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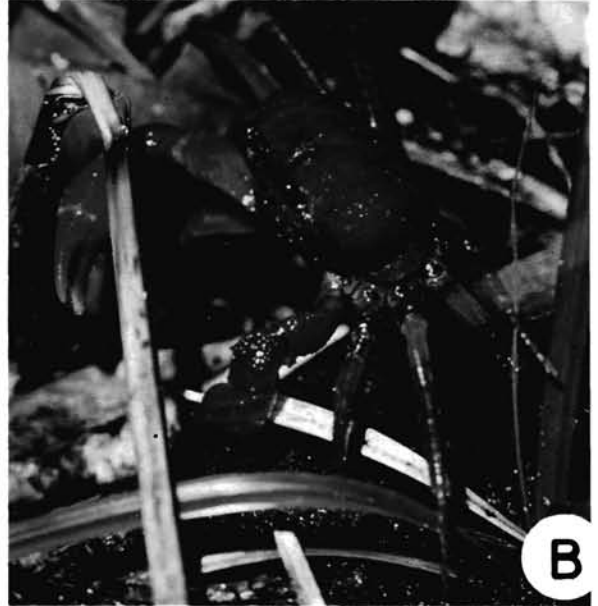
**TERRATHELPHUSA, A NEW GENUS OF SEMITERRESTRIAL
FRESHWATER CRABS FROM BORNEO AND JAVA (CRUSTACEA:
DECAPODA: BRACHYURA: SUNDATHELPHUSIDAE).**

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AUG 03 1990

COLOUR PLATE 2
P.K.L. Ng – New Semiterrestrial crab genus
Raffles Bulletin of Zoology 1989 37 (1 & 2): 116-131



Colour Plate 2. A, *Terrathelphusa loxophthalma* (De Man, 1892), Gunung Mulu National Park, Sarawak, Borneo [N. M. Collins];
Terrathelphusa kuchingensis (Nobili, 1901), Bako National Park, Sarawak, Borneo [G. Cubitt].

**TERRATHELPHUSA, A NEW GENUS OF
SEMITERRESTRIAL FRESHWATER CRABS
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BRACHYURA: SUNDATHELPHUSIDAE)**

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ABSTRACT. - A new genus, *Terrathelphusa* is established for Javan and Bornean gecarcinucoid freshwater crab species previously classified in *Perbrinckia* Bott, 1969. The four recognised species are all known to have semiterrestrial habits, possessing swollen carapaces.

INTRODUCTION

Bott (1969, 1970) established the genus *Perbrinckia* for four species, the type *P. enodis* (Kingsley, 1880) from Sri Lanka (Ceylon), *P. kuhli* (De Man, 1883), *P. modesta* (De Man, 1892) both from Java, and *P. loxophthalma* (De Man, 1892) from Borneo. The genus was erected despite the disjunct distribution of the type with the other species from Java and Borneo probably because of Bott's (1970) belief that Sri Lanka was once connected to Sumatra and/or Java during the glacial periods by a land bridge. There is however, little evidence to support this supposition (De Beaufort, 1951).

Although all four species have similar male first pleopods, this is not too helpful since their male first pleopod structures do not appear to be derived. Their similar carapaces could be due to parallel evolution rather than reflect a phylogenetic relationship. More importantly, whereas the male abdomen of *Perbrinckia enodis* is only vaguely T-shaped, appearing triangular, that of the other three species are distinctly T-shaped, closely resembling those of *Thelphusula* Bott, 1969, *Parathelphusa* H. Milne Edwards, 1853, *Somanthelphusa* Bott, 1968, *Siamthelphusa* Bott, 1968 etc. (see Bott, 1970; Ng, 1988). It would be better in the present author's opinion, to regard the type of *Perbrinckia*, *P. enodis*, as phylogenetically distinct from the Bornean and Javan taxa. A new genus is thus needed for the taxa from Java and Borneo.

The definition and taxonomy of this genus, *Terrathelphusa* new genus, forms the content of the present paper. The present revision recognises four species:

- Terrathelphusa kuhli* (De Man, 1883)
- Terrathelphusa modesta* (De Man, 1892)
- Terrathelphusa loxophthlama* (De Man, 1892)
- Terrathelphusa kuchingensis* (Nobili, 1901)

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Potamon (Geothelphusa) kuchingensis Nobili, 1901, previously placed under the synonymy of *Thelphusula melanippe buergeri* (De Man, 1899) by Bott (1970), is shown to be a valid species of *Terrathelphusa*.

The abbreviations G1 and G2 are used for the male first and second pleopods respectively. Measurements, in millimetres, are of the carapace width and length respectively. The terminology used here essentially follows that by Ng (1988). Specimens are deposited in the Sarawak Museum (SM), Kuching, Sarawak, East Malaysia; Museo ed Istituto di Zoologia Sistemática della Università di Torino (MUT), Turin, Italy; Museum Zoologicum Bogoriense (MZB), Bogor, Java, Indonesia; Instituto Venezolano de Investigaciones Científicas, Caracas, Venezuela; and the Zoological Reference Collection (ZRC), Department of Zoology, National University of Singapore.

TAXONOMY

SUPERFAMILY GECARCINUCOIDEA RATHBUN, 1904

FAMILY SUNDATHELPHUSIDAE BOTT, 1970

GENUS *TERRATHELPHUSA*, NEW GENUS

Type species. - *Geothelphusa kuhli* De Man, 1883

Perbrinckia - Bott, 1970: 64 (part)

Diagnosis. - Carapace strongly ovate, surfaces smooth, convex to strongly convex, branchial regions distinctly inflated, epibranchial and postorbital cristae very low, indistinct, epibranchial tooth low, indistinct, anterolateral margins distinctly convex, smooth, external orbital angle very low, often indistinct, confluent with anterolateral margin, when visible, broadly triangular, outer margin much longer than inner, posterolateral margins slightly convex, strongly converging. Exopod of third maxilliped reaching half length of merus, with well developed flagellum. G1 stout, slightly sinuous, directed outwards or upwards, terminal segment distinctly demarcated from subterminal segment, half as long as subterminal segment, conical, tapering. G2 with distinct distal segment, longer than half length of basal segment.

Etymology. - *Terrathelphusa* is derived from the Latin "terra" for land, and the genus name "Thelphusa", in allusion to the semiterrestrial habits of the crabs of this genus. The genus is feminine.

Remarks. - *Terrathelphusa*, new genus, is easily recognised by its oval, relatively smooth and swollen carapace, and cannot be confused with any other taxa except perhaps *Mainitia nieuwenhuisi* Bott, 1970, from Borneo. This species however, has a very short and stout G1, and can be separated from all known *Terrathelphusa* species by this character. Bott's classification of this species in the genus *Mainitia* Bott, 1969 is very unsatisfactory, and all indications are that a separate undescribed genus should be erected for "*Mainitia nieuwenhuisi*". The taxonomy of this species however, is beyond the scope of the present paper.

Bott (1970) placed the genus *Perbrinckia* in the Sundathelphusidae Bott, 1970, one of the three Sundanian families of the Gecarcinucoidea. Ng (1988) had already expressed doubts as to this classification and commented that the familial characters Bott cited were not always reliable. Pending a revision of the Gecarcinucoidea, Bott's classification is

followed here for *Terrathelphusa*.

All four known *Terrathelphusa* species have semiterrestrial habits, living out of water in wet areas. The following key will serve to separate the four species.

KEY TO THE SPECIES OF *TERRATHELPHUSA*

1. Epibranchial tooth small but distinct, rarely absent. Distal part of G1 terminal segment dilated (Java) *T. modesta*

Epibranchial tooth very low, indistinct or undiscernible. G1 terminal segment gradually tapering to tip (Java, Borneo) 2

- 2...Carapace not evenly (transversely and longitudinally ovate), frontal and anterolateral regions appearing compressed, anterolateral margins almost straight, distinctly shorter than posterolateral margins. G1 tip directed distinctly upwards (Borneo).....
..... *T. loxophthalma*

Carapace evenly ovate (transversely and longitudinally), anterolateral margins gently convex, subequal or longer than and smoothly confluent with posterolateral margins. G1 tip directed slightly outwards (Java, Borneo) 3

3. Anterolateral margins strongly convex, anterolateral and posterolateral regions smooth (Borneo) *T. kuchingensis*

Anterolateral margins gently convex, anterolateral and posterolateral regions lined with numerous oblique striae and small flattened granules (Java) *T. kuhli*

***Terrathelphusa kuhli* (De Man, 1883)**

(Pl. 1, Fig. 1)

Geotelphusa kuhli De Man, 1883: 154

Geotelphusa kuhli - De Man, 1892a: 288, Pls. 15, 16 fig. 3

Telphusa (Geotelphusa) kuhli - Ortmann, 1893: 490; Ortmann, 1894: 55

Potamon (Geotelphusa) kuhli - Ortmann, 1897: 214; Rathbun, 1905: 208

Paratelphusa (Liotelphusa) kuhli - Kemp, 1918: 248

Potamon (Geotelphusa) kuhli - Pesta, 1930: 95

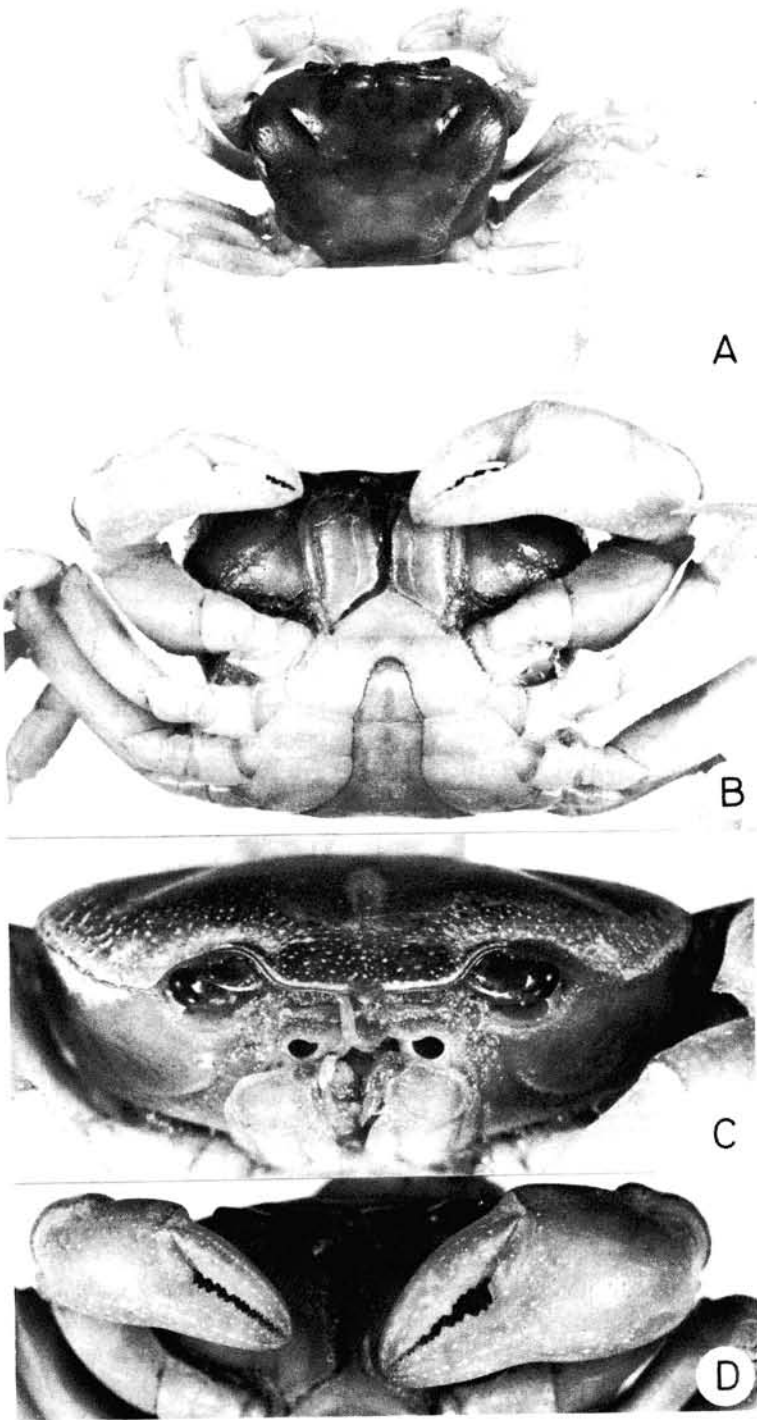
Para-Lio-thelphusa kuhli - Balss, 1937: 152, Fig. 8

Perbrinckia kuhli - Bott, 1970: 65, Pl. 10 fig. 12-14, Pl. 28 fig. 42

Diagnosis. - Carapace ovate, lateral surfaces with numerous flattened granules and oblique striae, epibranchial tooth undiscernible, almost completely confluent with external orbital angle, supraorbital margin almost parallel to frontal margin, orbits not distinctly sloping. Dorsal margins of ambulatory leg meri gently serrated, surfaces rugose. G1 terminal segment uniformly cone-shaped. G2 distal segment short, less than half length of basal segment.

Material. - 1♂, 1♀ (MZB Cru 1283), Kb. Kopi, Kec. Dio Dayang, Bolaang, Java, leg. 16.ix.1983; 1♂ (MZB Cru 1244), Sancang, west Java, 7° 44'S, 107° 50'E, leg. D. Iskandar,

New Semiterrestrial crab genus



Pl. 1. *Terrathelphusa kuhli* (De Man, 1883), male, 24.6 by 19.2 mm (ZRC 1985.4383), Tjibodas, Mt. Gede, Java.

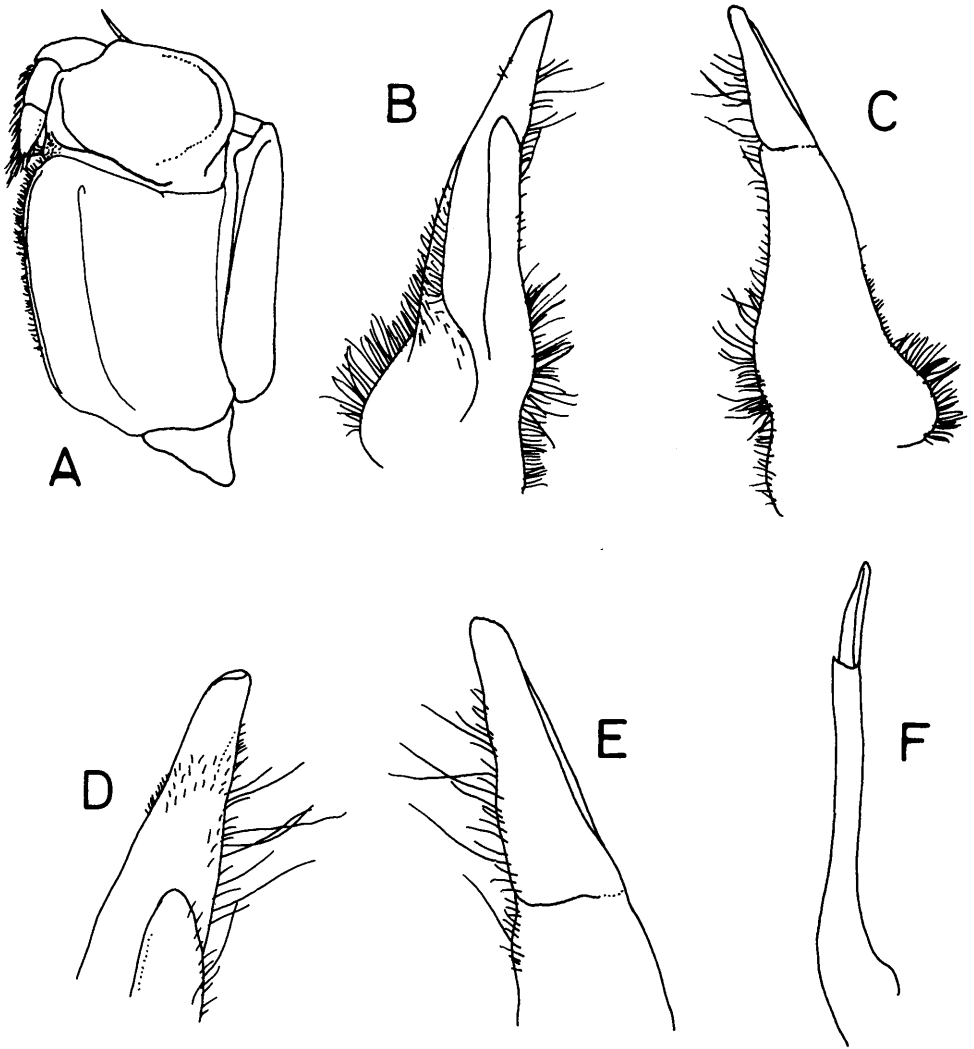


Fig. 1. *Terrathelphusa kuhli* (De Man, 1883), male, 21.6 by 17.3 mm (ZRC 1985.4384), Tjibodas, Mt. Gede, Java. A, left third maxilliped; B-E, left G1s; F, left G2s. B, D, ventral views; C, E, dorsal views; D, E, G1 terminal segments.

New Semiterrestrial crab genus

3.xii.1977; 1♂, 1♀(MZB Cru 465), Tjibeureum, Mt. Gede, west Java, leg. Asonan, 21.ii.1964; 1♀ (MZB Cru 632), Baturaden, Ja-Teng, Sungei Gemawang, west Java, ca. 1000 m asl, leg. G. G. Hawbali, 3.vii.1977; 1♀(MZB Cru 483), Gadok, Bogor, west Java, leg. Minin, 25.xii.1969; 2♀(MZB Cru 731), Awitali Cave, Cidalak, south Sukabumi, west Java, leg. Specavia, 10.x.1980; 2 specimens (badly damaged) (MZB Cru 046), Tjibodas, Mt. Gede, west Java, leg. van Leeuwen, no date; 3♀(MZB Cru 061), Tjibodas, Mt. Gede, west Java, ca. 1400m asl, leg. T. van Benthem-Jutting, xii.1930; 3♂, 2♀ (ZRC 1985.4383-4387), 1♀ (IVIC), Tjibodas, Mt. Gede, in soft mud, west Java, ca. 1400m asl, leg. P. K. L. Ng, 5.viii.1985.

Type locality. - Tjibodas, west Java, Indonesia.

Size. - 25.0 by 19.0 mm (Lectotype male) (RMNH).

Distribution. - Known only from western Java.

Remarks. - This species was first described by De Man (1883) from specimens he had obtained from Buitenzorg (Bogor), Java, or its vicinity. There is a possibility however, that these specimens had been collected from the nearby Tjibodas since De Man (1892a) also described the potamoid *Malayopotamon granulatum* (as *Potamon granulatum*) from this locality.

The carapace and legs are a distinct purplish red colour. The females however, tend to be mottled brown and white instead.

Little is known about the ecology of this species. Ortmann (1893) recorded specimens from 400 m asl, while the recent specimens were collected by the author from between 1300 and 1500 m asl, not far from the Tjibodas National Park. They dig burrows by the swampy, muddy, grass-covered banks of slow streams, but its habits appear to be basically semiterrestrial. The fully aquatic *Malayopotamon granulatum* was also found in the same area as *T. kuhli*, but prefers larger streams with rocky substrates.

Terrathelphusa modesta (De Man, 1892)

(Pl. 2, Fig. 2A-F)

Thelphusa gecarcinucoides Herklots, 1861: 13 (nomen nudum)

Geothelphusa picta - De Man, 1892b: 234

[*Geothelphusa*] *modesta* De Man, 1892b: 234, Pl. 8 fig. 2

Potamon (Geothelphusa) pictum - Ortmann, 1897: 314 (part)

Potamon (Geothelphusa) modestus - Rathbun, 1905: 220

Para-Lio-thelphusa picta modesta - Balss, 1937: 150

Perbrinckia modesta - Bott, 1970: 65, Pl. 10 Figs. 15-17, Pl. 28 fig. 43

(not *Telphusa picta* Von Martens, 1868)

Diagnosis. - Carapace very ovate, appearing very swollen, surfaces almost completely smooth, epibranchial tooth distinct or low, if present, blunt, supraorbital margin sloping downwards and outwards, not parallel with frontal margin, orbits sloping. Margins and surfaces of ambulatory leg meri almost smooth. G1 terminal segment cone-shaped, but tip somewhat dilated to form flap-like structure. G2 distal segment subequal or slightly shorter than basal segment.

Material. - 1♂, 1♀(MZB Cru 1213), Desa Kresek, Tangerang, west Java, 6° 08' S, 106° 22' E, leg. H. B. Munaf, 28.xii.1981; 1♀(MZB Cru 1230), Cikarung, Ujung Kulon, west Java, 6° 15' S, 107° 09' E, leg. E. Chalik, 20.i.1984; 3♀(all gravid) (MZB Cru 1231), Deca

Kresek, Tangerang, west Java, 6° 11' S, 106° 37' E, leg. M. Siluba, no date; 1♀ (MZB Cru 1286), Longlanuk, Java, leg. S. S. Liem, 14.x.1963; 3♂, 5♀ (MZB), 1♂ (36.5 by 26.1 mm), 1♀ (ZRC), Banyumas, in tobacco plantation, west Java (pest of tobacco plants), leg. de Voogd, 1930.

Type locality. - Java, Indonesia.

Size. - 43.3 by 30.0 mm (Lectotype female) (RMNH).

Distribution. - Known reliably only from west Java.

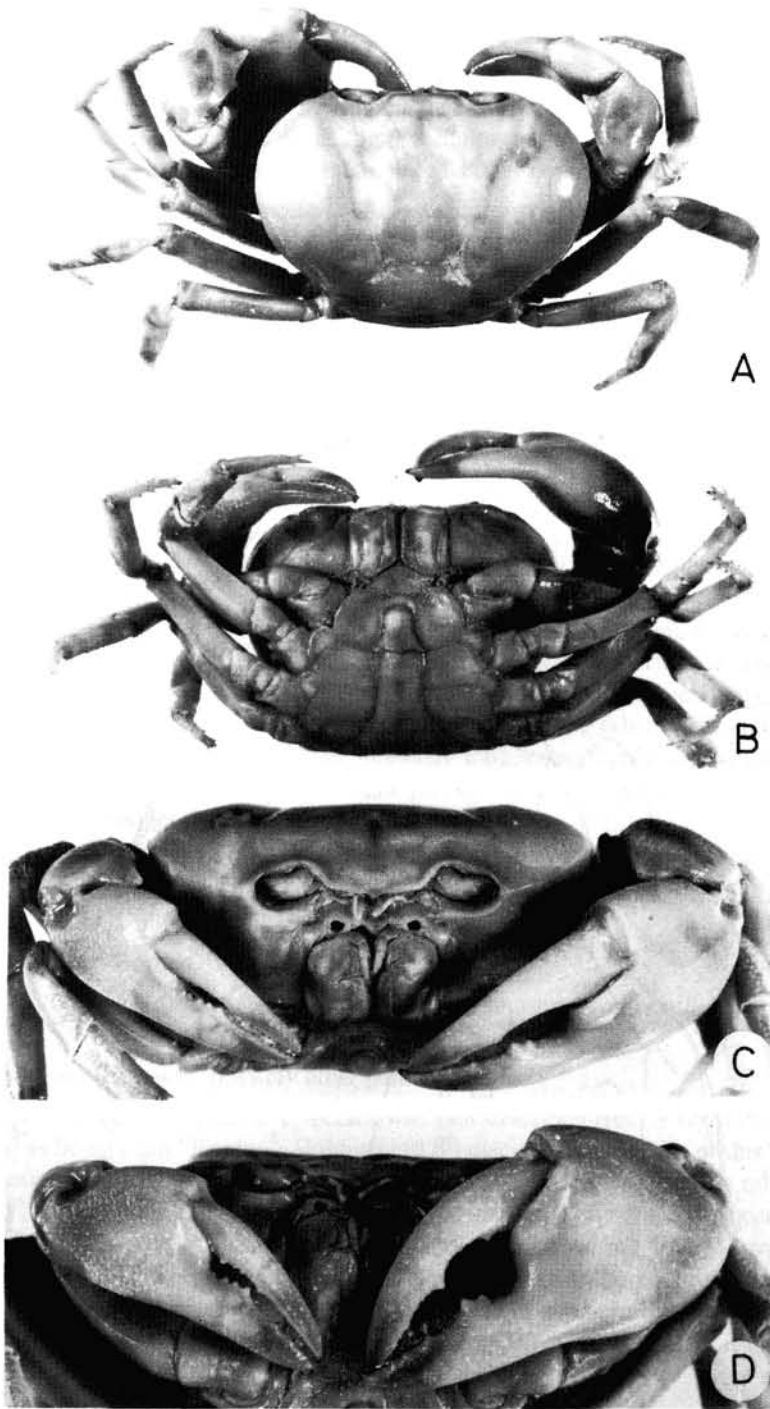
Remarks. - De Man (1892b) identified specimens from Java as "*Geothelphusa picta* (Von Martens)" on Hilgendorf's advice, but indicated that he had initially thought these specimens represented a separate species for which he proposed the name "*modesta*" in print. Rathbun (1905) however, recognised De Man's species as valid and its use here is accepted under the rules of the International Commission of Zoological Nomenclature (Anon, 1985) (see Bott, 1970). No type specimens were designated, but of the three males and six females seen by De Man, only two females had precise locality data. Consequently, the larger of these two females should be the lectotype.

Pretzmann (1964) suggested that specimens in the Vienna Museum described by Heller (1862) as *Thelphusa chilensis* from the NOVARA expedition are identical to De Man's specimens of *Geothelphusa modesta*. Pretzmann examined two syntypes (of which a 34.5 by 25.0 mm male was designated the lectotype), a male and a female without any data but possibly from the same expedition, a male from Shanghai, China (with doubt) and a male from Java. Pretzmann figured the lectotype, a paratype (probably the paralectotype) and the Java male. Heller had described the species from specimens he believed originated from Chile and named it after its presumed country of origin. It is however, known that Heller's material was badly mixed (see Rathbun, 1905, 1906). Heller's *Thelphusa chilensis* is certainly not South American in origin. The South American Pseudothelphusidae and Trichodactylidae have very different features. Heller's (1865) figure of *T. chilensis* however, seems to agree with Pretzmann's figures of the Java male rather than the lectotype male Pretzmann figured. The present author does not agree with Pretzmann that the three specimens he figured were all conspecific. The fingers of the large chelae of his "Javan" male are far too gaping when closed and the cutting teeth of the fingers are quite unlike those of any known Sundanian gecarcinucoid. The G1s Pretzmann figured of the "Javan" male and the lectotype also differ from the present material of *Terrathelphusa modesta* in being more slender, the terminal segment more elongate and the tip not dilated. The chelae of the "paratype" male figured however, seem to agree well with those of the present material.

Pretzmann's figures of the lectotype of *Thelphusa chilensis* (if correct) suggest that it may be conspecific with *Holthuisana subconvexa* (Roux, 1927) instead. Both species agree in their carapace, cheliped and G1 structures. Pretzmann (1964) suggested that Heller's *Thelphusa chilensis* be made the nominate subspecies, with *Thelphusa picta* Von Martens, 1868 (at present in *Sundathelphusa*, see Bott, 1970) being a subspecies. Bott (1970) however, showed otherwise.

Bott (1970) had already disputed Pretzmann's suggestions, stating that Pretzmann's material was in fact mixed and his descriptions, comparisons and figures having many discrepancies. Bott indicated that Pretzmann had two species, not one, as reflected in the above observations. Until a more careful study can be carried out whereby Heller's and De Man's types are compared directly, the present author prefers to follow Bott in accept-

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Pl. 2. *Terrathelphusa modesta* (De Man, 1892), male, 36.5 by 26.1 mm (ZRC), Banyumas, Java.

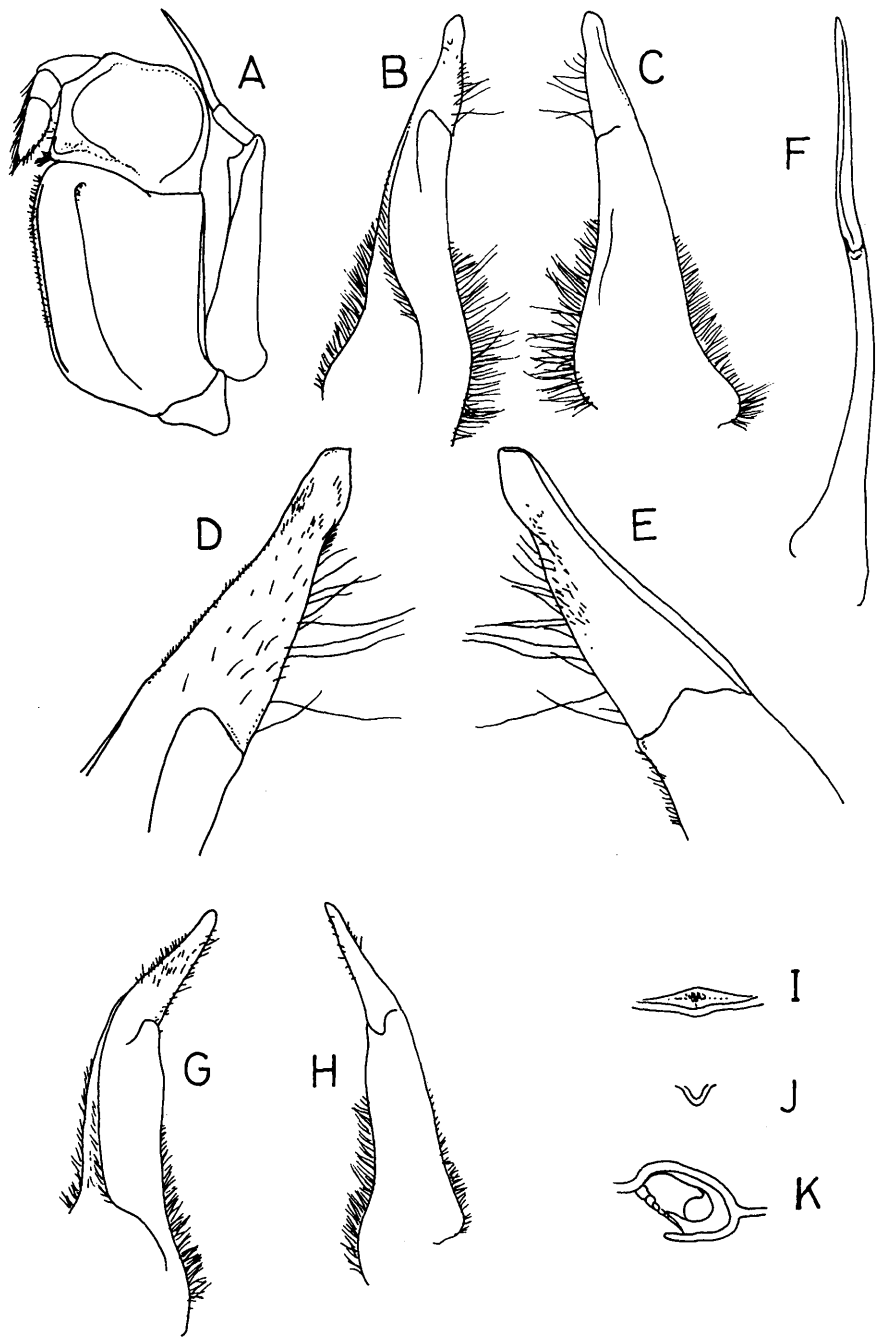


Fig. 2. A-F, *Terrathelphusa modesta* (De Man, 1892), male, 36.5 by 26.1 mm (ZRC), Banyumas, Java; G-K, *Terrathelphusa loxophalma*, male, 34.0 by 23.9 mm (SM Cru 1986.113). A, left third maxilliped; B-E, G, H, left G1s; F, left G2; I, frontal margin; J, median lobe of posterior margin of epistome; K, left orbit. B, D, G, ventral views; C, E, H, dorsal views; D, E, G1 terminal segment.

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ing De Man's species for which material and precise locality records are available and beyond dispute. For the moment, the status of *Thelphusa chilensis* must be regarded as *incerta sedis*.

As for *Terrathelphusa modesta*, the smooth and swollen carapace are easy distinguishing features. There appears to be some slight variation in the form of the external orbital angle and strength of the epibranchial tooth, but this does not appear to be significant.

All indications are that *T. modesta* is a semiterrestrial burrowing species, feeding mainly on vegetable matter. The data on one series of specimens indicates the species is a minor pest on Javanese tobacco farms.

Terrathelphusa loxophthalma (De Man, 1892)

(Colour Plate 2A; Pl. 3, Fig. 2G-K)

Geothelphusa loxophthalma De Man, 1892b: 245, P. 9 fig. 3

Potamon (Geothelphusa) loxophthalmum - Ortmann, 1897: 311, 314

Potamon (Geothelphusa) loxophthalmum - Nobili, 1900: 504

Potamon loxophthalmum - Nobili, 1901: 5

Potamon (Geothelphusa) loxophthalmum - Rathbun, 1905: 221 (part)

Perbrinckia loxophthalma - Bott, 1970: 67, Pl. 10 figs. 18-20, Pl. 28 fig. 44; Holthuis, 1979: 37, Pl. 6; Collins, 1980: 81

Diagnosis. - Carapace very swollen, surfaces convex, unevenly oval, anterolateral and frontal regions appearing compressed, distinctly narrower than posterior regions, epibranchial tooth undiscernible, confluent with anterolateral margin, supraorbital margin sharply sloping, not parallel with frontal margin, eyes and orbits sloping downwards and outwards from frontal view. G1 terminal segment relatively long, cone-shaped, gradually tapering to blunt tip, tip gently curving upwards, subequal to half length of subterminal segment. G2 distal segment longer than half length of basal segment.

Material. - 2♂ (largest 34.0 by 23.9 mm) (SM Cru 1986.113-114), pitfall trap in alluvial forest, Sarawak, Fourth Division, Gunong Mulu National Park, 4° 03' N, 114° 56' E, Borneo, leg. N. M. Collins, 18.vii.1978.

Type locality. - Borneo.

Size. - 35.0 by 23.0 mm (Holotype male) (Rijksmuseum van Natuurlijke Historie, Leiden, Cat. Nr. 1287).

Distribution. - Sarawak, possibly other parts of Borneo.

Remarks. - This very distinctive species was first described from a single male specimen listed as being from "Borneo". Holthuis (1979) discussed the origins of this specimen and suggested that it was possibly collected from southeastern Borneo. No other specimens of *T. loxophthalma* or of any *Terrathelphusa* species however, have been reliably recorded from this area. All other records of *T. loxophthalma* are from Sarawak. Bott (1970) and Holthuis (1979) both examined the type specimen and pronounced it conspecific with the Sarawakian specimens. More collections from southern Borneo are necessary to ascertain if *T. loxophthalma* is indeed a wide ranging Bornean species, or if the original record might be incorrect.

Bott (1970) indicated that Nobili's (1899) record of *Potamon (Geothelphusa) loxophthalmum* from the Aru Islands belongs to *Sundathelphusa aruana* instead. Rathbun's (1905) record included Nobili's Aru Island specimen (a male) and must be regarded as heterogeneous.



A



B



C



D

Pl. 3. *Terrathelphusa loxophthalma*, male, 34.0 by 23.9 mm (SM Cru 1986.113).

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N. M. Collins was kind enough to send me several colour slides of this species. Live individuals are brown to olive green overall (Colour Plate 2A).

Terrathelphusa loxophthalma is a semiterrestrial species, common in burrows in the alluvial forest of Sarawak, and probably in other parts of its range (Holthuis, 1979; Collins, 1980). Collins (1980) reported that these crabs were quite common along the banks of larger rivers and nocturnal in habits. He reported that their guts contained vegetable, mineral and insect matter, and suggested that they may contribute significantly to leaf litter degradation and their removal from the alluvial forest floor. The habits of *T. loxophthalma* thus appear to parallel those of the Christmas Island land crabs of the genus *Gecarcoidea* (see George, 1978). Whether the burrows of this species harbour dipterans is not known (see Bright & Hogue, 1972).

Terrathelphusa kuchingensis (Nobili, 1901)

(Pl. 4, Fig. 3)

Potamon (*Geothelphusa*) *kuchingensis* Nobili, 1901: 5

Potamon (*Geothelphusa*) *kuchingense* - Rathbun, 1905: 217

Parathelphusa (*Liothelphusa*) *kuchingensis* - Colosi, 1920: 27

Thelphusula melanippe buergeri - Bott, 1970: 61 (part)

Potamon (*Geothelphusa*) *kuchingense* - Leh, 1982: 4

(not *Potamon* (*Geothelphusa*) *bürgeri* De Man, 1899)

Diagnosis. - Carapace evenly oval transversely and longitudinally, surfaces convex, very smooth, epibranchial tooth indistinct but may be separated from external orbital angle by notch, supraorbital margin almost parallel with frontal margin. Ambulatory legs smooth, long. G1 terminal segment cone-shaped, tapered, gently curving outwards, subequal to half length of subterminal segment.

Material. - Holotype - 1♀ (25.0 by 19.5 mm) (MUT), "Kuching", Sarawak, leg. R. Shelford, xii. 1891.

Others - 1♂ (22.5 by 18.4 mm), 3♀ (largest 34.6 by 26.0 mm) (SM Cru 1986.62-65), Kuching, Sarawak, det. as *Geothelphusa kuchingense* by G. Nobili.

Type locality. - "Kuching", Sarawak, Borneo.

Size. - 25.0 by 19.5 mm (Holotype female) (MUT).

Distribution. - Known from Sarawak, possibly in the vicinity of Bako National Park, north of Kuching.

Remarks. - Described on the basis of a single female and never figured by any previous worker, the status of this species has been confused. Bott (1970) provisionally synonymised the species with "*Thelphusula melanippe buergeri*" without having examined the type. Examination of the type as well as male specimens in the SM clarifies its position considerably. As Nobili (1901) has noted, *T. kuchingensis* is closest to *T. loxophthalma*, but can easily be separated by its smaller size, more oval carapace, longer anterolateral margin which is distinctly separated from the posterolateral margins, the anterolateral and frontal regions not distinctly compressed, the orbits not sharply sloping, the supraorbital margin being almost parallel with the frontal margin. As Nobili (1900) had also recorded *T. loxophthalma* from Sarawak, he was probably able to make direct comparisons between the two species. The external orbital angle of *T. kuchingensis*, is also still discernible, being separated from the anterolateral lateral margin by a small but distinct notch, and the anteolateral margins is less distinctly crested. The ambulatory legs of

T. kuchingensis also appear to be slightly longer than *T. loxophthalma*, and distinctly longer than *T. kuhli* and *T. modesta*. The G1 of *T. kuchingensis* differs slightly from that of *T. loxophthalma* in having the tip directed laterally and not upwards.

Although the only known male of *T. kuchingensis* is smaller than most of the *T. loxophthalma* known, several female specimens are comparable or slightly larger than the specimens of *T. loxophthalma* examined. The non-sexual differences cited above thus do not appear to be associated with size.

Interestingly, Gerald Cubitt gave the author a slide of a swollen red semiterrestrial crab he had photographed in Bako National Park (Colour Plate 2B) which bears a striking resemblance to *T. kuchingensis*, and is likely to be conspecific with it. No specimens however, were collected. Bako National Park is only 20 km northeast of Kuching, and the proximity of the two locations suggests the possibility that Nobili's and the SM's specimens were collected from Bako National Park or its vicinity. Known specimens of *T. loxophthalma* are a dull olive-brown when alive, and the bright red coloration of *T. kuchingensis* (if the Bako specimen is indeed conspecific) provides another obvious distinction.

Cubitt informs the author (personal communication) that the specimen he photographed was foraging on the well shaded, damp and leaf-strewn forest floor. This agrees with what is known about the other species in the genus being semiterrestrial crabs.

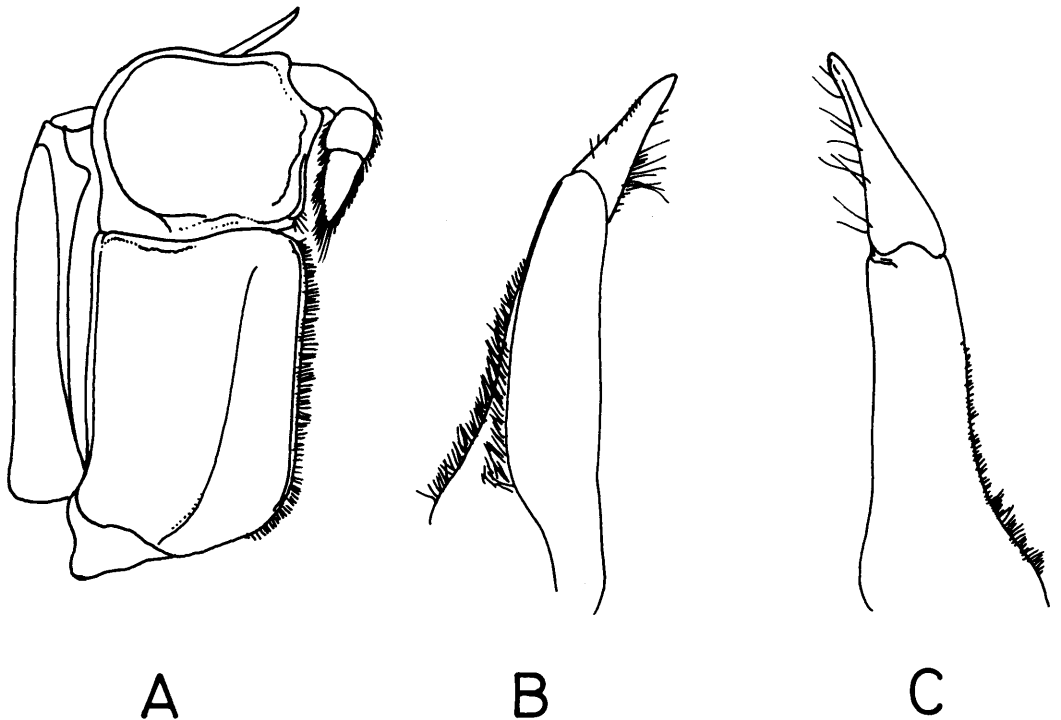
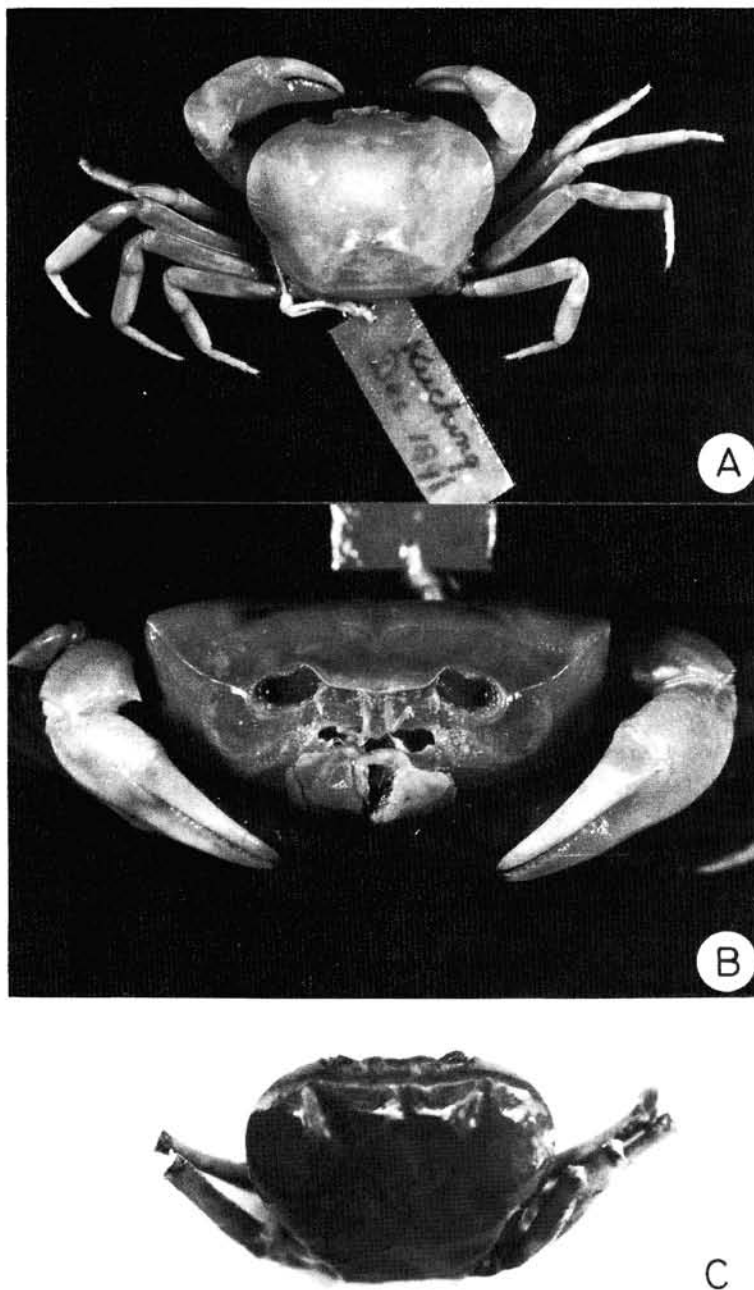


Fig. 3. A-C, *Terrathelphusa kuchingensis* (Nobili, 1901), A, Holotype female, 25.0 by 19.5 mm (MUT), "Kuching", Sarawak, Borneo; B, C, male, 22.5 by 18.4 mm (SM Cru 1986.62), "Kuching", Sarawak, Borneo. A, right third maxilliped; B, C, left G1.



Pl. 4. *Terrathelphusa kuchingensis* (Nobili, 1901), A, B, Holotype female, 25.0 by 19.5 mm (MUT), "Kuching", Sarawak, Borneo; C, Male, 22.5 by 18.4 mm (SM Cru 1986.62), "Kuching", Sarawak, Borneo.

Acknowledgements. - Thanks are due to many colleagues who have allowed me access to the specimens under their charge and their kind co-operation during the course of this study. These are Charles Leh (SM), Orsetta Elter (MUT), Daisy Wowor (MZB), Yang Chang Man (ZRC), Gerald Cubitt (World Wildlife Fund), and N. M. Collins (International Union for the Conservation of Nature and Natural Resources, London, United Kingdom). Mr H.K. Yip (National University of Singapore) kindly took most of the photographs.

LITERATURE CITED

- Anon, 1985. *International Code of Zoological Nomenclature, 1985*. Third Edition. Adopted by the XX General Assembly of the International Union of Biological Sciences. International Trust for Zoological Nomenclature, in association with the British Museum (Natural History), London, 338 pp.
- Balss, H., 1937. Potamoniden (Decapoda Brachyura) der Philippinen und des Malayischen Archipels. *Int. Rev. Ges. Hydrobiol. Hydrog.*, **34**(3-5): 143-187.
- Beaufort, L. F. De, 1951. *Zoogeography of the Land and Inland Waters*. Sidgwick & Jackson, London, pp. i-viii, 1-150.
- Bott, R., 1969. Fließskrabben aus Asien und ihre Klassifikation. (Crustacea, Decapoda). *Senckenbergiana biol.*, **50**(5/6): 359-366.
- Bott, R., 1970. Die Süßwasserkrabben von Europa, Asien, Australien und ihre Stammesgeschichte. Eine Revision der Potamoidea und Parathelphusoidea (Crustacea, Decapoda). *Abh. Senckenb. Naturf. Ges.*, Frankfurt, **526**: 1-338, Pls. 1-58.
- Bright, D. B. & C. L. Hogue, 1972. A synopsis of the burrowing land crabs of the world and list of their arthropod symbionts and burrow associates. *Contr. Sci. Nat. Hist. Mus. Los Angeles*, **220**: 1-58.
- Collins, N. M., 1980. The habits and populations of terrestrial crabs (Brachyura: Gecarcinucoidea and Grapsoidea) in the Gunong Mulu National Park, Sarawak. *Zool. Med.*, Leiden, **55**(7): 81-85.
- Colosi, G., 1920. I Potamonidi del R. Museo Zoologico di Torino. *Boll. Mus. Zool. Anat. Comp., R. Univ. Torino*, **35**(734): 1-39.
- George, R. W. 1978. *The Land and Freshwater Crabs of Christmas Island*. Unpublished manuscript, Dept. Crustacea, Western Australian Museum, 22 pp.
- Heller, C., 1862. Neue Crustaceen, gesammelt während der Weltumseglung der K. K. Fregatte Novara. *Verh. K. K. Zool.-bot. Ges. Wien*, **12**: 319-328.
- Heller, C., 1865. Crustaceen. In: Reise der Osterreichischen Fregatte Novara um die Erde in den Jahren 1857, 1858, 1859 unter den Befehlen des Commodores B. von Wüllerstorff-Urbair. *Zool. Theil, Zweiter Band*, **3**(1): 31-35, 25 Pls.
- Herklots, J. A., 1861. *Symbolae Carcinologicae. I. Catalogue des Crustacés qui ont servi de base au système carcinologique de M. W. de Haan, redigé d'après la collection du Musée des Pays, Bas et les Crustacés de la Faune du Japon*. Leyden, 1861, 43 pp.
- Holthuis, L. B., 1979. Cavemicolous and terrestrial decapod crustacea from northern Sarawak, Borneo. *Zool. Verh.*, Leiden, **171**: 1-47, Pls. 1-8
- Kemp, S., 1918. Zoological results of a tour in the Far East. Decapod and Stomatopod Crustacea. *Mem. Asiat. Soc. Bengal*, **6**: 210-297.
- Kingsley, J. S., 1880. Carcinological notes No. I. *Proc. Acad. Nat. Sci. Philadelphia*, **1880**: 34-37.
- Leh, C. M. U., 1982. A Checklist of Crustaceans in the Sarawak Museum Spirit Collection. Unpublished Checklist, Natural History Section, Sarawak Museum, pp. 1-7.
- Man, J. G., De, 1883. Carcinological studies in the Leyden Museum. No. 3. *Notes Leyden Mus.*, **5**: 150-169.
- Man, J. G., De, 1892a. Decapoden des Indischen Archipels. *Zool. Ergeb. Reise Nederland. Ost-Indien*, **2**: 265-527.
- Man, J. G., De, 1892b. Carcinological studies in the Leyden Museum. No. 6. *Notes Leyden Mus.* **14**: 225-264, Pls. 7-10.
- Ng, P. K. L., 1988. *The Freshwater Crabs of Peninsular Malaysia and Singapore*. Department of Zoology, National University of Singapore, Shinglee Press, Singapore, pp. i-viii, 1-156, 4 colour plates.

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- Nobili, G., 1899. Contribuzioni alla conoscenza della fauna carcinologica della Papuasias, delle Molucche e dell'Australia. *Ann. Mus. Civ. Stor. Nat. Genova*, (2)20: 230-282.
- Nobili, G., 1900. Decapodi e Stomatopodi Indo-Malesi. *Ann. Mus. Stor. Nat. Genova*, 40: 473-523.
- Nobili, G., 1901. Note intorno ad una collezione di Crostacei di Sarawak (Borneo). *Boll. Mus. Zool. Anat. Comp., R. Univ. Torino*, 16(397): 1-14.
- Ortmann, A., 1893. Die Decapoden-Krebse des Strassburger Museums, mit besonderer Berücksichtigung der von Heern Dr. Döderlein bei Japan und bei den Liu-Kiu-Inseln gesammelten und zur Zeit im Strassburger Museum aufbewahrten Formen. *Zool. Jahrb. (Syst.)*, 7: 411-495, Pl. 17.
- Ortmann, A., 1894. Crustaceen, aus Semon, Zoologische Forschungsreisen in Australien und dem Malayischen Archipel. *Denk. Med.-naturwiss. Ges. Jena*, 8: 1-80, Pls. 1-3.
- Ortmann, A., 1897. Carcinologische studien. *Zool. Jahrb. (Syst.)*, 10: 256-372, Pl. 17.
- Pesta, O., 1930. Zur Kenntnis der Land- und Süßwasserkrabben von Sumatra und Java. *Arch. Hydrobiol. (Suppl.)*, 8: 92-108, Pl. 1.
- Pretzmann, G., 1964. Studien zum system der südamerikanischen Süßwasserkrabben. *Ann. Naturhist. Mus. Wien* 67: 489-493, Pls. 1, 2.
- Rathbun, M. J., 1905. Les Crabes d'eau Douce. *Nouv. Arch. Mus. Hist. Nat., Paris*, (4)7: 159-323, Pls. 13-22.
- Rathbun, M., 1906. Les Crabes d'eau Douce. *Nouv. Arch. Mus. Hist. Nat. Paris*, (4)8: 33-122.
- Roux, J., 1927. Contribution a la faune carcinologique d'eau de la Nouvelle-Guinee. *Nova Guinea* 15: 319-350, Pls. 3, 4.

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