

A new species of *Nothobomolochus* (Copepoda: Bomolochidae) parasitic on *Engraulis anchoita* (Pisces: Engraulidae) from Argentina

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Abstract. *Nothobomolochus cresseyi* sp. n. (Copepoda: Bomolochidae), a parasite from gills of the engraulid fish *Engraulis anchoita* Hubbs et Marini (Pisces: Engraulidae) from the coast of Argentina, is described and illustrated. The new species can be distinguished from other species of *Nothobomolochus* Vervoort, 1962 by the following combination of characters: three modified setae on the base of the antennule similar in length to the plumose setae, the nature of the armature of the third segment of the fourth endopod and the length and width of the thoracic somites 2 to 4 decreasing gradually. The new species represents the first record of this genus for Argentina.

Records of parasitic copepods of the family Bomolochidae Claus, 1875 in the South West Atlantic are mainly restricted to Brazil (Carvalho 1951, 1955, 1958, Cressey and Cressey 1980). In Argentinean waters, the family is represented only by one species of the genus *Bomolochus* von Nordmann, 1832, one species of *Holobomolochus* Vervoort, 1969 and one species of *Orbitocolax* Shen, 1957 (Vervoort and Ramírez 1968, Cressey and Cressey 1980, Rohde et al. 1995). A species of *Nothobomolochus* Vervoort, 1962 was collected from the gill filaments of *Engraulis anchoita* Hubbs et Marini, 1935 (Pisces: Engraulidae) from the Argentinean Sea. This species is described herein.

MATERIALS AND METHODS

The gills of 1,490 specimens of *Engraulis anchoita*, captured in coastal areas of Argentina and Uruguay (between 34 and 46°S) in October 1993, October 1994 and September 1995, were examined. The parasites were fixed in 70% alcohol; the appendages were dissected and cleared with lactic acid. The drawings were made with the aid of a camera lucida. Measurements are given in mm; the means are followed by the range in parentheses.

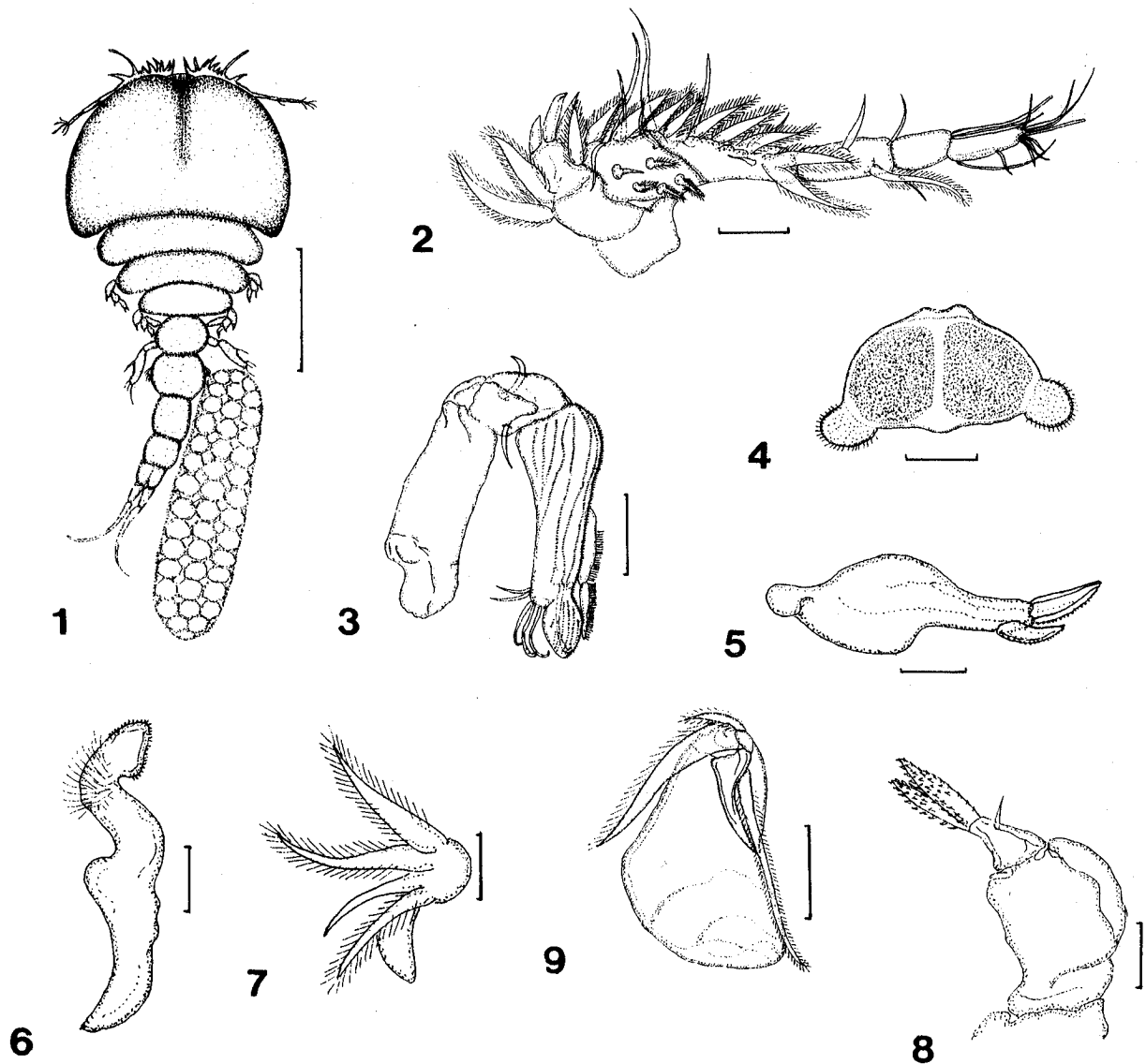
Nothobomolochus cresseyi sp. n. Figs. 1–16

Description

Female (Fig. 1): cephalothorax broader than long, with rounded anterior and lateral margins, convex in dorsal view, with longitudinal furrow slightly widening and deepening anteriorly, rostral plate prominent between bases of antennules. Second to fifth pedigers broader than long, gradually narrowing posteriorly, lateral margins of 2–4 pedigers covering, in dorsal view, basis of

legs. Genital complex about equally long and wide, with rounded lateral margins. Abdomen three-segmented, with segments smaller distally.

Antennule (Fig. 2) 6-segmented; with basal part 3-segmented and flattened with a dorsal chitinized plate and distal part (flagellum after Vervoort 1962) 3-segmented and cylindrical. Basal part with 9 slender and naked setae (one very long) and 4 plumose setae on ventral part in addition to 15 robust setae (of these, setae 3 to 5 from base of appendage, on chitinized plate, naked; fourth seta modified into hook, rest of setae plumose); first segment of distal part with 2 anterior and 2 posterior (one long and plumose) setae; second segment of distal part with 2 distal setae (1 anterior and one posterior) and one aesthete; terminal segment with 3 apical setae (2 long and one short) and one aesthete, 3 subapical setae and 1 lateral seta on posterior margin. Rostral area between bases of antennules, without ventral hooks. Antenna (Fig. 3) with 2-segmented sympod; first segment long, robust, subcylindrical, with slender seta near distal end; second segment short, with seta on ventral part of proximal end. Long first segment of endopod with irregular rows of hooklets becoming longer anteriorly and one distal row of long, slender spiniform setae continuing along margin of lamelliform process. Distal end with 4 articulated, curved spines and 2 slender setae. Labrum (Fig. 4) wider than long, with posterolateral lobes covered by setules and patch of spinules on each half, free posterior edge covering partially mandibles. Mandible (Fig. 5) with flat, rounded base and cylindrical shaft, large terminal process, subtriangular with sharp ventral margin and similar but smaller subterminal process. Paragnath (Fig. 6) curved backwards with marginal row of small denticles on distal borders,

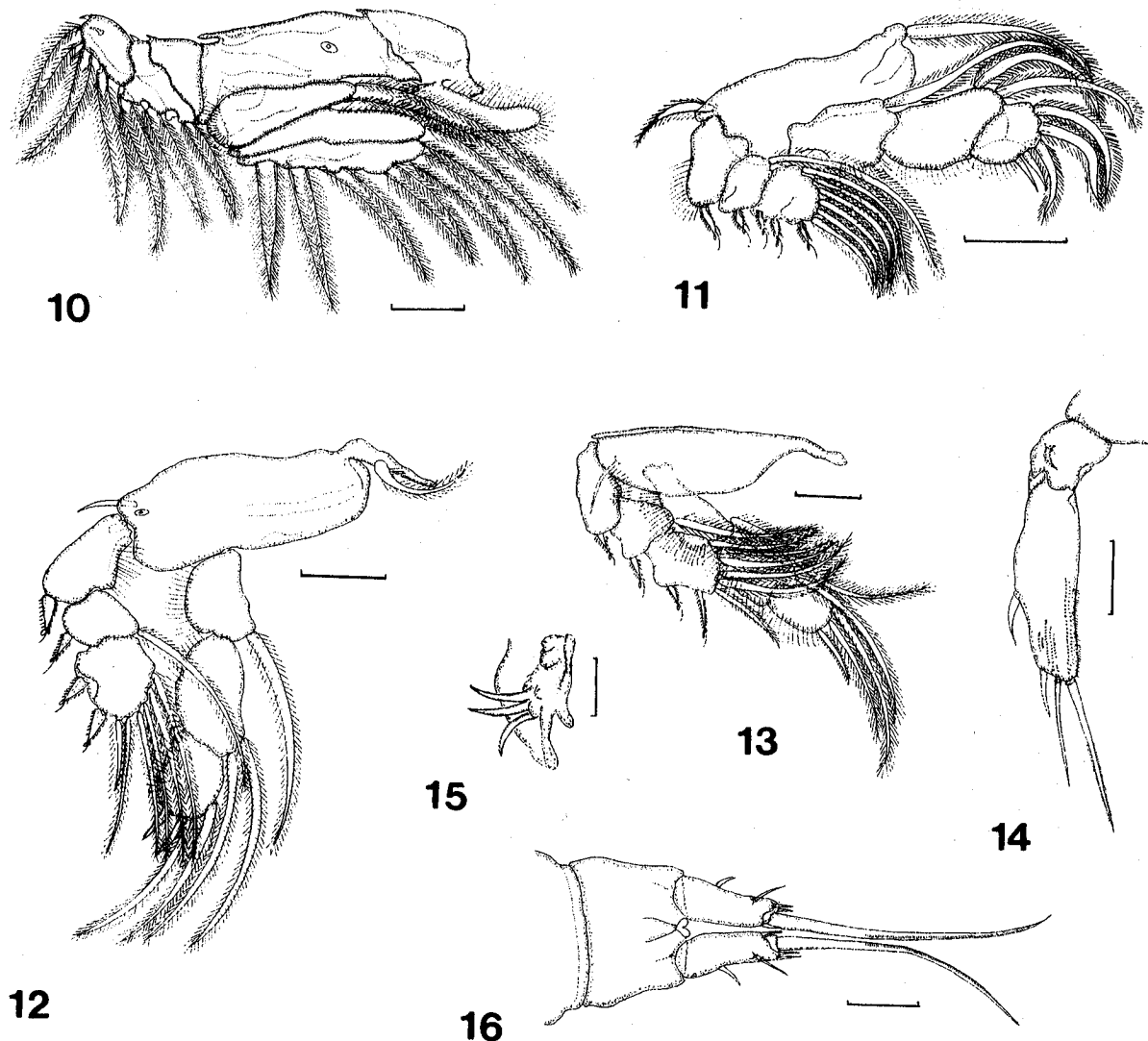


Figs. 1-9. *Nothobomolochus cresseyi* sp. n., female. Fig 1. Dorsal view; scale bar = 0.4 mm. Fig. 2. Antennule, ventral; scale bar = 0.05 mm. Fig. 3. Antenna, ventral; scale bar = 0.04 mm. Fig. 4. Labrum, ventral; scale bar = 0.08 mm. Fig. 5. Mandible, ventral; scale bar = 0.05 mm. Fig. 6. Paragnath, ventral; scale bar = 0.05 mm. Fig. 7. Maxillule, ventral; scale bar = 0.03 mm. Fig. 8. Maxilla, ventral; Scale bar = 0.04 mm. Fig. 9. Maxilliped, ventral; scale bar = 0.04 mm.

anterior margin convex and covered by setules. Maxillule (Fig. 7) rounded, with 3 stout plumose setae (2 long and 1 shorter) and one finer naked and more basal seta. Maxilla (Fig. 8) with broad proximal part and subcylindrical distal part with 2 terminal spinose processes of different size and short and naked subterminal seta. Maxilliped (Fig. 9) endopodite shaped as strong claw, with concave medial and lightly sigmoid lateral margins; widest one of three setae with setules on lateral margin and other two plumose. First to fourth legs (Figs. 10-13) with two-segmented sympods, biramous, all rami three-segmented and all setae plumose. Rami armature as follows (roman numbers: spines; arabic numbers: setae):

	endopod			exopod		
Leg 1	0-1	0-1	0-5	I-0	I-3	II-3
Leg 2	0-1	0-2	II-3	I-0	I-1	III-6
Leg 3	0-1	0-2	II-2	I-0	I-1	II-6
Leg 4	0-1	0-1	I-2	I-0	I-1	II-6

First leg (Fig. 10) strongly flattened, sympod with long lamelliform process fringed by setules. Lateral margin of segments of endopods fringed by setules. First segment of sympods 2 and 3 with plumose seta on medial margin, second segment of sympods 2 to 4 with dorsal seta on lateral margin. Spines of exopods 2 to 4 with serrations on margins. Spines of endopods finely fringed and with flagelliform terminal seta. Fifth leg



Figs. 10–16. *Nothobomolochus cresseyi* sp. n., female. **Fig. 10.** First leg, ventral; scale bar = 0.06 mm. **Fig. 11.** Second leg, ventral; scale bar = 0.08 mm. **Fig. 12.** Third leg, ventral; scale bar = 0.06 mm. **Fig. 13.** Fourth leg, ventral; scale bar = 0.05 mm. **Fig. 14.** Fifth leg, ventral; scale bar = 0.05 mm. **Fig. 15.** Sixth leg, ventral, scale bar = 0.05 mm. **Fig. 16.** Anal segment and caudal rami, ventral, scale bar = 0.5 mm.

(Fig. 14) two-segmented; first segment short, with single dorsolateral seta; second segment with patches of spinules and finely fringed in distal part of medial margin, three terminal setae decreasing in length laterally, longest with serrated distal margins, and fourth seta at midlength of lateral margin. Sixth leg (Fig. 15) reduced to three slender setae. Caudal rami (Fig. 16) scarcely shorter than anal segment, slightly more than twice as long as wide at base and slightly tapering posteriorly. Each ramus bearing 5 marginal setae and dorsal seta. Setae 1, 3, 4, and 5 and dorsal seta short and fine, seta 2 lengthened and thickened, with slightly swollen base and small spinules on internal margin; first seta sub-terminal, setae 2, 3 and 4 terminal, fifth inserts at upper

third of external margin and dorsal seta placed near distal, lateral border.

Measurements: total length 1.89 (1.53–2.66), cephalothorax length 0.54 (0.43–0.79); greatest cephalothorax width 0.70 (0.56–0.98), genital segment length 0.18 (0.14–0.23), genital segment width 0.20 (0.17–0.25); abdomen segments: first, length 0.14 (0.13–0.15), width 0.12 (0.11–0.15); second, length 0.12 (0.11–0.14), width 0.13 (0.12–0.14); third, length 0.09 (0.07–0.11), width 0.11 (0.09–0.13); caudal rami length 0.08 (0.07–0.08); caudal rami width 0.03 (0.03–0.04); egg sac length 0.85 (0.56–1.20); egg sac diameter 0.17 (0.15–0.19).

Male: unknown.

Type host: *Engraulis anchoita* Hubbs et Marini, 1935 (Clupeiformes: Engraulidae).

Habitat: gills.

Type locality: coastal area of Buenos Aires Province, Argentinean Sea (36°52'S; 55°28'W).

Type specimens: holotype (female) and 2 paratypes (females) deposited in the Collection of the Invertebrates Department (Crustaceans), Museo de La Plata, La Plata, Argentina; 1 paratype in the Institute of Parasitology, Academy of Sciences, České Budějovice, Czech Republic (Coll. No. Cr-3).

Record of specimens: 1 female (43°36'S; 6°49'W, October 1993); 1 female (41°30'S; 63°50'W, October 1993); 2 females (36°07'S; 54°27'W; October 1994); 3 females (36°52'S; 55°28'W, October 1994); 2 females (38°05'S; 57°32'W, September 1995). Prevalence 0.6%, mean intensity 1.

Etymology: The specific name is in a honour of Dr. Roger Cressey for his valuable contribution to the knowledge of the family Bomolochidae.

Comments: Of all the species of *Nothobomolochus* hitherto described, 8 of them, as well as the new species, exhibit three sclerotized elements on the base of the antennule similar in length as compared to the plumose setae: *N. denticulatus* (Bassett-Smith, 1898) from the Indian and Pacific Oceans (Pillai 1965, Monod 1970, Avdeev 1986), *N. gazzae* (Shen, 1957) from China (Vervoort 1962, Yamaguti 1963), *N. epulus* Vervoort, 1962 from Nigeria (Vervoort 1962), *N. digitatus*

Cressey et Collette, 1970 from the Indo-West Pacific (Cressey and Collette 1970), *N. elegans* Avdeev, 1977 from the Pacific and Indian Oceans (Avdeev 1977), *N. atlanticus* Avdeev, 1978 from the tropical Atlantic Ocean (Avdeev 1978), *N. marginatus* Avdeev, 1986 from the Pacific Ocean (Avdeev 1986) and *N. sigani* Hameed et Kumar, 1986 from India (Hameed and Kumar 1986).

Nevertheless, the new species differs from all these species by the armature of the third segment of the fourth endopod: I-2 in the new species, I-1-I in the others. Furthermore, in *N. denticulatus*, *N. gazzae*, *N. epulus*, *N. digitatus*, *N. marginatus* and *N. sigani* the third pediger overlaps partially or completely the fourth, or the fourth and fifth pedigers, and in *N. epulus*, *N. digitatus*, *N. marginatus*, *N. atlanticus* and *N. elegans* the middle process of the sclerotized ones on the basal part of the antennule is not apically curved as a hook. Based on these differences we propose a new species, *Nothobomolochus cresseyi*.

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