Expanded Description of the Female of *Lernaeenicus longiventris* Wilson, 1917, (Copepoda, Siphonostomatoida, Pennellidae) Based on Specimens from *Mugil platanus* Günther, 1880 (Perciformes, Mugilidae) of the State of Rio de Janeiro, Brazil

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The description of Lernaeenicus longiventris *is expanded and revised, based on specimens collected from the skin and fins of mullets,* Mugil platanus *Günther, 1880, from 21 locations in coastal waters of the State of Rio de Janeiro, Brazil.*

Key words: *Lernaeenicus longiventris* - *Mugil platanus* - expanded description - Brazil

Lernaeenicus longiventris Wilson, 1917 parasitizes more than 12 species of fish. Many of these fishes are mullets from various localities in the Atlantic Coast of North America (Wilson 1917, 1932, Bere 1936, Pearse 1952, Causey 1953, Rawson 1977, Skinner 1975, Meyers 1978, Paperna & Overstreet 1981), from the Atlantic Coast of South America (Conroy et al. 1986, Carvalho 1953), and from the Atlantic Coast of Africa (Brian 1924). In Brazil, *L. longiventris* was reported from *Scomberomus maculatus*, *Mugil* sp., and *Xenomelaniris brasiliensis* from the coast of the State of São Paulo (Carvalho 1951, 1953).

During a parasitological survey of *Mugil platanus* Günther, 1880, specimens of *L. longiventris* were collected from mullets captured in several locations off the coast of the State of Rio de Janeiro. In this paper, the description of *L. longiventris* is expanded and revised, based on these specimens.

MATERIALS AND METHODS

Between June, 1984 and August, 1988, 150 adult specimens of *M. platanus* (between 33.5 and 59.5cm of standard length) were captured off the coast of the State of Rio de Janeiro (Fig.1), by professional fishermen, and examined for parasitic copepods. Copepods were collected from the skin and fins of each fish with the aid of forceps and probes under a dissecting microscope. All specimens were fixed and preserved in 70% ethanol. Some specimens were stained with a 1:1 mixture of eosin and Orange G in 95% ethanol. Permanent preparations of stained or unstained specimens were made by dehydrating in phenol, clearing in methyl salicylate or creosote, and mounting in balsam. Some specimens were dissected with glass microprobes under a dissecting scope in Gray and Wess' mounting medium

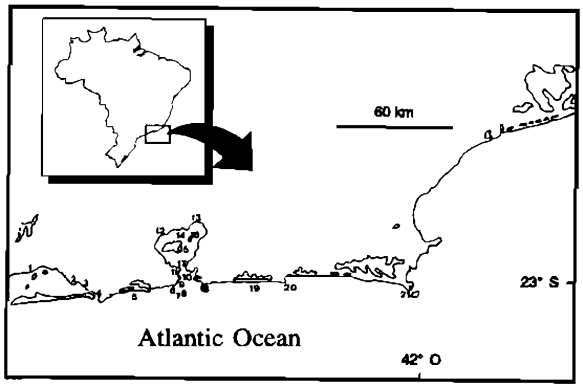

Fig. 1: sites of collection of *Mugil platanus* on the coast of the State of Rio de Janeiro, Brazil. Numbers refer to respective locations on the map: (1) Itacuruçá, (2) Sepetiba, (3) Pedra de Guaratiba, (4) Barra de Guaratiba, (5) Barra da Tijuca, (6) Ipanema, (7) Ilha Redonda, (8) Ilha Cagarra, (9) Copacabana, (10) mouth of the Guanabara bay, (11) Botafogo, (12) Mauá, (13) Magé, (14) Ilha da Feiticeira, (15) Ilha do Governador, (16) Ilha de Paquetá, (17) Rio-Niterói bridge, (18) Itaipu, (19) Barra de Maricá, (20) Ponta Negra, (21) Cabo Frio.

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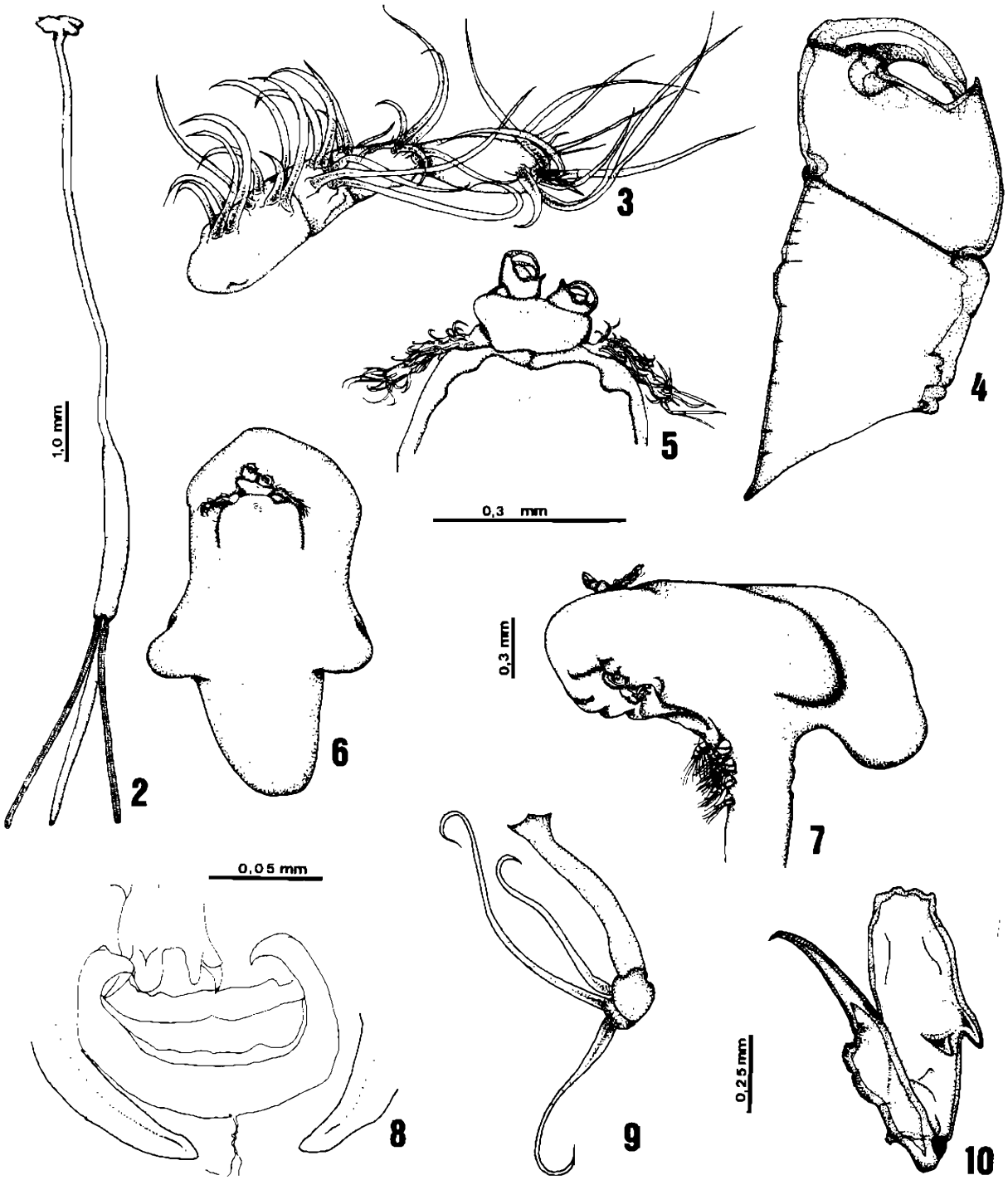
(prepared as in Humason 1979). Drawings were made with the aid of a camera lucida. Measurements were obtained with a measuring ocular and are given in micrometers; the average is given followed by the range in parentheses. Vouchers were deposited in the collection of the United States Parasitological Collection (USNM) and of the Museu Nacional UFRJ Carcinology Collection (MN) Brazil.

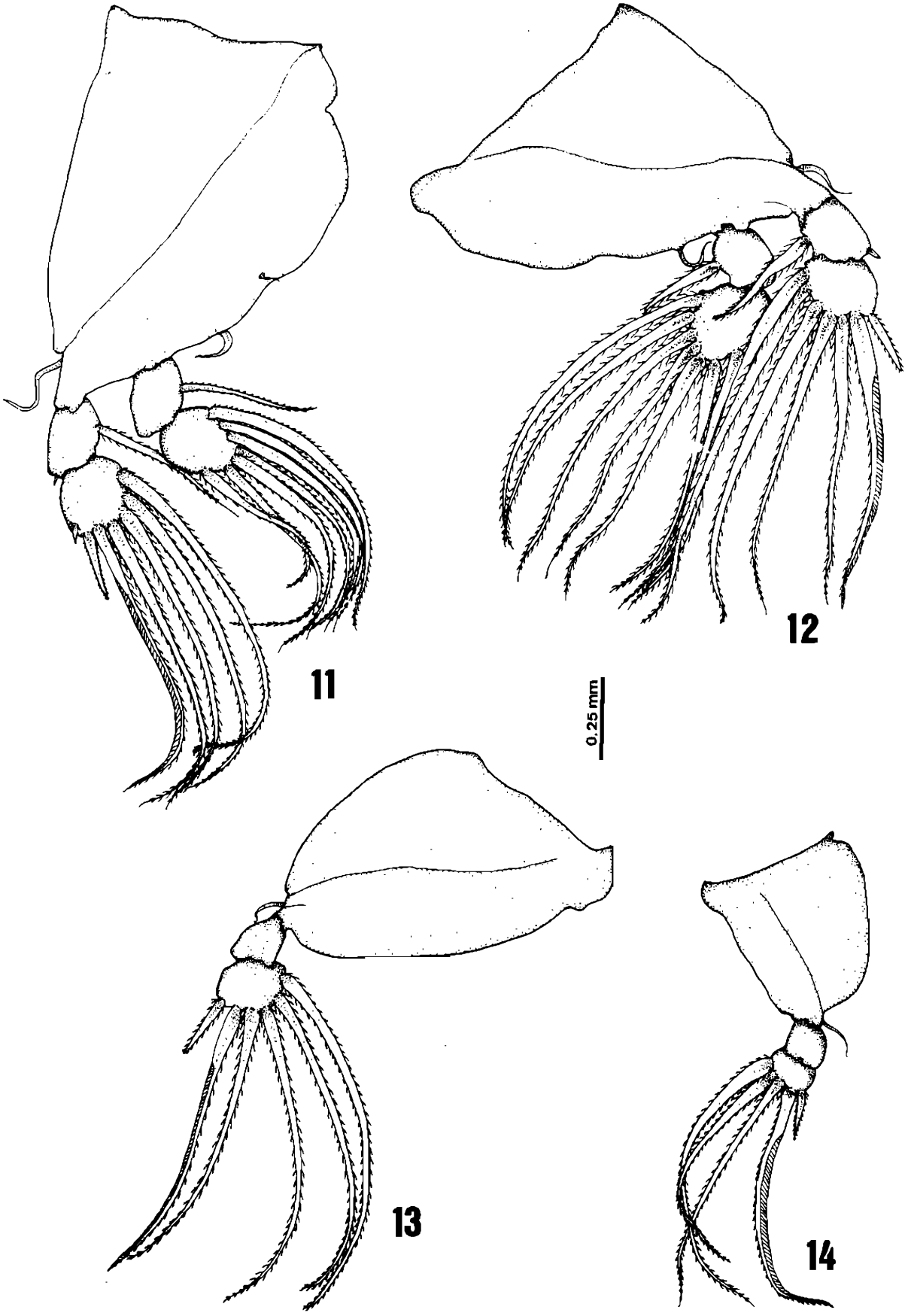
RESULTS

Pennellidae Kabata, 1979

Lernaeenicus longiventris Wilson, 1917 (Figs 2-14)



Figs 2-10: post-metamorphic females of *Lernaeenicus longiventris* Wilson, 1917. Fig. 2: voucher (ventro-lateral). Fig. 3: antennule. Fig. 4: antenna. Fig. 5: anterior end of head (dorsal). Fig. 6: head (dorsal). Fig. 7: head and fused pedigerous somites (lateral). Fig. 8: distal end of mouth tube with oral stilets and tips of mandibles (bold lines). Fig. 9: maxillule. Fig. 10: maxilla. Figs 3, 4, 9, and 10 are to the 0.25 mm scale. Figs 6, 7 are to the 0.3 mm scale. All other figures are to their respective scales.



Figs 11-14: legs of the post-metamorphic females of *Lernaeenicus longiventris* Wilson, 1917. Fig. 11: leg 1. Fig. 12: leg 2. Fig. 13: leg 3. Fig. 14: leg 4. All figures are to the same scale (0.25 mm).

Hosts and Localities (no specific type host or type locality were indicated by Wilson (1917)): *M. platanus* from Itacuruçá, Sepetiba, Pedra de Guaratiba, Barra de Guaratiba, Barra da Tijuca, Copacabana, Boca da Baía da Guanabara, Botafogo, Magé, Mauá, Paquetá, Ilha do Governador, Ponte Rio Niterói, Barra de Maricá, Ponta Negra, and Cabo Frio, all in the State of Rio de Janeiro (this paper); *Caranx crysos, C. hippos, Coryphaena hippurus, Palinurichthys perciformis, Scomberomus maculatus* from Massachusetts, USA (Wilson 1917, 1932); *Cybium maculatum* from Massachusets, USA (Wilson 1917); *Pomatomus saltatrix* from New York, USA (Wilson 1917); *C. crysos, Coryphaena equisetis, M. cephalus* from North Carolina, USA (Wilson 1917); *C. crysos* from the coast of New England, USA (Wilson 1917); *Pagrus* sp. from Mauritania (Brian 1924); *M. cephalus, P. saltatrix* from Massachusetts, USA (Wilson 1932); *M. cephalus* from North Carolina, USA (Wilson 1932); *Pogonias cromis* from Virginia, USA (Wilson 1932); *M. cephalus* from Gulf of Mexico, Florida, USA (Bere 1936); *S. maculatus* from São Paulo, Brazil (Carvalho 1951); *C. hippos, Rhachycentron canadus* from Texas, USA (Pearse 1952, Causey 1953); *C. hippurus* from Texas, USA (Pearse 1952); *Xenomelaniris brasiliensis, Mugil* sp. from São Paulo, Brazil (Carvalho 1953); *M. cephalus* from Florida, USA (Skinner 1975); *M. cephalus* from Georgia, USA (Rawson 1977); *M. curema* from Falcon and Carabobo, Venezuela (Conroy et al. 1986).

Vouchers (all from this study): USNM 259.809 to 259.814 and MN 4.350 to 4.351.

REDESCRIPTION (based on 11 females from the State of Rio de Janeiro; measurements in Table I): *Post metamorphic female:* body elongate, with head, neck, trunk, abdomen. Somites of body fused. Head with pair of posterolateral processes, median posterior process (Figs 5-7); posterolateral processes variable in size. Neck long, smooth. Pedigerous somites immediately posterior to head. Trunk cylindrical, wider than neck. Abdomen cylindrical, nearly twice as long as or little longer than trunk. Caudal rami present. Egg sacs, straight, slightly longer than abdomen. Antennule (Fig. 3) four segmented, with simple setae; setal formula = 9:5:9:13; one seta of distal segment bifid. Antenna (Fig. 4) three segmented; basal segment long, unarmed; second segment with prominent, triangular, concave process in distal corner; claw evenly curved, with subterminal, longitudinal ridges; tip of claw latches in triangular process of second segment. Mouth tube broad, with row of denticles along posterior margin. Mandible lacking dentigerous processes (Fig. 8). Maxillule (Fig. 9) with 3 simple setae. Maxilla (Fig.10) brachiform; lacertus robust, with 2 unciforms, bilateral, median spines; brachium distally curved, with delicate membrane cristae. Maxilliped absent. Legs 1, 2 biramous (Figs 11, 12); legs 3, 4 uniramous (Figs 13, 14). Sympods, rami two segmented; first segment unarmed; second segment with small seta lateral to base of exopod; second segment of sympods of legs 1, 2 with seta medial to base of endopod. Armature formula of legs in Table II. Setae of all endopods pinnate; lateralmost setae of exopods with strip of membrane along external margin.

TABLE I

Measurements, in milimeters, of post-metamorphic females of *Lernaeenicus longiventris*

	Length	Width
Body	33,156(27,066-38,631)	
Neck	20,098(15,427-25,455)	398(220-457)
Trunk	4,774(3,806-6,002)	759(476-1,043)
Caudal rami	227(183-366)	174(110-403)
Abdomen	8,029(6,588-9,955)	357(256-494)
Egg sac	7,533(6,771-8,601)	203(183-238)
Antenulle	137(115-150)	31(29-33)
Segments of antenna:		
1	122(110-147)	85(73-93)
2	106(101-119)	79(71-91)
3	67(62-73)	31(29-31)

TABLE II

Armature formula for the legs of post-metamorphic females of *Lernaeenicus longiventris*

	Endopod		Exopod	
	1	2	1	2
Leg 1	1-0	7	1-I	5, II
Leg 2	1-0	7	1-I	6, I
Leg 3	...	...	0-0	5, I
Leg 4	...	...	0-0	4, I

DISCUSSION

Although specimens of *L. longiventris* have been collected previously several times, from many locations, and by many authors, the description provided by Wilson (1917) has never been ammended. Wilson's description appears adequate to correctly identify the species but detailed descriptions and illustrations of certain structures are lacking (antennae, legs, maxillae).

These characters have been described/illustrated herein.

Kabata (1979) tentatively accepts 26 species of *Lernaeenicus* but only two are similar to *L. longiventris*, as indicated by the structure of the head: *L. hemiramphi* Kirtisinghe, 1956, from the Indian Ocean; and *L. sayori* Yamaguti, 1939, from Japanese waters. Reproduction of the original illustrations provided by Yamaguti (1963) indicates that *L. hemiramphi* can be differentiated from *L. longiventris* by its more robust antennae. Correspondingly, *L. sayori* differs from *L. longiventris* by the proportion of the cylindrical parts of the body (head : neck : abdomen) - in *L. sayori* this proportion is approximately 40 : 30 : 25 (calculated from Yamaguti's reproduction) while for *L. longiventris* it varies from 50 : 20 : 25 to 60 : 15 : 25. Further differentiation of these species should follow careful reexamination of available types or recollected specimens.

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