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NEW POECILOSTOMATOID COPEPOD (ANTHESSIIDAE) ASSOCIATED WITH THE OPISTHOBANCH *DISCODORIS HEATHI* OFF CALIFORNIA

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ABSTRACT

Katanthessius stocki new species, associated with the opisthobranch *Discodoris heathi* off California, is distinguished from *Katanthessius delamarei*, its only congener, by its smaller size, the 1 - segmented endopod in leg 4, and the strongly recurved claw on the maxilliped of the male.

RÉSUMÉ

Katanthessius stocki une espèce nouvelle, associée à l'opisthobranch *Discodoris heathi* sur la côte de la Californie, se distingue de *Katanthessius delamarei*, sa seule congénère, par sa plus petite taille, l'endopodite de la quatrième patte avec un seul article, et la griffe du maxillipède du mâle fortement recourbée.

INTRODUCTION

Copepods are well known as associates or parasites of opisthobranchs, where they occur on the gills or body surface or burrow into the cerata of the host. Relatively few copepods associated with opisthobranchs have been reported from the west coast of North America. *Pseudomolgus navanacis* Wilson, 1935, was found on the outer surface of the tectibranch *Navanax inermis* (Cooper) at Laguna Beach, Anaheim Slough, and La

Jolla, California (Wilson, 1935). *Anthessius lighti* Illg, 1960, occurred on the tectibranch *Aplysia californica* Cooper at Bodega Bay, California (Illg, 1960). *Anthessius obtusispina* Ho, 1983, was described from the notaspidean *Pleurobranchus californica* MacFarland off Santa Barbara, California (Ho, 1983). *Anthessius* sp. occurred on an undetermined tectibranch in California (Monod & Dollfus, 1932). *Hemicyclops thysanotus* Wilson, 1935, was described from specimens found on the outside surface of *Hermisenda crassicornis*

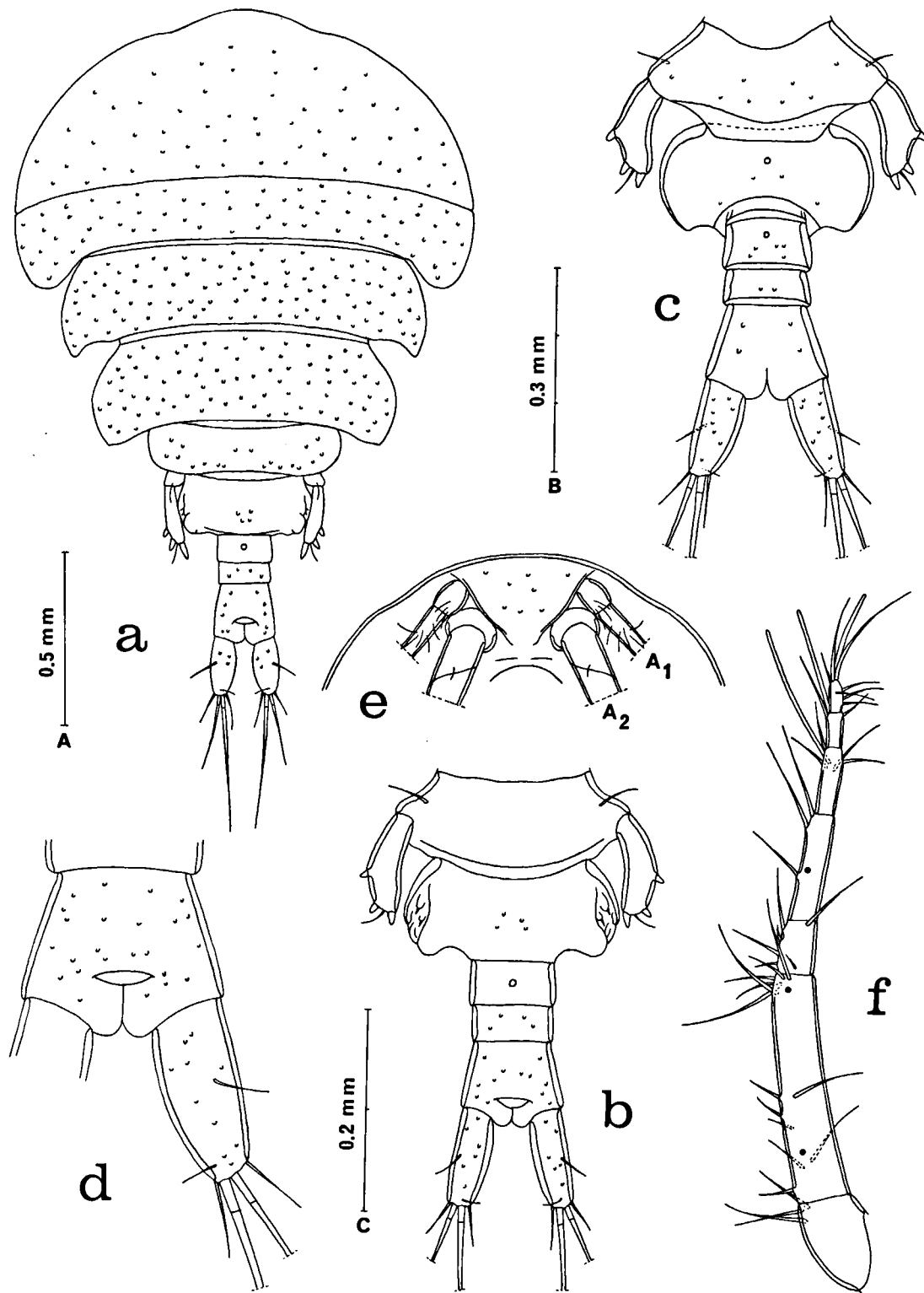


Fig. 1. *Katanthessius stocki* n.sp., female. a, body, dorsal (scale A); b, urosome, dorsal (B); c, urosome, ventral (B); d, anal somite and caudal ramus, dorsal (C); e, rostrum, ventral (A); f, antennule (with 3 dots showing positions of aesthetascs in male), dorsal (C). A₁ = antennule, A₂ = antenna.

Eschscholtz in Elkhorn Slough, Monterey Bay, California (Wilson, 1935) (see also Gooding, 1960). *Ismaila occulta* Ho, 1981, was found on the nudibranch *Dendronotus iris* Cooper, 1863, at Alamitos Bay, Long Beach, California (Ho, 1981). The larval stages of this copepod were later described by Ho (1987a) from the same host and locality. Belcik (1981) reported *Ismaila monstrosa* Bergh, 1867, from *Antiopella* (= *Janolus*) *fusca* (O'Donoghue, 1914) near Coos Bay, Oregon. (Ho, 1967b, recognized Belcik's Oregonian specimens of *Ismaila monstrosa* as a new species, *Ismaila belciki* Ho, 1967). Belcik (1981) mentioned that Illg (in litt., 1964) had collected splanchnotrophid copepods from the cephalaspidean *Aglaja diomedea*, and from the nudibranchs *Dirona* and *Triopha* and that he (Illg) had material from the nudibranchs *Dendronotus* and *Eubranthus* in California. Monod & Dollfus (1934) mentioned *Ismaila* sp. from *Archidoris* sp. on the coast of California.

In this paper a new species of the genus *Katanthessius* Stock, 1960, is described from the opisthobranch *Discodoris heathi* MacFarland, 1905, off California. Stock (1960) recognized the apparent relationship of *Katanthessius* to *Anthessius*. The genus *Katanthessius* was formally included in the Anthessiidae by Humes (1986).

MATERIALS AND METHODS

The copepods were measured and dissected in lactic acid, using the method of Humes & Gooding (1964). The length of the body does not include the setae on the caudal ramus. The lengths of the segments of the antennule were measured along their posterior nonsetiferous margins. In the formula for the armature of legs 1-4 Roman numerals indicate spines, Arabic numerals represent setae.

Poecilostomatoida Thorell, 1859

Anthessiidae Humes, 1986

Katanthessius Stock, 1960

Katanthessius stocki new species

Figs. 1a-f, 2a-k, 3a-l

Material examined

3 ♀♀, 1 ♂ from the branchial area of *Discodoris heathi*

MacFarland, 1905, in a depth of 61 m, station T2-200, 33°43.42'N, 118°23.20'W, off Abalone Cove, Palos Verdes Peninsula, California, Los Angeles County Sanitation Division (LACSD), 16 August 1990. Collected by Donald B. Cadien. Holotype ♀ (ZMA 203005) and 1 ♀ paratype (ZMA 203005) deposited in the Zoologisch Museum, Universiteit van Amsterdam. Remaining specimens (dissected) in the collection of the author.

Female: Body (Fig. 1a) with broad prosome. Length 1.94 mm (1.82-2.05 mm) and greatest width 1.27 mm (1.18-1.36 mm), based on 2 specimens. Greatest dorsoventral thickness 0.49 mm. Epimera of 4 metasomal somites, in succession, broadly rounded posteriorly, pointed, broadly rounded but with minute point, and rounded. Tergum of somite bearing leg 4 smaller than tergum of preceding somite and overlapping dorsally somite bearing leg 5. Ratio of length to width of prosome 0.98: 1, slightly wider than long. Ratio of length of prosome to that of urosome 1.82:1.

Somite bearing leg 5 (Fig. 1b, c) 104 x 330 µm. Genital double-somite in dorsal view broad, 122 x 308 µm, sides rounded, ratio 0.40: 1. Genital areas located dorsolaterally. Each area bearing 2 small setae (Fig. 1b). Three postgenital somites from anterior to posterior 70 x 140, 60 x 135, and 135 x 177 µm (greatest dimensions) (anal somite 125 µm wide anteriorly and 177 µm wide posteriorly).

Caudal ramus (Fig. 1d) elongate, 164 µm along outer side, 159 µm along inner side, and 75 µm wide (greatest width). Ratio 2.19: 1, based on greatest dimensions. Outer lateral seta, placed dorsally near midlength of ramus, 55 µm. Dorsal seta 34 µm. Outermost terminal seta 70 µm, innermost terminal seta 78 µm, and 2 median terminal setae 247 µm (outer) and 460 µm (inner). All 6 setae smooth.

Body surface with numerous sensilla (Fig. 1a-c).

Egg sac not seen.

Rostrum (Fig. 1e) incomplete posteroventrally. Antennule (Fig. 1f) slender, 7-segmented, 605 µm long. Lengths of its segments: 23 (94 µm along anterior margin), 220, 49, 107, 60, 36, and 34 µm, respectively. Armature: 3, 13, 6, 3, 4 + 1 aesthetasc, 2 + 1 aesthetasc, and 7 + 1 aesthetasc. All setae smooth. Antenna (Fig. 2a) 390 µm

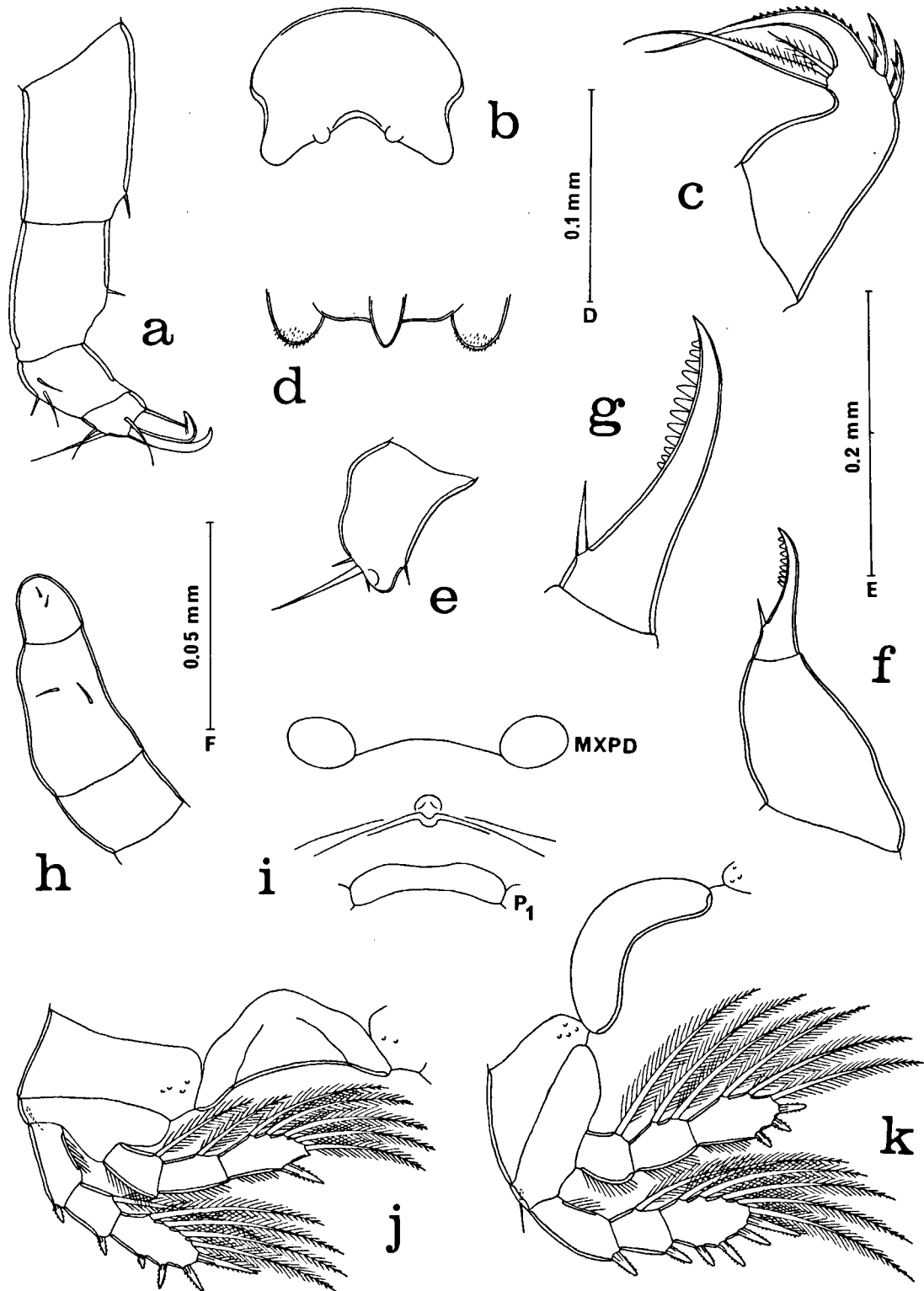


Fig. 2. *Katanthessius stocki* n.sp., female. a, antenna (scale C); b, labrum, ventral (C); c, mandible, posterior (D); d, paragnaths and median process, posterior (D); e, maxillule, posterior (D); f, maxilla, outer (E); g, second segment of maxilla, outer (F); h, maxilliped, inner (D); i, area between maxillipeds and first pair of legs, ventral (C); j, leg 1 and intercoxal plate, anterior (C); k, leg 2 and intercoxal plate, anterior (C). MXPDP = maxilliped, P₁ = leg 1.

long, 4-segmented, without fine ornamentation. Formula: 1, 1, 3, and 2 unequal terminal claws plus 3 setae, one claw stout with strongly recurved tip, other more slender, very weakly divided, and gently recurved.

Labrum (Fig. 2b) with 2 widely separated posteroventral lobes, both with small round protuberance on medial side. Mandible (Fig. 2c) with 2 spines on outer convex margin, both bearing setule, and 2 unequal setae on concave margin (longer seta setulose along distal side, shorter seta weakly plumose). Lash long with outer spinules. Paragnath (Fig. 2d) small lobe with minute spinules. Between paragnaths, median linguiform process. Maxillule (Fig. 2e) with 4 setae, one much longer than others. Maxilla (Fig. 2f) 2-segmented, first segment unarmed, second segment with inner seta and relatively short lash bearing inner row of 8-12 dentiform spinules (Fig. 2g). Maxilliped (Fig. 2h) 3-segmented with 2 setae on second segment and 2 small setae on rounded third segment.

Ventral area between maxillipeds and first pair of legs (Fig. 2i) without median sclerite often seen anterior to intercoxal plate of leg 1 in other anthessiid copepods.

Legs 1-4 (Figs. 2j, k, 3a, b) with 3-segmented rami, except endopod of leg 1 1-segmented. Formula for armature as follows:

P ₁	coxa 0-0	basis 1-0	exp 1-0;	I-1;	III, I,4
			enp 0-1;	0-1;	I,5
P ₂	coxa 0-0	basis 1-0	exp I-0;	I-1;	III,I,5
			enp 0-1;	0-2;	III,3
P ₃	coxa 0-0	basis 1-0	exp I-0;	I-1;	III,I,5
			enp 0-1;	0-2;	II,2
P ₄	coxa 0-0	basis 1-0	exp I-0;	I-1;	III,I,4
			enp 0		

Legs 1-3 with medial anterior surface of coxa bearing several sensilla. Outer spines on exopods of legs 1-4 with extremely small lateral barbules and their tips slightly recurved (though appearing blunt in low magnification). Endopod of leg 4 (Fig. 3c) pyriform, 19 x 11 µm, unsegmented and unarmed.

Leg 5 (Fig. 3d) with elongate, unornamented free segment 146 x 49 µm, ratio 2.98: 1, bearing 4 marginal elements, 3 stout smooth spines with minutely recurved tips (Fig. 3e) and 1 seta. Lengths of elements from outer to inner 10, 17, 26, and 21 µm. Seta on body somite adjacent to

free segment 30 µm.

Leg 6 represented by 2 small setae on genital area (Fig. 1b).

Color of living specimens unknown.

Male: Body (Fig. 3f) with prosome narrower than in female. Length 1.44 mm and greatest width 0.67 mm. Greatest dorsoventral thickness 0.39 mm. Ratio of length to width of prosome 1.31: 1. Ratio of length of prosome to that of urosome 1.5: 1.

Somite bearing leg 5 (Fig. 3g) 78 x 237 µm. Genital somite in dorsal view 114 x 190 µm, broader than long, ratio 0.6: 1, with only slightly expanded rounded sides. Four postgenital somites from anterior to posterior 70 x 133, 65 x 120, 47 x 112, and 86 x 130 µm.

Caudal ramus resembling that of female but smaller, 117 x 49 µm, ratio 2.39: 1.

Rostrum like that of female. Antennule similar to that of female but with 3 aesthetascs added (at points indicated by dots in Fig. 1f). Antenna as in female.

Labrum, mandible, paragnath, maxillule, and maxilla similar to those of female. Maxilliped (Fig. 3h, i) 4-segmented, assuming claw to represent fourth segment. First segment with inner distal patch of spinules. Second segment with proximal and distal inner patches of spinules, 2 setae, and on outer surface small sclerotized crescent (Fig. 3i). Third segment with long seta inserted on inner surface. Claw strongly recurved, 210 µm long, its proximal inner side bearing small seta and having subtriangular process.

Ventral area between maxillipeds and first pair of legs as in female.

Legs 1-4 segmented and armed as in female, except sexual dimorphism in endopod of leg 1. Leg 1 (Fig. 3j) with third segment of endopod having II,4, but outermost terminal seta slightly spiniform and 88 µm long. Slender outer spine 61 µm, inner stouter spine 66 µm, constricted in midregion and having on distal half slight longitudinal ridge on anterior surface. Outer spines on exopod longer and more slender than in female. Legs 2-4 as in female. Endopod of leg 4 (Fig. 3k) with 3 minute distal setules.

Leg 6 (Fig. 3l) posteroventral flap on genital somite bearing 2 setae. Spermatophore not seen.

Color unknown.

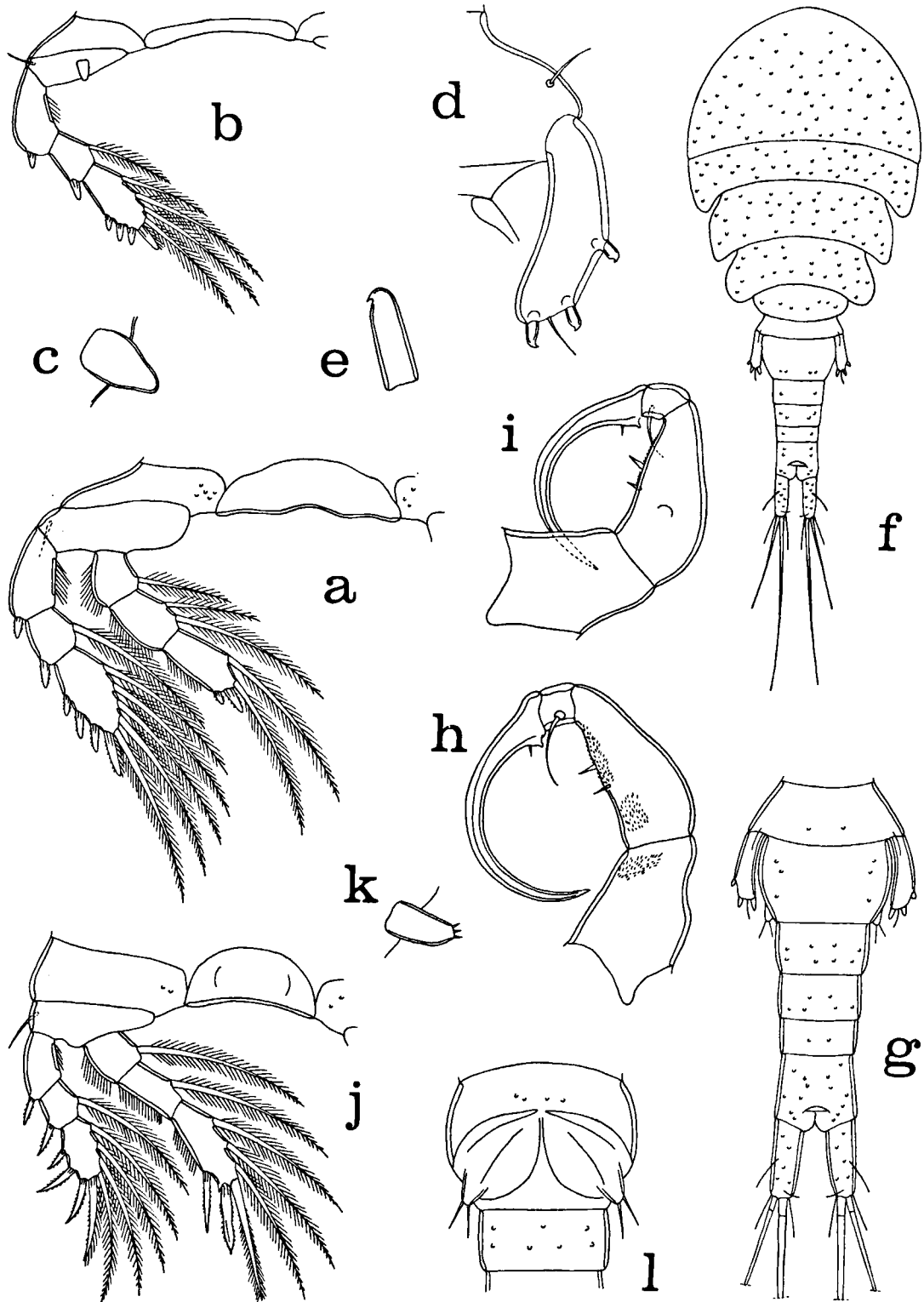


Fig. 3. *Katanthessius stocki* n.sp. Female: a, leg 3 and intercoxal plate, anterior (scale C); b, leg 4 and intercoxal plate, anterior (C); c, endopod of leg 4, anterior (F); d, leg 5, dorsal (E); e, distalmost spine on free segment of leg 5, dorsal (F). Male: f, body, dorsal (A); g, urosome, dorsal (B); h, maxilliped, inner (C); i, maxilliped, outer (C); j, leg 1 and intercoxal plate, anterior (C); k, endopod of leg 4, anterior (F); l, genital and first postgenital somites, showing leg 6, ventral (C).

Etymology: The specific name *stocki* is in memory of Prof. Jan H. Stock, a friend and colleague of the author for many years.

Remarks: *Katanthessius stocki* differs in several respects from its only congener, *K. delamarei* Stock, 1960, found on the opisthobranch *Tritonia* (= *Marionia*) *blainvillea* Risso at Banyuls, southern France. In the female of *K. stocki* the body is shorter (female 1.94 mm versus 2.40 mm in *K. delamarei*), the caudal ramus is 2.19:1 versus 3:1), the lash of the mandible has short spinules (versus long acicular teeth), the endopod of leg 4 is 1-segmented and unarmed (versus 2- or 3-segmented and armed). In the male, the claw of the maxilliped is strongly recurved in an arc (versus moderately recurved), the inner of the two spines on the third segment of the endopod of leg 1 is constricted at the middle and has a surficial ridge (versus evenly tapered without a ridge), and the three spines on the third segment of the endopod of leg 2 are short (versus long in *K. delamarei*, Stock's fig. 18i).

While the 1-segmented endopod of leg 4 in the new species contrasts with the 2- or 3-segmented condition in *K. delamarei*, this difference probably reflects the instability of this appendage in *Katanthessius*, as noted by Stock (1960).

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