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Nota Científica

A parasitic copepod, *Neoalbionella* sp. (Lernaeopodidae), on the southern lanternshark *Etmopterus granulosus* (Etmopteridae) off Juan Fernández Archipelago, Chile

Un copépodo parásito, *Neoalbionella* sp. (Lernaeopodidae), en el tiburón linterna *Etmopterus granulosus* (Etmopteriidae) del archipiélago Juan Fernández, Chile

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Abstract.- The morphology of an as yet undetermined *Neoalbionella* species is described from specimens collected from the second dorsal fin of the southern lanternshark *Etmopterus granulosus*, caught at a submerged ridge off Juan Fernández Archipelago, Southeastern Pacific Ocean, Chile. Two features of the females suggest that this may be an undescribed species: the presence of one secondary denticle on the claw of the maxilliped, and three setae on the outer lobe of the maxillule. However, males are essential to describe new species of Lernaeopodidae but were not found. This is a new host and geographical record of *Neoalbionella* sp. off the Pacific coast of South America.

Key words: Parasites, elasmobranch hosts, Southeastern Pacific, taxonomy

Introduction

Four lernaeopodid copepod species parasitic on 6 elasmobranch hosts have been reported from the southeastern Pacific Ocean, off Chile (Muñoz & Olmos 2007). These are: *Lernaeopoda tenuis* Castro & Baeza, 1986 and *Pseudolernaeopoda caudocapta* Castro & Baeza, 1986 on *Triakis maculata* (Castro & Baeza 1986), *Brianella corniger* Wilson, 1915 on *Psammobatis* sp., *Sympterygia brevicaudata* and on an unidentified host species (Wilson 1915, Atria 1967, Castro & Baeza 1987), and *Pseudocharopinoides myliobatidos* Castro & Baeza, 1987 on *Myliobatis chilensis* (Castro & Baeza 1987). Kabata (1979) transferred four *Lernaeopoda* species to a new genus *Albionella*, mainly on the basis of the adult male morphology. In addition, Kabata (1986), Rubec & Hogans (1988), Benz & Izawa (1990), and Benz (1991a, b) noted that females of *Albionella* species could be separated from *Lernaeopoda* spp. by the presence of one secondary denticle on the claw of the maxilliped. In contrast, *Lernaeopoda* females have two or more secondary denticles present. The number of setae on the outer lobes of the maxillule is different: *Albionella* have three setae but there are two in *Lernaeopoda*. To date, six species have conformed to the generic diagnosis of *Albionella*. However, Özdikmen (2008) changed the name of nine crustacean genera, including *Albionella* which was changed to *Neoalbionella*: so its species became *Neoalbionella globosa* (Leigh-Sharpe, 1918), *N. centroscyllii* (Hansen, 1923), *N. longicaudata* (Hansen, 1923), *N. etmopteri* (Yamaguti, 1939), *N. fabricii* (Rubec & Hogans, 1988), and *N. kabatai* (Benz & Izawa, 1990).

Here, we report for the first time a *Neoalboniella* species from southern lanternshark *Etmopterus granulosus* (Günther, 1880) (Squaliformes: Etmopteridae) specimens collected off Juan Fernández Archipelago, southeastern Pacific Ocean, Chile.

Material and methods

Thirty two southern lanternsharks *Etmopterus granulosus* were caught at depths between 450 and 800 m in the submerged ridges off Juan Fernández Archipelago (31°15'S, 71°47´W), southeastern Pacific Ocean, Chile, during April-May 2006. Collected parasite specimens were deposited at the Museum of Zoology, University of Concepción, Chile (MZUC 33513).

The copepods were fixed and stored in 70% ethanol until processing, and then cleared and dissected in lactic acid. Drawings were made with the aid of a camera lucida on a H600 (40-1000x) light microscope and a binocular

dissecting scope Coleman (10-40x). Two specimens were examined under scanning electron microscopy (SEM) to reveal anatomical characteristics. Terminology conforms to that of Boxshall & Halsey (2004). Scientific and common name of the host are in accordance with Compagno *et al*. (2005). Measurements are in mm and ranges in parentheses.

Results and discussion

Four of 32 southern lanternsharks harbored *Neoalbionella* sp. and only ovigerous females of the copepod were found (prevalence 16.6%, abundance 0.125).

Description (based on 4 female specimens). Total body length (cephalothorax tip to tip of caudal rami) ranged between 5.8 and 6.2 mm. The cephalotorax dorsoventrally depressed and reflexed ventrally towards trunk (Fig. 1A, 2A, 2B). The dorsal cephalothoracic shield indistinct, truncated anteriorly, approximately 44.5% overall body length and the border between cephalothorax and trunk is delimited dorsally and ventrally by cuticular indentation. The anterior portion of trunk wrinkled and posterolateral boundaries rounded. The trunk dorsoventrally flattened, pyriform in dorsal and ventral view (Fig. 2B). The caudal rami located ventral to oviduct orifices, and each is armed with one long naked apical seta proximally (Fig. 2I). The egg sacs located dorsolateral to caudal rami (Fig. 2A), each is multiseriate and longer than the trunk. The antennule four-segmented (length = 0.068-0.070, Fig. 2C) and armed with setal elements as follows (base to apex): 0, 1, 1, 5. The antenna biramous (Fig. 2D) with an unarmed sympod; the exopod unsegmented with a lobated denticulate apical and outer

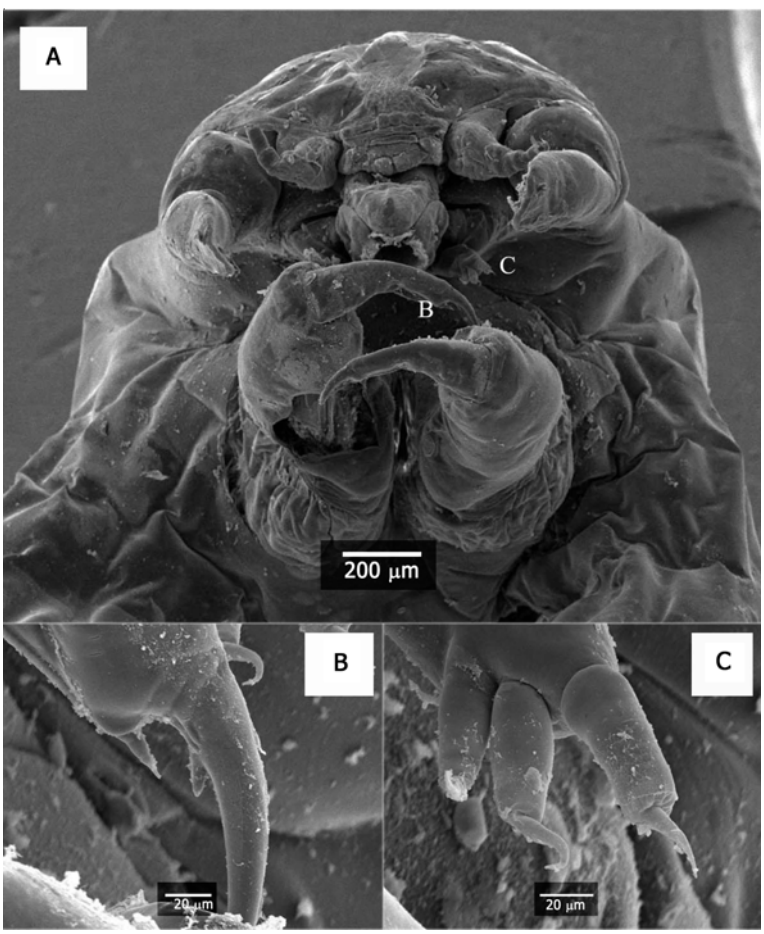

Figure 1. *Neoalbionella* **sp. SEM micrograph of an adult female. A) Apical view. B) Maxilliped. C) Maxillule** / *Neoalbionella* sp. Fotomicrografía en microscopio electrónico de barrido de una hembra adulta. **A)** Vista apical. **B**) Maxilípedo. **C**) Maxílula

margin (length = 0.34-0.35); with one small apical lateral spiniform element (Fig. 2D). The endopod two-segmented (length = 0.097-0.098), with the first segment bearing a small medial denticulate patch, and the second bearing one claw-like and three small, spiniform elements apically. The mouth cone and mandible are typical of the Lernaeopodidae (Fig. 2H), with a mandibular formula P1, S1, P1, S1, P1, S1, B4 (length = 0.114-0.116, maximum width = 0.045-0.047). The maxillule bilobate (Fig. 2E), outer lobe with three short naked apical setae, inner lobe with dorsal denticulate patch with three apical papillae each surmounted by a sturdy seta (length = 0.097-0.098). Maxillae forming cylindrical arms which are separate along their entire length except at the tip (Fig. 2F). They are slightly longer than the trunk body, tranversely wrinkled, tapering distally (length = 4.97-4.99). The bulla discoid (length = 0.314-0.318, width = 0.571-0.573, Fig. 2F). Maxillipeds (length = 0.328-0.331, width = 0.32-0.34) consisting of a broad corpus which tapers distally, and has denticulate cup on its distomedial border into which the opposing subchela fits (Fig. 2G, J). The myxal surface composed of a denticulate protuberance and more distal spiniform elements. The shaft of the subchela has one spiniform element approximately in the first-third of its length where shaft can opposes the denticulate cup on the corpus. There is a barb on the shaft just below the robust claw, which carries a small basal secondary denticle.

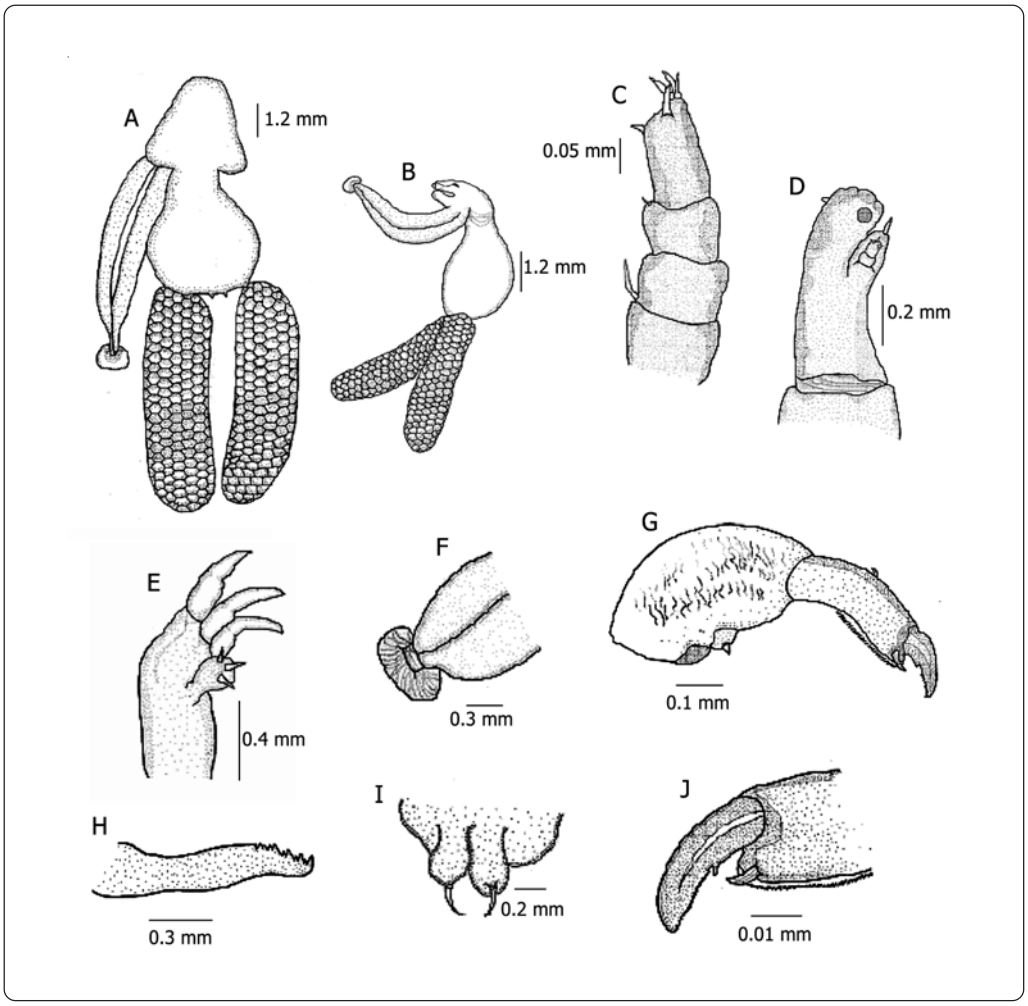

Figure 2. *Neoalbionella* **sp. adult female. A) Habitus dorsal. B) Habitus lateral. C) Antennule. D) Antenna. E) Maxillule. F) Maxillary arms and bulla. G) Maxilliped. H) Mandible. I) Caudal rami. J) Apex maxilliped shaft** / Hembra adulta de *Neoalbionella* sp. A) Habitus dorsal. B) Habitus lateral. C) Anténula. D) Antena. E) Maxílula. F) Extremo de la maxila y bula.G) Maxilípedo. H) Mandíbula. I) Ramas caudales. J) Ápice del maxilípedo

Table 1. Mean body length (mm), features of segmentation and apical armature of the antennule, and mandibular formula of females in *Neoalbionella* species / Longitud corporal promedio (mm), características de la segmentación y armadura apical de la anténula, y fórmula mandibular de las hembras de las especies descritas de *Neoalbionella*

	Body length mean	Antennule segmentation	Apical armature	Mandibular formula
Neoalbionella sp.	6.1	4	0, 1, 1, 5	P1, S1, P1, S1, P1, S1, B4
N. centroscyllii	4.3	4	0, 1, 1, 6	P1, S1, P1, S1, P1, S1, B5
N. etmopteri	4.6	4	0, 1, 1, 9	P1, S1, P1,S1, P1, S1, B4
N. fabricii	7.1	3	1, 1, 6	P2, S1, P1, S1, B5
N. globosa	2.5	4	0, 1, 1, 6	P1, S1, P1, S1, P1, S1, B4
N. kabatai	3.5	4	0, 1, 1, 7	P1, S1, P1, S1, P1, S1, B3
N. longicaudata	-	4	-	-
N. oviformis	4.1	4	0, 1, 1, 5	P2, S1, P1, S1, B6

In establishing the genus *Albionella* (now renamed *Neoalbionella*), existing species of *Lernaeopoda* were separated into two groups by Kabata (1979) solely on the basis of the morphological differences of the male. The differential generic diagnosis separating *Lernaeopoda* Blainville, 1822 from *Albionella*, now *Neoalbionella* was based solely on the morphology of the male (Kabata 1979). It would therefore be highly questionable to establish a new species of *Neoalbionella* based solely on the morphology of the female.

A female of *Neoalbionella* sp. described above is similar in structural features to some congeneric species in the following details (Table 1): (i) *N. etmopteri* and *N. globosa* both have the identical mandibular formula (Kabata 1979, Benz 1991b), (ii) *N. oviformis* have a similar apical armature of the antennule (Benz & Izawa 1990).

Females of this yet undetermined *Neoalbionella* species can be distinguished from all existing species in the genus by the following structural details (Table 1): *N. fabricii* is unique among *Neoalbionella* species in having an antennule of three segments instead of four, and two secondary teeth instead of three on the mandible. It can be easily distinguished from other members of the genus, except for *N. oviformis* and *N. longicaudata* by its long maxillae and caudal rami (Rubec & Hogans 1988). *Neoalbionella kabatai* has a shorter body length and a different apical armature of the antennule, the mandibular formula, the host species and geographical locality (Benz & Izawa 1990). *Neoalbionella etmopteri* is smaller and differs in the apical armature of the antennule (Benz 1991b). *Neoalbionella oviformis* is smaller and differs in the mandibular formula, in host species, *Squalus mitsukurii*, and in geographical locality, Japan (Benz 1991a). *Neoalbionella globosa* is the smallest species in the genus and also is different in the apical armature of the antennule, in host species, *Scylliorhinus caniculus*, and in geographical locality, British waters (Kabata 1979). *Neoalbionella centroscyllii* is also smaller and differs in the apical armature of the antennule and in mandibular formula, as well in host species, *Centroscyllium fabricii* and geographical locality, Canada (Kabata 1964).

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