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LEPEOPHTHEIRUS DISSIMULATUS WILSON 1905 AND *LEPEOPHTHEIRUS ZBIGNIEWI* NEW SPECIES (COPEPODA: CALIGIDAE) PARASITES OF INSHORE FISHES FROM THE PACIFIC COAST OF CHILE, SOUTH AMERICA

Raúl Castro Romero and Hernán Baeza Kuroki

ABSTRACT

Lepeophtheirus dissimulatus Wilson, 1905, new host species and new record from Chile, and *Lepeophtheirus zbigniewi* new species (Copepoda: Caligidae) are described and illustrated. These copepods are parasites of inshore fishes of the coastal waters of Chile.

The first record of the genus *Lepeophtheirus* Nordmann, 1832, from the Chilean waters was published by Edwards (1840), who described under the name *Caligus ornatus* a species he recognized as belonging to Nordmann's *Lepeophtheirus*. Transferred to *Lepeophtheirus* by Bassett-Smith (1899), this species was eventually synonymized with *L. nordmanni* (Edwards, 1837) by Stuardo (1958).

Other species of *Lepeophtheirus* described from Chile are: *L. chilensis* Wilson, 1905, found on a "ray" and on *Sebastes* sp. *L. interitus* Wilson, 1921, from *Polyprion oxygeneios*; *L. yanezi* Stuardo and Fagetti, 1961, from *Genypterus maculatus* and *G. chilensis* and *L. selkirki* Atria, 1969, from *Hectoria oxygeneios*.

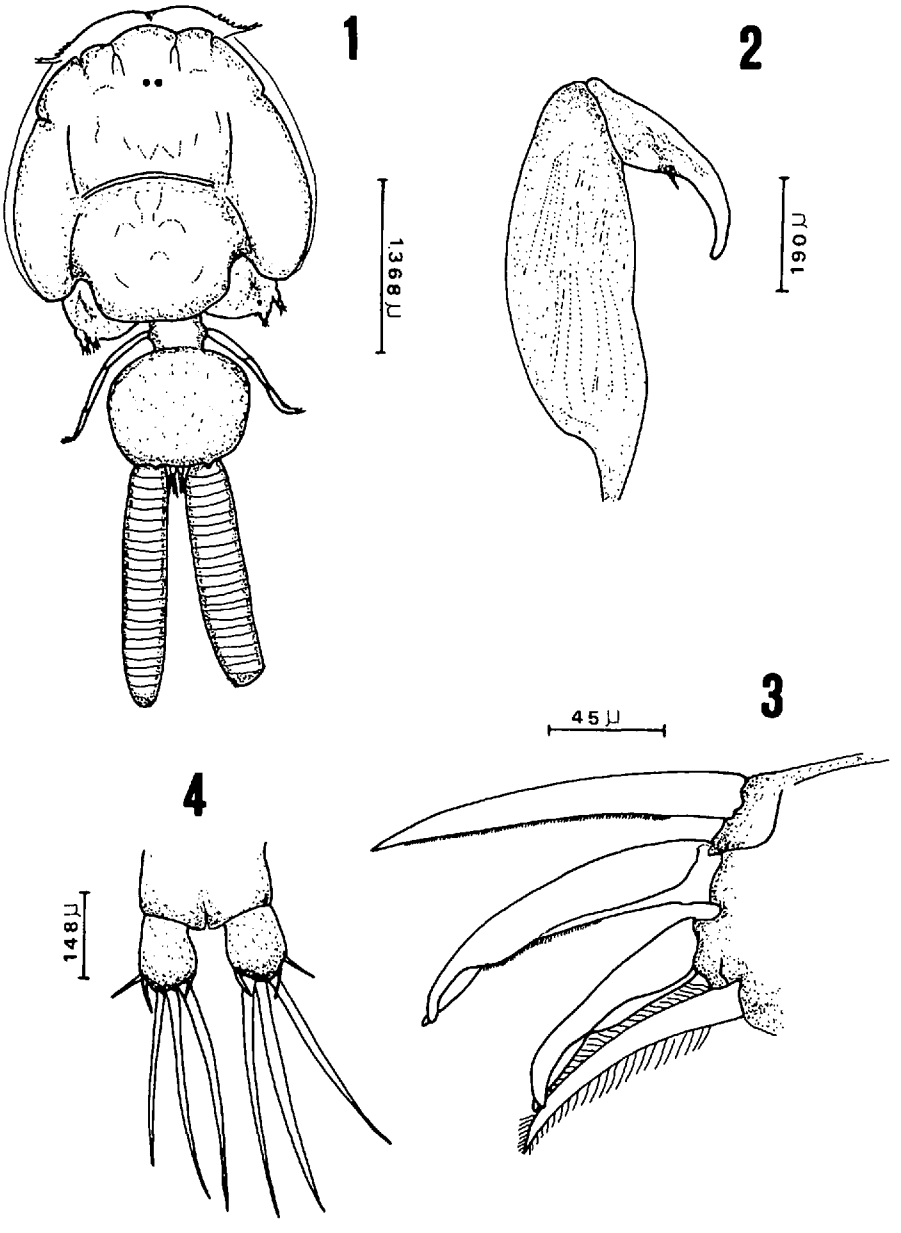
This paper presents the first record of *L. dissimulatus* Wilson, 1905, from Chile and on a new host species. Also a new species of *Lepeophtheirus* from a Chilean fish is described.

Lepeophtheirus dissimulatus Wilson, 1905
Figures 1–7

Record of Specimens.—12 females.
Host.—*Pimelometopon maculatus* (Perez).
Habitat.—All the corporal surface.
Locality.—Antofagasta, Chile (23°39'S; 70°25'W). The species was deposited in Museo Nacional de Historia Natural de Chile. Reg. No. MNHN 15018.
Previous Records.—The host range and the distribution of this species were summarized by Lewis (1967), whose list of hosts, with some additions, is presented below.

Distribution and Hosts.—ATLANTIC: Bermuda, *Epinephelus morio*, Wilson (1905); *Mycteroperca apua*, Linton (1907); *Thynnus pelamys*, Heegaard (1943). Dry Tortugas, *Lactophrys triqueter*, Wilson (1935). Mauritania, *Labrus* sp., Brian (1924). PACIFIC: Galapagos Islands, *Epinephelus labriformis*, Wilson (1905); *Mycteroperca* sp., Heegaard (1943); *Mycteroperca olfax*, Wilson (1937); *Mycteroperca xenarcha*, Wilson (1937); *Cratinus agassizii*, Wilson (1937); *Paralabrax humeralis*, Wilson (1937). EASTERN PACIFIC: *Bodianus diplotaenia*, Shiino (1959); *Epinephelus labrifrons*, Shiino (1959); *Merluccius productus*, Shiino (1959); *Paralichthys californiensis*, Shiino (1959); *Hypsopsetta guttulata*, Shiino (1959); *Sphyraena argentea*, Shiino (1959); *Paralabrax nebulifer*, Shiino (1959); *Spheroides annulatus*, Shiino (1959); *Galeichthys guatemalensis*, Causey (1960); *Gadus macrocephalus*, Lewis (1964). HAWAII: *Acanthurus olivaceus*, Lewis (1964); *Acanthurus dussumieri*, Lewis (1964); *Acanthurus triosteus sandvicensis*, Lewis (1964); *Zebrosoma flavescens*, Lewis (1964); *Naso hexacanthus*, Lewis (1964); *Chaetodon quadrimaculatus*, Lewis (1964); *Perupeneus cyclostomus*, Lewis (1967).

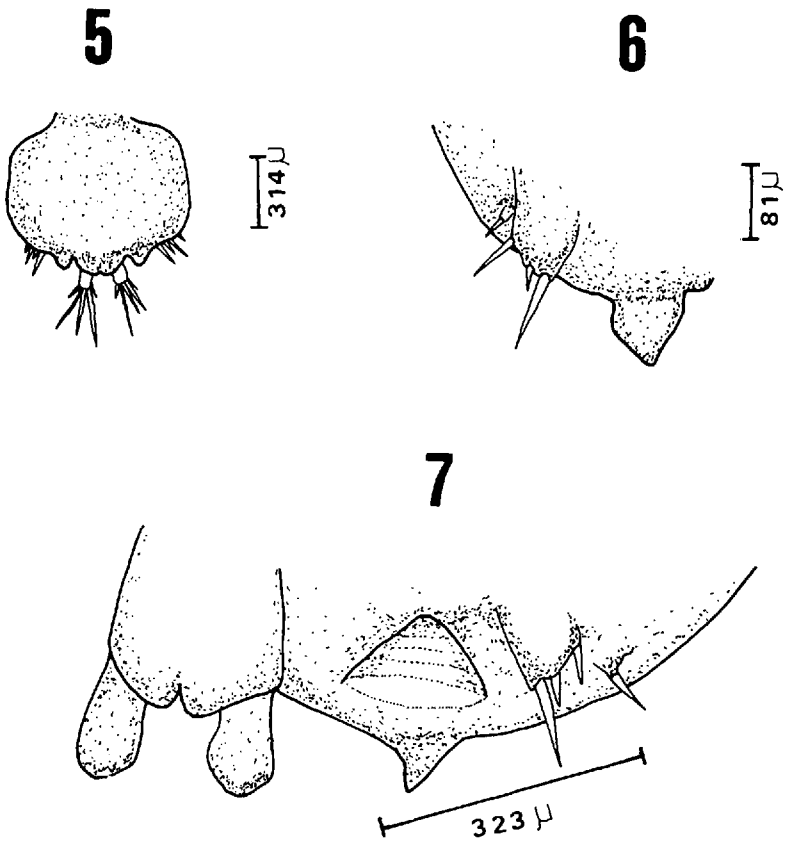
This paper extends the distributional range of *L. dissimulatus* to the South Pacific as well as adding another name to the host list.



Figures 1–4. *Lepeophtheirus dissimulatus*, female: 1, Entire, dorsal; 2, Maxilliped, lateral; 3, First leg, tip of exopod; 4, Posterior end of abdomen and uropods.

Comments.—The specimens collected in Chile are clearly conspecific with those described by Wilson (1905) from Galapagos Islands and later re-examined by Lewis (1964), who also had at his disposal additional material from Hawaii.

In particular, the posterior margin of the genital complex bears triangular lobes, one on each side close to the base of the abdomen. The fifth legs in Chilean specimens, as well as in the Galapagos and Hawaiian material, are very similar.



Figures 5–7. *Lepeophtheirus dissimulatus*, female: 5, Juvenile female, posterior half; 6, Fifth leg and posterior outgrowth of genital complex, ventral; 7, Same, showing oviduct orifice and point of attachment of egg sac.

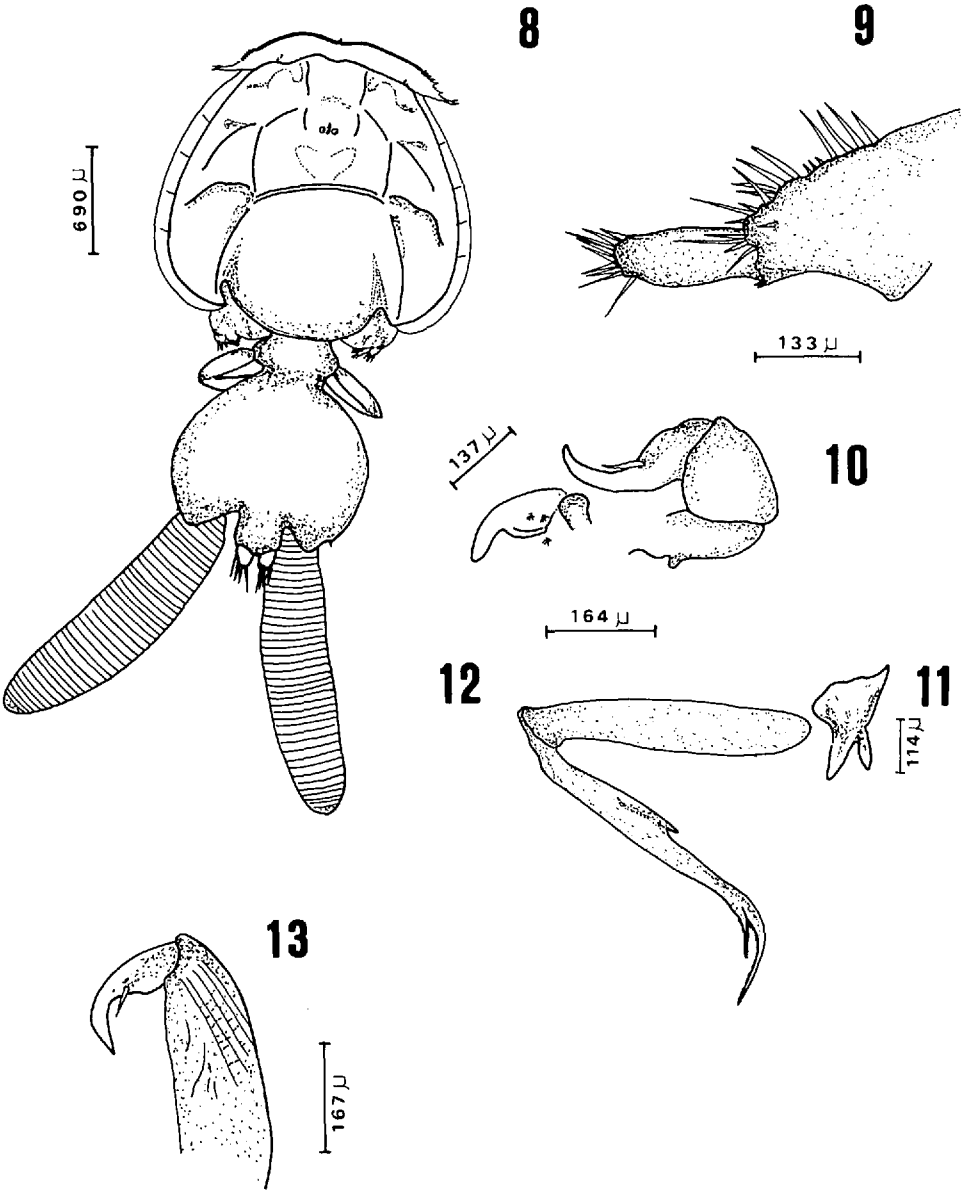
Those from Chile are more angular than the rather rounded fifth legs shown by Lewis (1964, fig. 11e) for his Hawaiian specimens.

Dimensions in mm based on 12 specimens: Cephalothorax, length 2.46 (range 2.30–2.60); width 2.34 (range 2.06–2.54). Fourth leg-bearing segment, length 0.25 (range 0.24–0.30); width 0.56 (range 1.15–1.39). Genital segment, length 0.93 (range 0.78–1.09); width 1.24 (range 1.15–1.39). Abdomen, length 0.26 (range 0.24–0.28); width 0.24 (range 0.22–0.24). Egg sac, length 1.17 (range 1.15–2.24). Total length 3.92.

The size of the specimens described by Wilson, 1905, is within the size range (minimum-maximum) of the specimens captured from the inshore fishes of the Pacific coast of Chile.

Lepeophtheirus zbigniewi new species
Figures 8–32

Record of Specimens.—Twenty females and one male were taken in Taltal, Chile (25°25'S; 70°29'W) on *Auchenionchus microcirrhis* (Val); five females were taken off Isla Santa María, Chile (23°39'S; 70°25'W) on *Auchenionchus microcirrhis* (Val). One female became the holotype of the species and is deposited in Museo



Figures 8–13. *Lepeophtheirus zbigniewi* new species, female: 8, Entire, dorsal; 9, First antenna, ventral; 10, Second antenna and postantennary process, ventral; 11, First maxilla, ventral; 12, Second maxilla, ventral; 13, Maxilliped, lateral.

Nacional de Historia Natural de Chile, Reg. No. MNHN 15015; allotype male, Reg. No. MNHN 15016; paratype female, Reg. No. MNHN 15017.

Host.—*Auchenionchus microcirrhis* (Val), vernacular name "chalaco."

Habitat.—Corporal surface; concentrate in the cephalic area.

Method.—The specimens were fixed and conserved in neutralized Formalin (8%).

The appendages were drawn out, cleared and studied as whole mounts in glycerine. Figures were drawn with the aid of a camera lucida.

Description.—Female (Fig. 8). Cephalothorax suborbicular, its length more than half of total length; cephalic and thoracic zones of about equal length, posterior sinuses shallow, posterior tips of lateral zones not protruding beyond posterior margin of thoracic zone. Fourth pedigerous segment narrow (about ¼ of maximum cephalothorax width), indistinctly delimited from genital complex. Latter subcircular, its width ⅔ that of cephalothorax; posterior margin of complex forming rounded lobes, one on each side of abdomen, their tips about level with the posterior margin of abdomen. Uropods (Fig. 25) subquadrangular, with distolateral corners truncated; length of uropods somewhat less than of abdomen.

Dimensions (in mm) based on 18 specimens: Cephalothorax, length 2.02 (range 1.82–2.12); width 1.96 (range 1.87–2.12). Fourth leg-bearing segment, length 0.28 (range 0.24–0.48); width 0.54 (range 0.54–0.54). Genital complex, length 1.05 (range 0.91–1.21); width 1.22 (range 1.09–1.33). Abdomen, length 0.27 (range 0.24–0.30); width 0.35 (range 0.34–0.39). Total length 3.62.

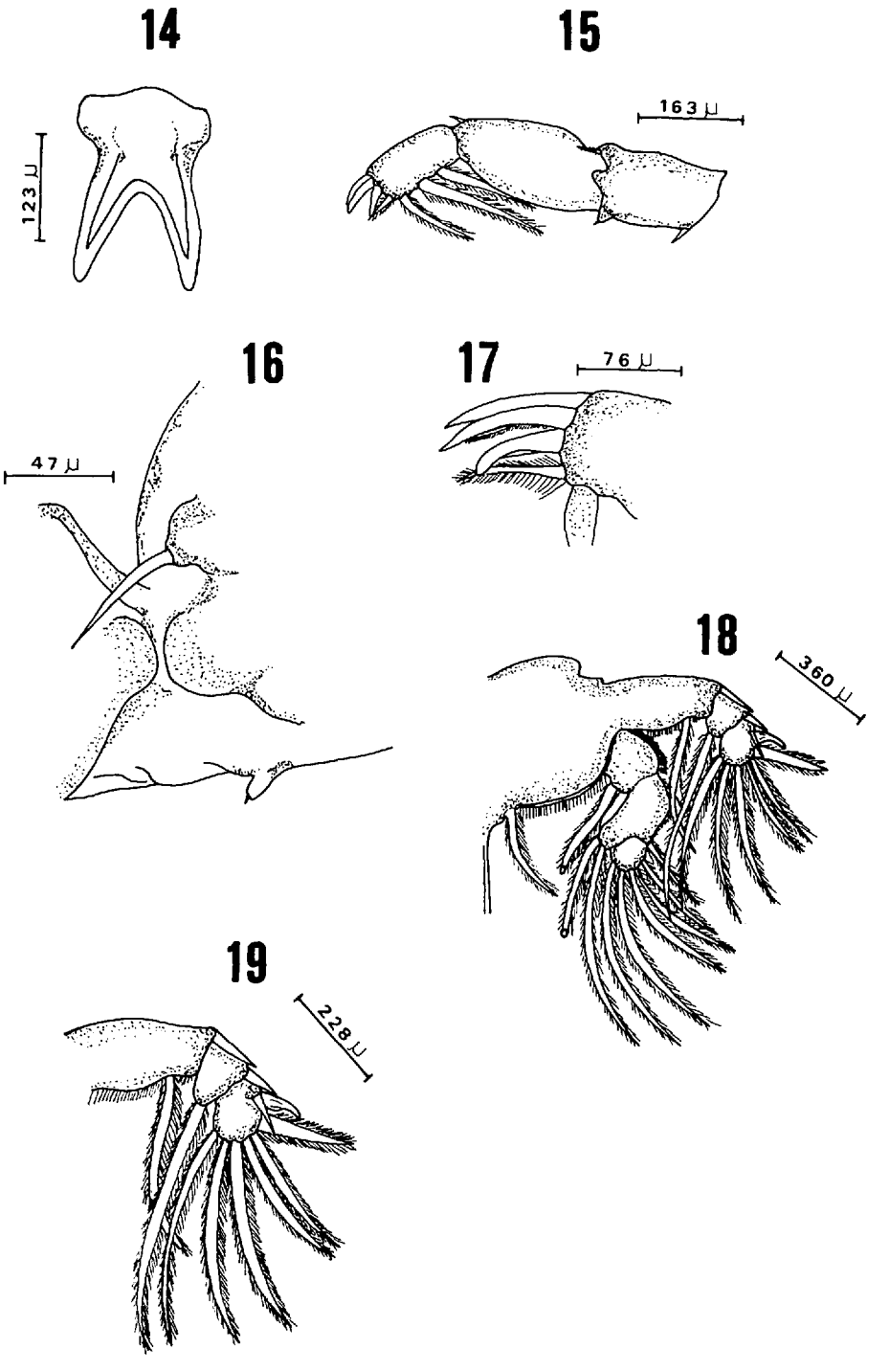
First antenna (Fig. 9) two segmented; posterolateral corner of basal segment bearing small denticles, resembling those of *Lepeophtheirus cuneifer* Kabata, 1974. Second antenna (Fig. 10) three segmented. The basal segment bearing a little process on the proximal third, the second segment is more robust than the other two, third segment finishing in a soft, curved claw, bearing a seta on the ventral surface.

Postantennary process (Fig. 10) with tine about as long as base; medial to base prominent papilla about half length of basal process. First maxilla (Fig. 11) with prominent base bearing two tines, medial shorter and more slender than lateral. Second maxilla (Fig. 12) without distinguishing characteristics. Maxilliped (Fig. 13) with unarmed, rather slender corpus; claw sharply curved, tapering. Sternal furca (Fig. 14) with tapering divergent tines, apparently without membranes or flanges.

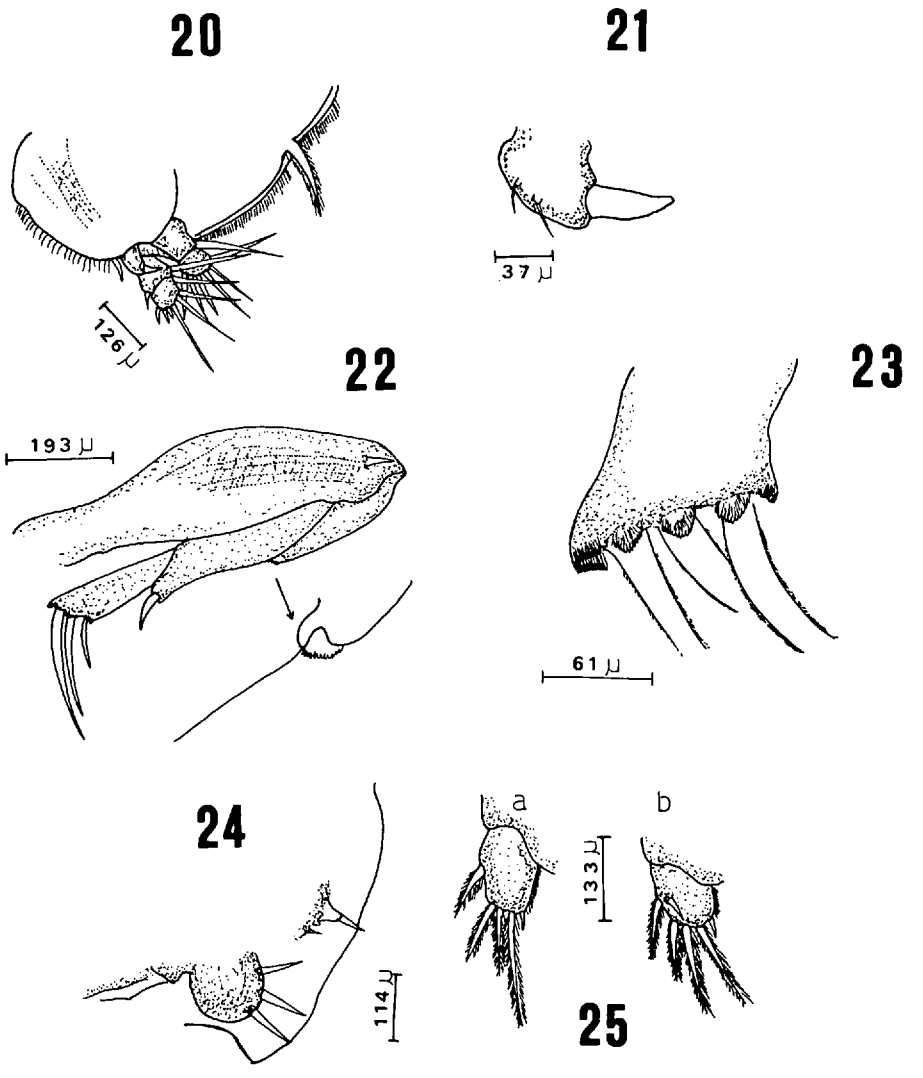
First leg (Fig. 15). Sympod bearing distally short seta (Fig. 16) mounted on papilliform outgrowth; base of seta uncovered. Endopod short and stubby, bearing minute setule at apex. Distal exopod segment (Fig. 17) with four setae on distal margin: one simple, serrated along one margin; two bifid, with one margin partly serrated; one single, pinnate, not longer than others; posterior margin with three pinnate setae at least as long as segment itself. Second leg (Fig. 18). Endopod with a fringe of fine setules on outer lateral margin of second segment. Exopod (Fig. 19) with third segment armed with three setae on outer lateral margin: one slender, unarmed, other two very broad, blade-like, shorter with serrated margins, longer with pinnate margins. Third leg (Fig. 20) of usual structure; hook of basal exopod segment (Fig. 21) robust, blunt, its base not inflated, bearing two unarmed, short setae on outer lateral margin of base. Fourth leg (Fig. 22) with three-segmented exopod: basal segment with short, hooked spine and pecten in distolateral corner, second segment with longer spine in same position; three spines of terminal segment decreasing in length, spine two only slightly shorter than one, spine three less than half length of two. With a fine pecten situated on the upper edge in the base of the first spine; and another (fine pecten) at the base of the other two spines.

Fifth leg (Fig. 24) subcircular, with three setae on lateral margin not projecting beyond margin of genital complex; two minute papillae medial to leg, two setae lateral to it, one very small, the other larger and surmounting papilliform outgrowth.

Male (Fig. 26). Cephalothorax more than half total length, dorsal shield with



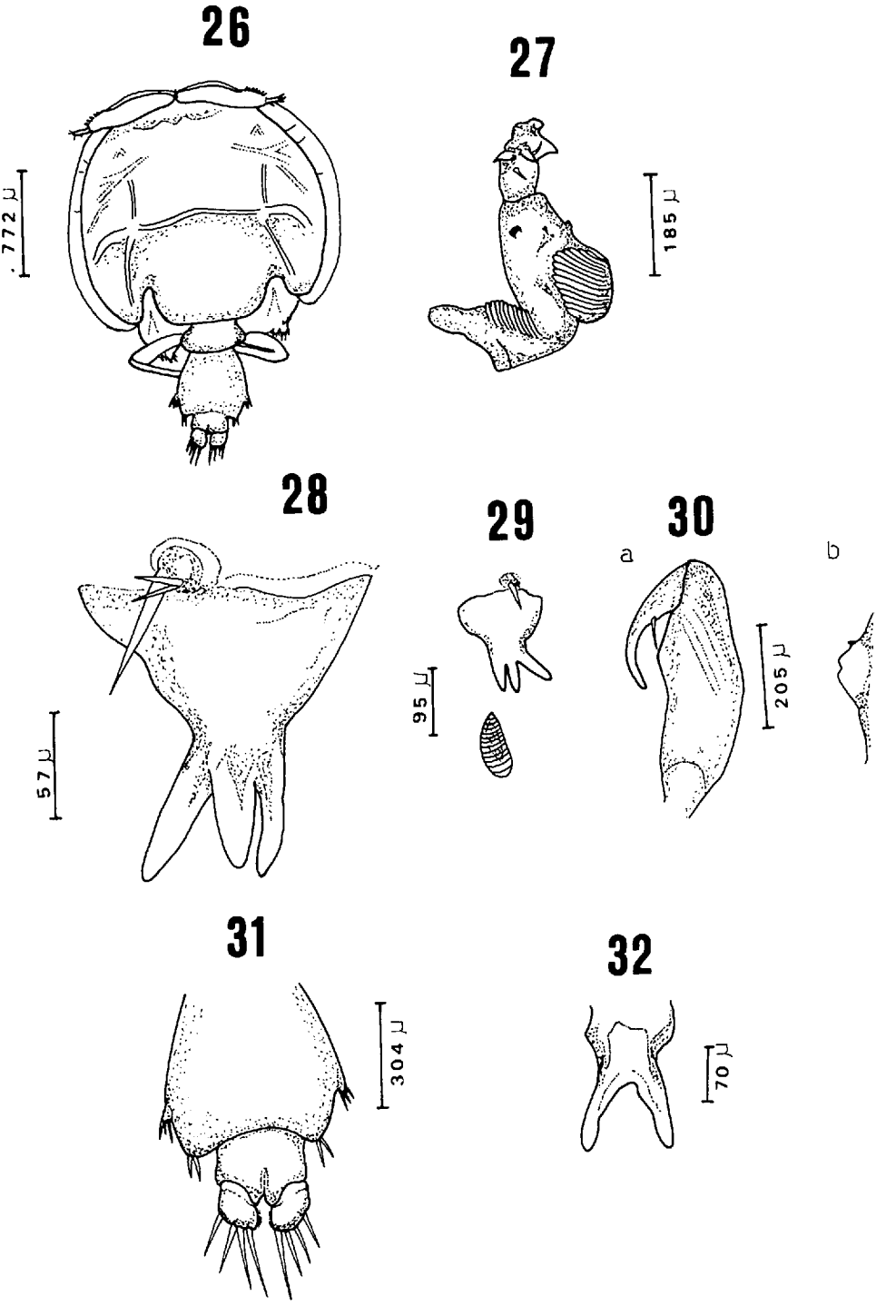
Figures 14–19. *Lepeophtheirus zbigniewi* new species, female: 14, Sternal furca, ventral; 15, First leg, entire, ventral; 16, Same, joint between sympod and exopod, ventral; 17, Same, tip of exopod, ventral; 18, Second leg, entire, ventral; 19, Same, exopod, ventral.



Figures 20–25. *Lepeophtheirus zbigniewi* new species, female: 20, Third leg, entire, ventral; 21, Same, hook of exopod, ventral; 22, Fourth leg, entire, ventral; 23, Same, tip of last segment and bases of terminal setae, ventral; 24, Fifth leg, ventral; 25a, Uropods, ventral; 25b, Uropods, dorsal.

very shallow posterior sinuses; posterior tips of lateral zones not protruding beyond posterior margin of thoracic zone. Genital complex not clearly delimited from fourth leg-bearing segment, with papilliform outgrowth on lateral margins; complex posteriorly broader than anteriorly, less than half length of dorsal shield of cephalothorax. Abdomen (Fig. 31) one-segmented, less than half length of genital complex. Uropods with usual armature, about equally long and broad, shorter than abdomen.

Dimensions in mm of the single specimen: Cephalothorax, length 1.51; width 1.69. Fourth leg-bearing segment, length 0.20; width 0.46. Genital complex, length 0.49; width 0.53. Abdomen, length 0.19; width 0.19. Total length 2.39.



Figures 26–32. *Lepeophtheirus zbigniewi* new species, male: 26, Entire, dorsal; 27, Second antenna, ventrolateral; 28, First maxilla, ventral; 29, Same, showing position of adhesion pad; 30a, Maxilliped, lateral; 30b, Same, prominence detail on lateral edge of basal segment; 31, Genital complex and abdomen, ventral; 32, Sternal furca, ventral.

Table 1. Differences between *Lepeophtheirus zbigniewi* n.sp., and other *Lepeophtheirus* species with short abdomina (The "x" indicates *L. zbigniewi* differs from other species with short abdomina)

Species	MX_1	MXP	F	L1	L2	L3	L4	L5
L. anguilli Hameed, 1976	x	x		x			x	x
L. anomalus (Pillai, 1967)				x		x		x
L. bifidus Fraser, 1920			x	x	x	x		x
L. bifurcatus Wilson, 1905			x					
L. bonaci Pearse, 1952							x	x
L. brachyurus Haller, 1865		x					x	
L. breviventris Fraser, 1920		x	x	x			x	x
L. bychowskii Gusev, 1951	x	x					x	x
L. chantoni Gusev, 1951			x			x	x	x
L. christianensis Wilson, 1924				x			x	
L. clarionensis Shiino, 1959	x					x		x
L. cossyphi Krøyer, 1963							x	x
L. crassus (Wilson and Bere, 1936)	x						x	x
L. cuneifer Kabata, 1974	x		x	x	x	x	x	x
L. dissimulatus Wilson, 1905	x			x				x
L. distinctus Hewitt, 1963	x		x			x	x	x
L. elegans Gusev, 1951	x						x	x
L. edwardsii Wilson, 1905	x	x	x			x	x	
L. gonistii Yamaguti, 1936	x	x				x		x
L. hapalogeneyos Yamaguti and Yamasu, 1959	x		x			x	x	x
L. heegaardi Hewitt, 1963	x		x					x
L. hexagrammi Gusev, 1951	x						x	x
L. hippoglossi (Krøyer, 1837)	x		x				x	x
L. histiopteridi Kazachenko et al., 1972	x							x
L. hospitalis Fraser, 1920	x		x				x	x
L. hummi Pearse, 1952			x			x		
L. insignis Wilson, 1908	x		x			x		x
L. intercurrens Krøyer, 1863			x				x	
L. kabatai Ho and Dojiri, 1977							x	
L. lagocephali Pillai, 1963	x						x	x
L. longispinosus Wilson, 1912	x		x	x		x		
L. marginatus Bere, 1936	x		x	x				
L. muraenae Shiino, 1960	x			x			x	x
L. nanaimoensis Wilson, 1912	x							x
L. natalensis Kensley and Grindley, 1973	x						x	
L. nordmanni (Edwards, 1840)	x	x	x	x	x			x
L. oblitus Kabata, 1973	x			x				x
L. orbicularis Shiino, 1965	x	x	x	x	x	x	x	x
L. parviventris Wilson, 1905			x	x		x	x	x
L. parvus Wilson, 1908		x		x			x	x
L. paulus Cressey, 1969		x		x			x	x
L. perpes Leigh-Sharpe, 1934	x							x
L. plectropomi Nunes-Ruivo and Fourmanoir, 1956			x				x	x
L. plotosi Barnard, 1948								x
L. polyprioni Hewitt, 1963	x		x		x	x		
L. pravipes Wilson, 1912				x			x	x
L. rotundiventris Bassett-Smith, 1898	x			x			x	
L. scutiger Shiino, 1956	x		x					x
L. sekii Yamaguti, 1936				x	x	x	x	x
L. semicossyphii Yamaguti, 1939	x							x
L. spinifer Kirtisinghe, 1937	x					x	x	x
L. watanabei Shiinno, 1957	x	x	x	x			x	
L. yanezi Stuardo and Fagetti, 1961	x						x	

Appendages generally similar to those of female, with few exceptions. Second antenna (Fig. 27) with large inflated adhesion pad and two small pads on middle segment; claw with pair of secondary outgrowths, one on each side under mid-length and with one robust spine and one slender spine on concave margin. First maxilla (Fig. 28) with two tines, medial shorter than lateral, and with soft digitiform outgrowth medial to tines and about as long as shorter tine. Suboval adhesion pad posteromedial to first maxilla on ventral surface of thorax (Fig. 29). Maxilliped (Fig. 30) with conical outgrowth on medial margin of corpus, in its distal half.

Etymology.—The species name was dedicated to Dr. Zbigniew Kabata.

Discussion.—*Lepeophtheirus zbigniewi* is not distinguished by any single striking characteristic. It is diagnosed as a new species rather because of a unique combination of characters, each of which is not in itself remarkable. The configuration of the posterior end of its genital complex is reminiscent of *L. nanaimoensis* Wilson, 1912, but *L. zbigniewi* differs from that species in the structure of its first maxilla and the shape of its fifth leg. *L. zbigniewi* has a short, one-segmented abdomen. It shares this characteristic with many of its congeners. A comparison between it and all other species with short abdomina (Table 1) has shown, however, that all of them differ from *L. zbigniewi* by one or more significant structural features. The features selected for this comparison are: first maxilla, maxilliped, sternal furca and legs 1–5. The species indicated in Table 1 as differing from *L. zbigniewi* by one characteristic might show other differences which are impossible to establish on the basis of information available. This comparison also disregards differences in habitat which often vary with age and maturity and are unreliable as specific discriminants, particularly when transmitted through insufficiently careful description and illustrations.

The examination of Table 1 clearly shows that *L. zbigniewi* is a new species, because of the differences from each of the analyzed species.

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