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DISSONUS PASTINUM N. SP. (SIPHONOSTOMATOIDA: DISSONIDAE), A COPEPOD PARASITIC ON A HORN SHARK FROM JAPAN

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ABSTRACT

A new species of siphonostomatoid copepod, *Dissonus pastinum*, is described from the horn shark, *Heterodontus japonicus* (Dumeril), from Awa, Japan. The new species differs from all congeners except *D. ruveti* Nunes-Ruivo & Fourmanoir, 1956 and *D. nudiventris* Kabata, 1965 by the presence of the sternal furca and absence of spines on the genital complex. However, the new species can be distinguished from *D. ruveti* by having a 1-segmented abdomen and from *D. nudiventris* by the absence of a large accessory spine on the second antennal claw.

INTRODUCTION

Ten species of *Dissonus*, a genus infecting the gills and external body surfaces of both elasmobranchs and teleosts and belonging to the monotypic family Dissonidae, have so far been described. They are (in alphabetical order): *D. furcatus* Kirtisinghe, 1950, *D. glaber* Kurtz, 1924, *D. heronensis* Kabata, 1966, *D. kapuri* (Ummerkutty, 1976), *D. manteri* Kabata, 1966, *D. nudiventris* Kabata, 1965, *D. ruveti* Nunes-Ruivo & Fourmanoir, 1956, *D. similis* Kabata, 1966, *D. spinifer* Wilson, 1906, and an unnamed species described by Pillai (1968) from the gills of *Trygon* sp. examined at Trivandrum, India. All these species have been reported only from the Indo-Pacific region, specifically off India, Sri Lanka, Madagascar, and Australia.

During a Short Term Visitor Appointment from the Smithsonian Institution in June 1989, the first author (GBD) examined a single specimen of the horn shark *Heterodontus japonicus*

(Dumeril) collected in Japan and housed at the Museum Support Center, Museum of Natural History, Smithsonian Institution. From the gill filaments of the host, he collected specimens of a new species of *Dissonus* which is described in the present paper. This report is the first record of this genus of parasitic copepod occurring in Japanese waters.

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Most of all we acknowledge and honor our friend and colleague Dr. Jan H. Stock for his many contributions to the study of Crustacea,

particularly of parasitic Copepoda. He has helped establish a firm foundation on which future researchers can build. Our hats and our champagne glasses are tipped in honor of his retirement!

SYSTEMATIC DESCRIPTION

Dissonus pastinum n. sp. (Figs. 1-2)

Material examined. 1 holotype female (USNM 241680) and 5 female paratypes (USNM 241679) (1 dissected on slide, and in collection of second author) collected from the Japanese horn shark, *Heterodontus japonicus* (Dumeril) off Awa, Japan.

Female. Body as in Fig. 1A. Total length 3.48 mm (3.46-3.51 mm) based on 3 specimens. Cephalothorax, composed of cephalosome and first pedigerous somite, wider than long, 0.83 mm (0.81-0.86 mm) × 1.53 mm (1.49-1.57 mm); frontal plate conspicuous; tips of first antennae not extending beyond lateral margins of cephalothorax; cephalic zone demarcated from lateral zones by longitudinal sclerotized ridges; lateral zones extending to midregion of second pedigerous somite, and each bearing sensory pit in posterolateral corner. Second pedigerous somite, 0.37 mm (0.33-0.38 mm) × 1.10 mm (1.06-1.14 mm), with lateral extensions, or epimera; lateral margins of somite rimmed with transparent membranes. Third pedigerous somite narrower than preceding somite, 0.32 mm (0.30-0.35 mm) × 0.90 mm (0.86-0.94 mm). Fourth pedigerous somite approximately 2 × wider than long, 0.35 mm (0.30-0.40 mm) × 0.67 mm (0.63-0.73 mm). Genital complex ovoid, longer than wide, 1.26 mm (1.11-1.39 mm) × 0.96 mm (0.91-0.99 mm); bifid spines on ventral surface of genital complex of several congeners absent. Abdomen (Fig. 1B) 1-segmented, subquadrangular, about as long as wide, 0.26 mm (0.24-0.29 mm) × 0.23 mm (0.21-0.24 mm). Caudal ramus (Fig. 1B) 0.12 mm (0.11-0.12 mm) × 0.08 mm (0.06-0.09 mm), with medial row of setules, and bearing 6 pinnate setae; posterior setiferous margin V-shaped.

First antenna (Fig. 1C) 2-segmented; first segment slightly inflated, carrying 27 naked setae; second segment cylindrical, with 1 subterminal seta at about midlength and 12 + 1 aesthete (2 slender posterior setae sharing common base) (possibly 11 + 2 aesthetes; refer to Fig. 1C). Second antenna (Fig. 1D) apparently 4-segmented; first 2 segments relatively small and unarmed; third segment robust, quad-angular, and without dorsal adhesion pad; terminal segment a curved claw bearing 2 naked setae. Mouth tube caligiform, 320 × 220 μm. Mandible (Fig. 1E) tripartite, with third and fourth segments fused, and equipped with 12 teeth. First maxilla (Fig. 1F) consisting of setiferous lobe and dentiform process which is tipped with 1 bipartite setiform element and a small hyaline lobe; rounded sclerotized process (Fig. 1F) posteromedial to first maxilla. Second maxilla (Fig. 2A) brachiform; fan-shaped structure, formed by curved row of hyaline spatulate elements (scalelike spinules) (see call-out of Fig. 2A), near distal end of brachium, and possibly representing a displaced flabellum, but most likely modified cristae (see Remarks); calamus with 4 serrated membranes (1 hidden from view in Fig. 2A); canna with 1 serrated membrane. Maxilliped (Fig. 2B) 3-segmented; corpus with 1-2 spinules on inner margin and attached to transparent membrane and sclerotized supporting bar at base; junction of shaft and claw with 1 small seta. Sternal furca (Fig. 2C) with pair of rounded anterior protuberances and 2 slender parallel tines whose tips extended to level of intercoxal plate of leg 1.

Legs 1-4 (Figs. 2D-J) biramous. Armature formula as follows (Roman numerals indicating spines, Arabic numerals setae):

P1	sympod 1-1		exopod I-0; III, I, 3 endopod 0-0; 3
P2	coxa 0-1	basis 1-0	exopod I-1; I-1; III, 5 endopod 0-1; 0-2; 6
P3	coxa 0-1	basis 1-0	exopod I-1; I-1; III, 5 endopod 0-1; 0-2; 4
P4	coxa 0-1	basis 1-0	exopod I-1; I-1; III, 5 endopod 0-1; 0-2; 3

Leg 1 (Fig. 2D) with 2-segmented rami; sympod with sclerotized flange at junction of coxa

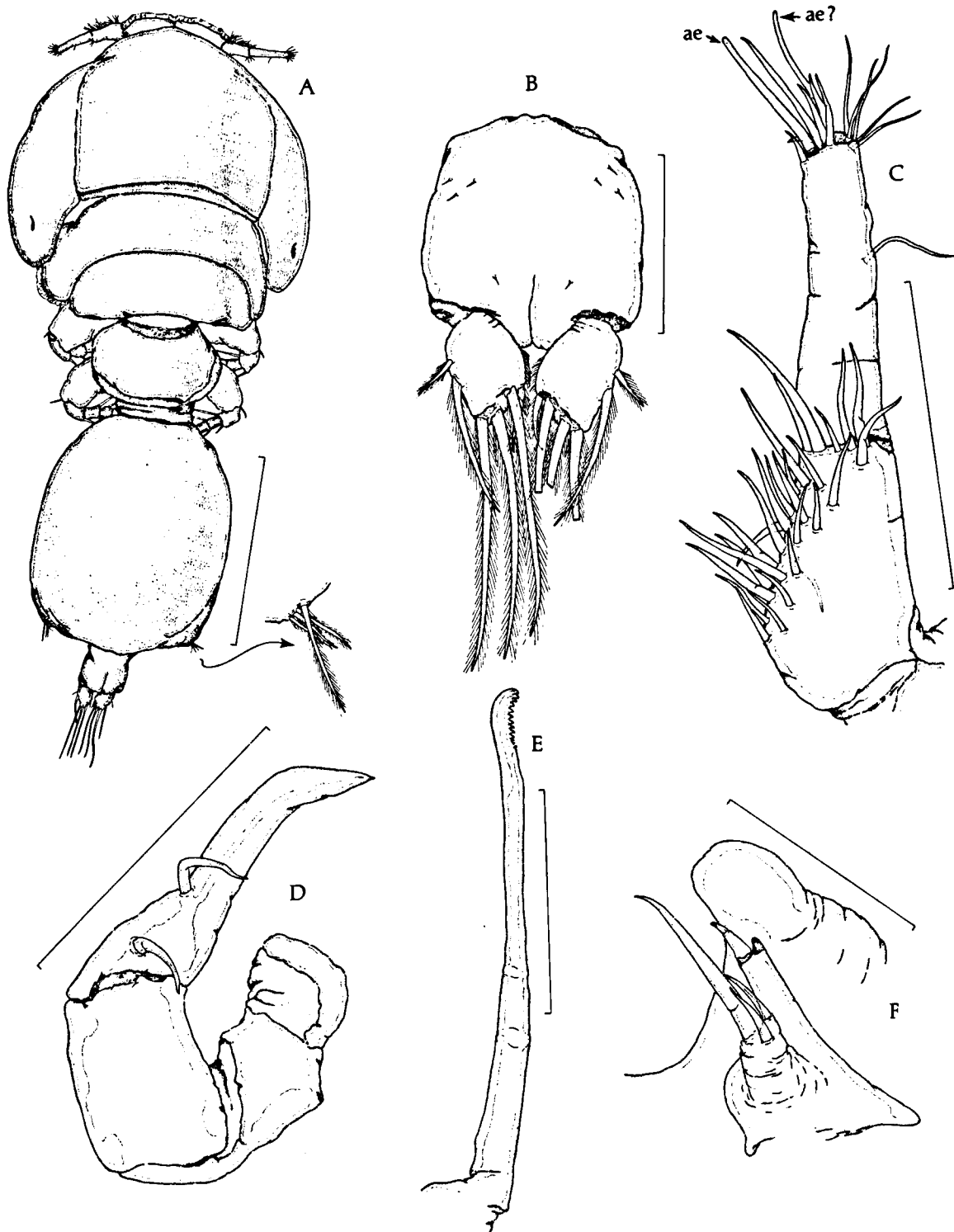


Fig. 1. *Dissonus pastinum* n. sp., female: A, body, dorsal (call-out shows magnified view of leg 5); B, abdomen and caudal rami, ventral; C, first antenna, ventral; D, second antenna, ventral; E, mandible, ventral; F, first maxilla and rounded sclerotized process, ventral. Scales: 1.0 mm in A; 0.1 mm in E, F; 0.2 mm in B-D. Symbol: ae = aesthete.

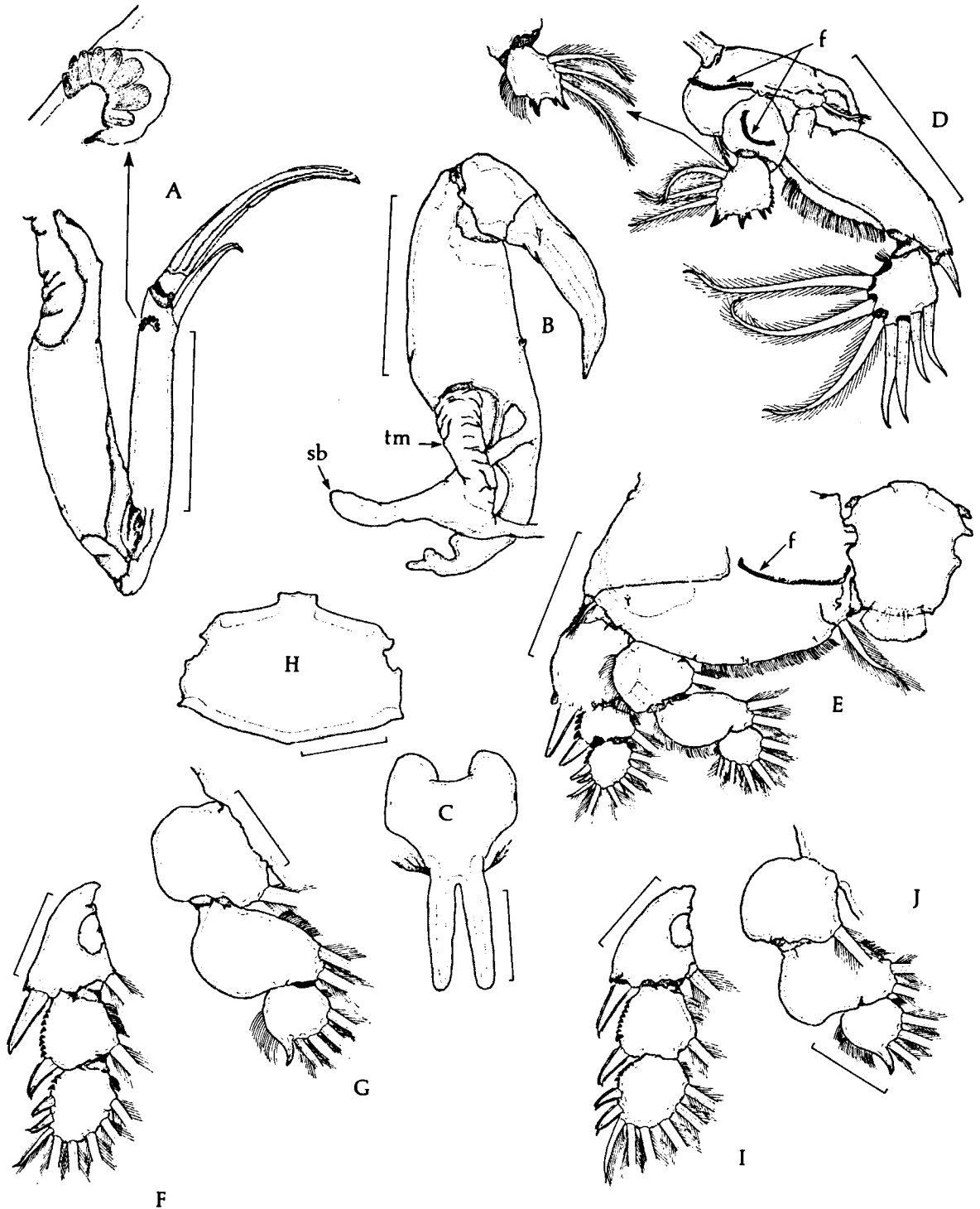


Fig. 2. *Dissonus pastinum* n. sp., female: A, second maxilla, dorsal (call-out shows magnified view of cristae); B, maxilliped, dorsal; C, sternal furca, ventral; D, leg 1, ventral; E, leg 2 and intercoxal plate, ventral; F, leg 3 exopod, ventral; G, leg 3 endopod, ventral; H, leg 4 intercoxal plate, ventral; I, leg 4 exopod, ventral; J, leg 4 endopod, ventral. Scales: 0.2 mm in A, D, E; 0.3 mm in B; 0.1 mm in C, F-J. Symbols: f = flange; tm = transparent membrane; sb = supporting bar.

and basis near intercoxal plate. First exopodal segment with minutely serrated membrane at base of large distal spine bearing setiform tip (bifid tip in some specimens), and equipped with row of setules along inner margin; second segment with 4 spines (each sclerotized only along proximal half), 3 pinnate setae, and short inner row of setules. Endopod 2-segmented; first segment with curved sclerotized flange on ventral surface; second segment with lateral row of spiniform processes of varying sizes (combination of row of setules and spiniform processes in one specimen; see call-out of Fig. 2D) and 3 pinnate setae. Leg 2 (Fig. 2E) with striated membrane on posterior margin of intercoxal plate; coxa and basis with large sclerotized protuberance near lateral margin of dorsal surface, and conspicuous flange on ventral surface at junction of coxa and basis near intercoxal plate; basis with inner row of setules; lateral margins of basis, coxa, and first exopodal segment with usual large fringing membranes (not drawn in Fig. 2E) on dorsal surface. Exopod with first spine bearing minutely serrated membrane at base; second and third exopodal segments each with a row of spiniform processes on lateral margin and row of setules on inner margin; first 4 exopodal spines with 2 rows of serrations (or denticles); innermost spine of terminal segment not highly sclerotized and armed with 1 row of inner pinnae. Endopod with outer (lateral) row of setules on all 3 segments. Leg 3 similar to leg 2; intercoxal plate, and basis as in leg 2; coxa lacking conspicuous flange on ventral surface near intercoxal plate; lateral fringing membrane on coxa reduced to small dorsal longitudinal strip, but absent on basis and first exopodal segment. Exopod (Fig. 2F) with lateral margin of second segment bearing 6-8 spiniform processes; terminal segment with second and third spines each tipped with setiform elements. Endopod (Fig. 2G) with lateral margins of first and second segments inflated; third segment with outwardly curved spiniform process. Leg 4 as in leg 3 except intercoxal plate (Fig. 2H) lacking striated membrane on posterior margin; dorsal fringing membrane on coxa absent. Exopod

(Fig. 2I) with outer margin of terminal segment having 5 spiniform processes. Endopod (Fig. 2J) with only 3 pinnate setae on terminal segment. Leg 5 (see call-out of Fig. 1A) represented by 4 pinnate setae.

Etymology. The specific name *pastinum*, Latin for a two-pronged instrument for digging, alludes to the shape of the sternal furca; the name is a neuter noun standing in apposition to the generic name.

Remarks. Two species of *Dissonus*, *D. nudiventris* and *D. ruveti*, are known to possess the sternal furca besides *D. pastinum*. The new species differs from *D. ruveti* in the shape of the genital complex (triangular in *D. ruveti*), segmentation of the abdomen (2-segmented in *D. ruveti*), and the ornamentation of the terminal segment of the leg 1 endopod (row of setules in *D. ruveti*) (refer to Nunes-Ruivo & Fourmanoir, 1956). It differs from *D. nudiventris* in the absence of the accessory tine on the second antennal claw, the absence of the long spinules or setules of the cristae of the second maxilla, the length of the sternal furcal tines, and the ornamentation of the terminal endopodal segment of leg 1 (see Kabata, 1965).

The curved row of scalelike spinules, a feature of the new species not found in congeners and located near the distal end of the brachium of the second maxilla, may represent either a displaced flabellum or a modified cristae. Since the flabellum in the members of the caligiform complex, to which the *Dissonidae* belongs along with the *Trebiidae*, *Caligidae*, *Pandaridae*, and *Cecropidae*, is usually positioned at midlength of the brachium, a migration of this structure to a more distal spot is required for this homology to be accepted. Also, the flabellum is typically a longitudinal striated membrane, and not the curved row of scalelike spinules observed in this structure. More likely, this fan-shaped structure is homologous to the cristae, a group of setules situated in about the same location on the brachium (see Kabata, 1965; Fig. 5). A modification of the simple setules of the original cristae to scalelike spinules would suffice to support this homology.

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