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Historical notes on various collectors of unidentified freshwater crabs (Crustacea: Decapoda: Brachyura) from the Malay Peninsula and Borneo, with descriptions of two new species of *Isolapotamon* Bott, 1968 (Potamidae)

Peter K.L. **Ng**[1#], Martyn E.Y. **Low**[1†] & Paul F. **Clark**[2*]

Abstract. Several lots of unidentified crabs assigned to Potamidae, Gecarcinucidae, and Sesarmidae from the Malay Peninsula and Northern Borneo were examined from material deposited in the reference collections of the Natural History Museum, London. While most of the species have been reported elsewhere, there are some new locality records, and surprisingly, two undescribed species of *Isolapotamon* Bott, 1968, a relatively well-studied Bornean-Philippine endemic potamid genus. These freshwater crabs are documented, the new taxa described, and notes are provided on the various collectors associated with this material, some of which date to the late 1800s.

Key words. taxonomy, Potamidae, Gecarcinucidae, Sesarmidae, southern Thailand, Peninsular Malaysia, Sarawak, Sabah, history of collectors

INTRODUCTION

As part of an upcoming project to study and digitise historically important Singapore specimens deposited in scientific institutions in the United Kingdom, several lots of unidentified freshwater crabs (Potamidae, Gecarcinucidae, and Sesarmidae) deposited in the reference collection of the Natural History Museum (NHM), London, England, were examined. This material was collected from the Malay Peninsula and Northern Borneo, and included specimens which had been collected in the late 1800s. While most of the species have been reported elsewhere, there are some new locality records, and surprisingly, two new species of *Isolapotamon* Bott, 1968, a relatively well-studied Bornean-Philippine endemic potamid genus. These species are documented, the new taxa described, and notes are provided on the various collectors associated with this material.

What is interesting about this particular collection of freshwater crabs is that many of the specimens were deposited in the NHM, but were not accessioned and remained unidentified even after the species were described on the basis of a different set of specimens. Notable are the collections from Baram (northwestern Borneo, Sarawak) by Charles Hose, which predated the Kükenthal Expedition (1893–1894) specimens from the same area described and named by De Man (1902) as *Potamon* (*Parathelphusa*) *pulcherrima* (now *Parathelphusa*), *Potamon* (*Potamonautes*) *baramensis* (now *Thelphusula*), and *Sesarma* (*Sesarma*) *ocypoda* var. *gracillima* (now *Geosesarma*). Likewise, Douglas Cator and Alfred Everett obtained specimens in the late 1800s identical to material that Ng & Goh (1987) described as *Parathelphusa valida*. Also present are specimens collected by A.G.C. Grandison and F.V. Slade during the Gunong Benom Expedition to this mountain (Pahang, Peninsular Malaysia) in 1966–1967 that are identical to material from nearby areas that Ng (2020) recently described as *Johora booliati*.

Also included in this study are biographical and collecting data pertinent to the naturalists involved in these various expeditions. These data are being collected as part of an upcoming project to study and digitise historically important specimens from Singapore housed in repositories in the UK (see Acknowledgements). This approach is taken in the recognition that "[p]eople are one of the best known and most stable entities in the biodiversity knowledge graph. The wealth of public information associated with people and the ability to identify them uniquely open up the possibility to make more use of these data in biodiversity science" (Groom et al., 2020: 1; Low, 2021: 256). The value of this approach in the present context is illustrated by Douglas and Dorothy Cator (see below) who, in addition to collecting freshwater crab specimens, travelled around North Borneo (now Sabah) and Sarawak in the 1890s, with these trips documented in a

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[1]Lee Kong Chian Natural History Museum, Faculty of Science, National University of Singapore, 2 Conservatory Drive, Singapore 117377, Republic of Singapore; [#]https://orcid.org/0000-0001-5946-0608; [†]https://orcid.org/0000-0001-7927-7149

[2]Department of Life Sciences, The Natural History Museum, Cromwell Road, London SW7 5BD, England, United Kingdom; Email: p.clark@nhm.ac.uk; https://orcid.org/0000-0001-6862-3982 (*Corresponding author)

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book by Dorothy entitled, 'Everyday Life among the Head-hunters' (Cator, 1905), which provides valuable background information about their travels, collecting activities, and even photographs by and portraits of the couple. This section of the 10 collectors of the material treated herein will hopefully form the basis for a greater appreciation of the contribution of such data towards taxonomy and other fields of research.

MATERIALS AND METHODS

Specimens examined are deposited in the NHM and the Zoological Reference Collection (ZRC), Lee Kong Chian Natural History Museum, National University of Singapore. All measurements, in millimetres, provided are of the maximum carapace width and length. The following abbreviations are used: *, denotes date of birth; †, denotes date of death; asl, altitude above sea level; ca., circa; Capt., Captain; coll., collected by; G1, male first gonopod; G2, male second gonopod; juv., juvenile; ovig., ovigerous, P2–P5 (first to fourth ambulatory legs), pereiopods 2–5, respectively, and purch., purchased. The terminology used follows Ng (1988, 2004) and Davie et al. (2015).

For citations, the rationale in Ng et al. (2008: 21) is followed who argued that in cases when different scientists with the same family name are involved, the more published author is the one who is cited simply, e.g., "Ng" rather than "PKL Ng". For the others who have the same family name, initials are added to differentiate them from the main one, e.g., "HP Ng".

Some comments on the geographical area treated is necessary. Malaysia is politically divided into two main areas, and these are often referred to as West and East Malaysia. Alternatively, 'Peninsular Malaysia' is often used for West Malaysia, which includes 11 states (Johor, Kedah, Kelantan, Malacca, Negeri Sembilan, Pahang, Penang, Perak, Perlis, Selangor and Terengganu) and two federal territories (Kuala Lumpur and Putrajaya). East Malaysia (or Malaysian Borneo) refers to the island of Borneo and comprises two states, Sabah and Sarawak, and one federal territory, Labuan. Brunei, a sovereign nation, is located between Sarawak and Sabah. In addition, most of the southern and central part of Borneo belongs to Indonesia and is known as Kalimantan. During the time of the collection of the present material, some of the political boundaries were less clear so it is difficult to precisely determine in which country some sites are located. For example, some collection areas in the Upper Baram are adjacent to Brunei and Kalimantan. In most cases, however, the majority of the material was collected from what is today Malaysia. For the present paper, reference to countries is avoided unless necessary.

For the Malaysian state of Sarawak, the following convention is applied; the eastern parts (e.g., the Kuching area) are referred to as "southern" and the western parts (e.g., the Miri and Mulu areas) as "northern". Only the primary synonyms are cited for the species treated.

The list of collectors was compiled by determining the identities of the naturalists recorded on the labels accompanying the jars of specimens, as well as the NHM Crustacea Accession Registers. The primary starting points for this was through the excellent collations of botanical collectors by van Steenis (1950), van Steenis-Kruseman (1958, 1974) which is also now available as an online database: http://www.nationaalherbarium.nl/FMCollectors/QuickSearch.htm, and Desmond (1994). An additional resource for identifying collectors is through the section at the Global Plants initiative via JSTOR (https://plants.jstor.org/).

BIOGRAPHICAL AND HISTORICAL INFORMATION ON THE COLLECTORS AND EXPEDITIONS RESULTING IN THE MATERIAL STUDIED

Collectors

Cecil Joslin Brooks (*1875, Cambridge, England; †1953, Hampstead, London, England). Brooks travelled up the Sarawak River ca. the end of September 1908 (Brooks, 1911). He was employed as a metallurgical chemist by the Borneo Company Limited in Sarawak during 1909 and 1910. It is possible that the specimens of *Lepidothelphusa* sp. (NHM 1911.2.28.3) and *Terrathelphusa kuchingensis* (NHM 1911.2.28.4–5), which have "Upper Sarawak" as their localities were collected during this trip. In addition to Borneo, Brooks also visited Amboina (Ambon), the Canary Islands, Sumatra, and New Zealand. He collected plants and animals during his travels. Biographical and collecting details are from van Steenis (1950: 82), van Steenis-Kruseman (1958: 31), and Desmond (1994: 103).

Douglas Cator (*11 February 1867; †2 June 1964, Hertford, England).
Cator was a civil engineer who went to North Borneo (now Sabah) to take on the role of secretary to the governor in Sandakan. He was accompanied by his wife, Dorothy Anne Benson (*26 July 1868, Hope Bowdler, Shropshire, England; †17 January 1947, Hertford, Hertfordshire, England). Under the name Dorothy Cator, she wrote an autobiographical account entitled "Everyday Life among the Head-hunters and Other Experiences from East to West" (Cator, 1905), which recounts her life with her husband, whom she refers to as "Dick". It details their leaving England, a stopover in Singapore before reaching North Borneo, travel throughout Borneo (including parts of Sarawak), return to England via Japan, and a later assignment to West Africa. There were accompanying details of daily life, as well as the plants and animals they encountered. Her book is an invaluable source of information for researchers with an interest in the natural history collections of Douglas Cator. Using a Kodak camera, Dorothy also captured their experiences such as their travels in Borneo and West Africa, as well as photographic portraits of herself and Douglas.

Another important source of collecting information for these explorers is a paper by Druce (1896) which was based largely

on butterflies collected by Douglas in North Borneo, with the following collecting localities mentioned: Sandakan, Segaliud River, Sapagaya River, Melikop or Penungah (now Pinangah), Tanganak Island, Banguey Island (now Banggi), Cagayan (most likely Cagayan de Sulu, and now known as Mapun in the Philippines) and Libaran Island. There are two known butterfly publications by Douglas (Pryer & Cator, 1894; Cator, 1904) which were based on material from North Borneo and West Africa, respectively.

Biographical and collecting details of Douglas and Dorothy are from Cator (1905), Fox-Davies (1910: 281), Loo (2014) and Anonymous (2022). Portraits of Douglas and Dorothy can be found in Cator (1905).

Joan Cramphorn. Cramphorn was affiliated with the Preston Montford Field Centre, administered by the Field Studies Council, during the Royal Geographical Society Expedition to Gunong Mulu in 1977 and 1978 (Hanbury-Tenison & Jermy, 1979: 187; Sankey, 1979: 450; Davison et al., 2013: 3, 4). During the expedition she made surveys of freshwater fish in the Melinau, Tutoh, and other rivers (Hanbury-Tenison & Jermy, 1979: 187). The specimen of *Borneosa tenebrosa* (Holthuis, 1979) (NHM 1918.12.77) collected from Deer Cave in Gunung Mulu, Sarawak likely originated from this expedition. Cramphorn would later conduct freshwater fish surveys in the Batang Ai River of Sarawak in 1982, and write several reports and papers (Cramphorn, 1982; Tan HH, 2021: 337, 358). She has also worked on fish surveys in Peninsular Malaysia (Cramphorn, 1983; Cramphorn et al., 1993). Like the Gunong Benom Expedition 1967 (see entry under Alice George Cruickshank Grandison), the Earl of Cranbrook was also involved with the organisation and other aspects of the faunal surveys (Hanbury-Tenison & Jermy, 1979: 179, 187). Joan is still active to date.

Alfred Hart Everett (*11 October 1848, Norfolk Island; †18 June 1898, London, England). Everett suffered the effects of an unspecified illness that prevented him from completing university, therefore he chose the path of a professional collector, and it was with this intention that he travelled to Sarawak in 1869. The remuneration from collecting does not appear to have been sufficient and Everett became the assistant resident of Rejang District, Sarawak, in 1872. During this time, he was involved in excavations of several cave sites, which resulted in an extensive 'Everett Collection' that is now in the NHM and continues to be an important source of archaeological and speleological material (Cranbrook, 2013). This even included fossil crab material (see Ng & Cranbrook, 2014). By the 1880s, Everett appears to have been able to devote more time to collecting animals and his name appears on several scientific articles on the birds of Borneo, Lombok, Flores, Celebes (now Sulawesi) and various islands in the Philippine archipelago which were based on his own collecting. The two NHM crab specimens (1893.3.26.20 and 1893.3.26.21) from the Sarawak and Kinabatangan Rivers, respectively, would have been made as part of these collecting trips. In about 1895, Everett suffered from an unspecified accident in Mindoro that would plague him during the three final years of his life and his collecting trips would be interrupted by periods of convalescence in Labuan and Singapore. Everett also collected with C. Hose (see entry below). Biographical and collecting details are from Anonymous (1898a: 627, 628; 1898b: 606), Bernau (1906: 27) and Cranbrook (2013: 84).

Captain Stanley Smyth Flower (*1 August 1871, London, England; †3 February 1946, Tring, England). Flower entered the army in 1890 and served in India and Malaya (now Peninsular Malaysia) before being transferred to Siam (now Thailand) to act as scientific adviser to the government. He later became director of the Zoological Gardens, Giza, Egypt before retiring to England where he would be associated with the Zoological Society of London, publishing articles on the animals held in its zoo. Flower published four papers on the herpetofauna of Siam and the Malay Peninsula (Flower, 1896, 1898, 1899, 1900a) which give details of his collecting localities. Additional collecting data can be found in a paper on mammals from Siam and the Malay Peninsula (now Peninsular Malaysia) which provides a list of localities mentioned therein (Flower, 1900b: 308–312). From the text of this paper (Flower, 1900b), it appears that Flower did indeed visit and collect at many of these localities. Unfortunately, none of these publications provide collecting dates. Two of the localities, Bangkok and Penang, however, agree with the collection data associated with the present specimens. The identity of one locality, "Takkom" is not clear. It is probably an alternate spelling for a better-known site called "Lacom", which is the old name for what is today the city of Nakhon or Nakhon Si Thammarat (see Lanchester, 1902: 550; Tweedie, 1940: 108; Ng, 1992: 23; Naiyanetr, 1994; Ng, 2017: 232). Biographical and collecting details are from Anonymous (1946a, 1946b), Chaworth-Musters (1946), Hindle (1946, 1947), Smith (1946), Adler (2007: 123, 124), and Moore & Warr (2009). Portraits can be found in Anonymous (1946a), Chaworth-Musters (1946), Smith (1946) and Adler (2007: 124).

Alice Georgie Cruickshank "Bunty" Grandison (*25 March 1927; †March 2014). Bunty Grandison graduated from the University of Glasgow in 1951 and was employed as a herpetologist in NHM during the time of this expedition. She later succeeded Hampton Wildman Parker (*1897; †1968) as the head of amphibians and reptiles until her retirement in 1984. Besides her publication in 1972 on the herpetofauna of the Gunong Benom Expedition, Grandison also published a checklist of the snakes of West (Peninsular) Malaysia and Singapore in 1978 (Grandison, 1972, 1978).

George Darby Haviland (*19 November 1857, Warbleton, Sussex, England; †after 6 July 1901, Natal, South Africa). Haviland was a naturalist and surgeon who held various roles in Singapore and Sarawak, including director of the Raffles Museum in Singapore, before going to Sarawak as a Medical Officer and Curator at the Government Museum (now the Sarawak Museum). After returning to England in 1895, he worked at the Kew Herbarium and wrote a paper on Isoptera largely based on his own collecting from the Malay Peninsula, Borneo and South Africa (Haviland, 1898). He went missing in Natal, South Africa in 1901 while on a

bicycle trip. Harris (1966) provided detailed data on those collecting localities based on the unpublished "Diary of Termites" by Haviland which is now held by the Museum of Zoology, Cambridge University. Haviland also collected with C. Hose (see entry below). Biographical and collecting details are from Anonymous (1907: 62), van Steenis (1950: 222), van Steen-Kruseman (1974: 42) and Desmond (1994: 326).

Charles Hose (*12 October 1863, Willian, Hertfordshire, England; †14 November 1929, Croydon, London, England). Hose left Cambridge University without a degree to take up a cadetship in the service of Rajah Sir James Brooke in Sarawak which he obtained through his uncle, George Frederick Hose (*1838; †1922). Charles left England in 1884, stopping for a week in Singapore before arriving in Sarawak, and over the next 16 years visited and collected in many localities throughout Sarawak. Hose focussed on the Baram District between 1884 and 1892 as detailed in his book "A Descriptive Account of the Mammals of Borneo" which includes a map of the collecting localities (Hose, 1893). The extensive material studied in this paper (see Taxonomy) also reflect the time spent collecting during this period. Hose also visited Celebes (now Sulawesi) at least twice. He left Borneo for England in 1900 but made a return visit in 1920. Hose also collected with A.H. Everett and G.D. Haviland (see entries above).

Hose also took photographs during his time in Borneo and some of these are now at the Museum of Archaeology and Anthropology, University of Cambridge (Boast et al., 2001: 33, 34). Some of these photographs were published in four other books written by Hose which also give autobiographical details and accounts of his travels and collecting (Hose & McDougall, 1912; Hose, 1926, 1927, 1929). The books also contain maps which may be of value for studying the collecting localities of Hose. Biographical and collecting details are from Hose (1927; 1929), Haddon (1929: 845), van Steenis (1950: 245, 246), van Steenis-Kruseman (1974: 46), Desmond (1994: 357), Wong (1995: xxiii) and Pringle (2001: 639, 694). His portraits can be found in Hose (1929), van Steenis (1950: 246) and Pringle (2001: 639).

John Kidman Cox (*1906, Lahore, Pakistan; † unknown). Appointed to the Colonial Agricultural Service in 1931, and posted to the Gold Coast, Cox was later transferred to North Borneo (Sabah) in 1947 and retired as Director of the Department of Agriculture in Jesselton (Kota Kinabalu), North Borneo in 1960. Cox made plant collections in West Africa and North Borneo together with his wife, Elizabeth Monica Howard (some sources give her surname as Hanham) (*1908, South Africa). It was during their time in Borneo that the specimen of *Isolapotamon buntyae*, new species (NHM 2022.170) from Ulu Dusun in Sandakan, Sabah was likely obtained. Biographical and collecting details are from Anonymous (1953: 383), Steenis-Kruseman (1974: 26, 27) and Wong (1995: xxix).

Herbert Christopher Robinson (*4 November 1874, Liverpool, England; †30 May 1929, Oxford, England). Robinson collected the crab specimens of *Stoliczia rafflesi* (NHM 1906.2.27.3–6) during the Skeat Expedition. Robinson first travelled to Malaya (now Peninsular Malaysia) and Singapore as part of the Skeat Expedition, but with Thomas Nelson Annandale (*1876; †1924) and support from the Royal Society of Edinburgh and the University of Liverpool. Later, he travelled and collected independently of that expedition (Anonymous, 1929a: 524, 525; Kloss, 1930: 1) Details of these collections have been published in the 'Fasciculi Malayenses' (London: Longmans, Green and Company, 1903–1906) (see Lanchester, 1906). Robinson returned to Malaya in 1903 to take up the post of Curator at the Selangor State Museum and would later become director following the resignation of the first director, Leonard Wray. Robinson would hold this position until his retirement in 1926. He returned to England and had planned to complete his "Birds of the Malay Peninsula", but only the first two volumes were complete at the time of Robinson's death in 1929 (Abdul Rahman, 2016: 40–42). Biographical and collecting details on Robinson are from Anonymous (1929a: 523–526; 1929b: 239, 240), Kloss (1930: 1–12), van Steenis (1950: 441, 442), Desmond (1994: 588). Portraits of Robinson can be found in Anonymous (1929a: pl. 17), Kloss (1930: frontispiece) and van Steenis (1950: 442).

Félice "Fee" Vera Slade (*25 March 1927, Chertsey, Surrey; †4 October 1984, Round Wood Annexe, Brasted Chart, Westerham, Kent). Félice Slade, known as Fee (pronounced Fay), joined the Gunong Benom Expedition in a personal capacity as a friend of Bunty Grandison (see her entry above). They undertook several expeditions together. Later, Bunty (1972: 97) did acknowledge that "[w]ithout Felice Slade's enthusiasm, energy and keen eyesight the results of the team's field work would undoubtedly have been very much poorer". Grandison and Slade appear to have continued making herpetofaunal collections together as late as 1974, when they collected a new species of frog in Tanzania (Grandison, 1974: 78). Biographical and collecting details on Grandison are from Adler (2007: 294; 2014: 106) and Anonymous (2014). Fee was an accountant and wrote at least one book in this field (Slade, 1974). Bunty took early retirement from the NHM in April 1984 to be with Fee and they had extensive plans to travel. Sadly, whatever dreams they may have had together for the future did not materialise because Fee died of cancer a few months later. After the death of Fee, Bunty moved back to Scotland.

The Gunong Expeditions

The Gunong (spelled Gunung in modern day Malaysia) Benom Expedition 1967 was the first "multi-disciplinary, multi-institutional expedition" in Malaysia organised by the Lord Medway (now Earl of Cranbrook; see Davison et al., 2013: 3). He would also be involved in the Gunong Mulu Expedition 1977–1978 (see entry under Joan Cramphorn). The expedition was formally in the field from 1 February to 15 April 1967, but additional collections were made by members of the expedition who remained on site (Medway, 1972: 5). Medway (1972) provides details of the base camps and collecting localities, as well as a map of the localities. The same volume of the 'Bulletin of the British Museum

(Natural History) (Zoology)' (1972, vol. 23) also contains the results of the expedition (viz., plants, mammals, reptiles, amphibians, birds, ticks and other parasitic invertebrates). Medway was also involved with the organisation and various aspects of the faunal surveys during this expedition, as he was during the Royal Geographical Society Expedition to Gunung Mulu in 1977 and 1978 (see entry under Joan Cramphorn; Davison et al., 2013: 3, 4).

The Gunong Tahan Expedition was organised by Leonard Wray (*1853; †1942) and Herbert Christopher Robinson, and was supported financially by the British Museum (Natural History) (now NHM) on the condition that the whole collection would be sent to that institution and the first set of material would be deposited there (Rendle in Ridley, 1908: 301; Robinson, 1908: iii, iv; Robinson & Wray, 1908). The expedition began when Robinson and Wray met at Kuala Kubu in the evening of 11 May 1905 and over the next two days reached the Semangko Pass, Raub, and Kuala Lipis. After acquiring supplies at Kuala Lipis, the party made their way up the Pahang River to Kuala Tembeling on 17 May, up the Tembeling River and then reached the Tahan River before beginning their ascent up Gunung Tahan (Robinson & Wray, 1908). The same account is illustrated with four photographs of the ascent. The remainder of the same volume of the 'Journal of the Federated Malay States Museums' (1908, vol. 8) contains the results of the expedition (viz., mammals, birds, fish, amphibians, reptiles and geology). The delay between the conclusion of the expedition (1905) and the publication of the results is explained by "the non-delivery of the [photographic] plates which were overcarried by the steamship company and lost sight of for nearly a year" (Robinson, 1908: iv).

SYSTEMATICS

Family Potamidae Ortmann, 1896

Genus *Stoliczia* Bott, 1966

Type species. *Telphusa stoliczkana* Wood-Mason, 1871.

Remarks. Sixteen species of *Stoliczia* are known from southern Thailand and Peninsular Malaysia (Ng et al., 2008; Ng & Schubart, 2014). This genus is characterised by the absence of a flagellum on the exopod of the third maxilliped.

Stoliczia stoliczkana (Wood-Mason, 1871)

Potamiscus (*Stoliczia*) *stoliczkana* Wood-Mason, 1871: 199, pl. 12, figs. 8–12.

Material examined. Penang: 1 male (NHM 1897.1.27.9), 610 m asl, coll. Capt. S.S. Flower, 27 November 1896; 2 males, 1 juv. (NHM 1898.11.28), 610 m asl, coll. Capt. S.S. Flower, March 1898; 1 juv. (ex. NHM 1898.11.28, now 2022.157), 610 m asl, coll. Capt. S.S. Flower, March 1896. ZRC material – Penang: 1 male, 2 females, 1 juv. (ZRC 1990.11565–11568), Botanic Gardens, coll. P.K.L. Ng, June 1987; 1 male (ZRC 1989.2013), Titikarawang Waterfall, coll. P.K.L. Ng, June 1987; 1 male (ZRC 2017.0061), Titikarawang Waterfall, coll. P.K.L. Ng, 21 December 2016; 1 juv. male (ZRC 1994.1262), Telok Bahang forest stream, coll. K.K.P. Lim, 18 August 1993.

Remarks. Some additional comments on the bottle of specimens associated with NHM registration number "1898.11.28" are necessary. The outside jar label actually only provides the following information in ink: "1898.11, Penang, S.S. Flower Esq" and is headed in pencil by "*Potamon*". This documentation is in the handwriting of curator Jeffrey Bell (see Ingle, 1991). In the Zoological Accessions, Crustacea Register, there is, however, no entry for just "1898.11". Instead, it appears to be "1898.11.28", a registration number that is repeated, once in black ink and below in red. The entry associated with this is confusing, because it states "1–4, *Anchistes inermis* (in *Pinna*), Kosichang, Gulf of Siam, Pres Capt. S.S. Flower." This too is in the handwriting of curator Jeffrey Bell and the locality is different than that on the jar. Inserted after this in black ink is "(L.A. Borradaile det 1/15)", followed in red ink by, "Bottle found with incomplete Reg. No. as given in red WTC (William Thomas Calman) 21.1.15." Above "*inermis*" is an arrow followed by, "= *custus* Forsk." This suggests that Calman had a problem finding this specimen of *Anchistus inermis* (Miers, 1884; probably under *Harpilius*) for Borradaile to examine on a Museum visit dated 21 January 1915, when the identification of the specimen was redetermined as "*Anchistes custus* Forskål, 1775" while Borradaile was working on his Pontoniidae revision (Borradaile, 1898). The registration number on this jar label is 1898.11.28.1–4 and four specimens are preserved. There is also another indication arising from (L.A. Borradaile det 1/15), "*Metapenaeus* n. sp. Redet. Burkenroad 1938", but no trace of this taxon has to date been found. Also, squeezed in above *Anchistes* is, "1 *Upogebia* See 1977.178." In the Zoological Accessions, Crustacea Register, the entry for accessions number 1977.178 reads, "*Upogebia carinicauda* (Stimpson), Kosichang, Gulf of Siam, coll. + pres. S.S. Flower, det. N. Ngoc-Ho". These data sets suggest the original marine and freshwater crustacean specimens collected by Flower were not well labelled or were mixed up by later workers.

Moreover, while the external label on the bottle says "1898.11, Penang, S.S. Flower Esq", there is a field note inside the jar that on one side is written "7 crabs" and on the other side "PENANG. 2000' March 1898. S.S. Flower." There were four crab specimens inside, which are presently identified as *Stoliczia stoliczkana*. This species was described by Wood-Mason (1871) from Penang and is now regarded as an endemic species on the island occurring in many fast-flowing forest and hill streams (see Ng, 1988, 1992). The *S. stoliczkana* species-group has been revised by Ng (1992). There is one small juvenile specimen (ex. NHM 1898.11.28, now re-registered as NHM 2022.157) collected by Capt. S.S. Flower, which was difficult to identify with certainty. It, however, agrees well with many smaller ZRC specimens from various Penang sites that were examined for this study. Furthermore, this is the only known *Stoliczia*

species on Penang. The absence of a flagellum on the exopod of the third maxilliped is a character present even in small *S. stoliczkana* specimens. The other three of the seven crabs inside the bottle collected by S.S. Flower from Penang in March 1898 are presently referred to *Geosesarma penangense* (Nobili, 1903) and are now re-registered as NHM 2022.912–914.

Stoliczia rafflesi (Roux, 1936)

Potamon (*Potamiscus*) *rafflesi* Roux, 1936: 33, text-figs. 3, 5, pl. 13, figs. 3, 4.

Material examined. 2 males, 3 females (NHM 1906.2.27.3–6), Peninsular Malaysia: Pahang: Gunung Tahan, coll. Gunong Tahan Expedition, May–September 1905).

Remarks. Roux (1936) described this species from Gunung Tahan in Pahang, the highest mountain on Peninsular Malaysia. Ng (1988: 76) clarified that material reported to be this species from a nearby peak, Gunung Padang in Terengganu by Bott (1966, 1970), belonged to a separate species and named it *S. changmanae* (Ng, 1988) (see also Ng, 1991).

Genus *Johora* Bott, 1966

Type species. *Potamon* (*Potamon*) *johorense* Roux, 1936.

Remarks. *Johora* is known from Singapore, Peninsular Malaysia and southern Thailand, and comprises 18 species (Ng et al., 2008; Ng, 2020).

Johora gapensis (Bott, 1966)

Potamiscus (*Johora*) *johorensis gapensis* Bott, 1966: 494, text-fig. 31, pl. 21, fig. 14.

Material examined. 1 female (NHM 2022.166), Camp 2, 3º51′30″ N 102º10′30″ E, 488 m asl, Gunung Benom, Pahang, Peninsular Malaysia, coll. A.G.C. Grandison & F.V. Slade, British Museum/University of Malaysia Expedition (February–April 1967), 12 March 1967.

Remarks. *Johora gapensis* is morphologically close to *J. intermedia* Ng, 1986, and the distributions for both species often overlap, especially at higher altitudes. At altitudes above 1000 m asl, only *J. gapensis* usually occurs (see Ng, 1987a, 1988, 2020). The most reliable diagnostic character is the structure of the G1 terminal segment, which in *J. gapensis* is elongate and sickle-shaped (Ng, 1987a: fig. 2I, J) (vs. G1 shorter and more gently curved in *J. intermedia*; Ng, 1987a: figs. 3, 4). The present specimen is a female so its species identity cannot be determined with certainty, but based on its presence in high altitudes, relatively small size (carapace width about 10 mm or less) and the fact that its already mature, suggests its more likely to be *J. gapensis* (see Ng, 1987a, 2020).

Bott (1966) consistently spelled the specific name as "*gapensis*" in his original paper, but in his book (Bott, 1970) he changed the spelling to "*gapiensis*" throughout the text without any explanation. Subsequent authors (e.g., Ng, 1987a, 1988, 2020) have used the original spelling.

Johora booliati Ng, 2020
(Fig. 1)

Johora booliati Ng, 2020: 20, figs. 1F, 2F, 3F, 4F, 5F, 10E–I, 12F, 13F, 14F.

Material examined. 1 male (31.8 × 26.8 mm), 1 juv. male, 1 juv. female (NHM 2022.167–169), 213 m asl, in stream at base camp, Gunung Benom, Pahang, Peninsular Malaysia, coll. A.G.C. Grandison, British Museum/University of Malaysia Expedition (February–April 1967), March 1967.

Remarks. *Johora booliati* has been misidentified as *J. tahanensis* (Bott, 1966) for many years (see Bott, 1970; Ng, 1987a, 1988). Ng & Takeda (1992) first indicated this was a species-complex, with Ng (2020) eventually revising the group. *Johora booliati* was described from material from Bukit Tinggi in Bentong and Fraser's Hill in Pahang, Peninsular Malaysia (Ng, 2020: 20), and Gunung Benom is an adjacent mountain. The G1 structure of the present adult male (Fig. 1D) agrees well with the original description, with the terminal segment relatively long and gently curved and the proximal part of the subterminal segment is broad (cf. Ng, 2020: fig. 10E–H). The one character that differs is the form of the posterior carapace margin; in the types, the median part is gently indented and the overall margin appears sinuous (Ng, 2020: fig. 2F). In the present adult male specimen, the posterior carapace margin is gently concave (Fig. 1A).

Genus *Isolapotamon* Bott, 1968

Type species. *Potamon* (*Potamon*) *anomalus* Chace, 1938.

Remarks. *Isolapotamon* is known only from Borneo and Mindanao, Philippines and is currently represented by 19 species (cf. Ng et al., 2008; Mendoza & Yeo, 2014), 14 of which are Bornean. It is with some surprise that among the NHM material, there were specimens of two new species from parts of Borneo which have been under-sampled.

Isolapotamon consobrinum (De Man, 1899)

Potamon (*Potamon*) *consobrinus* De Man, 1899: 99, pl. 10, fig. 10.

Material examined. 1 male (NHM 1893.3.26.20), Sarawak River, Sarawak, Borneo, Malaysia, coll. A. Everett.

Remarks. *Isolapotamon consobrinum* is a well-known species from southern Sarawak, the type locality being the Kapuas in western Kalimantan (De Man, 1899). It is well characterised by Bott (1970), Ng (1987b) and Ng & SH Tan (1998).

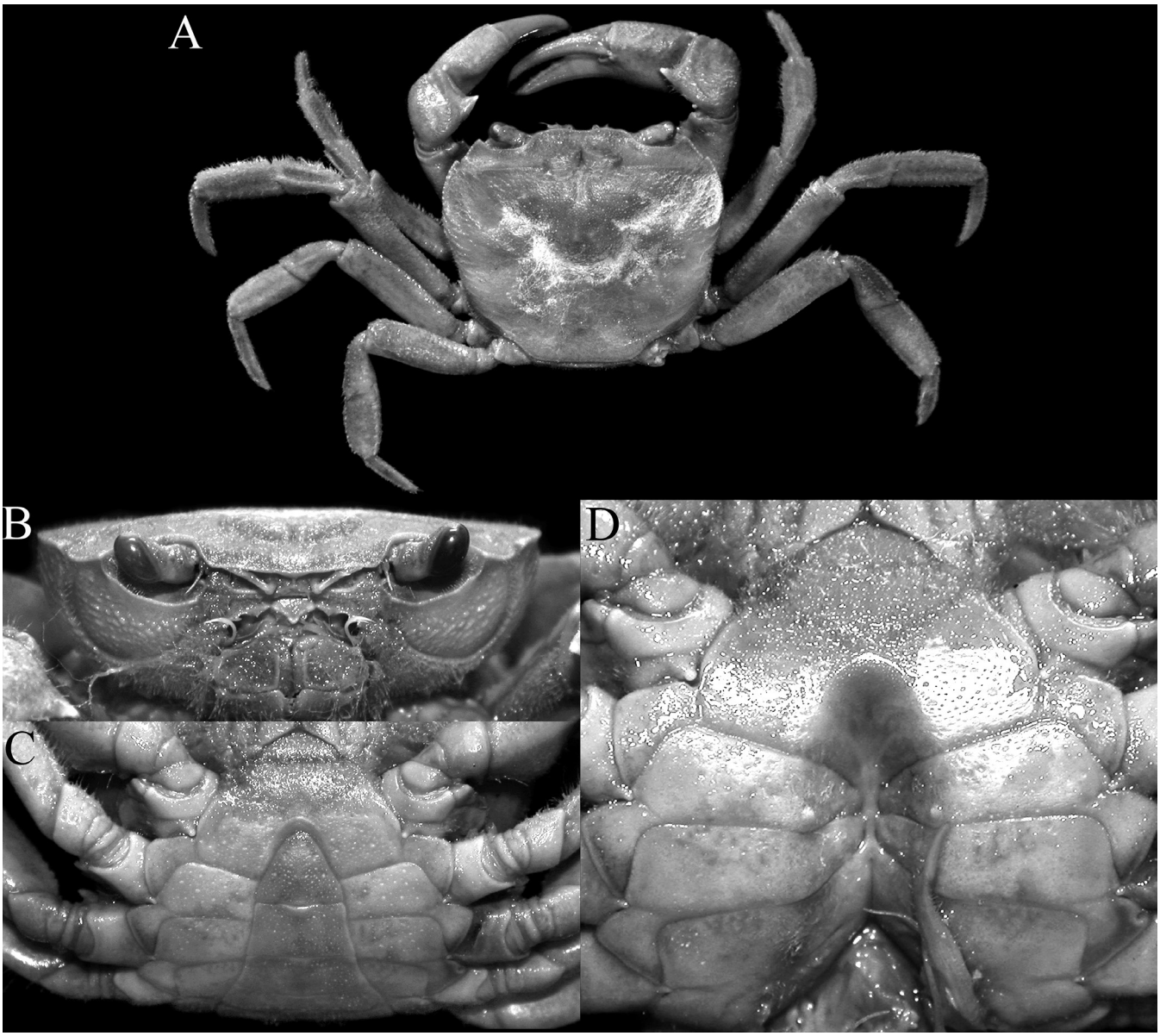

Fig. 1. *Johora booliati* Ng, 2020, male (31.8 × 26.8 mm), Gunong Benom. A, overall dorsal view; B, frontal view of cephalothorax; C, anterior thoracic sternum and pleon; D, sternopleonal cavity and gonopods in situ.

***Isolapotamon feeae*, new species**
(Figs. 2, 3, 6A–D)

Material examined. Sarawak, Borneo, Malaysia. Holotype: male (45.0 × 34.2 mm) (NHM 1898.10.25.15), Baram River, coll. C. Hose. Paratypes: 1 male (36.2 × 25.9 mm), 3 females (49.3 × 36.7 mm, 44.3 × 34.2 mm, 38.2 × 28.7 mm) (NHM 1898.10.25. 16), same data as holotype; 1 juv. (NHM 1895.7.2.34), Baram, coll. C. Hose, January 1895.

Comparative material. *Isolapotamon collinsi* Holthuis, 1979: 2 males (larger 44.4 × 34.8 mm), 1 female (ZRC 1997.0792), around Kuala Belalong Field Centre, Brunei, coll. S. Choy, 8–9 February 1991; 1 male, 3 juveniles (ZRC 1997.0793), Temburong, Sungai Belalong, Kuala Belalong Field Centre, Brunei, coll. K. Lim et al., 14–17 June 1995; 6 males (largest 51.1 × 39.2 mm), 2 females (ZRC 2008.0539), just downstream of Kuala Belalong Field Centre, Sungai Mata Ikan, Belalong Basin, Temburong district, Brunei, 4º32′50.4″N 115º09′27.6″E, coll. H. H. Tan, 6–9 October 2001. *Isolapotamon borneense* Ng & SH Tan, 1998: 6 males, 4 juveniles (ZRC 2022.0781), station THH02-33, Arur Dalan, Sungai Arur Dalan, Bario Plateau, Baram Basin, Sarawak, 03º45′32.1″N 115º26′28.0″E, Malaysia, 1110 m, coll. H. H. Tan & I. Das, 17 June 2002.

Diagnosis. Carapace wider than long, relatively low, dorsal surface of carapace gently convex to almost flat; epigastric cristae sharp, just anterior of postorbital cristae; postorbital cristae sharp, subparallel to front; median lobe of posterior margin of epistome acutely triangular (Fig. 2A–C). P2–P5 merus relatively long, dactylus of P5 long (Figs. 2A, 3I). Press-button of male pleonal locking mechanism on submedian part of sternite 5 (Fig. 3A). Male pleon subtriangular (Fig. 2F, G). G1 sinuous; subterminal segment relatively long, with basal part broad, forming subrectangular structure, distal part slender; terminal segment strongly sinuous, curved, terminal segment strongly curved, sinuous,

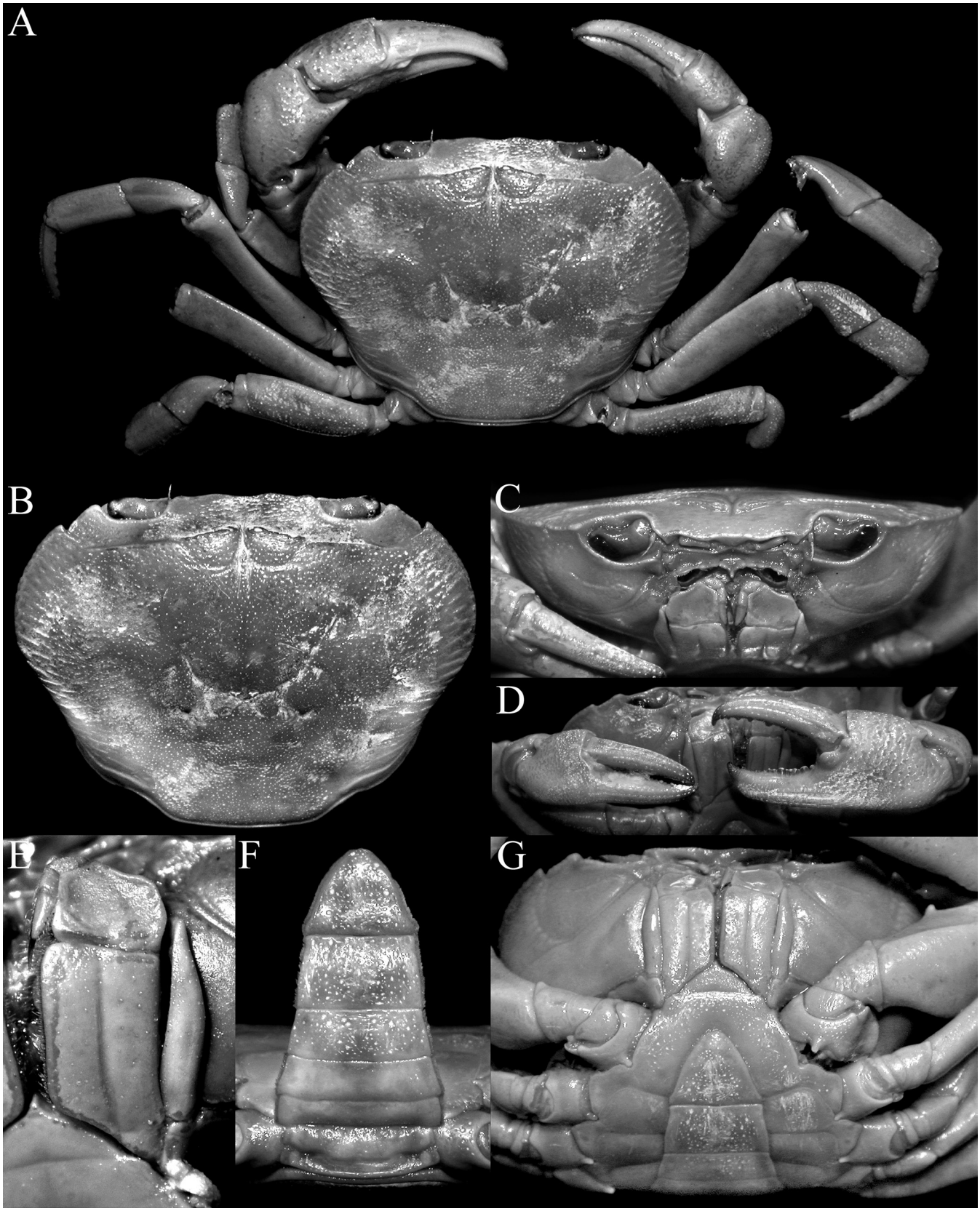

Fig. 2. *Isolapotamon feeae*, new species, holotype male (45.0 × 34.2 mm) (NHM 98.10.25.15/10), Baram River. A, overall dorsal view; B, dorsal view of carapace; C, frontal view of cephalothorax; D, chelae; E, left third maxilliped; F, pleon; G, anterior thoracic sternum and pleon.

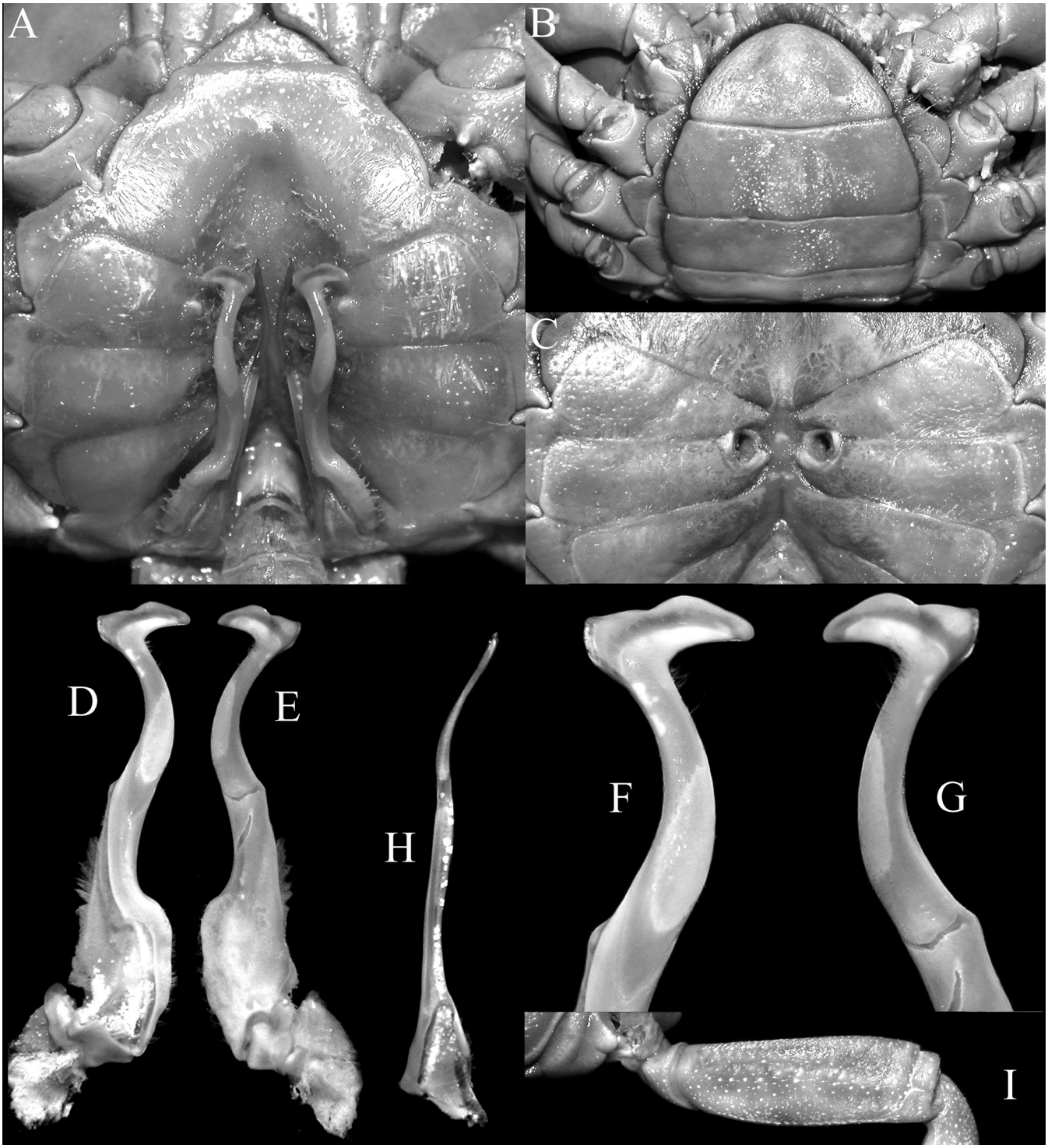

Fig. 3. *Isolapotamon feeae*, new species. A, D–I, holotype male (45.0 × 34.2 mm) (NHM 98.10.25.15/10), Baram River; B, C, paratype female (49.3 × 36.7 mm) (NHM 98.10.25.15/10), Baram River. A, sternopleonal cavity and gonopods in situ; B, female pleon; C, female sternopleonal cavity and vulvae; D, left G1 (ventral view); E, left G1 (dorsal view); F, distal part of left G1 (ventral view); G, distal part of left G1 (ventral view); H, left G2; I, right P5 merus. D, E, H; F, G, to same scale.

distal part relatively elongate, lobiform, curved about 90° from immediately preceding subdistal part, with distal margin distinctly sinuous, tip rounded (Figs. 3D–G, 6A–C).

Females and variation. The smaller males of this species in which the gonopods are developed are almost identical to the holotype male, with the G1 structure agreeing in structure. The females agree with the males in all non-sexual characters except that their chelipeds are relatively more slender. The female pleon is ovate and covers most of the thoracic sternum and the telson is almost semicircular (Fig. 3B). The vulvae are large, occupying more than half width of sternite 6, with the anterior margin pushing into the suture between sternites 5 and 6, and the posterior margin possessing a low ridge (Fig. 3C).

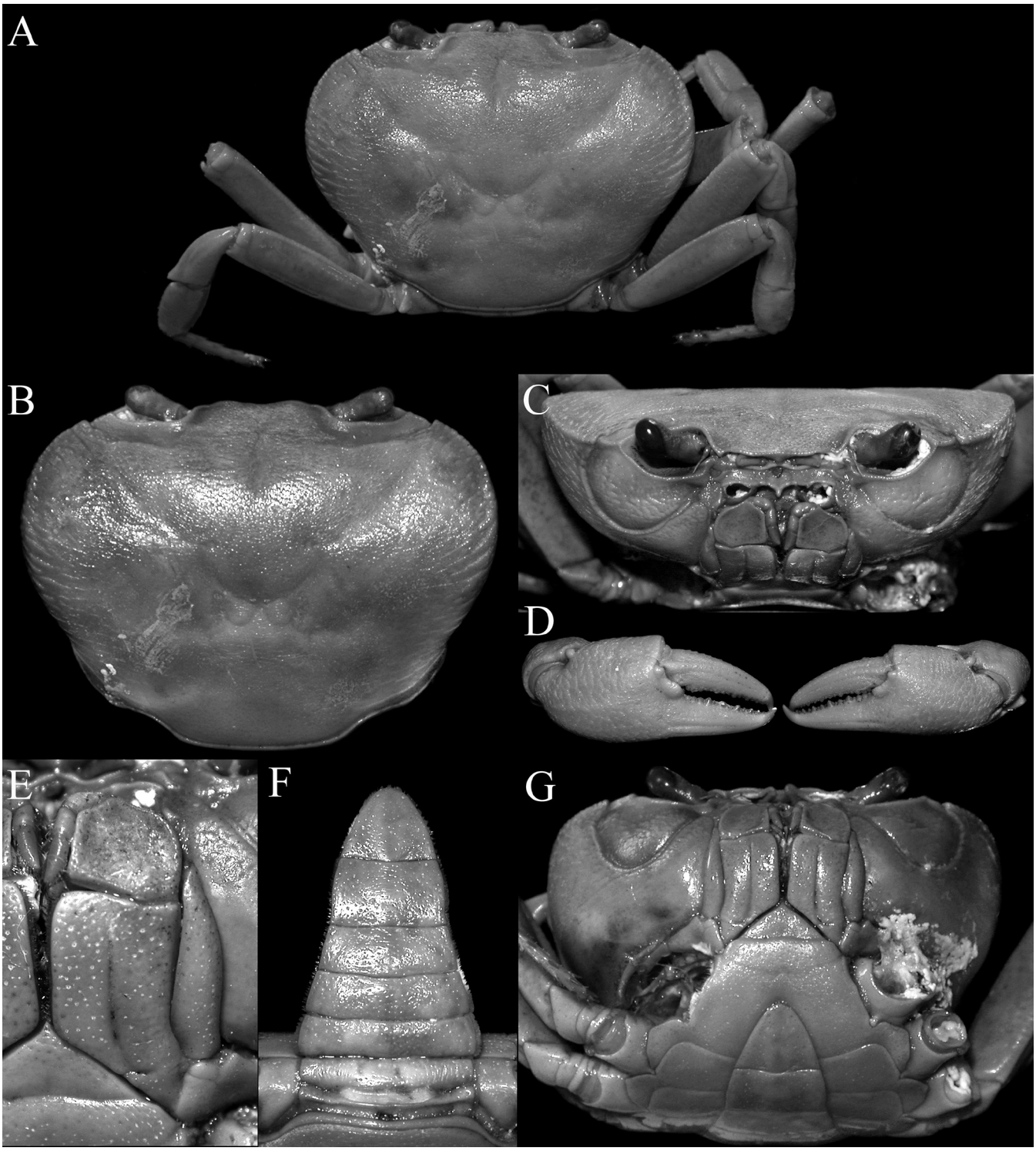

Fig. 4. *Isolapotamon buntyae*, new species, holotype male (43.6 × 32.7 mm) (NHM 2022.170), Ulu Dusun. A, overall dorsal view; B, dorsal view of carapace; C, frontal view of cephalothorax; D, chelae; E, left third maxilliped; F, pleon; G, anterior thoracic sternum and pleon.

Etymology. This new species is named for Félice "Fee" Vera Slade whose "enthusiasm, energy and keen eyesight during fieldwork" is recognised here (see information on collectors).

Remarks. Two *Isolapotamon* species are known from and around Baram; *I. collinsi* Holthuis, 1979 (from Gunung Mulu National Park and Brunei) and *I. borneense* Ng & SH Tan, 1998 (from upper Baram) (cf. Holthuis, 1979; Ng & SH Tan, 1998; Grinang et al., 2014). *Isolapotamon borneense* was described from an unknown site in Sarawak, but Grinang et al. (2014) confirmed that the species was from the Pulong Tai National Park area on the eastern drainage of the Baram River. The locality data for the new species, *I. feeae*, new species, is not detailed, but as it is a different species, it was likely to have been collected from the western catchment of the Baram River which drains from a different mountain range. More collections in that area will need to be made to confirm this supposition.

Not unexpectedly, the species closest to *I. feeae*, new species, is *I. borneense*, which occurs in the eastern drainage of Baram River (Grinang et al., 2014). The G1 of *I. feeae*, however, differs markedly from that of *I. borneense* in having the G1 subterminal segment proportionately longer, the terminal segment more strongly curved and sinuous, and the distal part of the terminal segment more elongate with the distal margin distinctly sinuous (Figs. 3D–G, 6A–C) (cf. Ng & SH Tan, 1998: fig. 1M–P; Grinang et al., 2014: figs. 3A–D, E, G–I, J, L–M). Noteworthy is that the carapace of *I. feeae* is distinctly wider proportionately; Fig. 2A, B (vs. carapace more quadrate in *I. borneense*; Grinang et al., 2014: fig. 2A–C), and the P2–P5 meri are distinctly longer; Fig. 4I (vs. meri are distinctly shorter in *I. borneense*; Grinang et al., 2014: fig. 2F).

One small juvenile specimen (NHM 1895.7.2.34) from Baram is referred to this species only because it was collected from the type locality.

Isolapotamon buntyae, new species
(Figs. 4, 5, 6E–H)

Material examined. Holotype: male (43.6 × 32.7 mm) (NHM 2022.170), "Ulu Dusun, North Borneo", Sabah, Malaysia, coll. J. Kidman-Cox, 1 August 1972, presented by Reptile Section.

Diagnosis. Carapace wider than long, relatively high, dorsal surface of carapace convex; epigastric cristae rugose, not sharp, anterior of postorbital cristae; postorbital cristae sharp, sloping posteriorly from front; median lobe of posterior margin of epistome acutely triangular (Fig. 4A–C). P2–P5 merus relatively long, dactylus of P5 long. Press-button of male pleonal locking mechanism on median part of sternite 5 (Fig. 5A). Male pleon distinctly triangular (Fig. 5F, G). G1 gently sinuous; subterminal segment relatively long, with basal part broad, forming subrectangular structure, distal part slender; terminal segment strongly sinuous, curved, distal part bifurcated, subdistal projection as long as distal projection, lobiform with rounded tip, laterally flattened (Figs. 5B–E, 6E–G). Female unknown.

Females and variation. Only known from the holotype male.

Etymology. The species is named after Alice Georgie Cruickshank "Bunty" Grandison, a well-respected, pioneering female herpetologist and museum curator (see information on collectors).

Remarks. The bifurcated distal part of the G1 of *I. buntyae*, new species, is diagnostic and places this species in a group with four other species sharing this character: *I. griswoldi* (Mount Kinabalu, Sabah), *I. collinsi* (Gunung Mulu and Brunei), *I. nimboni* (southern and central Sarawak), and *I. grusophallus* (southern Sarawak). Although Ng & SH Tan (1998) recognised *I. stuebingi* Ng, 1995b, as a distinct species, it has been subsequently shown that the holotype is just a subadult specimen of *I. nimboni* and the two names are now regarded as synonyms (cf. Ng, 2004: 324; Ng et al., 2008: 163).

The G1 subdistal process of *I. grusophallus* is the most distinctive, being prominently elongate and more than twice the length of the distal part (cf. Ng & Yang, 1986: fig. 1H–K; Ng, 1987b: fig. 3G, H; Ng & SH Tan, 1998: fig. 6A–D; Grinang et al., 2014: fig. 5A, B, D, E, H–K, M–P, R–T). The G1 of *I. griswoldi* is the shortest proportionately among all the members of this group of species, with the subdistal process short and almost rounded in appearance (Chace, 1938: pl. 1f–h; Bott, 1969: fig. 2; Bott, 1970: pl. 41, fig. 78; Ng & SH Tan, 1998: fig. 5M–P). The general features of the G1 of *I. buntyae* most closely resemble those of *I. collinsi* and *I. nimboni*. Compared to *I. buntyae*, the G1 terminal article of *I. collinsi* is gently sinuous and the subdistal process is subcylindrical in shape and distinctly longer than the distal process and positioned at a right angle with respect to the main stem of the terminal article (Fig. 7D, E, F, G, I, J, K, L; Holthuis, 1979: fig. 4b; Ng, 1987b: fig. 3F; Ng & SH Tan, 1998: fig. 5A–D (vs. terminal article strongly sinuous with the subdistal process laterally flattened and slightly longer than the distal process in *I. buntyae*; Figs. 5B–E, 6E–G). In *I. nimboni*, the G1 terminal segment is similar to that of *I. collinsi*, being gently sinuous to almost straight but the subdistal process is conical in shape, subequal to the distal process in length and positioned at a more acute angle (Ng, 1987b: fig. 2H–J; Ng & SH Tan, 1998: fig. 10I–L).

Ng & Goh (1987: 328, pl. 3C, D) reported a female specimen from near Gomantong in eastern Sabah which could not be identified to the species level. This site is some 42 km to the southeast of Ulu Dusun. From the general appearance of the carapace (notably the relatively flatter carapace) and the broader median lobe on the posterior margin of the epistome, however, it is unlikely that the Gomantong specimen is conspecific with *I. buntyae*.

Family Gecarcinucidae Rathbun, 1904

Genus *Lepidothelphusa* Colosi, 1920

Type species. *Potamon* (*Geotelphusa*) *cognettii* Nobili, 1903.

Remarks. *Lepidothelphusa* was long believed to be represented by only one species, *L. cognettii*, described from Mount Penrissen in southern Sarawak (Nobili, 1903a; Colosi, 1920). Grinang & Ng (2015a) revised the genus and described five new species from Sarawak.

Lepidothelphusa sp.

Material examined. 1 female (NHM 1911.2.28.3), Upper Sarawak, Borneo, coll. C. J. Brooks, no date.

Remarks. The various *Lepidothelphusa* species can be distinguished by a variety of male characters, including colours in life. Unfortunately, the present female specimen

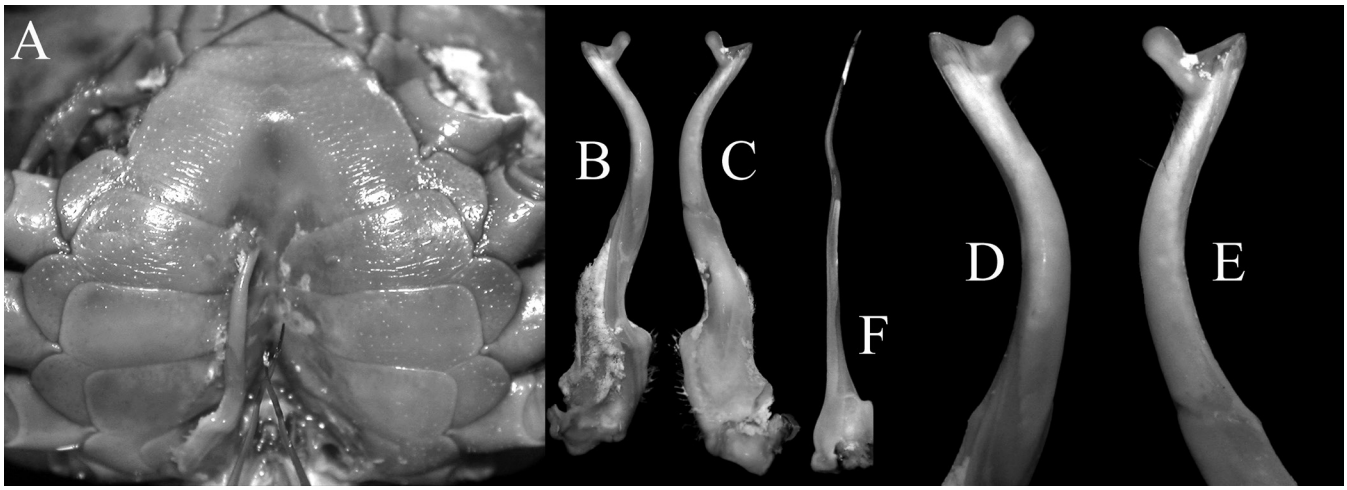

Fig. 5. *Isolapotamon buntyae*, new species, holotype male (43.6 × 32.7 mm) (NHM 2022.170), Ulu Dusun. A, sternopleonal cavity and gonopods in situ; B, left G1 (ventral view); C, left G1 (dorsal view); D, distal part of left G1 (ventral view); E, distal part of left G1 (ventral view); F, left G2. B, C, F; D, E to same scale.

has neither any trace of colour nor any precise provenance, so it is not possible to ascertain its precise identity.

Genus *Terrathelphusa* Ng, 1989

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

Remarks. *Terrathelphusa* was established for several terrestrial species from Java and Borneo which had been assigned to *Perbrinckia* Bott, 1969 (cf. Ng, 1989). The diversity of the genus in Borneo is high and nine species have been described from Sarawak, Sabah and Brunei in recent years (Ng, 1997; Ng & LWH Tan, 2015; Grinang & Ng, 2015b). Unfortunately, male characters, especially the G1 structure, are important for accurate species delineations in this genus. The absence of adult males and a precise provenance for the present specimens makes the determination of the following specimens provisional at best.

Terrathelphusa ovis Ng, 1997

Material examined. 1 female, Baram River, Sarawak, Borneo (NHM 1898.10.25.12), coll. C. Hose, no date.

Remarks. Specimens from Sarawak and Gunung Mulu National Park which is just east of the Baram River have been identified as *Perbrinckia loxophthalma* (De Man, 1892) by Bott (1970), Holthuis (1979), and Ng (1989). Ng (1997) re-examined the holotype of *Geothelphusa loxophthalma* and showed that its G1 structure was different from that of specimens from Gunung Mulu in northern Sarawak and referred the latter to a new species, *Terrathelphusa ovis*. The real *T. loxophthalma* was almost certainly collected from southeastern Borneo (cf. Holthuis, 1979; Ng, 1997). On the basis of the location where the present specimen was collected, it is likely to belong to *T. ovis*.

Terrathelphusa kuchingensis (Nobili, 1901)

Material examined. 2 females (NHM 1911.2.28.4–5), Upper Sarawak, Borneo, coll. CJ. Brooks, purchased from W. Gerrard.

Remarks. It is uncertain where in "upper Sarawak" C.J. Brooks collected his specimens from, but its possibly from the upper stretches of the Sarawak River. Brooks obtained many specimens from and around Kuching and southern Sarawak, so it is difficult to narrow where the present ones were obtained. Five species of *Terrathelphusa* are known from southern Sarawak (Grinang & Ng, 2015b), and all share relatively similar carapace shapes. In the Sarawak Museum in Kuching, there are two large females collected by C.J. Brooks from Bidi, Bau, Sarawak, which were referred to *T. kuchingensis* (Nobili, 1901) by Grinang & Ng, 2015b: 340), and the present specimens may have been from that lot. We therefore provisionally refer them to this species.

Genus *Thelphusula* Bott, 1969

Type species. *Potamon* (*Geothelphusa*) *buergeri* De Man, 1899.

Remarks. There are 12 recognised species in this Bornean genus (Ng et al., 2008; Grinang & Ng, 2014; Ng & PYC Ng, 2018); all characterised by their distinctly T-shaped male pleons, elongate and demarcated G1 terminal segments, and short G2s (cf. Tan & Ng, 1998).

Thelphusula baramensis (De Man, 1902)

Potamon (*Potamonautes*) *baramense* De Man, 1902: 553, pl. 20, fig. 16.

Material examined. 1 male (NHM 2022.158), Baram, Borneo, coll. C. Hose, February 1896.

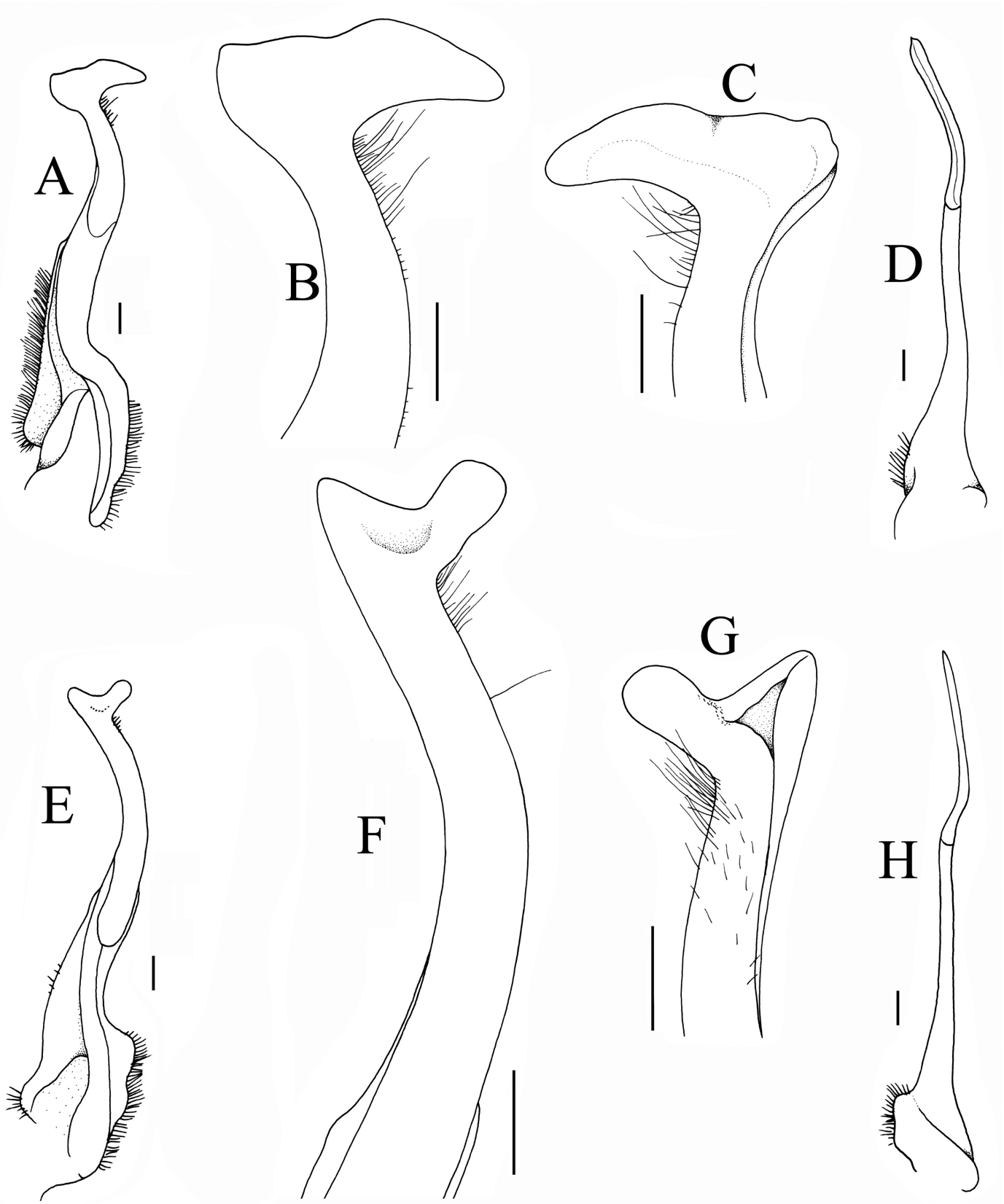

Fig. 6. A–D, *Isolapotamon feeae*, new species. A–D, holotype male (45.0 × 34.2 mm) (NHM 98.10.25.15/10), Baram River; E–H, *I. buntyae*, new species, holotype male (43.6 × 32.7 mm) (NHM 2022.170), Ulu Dusun. A, E, left G1 (ventral view); B, F, distal part of left G1 (ventral view); C, G, distal part of left G1 (ventral view); D, H, left G2. Scales = 1.0 mm.

Fig. 7. *Isolapotamon collinsi* Holthuis, 1979. A–G, male (44.4 × 34.8 mm) (ZRC 1997.0792), Brunei; I–L, male (51.1 × 39.2 mm) (ZRC 2008.0539), Brunei. A, overall dorsal view; B, frontal view of cephalothorax; C, right fourth ambulatory leg; D, I, left G1 (ventral view); E, J, left G1 (dorsal view); F, K, distal part of left G1 (ventral view); G, L, distal part of left G1 (ventral view); H, M, left G2. D, E, H; I, J, M to same scale.

Remarks. The taxonomy of *T. baramensis* has been treated at length by Bott (1970) and Tan & Ng (1998). It is one of the most distinctive *Thelphusula* species as it has a low transverse ridge on the posterior third of the dorsal surface of its carapace (cf. Tan & Ng, 1998: fig. 1A). The present male specimen can be considered topotypic.

Genus *Perithelphusa* De Man, 1899

Type species. *Potamon borneense* von Martens, 1868.

Remarks. *Perithelphusa* is exclusively Bornean in composition, with four known species (Bott, 1970; Ng, 1986a).

Perithelphusa borneensis (von Martens, 1868)

Thelphusa borneensis von Martens, 1868: 18.
Potamon (*Perithelphusa*) *borneense* var. *hilaris* De Man, 1899: 71, pl. 5, fig. 4.
Potamon (*Perithelphusa*) *silvicola* De Man, 1899: 86, pl. 6, fig. 6.

Material examined. 1 male, 6 females (NHM 1895.4.3.1–6), Sarawak, Borneo, coll. Dr. Haviland.

Remarks. The taxonomy of *P. borneensis* was clarified by Bott (1970) and elaborated on by Ng (1986a). It was described from Sambas and Kapuas in western Kalimantan in Borneo, and has been reported from several sites on the island (see De Man, 1899; Bott, 1970; Ng, 1995a).

Perithelphusa lehi Ng, 1986

Perithelphusa lehi Ng, 1986: 291, fig. 1, pls. 15, 16.

Material examined. 1 male, 3 females (NHM 2022.161–164), Mount Matang, Sarawak, Borneo, coll. July, no other data.

Remarks. *Perithelphusa lehi* was described by Ng (1986a) from Gunung Matang, and is only known from this locality.

Genus *Parathelphusa* H. Milne Edwards, 1853

Type species. *Parathelphusa tridentata* H. Milne Edwards, 1853.

Remarks. This large genus of 49 recognised species (Ng et al., 2008, 2016; Ng, 2014; De Grave et al., 2022) is recorded from southern Thailand to Sumatra, Peninsular Malaysia, Java, Borneo, Sulawesi, as well as Palawan and some adjacent islands in the Philippines. Borneo is not the centre of distribution with just 10 species, but is believed to be the origin of the remaining taxa (cf. Klaus et al., 2013).

Parathelphusa pulcherrima (De Man, 1902)

Potamon (*Parathelphusa*) *tridentatum* var. *pulcherrima* De Man, 1902: 270, 550, pl. 20, fig. 15.

Material examined. Borneo. 1 male (NHM 1893.3.26.21), Marabah, Kinabatangan Area, North Borneo, coll. A. Everett, December 1892; 1 male, 1 ovig. female (NHM 1895.7.2.28–29), Baram, coll. C. Hose, February, March 1895 (respectively); 3 females (NHM 1895.7.2.30–32), Baram, coll. C. Hose, February 1895; 1 female, Baram, Borneo (NHM 1895.7.2.35), coll. C. Hose, February 1895; 1 male, 1 female (NHM 2022.156), Baram River, coll. C. Hose.

Remarks. This distinctive and somewhat variable species was characterised by Bott (1970) and is known from the Baram River drainage and adjacent areas where it was described (De Man, 1902; Holthuis, 1979). Ng & Goh (1987: 317) discussed the taxonomy of *P. pulcherrima* at length, and noted that *P. shelfordi* (Nobili, 1901), described from Limbang, Brunei is likely to be a senior synonym. For the moment, they are treated as separate taxa (cf. Ng et al., 2008) as the margin of the external orbital angle of *P. shelfordi* is serrate (cf. Nobili, 1901) but is entire and smooth in *P. pulcherrima*, and there is also genetic data to suggest they are separate taxa (Klaus et al., 2013).

Parathelphusa valida Ng & Goh, 1987

Parathelphusa valida Ng & Goh, 1987: 317, fig. 1, pls. 1, 2.

Material examined. North Borneo. 1 female (NHM 1897.6.28.4), Sandakan, coll. D. Cator; 1 male (NHM 1893.3.26.21), Marabah, Kinabatangan area, coll. A. Everett, December 1892.

Remarks. *Parathelphusa valida*, while superficially similar to *P. pulcherrima*, can be distinguished, when viewed frontally, by its more inflated and convex carapace and the more slender and sharply tapered G1 terminal segment which has a small opening at the tip (vs. G1 opening dilated and open in *P. pulcherrima*; Ng & Goh, 1987: 317). In addition, *P. valida* occurs in what is today eastern Sabah where the present collecting localities are located. The type locality of *P. pulcherrima* is along the Sarawak-Brunei border some 450 km to the west.

Genus *Borneosa* Ng & Grinang, 2022

Type species. *Sundathelphusa tenebrosa* Holthuis, 1979.

Remarks. Ng & Grinang (2022) revised the Bornean species previously referred to *Sundathelphusa* Bott, 1969, and assigned them to a new genus, *Borneosa*, which they defined by a suite of carapace, male thoracic sternal and G1 characters. Seven species were recognised, with four being new. *Sundathelphusa* is now restricted to Sulawesi, the Moluccas, and the Philippines.

Borneosa tenebrosa (Holthuis, 1979)

Sundathelphusa tenebrosa Holthuis, 1979: 39, text-fig. 8, pl. 7.

Material examined. Sarawak, Borneo. 1 male (NHM 1898.10.25.11), Baram River, coll. C. Hose, purch. from W. Gerrard; 1 juv. female (NHM 2022.911), Deer Cave, Gunung Mulu, coll. J. Cramphorn, 18 December 1977.

Remarks. *Borneosa tenebrosa* was described from Gunung Mulu National Park and has subsequently been reported from nearby areas (Holthuis, 1979; Grinang & Nyanti, 2007; McFarlane et al., 2011; Ng & Grinang, 2022).

Genus *Sayamia* Naiyanetr, 1994

Type species. *Somanniathelphusa bangkokensis* Naiyanetr, 1982.

Remarks. Naiyanetr (1994) established *Sayamia* for several large gecarcinucid species which had previously been placed in *Somanniathelphusa* Bott, 1968. Five species are currently recognised in *Sayamia*, and the genus has a wide distribution in Thailand, Indochina, southern Thailand and northern Peninsular Malaysia.

Sayamia sexpunctata (Lanchester, 1906)

Potamon (*Paratelphusa*) *sexpunctata* Lanchester, 1906: 29, fig. 7.
Somanniathelphusa juliae Bott, 1968: 408, figs. 7, 8, 28.

Material examined. 2 females (NHM 1898.1.17.5–6), "Takkom, Siam", coll. Capt. S.S. Flower, 1 April 1897, in exchange with Capt. S.S. Flower.

Remarks. The taxonomy of the species has been clarified by Ng & HP Ng (1987) and they argued that *Somanniathelphusa juliae* Bott, 1968, is a junior synonym of *Parathelphusa sexpunctata* Lanchester, 1906. Lanchester (1906: 129) described his species from two females from "Sai kau, Nawngchik" and "Cape Pattani" in southern Thailand; while *S. juliae* was from Perlis in northern Malaysia (Bott, 1968b: 408). The present specimens are from near the localities of Lanchester in southern Thailand and had been collected several years earlier by Capt. S.S. Flower but, for whatever reason, were not examined. Incidentally, Bott (1968b) had mistakenly synonymised the Lanchester species with *S. germaini* (Rathbun, 1902) (see Ng & Naiyanetr, 1993).

Some comments on the bottle of specimens associated with registration number "1898.1.17.4–6" are necessary. The outside jar label and NHM Crustacea Register state "*Telphusa* Brunei, Borneo". This, however, conflicts with field-written labels attached to three of the crabs which appear not to have been considered by Jeffrey Bell (see Ingle, 1991) when registered on the 17th of January 1898. On the leg of one female is tied a label stating "77, Bangkok, Siam, coll. Capt. S.S. Flower, July 1897", this specimen is now registered as NHM 1898.1.17.4 and it is *S. bangkokensis* as now understood (cf. Naiyanetr, 1982, 1994; Ng & Naiyanetr, 1993). On the legs of two other female specimens (which were originally tied together) is a label stating "Takkom, Siam, coll. Capt. S.S. Flower, 1 April 1897", these now have been allocated the registration number 1898.1.17.5–6 and identified here as *S. sexpunctata* (Lanchester, 1906). Furthermore, *Sayamia* is not known from Borneo. Although the registration number 1898.1.17.4–6 indicates there are only three specimens in the bottle, four are actually present. The fourth specimen in the 1898.1.17.4–6 jar is an ovigerous female, and here identified as the sesarmid *Fasciarma fasciatum* (Lanchester, 1900) (see later). This crab does not have a label tied to it, consequently the locality is unknown but it is assumed to be somewhere in Siam (Thailand). Additionally, under the Zoological Accessions, Crustacea Register number 1898.1.17.4–6 is stated "In exchange with S.S. Flower Esq."

Family Sesarmidae Dana, 1851

Genus *Geosesarma* De Man, 1892

Type species. *Sesarma* (*Geosesarma*) *nodulifera* De Man, 1892.

Remarks. *Geosesarma* is a speciose genus with 68 species from Thailand, Peninsular Malaysia, Sumatra, Borneo, Java, Sulawesi, Indonesian Papua, Papua New Guinea, Philippines and Taiwan (Ng et al., 2008, 2015; Schubart & Ng, 2014; Ng, 2015, 2017, 2021; Manuel-Santos et al., 2016; Ng & Grinang, 2018; PYC Ng & Ng, 2019; Ng & Wowor, 2019; Shy & Ng, 2019; Naruse & Ng, 2020). Of these, 12 are known from Borneo (Ng, 2015; Ng & Grinang, 2018; PYC Ng & Ng, 2019).

Geosesarma penangense (Tweedie, 1940)

Sesarma penangense Tweedie, 1940: 106, text-fig. 10, pl. 24, fig. 4.

Material examined. 1 male, 1 female, 1 ovig. female (NHM ex. 1898.11.28 now 2022.912–914), 610 m asl, Penang, Peninsular Malaysia, coll. Capt. S.S. Flower, March 1896.

Remarks. The species was first described from Penang Hill (Tweedie, 1940) and has since then been reported and redescribed by Ng (1988). *Geosesarma penangense* is superficially similar to *G. peraccae* (Nobili, 1903b) from Singapore, but it has the dorsal surface of the carapace relatively smoother and the chitinous distal part of the G1 is shorter, more strongly spatulate and curved (Ng, 1988: 120, 130, fig. 58D, E).

Geosesarma malayanum Ng & Lim, in Ng, 1986

Geosesarma malayanum Ng & Lim, in Ng, 1986: 36, fig. 4.

Material examined. 1 male (NHM 2022.165), Camp 3, on peaty soil at roots of tree at side of path between camp and stream, night, 1067 m asl, Gunung Benom, Pahang, Peninsular Malaysia, coll. British Museum/University of Malaysia Expedition (February–April 1967), A.G.C. Grandison & F.V. Slade, 17 March 1967.

Remarks. *Geosesarma malayanum* is a widespread species in southern and central Peninsular Malaysia, being originally described from Endau-Rompin, Johor (Ng, 1986b) The taxonomy of the species has been treated at length by Ng & Lim (1987) and Ng (1988).

Geosesarma gracillimum (De Man, 1902)

Sesarma (*Sesarma*) *ocypoda* var. *gracillima* De Man, 1902: 522, pl. 19, fig. 9.

Material examined. 1 male (NHM 1895.7.2. 33), Baram, Borneo, coll. C. Hose, January 1895; 3 males, 2 females (NHM 1895.7.2.37–38), Baram, Boneo, coll. C. Hose, 2 females, January 1895.

Remarks. *Geosesarma gracillimum* was described from the Baram River by De Man (1902), originally as a variety of *G. ocypodum* (Nobili, 1900) (type locality: Sumatra). Holthuis (1979) partially redescribed it from material from Gunung Mulu, with Ng (1995b) adding more notes. Ng (2015) subsequently described it in more detail in his treatment of Bornean *Geosesarma* species. The present material can be considered topotypic.

Genus *Contusarma* Schubart & Ng, 2020

Type species. *Sesarma bocourti* A. Milne-Edwards, 1869.

Remarks. Schubart & Ng (2020) revised the systematics of mangrove and freshwater species associated with *Pseudosesarma* Serène & Soh, 1970, and several other East and Southeast Asian genera, and transferred many to new genera. Two distinctive species often found in back mangroves and peat swamps were referred to *Contusarma*. The most distinctive feature of members of this genus is the flattened outer surfaces of the chelae in both sexes. This feature is distinct in adults but still discernible in subadults.

Contusarma cheirogonum (Targioni Tozzetti, 1877)

Sesarma cheirogona Targioni Tozzetti, 1877: 141, pl. 9, fig. 2a–g.

Material examined. 1 subadult female (NHM 1895.7.2.36), Baram, Borneo, coll. C. Hose, February 1896.

Remarks. This specimen is a young female but agrees with this species as defined by Schubart & Ng (2020). The species was described from Sarawak (Targioni Tozzetti, 1877) but is known from southern Malaysia to northern Borneo (Schubart & Ng, 2020). *Contusarma cheirogonum* has been known to occur some distance inland, including peat and freshwater swamps (cf. Ng, 1995a; Yeo et al., 1999).

Genus *Fasciarma* Shahdadi & Schubart, 2017

Type species. *Sesarma fasciata* Lanchester, 1900.

Remarks. Shahdadi & Schubart (2017) and Shahdadi et al. (2020) revised species which have long been assigned to *Parasesarma* De Man, 1895, or *Perisesarma* De Man, 1895, referring various taxa to new genera. One species common in Peninsular Malaysia and Bornean mangroves, *Sesarma fasciata* Lanchester, 1900, was placed in a new monotypic genus, *Fasciarma* Shahdadi & Schubart, 2017.

Fasciarma fasciatum (Lanchester, 1900)

Sesarma fasciata Lanchester, 1900: 758, pl. 47, fig. 12.
Sesarma (*Chiromantes*) *siamense* Rathbun, 1909: 109.

Material examined. 1 ovig. female, Siam (NHM 2022.155), coll. Capt. S.S. Flower.
ZRC material – 6 males, 7 females (ZRC 2012.368), Kranji Nature Trail, northern Singapore, coll. P.K.L. Ng, 16 November 2011; 3 males, 4 females (ZRC 1999.0568), Pandan Besar, Bako National Park, Sarawak, Malaysia, coll. P.K.L. Ng et al., 28 June 1994; 1 male, 1 female (ZRC 2020.0367), Tanjung Delima, Bako National Park, Sarawak, Malaysia, coll. P.K.L. Ng et al., 30 June 1994; 4 males, 3 females (ZRC 2000.1667), estuary near University of Sabah, Kota Kinabalu, Sabah, Malaysia, coll. P.K.L. Ng & C.D. Schubart, 22 June 2000.

Remarks. The NHM female agrees well with what has been redescribed by Shahdadi & Schubart (2017). Smaller adult specimens tend to have the carapace relatively slightly wider and the lateral teeth more pronounced (e.g., ZRC 1999.0568), as is the case for the present specimen in NHM.

Fasciarma fasciatum, common in back mangroves, was described from Singapore but has since been reported from Peninsular Malaysia, eastern Thailand, northern Borneo (Labuan), southern China and Hong Kong (cf., Shahdadi & Schubart, 2017: 541). As discussed under the remarks for *Sayamia* (see above), the provenance of the present specimen is uncertain and its supposed origins, Thailand, must be treated with doubt.

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