PARASITIC COPEPODA FROM MEXICAN COASTAL FISHES

DAVID CAUSEY
University of Arkansas

ABSTRACT

Twenty-five genera and 46 species of parasitic copepods are reported from marine fishes of Mexico. Two new species: *Telson nicholsi* (Taeniacanthidae) and *Thysanote goodi* (Lernaeopodidae) are described.

This report is based upon four collecting trips to the Mexican coasts during the summers of 1954 through 1957. On the Gulf of Mexico, Tampico, Tuxpan, Veracruz, and nearby fishing villages were visited, and on the Pacific Coast, Ensenada and San Felipe in Baja California, and Guaymas, Mazatlan, San Blas, Acapulco, Salina Cruz, and Tehuantepec were visited. Most of these mainland Pacific Coast ports and Veracruz were visited two or more times during this survey. The fish examined were mainly those caught either by sportsmen or by market fishermen, supplemented by visits to fish markets and fish storage houses.

The results have been disappointing. We were able to examine only a relatively few fishes. Sportfishermen are interested in a very limited number of kinds of fishes, and only rarely bring in other than gamefishes. The market fishermen are obviously interested in just a few species of fishes for which there is a sale. Efforts to hire them to catch other kinds were not very successful. Sometimes we were not welcome in the markets, and when we were, the custom of removing the gills meant that so many parasites were lost. We never succeeded in examining the trash fish caught by shrimpers. Although the list of Mexican coastal fishes is both long and interesting, we feel that other methods must be used. Hook and line fishing, skin diving, and if one could afford the risk of loss of gear, the use of nets seem possibilities. More interest in the parasites of fish by Mexican ichthyologists might be very productive.

I wish, first of all, to thank my wife, Dr. Nell Bevel Causey, for her continued and essential assistance, both in the collection of the parasites and in the identification of the hosts. She found most of the parasites and took care of most of the interminable discussions in Spanish necessary for the work. I also thank Dr. G. D. Nichols, Dean of the College of Arts and Sciences, University of Arkansas, for his long continued interest and support of the work, and Dr. V. W.

Adkinson, Dean of the Graduate School, University of Arkansas, for a supplementary grant for the 1957 collecting trip. The many Mexicans, both officials and ordinary citizens, who helped in all ways possible have my deep thanks but must remain unnamed. Dr. C. Bolivar and Dr. Jorge Carranza of Mexico City, and Dr. Miguel Alvarez del Toro of Tuxtla Gutierrez, must, however, be thanked for their interest and aid. I am, of course, pleased to acknowledge the good natured courtesies of my fellow countrymen we met in Mexico.

Although I have little doubt that the majority of the parasitic copepods which have been reported from the United States portion of the Gulf of Mexico, and likewise the majority of parasitic copepods reported from the California coast will ultimately be found in Mexican waters, the following list is restricted to the parasites either reported by other investigators or by the present author as having been taken in Mexican waters. Most of these will be included in the author's projected monograph on the parasitic Copepoda of the Gulf of Mexico. The classification adopted is taken from Wilson's Copepods of the Woods Hole Region (1932). I feel that I must add that I am admittedly a "lumper," and not a "splitter." Many of the groups are in a rather chaotic condition, taxonomically speaking, *e.g.*, the Argulidae, and it seems unwise to add to the confusion by describing all slight variations as new species. Excellent as Dr. Wilson's work was, many of his genera and species are being rejected by later workers. The common names of the fishes are those listed by the American Fisheries Society, except for extralimital forms not covered in its checklist. Spanish names in parentheses are those used by the fishermen; often the same name is applied to several kinds of fishes.

SUBORDER ARGULOIDA

FAMILY ARGULIDAE

Genus *Argulus* Müller, 1785

Argulus chromidis Krøyer, 1863

Reported by Wilson (1936) from *Rhamdia sp.*, Xanaba Cenote Chico, Yucatan. It was "a single female taken from the intestine . . . and was probably a parasite upon some fish eaten by the Rhamdia . . ."

Argulus megalops Smith, 1873

Two collections: a young female from the stargazer, *Astroscopus zephyreus*, at Cholla Bay, near Puerto Penasco, Sonora; and an

immature specimen discovered in a vial with a leech taken from the snook (robalo pardo) *Centropomus undecimalis,* in a fish market at Alvarado, Veracruz. This could have come from any one of several kinds of fish in the market.

Argulus rhamdiae Wilson, 1936

Reported by Wilson (1936) from the skin of *Rhamdia sp.,* Scan Yui Cenote, Yucatan.

SUBORDER CYCLOPOIDA

FAMILY CLAUSIDIIDAE

Genus *Pherma* Wilson, 1923

Pherma curticaudatum Wilson, 1923

Reported by Wilson (1923): "Three adult females, one with egg strings, taken from the parapodia of an unnamed annelid dredged from a depth of 645 fathoms by the Bureau of Fisheries steamer ALBATROSS off the coast of Lower California in April, 1911."

FAMILY ERGASILIDAE

Genus *Ergasilus* Nordman, 1832

Ergasilus lizae Krøyer, 1863

From striped mullet (lisa), *Mugil cephalus,* Mazatlan, Sinaloa; San Blas, Nayarit; and Bocco del Rio near Veracruz.

Ergasilus mugilus Vogt, 1877

From *Mugil cephalus,* Tampico, Veracruz; Bocco del Rio near Veracruz; San Blas, Nayarit.

Both of these species are common on the mullet gills, which often look as though they had been peppered.

FAMILY BOMOLOCHIDAE

Genus *Bomolochus* Nordmann, 1832

Bomolochus attenuatus Wilson, 1913

From white croaker (corvina), *Genyonemus lineatus,* and spotfin croaker, *Roncador stearnsi,* at Ensenada, B. C.; and from California scorpion fish, *Scorpaena guttata,* at Cholla Bay near Puerto Penasco, Sonora.

Bomolochus cincinnus Wilson, 1911

From machete, *Tylosurus sp.*, at Acapulco, Guerrero.

Bomolochus nitidus Wilson, 1911

From *Mugil cephalus,* at Mazatlan, Sinaloa.

Bomolochus soleae Claus, 1864

From Pacific barracuda, *Sphyraena argentea;* California corbina (corvina), *Menticirrhus undulatus;* kelp bass, *Paralabrax clathratus,* and sand bass (cabrillo), *P. nebulifer;* California halibut, *Paralichthys californicus,* and several recorded as "flounders," at Ensenada, B. C.; "flounder," at Cholla Bay near Puerto Penasco, Sonora; and halibut, *Paralichthys sp.,* at Salina Cruz, Oaxaca.

On the United States portion of the Gulf of Mexico I have found *Ergasilus* more common than *Bomolochus.* My Mexican collections are too few to be significant, but *Bomolochus* appears to be the more common genus of the family on the Pacific Coast.

Family Taeniacanthidae

Genus *Telson* Pearse, 1952

Telson nicholsi, n. sp.

Figure 1

This species is, in general, like the type of the genus, *Telson elongatus* Pearse, 1952. The differences are summarized as follows:

T. elongatus	*T. nicholsi, n. sp.*
1st antennae with 4 segments	1st antennae with 6 segments
Maxilliped with a large hook and two hooklets	Maxilliped with a large hook, but no hooklets
4th leg with 2 terminal setae on each branch	4th leg with 4 terminal setae
5th leg with 3 segments and 2 terminal setae	5th leg not segmented and with 2 terminal setae
Abdomen of 1 segment	Abdomen of 3-4 segments, usually 4
Host: *Astroscopus y-graecum*	Host: *Astroscopus zephyreus*
Type locality: Texas coast, Gulf of Mexico	Type locality: Cholla Bay, near Puerto Penasco, Sonora.

Dr. Pearse gave the following dimensions for *T. elongatus:* Length of entire body, 3.8 mm; length of cephalothorax and free thorax, 1.5 mm, width of cephalothorax, 0.58 mm; length, 0.39 mm; length

of abdomen, 2.3 mm. I presume these are averages for his four specimens. The corresponding sizes for *T. nicholsi* are: Length of entire body, 5.86 (4.8-6.8) mm; length of cephalothorax and free thorax,

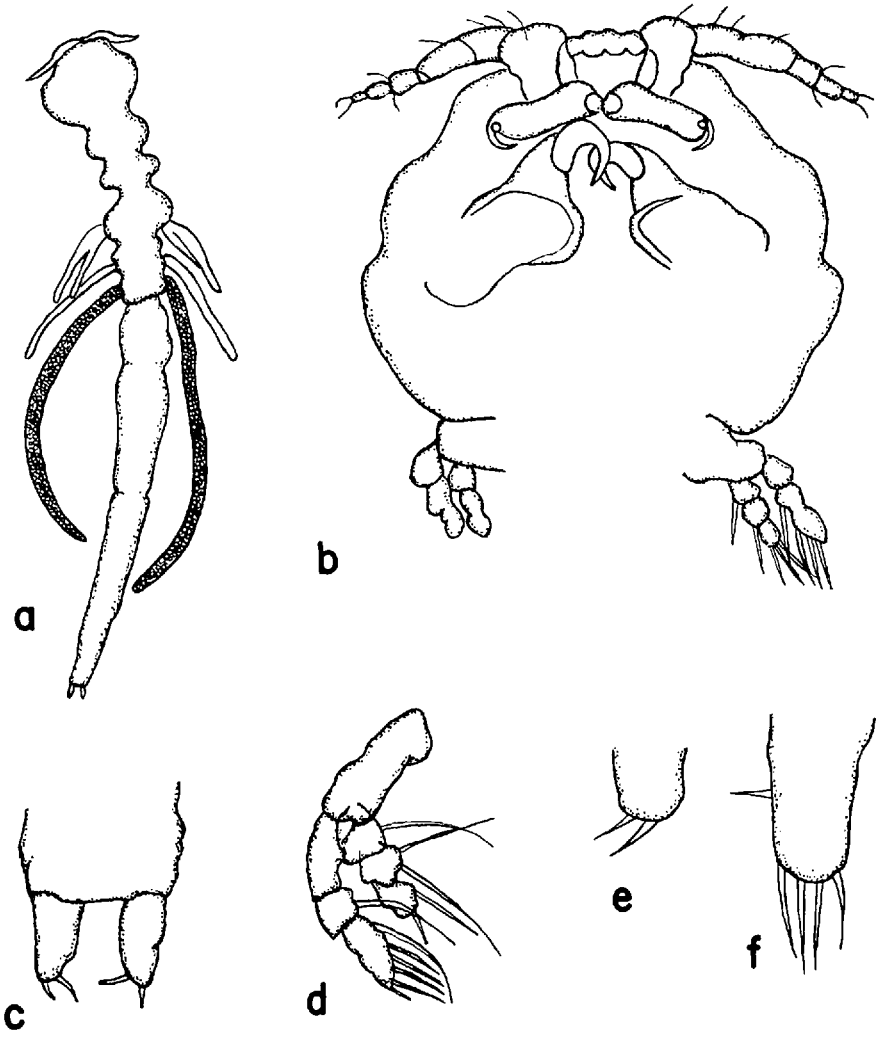

FIGURE 1. *Telson nicholsi*, n. sp. a, Dorsal view of the body. No attempt was made to indicate the portions of the first three pairs of legs which are visible from this view. b, Ventral view of the cephalothorax showing the 1st and 2nd antennae, the maxillipeds, and posteriorly, the 1st pair of legs. c, The caudal rami. d, The 3rd leg. e, End of the 5th leg. f, End of one branch of the 4th leg.

1.9 (1.3-2.6) mm; width of cephalothorax, 0.7 (0.5-0.8) mm; length, 0.58 (0.4-0.7) mm; length of abdomen, 3.13 (2.5-3.6) mm. These are averages for the first 10 straight specimens encountered, with minimal and maximal sizes in parentheses. 144 females were collected from the ventral surface near the pelvic fins of the host. The copepods had orange colored bodies and white egg strings. No males were found. The types are deposited in the U. S. National Museum, catalog numbers 101207 and 101208.

The species is named for Dr. G. D. Nichols, Dean of the College of Arts and Sciences, University of Arkansas, whose encouragement and financial assistance have made so much of my recent work possible.

SUBORDER CALIGOIDA

FAMILY CALIGIDAE

Genus *Anuretes* Heller, 1865

Anuretes heckelii Krøyer, 1863

From Atlantic spadefish (chavel), *Chaetodipterus faber,* on the gills and in the opercular chamber, at Tuxpan, Veracruz. This species is common on the spadefish, but occurs on other fishes.

Genus *Caligus* Müller, 1785

Caligus bennetti Causey, 1953

From the mouth of bacaco, a spotted sand bass, *Paralabrax maculatofasciatus,* at Mazatlán, Sinaloa; and from Bermuda chub (chopa blanca), *Kyphosus sectatrix,* operculum at a Veracruz fishmarket.

Caligus bonito Wilson, 1905

From the mouth of the Pacific bonito, *Sarda chiliensis,* at Salina Cruz, Oaxaca. A chalimus stage from *Lutjanus sp.,* Mazatlan, Sinaloa, is probably of this species.

Wilson (1905) reported this species from a grouper, *Cratinus agassizii,* and a red snapper, *Lutjanus novemfasciatus,* Tangola, Mexico.

Caligus constrictus Heller, 1865

From the Crevalle jack (toro), *Caranx hippos,* Mazatlan, Sinaloa; and Acapulco, Guerrero.

Caligus haemulonis (Krøyer), 1863

From the bandera, probably *Bagre marinus,* but my record is incomplete. Collected in the Veracruz fishmarket.

Caligus latifrons Wilson, 1905

From the bullseye puffer, *Sphaeroides annulatus,* at Guaymas, Sonora. This was identified by a Loma Linda scientist.

Caligus mutabilis Wilson, 1905

From Atlantic croaker (corvina), *Menticirrhus undulatus,* at Ensenada, B. C.; sierra, *Scomberomorus sierra,* Pacific porgy (mojarra garabata), *Calamus brachysomus,* the sand bass, *Paralabrax nebulifer,* the kelp bass, *Paralabrax clathratus,* and spotted sand bass, *Paralabrax maculatofasciatus,* at Cholla Bay, near Puerto Penasco, Sonora; sierra, *S. sierra,* and skipjack, tuna, *Euthynnus pelamis,* at Guaymas, Sonora; sierra, *S. sierra,* paperfish, *Selene oerstedii,* and *Mugil cephalus,* at Mazatlan, Sinaloa; robalo, *Centropomus sp.,* at San Blas, Nayarit; Pacific bonito, *Sarda chiliensis,* and triggerfish, *Balistes sp.,* Acapulco, Guerrero; and Pacific spadefish, *Chaetodipterus zonatus,* at Salina Cruz, Oaxaca.

Caligus pelamydis Krøyer, 1863

From king mackerel, *Scomberomorus cavalla,* Veracruz, Veracruz.

Caligus productus Dana, 1854

From the yellowtail, *Seriola dorsalis,* and kelp bass, *Paralabrax clathratus,* at Ensenada, B. C.; spotted sand bass, *Paralabrax maculatofasciatus,* a triggerfish, *Verrunculus polylepis,* a mackerel, and two females in a collection of small decapods, a snail and a brittlestar from the beach at Cholla Bay, near Puerto Penasco, Sonora; the skipjack, *Katsuwonus vagans,* the barracuda, *Sphyraena argentea,* sierra, *Scomberomorus sierra,* and dolphin, *Coryphaena sp.,* at Guaymas, Sonora; bacaco, an unidentified seabass, and the majarra, *Calamus brachysomus,* at Mazatlan, Sinaloa; red snapper, *Lutianus sp.,* at San Blas, Nayarit; dolphin, *Coryphaena hippurus,* at Acapulco, Guerrero; and snook, *Centropomus sp.,* at Salina Cruz, Oaxaca.

It would appear from these records that *Caligus mutabilis* and *C. productus* are the two common species on the Pacific coast, and that there is little host specificity. Most unexpected was the discovery of the two *C. productus* in a beach collection. Caligids are often found in the plankton, and their presence on the beach is easily understood.

Genus *Caligodes* Heller, 1865

Caligodes laciniatus (Krøyer), 1863

Two collections one from the barracuda, *Sphyraena argentea,* at

Guaymas, Sonora; and one from the machete or needlefish, not identified, at Acapulco, Guerrero.

Genus *Lepeophtheirus* Nordman, 1832

Lepeophtheirus dissimulatus Wilson, 1905

From the California hake, *Merluccius productus,* the California halibut, *Paralichthys californicus,* the diamond turbot, *Hypsopsetta guttulata,* and barracuda, *Sphyraena argentea,* at Ensenada, B. C.; the rock bass, *Paralabrax nebulifer,* at Cholla Bay near Puerto Penasco, Sonora; the puffer (cf. statement under *Caligus latifrons supra),* and catfish, *Galeichthys guatemalensis?,* at Mazatlan, Sinaloa.

Lepeophtheirus thompsoni Baird, 1850

From the white seabass (corvina), *Cynoscion nobilis,* at Cholla Bay near Puerto Penasco, Sonora; Guaymas, Sonora; San Blas, Nayarit; and Acapulco, Guerrero.

This genus is common along the United States portion of the Gulf of Mexico, and its absence along the Mexican portion can only mean inadequate collecting. An opportunity to examine fish *with gills* would change this!

Family Euryphoridae

Genus *Gloiopotes* Steenstrup and Lütken, 1861

Gloiopotes costatus Wilson, 1919

From the Pacific sailfish, *Istiophorus greyi,* at Guaymas, Sonora; and at Mazatlán, Sinaloa; and from the marlin, *Makaira sp.,* at Acapulco, Guerrero. One of the specimens collected at Mazatlán had the barnacle *Conchoderma* upon it. One Acapulco collection was sent to me by Mr. Terrance R. Leary, Rockport, Texas. This species of copepod was originally described by Wilson from a "swordfish" at Catalina Island, off the coast of California. Presumably, his use of quotation marks indicates some doubt as to the host. It is quite common on the sailfish and marlin along the Mexican Pacific coast. The blue bodies and red egg strings are quite conspicuous.

Family Pandaridae

Genus *Achtheinus* Wilson, 1908

Achtheinus oblongatus Wilson, 1908

From the bay shark, *Carcharhinus lamiella,* at Cholla Bay, near

Puerto Penasco, Sonora. This parasite was originally described by Wilson from the leopard shark, *Triakis semifasciata,* with La Jolla, California the type locality. This present record appears to be the second.

Genus *Perissopus* Steenstrup and Lütken, 1861

Perissopus communis Rathbun, 1887

From an unidentified shark, 6 feet long, examined at Acapulco, Guerrero. A single male was examined.

Genus *Pandarus* Leach, 1816

Pandarus bicolor Leach, 1816

From an unidentified shark at Acapulco, Guerrero. It was called a "flying shark," a common name I do not find in the literature.

Genus *Nesippus* Heller, 1865

Nesippus alatus Wilson, 1907

From the bay shark, *Carcharhinus lamiella,* at Cholla Bay, near Puerto Penasco, Sonora.

FAMILY ANTHOSOMIDAE

Genus *Lernanthropus* Blainville, 1822

Lernanthropus gisleri van Beneden, 1852

From the snook (chucumita), *Centropomus undecimalis,* at Tuxpan, Veracruz.

Lernanthropus micropterygis Richiardi, 1882

Reported by Wilson (1937) from the gills of the greater amberjack, *Seriola dumerili,* at White Friars, Mexico.

Lernanthropus pomatomi Rathbun, 1887

From pargo, *Lutjanus sp.,* at Mazatlán, Sinaloa; and from huracha (which may be a local version of jurel), the horse mackerel, *Trachurus trachurus,* at San Blas, Nayarit.

FAMILY EUDACTYLINIDAE

Genus *Krφyeria* van Beneden, 1853

Krφyeria papillipes Wilson, 1937

Reported by Wilson (1937) from a gray shark, Socorro Island, Mexico.

FAMILY PSEUDOCYCNIDAE

Genus *Pseudocycnus* Heller, 1865

Pseudocycnus appendiculatus Heller, 1865

Four collections from the Pacific bonito, *Sarda chiliensis,* at Acapulco, Guerrero.

Pseudocycnus buccatus Wilson, 1922

From cero (peto), *Scomberomorus regalis,* Spanish mackerel (sierra), *S. maculatus,* and king mackerel, *S. cavalla* at Veracruz; from *S. regalis* at Anton Lizardo near Veracruz; and from the Mexican sierra, *S. sierra,* and kelp bass, *Paralabrax maculatofasciatus,* at Cholla Bay near Puerto Penasco, Sonora.

Members of this genus are very common on the gillets or demibranchs, where patches as large as one's thumb nail are often present. The Pacific forms may be slightly smaller than the Gulf of Mexico representatives.

FAMILY DICHELESTHIIDAE

Genus *Hatschekia* Poche, 1902

Hatschekia albirubra Wilson, 1913

From the kelp bass, *Paralabrax clathratus,* and California corbina (corvina), *Menticirrhus* undulatus, at Ensenada, B.C.

Hatschekia oblonga Wilson, 1913

From the yellowtail snapper (rubia), *Ocyurus chrysurus,* at Anton Lizardo near Veracruz.

FAMILY LERNAEIDAE

Genus *Lernaeenicus* LeSueur, 1824

Lernaeenicus longiventris Wilson, 1917

From yellowtail, *Seriola dorsalis,* at Mazatlán, Sinaloa. This copepod, because of its length, attracts attention and is well known to fishermen. It is common along the United States Gulf of Mexico.

FAMILY PENNELLIDAE

Genus *Pennella* Oken, 1816

Pennella filosa (Linnaeus), 1758

From the Pacific sailfish, *Istiophorus greyi,* at Guaymas, Sonora;

Mazatlán, Sinaloa; and Acapulco, Guerrero. This large copepod is often encrusted with the barnacle *Conchoderma* and is quite conspicuous. We got the largest numbers at Guaymas, probably because more sailfish happened to be caught during our visit.

SUBORDER LERNAEOPODOIDA

FAMILY CHONDRACANTHIDAE

Genus *Acanthochondria* Oakley, 1927

Acanthochondria albigutta Pearse, 1952

From mangalla, *Paralichthys sp.*, at Salina Cruz, Oaxaca.

FAMILY LERNAEOPODIDAE

Genus *Thysanote* Krøyer, 1863

Thysanote goodi, n. sp.

Figure 2

This species, which I describe as new with some hesitancy, is based upon a single specimen obtained from the mouth of the great barracuda, *Sphyraena barracuda*, at Anton Lizardo, near Veracruz. In view of my having but one specimen, no attempt has been made to work out the mouth parts. It is deposited in the U.S. National Museum, No. 101209.

The specimen has a body length of 5 mm, with the egg strings 3 mm in length. If the specimen had lacked the egg strings I would have regarded it as an immature, possibly aberrant, *T. appendiculata* (Steenstrup and Lütken), 1861, to which it keys out in Wilson's (1915) key. The pertinent difference is in the processes which hang from the posterior margin of the second maxilla. *T. appendiculata* has four processes hanging from the border of each maxilla, while *T. goodi, n. sp.*, has but a single process on each maxilla. In *T. appendiculata* the length of these processes appears to vary; fig. 35 of Steenstrup and Lütken has a ventral view in which the medial pair of processes on the left side are about half the length of the lateral pair. Both species appear to agree in lacking processes attached to the body at the base of the maxillae, which Wilson lists as a generic character; and agree in the number of processes at the posterior end of the body. These processes appear to be relatively longer in *T. appendiculata* than in *T. goodi, n. sp.* The species is named for my

longtime friend and associate, Mr. William J. Good of the University of Arkansas.

With this species as a starting point a rather interesting series can be arranged for the genus: *T. goodi, n. sp.* and *T. appendiculata* differing in the number of unbranched processes; and then *T. longimana, T.*

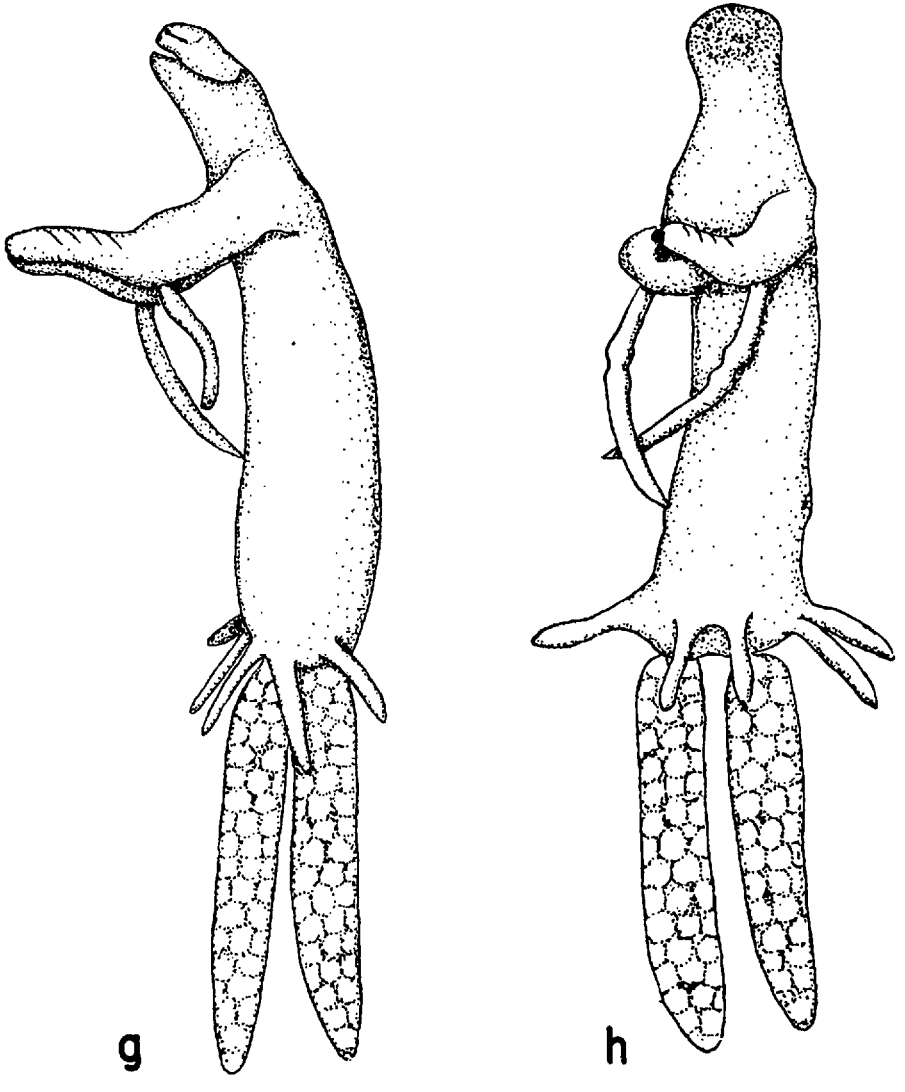

FIGURE 2. *Thysanote goodi,* n. sp. a, Lateral view. b, Ventral view.

lobiventri (with which *T. trilobate* may be identical), and *T. pomacanthi* in which the processes become progressively more and more branched.

Thysanote longimana Wilson, 1913

From pargo colorado, *Lutianus colorado,* Mazatlán, Sinaloa; San Blas, Nayarit; and Salina Cruz, Oaxaca; and from yellowtail snapper (rubia), *Ocyrus chrysurus,* at Anton Lizardo near Veracruz.

Genus *Naobranchia* Hesse, 1863

Naobranchia lizae (Krφyer), 1863

From *Mugil cephalus,* at Mazatlán, Sinaloa.

Anchorella Krφyer, 1837

Anchorella urolophi Krφyer, 1863

Reported by Krφyer (1863) off the Mexican coast. Wilson (1915) seemed to doubt the validity of this genus, and to regard it as synonymous with *Clavella.* He furthermore did not think that this species can be placed in the genus *Clavella.* Until additional specimens are found for study, it must remain uncertain as to validity and taxonomic position.

Genus *Brachiella* Cuvier, 1830

Brachiella gracilis Wilson, 1908

From ocean whitefish, *Caulolatilus princeps,* at Ensenada, B.C.; from berrugate, probably a local name for *C. princeps,* at Mazatlán, Sinaloa; from alacron, *Menticirrhus nasus?,* Salina Cruz, Oaxaca; and from the white croaker, *Genyonemus lineatus,* at Tehauntepec, Oaxaca, fishmarket.

Brachiella gulosa Wilson, 1915

From spotfin croaker, *Roncador stearnsi,* at Ensenada, B.C.

Brachiella sciaenophila Heller, 1865

A single specimen from a croaker, *Roncador stearnsi?,* at Ensenada, B.C.

Summary

Some 25 genera and 46 species of parasitic copepods are reported from fish of Mexican coastal waters, two of the species being new. This is disappointing and unsatisfactory, and shows how inadequate

the survey has been. To indicate the status of the "inventory" the following table is offered as approximately correct. The so-called semiparasitic copepods are omitted, and very few from invertebrates are included.

TABLE 1

PARASITIC COPEPODA FROM NORTH AMERICAN WATERS

Author	Locality	No. Genera	No. Species
Bere (1936)	Lemon Bay, Fla.	34	68
Causey (1953a)	Grand Isle, La.	15	24
Causey (1953b)	Port Aransas, Texas	23	45
Causey (1955)	Pascagoula, Miss.	22	30
Krøyer (1863)	New Orleans, La.	8	9
Pearse (1947, 1948)	Beaufort, N. C.	28	36
Pearse (1951)	Bimini, Bahamas	10	24
Pearse (1952a)	Port Aransas, Texas	33	56
Pearse (1952b)	Alligator Harbor, Fla.	25	47
Wilson (1913)	Jamaica	24	52
Wilson (1932)	Woods Hole, Mass.	69	121
Wilson (1935)	Dry Tortugas	28	37
Causey	Mexican Coasts	25	46

My checklist of the Gulf of Mexico copepods shows that 78 genera and 232 species (not including a few so-called semiparasitic species) have been reported, practically all having been found by two or more investigators. Most of these might well be expected to occur also on fish along the Mexican Gulf of Mexico. This is worth noting, as most of my Mexican records are from the Pacific Coast.

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