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Two new species of the genus *Mesocletodes* (Copepoda, Harpacticoida, Argestidae) from the Pacific Ocean, San Diego Trough

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Abstract.—Two new species of *Mesocletodes* were identified and described from the samples collected for an ecological study of benthic meiofauna in the bathyal zone of San Diego Trough (Southern California Continental Borderland, Pacific margin). *Mesocletodes tetrasetosus* appears to be closely related to *M. langi* and *M. ameliae* by sharing five setae in the endopod of mandibular palp. However, *M. tetrasetosus* differs from both congeners in the following features: (1) the second segment of antenna with seven setae, (2) the exopod of mandibular palp with two setae, (3) the terminal margin of praecoxal arthrite of maxilla with eight elements, (4) the basis of maxilla with a total of six setae, (5) the syncoxa of maxilliped with a strong or robust bipinnate seta, (6) the P1 enp-1 with an inner seta, (7) the P1 enp-2 innermost distal seta and distal spine are translocated, (6) the P3–P4 endopod with total of 4:3 elements, (7) the P5 endopod outermost seta three times as long as in *M. ameliae,* (8) the P5 endopod medial and innermost setae are sub equal, and (9) the caudal rami is as long as the last two urosomites. *Mesocletodes nudus* is closely related to *M. fladensis* by the presence of an outer spine along the midlength of P1 exp-1, and the P1 exp-3 distal outer element is almost as long as the exopod. However, *M. nudus* can be distinguished by the following character states: (1) the A1 with six segments, (2) the P4 enp-2 both distal setae are equal in length, (3) the P4 exp-3 outer spines are almost 0.5 times longer than in *M. fladensis,* (4) the P5 exopod with a total of three elements, (5) the P5 endopod inner distal seta is relatively slender and flexible, (6) the P5 exopod is reduced to half in its length and width, and (7) the P5 baseoendopod is represented by a transversely elongated plate, rectangular in shape. In addition, a key to the species of *Mesocletodes* including both new species is provided.

Keywords: taxonomy, Argestidae, meiofauna, biodiversity, Pacific Ocean.

Three species of the genus *Mesocletodes* Sars, 1909 such as *M. monensis* (Thompson, 1893), *M. irrasus* (Scott & Scott, 1894), and *M. abyssicola* (Scott & Scott, 1901) were initially allocated within the genus *Cletodes* Brady, 1872. Later, Sars (1909) redescribed *Cletodes irrasus* Scott & Scott, 1894 as *Mesocletodes irrasus* and introduced the genus *Mesocletodes*. A few years later, Sars (1921) redescribed *C. monensis* Thompson, 1893 as *M. monensis*, *C. abyssicola* Scott & Scott, 1901 as *M. abyssicola* and introduced *M. inermis* Sars, 1921. Por (1986a) erected the family

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Argestidae and transferred the genus *Mesocletodes* from Cletodidae into Argestidae.

The genus *Mesocletodes* is one of the 19 genera of the family Argestidae (Por 1986a) and currently has 35 valid species, 14 out of which belong to the *Mesocletodes abyssicola*-lineage by the presence of a dorsal process on the cephalothorax and/or anal somite (Scott & Scott, 1901, Sars 1921, Lang 1936a, Becker 1972, Schriever 1985, Bodin 1997, Menzel & George 2009). The remaining 21 species are included within the *Mesocletodes inermis*-lineage, which lacks the dorsal process on cephalothorax and/or anal somite (Bodin 1997, Menzel 2011). However, among these 21 species of the *Mesocletodes inermis*-group, the status of *M. arenicola* Noodt, 1952 is uncertain, therefore, the actual number of valid species is ranging from 34 to 35.

The species belonging to genus *Mesocletodes* Sars, 1909 are mostly dwelling in muddy sediments (Sars 1909, Lang 1948) with a worldwide distribution (Menzel et al. 2011). They are considered to be one of the most abundant taxa among deep-sea harpacticoid families (Menzel et al. 2011); nevertheless, some records are from shallow waters (Sars 1909, Lang 1948, Por 1979). The large-scale investigation on a distribution of *Mesocletodes* by Menzel et al. (2011) revealed the presence of 42 new species scattered across the South and North Atlantic, the Southern Ocean, southern Indian Ocean, and the Pacific Ocean. Furthermore, several species within *Mesocletodes* may have cosmopolitan distribution (Menzel et al. 2011).

During a survey to reveal the biodiversity of meiofauna in San Diego Trough (Southern California Continental Borderland), several specimens of *Mesocletodes* were obtained. In the present study, we proposed two new species of *Mesocletodes* based on this material. In addition, a key to the species of *Mesocletodes*, including the both new species is presented.

Material and Methods

Study site.—The samples were collected from San Diego Trough, the southernmost basin in the California Continental Borderland. The study site was shaped like an equilateral triangle 500 m on each side, which was centered at 32°35.75′N and 117°29.00′W (Thistle 1978). Depth varied from 1218 to 1223 m. The sediment at the study site consisted of 3% sand, 52.7% silt, and 44.3% clay. Mean grain size of 0.004 mm. The temperature of the overlying water was 3.5°C, and the oxygen concentration was 0.71 ml per liter. Maps were obtained from Quantum GIS Geographic information System and final figure plates were prepared in Adobe Photoshop CS6.

Sample collection.—The samples were taken with an Ekman-style grab modified to be used by a remotely operated vehicle. The grab contained four 10-cm by 10-cm subcores. The animals we studied came from a subcore from grab E12 and from a subcore from grab E47 (Thistle 1978). The grabs were separated by 285 m. The 0–1 cm layer of sediment and the overly water from each subcore were fixed with formalin on board. Subsequently, each sample was washed on a 0.062-mm aperture sieve, transferred to ethanol, and stained with rose bengal. The harpacticoids were removed from the sediment with the aid of a dissecting microscope.

Specimens preparation and illustrations.—Observations and drawings were made from whole and dissected specimens mounted in lactophenol with an Olympus BX51 microscope equipped with a drawing tube. Permanent slides were sealed using transparent nail varnish. The morphological terminology follows Huys & Boxshall (1991).

Abbreviations.—A1, antennule; Enp, endopod; exp, exopod; exp (enp)-1 (2, 3) to denote the proximal (middle, distal) segments of exopods and endopods; P1–P6 (first to sixth thoracopod). Specimens were deposited in the National Institute of

Biological Resources (NIBR). This work has been registered in ZooBank with the registration number [LSID]: urn:lsid:zoobank.org:pub:4130BD 08-8A02-4188-A873-4D884E59D7B2

Systematics
Family Argestidae Por, 1986
Genus *Mesocletodes* Sars, 1909
Mesocletodes tetrasetosus sp. nov.

Type locality.—San Diego Trough, Pacific Ocean, North America (32°35.75′N, 117°29.00′W Fig. 1, 1218 to 1223 m).

Material examined.—Holotype: 1 female, dissected, mounted on 3 slides (NIBRIV0000787786).

Description of female (based on holotype).—Habitus cylindrical in shape, total body length 706 μm, and width 126 μm (Fig. 2A); rostrum very small, with 2 sensilla terminally; cephalothorax (Fig. 2A) bell shaped in dorsal view, about 0.8 times as long as wide, comprising 24.4% of total body length, dorsal side with ridges, additional ornamentation consisting of few paired sensilla, posterior margin serrate and with several sensilla. Prosome 4-segmented comprising cephalothorax and 3 free pedigerous somites. Urosome comprising first urosomite, genital double-somite and 3 free urosomites. Boundary between prosome and urosome clearly visible, urosome/prosome length ratio 0.9 times (Fig. 2A). Genital double-somite fused in both dorsal and ventral view, 2.3 times as wide as long in dorsal view. Distal margins of prosomites, first urosomite and genital double somite with single row of spinules; distal margin of last urosomite without sensilla. Anal somite almost square in dorsal and triangular in lateral views, (Figs. 2A and 5B), with two dorsal sensilla, denticulated in lateral view, distal margin of operculum smooth (Figs. 2B and 5B), and not reaching to end of segment.

Antennule (Fig. 3A) 7-segmented; second, third and seventh segments subequal in length, and first segment with few spinules. Armature formula as follows: 1-[0], 2-[8], 3-[6], 4-[2+aes], 5[1], 6[2], 7[6+acrothek]. Aesthetasc located on fourth segment lost during preparation of holotype. Apical acrothek, and another setae located near acrothek broken.

Antenna (Fig. 3B) coxa short and unarmed. Basis smooth, twice longer than width. Exopod 1-segmented, twice longer than width, with 2 terminal sub equal naked setae. Endopod 2-segmented, enp-1 with 6 outer spinules, enp-2 with 2 outer and 3 inner spinules, distally with 5 pinnate setae (2 geniculated and 3 normal type) and 2 outer medial pinnate seta.

Mandible (Fig. 3C) with broad gnathobasis, single row of spinules near articulation of basis, cutting edge composed of grinding face with 1 naked seta at distal corner, and 6 major overlapping teeth. Mandibular palp 2-segmented with spinules. Basis with 1 inner bipinnate seta. Endopod 1-segmented, with 5 distal bipinnate setae. Exopod with 2 bipinnate setae.

Maxillule (Fig. 3D) with well developed praecoxal arthrite, ornamented with row of spinules, armed with 2 slender and naked surface setae and 8 stout elements with spinules. Coxal endite forming 1 strong spinular element ornamented with long spinules and with 3 long slender naked setae. Basis with 6 long slender naked setae (5 at terminal margin and 1 at sub proximal region).

Maxilla (Fig. 3E) with large syncoxa, ornamented with rows of spinules, bearing 2 endites. Proximal endite with 1 naked seta, distal endite with 1 strong pinnate claw accompanying 2 naked setae. Basis with 2 strong pinnate claws, and 1 naked seta. Endopod 1-segmented, very small, with 2 naked setae.

Maxilliped (Fig. 3F) subchelate, 3-segmented. Syncoxa slightly shorter than basis, with 1 bipinnate seta, exceeded distal margin of basis. Basis twice longer than width, with row of spinules along inner and outer margins. Endopod 1-segmented,

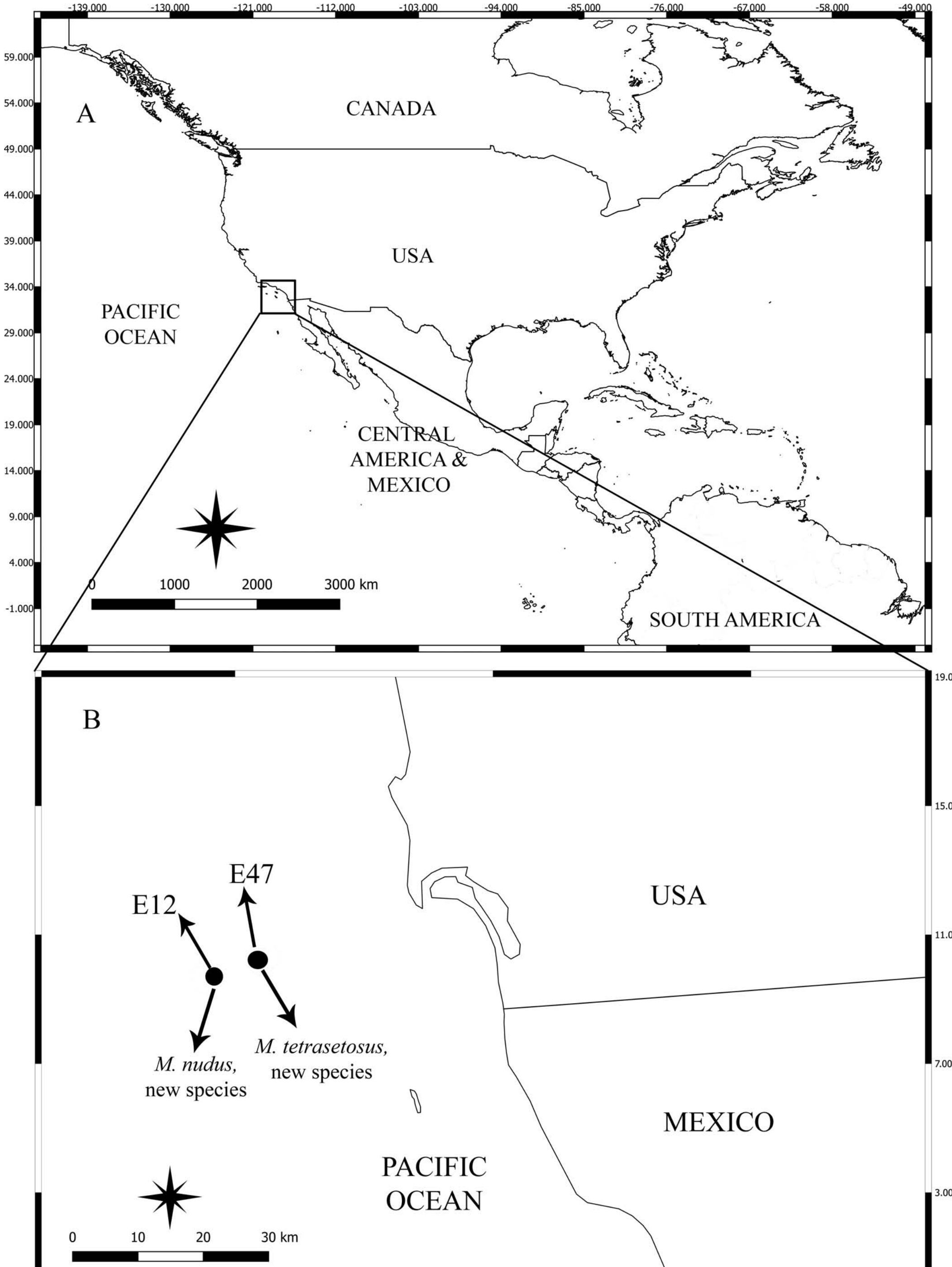

Fig. 1. A–B, map with dark dots showing the type localities of both new species are collected.

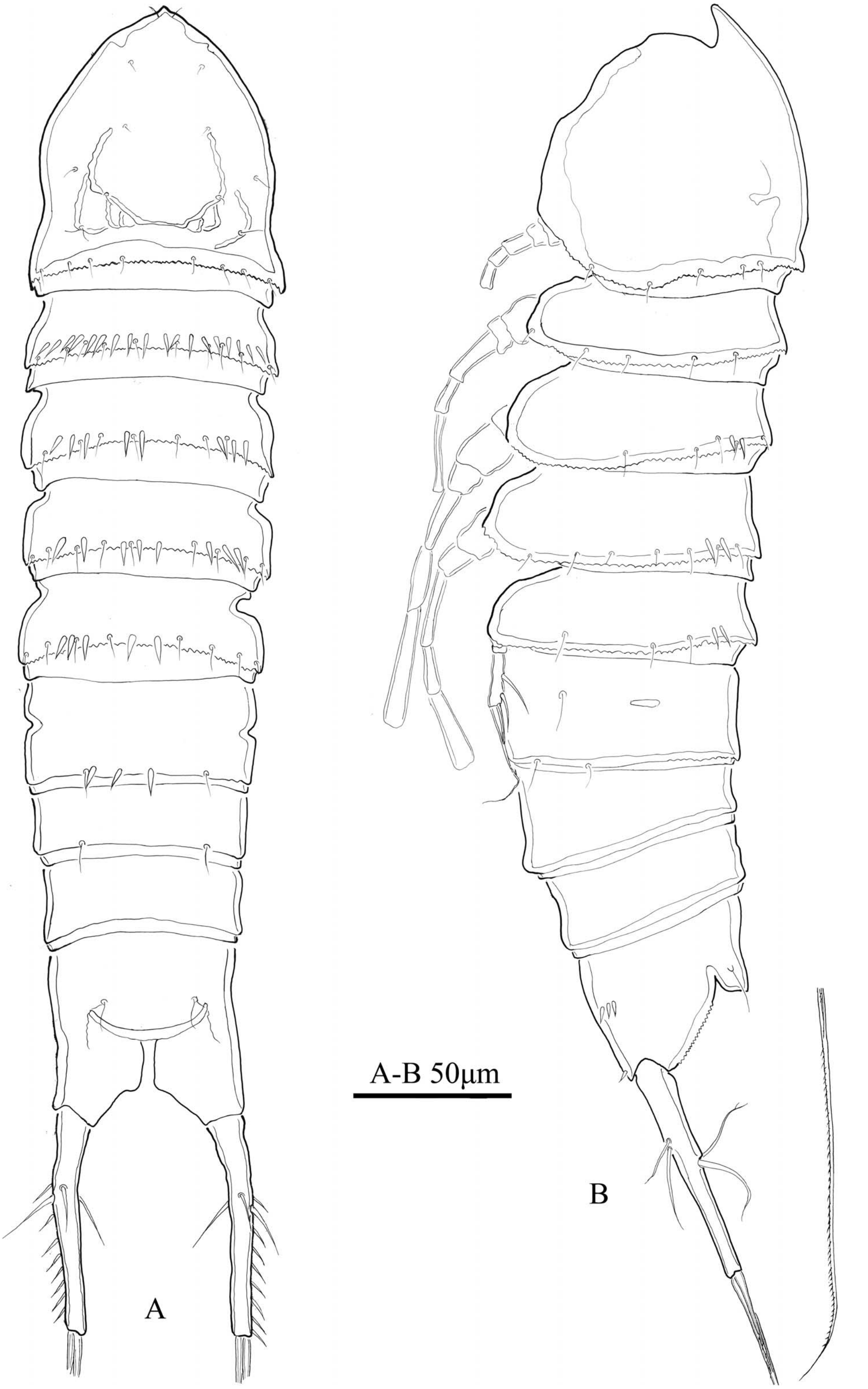

Fig. 2. *Mesocletodes tetrasetosus*. Female, holotype. A, habitus, dorsal; B, habitus, lateral.

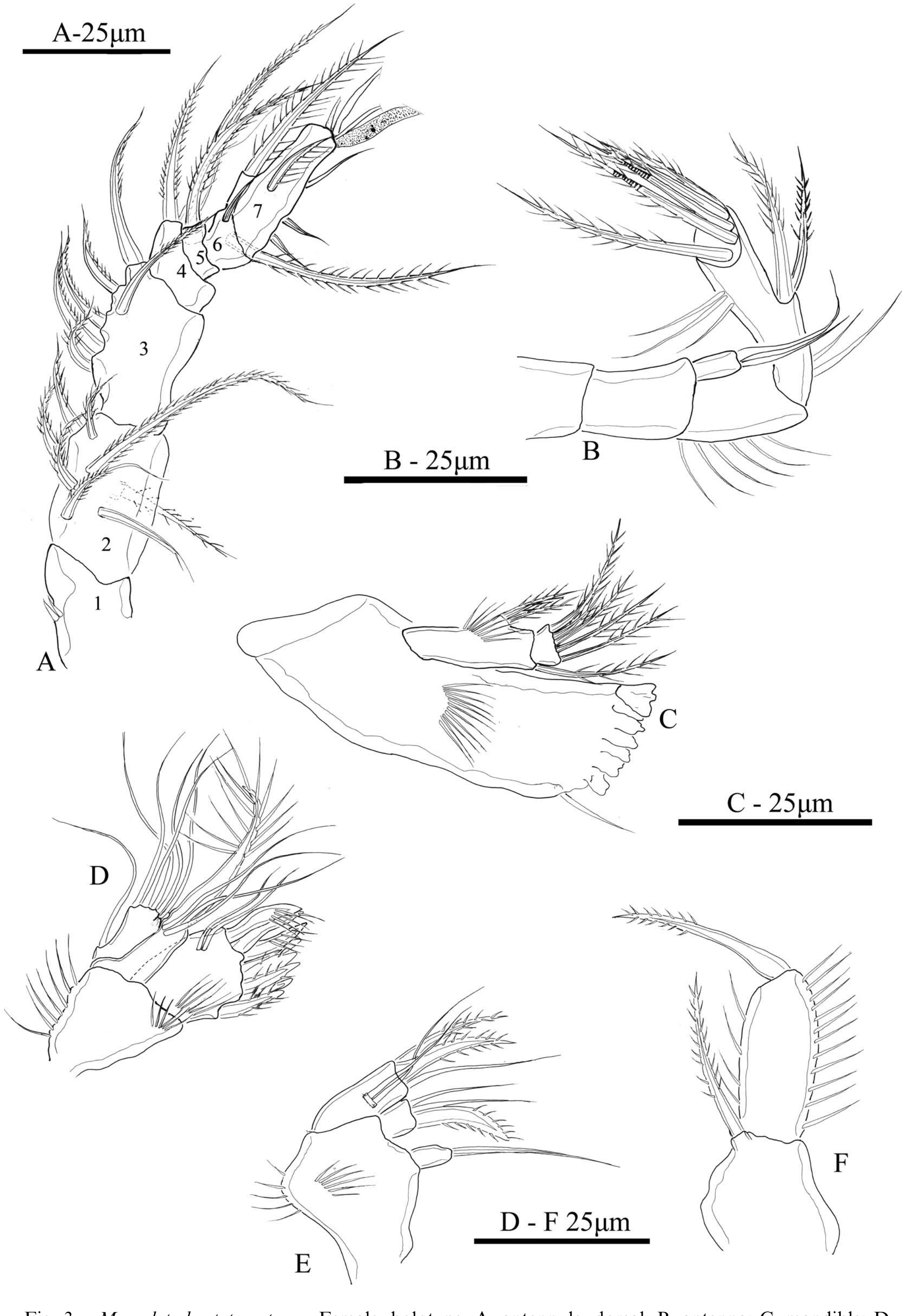

Fig. 3. *Mesocletodes tetrasetosus*. Female, holotype. A, antennule, dorsal; B, antenna; C, mandible; D, maxillula; E, maxilla; F, maxilliped.

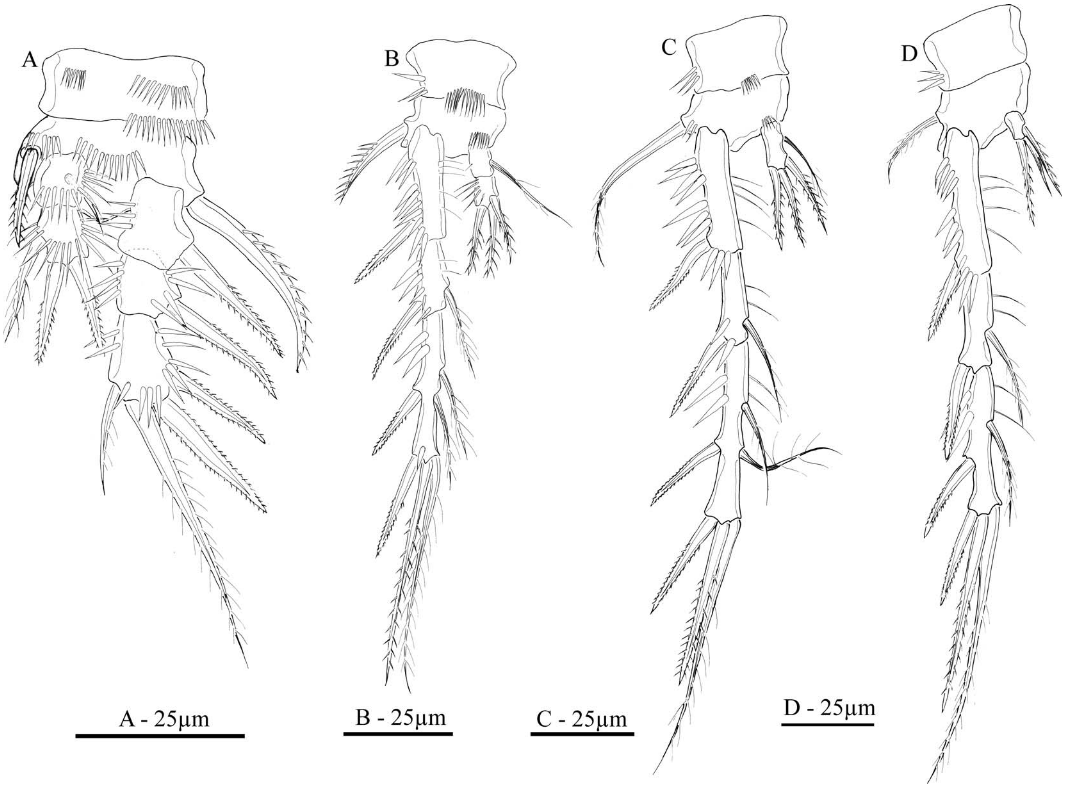

Fig. 4. *Mesocletodes tetrasetosus*. Female, holotype. A, P1; B, P2; C, P3; D, P4.

fused to strong claw, ornamented with small spinules.

P1–P4 (Fig. 4A–D) with smooth and bow-like intercoxal sclerite (not illustrated). Coxa with 1 (P2 and P3), with 2 (P1) spinular rows on anterior surface, with 1 (P2–P4) spinular row along outer margin. Basis with 2 (P3) spinules along outer margin near insertion of exopod, with 1 (P2 and P3) or 2 (P1) rows of spinules along distal margin near insertion of endopod; outer spine (P1–P2) and seta (P3–P4) pinnate, inner pinnate spine present on P1. Exopod 3-segmented, with robust spinules along outer distal margins (P1 exp-2 to -3, P2–P4 exp-1 to -3), with row of spinules along inner margins (P1 exp-1 to -3), and row of setules along inner margins (P2 exp-1 to -2, P3–P4 exp-1 to -3), with serrate outer spines (P1–P4 exp-1 to -3); all exopodal segments with bipinnate spine (P1–P4). Endopod 2-segmented (P1–P2), or 1-segmented (P3–P4); with robust spinules along inner to outer distal margins (P1 enp-1 to -2), row of outer spinules (P2 enp-2), with 2 serrate spines and 1 pinnate seta (P1 enp-2), with 3 pinnate spines or setae (P2 enp-2), with 3 pinnate spines or setae along distal margins and 1 inner sub apical pinnate seta (P3 endopod), with 2 pinnate spines or setae and 1 naked setae (P4 endopod). Setal formula as given below:

	Exopod	Endopod
P1 (Fig. 4A)	0.0.112	1.111
P2 (Fig. 4B)	0.1.222	1.111
P3 (Fig. 4C)	0.1.222	211
P4 (Fig. 4D)	0.1.122	111

P5 (Fig. 5A) baseoendopod with 1 long naked seta. Endopodal lobe with 3 ele-

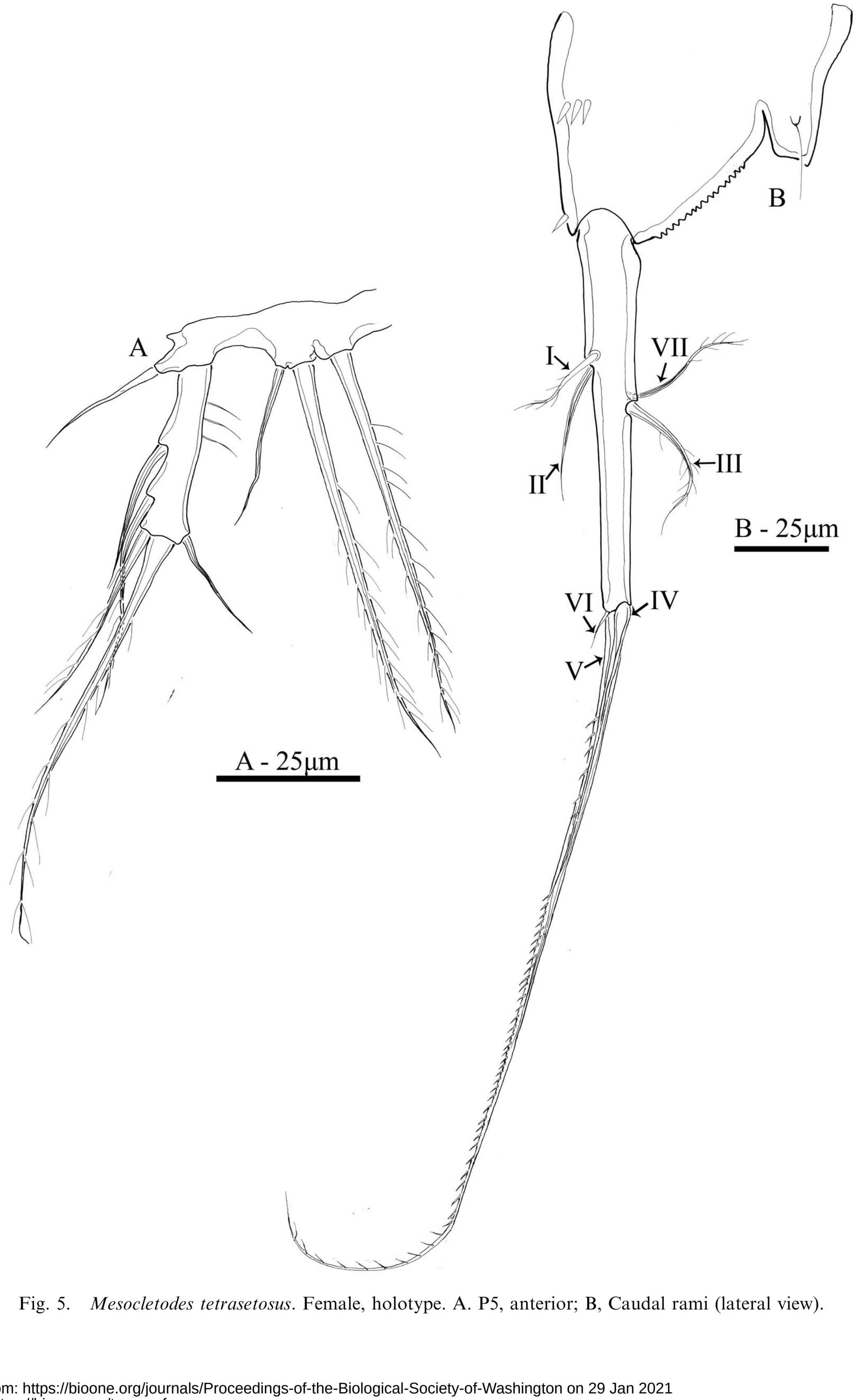

Fig. 5. *Mesocletodes tetrasetosus*. Female, holotype. A. P5, anterior; B, Caudal rami (lateral view).

ments (2 long bipinnate setae and 1 naked seta). Exopod articulating with baseoendopod, rectangular in shape and about 4 longer than width, with 3 spinules along inner margin, bearing 5 elements [1 innermost seta naked, 2 distal bipinnate setae (innermost seta twice longer than outer seta), 2 outer setae (1 pinnate and 1 naked)].

P6 difficult to observe due to several dust particles.

Caudal rami (Fig. 5B) long, slender, and smooth. Almost 6.5 times as long as wide. Seta I (bipinnate) located on lateral side close to seta II (naked). Seta III (bipinnate) located medially on outer dorsal side. Seta III and VII inserted close to each other. Setae IV–VI located terminally [setae IV and V bipinnate, seta VI small naked], seta V twice as long as caudal rami. Seta VII triarticulate located on inner dorsal side.

Etymology.—The specific name refers to the numbers of setae in endopod of P3.

Remarks.—As explained by Menzel & George (2009) the presence of Subapical Tubulate Extensions (STEs) in P1 exp-3 outer spines are normal in *Mesocletodes*. However, such characteristic in *M. tetrasetosus* is invisible. Since this specific character is extremely small, it is difficult to make a judgment on their absence under the microscope, whether it is naturally not present or broken by physical forces. Caudal rami spinular ornamentation was difficult to observe from ventral view, due to this reason it was hard to depict in the Fig. 5B.

Mesocletodes nudus sp. nov.

Type locality.—San Diego Trough, Pacific Ocean, North America (32°35.75′N, 117°29.00′W; Fig. 1, 1218 to 1223 m).

Material examined.—Holotype: 1 male, mounted on 1 slide (NIBRIV000 0787787). Paratypes: 2 males mounted on 2 slides (NIBRIV0000787788, NIBRI V0000787792).

Description of male (based on holotype and paratypes).—Habitus slender and dorsoventrally flattened, total body length 540 µm, and width 151 µm (Fig. 6A); rostrum very small, with 2 sensilla terminally; cephalothorax (Fig. 6A) almost rectangular in shape, about 0.78 times as long as width, comprising 35% of total body length, dorsal surface with strong ridges, additional ornamentation consisting of few paired sensilla. Prosome 4-segmented comprising cephalothorax and 3 free pedigerous somites. Urosome comprising P5-bearing somite, genital somite and 4 free abdominal somites. Boundary between prosome and urosome clearly visible, urosome/prosome length ratio 0.9 (Fig. 6A). Distal margins of first to fourth urosomites with few spinules in dorsal view (Fig. 6A). Distal margins of third, fourth and fifth urosomites with several spinules in ventral view (Fig. 7C). Anal somite with 2 pairs of dorsal sensilla (Fig. 6A), with very small operculum, with 3 long spinules raised on small projections on either side in ventral view (Fig. 7C).

Antennule (Fig. 7A) 6-segmented; second, fourth and sixth segments subequal in length; first segment with few spinules (lateral view). Armature formula as follows: 1-[0], 2-[6], 3-[5], 4-[7+aes], 5[1], 6[9 + acrothek]. Aesthetasc located on fourth segment 0.75 times as long as antennule, and robust. A second aesthetasc located on sixth segment 0.28 times as long as antennule. Fourth segment with 3 unique pinnate setae (over all leaf like shaped, arrowed in Fig. 7A).

Antenna (Fig. 7B) coxa short and unarmed. Basis smooth, twice longer than width. Endopod 2-segmented, enp-1 with 5 outer spinules, enp-2 with 4 outer and 4 spinules distally, distal margin with 2 pinnate and 2 naked setae, and 1 medial pinnate seta.

Mouthparts are atrophied, could not be traced due to their strong reduction.

P1–P4 (Fig. 8A–D) with smooth and bow-like intercoxal sclerite (not illustrat-

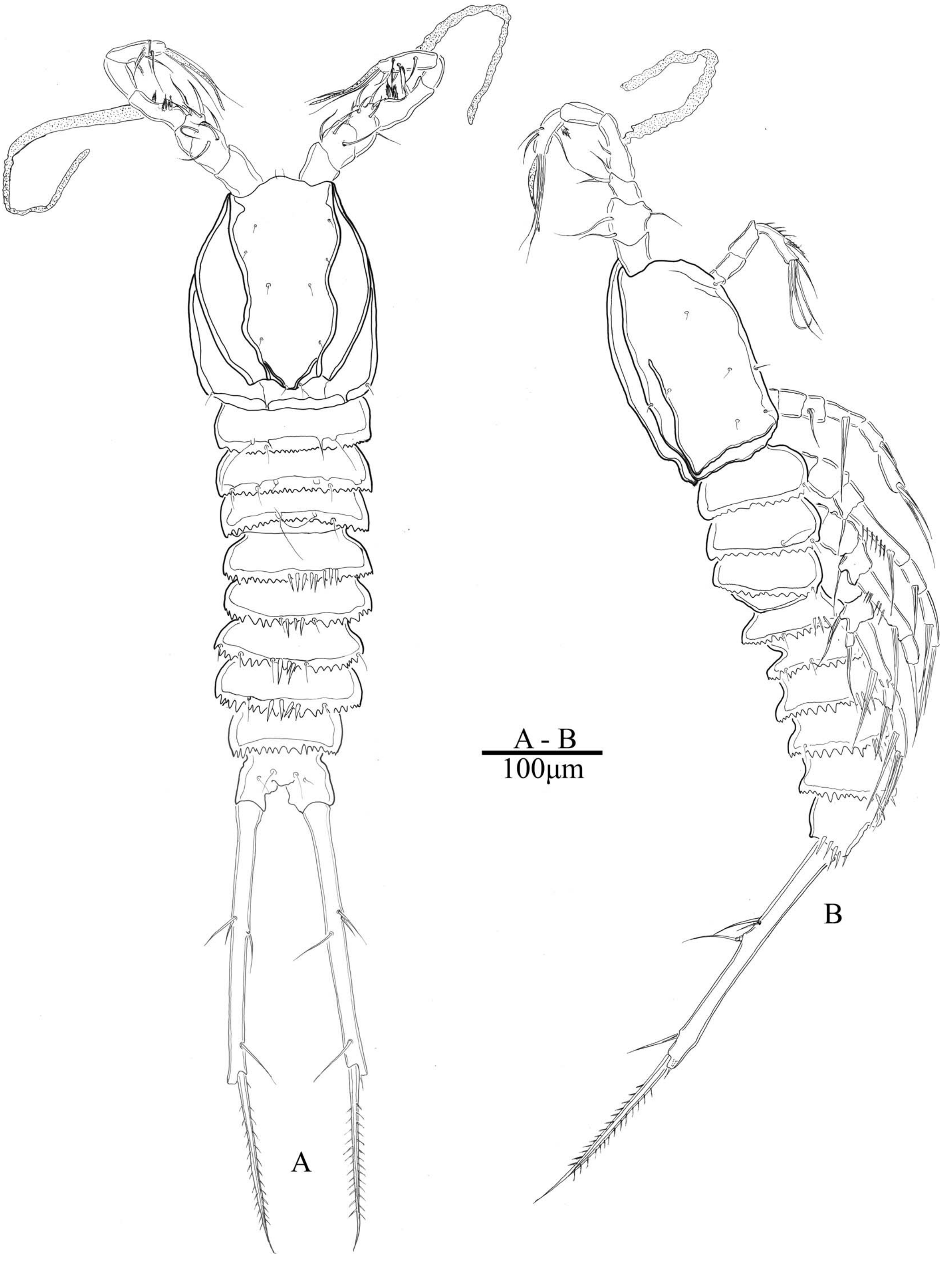

Fig. 6. *Mesocletodes nudus*. Male, holotype. A, habitus, dorsal; B, habitus, lateral.

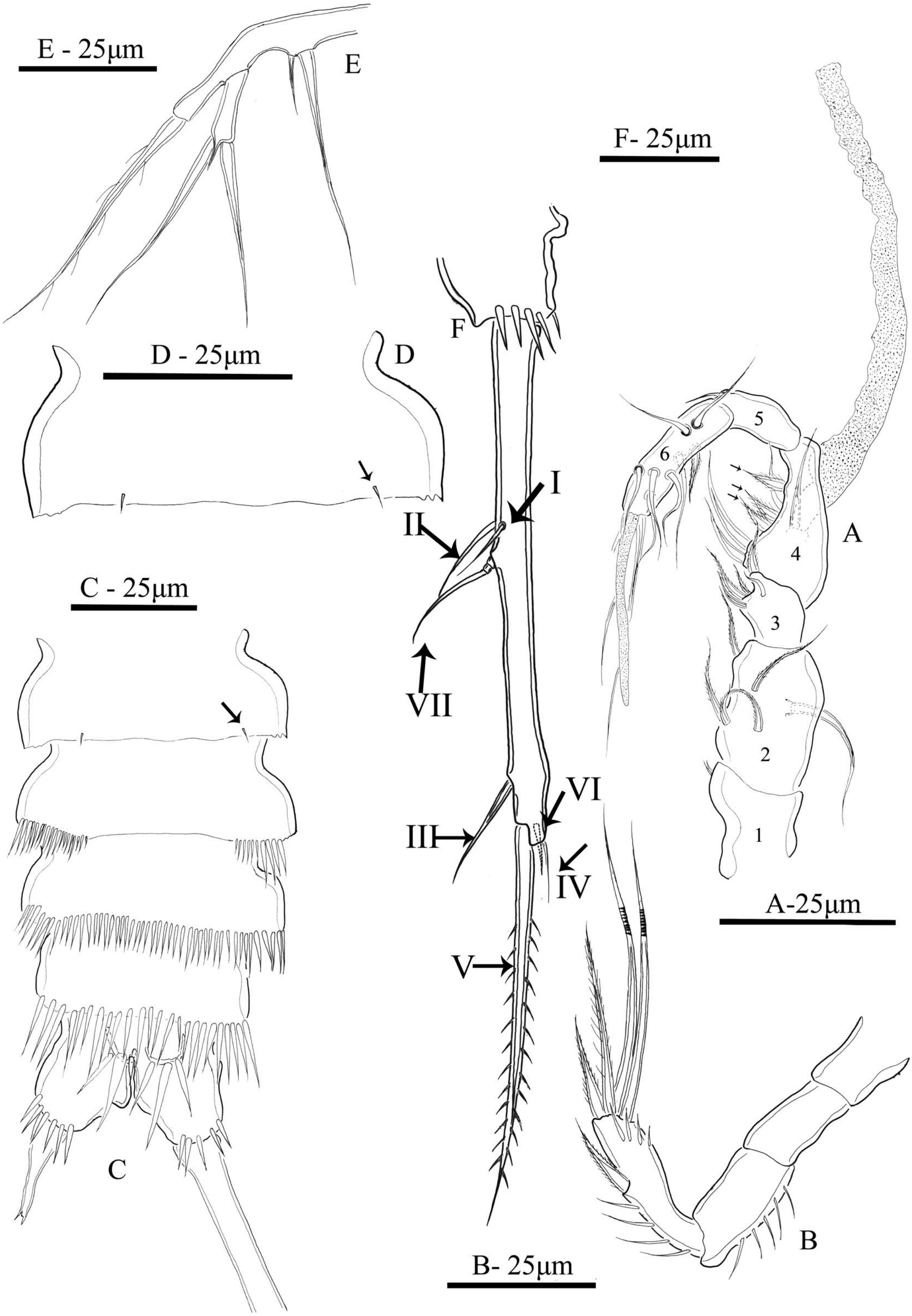

Fig. 7. *Mesocletodes nudus*. Male, holotype A–B, E–F, and paratype C–D. A, antennule, dorsal; B, antenna; C, genital double-somite, P6 (indicated by arrow), and abnormal caudal rami (left side); D, P6 (enlarged view); E, P5; F, Caudal rami.

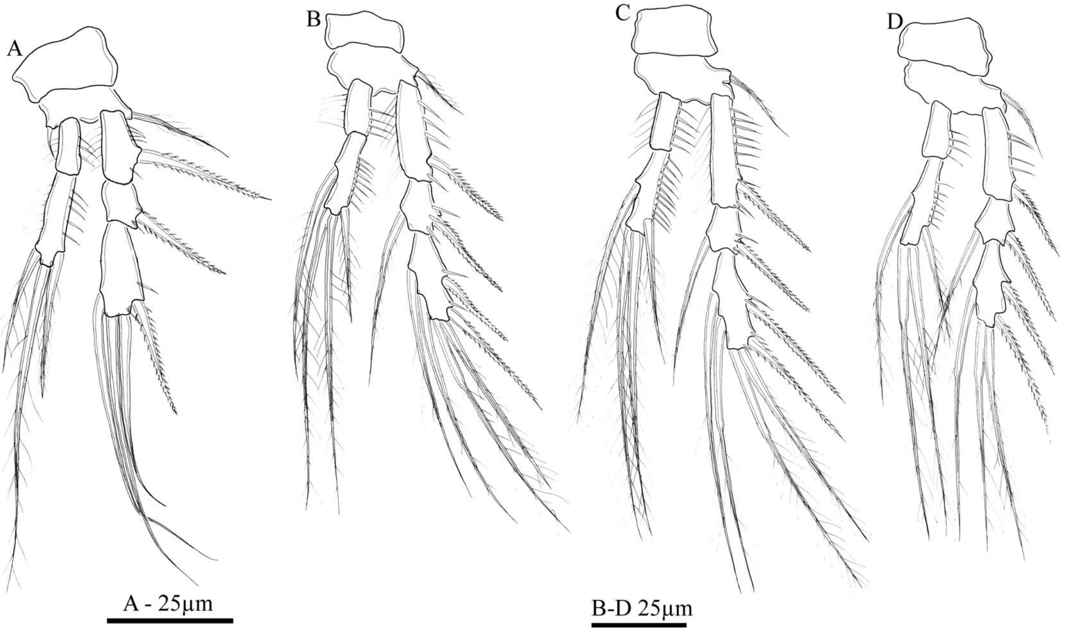

Fig. 8. *Mesocletodes nudus*. Male, holotype. A, P1; B, P2; C, P3; D, P4.

ed). Surface ornamentations of coxa and basis unclear. Basis with outer bipinnate setae (P1–P4), and inner small naked spine present on P1. Exopod 3-segmented, with few spinules along outer margins (P1–P4 exp-1 to -3, P4 exp-1), with row of setules along inner margins (P1–P3 exp-1), with serrate outer spines (P1–P4 exp-1 to -3); with naked setae (P1 exp-3), and bipinnate setae (P2–P4 exp-1 to -3). Endopod 2-segmented (P1–P4), with spinules along outer margins (P1–P4 enp-1 to -2), with several setules along inner margin (P1–P3 enp-1 and P1 enp-2), with bipinnate setae (P1–P4 enp-2). Setal formula as follows:

	Exopod	Endopod
P1 (Fig. 8A)	0.0.121	0.111
P2 (Fig. 8B)	0.1.222	0.121
P3 (Fig. 8C)	0.1.222	0.121
P4 (Fig. 8D)	0.1.122	0.121

P5 (Fig. 7E) baseoendopod with 1 long pinnate seta. Endopodal lobe with 2 naked setae (1 long and 1 small). Exopod articulating with baseoendopod, rectangular in shape and about twice longer than width, without surface ornamentation, bearing 2 distal long naked setae, and 1 small seta fused to segment located on distal margin just above 2 long naked setae.

P6 (Fig. 7C–D) integrated into genital field, reduced, and with 1 very small naked seta.

Caudal rami (Fig. 7F) long, slender, without surface ornamentation, almost 11 times as long as wide. Seta I (naked) located on dorsal side, and inserted close to seta II. Seta II (naked) located on dorsal side. Seta III (naked) located on dorsal side subterminally. Caudal ramus extremely elongated between setae III and VII. Setae IV–VI located terminally [seta IV (broken), seta V (0.7 times as long as caudal rami and bipinnate), seta VI (very small and naked)]. Seta VII triarticulate located on dorsal side. Abnormal caudal rami described based on paratype (see Fig. 7C).

Etymology.—The specific name refers to the presence of only bare setae in P5 exopod and endopod.

Remarks.—The presence of Subapical Tubulate Extensions (STEs) in P1 exp-3 outer spines of *M. nudus* cannot be traced. Caudal rami surface ornamentation could not be observed.

Discussion

The present two new species share with other species of *Mesocletodes* Sars, 1909 with the following characters: (1) the short rostrum, with pair of sensilla fused to cephalothorax in both sexes, (2) the antennule with 6–7 segments in female, (3) the antennule second segment with strong protrusion bearing one robust bipinnate seta pointing backwards in both sexes (see Menzel & George 2009), (4) the antenna with basis or allobasis in both sexes, (5) the antenna without abexopodal seta in both sexes, (6) the antenna exopod at most 1-segmented with at most two setae in only female, (7) the mandibular palp with at most 1-segmented exopod and endopod in female, (8) the mandibular gnathobase forming broad grinding face in female (see Menzel & George 2009), (9) the maxilla proximal endite with one seta in female (see Corgosinho and Martínez Arbizu 2010), (10) the maxilliped prehensile, with strong claw distally in female, (11) the 3-segmented exopods in P1–P4 in both sexes, (12) the P1 exp-3 with four setae in both sexes (13) the P1–P4 endopods at most biarticulate in both sexes, (14) the P5 exopod longer than wide in both sexes, (15) the P5 endopodal lobe barely protruding in both sexes, and (16) the caudal ramus extremely longer than width in both sexes.

Characters 3, 12 and 16 are synapomorphies for the species composing the genus *Mesocletodes* (see Menzel & George 2009), therefore supporting the inclusion of the new species within this genus. For discussion of character 3, see Menzel & George (2009). For character 12, although it is shared by *Mesocletodes* and *Eurycletodes* in Argestidae (see Menzel & George 2009), the presence of four setae on P1 exp-3 in *Eurycletodes* is only observed when P1 exp-2 has an inner seta. In the case of *Mesocletodes* it is always present, and the inner seta of P1 exp-2 is absent. Hence, the presence of a total of four elements in the P1 exp-3 is considered as unique for *Mesocletodes* (see Menzel & George 2009). For character 16, the elongated caudal rami is also considered to be autapomorphic for *Mesocletodes*; as such elongated caudal ramus appears to be mostly present in the species of *Mesocletodes*. The Subapical Tubulate extensions (STEs) on the outer spines of P1 exp-3 are also considered as autapomorphic for the genus *Mesocletodes* (see Menzel & George 2009). Since it was difficult to trace STEs on the both new species, it is not included and/or specified under the generic characters. The remaining characters that are considered to be plesiomorphies are certainly shared by several genera within the family Argestidae.

As explained above the genus *Mesocletodes* has two phylogenetic lineages (1) *Mesocletodes abyssicola*-group and (2) *Mesocletodes inermis*-group. Obviously, the both newly described species clearly belong to the "*Mesocletodes inermis*-group" as they both lack the dorsal or cuticular process on the cephalothorax and/or anal somite.

Within the *Mesocletodes inermis*-group*, Mesocletodes tetrasetosus* is closely related to *Mesocletodes langi* Smirnov, 1946 and *Mesocletodes ameliae* Soyer, 1975 because these are the only three species with five setae on the endopod of mandibular palp. To suggest the close relationship of these three species, they were discriminated with the characters that can be comparable among all the species of *M. inermis*-group. Among these characters, we only considered the character that is shared with the least number of species, such as the mandibular palp endopod with five setae shared by *M. tetrasetosus*, *M. langi* and *M.*

ameliae. Unfortunately, the figure plate for mandible is not provided for *M. makarovi* Smirnov, 1946. However, it is mentioned in the description (in Russian) that the mandibular palp is single-branched with four setae. It should be considered in total that the four setae on the mandibular palp in *M. makarovi* are inserted on basis, exopod, and endopod, whereas *M. tetrasetosus, M. langi,* and *M. ameliae* have five setae on the endopod. Therefore, *M. tetrasetosus* is suggested to be closely related to *M. langi* and *M. ameliae* within *M. inermis*-group.

Although *M. tetrasetosus* is closely related *to M. langi* and *M. ameliae*, it can be clearly distinguished from both congeners based on the following characters: (1) the antennary enp-2 with seven setae in *M. tetrasetosus* and *M. ameliae*, whereas *M. langi* has six setae, (2) the mandibular palp exopod with two setae in *M. tetrasetosus*, whereas *M. langi* has one seta and *M. ameliae* has three setae, (3) the maxillule praecoxal arthrite terminal margin has eight elements in *M. tetrasetosus*, whereas *M. ameliae* has seven elements, and details for *M. langi* is unavailable, (4) the maxillule basis (including endopod and exopod) has six setae in *M. tetrasetosus*, that of *M. ameliae* has four setae, and details for *M. langi* is unavailable, (5) the maxilliped syncoxa with a strong or robust bipinnate seta, in *M. ameliae* it is a relatively slender and naked seta, (6) the P1 enp-1 has an inner seta, in *M. langi* and *M. ameliae* it is absent, (7) the P1 enp-2 innermost element is a distal seta and the distal element is a spine (translocated or displaced), in *M. ameliae* the innermost element is a spine and the distal element is a seta, whereas in *M. langi* it is difficult to compare, (8) the P3 endopod has four elements in *M. tetrasetosus* and *M. langi*, while *M. ameliae* has two elements, (9) the P4 endopod has three elements in *M. tetrasetosus*, while *M. langi* has four elements, whereas in *M. ameliae* it has two elements, (10) the P5 endopod outermost seta is three times as long as in *M. langi* and *M. ameliae*, (11) the P5 endopod medial and innermost setae are sub equal in the *M. tetrasetosus*, whereas in *M. langi* and *M. ameliae* the innermost seta is half as long as the medial seta, and (12) the caudal rami is as long as the last two urosomites in the *M. tetrasetosus*, and that in *M. langi* and *M. ameliae* it is just as long as the last urosomite.

Mesocletodes nudus is described based on three males only. As explained above it clearly belongs to the *M. inermis*-group by the absence of cuticular process on the cephalothorax and/or anal somite. So far *M. inermis*-group consists of two species with males i.e., *M. fladensis* Wells, 1965 and *M. elmari* Menzel, 2011, out of which *M. fladensis* is solely erected based on male description. On the other hand, *M. elmari* shows the highest amount of sexual dimorphisms by having different setal numbers on the enp-2 of male and female swimming legs (Menzel 2011). For example, the female of *M. elmari* has 3:3:3:3 setae in enp-2 of P1–P4, whereas the male P1–P4 enp-2 has 2:4:4:4 setae. Therefore, we attempted to compare *M. nudus* with all the species of *M. inermis*-group rather than comparing with male species alone. Among the species of *M. inermis*-group, *M. nudus* appears to be closely related to *M. fladensis* because the outer spine of P1 exp-1 is located along the midlength of the segment. The homologous element in the remaining congeners is always located on the distal half or at the distal margin. Additionally, distal outer element of P1 exp-3 of *M. nudus* and *M. fladensis* is almost as long as the exopod, whereas in the case of remaining congeners it ranges from 0.4 to 0.6 times as long as exopod including both sexes.

Nevertheless, *M. nudus* clearly differed from *M. fladensis* by the several following characters: (1) the antennule has six segments, whereas *M. fladensis* has 8 segments, (2) the P4 enp-2 two distal setae are almost equal in length, whereas in *M.*

fladensis one distal seta is almost 0.4 times as long as the other distal seta, (3) the P4 exp-3 outer spines are almost 0.5 times as long as in *M. fladensis,* (4) the P5 exopod with total three elements (two long articulated setae and one small fused seta), while *M. fladensis* with total four articulated setae, (5) the inner distal seta of the P5 endopod is relatively slender and flexible in the *M. nudus*, and in *M. fladensis* it is robust with clear spine-like pattern, (6) the P5 exopod is reduced to half in its length and width when compared to the exopod of *M. fladensis*, and (7) the P5 baseoendopod is represented by a transversely elongated plate which is rectangular in shape, whereas in *M. fladensis* the transversely elongated plate is deeply projected downward and the overall shape differed.

Menzel (2011) suggested to remove *M. faroerensis* Schriever, 1985 and *M. thieli* Schriever, 1985 from *Mesocletodes* due to the presence of a proximal spine in the P1 exp-3 (both species), 3 inner setae on the P3 exp-3 (only in *M. faroerensis*), and the absence of a strong grinding face on the gnathobasis of the mandible (only in *M. thieli*). According to Menzel & George (2009), the absence of a proximal spine in the P1 exp-3 is an autapomorphic feature for the genus *Mesocletodes*; therefore, strongly supporting the exclusion of *M. faroerensis* and *M. thieli* from *Mesocletodes*, as they both have proximal spine in P1 exp-3 [a plesiomorphic state (see Menzel & George 2009)]. Furthermore, *M. arenicola* Noodt, 1952 does have the proximal spine in P1 exp-3; hence, the same rule applies to this species. However, this species is not yet formally excluded from *Mesocletodes* and its allocation is questionable (see Menzel & George 2009). Additionally, the type materials are unavailable to confirm on this aspect. Therefore, *M. arenicola* is not included in the present key to species and its generic status must be further investigated. A species key to the genus *Mesocletodes* (36 species, including both new species) belonging to both *M. abysiccola*-group and *M. inermis*-group are provided by amending Schriever's (1985) key to the species.

1) Cephalothorax and anal somite without dorsal projection -"*inermis*" group 2
– Cephalothorax and anal somite with dorsal projection -"*abyssicola*" group........................ 15
2) P1 endopod 2-segmented 3
– P1 endopod 1-segmented 14
3) P2–P4 endopod 2-, 1- and l-segmented 4
– P2–P4 endopod 2-segmented....... 6
– P2–P4 endopod 1-segmented..... .... *M. langi* Smirnov, 1946
4) Al 8-segmented, ♀ P5 Benp/Exp with 3/6 setae respectively .... *M. commixtus* Coull, 1973
– Al 7-segmented, ♀ P5 Benp/Exp with 3/5 setae respectively 5
5) P3 endopod with 2 setae......... .... *M. ameliae* Soyer, 1975
– P3 endopod with 4 setae......... .... *M. tetrasetosus*
6) P2–P4 enp-1 with 0:0:0 inner setae 7
– P2–P4 enp-1 with 1:1:1 inner setae 10
– P2–P4 enp-1 with 0:0:1 inner setae .... *M. parabodini* Schriever, 1983
7) P1 enp-2 with 2 setae............ .... *M. parirrasus* Becker et al., 1979
– P1 enp-2 with 3 setae.............. 8
– P1 enp-2 with 4 setae.............. 9
8) P1–P4 enp-2 distal setae, P1–P4 exp-2 and -3 inner and distal setae are all naked (♂)................ .... *M. fladensis* Wells, 1965
– P1–P4 enp-2 distal setae, P1–P4 exp-2 and -3 inner and distal setae are all bipinnate (♂)....... *M. nudus*
9) P2–P4 enp-2 with 3 setae .... *M. glaber* Por, 1964a

– P2–P4 enp-2 with 4 setae .... *M. carpinei* Soyer, 1975
10) P3–P4 enp-2 with 2 setae .... *M. duosetosus* Schriever, 1985
– P3–P4 enp-2 with 3 setae 11
– P3–P4 enp-2 with 4 to 5 setae..... 12
11) P1–P4 enp-2 ♀ with 3:3:3:3 setae, caudal rami almost as long as last three urosomites.......... *M. elmari* Menzel, 2011
– P1–P4 enp-2 ♀ with 3:3:3:3 setae, caudal rami just half as long as anal somite................. *M. sarsi* Becker et al., 1979
12) Al 5-segmented, ♀ P5 Benp/Exp with 2/6 setae.......... *M. variabilis* Schriever, 1983
– Al 7-segmented, P5 Benp/Exp with 3/6 setae ...... *M. farauni* Por, 1967
– A1 7-segmented, P5 Benp/Exp with 3/4 setae .... *M. bodini* Soyer, 1975
– Al 7-segmented, P5 Benp/Exp with 3/5 setae 13
13) P1 enp-1 without inner seta, enp-2 with 3 setae .... *M. irrasus* Scott & Scott, 1894
– P1 enp-1 with inner seta, enp-2 with 4 setae .... *M. kunzi* Schriever, 1985
14) P2–P4 endopod 2-segmented, with 2:3:3 setae respectively........... .... *M. guillei* Soyer, 1964
– P2 endopod 1-segmented and P3–P4 reduced to a small seta, with 2:1:1 (P2–P4) setae respectively ... . *M. trisetosa* Schriever, 1983
– P2–P4 endopod 1-segmented, with 2:2:3 setae respectively........... .... M. makarovi Smirnov, 1946
– P2–P4 endopod 1-segmented, with 2:2:2 setae respectively........... .... *M. inermis* Sars, 1921
15) P1–P4 endopod 2-segmented...... 16
– P1–P4 endopod 1-segmented...... 21
16) P2–P4 endopod 1-segmented..... .... *M. dolichurus* Smirnov, 1946
– P2–P4 endopod 2-segmented...... 17
17) Caudal rami as long as last 2 abdominal somites................ 18
– Caudal rami not as long as last 2 abdominal somites................ 19
18) P5 Exp ♀ with 5 pinnate setae... .... *M. katharinae* Soyer, 1964
– P5 Exp ♀ with 6 naked setae .... *M. monensis* Thompson, 1893
– P5 Exp ♀ with 5 naked setae .... *M. brevifurca* Lang, 1936b
– P5 Exp ♀ with 4 pinnate and 1 naked setae.......... *M. meteorensis* Menzel & George, 2009
19) Cuticular process dorsally on cephalothorax and anal somite.... 20
– Cuticular process dorsally on only anal somite ♂ .... *M. angolaensis* Menzel & George, 2009
20) P1–P4 enp-2 with total 2:4:4:4 elements................. *M. bicornis* Menzel & George, 2009
– P1–P4 enp-2 with 2:3:2:2 elements............ *M. dorsiprocessus* Menzel & George, 2009
21) P5 Benp ♀ with conical projection at base of exopod .... *M. bathybia* Por, 1964b
– P5 Benp ♀ normal at base of exopod........................... 22
22) P1–P4 endopod with 3:2:2:2 elements .... *M. abyssicola* Scott & Scott, 1901
– P1–P4 endopod with 3:3:3:3 elements .... *M. soyeri* Bodin, 1968
– P1–P4 endopod with 2:3:3:3 elements .... *M. opoteros* Por, 1986b
– P1–P4 endopod with 3:5:5:4 elements .... *M. robustus* Por, 1965
– P1–P4 endopod with 3:4:4:3 elements .... *M. quadrispinosa* Schriever, 1985

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