

## Recent Collections of Freshwater Crabs from the Pacific and Amazonian Regions of Ecuador, South America

TAKEDA Masatsune<sup>1)</sup>, SUGIYAMA Hiromu<sup>2)</sup>, KUMAZAWA Hideo<sup>3)</sup>,  
ROMERO Daniel<sup>4)</sup> and CALVOPÍÑA Manuel<sup>4)</sup>

<sup>1)</sup>Graduate School of Environmental Information, Teikyo Heisei University,  
3-21-2 Nakano, Nakano-ku, Tokyo 164-8530, Japan  
(Present address: Department of Zoology, National Museum of Nature  
and Science, 4-4-1 Amakubo, Tsukuba-shi, Ibaraki 305-0005, Japan)  
Corresponding author: takeda@kahaku.go.jp

<sup>2)</sup>Department of Parasitology, National Institute of Infectious Diseases,  
1-23-1 Toyama, Shinjuku-ku, Tokyo 162-8640, Japan

<sup>3)</sup>Department of Parasitology, Kochi Medical School, Oko-cho Kohasu,  
Nankoku-shi, Kochi 783-8505, Japan

<sup>4)</sup>Departamento de Parasitología Molecular y Medicina Tropical, Centro  
de Biomedicina, Facultad de Ciencias Médicas, Universidad Central  
del Ecuador, Quito, Ecuador

### 南米エクアドル産淡水カニ類

武田正倫<sup>1)</sup>・杉山広<sup>2)</sup>・熊澤秀雄<sup>3)</sup>・  
ダニエル＝ロメロ<sup>4)</sup>・マニユエル＝カルボピナ<sup>4)</sup>

<sup>1)</sup> 帝京平成大学大学院環境情報学研究所,  
〒164-8530 東京都中野区中野 3-21-2  
(現在, 国立科学博物館動物研究部,  
〒305-0005 茨城県つくば市天久保 4-4-1)

<sup>2)</sup> 国立感染症研究所寄生動物部, 東京都新宿区戸山 1-23-1

<sup>3)</sup> 高知大学医学部寄生虫学教室, 高知県南国市岡豊町小蓮

<sup>4)</sup> エクアドル中央大学医学部, エクアドル, キト

### 要約

2012, 2013年に南米エクアドル, アンデス山系の西部および東部で行われた肺吸虫類の調査中に採集された淡水カニ類は2科9種であったが (Takeda *et al.*, 2014), 2015年の調査では西部のマナビ県から Pseudothelphusidae 科 *Hypolobocera* 属の2種, *H. aequatorialis* (Ortmann, 1897) と *H. guayaquilensis* (Bott, 1967), ピチンチャ県プエルトキトから *H. mindonensis* Roderiguez & Von Sternberg, 1998, 東部

のナポ県テナ近郊から Pseudothelphusidae 科の *Lindacatalina* 属の 2 種, *L. latipenis* (Pretzmann, 1968) と *L. puyensis* (Pretzmann, 1978) および Trichodactylidae 科の *Moreirocarcinus emarginatus* (H. Milne-Edwards, 1853) が採集された。 *Hypolobocera mindonensis* および *Lindacatalina* 属の 2 種は前回の調査では採集されていない。いずれの種も, 甲の形態は酷似しているが, 雄の第 1 腹肢の形態が特化している。  
キーワード: 淡水産カニ類, エクアドル, Pseudothelphusidae, Trichodactylidae, *Hypolobocera guayaquilensis*, *Hypolobocera mindonensis*, *Lindacatalina latipenis*, *Lindacatalina puyensis*, *Moreirocarcinus emarginatus*.

## Abstract

The freshwater crabs collected in 2015 from the provinces of Manabi and Pichincha located in the Pacific coastal region of Ecuador are identified as three species of the genus *Hypolobocera* of the family Pseudothelphusidae, *H. aequatorialis* (Ortmann, 1897), *H. guayaquilensis* (Bott, 1967) and *H. mindonensis* Rodoriguez & Von Sternberg, 1998, and those from the province of Napo in the Amazonian region as two species of the genus *Lindacatalina*, *L. latipenis* (Pretzmann, 1968) and *L. puyensis* (Pretzmann, 1978) of the family Pseudothelphusidae, and *Moreirocarcinus emarginatus* (H. Milne-Edwards, 1853) of the family Trichodactylidae. In this report the six species are recorded taxonomically with photographs for subsequent identification. They are very similar to each other in the general appearance of the carapace, but remarkably different in the first male pleopod.

**Keywords :** Freshwater crab, Ecuador, Pseudothelphusidae, Trichodactylidae, *Hypolobocera aequatorialis*, *Hypolobocera guayaquilensis*, *Hypolobocera mindonensis*, *Lindacatalina latipenis*, *Lindacatalina puyensis*, *Moreirocarcinus emarginatus*.

## Introduction

Takeda *et al.* (2014) reported the identification of nine species of two families of freshwater crabs from Ecuador collected in 2012 and 2013 during field surveys for *Paragonimus* spp. lung flukes: *Hypolobocera aequatorialis* (Ortmann, 1897), *H. delsolari* Pretzmann, 1978, *H. exuca* Pretzmann, 1977, and *H. guayaquilensis* (Bott, 1967) of the family Pseudothelphusidae from the west of the Andean slopes, and *Moreirocarcinus chacei* (Pretzmann, 1968), *M. emarginatus* (H. Milne-Edwards, 1853), *Rotundovaldivia latidens* (A. Milne-Edwards, 1869), *Sylviocarcinus devillei* H. Milne-Edwards, 1853, and *Trichodactylus faxoni* Rathbun, 1905 of the family Trichodactylidae from the Ecuadorian Amazon Basin.

In 2015, the Japanese-Ecuadorian research team investigated the prevalence of lung fluke infection in the provinces of Manabi and Pichincha, specifically the Pedro Pablo Gomez area in the Pacific coastal region, and the vicinities of the city of Tena in the province of Napo in the Amazonian region. The freshwater crabs examined as a potential second intermediate host for *Paragonimus* sp. were identified, and five species of two genera, *Hypolobocera* and *Lindacatalina* of the family Pseudothelphusidae and *Moreirocarcinus emarginatus* of the family Trichodactylidae are recorded in this paper. Some taxonomical comments and photographs of the six species were given for subsequent taxonomical and biogeographical studies of South American freshwater crabs.

Since the reported species were captured in the endemic areas for paragonimiasis, this study will help the identification

of the potential intermediate host crabs as a source of human infection. The specimens examined are preserved in the collections of the Tsukuba Research Center, National Museum of Nature and Science, Tokyo (NSMT), for further taxonomical study.

In this paper, the abbreviations, cb and cl, are used to indicate the carapace breadth and length, respectively.

## Taxonomic Notes

### Family PSEUDOTHELPHUSIDAE

#### Genus *Hypolobocera* Ortmann, 1897

*Hypolobocera* Ortmann (1897: 323). [Type species: *Potamia chilensis* Lucas, in H. Milne-Edwards and Lucas, 1844] — Pretzmann, (1968: 1). — Rodríguez (1982: 45). — Rodríguez & Von Sternberg (1998: 111).

*Strengeria* (*Strengeria*) Pretzmann (1965: 6). [Type species: *Pseudothelphusa conradi* Nobili, 1897]

*Potamocarcinus* (*Hypolobocera*), Bott (1967: 365).

*Distribution.* Panama, Columbia, Venezuela, Ecuador and Peru, South America.

*Remarks.* This well established genus is known by 51 species from South America (Ng *et al.*, 2008). According to the revisional work of the genus by Rodríguez and Von Sternberg (1998), 12 species are known from Ecuador. As diagnosed briefly but suitably by them, in the genus *Hypolobocera* the length of the third maxilliped exopod is usually less than 0.45 of the ischium, and the strong longitudinal ridge and the lateral lobe strengthen the shaft of the first male pleopod.

In this report two species from the province of Manabi and one species from the province of Pichincha are recorded, with some photographs.

#### *Hypolobocera aequatorialis* (Ortmann, 1897)

(Fig. 1)

#### Selected synonymy

*Potamocarcinus aequatorialis* Ortmann (1897: 319, pl. 17 fig. 5).

*Potamocarcinus* (*Hypolobocera*) *aequatorialis aequatorialis*, Bott (1967: 368, fig. 3).

*Hypolobocera* (*Hypolobocera*) *aequatorialis aequatorialis*, Pretzmann (1972: 43, figs. 186-189, 265-267).

*Hypolobocera aequatorialis*, Rodríguez (1982: 61, fig. 33e, f). — Rodríguez & Von Sternberg (1998: 113, fig. 1A, B). — Takeda *et al.* (2014: 2, figs. 1, 3C, D).

*Hypolobocera* (*Hypolobocera*) [*aequatorialis*] *aequatorialis aequatorialis*, Pretzmann (1983d: 351, figs. 4, 18, 26, 39, 54, 56, 71).

*Material examined.* Las Armas, Pedro Pablo Gomez, Manabi Province; 2 ♂♂ (cb 23.0×cl 14.8 mm; cb 23.1×cl 15.2 mm); September 1, 2015; H. Kumazawa *et al.* leg.

Las Delicias, Pedro Pablo Gomez, Manabi Province; 2 ♂♂ (cb 27.0× cl 17.9 mm; cb 34.3×cl 22.0 mm); September 17, 2015; H. Kumazawa *et al.* leg.

*Remarks.* Takeda *et al.* (2014) examined some specimens from Cotopaxi Province and shortly diagnosed, with some photographs. The carapace (Fig. 1A in this work; Takeda *et al.*, 2014: Fig. 1A) is elliptical most typically among the Ecuadorian congeners, with the posterolateral margin weakly concave posteriorly. The outer margin of the shaft of the male first pleopod is gently convex behind the subdistal constriction as a lateral lobe along its whole length of the distal half; the subdistal constriction of the outer margin is deep (Fig. 1C), and truncated distally to form the flattened horizontal

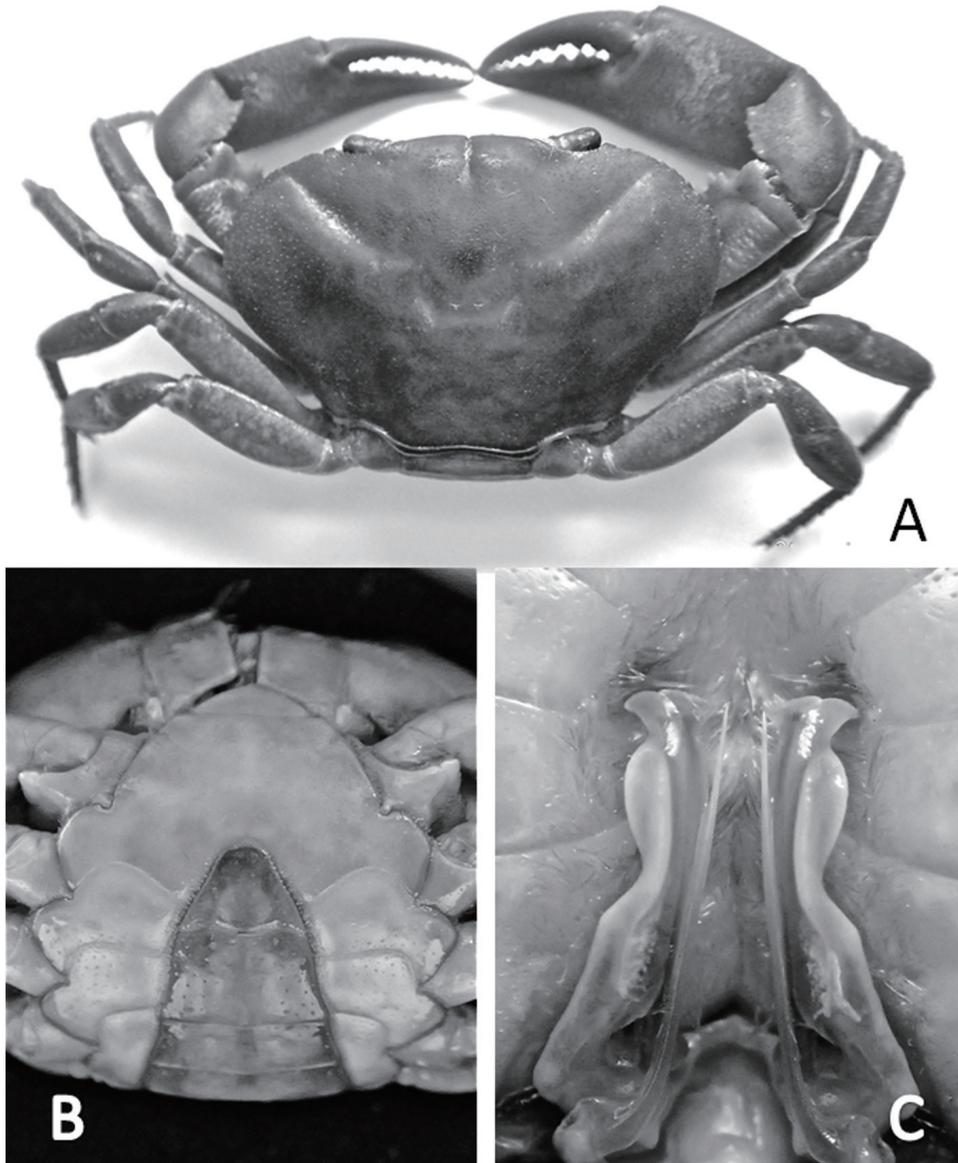


Fig. 1. *Hypolobocera aequatorialis* (Ortmann), male (cb 23.0 × cl 14.8 mm).  
A, dorsal view; B, abdomen; C, first and second pleopods *in situ*.

surface.

*Distribution.* According to Rodríguez and Von Sternberg (1998), this species occupies widely separated areas on the eastern and western slopes of the Eastern Cordillera of Ecuador.

*Hypolobocera guayaquilensis* (Bott, 1967)

(Figs. 2A-D, 3A)

*Potamocarcinus* (*Hypolobocera*) *aequatorialis guayaquilensis* Bott (1967: 368, fig. 4).

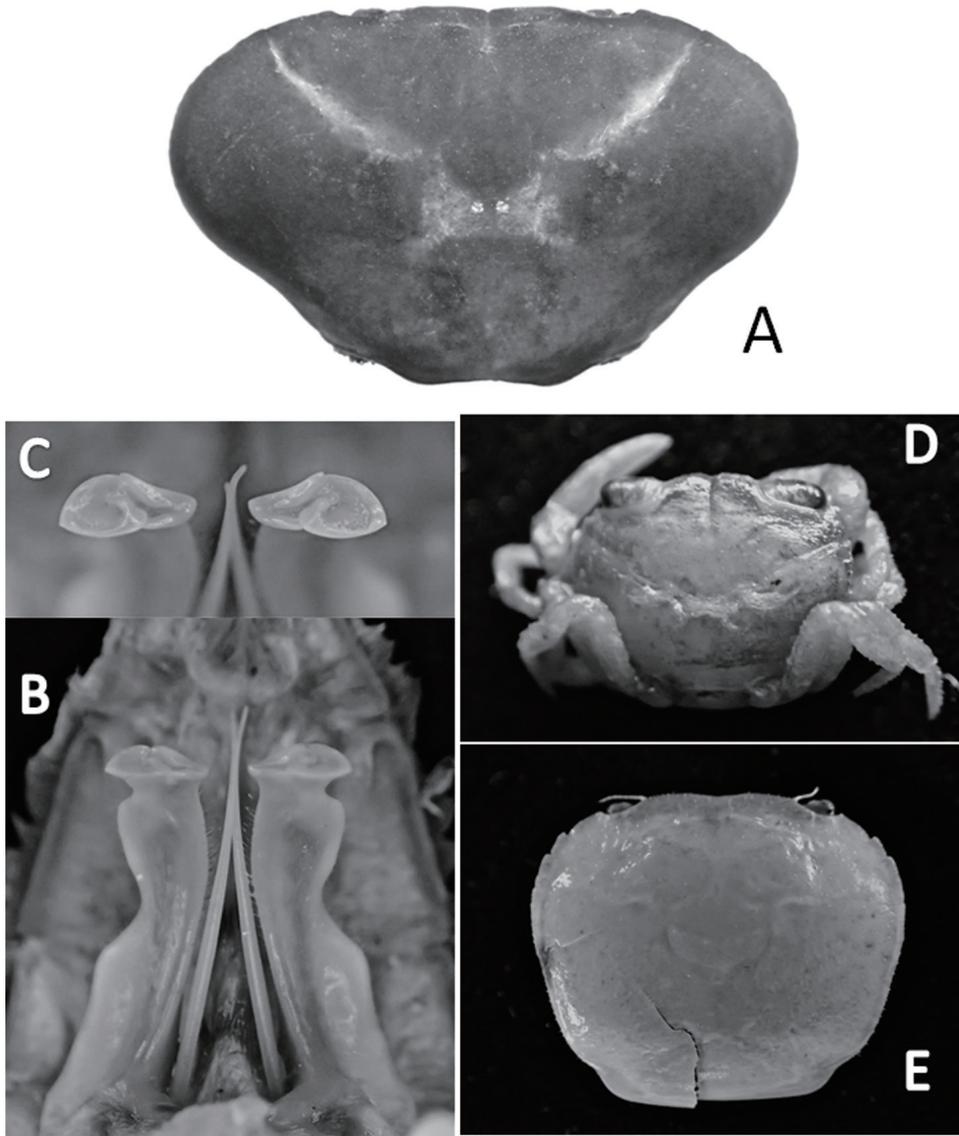


Fig. 2. *Hypolobocera guayaquilensis* (Bott). A, female carapace (cb 66.3 × cl 39.8 mm); B, C, first and second pleopods of male (cb 54.8 × cl 33.7 mm) in abdominal (B) and terminal (C) views *in situ*; D, juvenile (cb 5.0 × cl 4.0 mm). *Moretiocarcinus emarginatus* (H. Milne-Edwards), E, female carapace (cb 22.8 × cl 20.2 mm).

*Hypolobocera* (*Hypolobocera*) *caputii guayaquilensis*, Pretzmann (1971: 17).

*Hypolobocera* (*Hypolobocera*) *guayaquilensis*, Pretzmann (1972: 42, figs. 173-175).

*Hypolobocera guayaquilensis*, Rodríguez (1982: 64). — Rodríguez & Von Sternberg (1998: 118, fig. 5). — Takeda *et al.* (2014: 6, fig. 5).

*Hypolobocera* (*Hypolobocera*) [*aequatorialis*] *guayaquilensis*, Pretzmann (1983d: 353, pl. 2 fig. 5, pl. 5 fig. 16, pl. 8 fig. 28, pl. 10 fig. 37, pl. 12 fig. 53, pl. 13 fig. 57, pl. 15 fig. 69).

*Material examined.* Las Delicias, Pedro Pablo Gomez, Manabi Province; 3 sets of carapace and male abdomen with pleopods (cb 29.7×cl 19.2 mm; cb 32.5×cl 20.5 mm; cb 32.7×cl 21.2 mm), 15 carapaces (cb 15.2 ×cl 9.8 mm— cb 52.8×cl 32.6 mm), 8 male and 2 female abdomens with pleopods; January 2015; H. Sugiyama *et al.* leg.

San Vicente, Pedro Pablo Gomez, Manabi Province; 2 sets of carapace and male abdomen with pleopods (cb 54.8×cl 33.7 mm; cb 66.3×cl 39.8 mm) and 1 set of carapace and female abdomen with pleopods (cb 59.1×cl 36.3 mm) and 5 juveniles; January 2015; H. Sugiyama *et al.* leg.

*Remarks.* Although the proportion of the carapace seems to be variable according to the developmental stage, the carapace of the fully matured male is comparatively wider than those of the Ecuadorian congeners, with the concave posterolateral margin (Fig. 2A in this work; Takeda *et al.*, 2014: Fig. 5A). The first male pleopod is somewhat similar to that of *Hypolobocera aequatorialis* (Ortmann), but the shaft is stouter along the whole length and weakly but distinctly arcuate in lateral view, with the strongly developed outer lobe increasing its width distally and ending as an obtuse angle.

One of the juvenile specimens is represented (Fig. 2D), with cb 5.0 mm and cl 4.0 mm. The other specimens are nearly same size and similar in shape. The carapace is much narrower than the adult specimens, rounded quadrangular in shape and weakly convex dorsally; the cervical groove is deep, attaining the anterolateral margin of the carapace.

*Distribution.* This species was originally reported from Babahoyo on the Daute-Vinces Basin in Guayas Province, and is otherwise known from some localities in Manabi Province.

*Hypolobocera mindonensis* Rodríguez & Von Sternberg, 1998

(Figs. 3B, 4, 5A-C)

*Hypolobocera mindonensis* Rodríguez & Von Sternberg (1998: 121, fig. 7).



Fig. 3. A, *Hypolobocera guayaquilensis* (Bot), male (cb 54.8 × cl 33.7 mm). B, *H. mindonensis* Rodríguez & Von Sternberg, male (cb 18.8 × cl 12.3 mm). C, *Lindacatalina latipenis* (Pretzmann), (cb 41.7 × cl 26.7 mm). D, *L. puyensis* (Pretzmann), (cb 27.3 × cl 17.8 mm). (Preserved specimens)

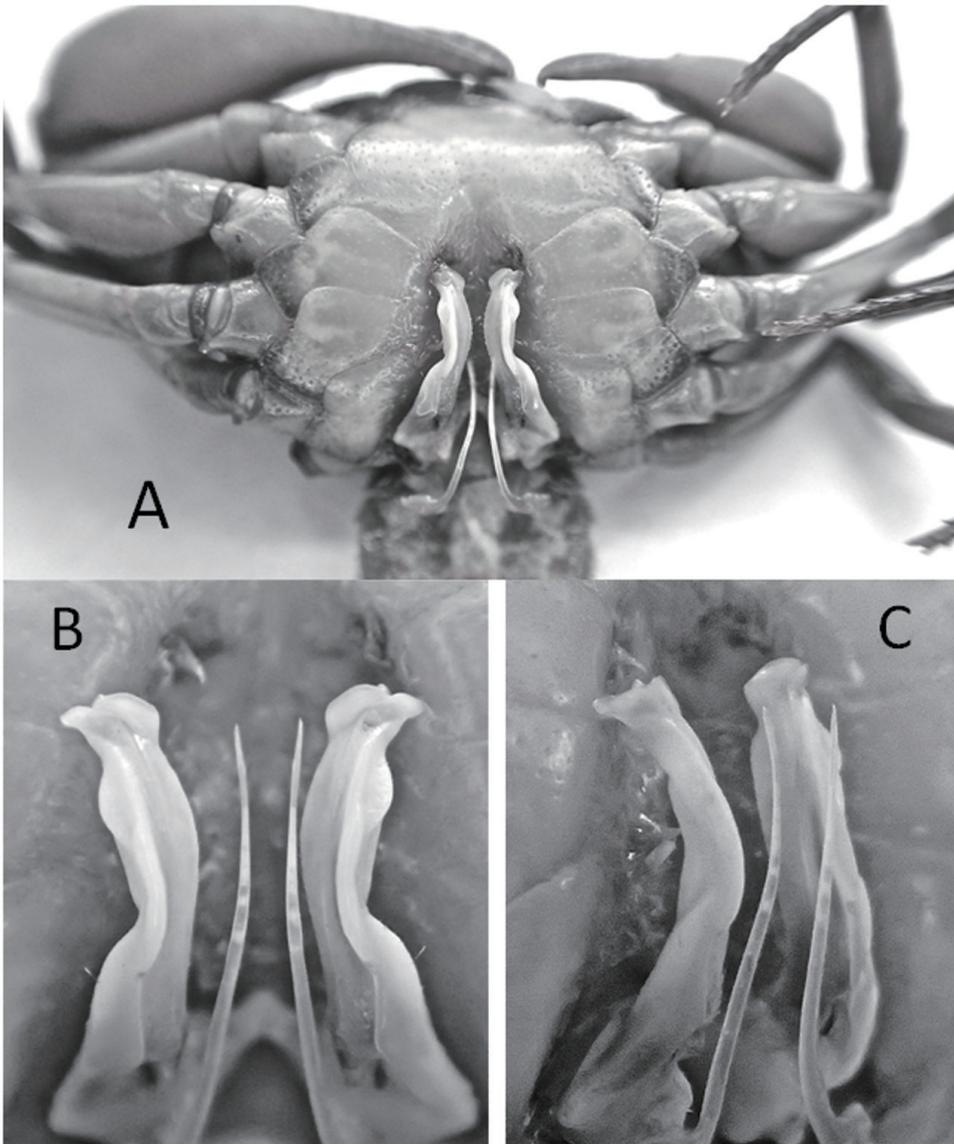


Fig. 4. A-C, *Hypolobocera mindonensis* Rodríguez & Von Sternberg, male (cb 23.0 × cl 14.2 mm), showing the first and second pleopods in different angles *in situ*.

*Material examined.* Puerto Quito, Pichincha Province; 2 sets of carapace and male abdomen with pleopods (cb 18.8 × cl 12.3 mm; cb 23.0 × cl 14.2 mm), 41 carapaces (cb 11.7 × cl 7.4 mm—cb 39.3 × cl 25.3 mm), 1 male abdomen with pleopods; August 30, 2015; H. Sugiyama *et al.* leg.

*Remarks.* The carapace is elliptical in dorsal view, with convex lateral margins, giving the cylindrical appearance in dorsal view (Fig. 3B), but in the frontal view (Fig. 5A) the dorsal surface is weakly convex dorsally only on the median part and seems to be flattened as a whole; the cervical groove is deep and wide proximally, becoming narrow and straight distally, and not reaching the lateral margin of the carapace; the anterolateral margin of the carapace is fringed with about 20 subacute granules directed forward.



Fig. 5. A-C, *Hypolobocera mindonensis* Rodríguez & Von Sternberg, male (cb 23.0 × cl 14.2 mm) in different angles to show the frontorbital region, chela and abdomen. D, *Lindacatalina puyensis* (Pretzmann), male (cb 33.3 × cl 20.5 mm).

The first male pleopod (Fig. 4) is somewhat similar to that of *Hypolobocera aequatorialis* (Ortmann) in its general formation, but the lateral lobe is smaller and about half in length, and the outer margin of the distal cup is weakly convex and differs from the regularly concave margin in *H. aequatorialis*.

*Distribution.* This species was originally reported from the confluence of Salaya and Rio Mindo in the Pichincha Province, between 1000 and 1200 m altitude.

#### Genus *Lindacatalina* Pretzmann, 1977

*Hypolobocera* (*Lindacatalina*) Pretzmann (1977: 437). [Type species: *Hypolobocera* (*Lindacatalina*) *hauserae* Pretzmann, 1977]

*Lindacatalina*, Rodríguez & Von Sternberg (1998: 136).

*Distribution:* Southern Colombia and Ecuador, South America.

*Remarks:* Pretzmann (1977) erected *Lindacatalina* as a subgenus of *Hypolobocera* Ortmann, 1897, mainly with some diagnoses of the male first pleopod as follows: Shaft of pleopod slender and widened basally, being equipped with strong longitudinal ridge and well developed lateral and supplementary lobes; distal part of shaft strongly constricted at base, forming a certain crown in lateral view; distal surface of shaft, or top of crown, truncated, circular or ovate in outline; lateral lobe behind constriction perpendicular to shaft. Otherwise, the third maxillipedal exopod with more than half the ischium length, the absence of frontal lateral angle, the different size of both chelipeds, and the small size are mentioned as the generic characters. All of these characters are not always generic, but at least the formation of the male first pleopod is considered to be of generic value. Rodríguez and Von Sternberg (1998) considered that the exopod of the third maxilliped is more than 0.45 length of the ischium in *Lindacatalina* and less than in *Hypolobocera*.

The species originally referred to this subgenus are the type species, *Hypolobocera* (*Lindacatalina*) *hauserae* Pretzmann, 1977, and the following additional species and subspecies, as also shown in Table 1, with nomenclatural transition: *Pseudothelphusa plana* Smith, 1870, *P. nobilii* Rathbun, 1898, *Hypolobocera* (*Hypolobocera*) *plana orientalis* Pretzmann, 1968, *H. (H.) latipenis* Pretzmann, 1968, *H. (Lindacatalina) latipenis puyensis*, *H. (L.) [plana] orcesi*, *H. (L.) [plana] plana olallai*, *H. (L.) lamercedis lamercedis*, and *H. (L.) lamercedis maytai*. The last five subspecies mentioned in 1977 were *nomen*

*nudum* and described properly in 1978.

On the evaluation of systematic problem and the consideration of individual variation, Rodríguez and Von Sternberg (1998) ranked *Lindacatalina* up to the full genus, and admitted six species with binominal nomenclature, excluding *H. orcesi* and *H. nobili* and including a new species, *L. sumacensis*. Further later, Rodríguez *et al.* (2002) described a new species, *L. sinuensis*, and Ng *et al.* (2008) put *P. plana* and *P. nobilii* as incertae sedis, and synonymized *L. plana olallai* with *L. orientalis*. At present, as shown in Table 1, the genus *Lindacatalina* is represented by the following seven species arranged in alphabetical order, *brevipenis*, *hauserae*, *latipenis*, *orientalis*, *puyensis*, *sinuensis* and *sumacensis*.

The species obtained during the fieldwork for the detection of lung fluke positive crabs in eastern Ecuador were identified as *L. latipenis* and *L. puyensis*.

***Lindacatalina latipenis* (Pretzmann, 1968)**

(Figs. 3C, 6)

*Hypobocera (Hypobocera) latipenis* Pretzmann (1968: 8).

*Hypobocerra (Hypobocera) conradi latipenis*, Pretzmann (1971: 17).

*Hypobocera conradi latipenis*, Pretzmann (1972: 135, figs. 190-193).

*Hypobocera (Lindacatalina) latipenis latipenis*, Pretzmann (1977: 432, 437, figs. 5, 6, 11).

*Hypobocera latipenis*, Rodóriguez (1982: 54, figs. 19n, 20a, f, 23a, 28).

*Hypobocera (Lindacatalina) [latipenis] latipenis latipenis*, Pretzmann (1983d: 357, figs. 12, 21, 34, 45, 49, 63, 68, 77, 78, 90).

*Lindacatalina latipenis*, Rodóriguez & Von Sternberg (1998: 127, figs. 1N-P, 12 A-C).

*Material examined.* Ahuano, Tena, Napo Province; 2 ♂♂ (cb 27.2×cl 20.5 mm; cb 32.3×cl 20.5 mm), 3 sets of carapaces (cb 48.8×cl 30.5 mm; cb 42.2×cl 26.8 mm; cb 41.7×cl 26.7 mm) and male abdomens with pleopods, 1 male abdomen with pleopods; September 2015; H. Kumazawa *et al.* leg.

*Diagnosis.* Carapace (Fig. 3C) transversely elliptical, with ca. 1.6 in ratio of breadth to length; dorsal surface smooth, microscopically granulated near frontal and anterolateral margins, flattened as a whole, with weakly raised gastric, cardiac and branchial regions; longitudinal linear, short groove from median notch of frontal margin divided into two short branch to divide anterior part of gastric region; longitudinal ovate, shallow depression at lateral of metagastric region; oblique prominent furrow running from anterolateral part of depression to small notch behind supraorbital angle of anterolateral margin of carapace.

Frontal margin as long as posterior margin of carapace, narrowly and thickly edged along whole length, with small median notch. Orbit transverse, shallow, half as wide as frontal margin; outer angle not prominent, but produced to be minute triangular tooth directed forward. Anterolateral margin of carapace strongly and regularly arched, fringed with subacute granules of good and subequal size, with small notch at anterior one third. Posterior margin of carapace distinctly concave.

Chelipeds (Fig. 3C) unequal, palm and both fingers inflated, with sharply toothed fingers; teeth of both fingers high, closely set, interlocked with each other; fingers similar to each other, subacute at tips, with median five teeth of immovable finger being much larger than others; smaller chela similar to larger chela, but slender, with triangular, sharply toothed teeth of image of shark's teeth.

Male abdomen (Fig. 6H) comparatively wide, regularly tapering as a whole; sixth and seventh segments subequal in length to each other and to fourth and fifth segments combined; seventh segment gently tapering, obtusely rounded at apex.

First male pleopod (Fig. 6A-G) stout, held inside of abdomen; caudal ridge (Fig. 6A, B) strongly developed like callus along about half length of shaft; lateral lobe (Fig. 6B-F) large, bent outward like earlobe with deeply concave inner and

Table 1. Nomenclatural change of the *Lindacatalina* species .

<i>Hypolobocera (Lindacatalina)</i> : Pretzmann (1977)	<i>Hypolobocera (Lindacatalina)</i> : Pretzmann (1978)
<i>H. (L.) [plana] plana plana</i> (Smith, 1870) « <i>Pseudothelphusa</i> »	
<i>H. (L.) nobilii</i> (Rathbun, 1897) « <i>Pseudothelphusa</i> »	
<i>H. (L.) [plana] plana orientalis</i> Pretzmann, 1968	
<i>H. (L.) latipenis latipenis</i> Pretzmann, 1968	
<i>H. (L.) hauserae</i> sp. nov.	
<i>H. (L.) [plana] plana olallai</i> « <i>Nomen nudum</i> »	<i>H. (L.) [plana] plana olallai</i> ssp. nov.
<i>H. (L.) lamercedis lamercedis</i> « <i>Nomen nudum</i> »	<i>H. (L.) lamercedis lamercedis</i> sp. nov.
<i>H. (L.) lamercedis maytai</i> « <i>Nomen nudum</i> »	<i>H. (L.) lamercedis maytai</i> ssp. nov.
<i>H. (L.) [plana] orcesi</i> « <i>Nomen nudum</i> »	<i>H. (L.) [plana] orcesi</i> ssp. nov.
<i>H. (L.) latipenis puyensis</i> « <i>Nomen nudum</i> »	<i>H. (L.) latipenis puyensis</i> ssp. nov.

outer surfaces, with outer margin being thickened; anterior part of lateral lobe produced as large supplementary lobe (Fig. 6B, D-F) directed transversely; apex (Fig. 6F, G) circular in distal view.

*Remarks.* As mentioned by Rodríguez and Von Sternberg (1998), the identification of the *Hypolobocera* and *Lindacatalina* species is difficult because of lack of the definitive differences in the carapace and appendages.

The anterior part of the Diagnosis given above is concerned with the carapace shape and areolation may be applied to most of the related species. It is known that the male first pleopod is characteristic of each species and complex with ridges and lobes as defined by Smalley (1964). However, the line drawings are often schematic and supply only the limited information for the definite identification. In the present paper, the differences between the first male pleopods

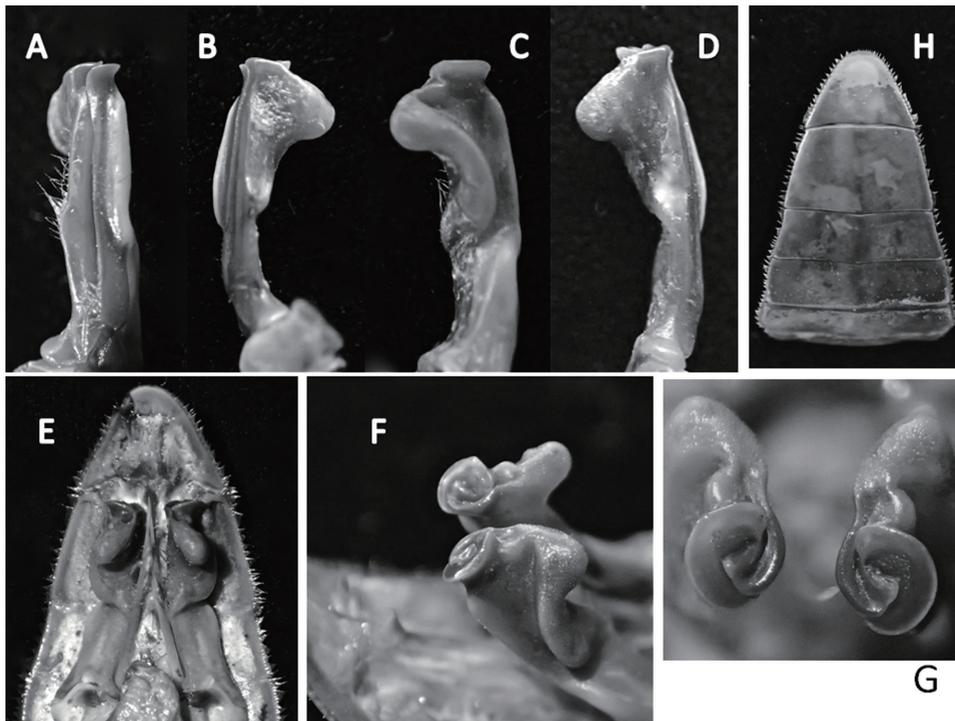


Fig. 6. *Lindacatalina latipenis* (Pretzmann). A-D, left male first pleopod in different angles; E-G, male first pleopod in different angles *in situ*; H, male abdomen.

Table 1. Continued.

<i>Lindacatalina</i> : Rodríguez & Von Steinberg (1998)	<i>Lindacatalina</i> : Ng <i>et al.</i> (2008)
→ <i>Incerta sedis</i>	→ <i>Incerta sedis</i>
→ ?	→ <i>Incerta sedis</i>
<i>L. orientalis</i> (Pretzmann, 1968)	<i>L. orientalis</i> (Pretzmann, 1968)
<i>L. latipenis</i> (Pretzmann, 1968)	<i>L. latipenis</i> (Pretzmann, 1968)
<i>L. hauserse</i> (Pretzmann, 1977)	<i>L. hauserae</i> (Pretzmann, 1977)
= <i>L. orientalis</i>	= <i>L. orientalis</i>
—	→ <i>Hypolobocera</i>
—	→ <i>Hypolobocera</i>
→ ?	→ <i>Hypolobocera</i>
<i>L. puyensis</i> (Pretzmann, 1978)	<i>L. puyensis</i> (Pretzmann, 1978)
<i>L. brevipenis</i> (Rodríguez & Díaz, 1981) « <i>Hypolobocera</i> »	<i>L. brevipenis</i> (Rodríguez & Díaz, 1981)
<i>L. sumacensis</i> sp. nov.	<i>L. sumacensis</i> Rodríguez & Von Steinberg, 1998
	<i>L. sinuensis</i> Rodríguez, Campos & López, 2002

of this species and the close congener, *L. puyensis* (Pretzmann) are shown in some frames with different angles.

*Distribution.* This species is known from the type locality, Concepcion (77°24'W, 0°48'S), and otherwise recorded from some localities in Napo Province.

*Lindacatalina puyensis* (Pretzmann, 1978)

(Figs. 3D, 5D, 7)

*Hypolobocera (Lindacatalina) latipenis puyensis* Pretzmann (1977: 438) (*Nomen nudum*). — Pretzmann (1978: 165, fig. 7). — Pretzmann (1983a: 302, pls. 5, 6).

*Hypolobocera (Lindacatalina) [latipenis] latipenis puvensis*, Pretzmann (1983d: 358, fig. 11).

*Lindacatalina puyensis*, Rodríguez & Von Sternberg (1998: 130, fig. 12D, E).

*Material examined.* Ahuano, Tena, Napo Province, 2 ♂♂ (cb 27.3×cl 17.8 mm; cb 33.3×cl 20.5 mm), 16 carapaces (cb 19.7×cl 12.4 mm—cb 39.0×cl 18.7 mm), 4 male abdomens with pleopods; September 23, 2015; H. Kumazawa *et al.* leg.

*Diagnosis.* Carapace (Figs. 3D, 7A) small, with 0.65 in the ratio of breadth to length of carapace, not fitted to remaining abdomens. Contour of carapace elongated elliptical rather than quadrilateral, with strongly convex lateral margins of carapace. Dorsal surface of carapace nearly smooth, with ill-defined regions; oblique furrow or depression originates from posterolateral part of metagastric region, but does not reach margin of carapace at each side. Supraorbital margin weakly raised, external orbital angle small, triangle, followed by small bight at beginning of anterolateral margin of carapace. Lateral margin of carapace minutely granulated, without interruption for about anterior three fourths; posterior one fourth forming posterolateral margin weakly convergent toward posterior margin of carapace.

Male abdomen (Fig. 7B) comparatively wide, with sixth segment as long as fourth and fifth segments combined; seventh segment triangular, with strongly tapering lateral margins, tips subacute.

Male first pleopod (Fig. 7C) stout, strongly calcified, held inside abdomen; caudal ridge (Fig. 7D-F) shaped of elongated, thick callus; lateral lobe (Fig. 7E-G) well developed, with convex, rather thin outer margin; ventral surface of proximal half of pleopod shaft deeply excavated, distal half obliquely bent ventrally; supplementary lobe (Fig. 7F, G) well developed, convex, inner surface deeply excavated; apex (Fig. 7H) circular.

*Remarks.* The lateral margin of the carapace is strongly convex and minutely granulated, without epibranchial interruption, making the general appearance of the carapace elliptical. The shape of the carapace is different from *Lindacatalina latipenis* (Pretzmann), in which the carapace is convergent along the posterolateral margin.

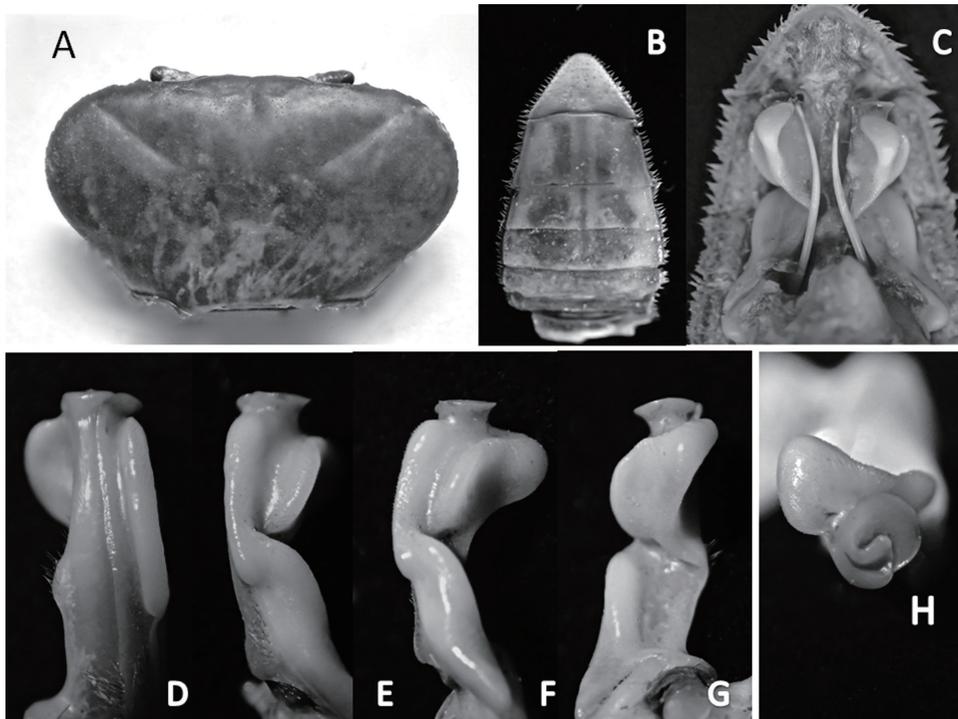


Fig. 7. *Lindacatalina puyensis* (Pretzmann). A, carapace; B, male abdomen (cb 32.2 × cl 19.2 mm); C, first and second male pleopods *in situ*; D-H, left male first pleopod in different angles.

The male abdomen of this species differs from that of *L. latipenis*, especially in the more triangular seventh segment, with the rapidly tapering lateral margins.

The male first pleopod is seemingly nodular, with the developed lateral and supplementary lobes, the shaft of the pleopod is strongly bent ventrally at the middle, and the ventral surface of the basal half and the inner surface of the distal half are deeply excavated. This species is differentiated from *L. latipenis* in the shape of the male first pleopod, as indicated in the diagnoses and the photographs.

*Lindacatalina puyensis* was originally described as a subspecies of *L. latipenis* by Pretzmann (1978), and ranked up to the species level by Rodríguez and Von Sternberg (1998). The basic formation of the male first pleopod is common in both species, but as noticed in this paper, that of *L. puyensis* is thicker and stouter than that of *L. latipenis*, and tightly bent ventrally. And also, according to Rodríguez and Von Sternberg (1998), the smaller specimens less than 35 mm in carapace breadth are attributed to *L. puyensis*, and *L. latipenis* attains at least 58 mm in carapace breadth. They are wondering about whether the smaller specimens referred to *L. puyensis* may be the younger specimens of *L. latipenis*, and stated that this problem is solved only by the discovery of mature female of small size. Among the male abdomens examined is a small one that is seemingly slender like the large abdomen, with the *latipenis*-type pleopod. There is no problem in considering the validity of both species.

*Distributin.* The hitherto recorded localities are 10 and 32 km north of Puyo in Pastaza Province, 980 m alt., and San Bernardo and Talac in Napo Province, 1500 m alt.

## Family TRICHODACTYLIDAE

Genus *Moreiocrarcinus* Magalhães & Türkay, 1996

*Moreiocrarcinus* Magalhães & Türkay (1996: 82). [Type species: *Trichodactylus (Trichodactylus) chacei* Pretzmann, 1968]

*Distribution.* Orinoco drainage of Colombia and Venezuela; Amazon drainages of Brazil, Peru and Ecuador.

*Remarks.* The original definition is cited as follow: "Carapace with 2-6 anterolateral teeth. Abdominal segments III-VI fused. Thoracic sternum and endophragmal system (as judged by external view for most species) identical with those of *Poppiana*. Male plp 1 tapering, straight or slightly bent in mesio-dorsal direction; lateral and mesial borders follow a regular curve; subterminal spine field fairly well developed; suture straight (means following the general curve of plp 1), not torqued; distal opening simple, V-shaped. Plp 2 longer than plp 1."

Other than the type species, two species *Dilocarcinus emarginatus* H. Milne-Edwards, 1853, and *D. laevifrons* Moreira, 1901, were originally referred to the new genus *Moreiocrarcinus* by Magalhães and Türkay (1996). These species have been once included in the genus *Dilocarcinus* H. Milne-Edwards and then the genus *Zilchiopsis* Bott, but form a homogeneous group distinct from the species of these genera and warrant the establishment of the new genus.

*Moreiocrarcinus emarginatus* (H. Milne-Edwards, 1853)

(Figs. 2E, 8)

## Selected synonymy

*Dilocarcinus emarginatus* H. Milne-Edwards (1853: 216).

*Trichodactylus (Dilocarcinus) emarginatus*, Rathbun (1906: 64, pl. 18 fig. 2).

*Trichodactylus (Valdivia) ecuadoriensis* Pretzmann (1968: 3).

*Zilchiopsis emarginatus*, Bott (1969: 35, pl. 21 fig. 56). — Pretzmann (1983c: 327). — Rodríguez (1992: 102, figs. 3G, 4T, 5M, 7H, 8B, 9I, 10C, 13G, H, 35, 36).

*Zilchiopsis ecuadoriensis*, Smalley & Rodríguez (1972: 49, figs. 9, 10). — Pretzmann (1983c: 328, pl. 13 fig. 30, pl. 14 fig. 32).

*Moreiocrarcinus chacei*, Takeda *et al.* (2014: 7, fig. 6A).

Nec *Moreiocrarcinus emarginatus*, Takeda *et al.* (2014: 8, figs. 6B-D).

*Material examined.* Ahuano, Tena, Napo Province; 1 ♂ (cb 16.5×cl 14.3 mm), 1 ♀ (cb 22.8×cl 20.2 mm) with detached abdomen, chelipeds and ambulatory legs; September 23, 2015; H. Kumazawa *et al.* leg.

*Remarks.* Two specimens in the recent collection from Napo Province are morphologically noted as follows. The carapace of the male (Fig. 8A) and the female (Fig. 2E) are narrow, only slightly wider than long; the dorsal surface is evenly convex in both directions, ill-defined but each region is traceable; the frontal margin is deeply and widely convex dorsally in the frontal view (Fig. 8B) and concave medially in the dorsal view (Fig. 2E, 8A); the lateral margins of the carapace is narrowly rimmed along the whole length; the anterolateral margin is cut into two distinct and three indistinct lobes; the first lobe is just the anterolateral margin, as long as the second and third lobes combined, not convex; the anterior end of the second lobe is angulated and directed forward. The male abdomen (Fig. 8C) is remarkably wide at the base of the fifth ambulatory legs, the fourth to sixth segments completely coalesce into one piece, without any protuberance. The male first pleopod (Fig. 8D) is quite simple and rod-like with obtuse tip.

The specimens examined at present agree well with the carapace of *Moreiocrarcinus chacei* identified by Takeda *et al.* (2014: Fig. 6A), but its identification based only on the carapace was not always reliable. The male specimen in the

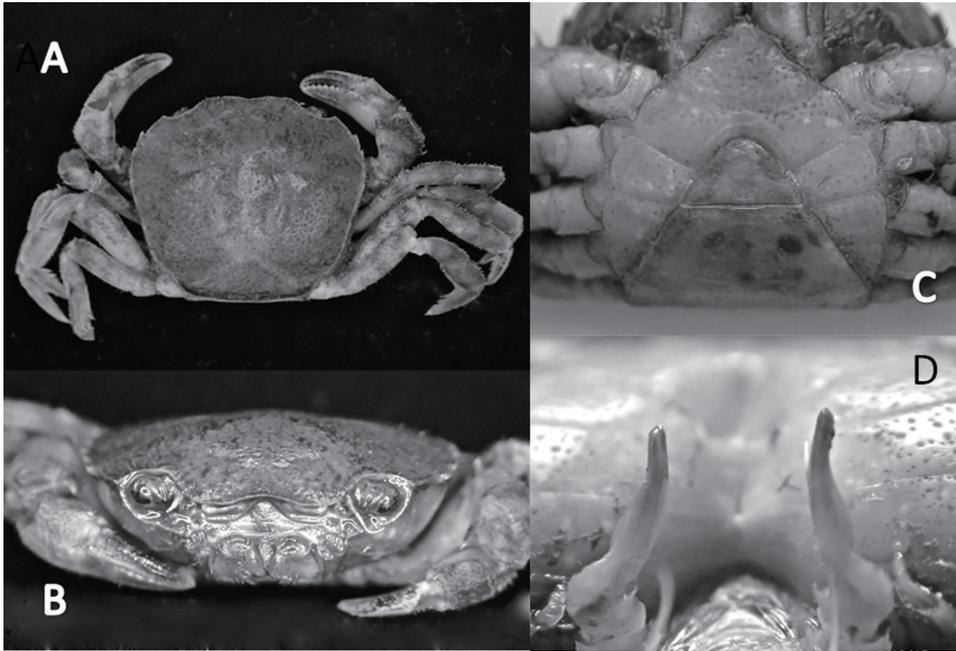


Fig. 8. *Moreirocarinus emarginatus* (H. Milne-Edwards), male (cb 16.5 × cl 14.3 mm) in dorsal (A), frontal (B) views; C, abdomen; D, first pleopod *in situ*.

present collection indicates that the true scientific name is not *M. chacei*, but *M. emarginatus*, because the male first pleopod is stout, weakly curved outward and rod-like with obtuse tip, differing from the slender, straight and tapering first pleopod without sharp tip in *M. chacei*.

Otherwise, the present specimens are, without doubt, referred to the species identified and represented as *Zilchiopsis chacei ecuadoroides* Pretzmann by Pretzmann, 1983c: pl. 13 fig. 29). As regards the taxonomic status of this subspecies, Magalhães and Türkay (1996) indicated that the photographs represented on the plates are really *Z. ecuadoriensis* and not *Z. chacei ecuadoroides*, and also that *Z. ecuadoriensis* is synonymous with *Moreirocarinus emarginatus*. The definitive differences between the closely related two species, *M. chacei* and *M. emarginatus*, is seen in the first male pleopod as mentioned above. As a result, our previous records of *M. chacei* and *M. emarginatus* should be corrected at present. It is otherwise noted here that one of the carapaces of *M. emarginatus* represented by Takeda *et al.* (2014: Fig. 6B) is seemingly identical with the line drawing of a young male of *Z. emarginatus* given by Rodríguez (1992: Fig. 36A).

*Distribution.* Colombia, Venezuela, Peru and Ecuador. In Ecuador, this species is known from Loreto (450 m alt. in the foothills of Mt. Sumaco, Napo Province (Smalley & Rodríguez, 1972; Rodríguez, 1992), Payamino, Napo Province (Pretzmann, 1968)

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Prof. Dr. M. Türkay of the Senckenberg Research Institute and Natural History Museum Frankfurt was kind enough to recommend for us to examine the male first pleopod of two *Moreirocarinus* species for the definite identification. We deeply regret, with our cordial respects, his passing on September 9, 2015.

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