

2) 遺伝子学的解析

症例1のITS1領域の一部, 96塩基を解析した結果, シュードテラノーバ属幼虫と考えられた(表1). そのためITS2領域94塩基を解析したところ*P. azarasi*の塩基配列と完全一致した(表2). 症例2の2隻の幼虫のITS1領域を解析した結果, *A. simplex* (s.s.)と一致した(表1). 今回得られた塩基配列情報は国立遺伝学研究所日本DNAバンク(DDBJ)(<http://www.ddbj.nig.ac.jp/>)に登録した(Accession number: AB738323, AB738324).

表1 症例1および2から検出された虫体のITS1領域塩基配列解析

	登録番号	塩基位置		
		49	65	89
<i>A. simplex sensu stricto</i>	AY826723	T	T	A
症例2	AB738324	T	T	A
<i>A. simplex C</i>	AY826722	C	T	A
<i>A. pegreffii</i>	AY826720	C	C	A
<i>A. physeteris</i>	AB592792	T	C	T
<i>P. decipiens sensu stricto</i>	AB576757	A	T	T
<i>P. azarasi</i>	AB576756	A	T	T
症例1	—	A	T	T

表2. 症例1から検出された虫体のITS2領域塩基配列解析

	登録番号	塩基位置		
		17	70	72
<i>P. decipiens sensu stricto</i>	AJ891128	A	G	C
<i>P. azarasi</i>	AJ891125	G	G	C
症例1	AB738323	G	G	C
<i>P. cattani</i>	AJ891127	A	G	C
<i>P. bulbosa</i>	AJ891126	A	G	T
<i>P. krabbei</i>	AJ891131	A	A	C

考察

シュードテラノーバ属幼虫は分子系統解析により, *P. decipiens* (s.s.), *P. azarasi*, *P. cattani*, *P. krabbei*, *P. bulbosa* の5種に分類される. 人体症例における同胞種間での同定例は1例しかなく, 本症例と同じ*P. azarasi*であった⁵⁾. これまで人体症例はすべて*P. decipiens*として報告されてきたが, *P. azarasi*感染例が続けて報告されたことから, *P. decipiens*の病原性についてはさらに検討する必要があると考えられた.

アニサキス症は待機宿主内の3期幼虫によって発症し, 体内で4期幼虫に脱皮するまで3日-4日要するといわれている. 症例2では排虫6日前の内視鏡検査で胃内に異常がなかったことから, 検査から3-4日後の原因食摂取により感染したが, 自然排虫したのではないかと推察された. これまで国内では*P. decipiens*幼若成虫の自然排虫例の報告はあるが⁶⁾, *A. simplex*3期幼虫の自然排虫例は本邦第1例目と思われた. しかし, 海外ではアラスカのイヌイットの人たちの糞便内にはアニサキス属の幼虫がしばしばみられるという⁷⁾.

A. simplex (*sensu lato*)は遺伝子解析の結果, *A. simplex* (s.s.), *A. pegreffii*, *A. simplex C*の3同胞種に分類される^{2, 3)}. 梅原らの報告によると北海道のアニサキス症患者5名及び九州のアニサキス症患者80名より摘出された100隻の解析結果では, 摘出虫体の99%が*A. simplex* (s.s.)であった⁴⁾. この結果は同胞種間で病原性に差異があることを示唆しており, 国内の他地域における解析がさらに必要と考えられた. また, 寄生虫種の同定に遺伝子検査の機会が増加していることから, 従来行われていたホルマリン固定に替えて, 摘出虫体はエタノール保存すべきであると考えられる.

文 献

- 1) Ishikura H. (2003) : Anisakiasis. 2. Clinical pathology and epidemiology. In: Progress of Medical Parasitology in Japan, vol. 8. (Otsuru M., Kamegai S., Hayashi S., eds.), pp. 451-473, Meguro Parasitological Museum, Tokyo.
- 2) Arizono N. *et al.* (2008) : Diplogonoporiasis in Japan: genetic analyses of five clinical isolates. *Parasitol Int*, 57, 212-216.
- 3) Mattiucci S. *et al.* (2008) : Advances and trends in the molecular systematics of anisakid nematodes, with implications for their evolutionary ecology and host-parasite co-evolutionary processes. *Adv Parasitol*, 66, 47-148.
- 4) Umehara A. *et al.* (2007) : Molecular identification of the etiological agent of the human anisakiasis in Japan. *Parasitol Int*, 56, 211-215.
- 5) Arizono N. *et al.* (2011) : Human infection with *Pseudoterranova azarasi* roundworm. *Emerg Infect Dis*, 17, 555-556
- 6) 石倉 肇 他 (1995) : ヒトより脱皮中生存して排出された *Pseudoterranova decipiens* (Krabbe 1878) Gibson 1983 雌幼若成虫の寄生虫学的意義について. *北海道医学雑誌*, 70, 667-685
- 7) Hitchcock D. J. (1950) : Parasitological study on the Eskimos in the Bethel area of Alaska. *J Parasitol*, 36, 232-234.

埼玉県で再び発生したアジア条虫症の一例と 本邦での感染が強く疑われた無鉤条虫症の一例

三木田馨¹⁾, 前田卓哉¹⁾, 藤倉雄二¹⁾, 三沢和央¹⁾, 河野修一¹⁾, 原 悠¹⁾, 叶宗一郎¹⁾,
小野岳史²⁾, 宮平 靖²⁾, 山本哲久³⁾, 武藤麻紀⁴⁾, 山崎 浩⁴⁾, 川名明彦¹⁾

1) 防衛医科大学校 内科学 (感染症・呼吸器) 講座

2) 防衛医科大学校 国際感染症学講座

3) 新越谷肛門胃腸クリニック

4) 国立感染症研究所 寄生動物第二室

Key Words: アジア条虫, 無鉤条虫, *Taenia asiatica*, *Taenia saginata*

はじめに

ヒトに寄生するテニア属条虫として、有鉤条虫 (*Taenia solium*) と無鉤条虫 (*Taenia saginata*) の存在が良く知られている。この2種に加えて形態は無鉤条虫に酷似するが、豚を中間宿主とすることでは有鉤条虫に似るアジア条虫 (*Taenia asiatica*) もヒトに寄生する。アジア条虫は、本邦には分布していないと考えられていたが、2010年

6月～2011年2月までの間に、ヒトの感染事例が関東地方で相次いで報告された^{1,2)}。アジア条虫のヒトへの感染経路は豚の内臓 (特に肝臓) に寄生する囊虫の経口摂取によるが³⁾、報告例の多くに海外渡航歴がないことから、国内でアジア条虫症が一過性に流行したと考えられた。一方、形態が酷似する無鉤条虫によるヒトの症例報告は2000年以降、50例程度で、そのうちで本邦での発生が疑われた例は2例しかない。

A human case infected with *Taenia asiatica* re-occurring in Saitama and a case of *Taenia saginata* infection suspected to be acquired in Japan

Kei Mikita¹⁾, Takuya Maeda¹⁾, Yuji Fujikura¹⁾, Kazuhisa Misawa¹⁾, Shuichi Kawano¹⁾,
Yu Hara¹⁾, Soichiro Kano¹⁾, Takeshi Ono²⁾, Yasushi Miyahira²⁾, Tetsuhisa Yamamoto³⁾,
Maki Muto⁴⁾, Hiroshi Yamasaki⁴⁾, Akihiko Kawana¹⁾

¹⁾ Division of Infectious Diseases and Pulmonary Medicine, Department of Internal Medicine, National Defense Medical College

²⁾ Department of Global Infectious Disease and Tropical Medicine, National Defense Medical College

³⁾ Shin-Koshigaya Komon-Icho Clinic

⁴⁾ Department of Parasitology, National Institute of Infectious Diseases

論文請求先: 前田卓哉 〒359-8513 埼玉県所沢市並木 3-2 防衛医科大学校 内科学 (感染症・呼吸器) 講座

今回我々は、本邦での感染が疑われたアジア条虫症、無鉤条虫症を、それぞれ1例ずつ経験したので報告する。

症例 1

41歳女性。

2011年8月から、月に1回、離断傾向のない虫体排泄があるため、2011年11月に当科を受診。虫卵検査は陰性。海外渡航歴なし。牛肉、豚肉の生食歴は不明。虫卵検査は陰性であったが、虫体が紐状であり離断傾向がなかったことから、裂頭条虫目の寄生を考えた。プラジカンテル1,200 mg服用後、マグコロールを内服させ、虫体の排泄を確認した。頭節を確認することができ、形態学的には、テニア属、特に無鉤条虫、あるいはアジア条虫が疑われる虫体であった(図1)。種鑑別のためにミトコンドリアDNA (cox1 遺伝子) と核DNA (elp,efl- α 遺伝子) の解析を行ったところ、アジア条虫と同定された。



図1 排出された、アジア条虫の虫体

症例 2

40歳 女性

2011年8月頃から、虫体排泄を確認したため近医受診。虫卵検査は陰性。海外渡航歴なし。牛肉や豚肉の生食歴は不明。大腸内視鏡検査前の下剤内服で、1.4 mの虫体が排泄されたが、頭節の確

認はできなかった。内視鏡検査時に、回腸内に遺残虫体を確認したが、摘出はできなかった。虫体を、検査機関に提出したところ、形態的特徴から無鉤条虫が疑われるとの返答であった。プラジカンテル1,200 mg服用後、マグコロールを内服させ、2.6 mの虫体の排泄を確認した。アジア条虫の可能性について当科に相談があったため、遺伝子検査を実施したところ、無鉤条虫と同定された。

考察

本邦においては、最近までアジア条虫は存在しないと考えられていたが、2010年6月～2011年2月までの間、ヒトへアジア条虫の感染が関東地方で相次いで報告され、その時点では一過性のendemicと考えられていた。しかし、アジア条虫は嚢虫を摂食後、2～3ヶ月の潜伏期間を経て、小腸内で成虫になり、排便時に受胎片節が排出されるか、あるいは自力で肛門から這い出すことが受診の契機となることを鑑みると、症例1は海外渡航歴がなく、2011年8月に虫体の排泄が認められたことから、2011年5月以降に国内でアジア条虫に感染したと考えられた。本症例は、山崎らが報告した関東での一過性のアジア条虫症の流行¹⁾の後での感染が示唆されることから、アジア条虫が本邦、特に関東地方で epidemicではなく、endemicに流行していることを示唆する症例と考えられ、今後もアジア条虫症の発生動向を注視する必要がある。

一方、無鉤条虫症は、本邦での症例のほとんどが輸入症例で、前述のアジア条虫症の流行を鑑みると、無鉤条虫症、アジア条虫症が疑われた症例で、渡航歴がない場合は、アジア条虫症と診断することになる。しかしながら、本症例が発見された埼玉県では、平成23年度に無鉤嚢虫に感染した牛が発見されており、国内での無鉤条虫感染リスクは皆無ではないことが示唆される。

結語

本報告は、アジア条虫症が endemic に本邦に存在する可能性を示唆した。また、食肉流通路の囊虫検査体制が確立しているにもかかわらず、本報告のように、未だ健康被害が報告されていることから、アジア条虫症、無鉤条虫症ともに、今後の発生動向に注意し、感染拡大の防止を図る必要がある。

文 献

- 1) 山崎 浩, 他 (2011) : 2010 年に関東地方で、発生が相次いだアジア条虫症について. Clin Parasitol, 22, 75-78.
- 2) 中村 (内山) ふくみ, 他 (2011) : 当院で経験した 4 例のアジア条虫症について. Clin Parasitol, 22, 72-74.
- 3) Eom, K.S. *et al.* (2011) : Epidemiological understanding of *Taenia tapeworm* infections with special reference to *Taenia asiatica* in Korea. Korean J Parasitol, 39, 267-283.
- 4) 平成 23 年度食肉衛生検査センター事業年報 <http://www.pref.saitama.lg.jp/uploaded/attachment/503755.pdf>

Some Freshwater Crabs from Northeast India bordered on Myanmar

TAKEDA Masatsune ¹⁾, SUGIYAMA Hiromu ²⁾ and
Takhellambam SHANTIKUMAR SINGH ³⁾

- 1) Graduate School of Informatics, Teikyo Heisei University,
2-51-4 Higashi-Ikebukuro, Toshima-ku, Tokyo, 170-8445 Japan
- 2) Department of Parasitology, National Institute of Infectious Diseases,
1-23-1 Toyama, Shinjuku-ku, 162-8640 Japan
- 3) Sikkim Manipal Institute of Medical Sciences, 5th Mile, Tadong,
Gangtok 737102, Sikkim, India

インドとミャンマーとの国境付近で得られたサワガニ類

武田正倫¹⁾・杉山 広²⁾・タクヘランバン シャンティクマール シン³⁾

- 1) 帝京平成大学大学院 情報学研究科
- 2) 厚生労働省 国立感染症研究所 寄生動物部
- 3) インド・シッキム医科大学

Abstract

Maydelliathelphusa lugubris (Wood-Mason, 1871) of the Gecarcinucidae, and *Potamiscus manipurensis* (Alcock, 1909), comb. nov. and *Alcomon superciliosum* (Kemp, 1913) of the Potamidae are recorded from Manipur State, northeast India bordered on Myanmar, and *Paratelphusula burmensis* (Bott, 1966) of the Potamidae from Myanmar bordered on India are recorded, and their taxonomic problems are discussed, with line drawings and photographs.

Keywords : Freshwater crabs, India, Myanmar, *Maydelliathelphusa*, *Potamiscus*, *Indochinamon*, *Alcomon*, *Paratelphusula*, Gecarcinucidae, Potamidae, lung fluke, *Paragonimus*.

摘要

肺吸虫類の調査に際して、ミャンマーとの国境近く、インド東部のマニプール州で採集されたカニ類は、Gecarcinucidae 科の *Maydelliathelphusa lugubris* (Wood-Mason, 1871)、サワガニ科 Potamidae の *Potamiscus manipurensis* (Alcock, 1909), comb. nov. と *Alcomon superciliosum* (Kemp, 1913) の 2 科 3 種に同定された。また、市場で購入した唐揚げにされたカニ（インドとの国境近くのミャンマー産）はサワガニ科の *Paratelphusula burmensis* (Bott, 1966) と同定された。それぞれの種ごとに写真とともに特徴を記述し、同定に関する問題について議論した。

Introduction

Lung fluke disease, or paragonimiasis, is one of the most important food-borne helminthic zoonoses. Human cases of paragonimiasis occur mainly in countries with traditional habit of eating raw or undercooked freshwater crabs or crayfish that are the second intermediate hosts of lung flukes. The clinical and imaging features of pulmonary paragonimiasis, which is an infection of the lungs and pleural cavity primarily caused by members of the genus *Paragonimus*, are very similar to those associated with pulmonary tuberculosis. These similarities are considered to have a significant impact on tuberculosis control programs, particularly in countries such as India where both diseases are sympatric.

A collaborative Indo-Japanese research initiative has been conducted on *Paragonimus* and paragonimiasis since 1990 by the late Prof. K. Kawashima of Kyushu University and his co-researchers including the junior authors of this study. Freshwater crabs, possibly acting as the infection sources for paragonimiasis, were collected at several locations in Imphal City and its vicinity in Manipur State, in northeast India, which borders on Myanmar. In this study, several of the crabs that had been deposited at the National Museum of Nature and Science, Tokyo, by Prof. K. Kawashima and others were taxonomically re-examined and recorded.

In addition, the junior authors also recently obtained another edible crab species in Moreh, Manipur State, as well as crabs said to have originated in Myanmar that were fried as a delicacy in the local market. These two additional species are also recorded in this paper.

The present specimens referred to four species of two families are discussed taxonomically with reference to variations. The descriptive notes and fine photographs will contribute toward the subsequent identification.

All the specimens examined are preserved in the National Museum of Nature and Science, Tokyo.

Taxonomic Notes

Family GECARCINUCIDAE

Genus *Maydelliathelphusa* Bott, 1969

Maydelliathelphusa lugubris (Wood-Mason, 1871)

(Figs. 1, 2)

Telphusa lugubris Wood-Mason, 1871, p. 197, pl. 12 figs. 5-7. — Henderson, 1893, p. 381.

Potamon lugubre, De Man, 1898, p. 437 (In list). — Alcock, 1909, p. 247.

Potamon (Potamon) lugubris, Rathbun, 1905, p. 308.

Potamon lugubre var. *nigerrimum* Alcock, 1909, p. 247.

Potamon lugubre var. *plautum* Alcock, 1909, p. 248.

Paratelphusa (Barytelphusa) lugubre, Alcock, 1909, p. 376 (In discussion).

Paratelphusa (Barytelphusa) lugubris, Alcock, 1910, p. 91, pl. 12 fig. 58.

Paratelphusa (Barytelphusa) lugubris var. *nigerrima*, Alcock, 1910, p. 93.

Paratelphusa (Barytelphusa) lugubris var. *plauta*, Alcock, 1910, p. 93, pl. 6 fig. 23.

Barytelphusa (Maydelliathelphusa) lugubris lugubris, Bott, 1970, p. 34, pl. 3 figs. 24-26, pl. 26 fig. 15.

Barytelphusa lugubris, Brandis & Sharma, 2005, p. 20, fig. 10.

Maydelliathelphusa lugubris, Ng *et al.*, 2008, p. 68 (In list).

Material examined. Sinamkom, 1 ♂ (54.5×35.8 mm), 1 ♀ (46.5×33.5 mm), Nov. 20, 1990; Bishenupur, 1 ♂ (36.9×27.6 mm), 1 ♀ (40.8×30.2 mm), Nov. 24, 1990; Purumkhunou, 1 ♂ (73.5×51.2 mm), 1 ♀ (62.8×45.3 mm), 3 carapaces (68.3×49.4 mm, 66.8×45.7 mm, 49.4×36.0 mm), Nov. 28, 1990; K. Kawashima leg.

Descriptive notes. All the specimens examined are characteristic in color, with dark chocolate brown even after long preservation in 70% ethanol.

This species attains the enormous size exceeding 7 cm in carapace breadth and is remarkably variable in the ornamentation of the epigastric and postorbital crests, the armature of the epibranchial tooth, and the cheliped formation, as already mentioned by Alcock (1910) who distinguished some variants such as *nigerrima* and *plauta*. According to Bott (1970), however, some of the variants are not retained as distinct species or subspecies, and recently Brandis and Sharma (2005) considered that all the subspecies are synonymous with the nominate species.

In addition to its size and color, this species is characteristic in having the wide elliptical carapace, its proportion generally becoming wider according to the size; the dorsal surface is rather flattened, areolated and shining, but covered with minute pits; the cervical groove is broad and deep at both sides of the gastric region, running obliquely from each mesogastric posterolateral furrow to the epibranchial tooth; the protogastric and branchial regions are weakly convex dorsally; the frontal and postorbital regions are narrowly sunken; the epigastric regions of both sides are weakly convex dorsally and forward, separated from each other by the median longitudinal furrow, separated laterally from each postorbital gastric region by a shallow depression, and confluent posteriorly with each protogastric region.

The frontal margin is thin, shallowly concave in the middle, twice as wide as the orbital breadth. The anterolateral margin of the carapace is beaded with granules, nearly straight for its anterior one third before the epibranchial small tooth, and weakly convex outward behind the epibranchial tooth. The posterolateral margin of the carapace is weakly concave laterally and dorsally, as long as the main part of the anterolateral margin behind the epibranchial tooth.

The third maxilliped is elongated, almost smooth, with a longitudinal linear furrow at inner one third of the ischium; the merus is about half as long as the ischium; the exopod is narrow and tapering, attaining to about basal one third of the merus, with well developed flagellum.

Both chelipeds are heavy and unequal; the outer surfaces of the merus and carpus are rugulose, with the granulated ridges; the outer surface of the palm and fingers are sparsely covered with minute pits; in the large specimen the movable finger of the larger chela are curved and leave a space toward the immovable finger; the cutting edges of both fingers are armed with several to more than ten thick teeth of variable size; in the smaller

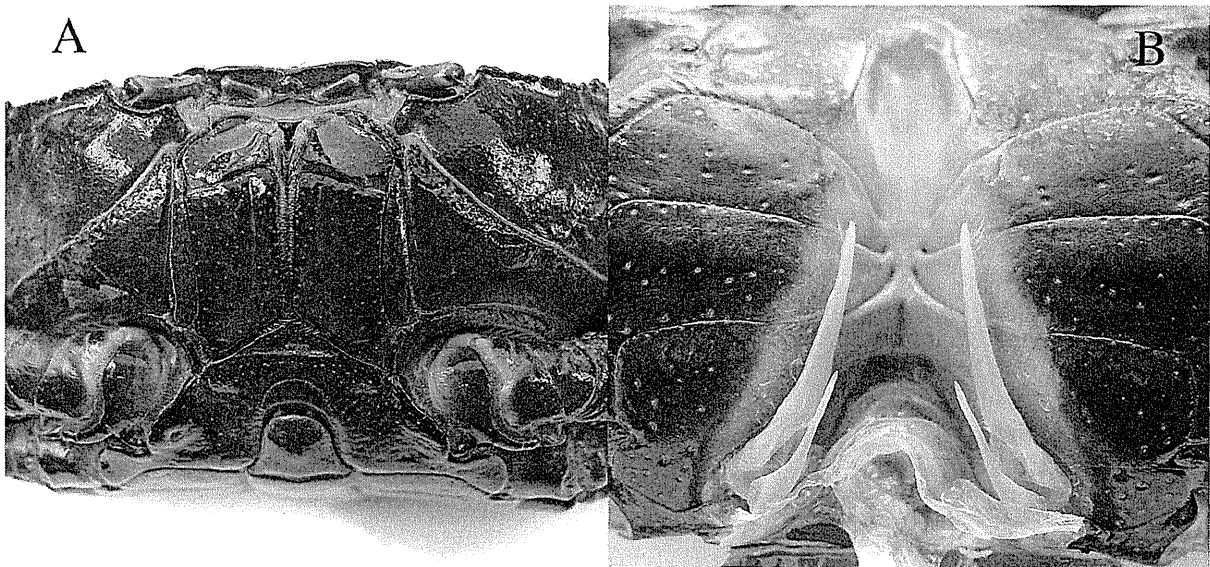


Fig. 1. *Maydelliathephusa lugubris* (Wood-Mason), ♂ (73.5×51.2 mm) from Purumkhunou. A, third maxillipeds, suborbital and pterygostomial regions; B, first and second pleopods *in situ*.

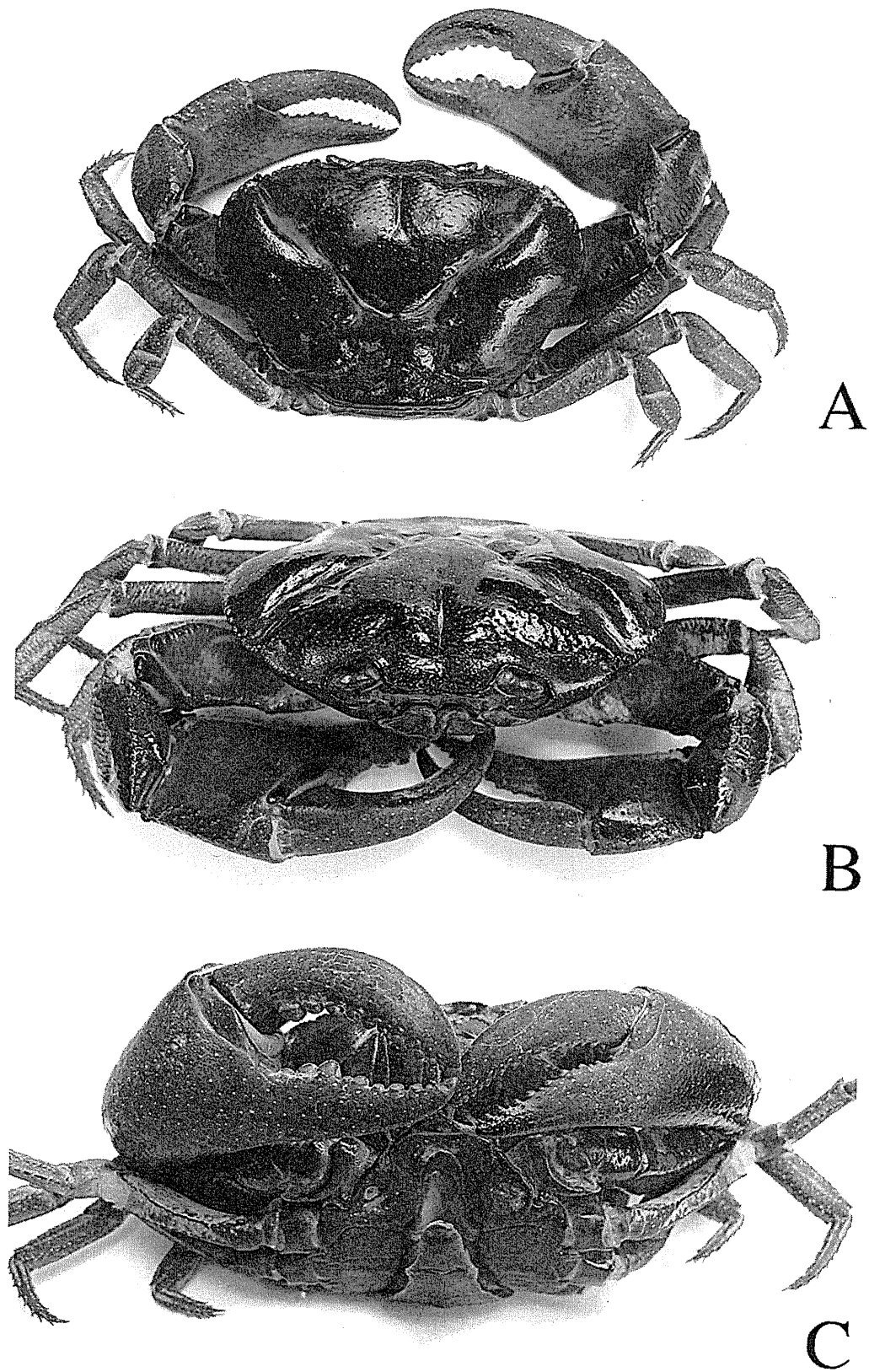


Fig. 2. *Maydelliathelphusa lugubris* (Wood-Mason), ♂ (73.5×51.2 mm) from Purumkhunou. (In spirits)

chela the teeth on the cutting edges are smaller and sharper; all the teeth and the tips of both fingers are brick red.

The male first pleopod is moderate in length, simple, straight and tapering, with a small opening at its tip. The second pleopod is also straight and about half as long as the first.

Remarks. The group II (*Jugubris* group) of *Paratelphusa* (*Barytelphusa*) defined by Alcock (1910: 90) is most characterized by the incompletely or indistinctly separated epigastric and postorbital crests. The species and varieties originally referred to this group are *Thelphusa lugubris* Wood-Mason, 1871, *Telphusa masoniana* Henderson, 1893, *Potamon lugubre* var. *harpax* Alcock, 1909, *P. l.* var. *nigerrimum* Alcock, 1909, *P. l.* var. *plautum* Alcock, 1909, *P. l.* var. *edentula* Alcock, 1909, *P. napaeum* Alcock, 1909, and *Paratelphusa* (*Barytelphusa*) *falcidigitis* Alcock, 1910. Of these, *Paratelphusa* (*Barytelphusa*) *plauta* was considered as a variant of the nominate species as well as *P. (B.) nigerrima* by Bott (1969), as listed in the above synonymy, and *P. (B.) napaea* is now known as a species of the genus *Travancoriana* Bott, 1969 by Bahir and Yeo (2007). The group II is distinguished from the group I (*jacquemonti* group) by that the epigastric crest is indistinctly separated from the postorbital crest, but form a common curve. Among the congeners, this species is most characteristic in the dorsal sculpture such as the cervical groove and the epibranchial tooth of the anterolateral border remarked in the above descriptive notes. The dorsal surface of the carapace is rather flattened, with the distinct but small epibranchial tooth.

Brandis and Sharma (2005) dealt with *Maydelliatelphusa* as a subgenus of *Barytelphusa* and synonymized all the subspecies of "*Barytelphusa*" *lugubris*. However, Ng *et al.* (2008) elevated *Maydelliatelphusa* to the genus and listed, without discussion, the following five species: *M. edentata*, *lugubris*, *falcidigitis*, *harpax* and *masoniana*. As for the synonymy, it may be better at present to follow Brandis and Sharma (2005) who examined many specimens from Nepal and northern India and showed no evidence to justify erection of the subspecies.

Distribution. This species is commonly found and widely but restrictively distributed in northeastern India, with the type locality, Punkabara, Sikkim. Alcock (1910) recorded following localities: Taesta Valley and Punkabara, Darjeeling; Manipur Hills; Dafla Hills; Thankot Hills, Nepal; Sikkim; Garo Hills; Cherrapunji. The localities of the specimens examined by Bott (1970) are as follows; Naga Hills; Garo Hills; northern India; Kalkutta; Changil, Assam. Brandis and Sharma (2005) concluded that this species is distributed along the Ganges and Brahmaputrya valleys ranging from Punjab to Nagaland. It predominantly inhabits the lowland banks of rivers, but reaches higher altitudes (up to 3,500 m) in the Himalaya.

Parasitological notes. Metacercariae of *Paragonimus heterotremus* Chen & Hsia, 1964 and those of *P. westermani* (Kerbert, 1878) were isolated from this crab species from Arunachal Pradesh (Narain *et al.*, 2003; Devi *et al.*, 2010).

Family POTAMIDAE

Genus *Potamiscus* Alcock, 1909

Potamiscus manipurensis (Alcock, 1909), comb. nov.

(Figs. 4, 5, 6B)

Potamon andersonianum var. *manipurensis* Alcock, 1909, p. 244. — Alcock, 1910, p. 35, pl. 14 fig. 68.

Indochinamon manipurensis, Yeo & Ng, 2007, p. 283 (In list). — Ng *et al.*, 2008, p. 163 (In list).

Material examined. Langol, 1 young ♂ (20.3×16.2 mm), 1 young ♀ (21.3 ×16.8 mm), Nov. 28, 1990; Lousangkong, 1 ♂ (48.1×37.8 mm), 1 ♀ (49.5×37.1 mm), 4 carapaces (63.3×47.8 mm; 57.7×44.3 mm; 47.0 ×36.6 mm; 44.8×35.3 mm), Nov. 23, 1991; Keibi, 1 ♂ (50.0×38.4 mm), 1 ♀ (38.6×29.8 mm), Nov. 21, 1990; Sinamkom, 1 ♂ (39.0×30.2 mm), Nov. 20, 1990; K. Kawashima leg.

Descriptive notes. Large species, exceeding 5 cm in carapace width. Carapace narrowly ovate, with regularly convex, well defined anterolateral margins; dorsal surface rather flattened, uneven, with furrows and depressions to separate regions; epigastric crests tumid, rugose, nearly transverse or weakly retreats toward lateral end; a distinct

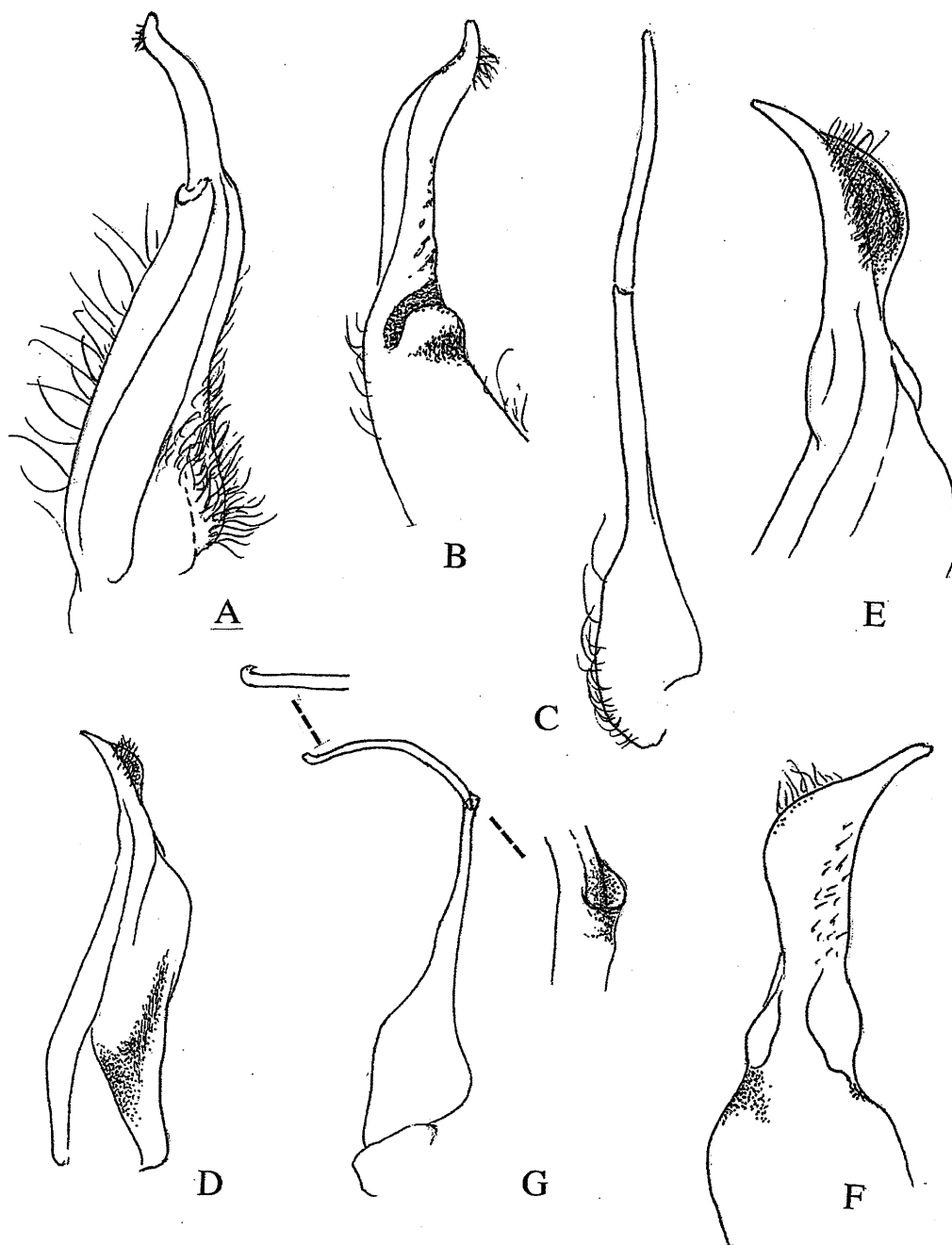


Fig. 3. *Alcomon superciliosum* (Kemp), ♂ (20.8×15.5 mm) from Moreh. A, B, first pleopod; C, second pleopod. *Paratelphusa burmensis* (Bott), ♂ (48.6×35.9 mm) from Myanmar. D-F, first pleopod; G, second pleopod, with deformed distal whip.

interruption marked with longitudinal short furrow between epigastric and postorbital crests, the latter of which is about twice as wide as epigastric crest, thick for its whole length; nearly transverse postorbital crest ends at distal end of gastro-branchial furrow in a level of external orbital angle in dorsal view; mesogastric region elongated forward as a narrow extension, expanded posteriorly like a bottom of flask; protogastric region wide, with an oblique posterolateral depression somewhat like of injury; an elongated oblique region outside of protogastric region; distal end of a linear furrow between this elongated region and branchial region just reaches epibranchial tooth which is indicated by a small but distinct notch behind external orbital tooth; anterolateral margin of carapace with a narrow

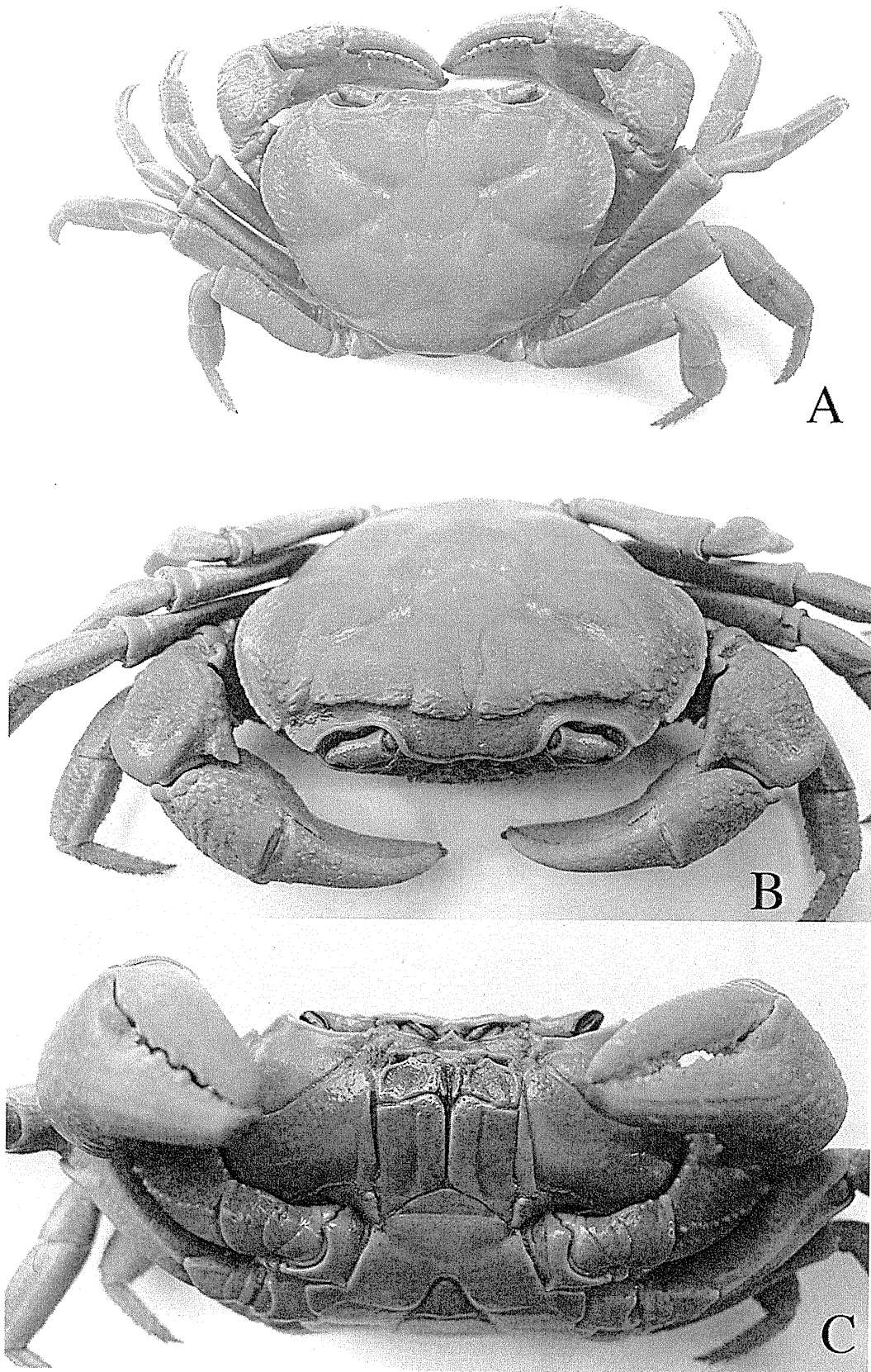


Fig. 4. *Potamiscus manipurens* (Alcock), ♂ (50.0×38.4 mm) from Keibi. (In spirits)

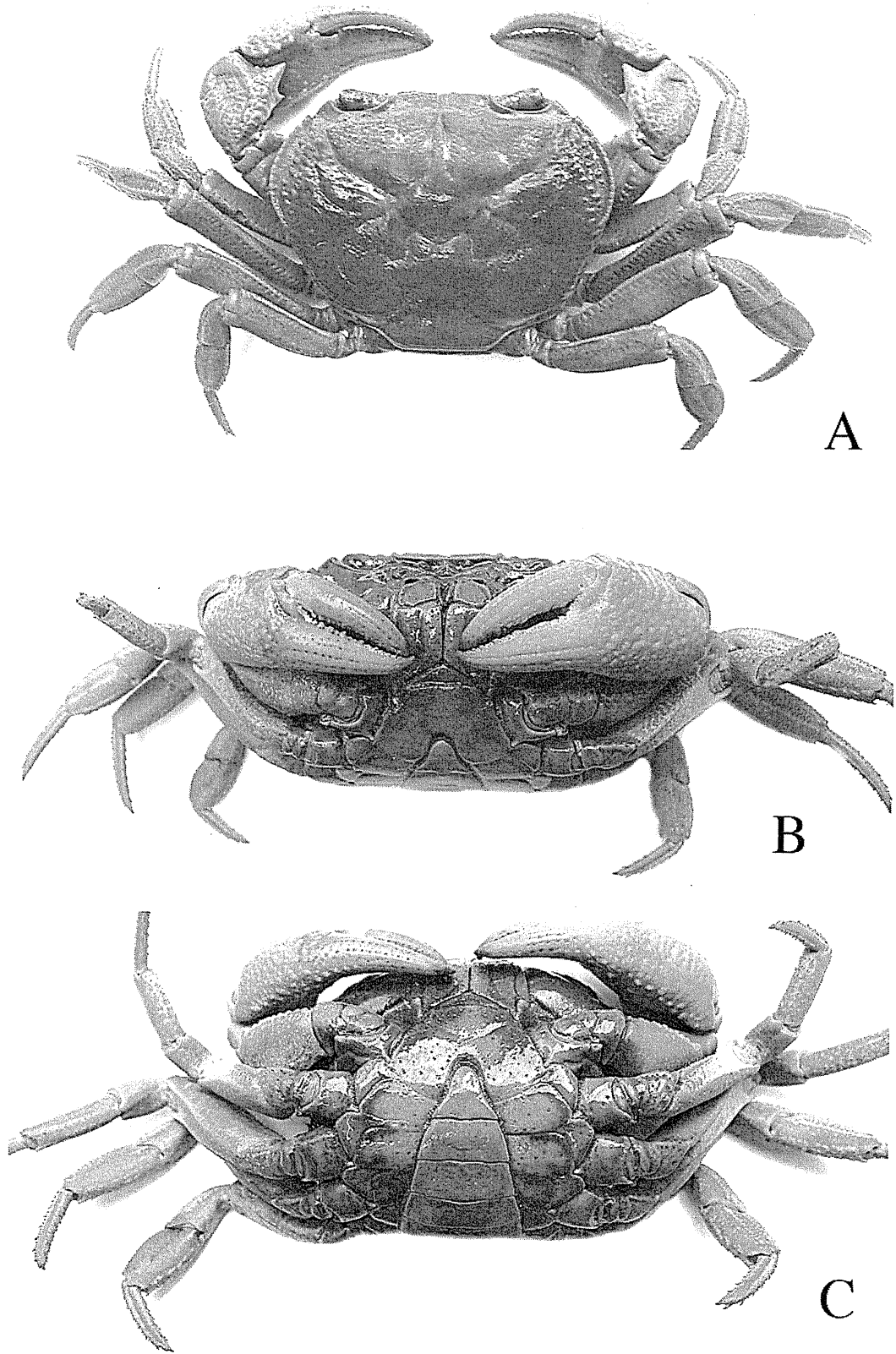


Fig. 5. *Potamicus manipurens* (Alcock), ♂ (48.1×37.8 mm) from Lousangkhong. (In spirits)

rim fringed with granules; its posterior end weakly directed dorsally; branchial region separated into two by an oblique furrow toward lateral end of mesogastric region. Frontal margin deflexed downward, invisible in dorsal view; median one third weakly convex, weakly concave laterally.

Third maxilliped elongated, smooth without hairs; merus provided with longitudinal furrow at submedian part; ischium quadrate, about half as long as merus, with thickened margins; exopod tapering, attaining to basal one third of ischium by its tip; no flagellum.

Both chelipeds only slightly unequal in size, same in shape, strongly squamose, with thickened margins of merus and carpus. Outer surface of palm granulated to be more or less scabrous. Outer surface of fingers with one or two longitudinal linear grooves; tips of both fingers sharply pointed; cutting edges sharply and irregularly toothed throughout whole lengths.

Ambulatory legs stout, with upper margins of meri, carpi and propodi being weakly crested; in carpus and propodus each upper surface provided with a longitudinal submarginal ridge, forming a longitudinal depression.

Terminal segment of male abdomen as long as wide, becomes narrower abruptly. Male first pleopod stout, with depressions at distal part of sternal surface; its distal beak strongly bent outward, sharply pointed at tip; shallow furrow along seam on ventral surface of shaft continues to sternal surface of distal beak; upper margin of ventral surface of distal beak more or less developed as a flap supplied by a series of plumose hairs on sternal surface:

Second male pleopod as long as first pleopod; length of distal segment one third of shaft, with sharp tip.

Remarks. It is apparent that in the larger specimens the carapace is proportionally wider, as indicated by the ratio of carapace length and breadth being 1.32 in the largest male, and 1.25 in the smallest young male. The terminal segment of the male first pleopod also becomes shorter and more strongly convex outward in the larger specimens.

Three varieties of *Potamon andersonianum* (Wood-Mason) distinguished by Alcock (1909), viz. *asperatum*, *tritum* and *manipurensis*, were included, without discussion, into the nominate species by Bott (1970). This synonymy was followed by Brandis (2000) who transferred many *Potamon* species to the genus *Potamiscus* and synonymized them with the known species based exclusively on the form of the male first and second pleopods. Yeo & Ng (2004) disagreed with this view because the other characters were not considered for the systematic discussion, and their reappraisal study of the genus *Potamon* and allies in Indochina (the geographic region bordered by China, India and the Malay Peninsula) resulted in the establishment of 8 known and 18 new genera for 91 species (Yeo & Ng, 2007).

Yeo & Ng (2007) validated three varieties mentioned above and enrolled for the newly established genus *Indochinamon* as full species. One of the generic characters of *Indochinamon* is, as mentioned in the original definition, that the exopod of the third maxilliped is equipped with the well developed flagellum. In all the six specimens examined in this study, however, the third maxilliped exopod has no flagellum.

In general the character that the flagellum of the third maxilliped exopod is well developed or vestigial, or even completely absent, is considered to be generic. Therefore, the present specimens are to be referred to the genus *Potamiscus* in which the flagellum of the third maxilliped exopod is typically reduced, short or vestigial. In addition, the male first pleopods of all the specimens examined are distinctly "*Potamon*"-type, and the terminal segment is short, about one-fifth of the shaft in length and strongly directed outward. In the male first pleopod of *Indochinamon andersonianum* given by Brandis (2000) the terminal segment is not short but about half as long as the shaft, directed forward and tapering distally. Furthermore, the dorsal areolation of the carapace in the present specimens agrees quite well with the photograph of *Potamon andersonianum* var. *manipurensis* given by Alcock (1910). For these reasons, *Potamiscus manipurensis* is adopted for the scientific name of the present specimens. The scientific name, *Potamiscus manipurensis*, has often been used for the host crab of lung fluke, although the combination of the genus *Potamiscus* and the specific name *manipurensis* has never appeared in the taxonomic papers on the freshwater crabs.

Distribution. Known only from Manipur State, northeast India.

Parasitological notes. Metacercariae of *Paragonimus skrjabini* Chen 1959 and those of *P. heterotremus* Chen & Hsia, 1964 were isolated (Singh *et al.*, 2006; 2007; 2009) from "*Potamiscus manipurensis*" in Manipur and Nagaland States.

Genus *Alcomon* Yeo & Ng, 2007

Alcomon superciliosum (Kemp, 1913)

(Figs. 3A-C, 6A, 7)

Potamon (Geotelphusa) superciliosum Kemp, 1913, p. 300, pl. 18 figs. 15-18

Alcomon superciliosum, Yeo & Ng, 2007, pp. 295-297, fig. 13. — Ng *et al.*, 2008, p. 159 (in list).

Material examined. Khujailok, Moreh, Manipur, 1 ♂ (20.8×15.5 mm), June 6, 2010, H. Sugiyama leg.

Descriptive notes. Carapace rather quadrilateral, with weakly convex anterolateral margins; length about five sevenths breadth; dorsal surface nearly flattened, or weakly convex anteriorly for its frontal region, its depth being just half as wide as carapace; dorsal surface of carapace smooth to naked eye, but under magnification uniformly and sparsely covered with fine pits for its most part, with short rugose ridges along antero- and posterolateral margins; under high magnification, rugose ridges with some granules arranged in a line, provided with minute setae.

Frontal region deflexed obliquely downward with dispersed, warty granules of good size and microscopical stiff setae; frontal margin separated into two lobes by a median wide depression; each lobe weakly convex forward and dorsal, being fringed with a distinctly narrow rim that is continuous to supraorbital margin without interruption; each lobe of frontal margin equal to orbit, one third as wide as half of carapace.

Lateral end of frontal edge continuous with supraorbital margin without special angle, supraorbital margin raised to be a distinct rim as continuation of frontal margin; orbit as wide as each frontal lobe, shallow in dorsal view, with an obtuse external orbital angle.

Anterolateral margin regularly convex, rimed, more or less serrate with about 20 sharp or obtuse granules of variable size; epibranchial tooth or notch, with an indistinct lateral depression at about half way of anterolateral

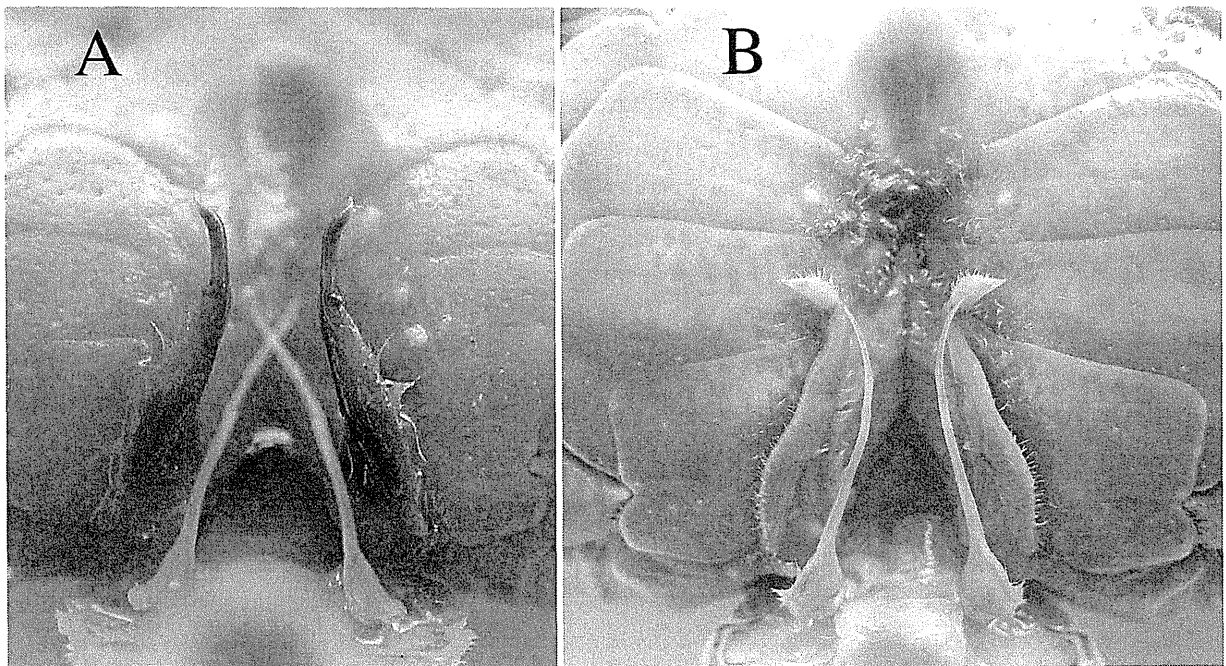


Fig. 6. Male pleopods of *Alcomon superciliosum* (Kemp), ♂ (20.8×15.5 mm) from Moreh (A) and of *Potamiscus manipurensis* (Alcock), ♂ (50.0×38.4 mm) from Keibi (B).

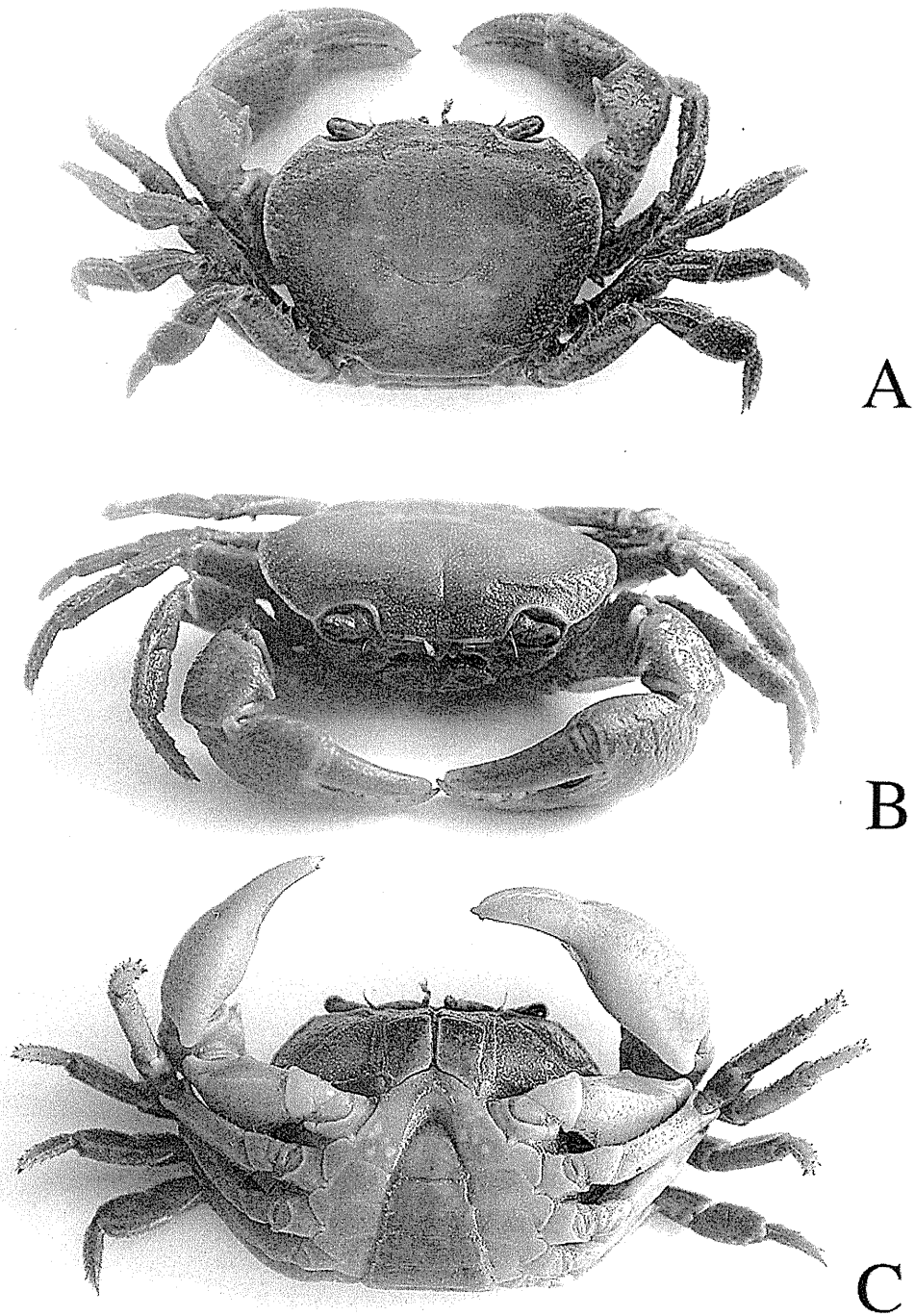


Fig. 7. *Alcomon superciliosum* (Kemp), ♂ (20.8×15.5 mm) from Moreh. (In spirits)

margin. Posterolateral margin weakly convergent as usual, without marginal rim like anterolateral margin. Main part of posterior margin as wide as frontal margin, with deep lateral concavity to receive coxa of last ambulatory leg; lateral end of concavity just level of external orbital angle.

Epigastric crests distinguishable as low, broad elevations, with some granulated ridges different from frontal and gastric surfaces; each crest separated from each other by a median longitudinal linear furrow, being followed some

distance only by a tip of branchial to separate proto- and mesogastric regions.

Postorbital crests indicated by a transverse elevations, with a granulated ridge beginning from posterolateral part of epigastric elevation and ending at level of outer two thirds of orbit; outer extension of postorbital elevation weakly retreats toward vestigial epigastric tooth. Main part of cardiac region outside of protogastric region shallowly depressed. Posterior margin of mesogastric region marked with a distinct linear furrow; a pair of ovate dimples just posterior of gastro-cardiac furrow. Cardiac region very weakly traceable as a longitudinal elevation at imaginary place behind gastro-cardiac furrow.

Third maxillipeds wide, completely close buccal flange, smooth only with sparse, microscopical setae and pits; ischium with an oblique distinct furrow, only slightly becoming wider distally; merus quadrilateral, about half length of ischium; exopod slender, attaining to half of merus, with a long flagellum.

Abdomen smooth, moderate in width, regularly narrowing distally; sixth and seventh segments subequal in length, twice as long as other segments; length of sixth segment about two thirds as its width; terminal segment obtuse at tip

Both chelipeds inflated, only slightly different in size, same in shape; merus disguised under carapace for its most part, with inner surface excavated, upper edge and lower inner and outer edges thickened; distal margins of inner and lower surfaces strongly thickened to receive carpus when fixed; outer surface covered with many short ridges fringed with series of setae, making scaly appearance; ridges become stronger on upper part, markedly so on upper margin, with upper margin interrupted with some ridges with longer setae. Carpus rough, more or less wrinkled for its outer surface, armed with an obtuse strong tubercle at its inner upper angle; upper surface rather flattened with a shallow longitudinal depression; inner distal margin thickened to receive inner surface of palm like a crescent callus. Palm heavy, smooth for its most part, with traces of rugae on upper margin. Fingers not gaped, strongly toothed with some stout, conical teeth in both fingers; tips of both fingers sharply pointed.

Ambulatory legs stout, not long, strongly depressed, with fringe of soft hairs on anterior margins of meri, carpi and propodi; each carpus and propodus with dispersed setae and lines of setae on upper and lower submarginal parts; in last leg propodus prominently high, with 1:1.5 proportion in contrast to preceding pairs with 1. 2.0.

Terminal segment of male first pleopod comparatively slender, without basal flap, being twice as long as shaft; in terminal segment basal two thirds directed forward, then curved obliquely outward, directed forward at distal beak, being provided with some long setae at outer party of base of distal beak; male second pleopod as long as the first, or sharp at its tip, with distal segment being two thirds as long as basal segment.

Remarks. Bott (1970) mentioned the present species in the discussion about the transfer of *Potamon (Geothelphusa) adiatretum* (Alcock, 1909) to the genus *Tiwaripotamon*, and the later species was transferred to the new genus *Teretamon* by Yeo and Ng (2007) as a monotypic representative. *Teretamon adiatretum* is distinctly different from the present species in its smooth carapace without the epibranchial tooth.

The present species is designated as the type of the genus *Alcomon* Yeo & Ng, 2007 established for two northeastern Indian species. Another representative is *A. lophocarpus* (Kemp, 1913). The specimen at hand is rather tentatively identified with the present species, because the carapace seems to be comparatively narrower in comparison with the figure given by the original author and the photograph given by Yeo and Ng (2007). The male first pleopod is basically similar to the figures given by Yeo and Ng (2007), but the tip of the terminal segment is weakly recurved as in Fig. 3A, B (nearly straight in the figure given by them).

Distribution. Known from Yembung River, Egar stream between Renging and Rotung, stream near Balek, Abor County (present day, Abor State, Arunachal Pradesh), northeast India (Kemp, 1913).

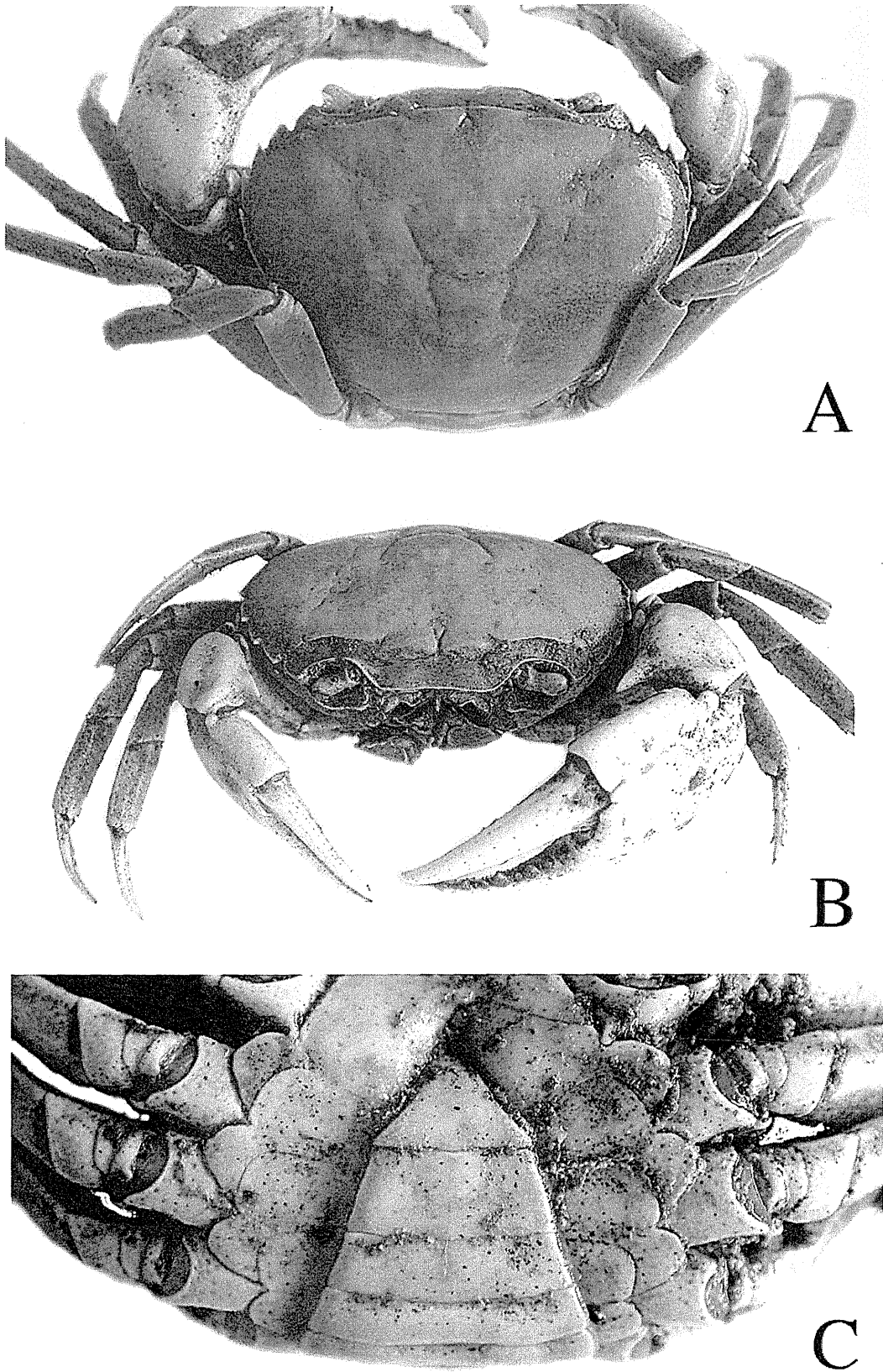


Fig. 8. *Paratelephusa burmensis* (Bott), ♂ (48.6×35.9 mm) from Myanmar. (Fried specimen in spirits)

Notes on *Paratelphusula burmensis* (Bott, 1966)

The fried crabs bought at the market of Moreh, Manipur, India were said that they were brought from Myanmar by the local people. They were identified as *Paratelphusula burmensis* (Bott, 1966). The specimens examined are as follows: 2♂♂ (48.6×35.4 mm; 45.8×32.2 mm), 2♀♀ (52.0×37.6 mm; 48.3×35.4 mm). The largest male and its first pleopod were represented in this paper (Figs. 3D-G, 8).

The genus *Paratelphusula* Alcock, 1909 established as a subgenus of the genus *Potamon* Savigny, 1816 was synonymized with *Potamon* (*Acanthothelphusa*) Ortmann, 1897 by Alcock (1909, 1910a, b). Kemp (1913) indicated *Paratelphusula* is a senior synonym of the genus *Lobothelphusa* Bouvier, 1917, but Bott (1970) relegated *Paratelphusula* to be a synonym of the genus *Parapotamon* De Man, 1907. Ng and Kosuge (1997) considered *Lobothelphusa* as valid in describing a new species, but later Ng *et al.* (2008) resurrected *Paratelphusula* distinct from *Lobothelphusa*, as *Lobothelphusa* sensu Bott (1970) is heterogeneous. Thus, the genus *Paratelphusula* is represented by *P. dayana* (Alcock, 1909), *P. peguensis* (Rathbun, 1905), *P. burmensis* (Bott, 1966) and *P. gibbosa* (Ng & Kosuge, 1997).

The crabs fried as delicacy by the local people are big in size as the measurements given as above, and generally close to *P. burmensis* and *P. gibbosa* especially in the armature of the anterolateral margins of the carapace, with five sharp teeth diminishing the size posteriorly not protruded from the general contour of the carapace. The distal segment of the male first pleopod is much shorter in *P. gibbosa*. In the specimens at hand the distal segment of the male first pleopod seems to be somewhat shorter than that of the photograph given by Bott (1970). This difference may be due to the different angle in the photograph.

This species is endemic to Myanmar, being known from Mandalay, Prome, Pegu, Bhamo and Yangon.

Acknowledgements

We are thankful to the late Prof. K. Kawashima of Kyushu University, who put the specimens to the National Science Museum (now the National Museum of Nature and Science), Tokyo, for taxonomic study.

Literature

- Alcock, A. (1909): Diagnoses of new species and varieties of freshwater crabs. Nos. 1-3, 4. *Rec. Ind. Mus.*, 3: 243-252, 375-381.
- Alcock, A. (1910): *Catalogue of the Indian Decapod Crustacea in the collection of the Indian Museum. Part I. Brachyura I. Fasciculus II. The Indian fresh-water crabs — Potamonidae*. Calcutta, 135 pp., 14 pls.
- Bahir, M. M. & Yeo, D. C. J. (2007): The gecarcinucid freshwater crabs of southern India (Crustacea: Decapoda: Brachyura). *Raffles Bull. Zool.*, Suppl. 16: 309-354.
- Bott, H. (1966): Potamiden aus Asien (*Potamon Savigny* und *Potamiscus* Alcock) (Crustacea, Decapoda). *Senck. Biol.*, 47: 469-509, pls. 16-21.
- Bott, H. (1969): Flußkrabben aus Asien und ihre Klassifikation (Crustacea, Decapoda). *Senck. Biol.*, 50: 359-366.
- Bott, H. (1970): Die Süßwasserkrabben von Europa, Asien, Australien und ihre Stammesgeschichte. Eine Revision der Potamoidea und Parathelphusoidea (Crustacea, Decapoda). *Abh. Senck. Nat. Ges.*, Frankfurt, 526: 1-338.
- Brandis, D. (2000): The taxonomical status of the freshwater crab genus *Potamiscus* Alcock, 1909 (Decapoda, Brachyura, Potamidae). *Senck. Biol.*, 80: 57-100.
- Brandis, D. & Sharma, H. (2005): Taxonomic revision of the freshwater crab fauna of Nepal with description of a new species (Crustacea, Decapoda, Brachyura, Potamoidea and Gecarcinucoidea). *Senck. Biol.*, 85: 1-30.

- Bouvier, E.-L. (1917): Sur la classification des Eupotamonea, crabes d'eau douce de la famille des Potamonides. *Compt. R. Acad. Sci.*, Paris, 165 : 613-621.
- Dai, A. (1999): *Fauna Sinica. Arthropoda Crustacea Malacostraca Decapoda Parathelphusidae Potamidae*. Science Press, Beijing, xiii + 501 pp., 30 pls. (In Chinese with English abstract)
- Dai, A.-Y. & Chen, G.-X. (1985). A preliminary report on the freshwater crabs of Hengduan mountains area. *Sinozoologia*, 3 : 39-72, pls. 1-2. (In Chinese with English summary)
- Devi, K. R., Narain, K., Agatsuma, T., Blair, D., Nagataki, M., Wickramasinghe, S., Yatawara, L. & Mahanta, J. (2010): Morphological and molecular characterization of *Paragonimus westermani* in northeastern India. *Acta Trop.* 116: 31-38.
- Henderson, J. R. (1893): A contribution to Indian *carcinology*. *Trans. Linn. Soc. London*, (Zool.), 5 : 325-458, pls. 36-40.
- Kemp, S. (1913): Zoological results of the Abor Expedition, 1911-1912. XX. Crustacea Decapoda. *Rec. Ind. Mus.*, 8 : 289-310, pls. 17-21.
- Kemp, S. (1923): On a collection of river-crabs from Siam and Annam. *J. Nat. Hist. Soc. Siam*, 6 : 1-42, pls. 1-6.
- De Man, J. G. (1898): Note sur quelques espèces des genres *Parathelphusa* H.M.E. et *Potamon* Sav., recueillies par M. Leonardo Fea pendant son voyage en Birmanie. *Viaggio di Leonardo Fea in Birmania et regioni vicine*, LXXXI, *Ann. Mus. Civ.*, (2), 19: 384-440, pls. 4-6.
- De Man, J. G. (1907): On a collection of Crustacea, Decapoda and Stomatopoda, chiefly from the Inland Sea of Japan; with descriptions of new species, with 3 plates. *Trans. Linn. Soc. London*, (2), 9: 387-454, pls. 31-33.
- Narain, K., Devi, K. R. & Mahanta, J. (2003): *Paragonimus* and paragonimiasis: a new focus in Arunachal Pradesh, India. *Curr. Sci.* 84: 985-987.
- Ng, P. K. L. & Kosuge, T. (1997): *Lobothelphusa gibbosa*, a new species of potamid crab (Decapoda, Brachyura) from rice fields in Burma. *Crustaceana*, 70: 813-821.
- Ng, P. K. L., Guinot, D. & Davie, P. J. F. (2008): Systema Brachyurum; Part I. An annotated checklist of extant brachyuran crabs of the world. *Raffles Bull. Zool.*, Suppl. 17: 1-286.
- Ortmann, A. (1897): Carcinologische Studien. *Zool. Jahrb.*, (Syst.), 10: 258-372.
- Rathbun, M. J. (1905): Les crabs d'eau douce. *Nouv. Arch. Mus. Hist. Nat.*, Paris, (4), 7: 159-323, pls. 13-22.
- Savigny, J. C. (1816): *Mémoires sur les animaux sans vertèbres: Première Partie: Description et classification des animaux invertébrés et articulés, connus sous les noms de Crustacés, d'Insectes, d'Annélides, etc.* Paris, G. Dufour. v., 118 pp., 8 pls.
- Singh, T. S., Singh, D. L. & Sugiyama, H. (2006): Possible discovery of Chinese lung fluke, *Paragonimus skrjabini*, in Manipur, India. *Southeast Asian J. Trop. Med. Pub. Health*, 37 (Suppl. 3): 53-56.
- Singh, T. S., Sugiyama, H., Rangsiruji, A. & Devi Kh. R. (2007): Morphological and molecular characterizations of *Paragonimus heterotremus*, the causative agent of human paragonimiasis in India. *Southeast Asian J. Trop. Med. Pub. Health*, 38 (Suppl. 1): 82-86.
- Singh, T. S., Sugiyama, H., Umehara, A., Hiese, S. & Khato, K. (2009): *Paragonimus heterotremus* infection in Nagaland: a new focus of paragonimiasis in India. *Ind. J. Med. Microbiol.*, 27: 123-127.
- Yeo, D. C. J. & Ng, P. K. L. (2004): Recognition of two subfamilies in the Potamidae Ortmann, 1896 (Brachyura, Potamidae) with a note on the genus *Potamon* Savigny, 1816. *Crustaceana*, 76: 1219-1235.
- Yeo, D. C. J. & Ng, P. K. L. (2007): On the genus "*Potamon*" and allies in Indochina (Crustacea: Decapoda: Brachyura: Potamidae). *Raffles Bull. Zool.*, Suppl. 16: 273-308.
- Wood-Mason, J. (1871): Contribution to Indian *carcinology*. *J. Asiat. Soc. Bengal*, 42: 189-207, 449-454, pls. 11-14, 27.