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Lepeophtheirus mondacola sp. nov. (Copepoda; Caligidae) parasitic on the shortjaw leatherjacket *Oligoplites refulgens* (Teleostei; Carangidae) in the Gulf of California, Mexico

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Abstract A new species of parasitic copepod, *Lepeophtheirus mondacola* **sp. nov.** (Siphonostomatoida; Caligidae), is described based on female and male specimens obtained from the shortjaw leatherjacket *Oligoplites refulgens* (Actinopterygii; Perciformes; Carangidae), captured in the southeastern Gulf of California off northwestern Mexico. The new species can be separated from its congeners by a combination of characters that includes: adult female with a subquadrate genital complex bearing slightly protruded posterolateral corners, two indistinct somites on the abdomen which, when combined together, is about two times longer than wide, a caudal ramus that is twice as long as it is wide, a postantennal process comprising a stout base and short claw, a dentiform process of the maxillule with two unequal tines, a maxilliped with a stout protopod and subchela, a sternal furca with a pair of bifurcated tines, a leg 3 exopod composed of 2 segments, five setae on the distal endopodal segment of leg 3 and a leg 4 exopod composed of three segments and armed with one long and two short apical spines on the distal exopodal segment; adult male with a suborbicular genital complex, an abdomen composed of one short and one long, indistinctly separated somites, a caudal ramus that is twice as long as it is wide, a stout postantennal process, a small triangular process at the base of the inner tine of the maxillulary dentiform process and a 3-segmented exopod on leg 4. *Lepeophtheirus mondacola* **sp. nov.** represents the first record of a species of *Lepeophtheirus* from a member of *Oligoplites* and the second caligid species reported from *O. refulgens*.

Keywords Crustacean · Marine fish · Eastern Pacific · Ectoparasite

Introduction

Lepeophtheirus von Nordmann, 1832, with 124 valid species (Walter & Boxshall, 2022), is the second most species-rich genus of the copepod family Caligidae Burmeister, 1835. To the best of our knowledge, only seven species of this genus have been reported from teleost fishes of the Mexican Pacific and Gulf of California. They are *L. clarionensis* Shiino, 1959 from the striped triggerfish *Xanthichthys lineopunctatus* (Hollard) (Balistidae Rafinesque); *L. dissimulatus* Wilson, 1905 from the giant hawkfish *Cirrhitus rivulatus* Valenciennes (Cirrhitidae Macleay),

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yellowtail surgeonfish *Prionurus punctatus* Gill (Acanthuridae Bonaparte), diamond turbot *Hypsopsetta guttulata* (Girard) (Pleuronectidae Rafinesque), north Pacific hake *Merluccius productus* (Ayres) (Merlucciidae Rafinesque), California flounder *Paralichthys californicus* (Ayres) (Paralichthyidae Regan), Pacific barracuda *Sphyraena argentea* Girard (Sphyraenidae Rafinesque), barred sand bass *Paralabrax nebulifer* (Girard) (Serranidae Swainson) and blue sea catfish *Ariopsis guatemalensis* (Günther) (Ariidae Bleeker); *L. eminens* Wilson, 1944 from the blue marlin *Makaira nigricans* Lacepède (Istiophoridae Rafinesque); *L. parvus* Wilson, 1908 from the California sheephead *Semicossyphus pulcher* (Ayres) (Labridae Cuvier); *L. rotundipes* Dojiri, 1979 from the vermilion rockfish *Sebastes miniatus* (Jordan & Gilbert) (Sebastidae Kaup); *L. simplex* Ho, Gómez & Fajer-Ávila, 2001 from the bullseye puffer *Sphoeroides annulatus* (Jenyns) (Tetraodontidae Bonaparte); and *L. thompsoni* Baird, 1850 from the white weakfish *Atractoscion nobilis* (Ayres) (Sciaenidae Cuvier) (Morales-Serna et al., 2012, 2014; Rodríguez-Santiago et al., 2015). During our recent survey on parasitic copepods of marine fishes in the Gulf of California, an undescribed species of *Lepeophtheirus* was found on the shortjaw leatherjacket *Oligoplites refulgens* Gilbert & Starks (Carangidae Rafinesque). The new species is described in detail below based on both sexes.

Materials and methods

Fine forceps were used to remove specimens of the new species from the skin of a total of two samples of shortjaw leatherjacket caught by hook and line in coastal waters off Mazatlán, Sinaloa (southeastern Gulf of California) in October 2018 and February 2022. Copepods were immediately fixed and preserved in 96% ethanol and later cleared in lactic acid for microscopic examination. Whole specimens were used for observations of the ventral and dorsal habitus. One specimen was dissected under a Motic dissection microscope for a detailed examination of the appendages. Body measurements of three adult females and three adult males were made with an ocular micrometer. Pencil drawings were made with the aid of a drawing tube attached to a Leica DMLB compound microscope, digitized with an Epson L355 scanner and resized and joined together in GIMP 2.10.14. Digital inking was performed with INKSCAPE 1.0 and each drawing was assembled into figure plates with GIMP. The type-material was deposited in the Copepoda collection of the Instituto de Ciencias del Mar y Limnología, Unidad Académica Mazatlán (ICML-EMUCOP), Sinaloa, Mexico. Fish classifications and names used herein conform to Froese & Pauly (2022).

Comparisons between the new species and morphologically similar species were based on published descriptions and drawings of the latter.

Order Siphonostomatoida Thorell, 1859
Family Caligidae Burmeister, 1835
Genus *Lepeophtheirus* von Nordmann, 1832
Type species by original designation *Lernaea pectoralis* Müller, 1776

Lepeophtheirus mondacola sp. nov.

Type-host: Shortjaw leatherjacket *Oligoplites refulgens* Gilbert & Starks (Carangidae).
Type-locality: Mexican Pacific, off Mazatlán Port (23°12’N, 106°26’W), Sinaloa, Mexico.
Type-material: Holotype, adult ovigerous female (ICML-EMUCOP-131018-01), collected on 13 Oct. 2018. Allotype, adult male (ICML-EMUCOP-131018-02), from the same host individual as the holotype. Paratypes, 10 adults (4 ovigerous females, 6 males) (ICML-EMUCOP-131018-03), from the same host individual as the holotype and allotype; 5 adults (2 ovigerous females, 3 males) (ICML-EMUCOP-160222-01), from a single shortjaw leatherjacket captured at the type locality on 16 Feb. 2022.
Site on host: body surface.

Etymology: The specific epithet mondacola comes from monda, the local vernacular name for the shortjaw leatherjacket, and the Latin suffix -cola, inhabitor. It is in the nominative singular, gender masculine.

Description (Figs. 1–4)
Adult female. Body length ranging from 4.22–4.66 mm (mean of 4.50 mm), excluding caudal setae (Figure 1A). Cephalothoracic shield subcircular, slightly longer than wide [length ranging from

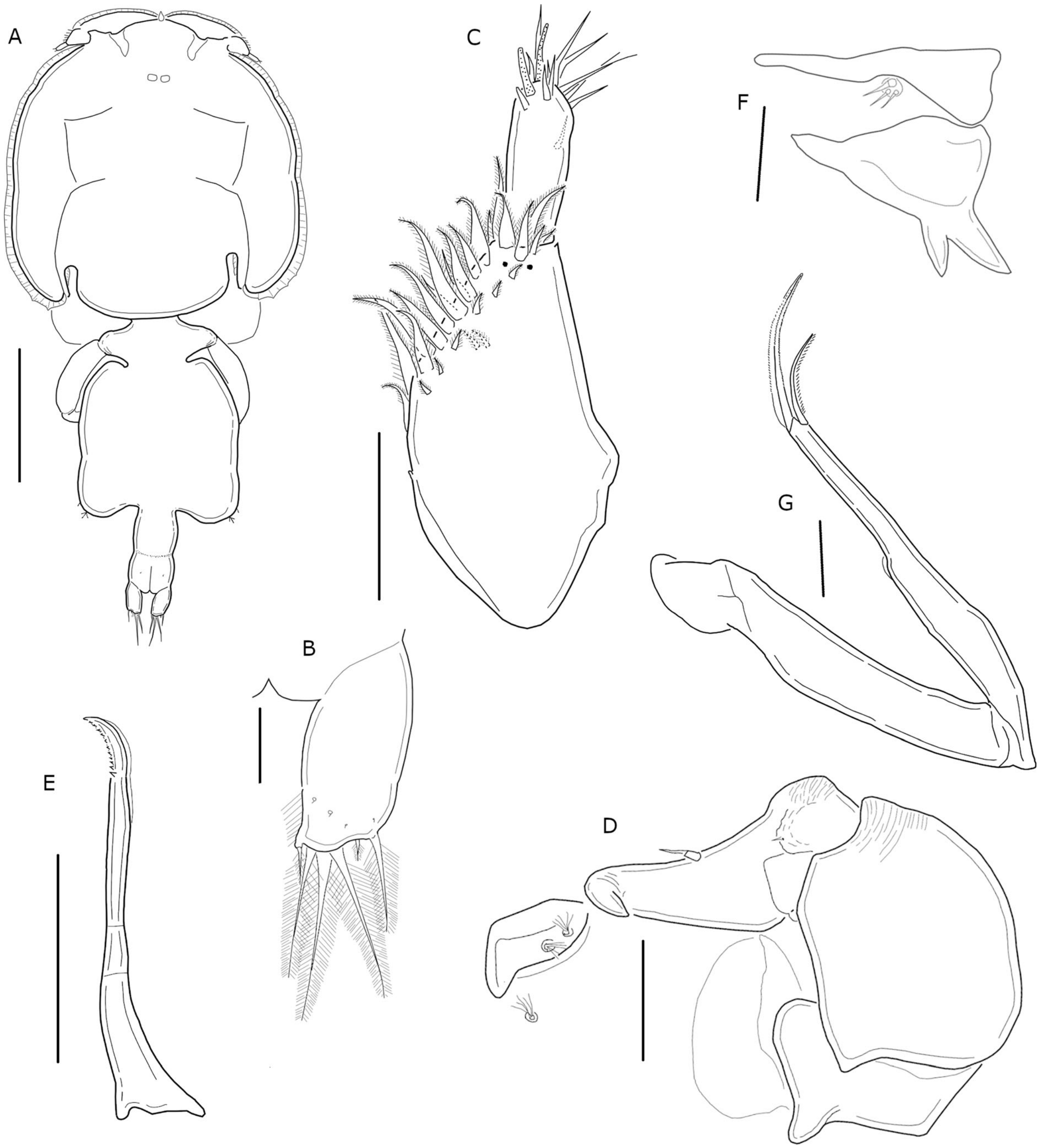

Fig. 1 *Lepeophtheirus mondacola* **sp. nov.**, adult female. (A) Habitus, dorsal view; (B) Right caudal ramus, dorsal view; (C) Left antennule, ventral view (black circles indicate position of additional setae on the male antennule); (D) Right antenna and postantennal process, ventral view; (E) Left mandible, posterior view; (F) Left maxillule, ventral view; (G) Right maxilla, anterior view. Scale bars: 1 mm for A, 0.1 mm for B–G.

2.24–2.38 mm (mean of 2.28 mm); width ranging from 1.85–2.1 mm (mean of 1.98 mm)], with paired frontal plates; posterior margin of thoracic zone extending beyond posterior limit of lateral zone; hyaline membrane present along outer margin of frontal plates and lateral zones. Free fourth pedigerous somite nearly three times wider than long [width ranging from 0.736–0.816 mm (mean of 0.785 mm); length ranging from 0.261–0.284 mm (mean of 0.275 mm)] and indistinctly separated from genital complex. Genital complex subquadrate [length ranging from 1.10–1.17 mm (mean of 1.12 mm); width ranging from 0.99–1.14 mm (mean of 1.10 mm)], with posterolateral region slightly protruded. Abdomen composed of two indistinctly separated somites, about two times longer than wide [length ranging from 0.560–0.621 mm (mean of 0.597 mm); width ranging from 0.272–0.301 mm (mean of 0.290 mm)]. Caudal ramus (Figure 1B) about two times longer than wide [length ranging from 0.224–0.248 mm (mean of 0.239 mm); width ranging from 0.112–0.124 mm (mean of 0.119 mm)], with setules along distal third of inner margin and 2 short, 1 medium and 3 long plumose setae along distal margin. Egg sacs (not figured) uniseriate.

Antennule (Figure 1C) 2-segmented. Proximal segment longer than distal one, bearing 1 tiny process on anterior margin, 1 minute process on ventrodistal margin, 23 plumose setae arrayed along anteroventral surface, 2 naked setae inserted on anterodorsal surface and 2 plumose setae located dorsally. Distal segment cylindrical, bearing 11 naked setae and 2 aesthetascs around apex, plus 1 naked seta on posterior margin.

Antenna (Figure 1D) 3-segmented, comprising coxa, basis and 1-segmented endopod incorporating distal claw. Coxa with posteriorly-directed process. Basis stout, with corrugated surface on inner distal corner. Endopod long, uncinate, bearing 1 proximal spinulate seta and 1 naked seta at mid-length of claw. Postantennal process (Figure 1D) robust, weakly curved, with 2 setulose papillae on base and 1 setulose papilla on adjacent cephalothoracic surface.

Mandible (Figure 1E) styliform, bearing distolateral hyaline membrane and 12 distomedial teeth.

Maxillule (Figure 1F) comprising anterior papilla bearing 3 small, unequal naked setae and posterior dentiform process; latter with 2 unequal tines (inner tine shorter than outer).

Maxilla (Figure 1G), brachiform, 2-segmented, composed of elongated unarmed syncoxa and slender basis. Basis with flabellum at mid-length and terminating in claw-like calamus and canna, former longer than latter, each ornamented with 1 strip of serrated membrane.

Maxilliped (Figure 2A,B) large, subchelate, 3-segmented, comprising long protopod (corpus) and robust subchela consisting of free endopodal segment (shaft) and claw. Protopod with small, semispherical process in myxal area and 2 large patches of crescentic denticles on anterior surface. Claw separated from shaft by incomplete suture, bearing 1 naked proximal seta on posterior surface.

Sternal furca (Figure 2C) with broadly divergent tines, each apically bifurcated (see Variability section below for additional details).

Legs 1–3 (Figures 2E,F and 3A–C) biramous; leg 4 (Figure 3D) uniramous. Armature formulae of legs 1 to 4 as follows (Roman and Arabic numerals indicating spines and setae, respectively):

	Coxa	Basis	Exopod	Endopod
Leg 1*	0-0	1-1	I-0; 0,III+1,3	vestigial
Leg 2	0-1	1-0	I-1; I-1; II,I,5	0-1; 0-2; 6
Leg 3*	0-1	1-0	I-1; IV,5	0-1; 5
Leg 4*	0-0	1-0	I-0; I-0; 0,III,0	absent

*Although the coxa and basis are fused to form a protopod, these segments are treated separately in this Table

Leg 1 (Figure 2E) intercoxal sclerite naked and elongate. Protopod with 1 outer and 1 inner plumose seta, plus 1 proximolateral setulose papilla. Exopod 2-segmented; first segment with inner row of setules and 1 small, outer distal spine; second segment with 3 apical spines each with serrations on anterior and posterior edges, 1 apical plumose seta as long as inner apical spine and 3 inner plumose setae; middle and inner apical spines each with 1 accessory process. Endopod vestigial, digitiform, bearing 2 small elements apically.

Leg 2 (Figure 2F) intercoxal sclerite bearing hyaline membrane distally. Coxa with 1 inner plumose seta and 1 surface sensillum. Basis with inner hyaline membrane, 1 outer naked seta, 1 long inner sensillum and hyaline membrane on posterolateral surface. Exopod 3-segmented, with hyaline membrane on posterior surface of first segment; first segment bearing 1 finely serrated, outer distal spine with pectinate membrane at base, 1 inner plumose seta and inner row of setules; second segment with 1 finely serrated, outer distal spine, 1 inner plumose seta and inner row of setules; third segment with 3 outer spines (proximal spine finely serrated; middle spine with

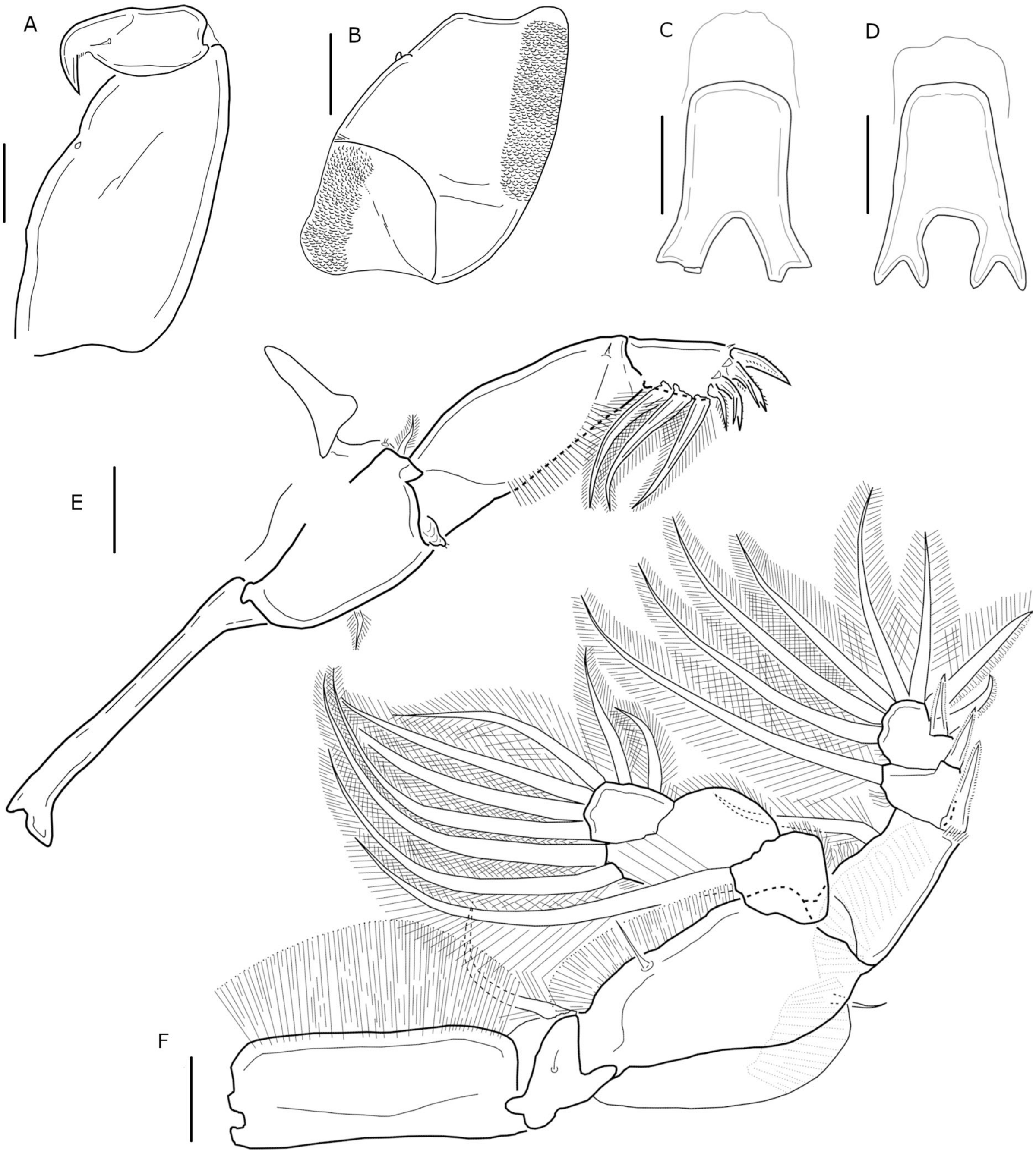

Fig. 2 *Lepeophtheirus mondacola* **sp. nov.**, adult female. (A) Right maxilliped, posteroventral view; (B) Protopod of maxilliped, anterior view; (C), (D) Sternal furca, ventral view; (E) Left leg 1, anterior view; (F) Right leg 2, anterior view. Scale bars: 0.1 mm.

outer hyaline membrane; distal spine with outer hyaline membrane and row of inner setules), 5 inner plumose setae and inner row of setules. Endopod 3-segmented; first segment with rows of outer setules and 1 inner plumose seta; second segment with rows of outer setules, 2 inner plumose setae and inner row of setules; third segment with 6 plumose setae and outer row of setules.

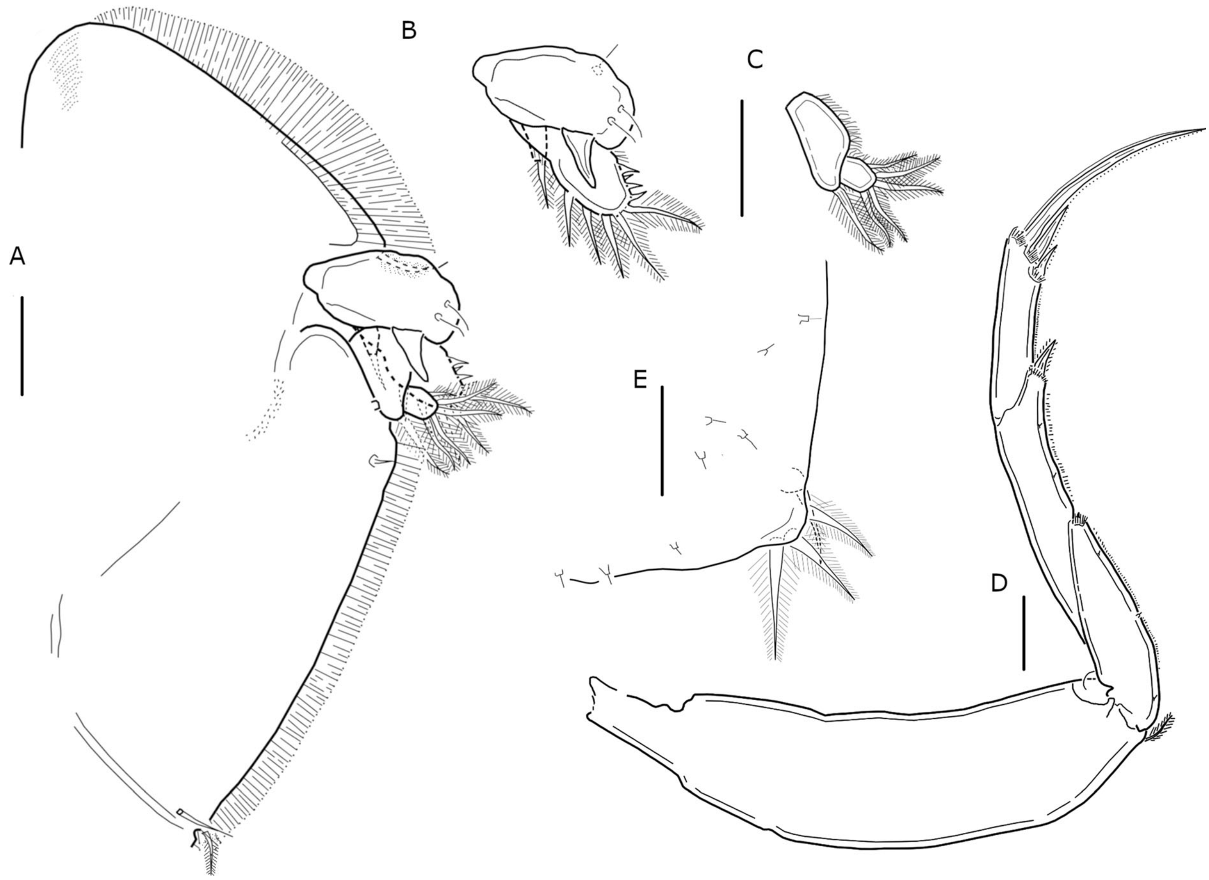

Fig. 3 *Lepeophtheirus mondacola* **sp. nov.**, adult female. (A) Left leg 3, ventral view; (B) Left leg 3 exopod, ventral view; (C) Left leg 3 endopod, ventral view; (D) Right leg 4, anterior view; (E) Leg 5, ventral view. Scale bars: 0.1 mm.

Leg 3 (Figure 3A) protopod large, modified to form apron, with 1 outer plumose seta situated near insertion of exopod, 1 inner plumose seta near large intercoxal sclerite, 2 widely separated posterior sensilla, 1 proximolateral corrugated pad on dorsal surface and marginal membrane posteriorly and along lateral margin anterior to exopod. Exopod 2-segmented (Figure 3B); first segment large, with 1 inner plumose seta, 1 stout subapical spine directed over ventral surface of second segment, 2 long ventral sensilla and 1 long dorsal sensillum; second segment with outer and inner setules proximally, 4 small, naked outer spines and 5 inner plumose setae. Endopod 2-segmented (Figure 3C); first segment with 1 inner plumose seta and row of outer setules; second segment with 5 plumose setae and setules along outer and inner margins.

Leg 4 (Figure 3D) protopod with 1 distolateral plumose seta. First exopodal segment with pectinate membrane at base of tiny, outer spine, plus serrations and several sensilla along outer margin. Second exopodal segment similar to first but with larger outer spine furnished with pectinate margins. Third exopodal segment with 3 apical pectinate spines, pectinate membrane at base of each spine and tiny serrations along outer margin; inner apical spine longest, longer than third exopodal segment; middle apical spine 1/3 length of inner spine; outer apical spine shortest, 2/3 length of middle spine.

Leg 5 situated on posterolateral corners of genital complex (Figure 1A), bearing 2 small papillae, one tipped with 1 small plumose seta and other with 3 plumose setae (Figure 3E).

Adult male. Body length ranging from 3.20–3.45 mm (mean of 3.34 mm), excluding caudal setae (Figure 4A). Cephalothoracic shield orbicular, slightly longer than wide [length ranging from 1.87–2.02 mm (mean of 1.95 mm); width ranging from 1.74–1.88 mm

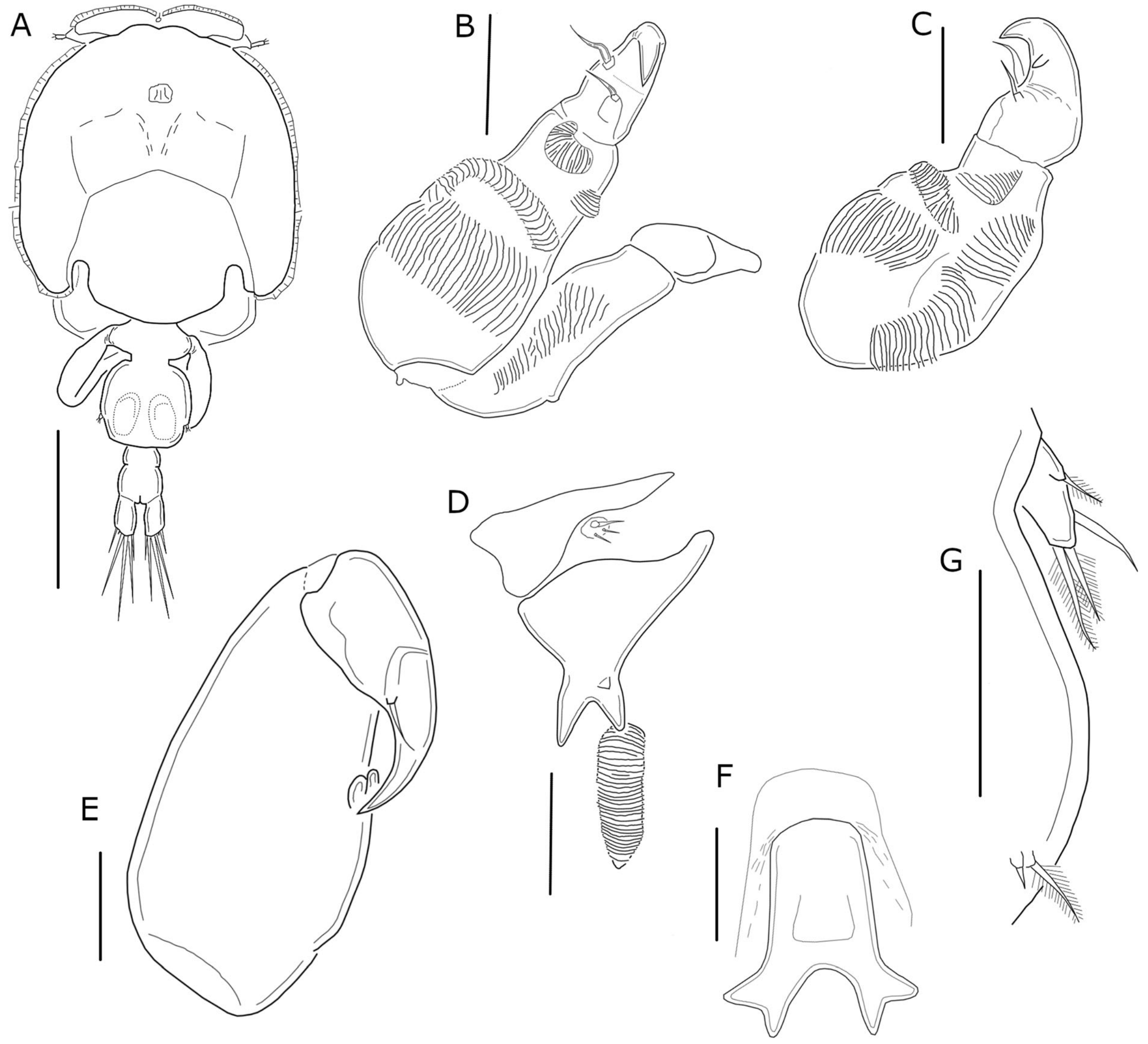

Fig. 4 *Lepeophtheirus mondacola* **sp. nov.**, adult male. (A) Habitus, dorsal view; (B) Left antenna, posteromedial view; (C) Left antenna, posterolateral view; (D) Right maxillule and postoral process, ventral view; (E) Left maxilliped, anterior view; (F) Sternal furca, ventral view; (G) Left legs 5 and 6, ventral view. Scale bars: 1 mm for A, 0.1 mm for B–G.

(mean of 1.81)], with paired frontal plates; posterior margin of thoracic zone extending beyond posterior limit of lateral zone; hyaline membrane present along outer margin of frontal plates and lateral zones. Free fourth pedigerous somite wider than long [width ranging from 0.560–0.605 mm (mean of 0.584 mm); length ranging from 0.208–0.225 mm (mean of 0.217 mm)]. Genital complex suborbicular, slightly wider than long [width ranging from 0.560–0.604 mm (mean of 0.584); length ranging from 0.480–0.518 mm (mean of 0.500 mm)]. Abdomen composed of 2 indistinctly separated somites. Caudal ramus two times longer than wide [length ranging from 0.208–0.224 mm (mean of 0.217 mm); width ranging from 0.096–0.103 mm (mean of 0.100 mm)], with 6 plumose setae and inner row of setules.

All appendages as in female, except for the following. Antennule with 2 additional setae on ventrodistal surface of proximal segment (position of each seta indicated by black circle in Figure 1C). Antenna (Figure 4B,C) 3-segmented, comprising coxa, basis and 1-segmented endopod incorporating distal claw; coxa with large corrugated pad on posterior side; basis with 4 corrugated pads on posterior surface and 2 corrugated pads on anterior side; endopod forming robust recurved claw bearing 2 proximal naked setae and 1 accessory claw. Maxillule (Figure 4D) with small triangular process at base of inner tine. Postoral process (Figure 4D) elongate and corrugated. Maxilliped (Figure 4E) with 2 rounded myxal processes on proximal segment. Sternal furca (Figure 4F) with tines slightly more divergent than those in female. Leg 5 (Figure 4G) lobate, armed with 1 naked and 3 plumose setae. Leg 6 (Figure 4G) represented by 2 papillae on outer distal corner of genital complex; outer papilla with 1 plumose seta, inner papilla with 1 spiniform element.

Variability. The tines on the sternal furca of the female specimens collected in October 2018 are weakly bifurcated at the tip and the area separating the two tines resembles a lancet arch (Figure 2C). By contrast, the tines on the sternal furca of the female specimens collected in February 2022 are deeply bifurcated and the area between the two tines resembles a round arch (Figure 2D). It is possible that the tips on the sternal furca of the female specimens collected in October 2018 were damaged when the copepods were manually removed from the host individual. Nevertheless, we consider these slight differences in the tines of the sternal furca of the new species as intraspecific variation, because variability in the tines of the sternal furca of a similar species, *Lepeophtheirus hippoglossi* (Krøyer, 1837), has been previously documented (Schram & Haug, 1988).

Remarks Apically bifurcate tines on the sternal furca can be found in species of the caligid genera *Lepeophtheirus*, *Tuxophorus* Wilson, 1908 and *Gloiopotes* Steenstrup & Lütken, 1861 (Hayes et al., 2012). Among species of *Lepeophtheirus*, this feature is present in *L. appendiculatus* Krøyer, 1863, *L. bifidus* Fraser, 1920, *L. bifurcatus* Wilson, 1905, *L. hippoglossi*, *L. longispinosus* Wilson, 1908 and *L. mondacola* **sp. nov.** *Lepeophtheirus appendiculatus* was described based on four male specimens collected on the thornback ray *Raja clavata* Linnaeus (Rajidae de Blainville) from the northern Kattegat area off Denmark (Krøyer, 1863). Wilson (1935) provided a new record of *L. appendiculatus* from the gills of the Atlantic halibut *Hippoglossus hippoglossus* (Linnaeus) (Pleuronectidae) captured in the Bering Sea, off St. George Island, Alaska. Wilson's (1935) record of *L. appendiculatus* from the Bering Sea requires confirmation, because Atlantic halibut occurs only in the north Atlantic Ocean (Froese & Pauly, 2022). We suspect that Wilson's (1935) material is conspecific with either *L. hippoglossi* or *L. bifidus*. While *L. hippoglossi* has been reported primarily on the Atlantic halibut and occasionally on other flatfish hosts (e.g., on the brill *Scophthalmus rhombus* (Linnaeus) (Scophthalmidae) and Greenland halibut *Reinhardtius hippoglossoides* (Walbaum) (Pleuronectidae)) from Greenland, Iceland, the Barents Sea, the Atlantic coast of the U.S.A. and along the European coast (Kabata, 1979), Markevich (1956) recorded *L. hippoglossi* (the host species was not explicitly given) from the Bering Sea and Bering Island. *Lepeophtheirus bifidus* was described from the skin of the rock sole *Lepidopsetta bilineata* (Ayres) (Pleuronectidae) from Vancouver Island, Canada (Fraser, 1920), and it was later reported on two other pleuronectid flatfishes, namely English sole *Parophrys vetulus* Girard and curlfin sole *Pleuronichthys decurrens* Jordan & Gilbert, from the Pacific coast of Canada (Bere, 1930; Kabata, 1988). Although Ho (1975) reported *L. bifidus* from the diamond turbot and California flounder in Anaheim Bay, California, Kalman (2006) suggested that Ho's material is likely conspecific with *L. bifurcatus*. The latter species was described based on two females collected from the Pacific sand sole *Psettichthys melanostictus* (Girard) (Pleuronectidae) captured in San Francisco Bay, California (Wilson 1905). Kalman (2006) provided new records of *L. bifurcatus* on the California flounder and hornyhead turbot *Pleuronichthys verticalis* Jordan & Gilbert (Pleuronectidae) in Santa Monica Bay, California. *Lepeophtheirus longispinosus* was described from the gills of the smooth hammerhead *Sphyrna zygaena* (Linnaeus) (Sphyrnidae Bonaparte) captured in the Atlantic Ocean off North Carolina, U.S.A. (Wilson, 1908). This copepod species was later reported on the bull shark *Carcharhinus leucas* (Valenciennes) (Carcharhinidae Jordan & Evermann) and shortnose spurdog *Squalus megalops* (MacLeay) (Squalidae de Blainville) captured off South Africa (Kensley & Grindley, 1973; Oldewage, 1992).

Lepeophtheirus appendiculatus can be distinguished from *L. mondacola* **sp. nov.** by the longer postantennal process, longer tines on the maxillulary dentiform process, a 2-segmented exopod on leg 4, distinct posterolateral lobes on the genital complex, a single abdominal somite and a shorter caudal ramus in the male (Krøyer, 1863). *Lepeophtheirus hippoglossi* differs from *L. mondacola* **sp. nov.** by having a considerably larger body size (9.60–14.30 mm vs. 4.22–4.66 mm for ovigerous females; 3.90–7.20 mm vs. 3.20–3.45 mm for males), one short abdominal somite, a relatively shorter caudal ramus, a 3-segmented exopod and six setae on the distal endopodal segment of leg 3 and a shorter inner apical spine on the distal exopodal segment of leg 4 in both sexes. In addition, the female of *L. hippoglossi* has a proportionately longer genital complex, a slimmer antennal claw and apically rounded tines on the maxillulary dentiform process and the male has two flanges (vs. one accessory claw) on the antennal claw, a longer process at the base of the inner tine on the maxillulary dentiform process, two to three setae on leg 5 and three setae on leg 6 (Wilson, 1905; Kabata, 1979; Schram & Haug, 1988). *Lepeophtheirus bifidus* can be delineated from *L. mondacola* **sp. nov.** by having one short abdominal somite, a relatively shorter caudal ramus, a longer tip on the postantennal process, a longer endopod on leg 1, a slimmer first exopodal segment on leg 3 and a shorter inner apical spine on the distal exopodal segment of leg 4 in both sexes. Moreover, the female of *L. bifidus* has an orbicular genital complex, a proximal semispherical knob and subequal tines on the maxillulary dentiform process, broader tines on the sternal furca and three setae on leg 5 and the male has thin flanges on either side of the tip of the antennal claw, a long, slender process medial to the tines on the maxillulary dentiform process, unequal tines on the sternal furca and a lobate leg 5 armed with three setae (Kabata, 1973). *Lepeophtheirus bifurcatus* can be differentiated from *L. mondacola* **sp. nov.** by having a genital complex that is longer than wide and is tapered anteriorly, an abdomen that is composed of a single short somite, a shorter caudal ramus, a slimmer antennal claw, a pair of widely separated, subequal tines on the maxillulary dentiform process, a slimmer protopod and subchela on the maxilliped and one short and two long apical spines on the distal exopodal segment of leg 4 in the female (Wilson, 1905). *Lepeophtheirus longispinosus* differs from *L. mondacola* **sp. nov.** by having an orbicular genital complex, a single abdominal somite, a long, slim process on the antennal coxa, a long, slim claw on the antenna and postantennal process, one short and one long, thin process on the maxillule, one apical claw on the distal segment of the maxilla, the bifurcate tines on the sternal furca each consisting of a long, spatulate outer branch and a short, pointed inner branch, a long endopod on leg 1, six setae on the distal endopodal segment of leg 3 and a 2-segmented leg 4 exopod in the female (Wilson, 1908; Kensley & Grindley, 1973).

Discussion

Five valid species of *Oligoplites* are recognized: *O. altus* (Günther), *O. palometa* (Cuvier), *O. refulgens*, *O. saliens* (Bloch) and *O. saurus* (Bloch & Schneider) (Froese & Pauly, 2022). *Oligoplites altus* and *O. refulgens* can be found in coastal waters of the eastern Pacific, ranging from Mexico to Peru. *Oligoplites palometa* and *O. saliens* inhabit coastal waters of the western Atlantic, ranging from Guatemala to Brazil for *O. palometa* and from Honduras to Uruguay for *O. saliens*. *Oligoplites saurus* occurs in marine and brackish waters of the western Atlantic (from Maine, U.S.A. and the Gulf of Mexico to Uruguay) and eastern Pacific (from Baja California, Mexico to Ecuador) (Froese & Pauly, 2022). With the discovery of *Lepeophtheirus mondacola* **sp. nov.** on *O. refulgens*, a total of eight species of caligid copepods have been reported from species of *Oligoplites* (Table 1). Five of the eight caligid species (*Caligus bonito* Wilson, 1905, *Caligus robustus* Bassett-Smith, 1898, *Caligus rufimaculatus* Wilson, 1905, *Metacaligus rufus* (Wilson, 1908) and *Tuxophorus caligodes* Wilson, 1908) were found on a total of three species of *Oligoplites* captured off Brazil. Two of the three remaining caligid species (*Caligus asperimanus* Pearse, 1951 and *Caligus mutabilis* Wilson, 1905) have been reported from a total of three species of *Oligoplites* from the Pacific coast of Mexico. *Oligoplites palometa* harbors the most caligid species (five), followed by *O. saliens* and *O. saurus* each hosting four caligid taxa. *Lepeophtheirus mondacola* **sp. nov.** represents the first record of a species of *Lepeophtheirus* from a member of *Oligoplites* and the second caligid species reported from *O. refulgens*. The absence of species of *Lepeophtheirus* in Santos-Bustos et al.'s (2018) parasite survey of 94 *O. altus*, 260 *O. saurus* and 114 *O. refulgens* samples obtained from commercial fishermen plying the waters off San Blas, Nayarit to Zapotalito, Oaxaca

Table 1 Caligid copepods reported from species of *Oligoplites* Gill, 1863.

Caligid species	Host species	Locality	References
Caligus asperimanus Pearse, 1951	*O. altus* (Günther, 1868)	Pacific coast of Mexico	Santos-Bustos et al. (2018)
Caligus bonito Wilson, 1905	*O. palometa* (Cuvier, 1832)	Brazil	Takemoto & Luque (2002)
	O. saurus (Bloch & Schneider, 1801)	Gulf of Mexico	Bere (1936)
Caligus mutabilis Wilson, 1905	*O. altus*	Pacific coast of Mexico	Santos-Bustos et al. (2018)
	O. refulgens (Gilbert & Starks, 1904)	Pacific coast of Mexico	Santos-Bustos et al. (2018)
	O. saurus	Pacific coast of Mexico	Santos-Bustos et al. (2018)
Caligus robustus Bassett-Smith, 1898*	*O. palometa*	Brazil	Takemoto & Luque (2002)
	O. saliens (Bloch, 1793)	Brazil	Carvalho (1956); Takemoto & Luque (2002)
	O. saurus	Brazil	Takemoto & Luque (2002)
Caligus rufimaculatus Wilson, 1905	*O. palometa*	Brazil	Takemoto & Luque (2002)
	O. saliens	Brazil	Takemoto & Luque (2002)
Lepeophtheirus mondacola **sp. nov.**	*O. refulgens*	Gulf of California	This study
Metacaligus rufus (Wilson, 1908)	*O. palometa*	Brazil	Takemoto & Luque (2002)
	O. saliens	Brazil	Takemoto & Luque (2002)
Tuxophorus caligodes Wilson, 1908	*O. palometa*	Brazil	Takemoto & Luque (2002)
	O. saliens	Brazil	Takemoto & Luque (2002)
	O. saurus	Brazil	Takemoto & Luque (2002)

*Reported as *Caligus oligoplitisi* Carvalho, 1956 by Carvalho (1956).

in Mexico suggests that *L. mondacola* **sp. nov.** is host specific to *O. refulgens* and it is restricted to the Gulf of California.

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Declarations

Conflict of interest The authors declare that they have no conflict of interest**.**

Ethical Approval Not applicable.

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