

## First record of *Lepidophthalmus tridentatus* (VON MARTENS, 1868) (Callianassidae) from the Philippines

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### Abstract

Several specimens of the burrowing shrimp *Lepidophthalmus tridentatus* are reported from the islands of Leyte and Bohol, where they were collected in a brook and a river, respectively. This is the first record of the species from the Philippines.

**Key Words:** Thalassinidea, Callianassidae, *Lepidophthalmus*, new record.

### Zusammenfassung

Mehrere Exemplare des grabenden Krebses *Lepidophthalmus tridentatus* wurden in Leyte und Bohol in einem Bach bzw einem Fluß gefangen. Dies ist der erste Fund dieser Art in den Philippinen.

### Introduction

Members of the family Callianassidae (Decapoda, Thalassinidea) occur in various sedimentary bottoms, most commonly in shallow waters. The majority are marine, but some species inhabit estuarine environments under reduced salinities (DWORSCHAK, 2005).

During a stay on the island of Leyte, Philippines, in 1996, Jörg Ott (University Vienna) used a yabby pump to collect a single specimen of a callianassid shrimp in a brook, about 200 m inland. Subsequently, during the Panglao 2004 Marine Biodiversity Project numerous mollusks and decapod crustaceans were collected in various marine habitats including mangroves and rivers under tidal influence. One of these environments was the Abatan River, Bohol, with mangroves near the mouth and bordered by Nipa Palm [*Nypa fruticans* (Thunb.) Wurm 1781] and Coconut Palm [*Cocos nucifera* L. 1753] plantations further inland. During a boat trip 4 to 5 km up the river, several members of the local population were observed to quarry sand from the river (Fig. 1). Inspection of the sand brought up from the riverbed in 3 - 4 m depth revealed several specimens of a callianassid shrimp. One further specimen was later collected with an airlift sampler by a diving team of the expedition from muddy sand in 1 - 3 m depth ca 2 km inland.

Material has been deposited in the National Museum of the Philippines, Manila (NMCR), the Zoological Reference Collection at the National University of Singapore (ZRC), the Muséum National d'Histoire Naturelle, Paris (MNHN) and the Naturhisto-

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risches Museum Wien, Austria (NHMW). Size is expressed as total length (tl in mm) from the tip of the rostrum to the end of the telson and as carapace length (cl in mm) from the tip of the rostrum to the posterior median edge of the carapace. Other abbreviations used include: ZMB, Zoological Museum of the Humboldt University, Berlin; A1, first antenna (antennule); A2, second antenna; Mxp3, third maxilliped; Plp3-5, third to fifth pleopod; coll., collected.

### *Lepidophthalmus tridentatus* (VON MARTENS, 1868)

(Figs. 2 - 39)

*Callianassa tridentata* VON MARTENS, 1868: 614-615; A. MILNE-EDWARDS, 1870: 101; MIERS, 1884: 13-15.

*Callianassa (Callichirus) tridentata*; DE MAN, 1928a: 27-30, pl. 7: figs 13-13h; 1928b: 110 (key); SAKAI, 1970: 393-400, figs 1-3

*Lepidophthalmus tridentatus*; SAKAI, 1999: 71, fig. 14e-f; 2005: 156.

*Corallichirus tridentatus*; TUDGE et al., 2000: 144(list); KENSLEY, 2001: 332.

#### **Material:**

NHMW 18323, 1 female (tl 45, cl 10.6), Philippines, Leyte, Baybay, brook (ca 1.2 m wide) near Visayas State College of Agriculture (now Leyte State University), sandbank ca 200 m inland, J. Ott coll. with yabby pump June 1996. – ZRC 2006.0161, 1 male (tl 36, cl 9.0), Philippines, Bohol, Abatan River, M28: 9°44.5'N, 123°53.8'E, brought up in buckets with sand from riverbed in ca 3-4 m depth by local divers, S = 7.5, 23 June 2004 (PD185). – NMCR 27007, 1 female (tl 47, cl 10.9), Philippines, Bohol, Abatan River, M28: 9°44.5'N, 123°53.8'E, brought up in buckets with sand from riverbed in ca 3-4 m depth by local divers, S = 7.5, 23 June 2004 (PD186). – ZRC 2006.0160, 1 female (abdomen missing, cl 7.0), Philippines, Bohol, Abatan River, M28: 9°44.5'N, 123°53.8'E, brought up in buckets with sand from riverbed in ca 3-4 m depth by local divers, S = 7.5, 23 June 2004 (PD187). – MNHN Th-1506, 1 female (tl 22, cl 4.9), Philippines, Bohol, Abatan River Estuary, S33: 9°43.8'N, 123°52.7'E, 1-3 m, coll. with airlift sampler, S = 10, muddy sand, 28 June 2004 (PD211).

**Diagnosis:** Dorsally, carapace ca 0.9 times as long as abdominal somites 1 and 2 combined (Figs 2, 3). Frontal margin of carapace trispinose (Figs 2, 3, 8, 19, 20). Rostrum triangular and acute, reaching from 3/4 to almost end of visible length of eyestalks. Lateral projections of carapace front acute, not marked by a noncalcified membrane proximally, extending to 1/4 to 1/3 the length of the rostrum. Carapace with distinct dorsal oval, lacking cardiac prominence and dorsal carina.

Eyestalks reaching to 3/4 length of basal antennal article, triangular in dorsal view (3, 20), rhomboidal to rectangular in lateral view (Figs 2, 8, 19); distinct, pigmented cornea on dorsolateral surface, area of pigmentation often larger than faceted surface.

Antennular peduncle (Fig. 9) heavier, longer than antennal peduncle (Figs 2, 3); second article slightly longer than basal article; terminal article twice as long as second.

Antennal peduncle (Fig. 10) reaching to midlength of antennular peduncle; basal article with dorsolateral carina forming lip above excretory pore; second article ventrally with large suture; third article elongate, as long as basal and second article combined; fourth article narrower, 1.1 times as long as third article.

Third maxilliped (Figs 21, 22, 31) with small, naked, rudimentary exopod and large setose endopod; endopodal ischium 1.5 times as long as wide, mesial surface with low, unarmed longitudinal ridge or elevation, strongest proximally; merus triangular, as long

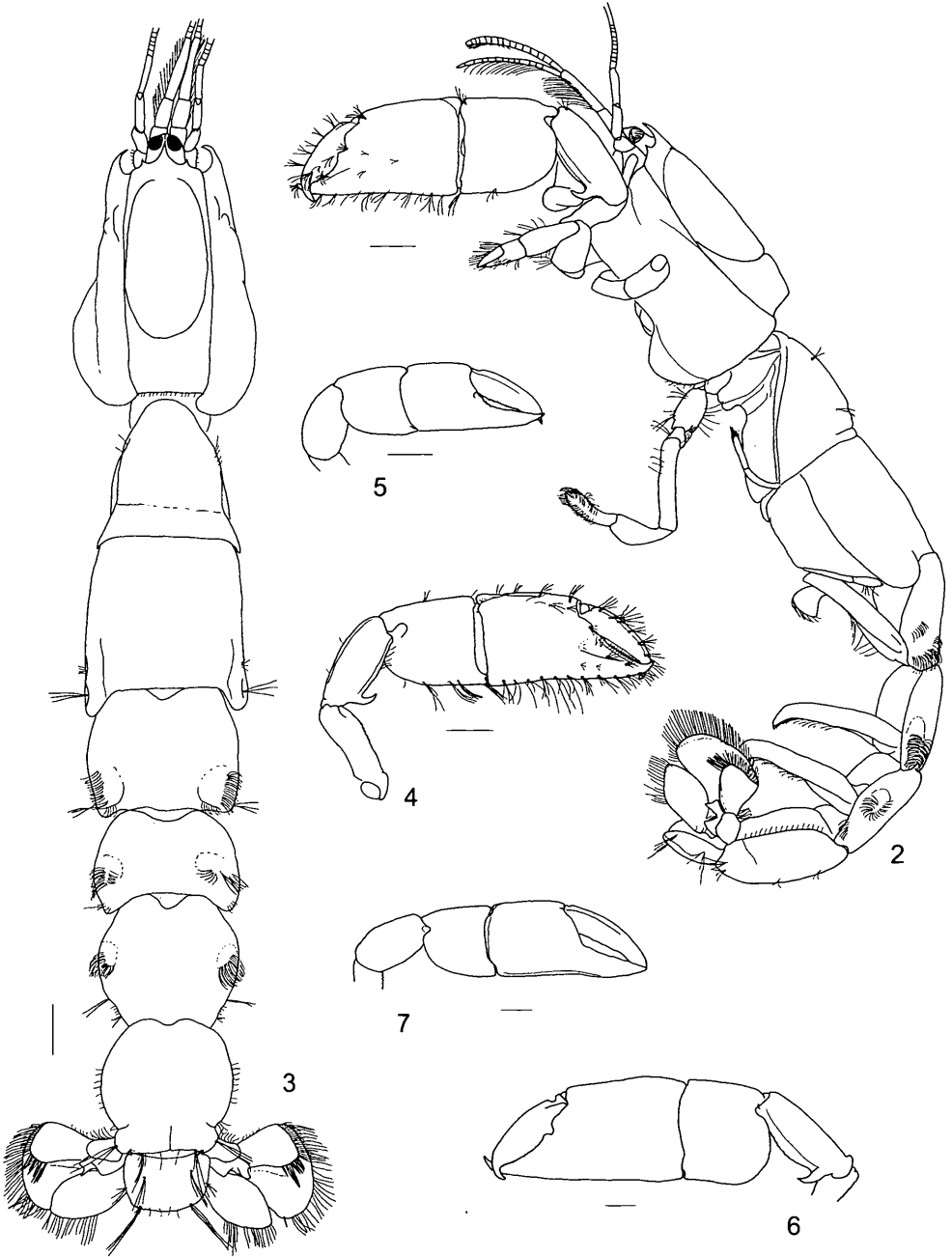


Fig. 1: Sand quarrying from the bed of Abatan River, Bohol, Philippines.

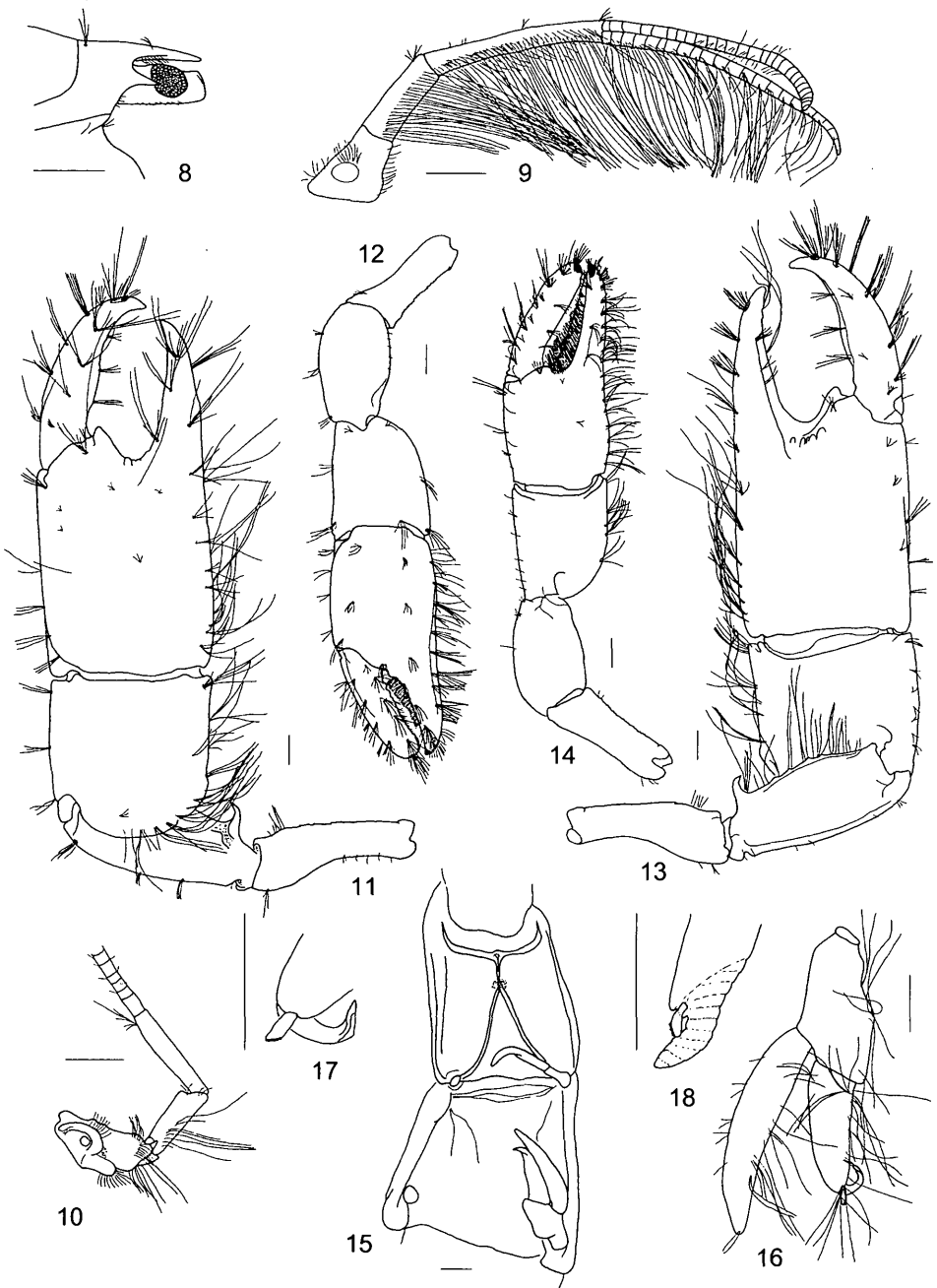
as broad; carpus triangular, longer than broad; propodus large, ovoid, broader than long; dactylus narrow, arcuate.

Major cheliped (Figs 4, 6, 11, 13, 23, 24, 32, 34) located on either right or left side of body, shape and ornamentation of propodus and dactylus sexually dimorphic. Ischium slender, superior margin sinuous, row of small denticles on proximal 2/3 of inferior margin; merus with distinct notch in proximal 1/10 of superior margin, inferior margin with strong, sinuous proximal hook offset on inner surface from base of undulated keel; carpus as long as broad; propodus usually heavy in males, excavated below articulation with dactylus, fixed finger curved; propodus more slender in smaller females than in male, lacking excavation, fixed finger broadly triangular; dactylus curved dorsally, cutting edge of male with two broad triangular teeth, cutting edge in females sinuous, with small denticles.

Minor cheliped (Figs 5, 7, 12, 14, 25, 33, 35) sparsely armed, ischium with row of minute denticles on inferior margin; merus unarmed, with rounded superior and inferior margins; carpus slightly longer than broad; fixed finger of females with dense brush of setae on proximal 4/5 in depression between inner and outer prehensile margins; fixed finger of male less depressed and with less dense setae than in that of the female, with one low triangular tooth on outer prehensile margin; dactylus slightly curved, cutting edge with three low teeth in the male, with small corneous denticles in females. Tips of both fixed fingers and dactylus corneous.



Figs 2 - 7: *Lepidophthalmus tridentatus* (VON MARTENS, 1868), Abatan River, Bohol. 2 - 5: MNHN Th-1506 (PD211), female tl 22; (2) lateral view; (3) dorsal view; (4) left major cheliped, mesial face; (5) minor right cheliped, lateral aspect (setae omitted). (6, 7) ZRC 2006.0160 (PD187), female cl 7.0; (6) major left cheliped, lateral view (setae omitted); (7) minor right cheliped, lateral view (setae omitted). Scale is 1 mm.



Figs 8 - 18: *Lepidophthalmus tridentatus* (VON MARTENS, 1868), Baybay, Leyte, NHMW 18323, female, cl 10.6. (8) detail of front in lateral view; lateral aspect of right first (9) and second (10) antenna; lateral aspect of right major (11) and left minor (12) cheliped; mesial aspect of major (13) and minor (14) cheliped; (15) first two abdominal somites in ventral view; (16) right second pleopod, anterior view; detail of appendix interna in anterior (17) and posterior (18) view (setae omitted). Scale is 1 mm.

Third pereopod (Fig. 26) propodus with inferodistal margin below articulation of dactylus bilobate, proximal lobe with corneous tooth obscured by setae.

Abdomen long (Figs 2, 3); dorsal length ratio (along midline) of first to sixth abdominal somites 1.0: 1.1: 0.78: 0.52: 0.84: 0.94. First two abdominal somites very soft, barely calcified dorsally, ventrally without obvious plating (Figs 15, 36).

Male first pleopod simple, consisting of two articles (Fig. 37). Female first pleopod simple (Fig. 27), basal article curved, shorter than terminal article; terminal article with shoulder at midlength.

Male second pleopod biramous (Fig. 38), weakly demarcated appendix masculina and small appendix interna on endopod (Fig. 39). Female second pleopod biramous (Figs 16, 28), endopod with appendix interna (Figs 17, 18, 29).

Third to fifth pleopods with appendix interna embedded in mesial margin of endopod (Fig. 30).

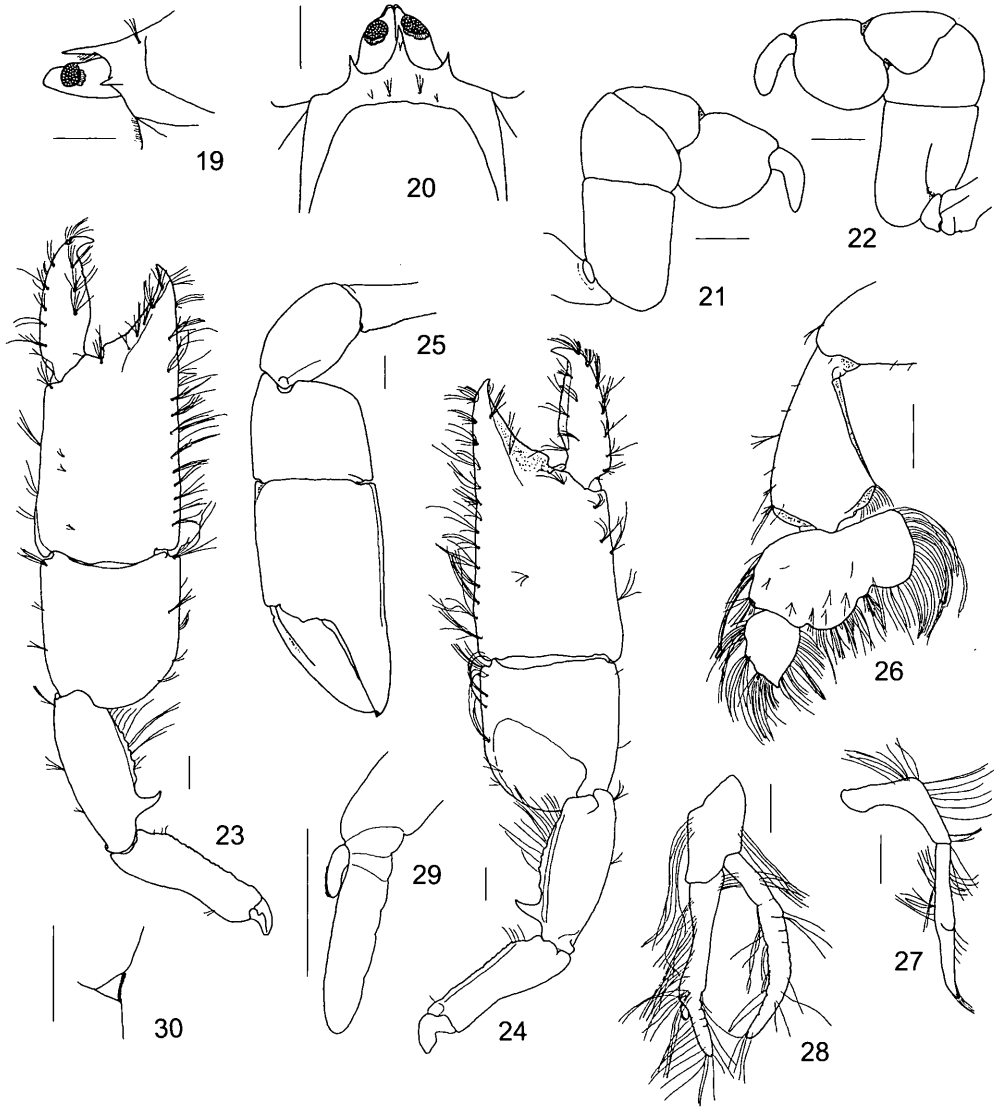
Telson (Fig. 3) broader than long, broadest proximally, posterior margin arcuate. Uropodal endopod elongate, ovoid, about twice as long as wide. Uropodal exopod with anterodorsal plate.

**Colour** (from colour notes and photographs of live animals). Carapace and appendages opaque white, abdomen translucent, dorsal face of telson and uropods yellow.

**Remarks.** *Callianassa tridentata* VON MARTENS, 1868 was rather briefly described in the original account, but not figured, based on type material from Java, Indonesia. Later, MIERS (1884) mentioned another specimen from Ceylon [Sri Lanka] in the collections of the British Museum. COUTIÈRE (1899), who obviously studied the type specimens, could not give any details on the large cheliped because these were lacking. Later, DE MAN (1928a) re-investigated the four type specimens deposited in ZMB and provided figures. He noted that all specimens were broken and also mentioned that only one bore a major cheliped, of which carpus and chela were wanting. SAKAI (1970) studied the specimen mentioned by MIERS (1884) along with further material from Sri Lanka and New Britain and provided a detailed supplementary description and figures. SAKAI (1999) noted for the first time the tiny exopod on Mxp3 in additional material from Sri Lanka and transferred the species to the genus *Lepidophthalmus* HOLMES, 1904.

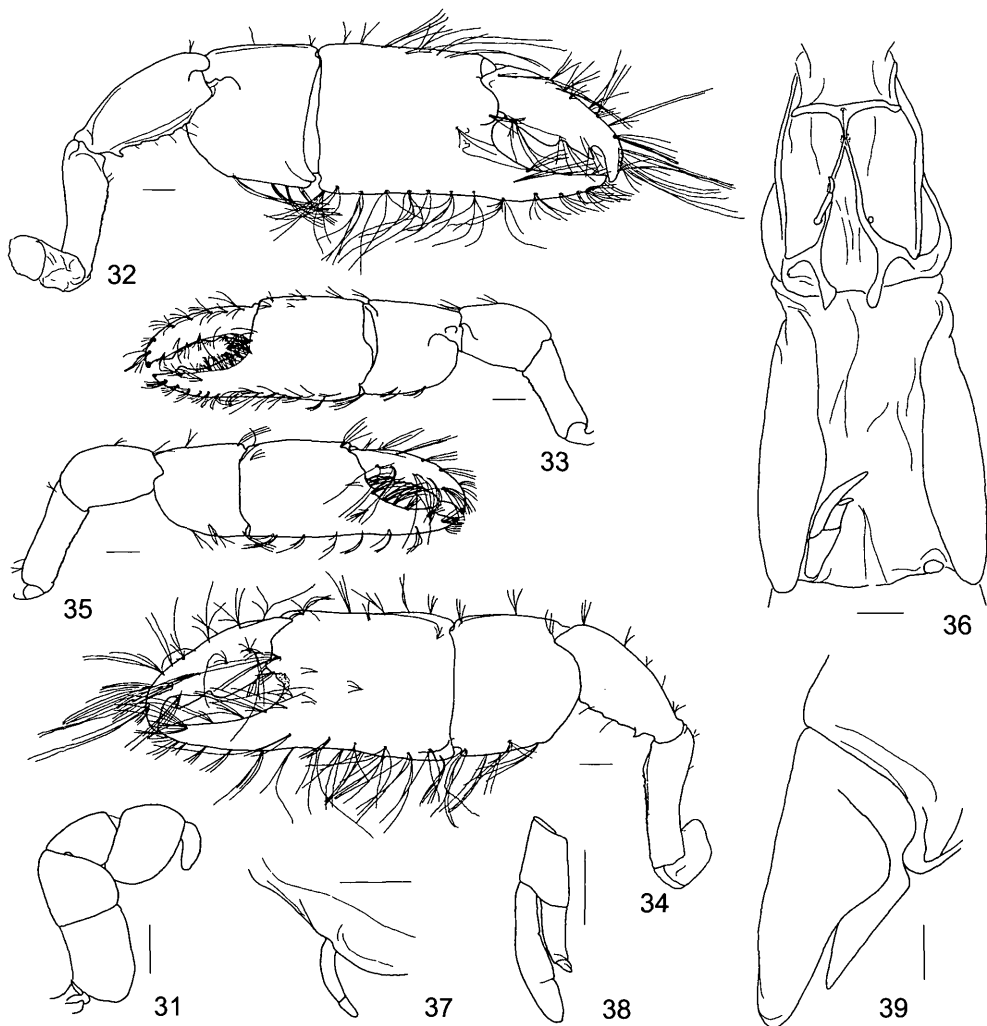
The species shows all the characters typical for the genus *Lepidophthalmus* as given by MANNING & FELDER (1991): 1) A1 peduncle longer and stouter than A2 peduncle; 2) Mxp3 with tiny exopod; 3) chelipeds unequal, major with meral hook; 4) appendices internae embedded in margin of endopod on Plp3-5. In addition, it shares with all other species assigned to *Lepidophthalmus* Holmes, 1904 the bilobed propodus of P3. TUDGE & al. (2000) were clearly unaware of the tiny exopod on Mxp3 in their phylogenetic analysis and the species came out as member of the genus *Corallichirus* MANNING, 1992.

The specimens from the Philippines are rather small (tl 22-47) when compared to those reported previously from other localities (tl 75-100; SAKAI 1970). The chelipeds of the male specimen from the Abatan River and those of the female from Leyte are very similar to those described by SAKAI (1970: figs 2a, d) for larger specimens. The small females from the Philippines, however, have a much broader fixed finger and lack the



Figs 19 - 30: *Lepidophthalmus tridentatus* (VON MARTENS, 1868), Abatan River, Bohol (NMCR 27007), female cl 10.9. Detail of front in lateral (19) and dorsal (20) view; lateral (21) and mesial (22) face of third maxilliped (setae omitted); lateral (23) and mesial (24) face of right major cheliped; (25) minor cheliped in lateral view (setae omitted); (26) distal part of third pereopod in mesial view; (27) ventral face of first right pleopod; (28) posterior face of second right pleopod; (29) same, detail (setae omitted); (30) detail of appendix interna on right third pleopod, anterior view. Scale is 1 mm.

incision. The male pleopods of the specimen from the Philippines seem to be not yet fully developed: the first pleopod shows a simple tip and the second pleopod lacks cincinnuli on the appendix interna. In larger males, the Plp1 is chelate (SAKAI 1970: fig. 3a, b), and the Plp2 has an appendix interna with cincinnuli (SAKAI, 1999: fig. 14).



Figs 31 - 39. *Lepidophthalmus tridentatus* (VON MARTENS, 1868), Abatan River, Bohol (ZRC 2006.0161), male cl 9.0. (31) right third maxilliped, lateral face (setae omitted); mesial (32) and lateral (34) face of left major cheliped; mesial (33) and lateral (35) face of minor cheliped; (36) first abdominal somites in ventral view (setae omitted); (37) right first pleopod, lateral view; (38) right second pleopod, posterior view (setae omitted); (39) same, detail of appendix interna. Scale is 1 mm (31 - 38) and 0.05 mm (39).

Only for the specimen from New Britain are details about the habitat known, as it was reportedly collected from a brook near the coast (SAKAI 1970). Similarly, the specimen from Leyte, Philippines, was collected in a brook 200 m inland (J. Ott, pers. comm.). In Bohol, material was found in a larger river. The Abatan River has a drainage area of about 368 km<sup>2</sup> and is strongly influenced by tides in its lower reaches. Salinity of the surface water measured in June 2004 reached from 10 ca 2 km inland (station S33) to



7.5 at 4 - 5 km inland (station M28), and 4.5 at about 7 km inland (station M29). Sediment at the collection site M28 was a mixture of gravel sized shell and mud. The density of the mudshrimps in the riverbed seems to be rather high, as three of the five buckets of sediment inspected contained one specimen each.

**Distribution:** Indonesia, Java (type-locality, VON MARTENS 1868), Sri Lanka (MIERS 1884; SAKAI 1970), New Britain (SAKAI 1970), Philippines (this study).

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