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VERSITA

Parasitic copepods from reef grunts (Teleostei, Haemulidae) with description of a new species of *Lernanthropus* (Siphonostomatoida, Lernanthropidae) from the Mexican Caribbean

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Abstract

During a parasitological survey of the reef ichthyofauna in the Caribbean coast of Mexico, parasitic siphonostomatoid copepods were obtained from the white grunt *Haemulon plumierii* (Lacepède) and the blue striped grunt *H. sciurus* (Shaw). *Caligus haemulonis* Krøyer, 1863 has been recorded from both species of *Haemulon* in the Northwestern Tropical Atlantic, but it is reported herein for the first time from Mexico. The prevalence and intensity of infection of *C. haemulonis* has not previously been evaluated in the Caribbean grunts; during this survey, prevalence was highest in *H. sciurus*; values are similar to those found in other haemulids. *Lernanthropus chacchi* sp. nov. can be distinguished from its closest congener, *L. rathbuni* Wilson, 1922, by its female having a dorsal plate covering the entire urosome and the lack of lateral notches at the base of the modified third legs, the male has relatively longer third legs, different body proportions and ornamentation of the first and second legs. This is the third species of *Lernanthropus* known from reef grunts in the Caribbean and the second species of the genus described from Mexican waters. The infection prevalence of the new species on *H. sciurus* (24%) was higher than that known for *L. rathbuni* from other haemulids. Taxonomic illustrations of females and males of both species are also provided. Other crustacean ectoparasites included the copepod *Hatschekia* spp. and praniza larvae of a gnathid isopod.

Keywords

Crustacea, parasitic copepods, Haemulidae, *Lernanthropus chacchi* sp. nov., reef fish, Mexico

Introduction

Records of parasitic copepods of Mexican marine teleosts are relatively scarce; most of the parasitological studies have focused on endoparasitic helminths (Luque and Poulin 2007). This is particularly true in the Caribbean Sea, a region in which the parasitological research is lagging despite the high number of parasite species harbored by Caribbean fish (Bunkley-Williams and Williams 1994, Luque and Poulin 2007). Other fish metazoan parasites have been studied in the Mexican Caribbean (Aguirre-Macedo *et al*. 2002, Kohn *et al*. 2006) but data on copepods are virtually non-existent.

During a parasitological survey of the ichthyofauna of a reef system on the southern coast of the Mexican Caribbean, several individuals of the grunts *Haemulon plumierii* (Lacepède, 1802) and *H. sciurus* (Shaw, 1803) (Haemulidae) were examined. These species are common members of the reef fish communities; they are widely distributed in coastal areas of the Gulf of Mexico and the Caribbean (Hoese and Moore 1998). The copepod parasites of these species have not been hitherto studied in the Mexican sector of the western Caribbean. In this survey we provide the results of the taxonomic and parasitological survey of the crustacean ectoparasites recorded from these two teleost species. A new species of *Lernanthropus* Blainville, 1822 is described herein based on adult male and female specimens. We also report the occurrence of a species of *Caligus* collected from the same teleost species in the surveyed area. Data on the abundance, intensity, and prevalence of infection of the ectoparasitic crustaceans recorded from both haemulid species are also presented.

Materials and methods

Adult individuals of both sexes of the caligid copepod *C. haemulonis* were recovered from the parasitological ex-

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amination of 45 specimens of *Haemulon sciurus*, and 49 of *H. plumierii* from the reef system of Xcalak, State of Quintana Roo, Mexico. The fish fauna and parasites from this reef area were surveyed during several months between August 2007 and June 2008. Copepods were collected by carefully removing them from the fish body under a stereomicroscope. All specimens were fixed shortly after collection in 70% ethanol. Drawings were prepared using a camera lucida mounted on an E-200 Nikon compound microscope. Terminology of the body parts and appendages follows Ho and Lin (2004) for *Caligus* and Boxshall and Montú (1997) for *Lernanthropus*. The use of ecological and infection parameters including mean abundance and intensity, and prevalence followed Bush *et al*. (1997). Voucher specimens were deposited in the collection of Zooplankton held at El Colegio de la Frontera Sur (ECOSUR), Unidad Chetumal (ECO-CHZ), Quintana Roo, Mexico and the Collection of Parasitic Helminths (ECO-PAR) of the same institution.

Results and discussion

Order Siphonostomatoida
Family Caligidae Burmeister, 1835
Genus *Caligus* Müller, 1785

***Caligus haemulonis* Krøyer, 1863** (Figs 1 and 2)

Total length of the adult female body ranges from 3.14 to 3.27 mm in the specimens from the Mexican Caribbean. The cephalothorax is 1.31–1.37 mm long and 1.40–1.43 mm wide. The two males recorded ranged between 1.75 and 1.81 mm, the cephalothorax is 0.53–0.56 mm long and 0.49–0.51 mm wide.

Hosts: The blue striped grunt, *Haemulon sciurus* and the white grunt, *H. plumierii* (Haemulidae).

Locality: Xcalak reef system, Quintana Roo, Mexico.

Site of infection: Gills.

Type host: *Haemulon sciurus* (Haemulidae).

Infection: The infection rate parameters of *C. haemulonis* on each of the two species of *Haemulon* examined are shown in Tables I and II. In the Xcalak reef system infestation by *C. haemulonis* is clearly heavier in *H. sciurus* than in *H. plumierii*.

Material examined: One adult female from gills of *Haemulon sciurus* (Haemulidae), collected from the Xcalak reef system, Quintana Roo, Mexico, February 12, 2008, specimen undissected, mounted on semi-permanent slide sealed with Entellan®, deposited in ECO-CHZ-05630; one adult male from *H. sciurus*, same locality, March 17, 2008, specimen undissected, semi-permanent slide (ECO-CHZ-05631). One male from gills of *H. plumierii* (Haemulidae) January 31, 2008, undissected, slide deposited in ECOPA-057. One adult female from gills of *H. sciurus*, same locality, December 6, 2007, specimen undissected, semi-permanent slide (ECO-CHZ-05632).

Remarks: The genus *Caligus* currently comprises more than 250 species (Ho *et al*. 2000, Boxshall and Halsey 2004) that are ectoparasites of a wide variety of teleosts (Ho and Lin 2004) and some elasmobranchs (Kabata 1979, Tang and Newbound 2004). *Caligus haemulonis* shares with several other species of the genus a 2-segmented exopod of leg 4. The first exopodal segment of this appendage bears a long spine on the

Table I. Infection parameters of the ectoparasitic metazoans recorded from *Haemulon sciurus* (n = 45) in the southern coast of Quintana Roo, Mexico

Species	Infected fish	No. of parasites	PV (%)	MA ± SD	MI ± SD
Lernanthropus chacchi	11	22	24	0.49 ± 1.10	2.0 ± 1.41
Caligus haemulonis	6	7	13	0.16 ± 0.42	1.17 ± 0.41
Hatschekia spp.	4	5	9	0.11 ± 0.38	1.25 ± 0.5
Gnathid isopod	9	13	20	0.29 ± 0.66	1.44 ± 0.73

PV – prevalence, MA – mean abundance, MI – mean intensity, SD – standard deviation.

Table II. Infection parameters of the ectoparasitic metazoans recorded from *Haemulon plumierii* (n = 49) in the southern coast of Quintana Roo, Mexico

Species	Infected fish	No. of parasites	PV (%)	MA ± SD	MI ± SD
Lernanthropus chacchi	1	2	2	0.04 ± 1.10	2 ± 0
Caligus haemulonis	3	3	6	0.06 ± 0.42	1 ± 0
Hatschekia spp.	7	38	14	0.77 ± 0.38	5.43 ± 4.5
Gnathid isopod	1	3	2	0.06 ± 0.66	3 ± 0

PV – prevalence, MA – mean abundance, MI – mean intensity, SD – standard deviation.

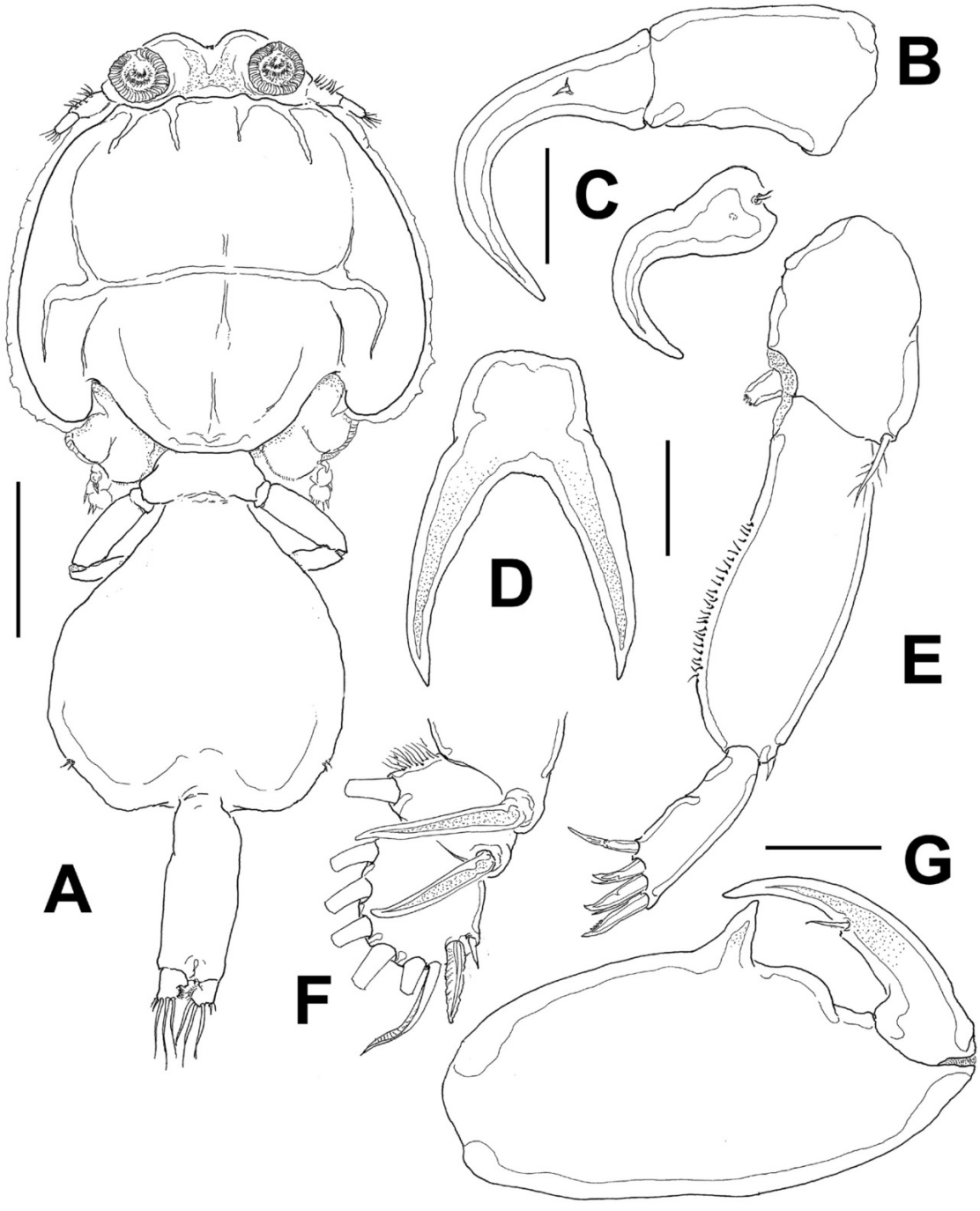

Fig. 1. *Caligus haemulonis* Krøyer, 1863, adult female from Xcalak, Quintana Roo, Mexico. **A** – habitus, dorsal view; **B** – antenna; **C** – postantennal process; **D** – sternal furca, ventral view; **E** – first leg; **F** – detail of exopod of second leg; **G** – maxilliped. Scale bars = 0.5 mm (A), 0.1 mm (B-F), 0.15 mm (G)

outer distal corner and the distal segment bears a spine on mid-length of outer margin, plus three large terminal spines (Fig. 2G). This armature pattern is known in several other American species of *Caligus* (see Cressey 1991), but *C. haemulonis* can be easily distinguished from most of its congeners by the lack of the usual three plumose setae on the posterior margin of the last exopodal segment of the first leg in both the male and female (see Figs 1E, 2E). It shares this feature only with *C. productus* Dana, 1852; these species can be separated by the different shape and size of their postantennal process and also by the shape of the antennal claw, which is weakly, bent in *C. productus* (see Cressey 1991) vs. a hook-like shape in *C. haemulonis* (Fig. 1B; Cressey 1991). Other differences between these two species are the structure and size of the sternal furca,

with relatively shorter arms in *C. haemulonis* (Figs 1D, 2C) and the shape of the female genital complex, which is strongly globose in *C. haemulonis* (Fig. 1A) and with expanded posterolateral lobes in *C. productus*. Also, the innermost terminal setal element on the last exopodal segment of the first leg is short, spiniform in *C. haemulonis* vs. a setiform condition in *C. productus*. Recently, Boxshall and El-Rashidy (2009) included both species, together with 13 more, in the *productus*-group, characterized by the loss of two and the reduction or loss of the third of the three plumose usual setae on the posterior margin of the distal exopodal segment of the first swimming leg.

The specimens examined herein largely agree with descriptive works on this species by Cressey (1991) from non-type specimens collected in the Gulf of Mexico and the Caribbean Sea and Luque and Takemoto (1996) and Boxshall and El-Rashidy (2009) from Brazil. At a size range of 3.1–3.2 mm, our female specimens are smaller than those reported by Cressey (1991) for the type specimens from the west coast of Florida (total length: 3.56 mm); they are also smaller than the females from Sepetiba Bay, Brazil as reported by Luque and Takemoto (1996) (3.33–3.92 mm) and within the size range recorded by Boxshall and El-Rashidy (2009) (2.96–3.92 mm) from specimens collected in Ubatuba, Brazil. With a total length of 1.75–1.81 mm, our male specimens of *C. haemulonis* are also smaller than those from Florida (1.86 mm) (Cressey 1991) and Brazil (2.03–2.12 mm) (Luque and Takemoto 1996). The known size range of the males of *C. haemulonis* is very wide (1.86–3.26) (Boxshall and El-Rashidy 2009), but our specimens are even smaller.

There are some additional, subtle morphological differences between the Xcalak specimens of *C. haemulonis* when compared with those described from other areas of the Tropical Atlantic; the length/width ratio of the globose female genital complex is 1.12 in our specimens (Fig. 1A), 0.9 in the Florida females (Cressey 1991, fig. 82), 1.25 in the Brazilian females from Sepetiba (Luque and Takemoto 1996, fig. 16), and 1.23 in females from Ubatuba, Brazil (Boxshall and El-Rashidy 2009). Hence, the genital complex is widest, strongly globose in the Florida specimens vs. a less expanded shape in the material from the other localities. The tines of the female sternal furca are slightly thinner in our Caribbean specimens (Fig. 1D) than those depicted by Cressey (1991) for the Florida specimens, but the proportions and the box size and shape (basally rounded) are identical. The sternal furca in Luque and Takemoto's (1996) specimens differs in having clearly curved, relatively shorter tines and a subtriangular, basally expanded box. Boxshall and El-Rashidy (2009) attributed some of these differences to styles of drawing more than actual morphological divergence among populations.

Luque and Takemoto (1996) noticed that, differing from Cressey's (1991) description of *C. haemulonis*, the first leg of their specimens from Brazil lack setules on the inner margin of the first exopodal segment of the first leg; our specimens from the Mexican Caribbean have a row of short setules as described by Cressey (1991). The outer basipodal seta of the first leg is slightly shorter in our specimens (Fig. 1E) and in the Brazilian females (Luque and Takemoto 1996, fig. 25) when compared with Cressey's (1991, fig. 86) depiction. The basipod of leg 1 is clearly more robust in the Brazilian females than in our specimens (Fig. 1E) or in those from Florida (Cressey 1991).

The males of the three groups of specimens are identical in most respects but differ slightly in the shape and proportions of the genital somite. In the Brazilian specimens, this somite has straight lateral margins, not medially expanded (Luque and Takemoto 1996, fig. 30) whereas margins are rounded in our specimens (Fig. 2A, B) and in those from Florida (Cressey 1991) and Ubatuba, Brazil (Boxshall and El-Rashidy 2009). The proportion of this somite with respect to the total body length shows some variation: 21.8% in the Florida females (Cressey 1991), 20.0% in the Brazilian specimens, and 23.6% in our specimens from the Caribbean.

This species was originally described as a parasite of the white grunt *H. sciurus* (as *H. elegans*) from the insular Caribbean (Krøyer 1863, Margolis *et al*. 1975). It has been known to occur as an ectoparasite of a wide variety of teleosts including members of the Ephippidae, Ariidae, Sparidae, Monacanthidae, Sciaenidae, and seven other families (Margolis *et al*. 1975, Cressey 1991, Chaves and Luque 1999, Boxshall and El-Rashidy 2009). In the western Caribbean it was reported only on haemulid fish including *Haemulon plumierii*, *H. macrostomum* Günther, 1859, *H. carbonarium* Poey, 1860, and *Anisotremus virginicus* Linnaeus, 1758 (Cressey 1991). In Brazilian coastal waters off Rio de Janeiro, *C. haemulonis* has been reported from the gills of other two haemulid teleosts, *H. steindachneri* (Jordan et Gilbert) and *Orthopristis ruber* (Cuvier) (Luque and Takemoto 1996). The finding of this caligid copepod from these two species of *Haemulon* in the Mexican reef areas was of course predictable but supports Cressey's (1991) assumption that haemulids are preferred hosts of *C. haemulonis* when present, particularly in highly diverse ichthyologic communities like those from coral reefs. It also reveals a modest expansion of the known geographic range of this parasitic copepod from southern Belize (Cressey 1991) to the southern sector of the Mexican Caribbean and represents the first record of the species from Mexican waters. This is also the first quantitative evaluation of the infection of *C. haemulonis* on these two Caribbean species of *Haemulon*. In Sepetiba, Brazil, Luque and Takemoto (1996) reported prevalence values of *C. haemulonis* on *H. steindachneri* (11.2%) that are similar to those found in both species examined in this survey.

Family Lernanthropidae Kabata, 1979
Genus *Lernanthropus* de Blainville, 1822

***Lernanthropus chacchi* sp. nov.** (Figs 3 and 4)

Description: Female. Total length of body 1.96–2.63 mm. Cephalic region relatively short (0.58–0.81 mm), representing

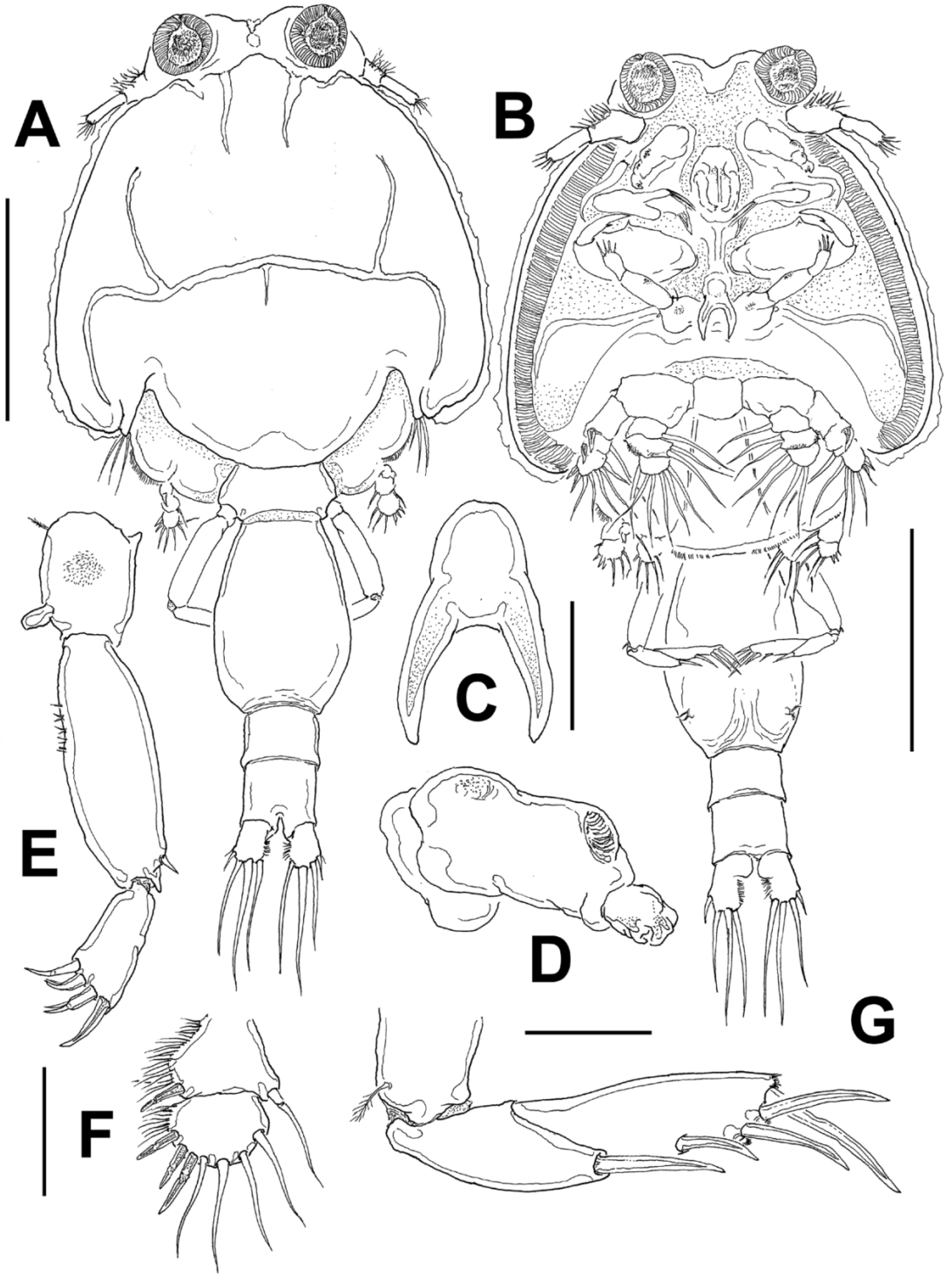

Fig. 2. *Caligus haemulonis* Krøyer, 1863, adult male from Xcalak, Quintana Roo, Mexico. **A** – habitus, dorsal view; **B** – habitus, ventral view; **C** – sternal furca, ventral view; **D** – antenna; **E** – first leg; **F** – detail of armature of exopod of third leg; **G** – distal segments of fourth leg. Scale bars = 0.5 mm (A), 0.1 mm (B-G)

30% of total body length. Cephalothorax measuring 0.62–0.86 mm. Cephalic region wide, subquadrate, with anteriormost margin truncate, without sinuses on either side of antennal area, segment delimited posteriorly from trunk by well-defined neck-like constriction. Trunk with rounded lateral margins and moderate constriction near base of third leg. Dorsal plate subcircular, wider than trunk (width: 0.84–1.1 mm, length: 0.74–0.76 mm), distal margin with conspicuous, deep

medial sinus; plate entirely covering genito-abdomen in dorsal view. Dorsal plate covered with irregular pattern of minute cuticular spinules visible on dorsal surface. Genito-abdomen subrectangular, with lateral rounded expansions and relatively short caudal rami, ornamented with two short setules near base. Egg sacs relatively short, not coiled, barely reaching beyond end of fourth legs endopods.

First antenna (Fig. 3D) six-segmented, segments well-defined, setal armature as follows: 1, 2, 1, 1, 2, 6 + 1 aes. Parabasal flagellum with large, dilated pilose base. Second antenna (Fig. 3F) represented by two segments, basal segment robust, subrectangular, weakly curved, second segment forming stout, strongly curved chitinized claw. Mandible (Fig. 3E) siphonostome, with seven minute, blunt teeth. First maxilla

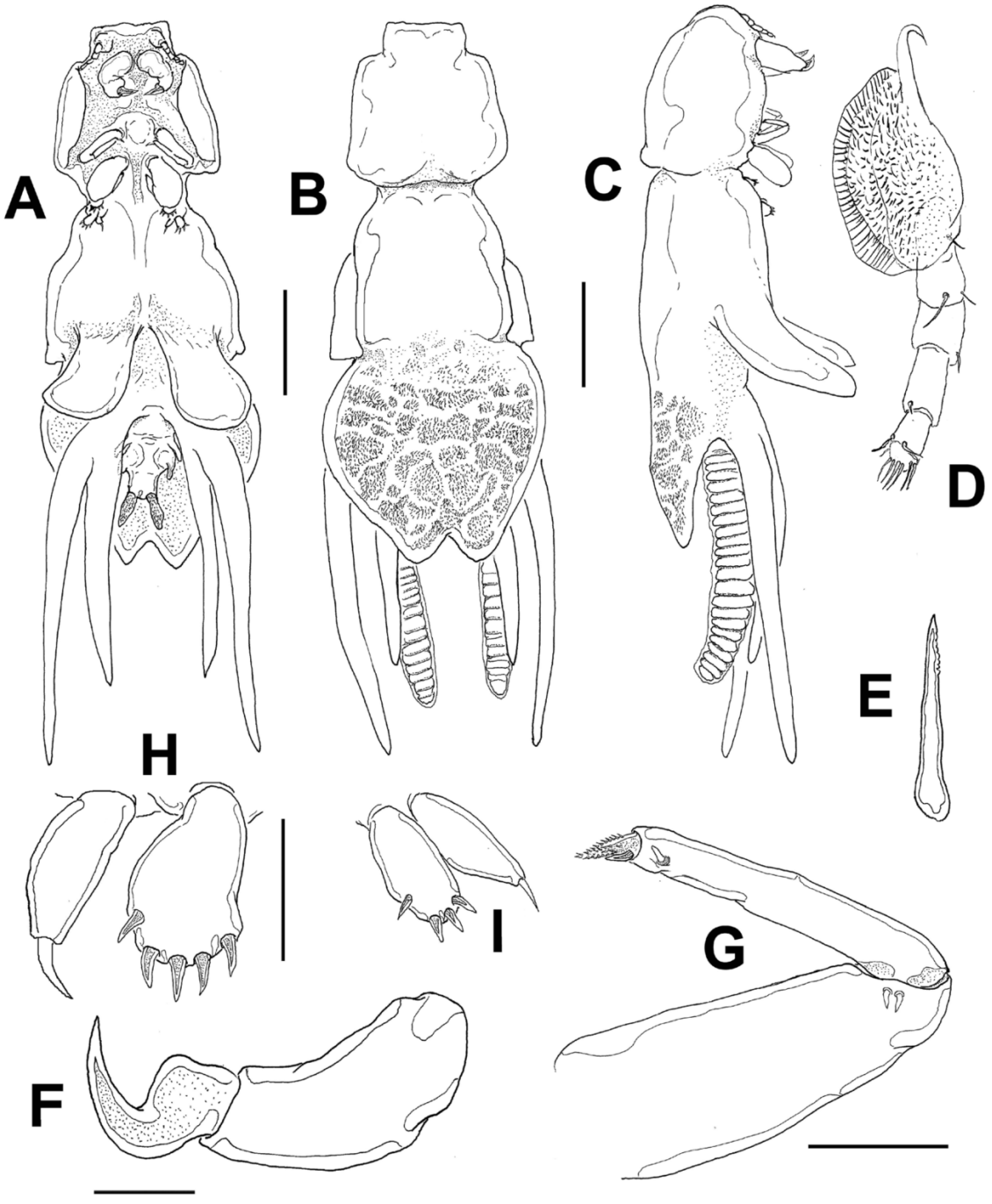

Fig. 3. *Lernanthropus chacchi* sp. nov., adult female from Xcalak, Quintana Roo, Mexico. **A** – habitus, ventral view; **B** – habitus, dorsal view; **C** – habitus, lateral view; **D** – antennule with parabasal flagellum; **E** – mandible; **F** – antenna; **G** – maxilla; **H** – first leg; **I** – second leg. Scale bars = 0.5 mm (A-C), 0.1 mm (D-G), 0.05 mm (H, I)

(Fig. 4F) bilobed, both lobes one-segmented; outer lobe subtriangular, about half as long as endopod, with short apical spine. Inner lobe oblong, with pinnate apical central spine and two short subapical spines. Second maxilla (Fig. 3G) formed by two elongate segments, proximal lacertus relatively robust, with two fang-like distal spiniform processes. Brachium slender, armed distally with wide-based, short subapical process and spiniform process armed with longitudinal rows of minute teeth. Two distal spiniform processes, one pinnate, large, plus smaller secondary, naked spine. Maxilliped with robust subrectangular proximal segment; second segment with strong distal claw.

First leg (Fig. 3H) with one-segmented rami. Exopod wide, subrectangular, with five distal, subequal chitinized spines. Endopod oblong, as long as exopod, with curved apical seta 1/3 as long as segment. Second leg (Fig. 3I) biramous, sympod with seta near base of endopod. Exopod bearing three apical spines and one smaller, subapical spine; lateral margins of ramus smooth. Endopod oblong, with small, acute distal sensilla, surface smooth. Third leg (Fig. 3A, B) flat, foliaceous, separated at base, with rounded distal margins, obliquely projected from trunk in lateral view. Measured from base to tip, third legs about as long as cephalic region. Fourth legs long, biramous, both rami cylindrical, slender, tapering to blunt point, exopod (1.8–1.9 mm) slightly longer than endopod (1.34–1.37 mm), approximately 56% of body length measured from exopod-endopod bifurcation. Fifth leg short, digitiform (Fig. 3A), inserted at base of genito-abdomen.

Male. Total body length 1.18–1.65 mm (excluding caudal rami). Cephalic region clearly wider than trunk. Trunk relatively short, roughly cylindrical. Genito-abdomen small, anal somite free, not surrounded by preceding somite. Dorsal plate tapering posteriorly, without medial dorsal sinus, anterior part wider than posterior, lateral margins folded ventrally. Cephalic appendages as in females (Fig. 4C-H), except for seven-segmented first antenna (armature: 3, 2, 3, 1, 1, 1 + aes, 6) (Fig. 4B), stronger terminal spines on first leg exopod and relatively longer endopodal terminal spine (Fig. 4G). Second leg (Fig. 4H) sympod with short spiniform element near base of exopod and short seta near base of endopod. Exopod wide, subquadrate, longer than endopod, with distal margin truncate, armed with outer cluster of three large apical spines, a cluster of smaller subapical spinules and numerous minute spinules. Endopod slender, cylindrical, with short apical seta. Third leg (Fig. 4A) biramous, rami cylindrical, slender, tapering to blunt point-like, unsegmented, exopod reaching posteriorly beyond distal margin of caudal rami; endopod reaching distal margin of caudal rami. Fourth leg biramous, cylindrical, slender, very long, exopod about 80% of total body length (0.82–1.89 mm); endopod almost as long as exopod. Caudal rami cylindrical, relatively longer than in female (Fig. 4I).

Etymology: The specific epithet is *chacchi*, a Mayan term that generically refers to grunts; it is used as a noun in apposition to emphasize the only known fish host of the new species.

Site of infestation: Gill filaments.

Host: The striped grunt, *H. sciurus* and the white grunt, *H. plumierii* (Haemulidae).

Type locality: Xcalak reef system, Quintana Roo, Mexico.

Type host: *Haemulon sciurus* (Haemulidae).

Infection: The infection parameters of the two teleost species examined are presented in Tables I and II. Infection of *L. chacchi* sp. nov. in the Xcalak reef system is more intense in *H. sciurus* than in *H. plumierii*.

Type material: Holotype adult female from gills of *Haemulon sciurus* (Haemulidae), collected from the reef system of Xcalak, Quintana Roo, Mexico, February 12, 2008 by D. González-Solís, specimen undissected, mounted on slide, deposited in ECO-CHZ-05633. Allotype male from gills of *H. sciurus*, same locality and date but different host individual, specimen undissected, mounted in glycerine, slide sealed with Entellan® (ECO-CHZ-05634). Paratypes: Adult female from gills of *H. plumierii* (Haemulidae), Xcalak, Quintana Roo, Mexico, January 29, 2008, coll. by D. González-Solís, specimen undissected, mounted on slide, deposited in ECO-CHZ-05635. Adult female from gills of *H. sciurus*, Xcalak, Quintana Roo, Mexico, February 12, 2008, specimen undissected, mounted on slide (ECO-CHZ-05636). Adult male from gills of *H. sciurus*, same locality, collected February 12, 2008, specimen undissected, mounted in glycerine, slide sealed with Entellan® (ECO-CHZ-05637).

Remarks: The family Lernanthropidae was split into different genera and many of the nearly 100 species previously assigned to *Lernanthropus* were moved to other genera; currently, there are about 119 species of *Lernanthropus* known (Boxshall and Halsey 2004). Our specimens were included in this genus because of the presence of (1) linear egg sacs, (2) fourth leg somite with single dorsal plate, (3) fourth leg endopod slightly shorter than the exopodal, and (4) non-fused members of third leg (Boxshall and Halsey 2004). The new species is most closely related to its congener *L. rathbuni* because of the similar body proportions, the subquadrate anteriormost cephalic area, the medial posterior sinus of the dorsal plate, the presence of an apical sensilla on the endopod of the second leg, the size and shape of the third legs, and the fourth legs with an endopod slightly shorter than the exopod (Wilson 1922, Luque and Takemoto 1996). Luque and Takemoto (1996) redescribed this species based on specimens collected from haemulid fish in coastal areas of Brazil and examining also specimens from the Gulf of Mexico.

The new species differs from its congener *L. rathbuni* in the lack of a deep anteriorly directed sinus at the insertion of the third leg, a character mentioned by Luque and Takemoto (1996) as relevant to recognize this species; in the new species there is a weak constriction in the same area of the body, but not a sinus. Also, our specimens lack the postantennal sinuses marked by Wilson (1922) as another distinguishing character of *L. rathbuni*; these sinuses were also depicted by Luque and Takemoto (1996, fig. 33c). In both *L. chacchi* sp. nov. and *L. rathbuni* the dorsal plate has a medial posterior sinus, but in

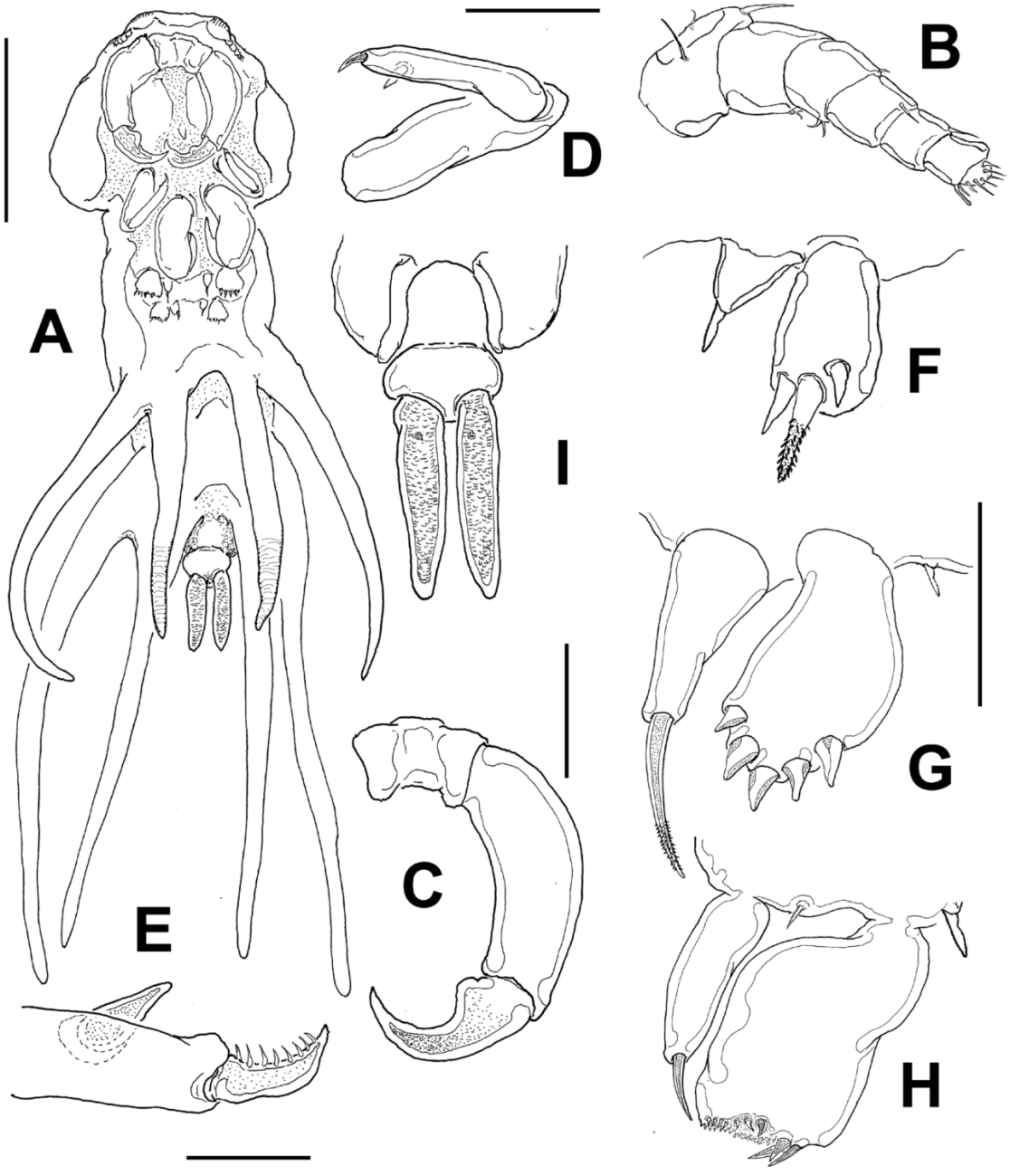

Fig. 4. *Lernanthropus chacchi* sp. nov., adult male from Xcalak, Quintana Roo, Mexico: **A** – habitus, ventral view; **B** – caudal rami, ventral view; **C** – antenna; **D** – maxilla; **E** – detail of maxilla; **F** – maxillule; **G** – first leg; **H** – second leg; **I** – caudal rami. Scale bars = 0.5 mm (A), 0.1 mm (B-D, F-I), 0.025 mm (E)

the new species the plate covers entirely the genito-abdomen in dorsal view, whereas this structure is shorter in *L. rathbuni* and the genito-abdomen is fully visible in dorsal view (see Wilson 1922, Luque and Takemoto 1996, Cavalcanti *et al.* 2006). The antennular armature appears to be lighter in *L. chacchi* sp. nov. than in *L. rathbuni*, with fewer elements in segments 2–4; other species of the genus like *L. polynemi* Richiardi, 1881 have a reduced antennular armature (Piasecki and Hayward 2002). The mandible teeth are clearly blunt in the new species whereas these are distally acute in *L. rathbuni* (Luque and Takemoto 1996); also, the surface of the exopod and endopod of the first and second legs are smooth in the new species. Both the subapical and terminal spiniform processes of the second maxilla are relatively longer in *L. rathbuni* (see Luque and Takemoto 1996, fig. 39) than in the new species. The male shows additional characters to separate these two species; in *L. rathbuni* the endopod of the first and second legs is furnished with spinules vs. a smooth condition of these appendages in *L. chacchi*; furthermore, the spinulation pattern of the second leg exopod is different in both species, with four

large distal spines in *L. rathbuni* and three in the new species. The endopod of the third leg is relatively longer in the new species (0.8 of length of exopod) than in *L. rathbuni* (0.45). Also, the fourth legs are relatively longer in *L. chacchi* sp. nov. (1.1 as long as body, excluding caudal rami) than in *L. rathbuni* (0.78). Particularly, the exopod, measured from exopod-endopod bifurcation is relatively longer in *L. rathbuni* (0.64% of total body length vs. 0.54 in the new species). The new species has also some affinities with the widely distributed *L. kroyeri*, including the posterior sinus in the dorsal plate and the general structure of the body (see Kabata 1979), but in *L. chacchi* the fourth leg endopod is shorter than the exopod, whereas the opposite pattern is found in *L. kroyeri*. In the new species the dorsal plate is wider anteriorly and tapers posteriorly, whereas the plate margins are straight in *L. kroyeri*. The males of both species are clearly different in body proportions and in the length of the third and fourth legs.

Lernanthropus rathbuni has been recorded as a parasite of other haemulid teleosts including *Orthopristis ruber* (Cuvier, 1830), *Haemulon steindachneri* (Jordan et Gilbert, 1882), and *Pomadasys corvinaeformis* (Steindachner, 1868) (Ho 1998, Cavalcanti *et al*. 2006). It has been recorded also in the lutjanid *Lutjanus griseus* in the Venezuelan Caribbean (Fuentes-Zambrano *et al*. 2003). It was recorded in Puerto Rico as a parasite of ladyfish (Elopidae) (Bunkley-Williams and Williams 1994). The new species is also a parasite of haemulid fish, so far recorded only from *H. sciurus* and *H. plumierii*, but it is expected that, as *L. rathbuni*, it has a wider host range. In other haemulids (Luque and Takemoto 1996, Cavalcanti *et al*. 2006), *L. rathbuni* has a lower prevalence (7.5–17.4%) than that recorded for *L. chacchi* on *H. sciurus* (24%) in the Mexican Caribbean. The parasitic copepods from western Caribbean reef fish deserve further study. This is the second species of the genus described from Mexican waters, after *L. corteziensis* known from the Gulf of California (Deets and Kabata 1991).

Other parasites recorded in these two species of *Haemulon* from the Mexican Caribbean included an unidentified species of *Hatschekia* and praniza larvae of a gnathid isopod. Data of infection of these crustaceans on *H. sciurus* and *H. plumierii* are presented in Tables I and II. Praniza larvae are found indistinctly in a wide variety of coastal fish (Williams and Bunkley-Williams 1977, Bosques 2004) and further studies are likely to reveal more about the host specificity of these ectosymbiotic isopods.

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