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Crustaceana 96 (6) 595-600

CRUSTACEANA



ANOMALOCOLAX NEMIPTERI GEN. ET SP. NOV. (COPEPODA,
CYCLOPOIDA, BOMOLOCHIDAE) RECOVERED FROM *NEMIPTERUS*
JAPONICUS (BLOCH, 1791) (ACTINOPTERYGII) IN JAPAN

BY

KUNIHICO IZAWA¹⁾

Izawa Marine Biological Laboratory, 795-16 Kannonji, Tsu, Mie 514-0062, Japan

ABSTRACT

Anomalocolax nemipteri gen. et sp. nov. is described based on a single specimen of the female recovered from the bucco-branchial cavity of the Japanese threadfin bream, *Nemipterus japonicus* (Bloch, 1792) (Nemipteridae) in Japan. This species is unique in the family in having one process on the first free segment of the antennule in addition to five plumose setae in the adult female.

Key words. — Parasitic copepods, Cyclopoida, Bomolochidae, new genus, Actinopterygii

RÉSUMÉ

Anomalocolax nemipteri gen. et sp. nov. est décrite à partir d'un unique spécimen femelle collecté dans la cavité bucco-branchiale de la cohana japonaise, *Nemipterus japonicus* (Bloch, 1792) (Nemipteridae), au Japon. Cette espèce est unique dans la famille par la présence d'un processus sur le premier segment libre de l'antennule en plus de cinq soies plumueuses chez la femelle adulte.

Mots clés. — Copépodes parasites, Cyclopoida, Bomolochidae, genre nouveau, Actinopterygii

INTRODUCTION

Anomalocolax nemipteri gen. et sp. nov. is described based on a single specimen of the female recovered from the bucco-branchial cavity of the Japanese threadfin bream *Nemipterus japonicus* (Bloch, 1791) (Nemipteridae) in Japan. This species is unique in the family in having one process on the first free segment of the antennule in addition to five plumose setae in the adult female.

¹⁾ e-mail: izawakun@zc.ztv.ne.jp

MATERIAL AND METHODS

Specimens recovered from hosts were fixed in formalin and preserved in 70% alcohol. The specimens were stained with chlorazol black E in lactic acid and examined with a differential interference contrast microscope using the “wooden slide method” of Humes & Gooding (1964). Drawings were made with the aid of a drawing tube. The terminology for copepod morphology is based on Huys & Boxshall (1991). Common and scientific names of the hosts follow Froese & Pauly (2023). The specimens were deposited in the National Museum of Nature and Science, Tsukuba (NSMT).

TAXONOMIC DESCRIPTIONS

Anomalocolax gen. nov.

Female.— The first free segment of the antennule bears one process in addition to 5 plumose setae. Rostral plate with ventral processes. Maxilliped without accessory process on claw. Legs 2-4 with 3-segmented rami, coxae of legs 2-4 without medial seta. Endopod segment 3 of leg 1 with lateral spine. Exopod segment 3 with 4 setae in legs 2-4. Endopod segment 2 with 2 medial setae only in leg 2. Medial setae on endopod segments 1 and 2 of leg 4 replaced by spines.

Male.— Unknown.

Type species.— *Anomalocolax nemipteri* sp. nov.

Etymology.— The generic name, with the prefix “anomalo” [= anomalous] refers to its unique armature of the first free segment of the antennule; the gender of the name is masculine.

Remarks.— This genus is unique in that the first free segment of the antennule bears one process besides five plumose setae in the adult female.

Anomalocolax nemipteri sp. nov.

(figs. 1-2)

Material examined.— One female from the bucco-branchial cavity of the Japanese threadfin bream *Nemipterus japonicus* (Bloch, 1791) (Nemipteridae), landed in Shimane Prefecture, on 8 September 2022 (NSMT K-889).

Etymology.— The specific name refers to the generic name of the host. It is a noun in the genitive singular.

Female (figs. 1-2).— Habitus (fig. 1A), body length excluding caudal rami 2.01 mm ($n = 1$), cephalothorax 1.6 times as wide as long, 0.46×0.72 mm, with pair of processes anteriorly on cephalic shield (fig. 1D), width ratios of pedigers 2 and 3 to cephalothorax 0.79 and 0.74, respectively. Genital somite about 1.1

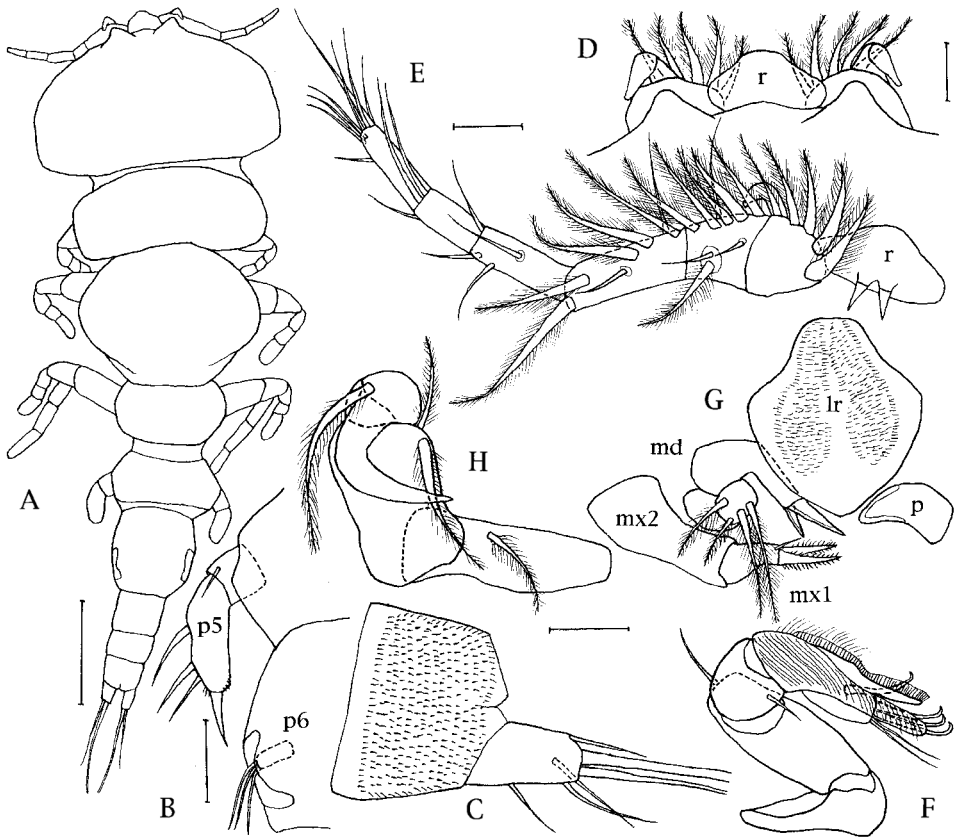


Fig. 1. *Anomalocolax nemipteri* gen. et sp. nov., female. A, Habitus, dorsal; B, legs 5 and 6, dorsal; C, anal somite and caudal ramus, ventral; D, rostral plate, first free segment of antennule, and anterior portion of cephalic shield, dorsal; E, rostral plate and antennule, ventral; F, antenna, ventral; G, mouthparts, ventral; H, maxilliped, ventral. Abbreviations: lr, labrum; md, mandible; mx1, maxillule; mx2, maxilla; p, paragnath; p5, leg 5; p6, leg 6; r, rostral plate. Scale bars: 0.3 mm for A; 0.1 mm for B; 0.05 mm for C-H.

times as wide as long, with leg 6 in dorsolateral gonopore of each side (fig. 1B, p6), represented by small lobe tipped by 3 setae. Abdomen 3-segmented, anal somite about 1.3 times as wide as long, spinulose ventrally (fig. 1C). Caudal ramus (fig. 1C) about 1.7 times as long as wide, with 6 setae including 2 major setae. Egg sac 0.91×0.34 mm ($n = 1$), egg 0.10 mm in diameter.

Rostral plate (fig. 1D, E) convex anteriorly, with sharply pointed ventral processes. Antennule (fig. 1E) 7-segmented, first segment forming pedestal, number of setal elements per segment (base to apex) as follows: 0, 5 + 1 process, 5 + 4, 5 + 2, 4, 3, 8. Antenna (fig. 1F) 5-segmented, first segment unarmed, second with distal seta, third with medial seta, fourth narrowed distally, bearing diagonal

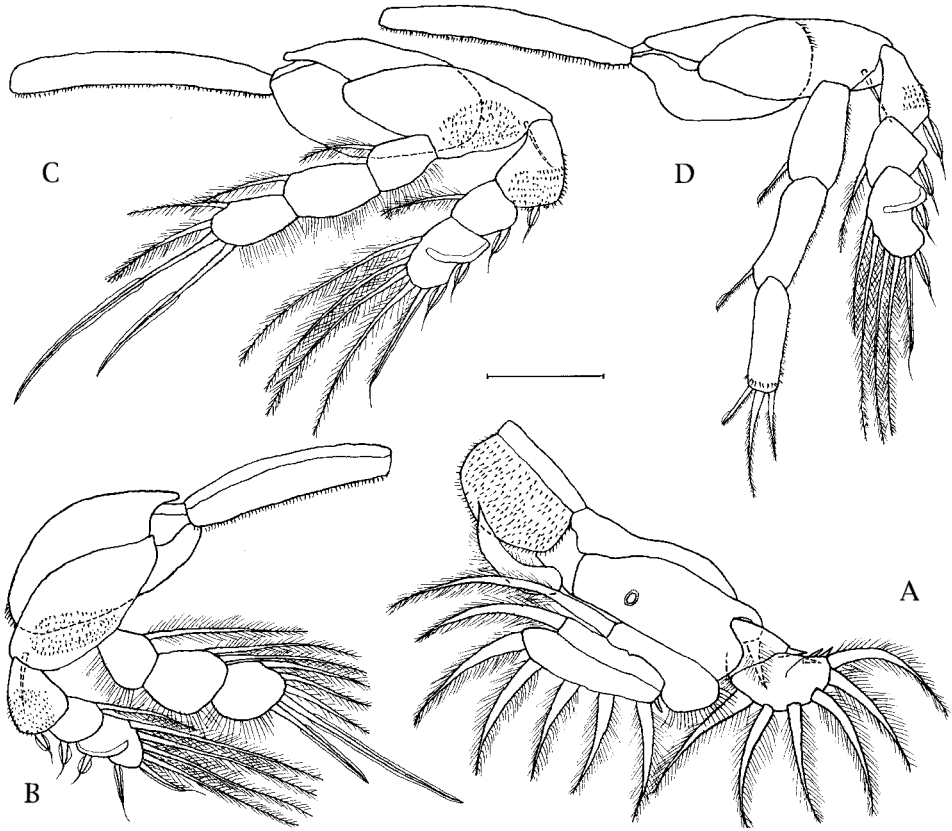


Fig. 2. *Anomalocolax nemipteri* gen. et sp. nov., female. A, Leg 1, ventral; B, leg 2, ventral; C, leg 3, ventral; D, leg 4, ventral. Scale bar: 0.1 mm for A-D.

rows of grooves ventrally, ciliate anterodorsally, with comb-plate and hook-like seta anteriorly, fifth with 3 hook-like setae and 2 simple setae distally.

Mouthparts (fig. 1G), labrum (lr) spinulose ventrally; mandible (md) with 2 blades; paragnath (p) thumb-shaped, pectinate on distal lobe; maxillule (mx1) with 4 setae; maxilla (mx2) 2-segmented, second segment with setula distally and tipped by 2 pectinate processes; labium indiscernible. Maxilliped (fig. 1H) 3-segmented, syncoxa with seta anteriorly, basis roughly quadrangular, with 2 setae mediolaterally, endopod forming recurved claw, claw with seta proximally, without accessory process.

Legs 1-4 (fig. 2A-D) each with intercoxal plate, biramous, rami 3-segmented except 2-segmented exopod of leg 1. Formulae for spines (Roman numerals) and setae (Arabic numerals) of these legs as follows:

Leg 1 coxa 0-1 basis 1-1 exopod I-0; III, 6 endopod 0-1; 0-1; I, 5

Leg 2 coxa 0-0 basis 1-0 exopod I-0; I-1; II, I, 4 endopod 0-1; 0-2; II, 3

Leg 3 coxa 0-0 basis 1-0 exopod I-0; I-1; II, I, 4 endopod 0-1; 0-1; II, 2
Leg 4 coxa 0-0 basis 1-0 exopod I-0; I-1; II, I, 4 endopod 0-1; 0-1; I, 1, I

Medial seta of leg 1 basis atrophied, lateral spines of exopods of legs 2-4 pectinate on both sides, tipped with flagella, distal spines of exopod segments 3 of legs 2-4 pectinate laterally and pinnate medially, distal spines of endopod segments 3 of legs 2 and 3 pectinate on both sides, much longer than setae of this segment. Medial spines of endopod segments 1-3 of leg 4 pectinate laterally, with membranous fringe mediodistally. Leg 5 (fig. 1B, p5) 2-segmented, first segment with dorsodistal seta, second segment 4.5 times as long as wide, with 4 setal elements.

Male.— Unknown.

Remarks.— Bomolochidae Claus, 1875 consists of 24 genera (cf. Walter & Boxshall, 2023) other than *Anomalocolax* gen. nov. The new species, *A. nemipteri* sp. nov. is unique in the family in having one process besides five plumose setae on the first free segment of the antennule in the adult female. Studies on the postembryonic development of parasitic copepods indicate that the first free segment of the antennule bears 2 setae in copepodids I and II, and then gets one additional seta per stage in copepodids III-V, while the number of setae on the segment is complete in copepodid V (5 plumose setae) in Bomolochidae and Taeniacanthidae Wilson C.B., 1911 (cf. Izawa, 1986, 2021). Although one to three setae of the 5 plumose ones may be modified to form spine(s)/process(es) in the female in copepodid VI (adult) in the Bomolochidae (cf. Boxshall & Halsey, 2004). In regard of the homology of the unique process described above for this new species, this obviously has yet to be elucidated.

ACKNOWLEDGEMENT

Hearty thanks are due to anonymous reviewers and to the editors of *Crustaceana* for their useful suggestions in ameliorating the manuscript.

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First received 22 March 2023.

Final version accepted 22 April 2023. Published online 16 June 2023.