

A NEW SPECIES OF *MUNIDA* LEACH (DECAPODA, GALATHEIDAE)  
FROM OFF THE WEST COAST OF BAJA CALIFORNIA, MEXICO

BY

MICHEL E. HENDRICKX<sup>1,3</sup>) and MANUEL AYON PARENTE<sup>2</sup>)

<sup>1</sup>) Laboratorio de Invertebrados Bentónicos, Unidad Académica Mazatlán, Instituto de Ciencias del Mar y Limnología, Universidad Nacional Autónoma de México, P.O. Box 811, Mazatlán, Sinaloa, 82000, Mexico

<sup>2</sup>) Postgraduate Program, Laboratorio de Invertebrados Bentónicos, Unidad Académica Mazatlán, Instituto de Ciencias del Mar y Limnología, Universidad Nacional Autónoma de México, P.O. Box 811, Mazatlán, Sinaloa 82000, Mexico

ABSTRACT

A new species of *Munida* (Galatheidae) is described based on three specimens collected off the west coast of Baja California. The new species is distinguished from all other species of *Munida* known from the East Pacific region by the combination of the following characters: carapace with a transverse row of spines next to the posterior margin, supraocular spines parallel to rostrum, anterior ridges of abdominal somites 2-4 with spines, chelipeds long, moderately robust, a patch of strong granules on both sides of sternite 7 and an antennular basal article with a very short distomesial spine.

RÉSUMÉ

Trois spécimens recoltés au large de la côte ouest de la Basse Californie, Mexique, permettent de décrire une nouvelle espèce de *Munida* (Galatheidae). La nouvelle espèce est distinguée de toutes les autres espèces de *Munida* connues de la région du Pacifique Est par la combinaison des caractères suivants: carapace avec une rangée transversale d'épines près du bord postérieur; épines supraoculaires parallèles au rostre; crêtes antérieures des somites abdominaux 2, 3 et 4 avec des épines; chélipèdes longs, moyennement robustes; un groupe de granules de chaque côté du sternite 7; article basal de l'antennule avec l'épine distomesiale très courte.

INTRODUCTION

The species of *Munida* from the eastern Pacific were recently reviewed by Hendrickx (2000, 2003). In these two contributions, 18 species were

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<sup>3</sup>) Corresponding author; e-mail: michel@ola.icmyl.unam.mx

reported, including three previously undescribed species. Since 2008, however, *Munida gregaria* (Fabricius, 1793) and *M. subrugosa* (White, 1847) are known to be conspecific based on DNA analysis (Pérez-Barros et al., 2008: 423). Consequently, 17 valid species of *Munida* (but see below) have had at least one record along the Pacific coast of America, from Alaska to Chile. Information related to these species (and many others) has been listed in two important recent contributions. The first deals with all species of Galatheidae and Chirostylidae known from the neotropical region (Fierro et al., 2008) and the second deals with all species of Galatheoidea worldwide (Baba et al., 2008). In these contributions, however, the record of *M. microphthalma* (a species widely distributed in the Atlantic) in the eastern Pacific is either omitted (see Fierro et al., 2008: table) or considered as questionable (see Baba et al., 2008: 128). In fact, the questionable nature of the single record of *M. microphthalma* off “Cocos Island” (Isla del Coco), Costa Rica (Faxon, 1893, 1895) in the eastern Pacific by Faxon (1893, 1895) had already been remarked upon by Hendrickx (2003: 178). As far as we know, there has been no deep water sampling around the Cocos Islands since the RV “Albatross” visited the area in 1892. On the other hand, intensive sampling off the coast of western Mexico (see Hendrickx, 2003) failed to reveal the presence or any specimen close to the original description of *M. microphthalma*.

Based on these contributions and considerations, the 16 species of *Munida* currently confirmed for the eastern Pacific are: *M. bapensis* Hendrickx, 2000; *M. debilis* Benedict, 1902; *M. curvipes* Benedict, 1902; *M. gracilipes* Faxon, 1893; *M. gregaria*; *M. hispida* Benedict, 1902; *M. macrobrachia* Hendrickx, 2003; *M. mexicana* Benedict, 1902; *M. montemaris* Bahamonde & López, 1962; *M. obesa* Faxon, 1893; *M. perlata* Benedict, 1902; *M. propinqua* Faxon, 1893; *M. quadrispina* Benedict, 1902, *M. refulgens* Faxon, 1893; *M. tenella* Benedict, 1902; and *M. williamsi* Hendrickx, 2000.

During sampling off the west coast of Baja California, Mexico, a small series of specimens of *Munida* was collected and examined. These specimens represent an additional species new to the galatheid fauna of the eastern Pacific.

## MATERIAL AND METHODS

Specimens were trawled off the coast of Baja California, in the California Current, during exploratory research cruises aimed at determining the availability of deep-water shrimp resources, in particular *Pandalus platyceros*

Brandt, 1851 (see Flores et al., 2004). The material was obtained with a commercial Otter trawl, preserved onboard in 98% ethanol and brought to the laboratory for further study.

The type material is deposited in the Regional Collection of Invertebrates (EMU), in Mazatlán, Mexico, and the Los Angeles County Museum of Natural History, Crustacea collection (LACM CR), in California, USA. Abbreviations used herein are: CL, carapace length; CLwr, carapace length without rostrum; CW, carapace width.

## TAXONOMY

### Family GALATHEIDAE Samouelle, 1819

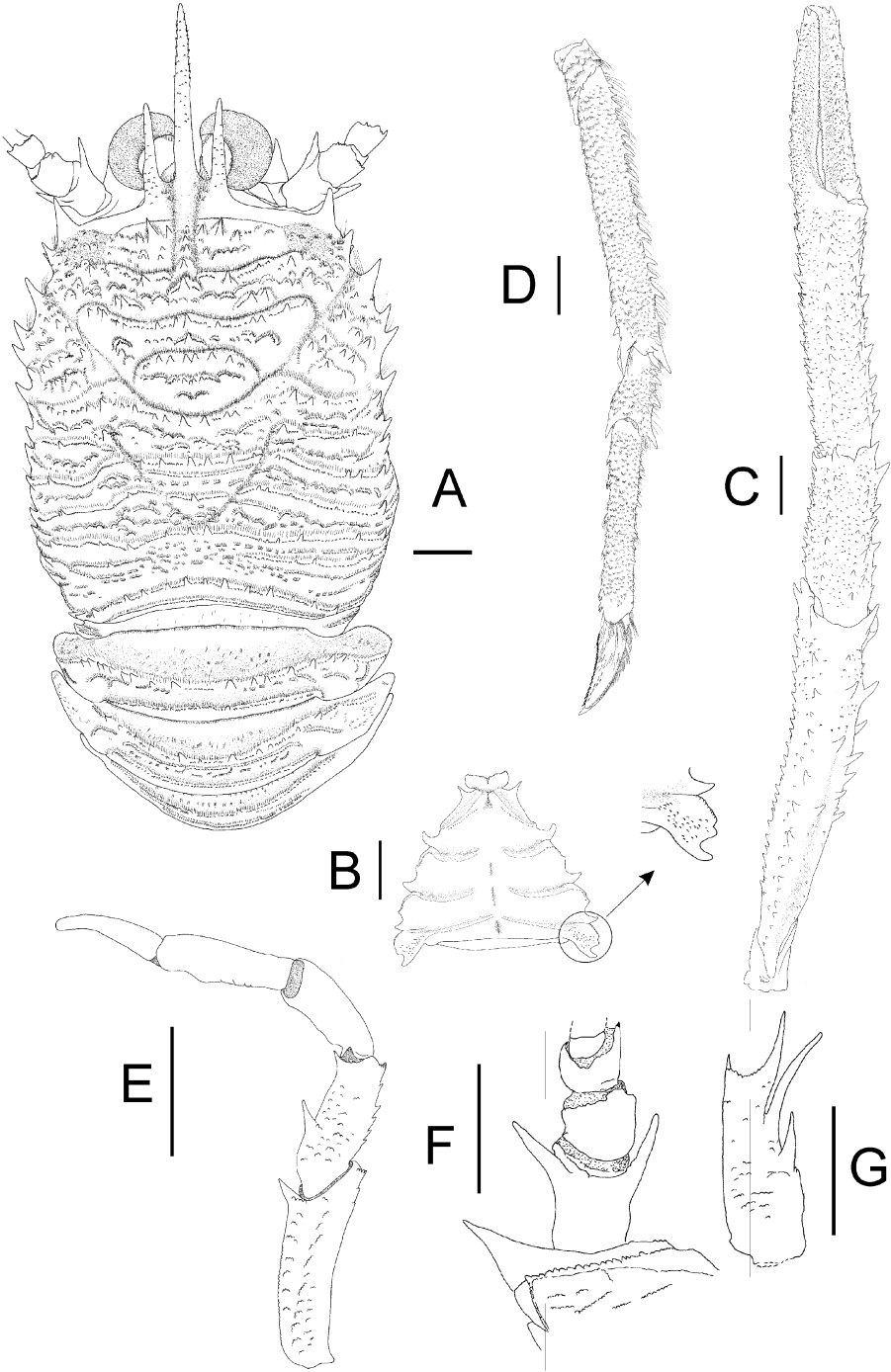
#### ***Munida lipkeholthuisi* sp. nov.**

(fig. 1)

Type material. — Holotype, off Baja California, Mexico, St. 2 (28°47.860'N 114°49.300'W), B/P "Don Agustín", 16 April 2005, ovigerous female (CL 44.6 mm; CLwr 31.6 mm; CW 28.8 mm), 93 m, Otter trawl (collector, Soledad Ibarra) (EMU-8606). Paratypes, same station, same data, one male (CL 37.4 mm; CLwr 26.2; CW 22.7 mm) (LACM CR 2005-042) and one male, damaged (CL 34.3 mm; CLwr 24.7; CW 20.2 mm) (EMU-8607).

Description. — Carapace longer than wide, little convex transversally and longitudinally. Main transverse striae strongly raised, mostly entire, fringed with dense, short setae. Secondary striae incomplete or interrupted. Gastric region slightly elevated, cervical groove deep, cardiac region narrow, surrounded by a deep groove, the latter deeper anteriorly. Pterygostomial flap long, narrow, little inflated and not visible in dorsal view, its anterior margin marked by a series of spinules, the anterior-most slightly larger than the others; flap projecting forwards and not reaching tip of antennal basal segment (lateral view), with numerous striae on anterior and posterior part, the latter separated by a shallow groove, flap without spines.

Carapace with numerous spines, spinules and small tubercles, most bordering transverse striae; one pair of strong epigastric spines beyond supraorbital spines, flanked by outer pair of smaller spines and inner pair of medium-size spines, scattered spinules contiguous to outer pair, beyond orbital margin; another pair of strong spines posterior to anterior one, forming irregular square with anterior pair, several scattered spinules on both sides of this posterior pair; protogastric region with scattered spines and tubercles forming irregular rows; mesogastric and metogastric regions with scattered spinules; longitudinal series of small spines running from base of rostrum to protogastric region;



hepatic region with scattered spinules and some tubercles. Oblique row of 2-3 pairs of postcervical spines, anteriormost spines strongest. Cardiac region well defined, anterior transverse striae bordered with 8-9 strong spines, intermediate striae with 5-6 similar spines, and posterior striae with one median spine. Pair of median, medium-size spines bordering major striae beyond cardiac groove; striae extending to branchial region, with some additional spinules. Intestinal region with well-defined, raised, posterior striae, close to posterior margin and bordered by series of 12 spines, median pair strongest.

Frontal margin almost transversal. Rostrum long, less than half length of remaining carapace, almost straight. Supraocular spines sharp, parallel to rostrum, straight, about half rostrum length, slightly overreaching anterior margin of corneas. Lateral margin feebly convex in anterior and posterior parts; carapace widest at about half of its length. Anterolateral spine sharp, situated at anterolateral angle, about half supraocular spine length, not reaching to level of sinus between rostrum and supraocular spines, followed by one hepatic spine, smaller than anterolateral. Anterior branchial margins with four spines, second and third closely-set, first strongest; posterior branchial margin with 4-6 spines or spinules; a total of 9-11 spines or spinules on entire lateral margin of carapace (excluding anterolateral).

Sternal plastron (sternites 3-7) slightly wider than long. Sternite 3 projected anteriorly, forming neck with sternite 4; sternite 4 narrow anteriorly, about half as long as wide. Sternites 4-6 separated by deep sutures, naked, without spine or tubercles except for row of small tubercles close to outer margin. Each side of sternite 7 with patch of small tubercles. Transverse ridges between fifth, sixth and seventh sternites slightly raised. Anterior ridge of second abdominal tergite with pair of median spines and row of 6-7 smaller spines on both sides, posterior ridge with median pair of smaller spines; anterior ridge of third abdominal tergite with pair of median spines and row of four smaller spines on both sides; anterior ridge of fourth abdominal tergite with pair of median spines. Eyes medium-size, cornea diameter about half rostrum length and about equal to distance between bases of anterolateral spines.

Distomesial spine of antennular basal article very short, less than half distolateral spine length, distolateral spine of median length, two lateral spines,

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Fig. 1. *Munida lipkeholthuisi* sp. nov., holotype, ovigerous female (EMU-8606). A, carapace, dorsal view; B, sternal plastron, ventral view; C, left cheliped, dorsal view (setae omitted); D, right second pereopod, lateral view; E, left third maxilliped, endopod, lateral view, setae omitted; F, anterior portion of pterygostomial flap and antennal peduncle, ventral view; G, basal antennular segment, ventral view.

proximal one short, about one third distal spine length, distal spine not reaching tip of distolateral spine.

First (basal) segment of antennal peduncle with distomesial spine moderately long, nearly reaching end of second segment (measured with peduncle along basal segment); second segment with two moderately long distal spines, lateral pointing forwards, reaching about mid-length of third segment, mesial spine of equal length, slightly pointing outwards; third segment unarmed; fourth segment with one short, sharp distolateral spine; flagellum very long, more than three times carapace length.

Ischium and merus of third maxilliped of about same length; ischium with distoventral spine; merus bearing one strong spine at about mid-length and one smaller distal spine on flexor margin; extensor margin armed with series of small spines.

Chelipeds subequal, with longitudinal rows of spines. Left cheliped little over 2.5 times as long as carapace; merus length equal to carapace length, about twice as long as carpus and 1.5 times as long as palm; fingers shorter than palm. Merus triangular in cross section, armed with four rows of strong spines on dorsal (three) and outer (one) faces; distal spines longer dorsally; ventral margin with two parallel rows of numerous short, flattened, spiny tubercles. Carpus almost round in cross section, with three rows of spines on outer face, two shorter rows of dorsal spines, and two irregular rows of smaller spines on ventral margins. Outer face of palm with three rows of spines, lower one with parallel row of similar, ventral spines; two additional, irregular rows of similar spines on dorsal margin; palm with two rows of minute spines and strong spine at base of dactyl. Fingers with numerous spines and spinules mostly arranged in dorsal and ventral rows, distally curving, ending in blunt tooth and subterminal smaller tooth; one strong, proximal, dorsal spine on dactyl; cutting edge of both fingers flattened, finely serrated; finger slightly gapping proximally.

Walking legs strong, flattened, decreasing in length posteriorly, ventral face smooth. Second pereopod about one and one half as long as CLwr; merus about two-thirds CLwr, ca 3.5 times as long as carpus, ca 1.5 times as long as propodus, about seven times as long as high; propodus twice as long as dactylus; merus with thick fringe of setae on dorsal margin, latter with one row of 15-16 spines, increasing in length distally, and one much longer, sharp distal spine; ventral margin with one long, sharp distal spine followed by two irregular rows of alternating short and medium-size spines, rows merging proximally; lower margin of inner face with rows of irregularly-set. small,

spiny tubercles. Carpus with row of four dorsal spines, largest at anterodistal angle, this row paralleled by marginal row of smaller spines on outer face; one strong ventrodiscal spine followed by cluster of spiny tubercles. Propodus compressed, with seven bifid tubercles tipped with small movable spine on ventral margin, and three small spines on dorsal margin; inner and outer faces with irregular rows of tubercles. Dactylus slightly convex, compressed, ca 25 movable spinules along flexor margin.

Third pereopod about one and one third as long as CLwr; merus about one half CLwr, ca 3.5 times as long as carpus, ca 1.5 times as long as propodus, about six times as long as high; propodus about one and one half as long as dactylus; merus with tick fringe of setae on dorsal margin, latter with one row of 12-13 spines, increasing in length distally, and one much longer, sharp distal spine; ventral margin with one long, sharp distal spine followed by two irregular rows of alternating short and medium-size spines, rows merging proximally; lower margin of inner face with rows of irregularly-set, small, spiny tubercles. Carpus with row of 4-5 dorsal spines, largest at anterodistal angle, this row paralleled by marginal row of smaller spines on outer face; one strong ventrodiscal spine followed by cluster of spiny tubercles. Propodus compressed, with seven bifid tubercles tipped with small movable spine on ventral margin, and 3-5 small spines on dorsal margin; inner and outer faces with irregular rows of tubercles. Dactylus slightly convex, compressed, ca 25 movable spinules along flexor margin.

Fourth pereopod about one and one fourth as long as CLwr; merus about 0.28 times CLwr length, ca twice as long as carpus, as long as propodus, about 3.5 times as long as high; propodus about 1.3 times as long as dactylus; merus with tick fringe of setae on dorsal margin, latter with one row of 5-6 blunt spines, increasing in length distally, and one much longer, sharp distal spine; ventral margin with irregular rows of alternating short and medium-size spines and flattened tubercles, rows merging proximally; lower margin of inner face with rows of irregularly-set, small, spiny tubercles. Carpus with row of four dorsal spines, largest at anterodistal angle, this row paralleled by marginal row of smaller spines on outer face; one strong ventrodiscal spine followed by cluster of spiny tubercles. Propodus compressed, with five bifid tubercles tipped with small movable spine on ventral margin; inner and outer faces with irregular rows of tubercles. Dactylus slightly convex, compressed, ca 25 movable spinules along flexor margin.

Etymology. — The species is named in honour of the late Prof. Lipke B. Holthuis, undoubtedly one of the greatest carcinologists of all time, for his ex-

traordinary contribution to the study of crustaceans, his encyclopedic knowledge of the group, and his charisma. The name is an arbitrary combination of his first name and his surname, used as a noun in apposition.

Distributional range. — Known only from the type locality, off the west coast of Baja California, Mexico (28°47'52"N 114°49'18"W) at a depth of 93 m.

Remarks. — The small paratype (EMU-8607) was partly damaged during sampling, yet it is fully identifiable with *Munida lipkeholthuisi* sp. nov. All three specimens of the type series have characteristics that clearly separate them from all the other species of *Munida* reported in the East Pacific.

Among the eastern Pacific species, *Munida lipkeholthuisi* sp. nov. is closest to *M. hispida* and *M. bapensis*. In all three species, the transverse striae running parallel to the posterior border of the carapace are armed with spines and spinules.

Both species can be clearly separated from *M. lipkeholthuisi* sp. nov. by several characters. As indicated by its name, *Munida hispida* is a very spinose species, and the spinal distribution on the carapace is somewhat similar to *M. lipkeholthuisi* sp. nov.; however, they appear generally smaller in the type of *M. hispida* (see Hendrickx, 2000, fig. 6). The supraocular spines are clearly divergent and the cheliped is more slender (propodus about eight times as long as wide, carpus about ten times as long as wide), while the supraocular spines are parallel and the cheliped is more massive, proportionally shorter (propodus about 4.5 times as long as wide, carpus about 6 times as long as wide) in *M. lipkeholthuisi* sp. nov.

In *M. bapensis* the supraocular spines are slightly divergent and proportionally smaller (compared to rostral length) than in *M. lipkeholthuisi* sp. nov.; the cardiac and intestinal regions are almost completely devoid of spines, except for the series parallel to the posterior margin and a pair of spines and a pair of small spinules just beyond the cervical groove (see Hendrickx, 2000, fig. 3), versus numerous transversal rows of spines and spinules all over the cardiac and intestinal regions in *M. lipkeholthuisi* sp. nov.

Among the rest of the eastern Pacific species, *M. gracilipes* features a single pair of large spines on the transverse striae running parallel to the posterior border of the carapace, whilst in the other species (i.e., *M. tenella*, *M. obesa*, *M. gregaria* (= *M. subrugosa*), *M. propinqua*, *M. perlata*, *M. curvipes*, *M. montemaris*, *M. mexicana*, *M. debilis*, *M. refulgens*, *M. williamsi*, *M. quadrispina* and *M. macrobrachia*) this striae is unarmed (see Hendrickx, 2000, 2003).



Because of its large size, *Munida lipkeholthuisi* sp. nov. has a superficial resemblance to *M. macrobrachia* but, in addition to the absence of a row of spines close to posterior margin of carapace (see supra), it differs from the latter by the presence of numerous rows of spines on the cardiac and intestinal regions, proportionally larger eyes and by the presence of strong granules on the lateral parts of sternite 7 (smooth in *M. macrobrachia*).

In eastern Pacific species of *Munida*, a patch of granules on each side of sternite 7 is present in *M. bapensis*, *M. hispida*, *M. propinqua* and *M. lipkeholthuisi* sp. nov. The sternite of *M. montemaris* is undescribed, but Hendrickx (2000: 125) suggested that this species could be a junior synonym of *M. curvipes*, a species lacking granules on sternite 7. *Munida bapensis*, *M. hispida*, *M. propinqua*, and *M. lipkeholthuisi* sp. nov. also share an antennular basal article with a very short distomesial spine. The combination of a very short distomesial spine and of strong granules on sternite 7 set this group of species apart from the rest of the eastern Pacific species of *Munida*.

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