods, especially the latter, although that of *Phaibulamon* is still the shortest. The external and G1 features of both Chinese taxa are however, very different from that of *Phaibulamon* (see DAI, 1990).

The structure of the third and fourth sternites is interesting. In almost all Asiatic potamids the author has examined, these two sternites are completely fused, forming a single plate. In *Phaibulamon*, the sutures separating these two segments are still distinct. Comparisons from literature are unsatisfactory as the sternites, when figured, do not always clearly show this feature.

The G1 of *Phaibulamon* is short and strongly bent at a 90° angle outwards. There is no other potamid with a G1 quite like it and is therefore a distinctive feature. The folding is also unusual and there are numerous small sharp tubercles on the proximal lower part of the terminal segment. These sharp tubercles have not been reported for other potamids. BOTT (1966, 1970) figured the G1 of a specimen he had identified as "*Ranguna (Ranguna) rangoonensis* RATHBUN" which is somewhat similar in general shape to that of *Phaibulamon*, but the G1 subterminal segment of *Phaibulamon* is shorter, stouter and the terminal segment is differently structured. TURKAY and NAIYANETR (1978) have since shown that BOTT had misidentified his specimen, the actual *rangoonense* RATHBUN, 1904, being a very different species with a different G1 and is, for all purposes, a

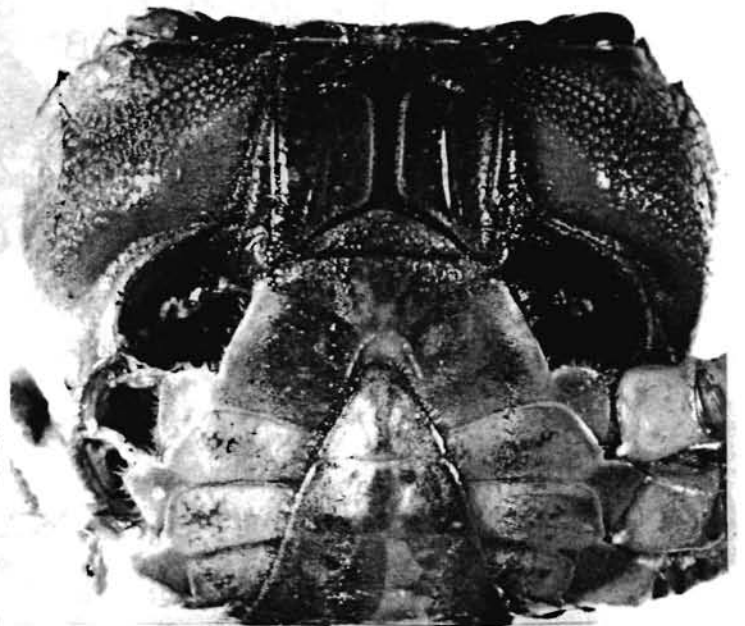


Fig. 1 - *Phaibulamon stilipes*, n. gen., n. sp., holotype male : 28.5 by 22.7 by 11.1 .

*Potamiscus*. They also suggested that BOTT's "*rangoonense*" might perhaps be related to *Potamon pruinosum* ALCOCK, 1909, or *Potamon beieri* PRETZMANN, 1966. The G1 of *Phaibulamon* is also generally similar to *Potamon flexum* DAI *et al.*, 1980, but that species has a different physiognomy and a well developed flagellum on the third maxilliped exopod.

*Phaibulamon stilipes*, new species  
Figs. 1-3.

**Material.** Tham Nam Pah Khoan cave, from "K2" resurgence, Kwai Valley, in Kanchanaburi Province, Thailand ; 18 August 1990 ; FRENCH EXPEDITION KWAI 90 ; 1 male holotype, 28.5 by 22.7 by 11.1 mm.

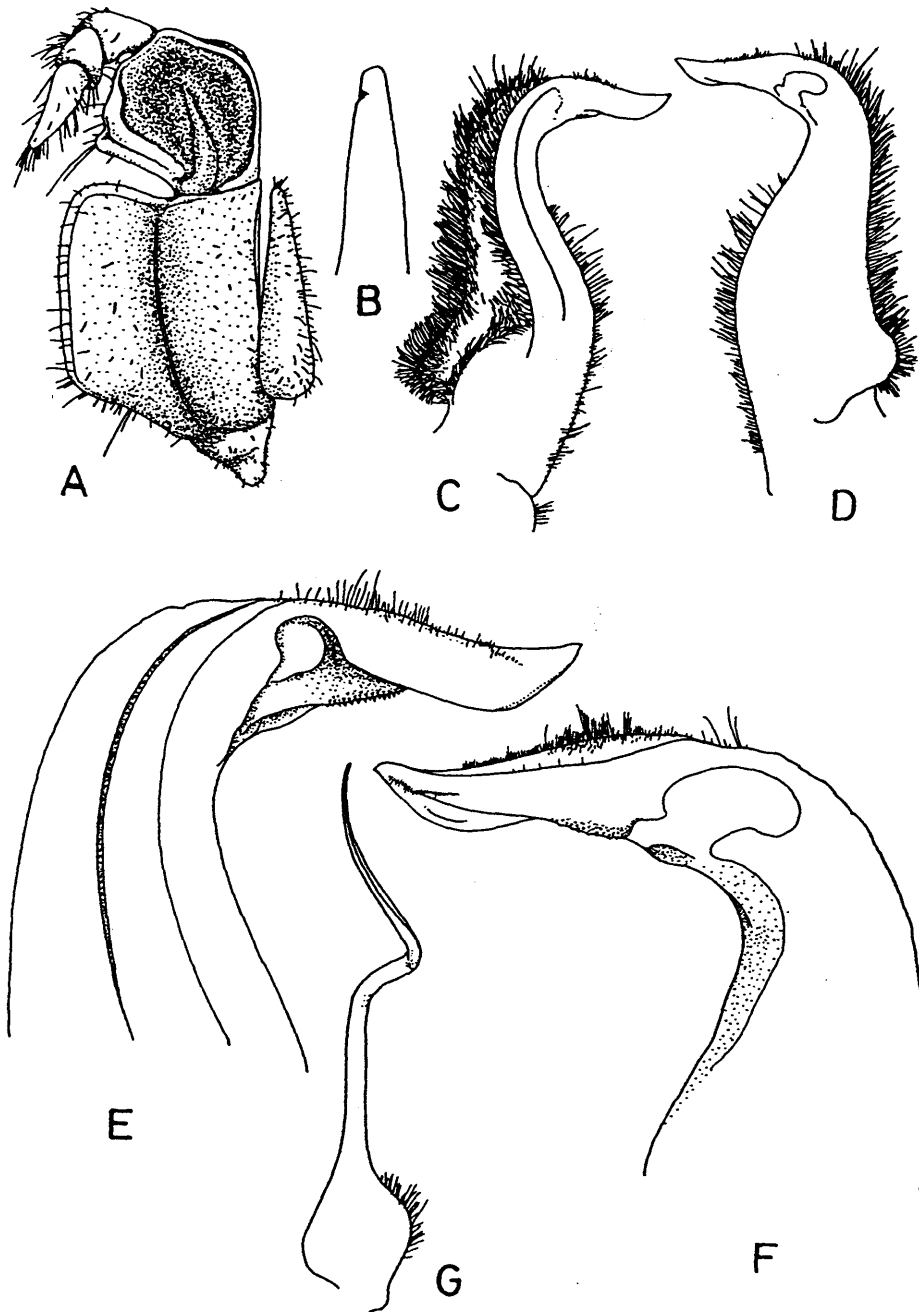


Fig. 2 - *Phaibulamon stilipes*, n. gen., n. sp., holotype male, 28.5 by 22.7 by 11.1 mm. A, right third maxilliped ; B, distal part of exopod of right third maxilliped ; C-F, left G1 ; G, left G2. E, F, G1 terminal segments. C, E, ventral views ; D, F, dorsal views.

**Description.** Carapace transverse, relatively high, dorsal surfaces without hair; branchial, gastric and cardiac regions inflated. Epigastric cristae very rugose, low, not distinctly sharp, separated by shallow V-shaped groove which extends to mesogastric region; postorbital cristae rugose, very low, separated from epigastric cristae by short, very shallow groove. Epibranchial tooth small but prominent, sharp, directed upwards and obliquely outwards, anterolateral margin serrated; external orbital angle acutely triangular, sharp, outer margin straight, gently serrated, more than twice length of inner margin. Supraorbital margin smooth, gently sinuous. Frontal margin entire, gently sinuous, gently deflexed downwards. Orbits broad, eyes well developed, corneal pigments distinct. Anterolateral, progastric, mesogastric, frontal and postorbital regions covered with numerous small granules, surfaces appearing very rough. Posterolateral margin gently convex, regions lined with low oblique striae. Cervical groove very shallow, indistinct, reaches shallow H-shaped depression. Suborbital, sub-branchial and pterygostomial regions well demarcated by granulose ridges, surfaces very rugose/granulose, without hair. Anterior margin of epistome almost straight, parallel with frontal margin; posterior margin with one median triangular tooth, lateral margins sinuous.

Exopod of third maxilliped just reaching upper edge of ischium, not extending to merus, inner margin of distal part without tooth, without trace of flagellum. Ischium with deep median groove; inner margin with numerous stiff bristles. Merus cristate along margins, with median longitudinal ridge, other areas distinctly depressed.

Chelipeds subequal, right larger. Outer surfaces of merus, carpus and palm covered with numerous small rounded granules. Larger cheliped dimensions as follows: IB = 5.0, M = 12.3, C = 8.6, CH = 22.1. Merus relatively long, covered with short stiff bristles on granulated margins, no trace of subterminal spine; inner distal surface with 1 or 2 larger granules. Carpus with well developed sharp spine on inner margin, outer surface with granulated crest near base of spine. Fingers gently curved downwards and inwards, longer than palm, tips hooked, cutting surfaces with 2 to 5 blunt teeth and numerous denticles. Ischium and basis fused, suture visible. Coxa with one sharp granule on inner margin.

Ambulatory legs long, second leg longest. Second leg dimensions as follows: IB = 2.6, M = 24.6, C = 9.6, P = 14.5, D = 14.4. Merus without distinct subterminal spine, dorsal margin gently serrated, outer surface with low median ridgeline with scattered short stiff hairs. Surfaces generally smooth, covered with scattered short, stiff hairs, densest along ventral margin of merus, and both margins of propodus.

Surfaces of sternites 1-4 covered with very low granules and sparse pubescence. Suture between sternites 2 and 3 very gently convex (towards buccal field). Sutures between sternites 3 and 4 discernible, shallow, complete, extending from base of chelipeds to abdominal cavity.

Abdominal cavity reaches between sternites 3 and 4. Sternal knobs on sternite 5, small. Abdomen triangular, seventh segment subequal in length to sixth, lateral margins gently convex, tip rounded; first segment reaches base of last pair of legs; second to sixth progressively broader and longer.

G1 short, relatively stout, bent at right angles outwards. Inner margin and groove for G2 densely covered with long, soft hairs; outer margin distinctly sinuous, covered with short, soft hairs. G1 terminal segment 0.3 times length of subterminal segment, semi-cylindrical, tapering gradually; upper margin almost straight, covered with numerous short hairs; groove between dorsal and ventral folds not visible from ventral view; proximal surface of lower margin covered with numerous small, sharp tubercles. G2 1.7 times length of G1 subterminal segment, with

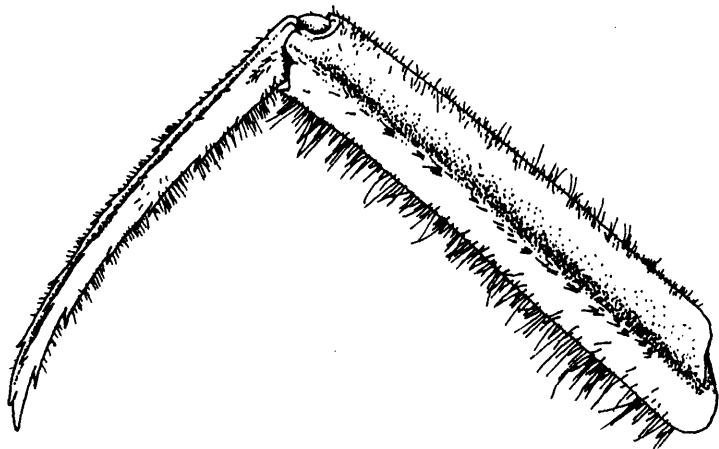


Fig. 3 - *Phaibulamon stilipes*, n. gen., n. sp., holotype male, 28.5 by 22.7 by 11.1 mm. Dactylus and propodus of left second ambulatory leg. well developed distal segment, longer than half length of basal segment.

**Etymology.** The specific name is derived from the Latin "*stilus*" for stake or stylus; and "*pes*" for foot; alluding to the long legs of the species. It is used as a noun in apposition.

**Remarks.** In general carapace aspects, *Phaibulamon stilipes*, new species, resembles *Tiwaripotamon whiteheadi* PARISI, 1916, especially with regards to the granulose/rugose surfaces. The legs of *P. stilipes* are however, proportionately longer. The eyes and orbits of *T. whiteheadi* are also proportionately larger. The forms of their external orbital angles and epibranchial teeth are clearly different; with the epigastric and postorbital cristae of *T. whiteheadi* much stronger and sharper (see FROGLIA and GRIPPA, 1986).

The cave where the type specimen of *P. stilipes* was collected is in the Kwai Valley, and a small river runs from it. The crab was found in a gallery 30 metres above the river level, about 150 metres from the entrance of the

cave. The river is about 30 m below sea level, the water temperature was about 25 °C with a flow rate of between 20 and 30 litres per second. The specimen was ornage in life (L. APEL & F. GUILLOT, *in litt.* 1 April 1991).

#### IV - COMMENTS ON THE GENERA *TIWARIPOTAMON* BOTT, 1970, AND *LARNAUDIA* BOTT, 1966

The genus *Tiwaripotamon* was established by BOTT (1970 : 150), with *Geothelphusa annamensis* BALSS, 1914, as type-species. He characterised it mainly by the flat carapace, shallow grooves, short frontal margin, long and slender ambulatory legs, and the distinctly upcurved G1 terminal segment. He recognised seven species in the genus : *T. annamense* (BALSS, 1914) (Vietnam), *T. austenianum* (WOOD-MASON, 1871) (Cherra Punji, India), *T. simulum* (ALCOCK, 1909) (Burma), *T. araneum* (RATHBUN, 1904) (Hanoi), *T. artifrons* (BURGER, 1894) (Luzon, Philippines), *T. adriatretum* (ALCOCK, 1909) (Moulmein, Burma), *T. beusekomae* BOTT, 1970 (Thailand). BOTT's key (1970 : 150-151 ; addendum), however, dealt with only six of the species, inexplicably leaving out *T. austenianum* (see also English translation by CHUENSRI, 1974). DAI *et al.* (1980) described two more species from southwestern China (near the Vietnamese border) - *T. depressum* and *T. glabrum* ; while SONG (1984) described *T. pusillum* from the same area in China.

The type-species, *T. annamense* however, closely resembles only three of the nine other species in this genus : *T. araneum*, *T. simulum* and *T. austenianum*. *Tiwaripotamon annamense* differs from the remaining species too significantly to justify their congenericity. *Tiwaripotamon annamense* was first described by BALSS (1914) on the basis of a 38.0 by 29.0 mm male obtained from Phuc-Son, Annam (at present in northern Vietnam). It was redescribed by BOTT (1970) who figured the G1. Later, DAI *et al.* (1980 : 370, Fig. 2, Pl. 1 fig. 2) reported this species from southwestern China in Pingguo County, but these authors transferred it to the genus *Ranguna* BOTT, 1966, commenting that the base of the dorsal fold of the G1 terminal segment had a small fold. As *annamense* was the type species of *Tiwaripotamon*, they were unknowingly, synonymising *Tiwaripotamon* with *Ranguna* BOTT, 1966. In the same paper, DAI *et al.* assigned to *Tiwaripotamon* two of their new species : *T. depressum* and *T. glabrum*. They commented that since their specimens of "*Ranguna annamense*" (one male and one female) were larger than BALSS' type, differences are to be expected, citing the broader third maxilliped and broader male abdomen of their specimens as compared to BALSS'. These differences however, cannot be merely explained by size. The dimensions of the third maxilliped are not known to vary significantly in proportion between younger and older specimens, although the male abdomen might. The structure of the G1 also cannot be explained by size differences. The subterminal segment of the G1 of the type of *T. annamense* is distinctly sinuous, the outer margin been strongly concave ; the junction between the terminal and subterminal segments possessing a small but distinct swelling on the outer margin, the terminal segment been more upcurved, without trace of a flap. While the last character has been known to vary in some potamids (see NG, 1985, 1988 b), the others have not. Pending a reexamination of the her specimens, it is very likely that DAI *et al.*'s (1980) pair of specimens actually belong to an undescribed species of *Tiwaripotamon* instead.

As to the three other species closely affiliated with *T. annamense*, *T. austenianum* and *T. simulum* were classified by ALCOCK (1910) in his "Group IV : *austenianum* group" of the subgenus *Potamon* (*Potamon*), which was characterised by the extremely "... long slender legs, the propodites of the two middle pairs being three to four times as long as broad" (p. 44). *Tiwaripotamon austenianum* is known only by a 48.0 by 35.0 mm female collected from Cherra Punji, somewhere in India, and its status is uncertain. *Tiwaripotamon simulum* is also known only by a 48.0 by 38.0 mm female obtained from somewhere in Burma, and has not been collected since. *Tiwaripotamon araneum* is known only by a small male 13.3 by 11.2 mm from Jainkin Mountains near Hanoi, Vietnam, and the only clue to its inclusion in this genus been RATHBUN's (1904) statement (no figures) of the species having very long legs like those of *Potamon* (*Geothelphusa*) *bidiensis* LANCHESTER, 1900 (present *Stygothelphusa bidiensis* sensu NG, 1989).

BOTT (1970) commented that *Potamon* (*Potamon*) *whiteheadi* PARISI, 1916 from Hainan island was probably synonymous with *T. araneum*, but the present author prefers to regard both as distinct taxa for the moment. PARISI's (1916) figures are very good, and while RATHBUN (1904) describes the epibranchial tooth of *T. araneum* as small, that on *P. whiteheadi* is well developed. FROGLIA and GRIPPA (1986) reexamined the type specimens of *T. whiteheadi* in the Milan Museum, commenting that *T. whiteheadi* differed from *T. annamense* in having a wider front, more indented anterolateral margin with a well developed epibranchial tooth, and shorter ambulatory legs. They also noted that compared to *T. whiteheadi*, *T. araneus* "... seems to be characterized by still longer legs" (p. 276). The G1 of *T. whiteheadi* was also figured by these two authors for the first time. *Tiwaripotamon whiteheadi* is almost certainly a valid species. This is also considering that the island of Hainan is separated from mainland Hanoi (the type-locality of *T. araneum*) by the Gulf of Tonkin (Tongking).

A redefinition of the genus *Tiwaripotamon* seems necessary.

**Diagnosis of *Tiwaripotamon*.** Carapace transverse, surfaces smooth, branchial regions swollen, regions between branchial regions and behind epigastric cristae flattened. Epigastric and postorbital cristae well developed but low, not sharp, strongly forward, frontal region appearing very narrow. Epibranchial tooth small, usually blunt, very forward. External orbital angle small, triangular to acutely triangular. Anterolateral margin



distinctly convex. Third maxilliped exopod with short flagellum, the length not extending beyond width of merus. Cheliped fingers elongate, as long as or longer than palm. Ambulatory legs very long. Male abdomen distinctly triangular in shape. G1 slender, subterminal segment tapering from relatively broad base, terminal segment usually upcurved, with or without dorsal folds. G2 with long distal segment, longer than half length of basal segment. Distribution : Eastern India, Burma, Vietnam, Southern China, Hainan.

A total of five species are here recognised for the genus *Tiwaripotamon* s. str. - *T. annamense*, *T. simulum*, *T. austenianum*, *T. araneum* and *T. whiteheadi*. The exact position of these species can only be determined when more specimens can be obtained and their gonopods are known.

As to the status of the remaining five species, "*T. artifrons*", "*T. adriatretum*", "*T. beusekomae*", "*T. depressum*", "*T. glabrum*" and "*T. pusillum*", they are very different from *Tiwaripotamon* s. str. in having normal epigastric and postorbital cristae, broadly triangular external orbital angles, third maxilliped exopods with longer flagellum, and ambulatory legs of normal length. They will be considered separately.

*Telphusa artifrons* BURGER, 1894 resembles *T. annamense* in only one main aspect - the general similarity in their G1 structures. In *T. annamense*, the terminal segment is shorter, more cone-shaped, gradually tapering throughout its length, the subterminal segment been distinctly sinuous. In *T. artifrons*, the terminal segment is longer, more cylindrical, and tapers only in the distal half, with the subterminal segment stouter and straighter. The third maxilliped exopod of *T. annamense* only bears a short flagellum which does not extend beyond the width of the merus, in contrast to *T. artifrons* which has a well developed one. Compared to *T. annamense*, the carapace of *T. artifrons* is less transverse, the anterolateral margins smooth and rounded (not distinctly cristate and serrated), the surfaces much smoother, and the external orbital angle more acutely triangular. Moreover, the chelipeds and ambulatory legs of *T. annamense* are very much longer than those of *T. artifrons* which are of normal length and not elongated. Although a new genus is almost certainly needed for BURGER's species, the present author would prefer to wait until he has an opportunity to examine the specimens personally before doing so.

Only the type specimens of *Telphusa artifrons* are known, being collected from a cave in Luzon (BURGER, 1894). The number of type specimens is confusing. BURGER (1894) recorded that he only had females specimens (number not stated). DE MAN (1906) commented that one of the "female" specimens was in fact a male. BALSS (1937 : 168, 169), who first figured the G1, however, listed one male and three females. BOTT (1968) listed one male and two females, designating the male as the lectotype. BOTT (1968) had originally classified this species in the genus *Isolapotamon*, probably because this genus is found in the Philippines. Later (1970), probably on the basis of its carapace morphology and G1 structure, he transferred it to his new genus *Tiwaripotamon*. The structure of the G1 figured by BALSS (1937) and BOTT (1968, 1970) appears very different. Those of BOTT shows a long, upcurved G1 terminal segment, whereas the terminal segment figured by BALSS is more cylindrical, short and not upcurved. It is possible that BALSS had drawn the G1 in situ and his drawing was distorted. In any event, BOTT's 1968 figure (Fig. 8) also differs somewhat from his 1970 photograph (Pl. 41 fig. 75) ; the terminal segment been stouter, more "sausage-shaped", and the tip rounded in his 1970 figure but sharply tapering and more slender in his 1968 figures. This however, is certainly due to the angle in which the G1 was drawn or photographed.

*Potamon (Geotelphusa) adriatretum* was described by ALCOCK (1909) from Moulmein, Burma, and has since been reported from the Kakhien Hills and Dafla Hills in Burma (ALCOCK, 1910 ; KEMP, 1913). BOTT (1970) first figured the G1 of this species, from a male originally examined by KEMP (1913) from Yembung River, Burma. BOTT (1970) also regarded *Potamon (Geotelphusa) adriatretum* var. *lophocarpus* KEMP, 1913 (Upper Rotung River, Burma) as synonymous with *T. adriatretum*. KEMP had separated *lophocarpus* from the nominate form by its inner carpal angle been so reduced that a spine is completely absent, as well the presence of coarse hairs been present on the inner surfaces of the carpus (absent in *adriatretum* s. str.). KEMP (1913) had noted that these differences were consistent for 35 specimens he studied from one area, and no intermediates were found, or were both forms found together, although their localities were close. KEMP's observations suggest that it would be better to recognise his variety as a distinct species, i. e. *Potamon lophocarpus* KEMP, 1913, until the types can be reexamined. Another species which BOTT (1970) regarded as synonymous (but without explanation) with *T. adriatretum* was *Potamon (Geotelphusa) superciliosum* KEMP, 1913. KEMP separated his species from *adriatretum* by its differently structured frontal and anterolateral margins, epigastric and postorbital cristae, and the small (not almost absent) epibranchial tooth. 12 specimens were examined, all from the Yembung and Balek Rivers in Burma, in the same area as *A. adriatretum*. KEMP notes that the differences he observes are consistent even between specimens of the same sizes. Until the specimens (and the G1s) can be reexamined, it would be better to also recognise this as a separate species.

These three species, *adriatretum*, *loxophrys* and *superciliosum*, differ significantly from the type species of *Tiwaripotamon* in having the external orbital angle broadly triangular, with the outer margin distinctly longer than the inner, the third maxilliped exopod with a long flagellum, the legs of normal length, and the G1 terminal segment cylindrical, with several prominent hairs on the dorsal margin. These differences suggest the establishment of a new genus for this species and its allies. The author however, prefers not to erect one until specimens of all the related species can be examined. These species should be referred back to the genus *Potamon*

s. lato for the moment.

KEMP (1923) described *Potamon (Geotelphusa) loxophrys*, and a new subspecies, *Potamon (Geotelphusa) dehaani* var. *laevior*, from southern Annam. They have characters (relatively smooth carapaces, triangular to broadly triangular external orbital angle, and presence of a long flagellum on the third maxilliped exopod) which suggest that they might perhaps be allied to the *adriatretum* group of species. *Potamon loxophrys* is aberrant in that its carapace is much flatter than the other members. A flat but smooth carapace is a rare character in Asiatic potamids and might suggest that a separate genus might be needed. Both species were not dealt with in detail, only mentioned briefly under *Ranguna (Ranguna) brousmichei* by BOTT (1970 : 167).

As for "*T. beusekomae*", the position of this species was revised by TURKAY and NAIYANETR (1987). They showed that the type species of the genus *Larnaudia* BOTT, 1966, *Telphusa larnaudii* A. MILNE EDWARDS, 1869, was based on misidentified material by BOTT (1966, 1970). TURKAY and NAIYANETR (1987) reexamined the lectotype male of MILNE EDWARDS' species in the Paris Museum, and showed that the G1 was very close to "*Tiwaripotamon beusekomae*" instead. They also commented that the genus *Tiwaripotamon* as recognised by BOTT (1970) was heterogeneous, and preferred to remove "*T. beusekomae*" to another genus. Since the lectotype male of *Thelphusa larnaudii* had a G1 similar in form to "*T. beusekomae*", and the former species was the type of BOTT's genus *Larnaudia*, they suggested that both species should be classified together in *Larnaudia* instead. The present author is in full agreement with this action (see also HOLTHUIS, 1990 ; NG, 1990). The three Chinese species "*T. depressum*", "*T. glabrum*" and "*T. pusillum*" have G1 structures very similar to those of *L. larnaudii* and *L. beusekomae*, and their authors noted (in Chinese) that the third maxilliped exopods of these species had a distinct flagella. They can easily be accommodated in the genus *Larnaudia* as well.

*Larnaudia* was originally erected as a subgenus of *Potamiscus* by BOTT (1966), but later became a distinct genus (BOTT, 1970). TURKAY and NAIYANETR (1987) redefined the genus after showing that BOTT's type species had been based on misidentified material. Since TURKAY and NAIYANETR (1987) did not rediagnose the genus *Larnaudia* in any detail, it is redefined here.

**Diagnosis of *Larnaudia*.** Carapace transverse, surfaces rugose, regions well defined. Epigastric and postorbital cristae well defined but low, strongly rugose. External orbital angle triangular to broadly triangular, outer margin longer than inner. Anterolateral margin convex, slightly serrated, epibranchial tooth low but visible. Third maxilliped with short or no flagellum. Ambulatory legs normal length. Male abdomen triangular. G1 relatively stout, subterminal segment tapering gradually from broad base, terminal segment cone-shaped, tapering, bent outwards, distinctly upcurved, tip blunted, shorter than half length of subterminal segment. G2 with long distal segment. Distribution : Thailand, southern China, probably Vietnam and other parts of Indo-China.

*Larnaudia chaiyaphumi* NAIYANETR, 1982, is also retained in the genus *Larnaudia*. The author has examined the types, and the structure of the carapace, third maxilliped exopod and G1 agree with the generic definition very well.

The specimens identified as *Larnaudia larnaudii* by BOTT (1966, 1970) were referred to a new genus and species by TURKAY and NAIYANETR (1987), *Neolarnaudia botti*. The diagnosis and figures provided by BOTT (1966, 1970) as representing *L. larnaudii* now apply for *Neolarnaudia* instead. TURKAY and NAIYANETR (1987) regarded *Neolarnaudia* as monotypic. *Neolarnaudia* has a well developed flagellum on its third maxilliped exopod (fide BOTT, 1970, as "*Larnaudia larnaudii*"), and this character helps to separate it from *Larnaudia* s. str. TURKAY and NAIYANETR (1987) noted that the other species classified by BOTT (1970) in his genus "*Larnaudia*", *L. browneana* (KEMP, 1918), was in fact more closely affiliated with *Ranguna brousmichei* (RATHBUN, 1904), and should be transferred to the genus *Ranguna* BOTT, 1966 (sensu BOTT, 1970) instead. As *Ranguna* is now regarded as a junior synonym of *Potamiscus* (see TURKAY & NAIYANETR, 1987 ; HOLTHUIS, 1990 ; NG, 1990), *Ranguna brousmichei* should perhaps be transferred to the genus *Potamon* s. lato instead as exopod of the third maxilliped of *brousmichei* has a distinct flagellum.

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#### SUMMARY

A new genus and species of potamid crab, *Phaibulammon stilipes*, new genus, new species, is described from a cave in Kwai, Kanchanaburi, Thailand. The genus appears to be related to *Potamiscus* ALCOCK and *Tiwaripotamon* BOTT, but can be distinguished by the form of the third maxilliped exopod, sternal structure, elongate chelipeds and ambulatory legs, as well as the male first pleopod. The systematic problems with the genera *Tiwaripotamon* BOTT, 1970, and *Larnaudia* BOTT, 1966, are also reviewed.



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Erratum : Chap. IV : Read "*adiatretum*" instead of "*adriatretum*".