



УДК 595.34

VENSIASA INCERTA (COPEPODA, CALANOIDA): A NEW GENUS AND SPECIES FROM DEEP ATLANTIC WATERS

E.L. Markhaseva

Zoological Institute of the Russian Academy of Sciences; Universitetskaya Emb. 1, 199034, Saint Petersburg, RUSSIA;
e-mail: markhaseva@yahoo.com

ABSTRACT

A new genus of a benthopelagic copepod is described from females and male taken from the abyss of the South Atlantic close to the sea bed. *Vensiasa incerta* gen. et sp. n. shares the presence of sensory setae on maxilla and maxilliped with all other “Bradfordian” members of the Clausocalanoidea. This new genus with a 1, 2, 3 setal pattern on the praecoxal endites of the maxilliped is attributed to the Diaixidae. *Vensiasa* gen. n. is distinct from all other diaixid genera in the following characters: maxillary endopod with 5 setae; maxillary endopod setal formula as 6w+2br, worm-like setae differ in morphology between each other, same for brush-like setae; male’s P5 protopods asymmetrical, and left leg endopod is longer than the 3-segmented exopod. A differential diagnosis for the genus is given based on both sexes. *Vensiasa* gen. n. is now found from equator up to 36°S in the eastern and western South Atlantic.

Key words: Copepoda, new taxa, *Vensiasa* gen. n., calanoids, Atlantic, deep water, benthopelagic

VENSIASA INCERTA (COPEPODA, CALANOIDA): НОВЫЙ РОД И ВИД ИЗ ГЛУБОКОВОДНОЙ АТЛАНТИКИ

Е.Л. Мархасева

Зоологический институт Российской академии наук, Университетская наб. 1, 199034, Санкт-Петербург, Россия;
e-mail: markhaseva@yahoo.com

РЕЗЮМЕ

Новый род бентопелагических копепод описан по самкам и самцу из проб, собранных в непосредственной близости от дна в абиссали южной Атлантики. *Vensiasa incerta* gen. et sp. n. относится к группе брэдфордских семейств Clausocalanoidea, для которой характерно наличие сенсорных щетинок на максилле и максиллипеде. У нового рода прекоксальные эндиты максиллипеды вооружены 1, 2 и 3 щетинками, род помещен в семейство Diaixidae. *Vensiasa* gen. n. отличается от всех остальных диаиксид следующими чертами строения: эндоподит максиллулы с 5 щетинками; формула вооружения эндоподита максиллы 6w+2br, причем, червевидные щетинки различаются между собой по строению, также различны по строению кистевидные щетинки. P5 самцов нового рода характеризуются асимметричными протоподитами и эндоподитом левой ноги длиннее 3-сегментного экзоподита. Дифференциальный диагноз рода основан на строении самок и самцов. Род *Vensiasa* gen. n. в настоящее время найден от экватора до 36° ю.ш. в восточной и в западной частях южной Атлантики.

Ключевые слова: Copepoda, новые таксоны, *Vensiasa* gen. n., каланоида, Атлантика, глубоководные, бентопелагические

INTRODUCTION

An interim synopsis of the “Bradfordian” calanoid families refers to 48 genera in 7 families (Phaennidae, Scolecitrichidae, Tharybidae, Diaixidae, Parkiidae, Rostrocalanidae and Kyphocalanidae), and 7 genera with an unresolved family status (Markhaseva et al. 2014). Representatives of the so-called “Bradfordian” taxa (Ferrari and Steinberg 1993) all belong to the superfamily Clausocalanoidea and are distinguished by their possession of sensory setae on the maxilla and maxilliped. In this paper a new benthopelagic “Bradfordian” genus and species, *Vensiasa incerta* gen. et sp. n. is described with an unnamed species both from samples collected from the abyssal region (depth 4585 to 5181 m) of the tropical Atlantic during the German expeditions DIVA–II and DIVA–III (Latitudinal Gradients of Deep-Sea Biodiversity in the Atlantic Ocean) in 2005 and 2009.

Vensiasa gen. n. is placed in the family Diaixidae Sars, 1902, which now includes 15 genera *Anawekia* Othman and Greenwood, 1994, *Byrathis* Markhaseva and Ferrari, 2005, *Cenognatha* Bradford-Grieve, 2001, *Diaixis* Sars, 1902, *Falsilandrumius* Vyshkvartzeva, 2001 (adult male unknown), *Grievella* Ferrari and Markhaseva, 2000 (male unknown), *Landrumius* Park, 1983 (male unknown), *Neoscolecithrix* Canu, 1896, *Paraxantharus* Schulz, 2006, *Procenognatha* Markhaseva and Schulz, 2010, *Ranthaxus* Markhasava and Schulz, 2010 (male unknown), *Sensiava* Markhaseva and Schulz, 2006, *Thoxancalanus* Markhaseva, Laakmann and Renz, 2014 (male unknown) *Xantharus* Andronov, 1981, *Xancithrix* Markhaseva, 2012 (Markhaseva 2014, Markhaseva et al. 2014). Excluding the pelagic genus *Landrumius* several pelagic species of the genera *Falsilandrumius*, and *Xantharus*, nearly all taxa of this family are obligate or predominantly obligate benthopelagic, all dwelling in near-bottom conditions. The establishment of this new benthopelagic “Bradfordian” genus contributes to the biodiversity of the deep-water near-bottom calanoid fauna, especially in regards to the diaixid forms.

METHODS AND TERMINOLOGY

Male and female copepods were collected during the RV Meteor expeditions DIVA–II–III in 2005 and 2009 close to the sea bed at depths between 4585 and 5181 m in the tropical Atlantic by a closing epibenthic sledge (Brenke 2005). The material was

fixed in 96% ethanol and later stained with a solution of chlorazol black E dissolved in 70% ethanol/30% water. Oral appendages and swimming legs were dissected in glycerine and figures were prepared using a *camera lucida*. Total body length measured from the anterior end of cephalothorax to the posterior border of caudal rami.

The following abbreviations are used in the descriptions: P1–P5, swimming legs 1–5; protopod, coxa plus basis; “sc”, sclerotized seta, “w”, worm-like sensory seta, “br”, brush-like sensory seta. Articulating segments of the antennules are designated by Arabic numerals, ancestral segments by Roman numerals. One seta and 1 aesthetasc on a segment of the antennule are designated: 1s + 1ae; “1?” indicates a broken setal element whose identity on the antennule could not be determined and only the scar or socket at its presumed position was counted. The numbering of the antennule ancestral segments follows Huys and Boxshall (1991). The antenna exopod and maxillule setation formula, the maxilla segments nomenclature and the maxilliped praecoxal endites setal formula (in sequence from praecoxal proximal to distal endite) are given according Markhaseva et al. (2014) and thus consider publications by Ferrari and Ivanenko (2001, 2008), Ferrari and Markhaseva (2000a, b), and Markhaseva and Ferrari (2005). The recently suggested revision of the calanoid copepod systematics (Andronov 2014) is considered, but the classification of Clausocalanoidea mostly follows Andronov (1974), as subsequently amended by Park (1986) and tested by molecular methods (Blanco-Bercial et al. 2014). The taxonomic composition of the group of “Bradfordian” families follows Markhaseva (2014) and Markhaseva et al. (2014).

Type material and additional specimens are deposited in the Zoological Museum Hamburg (ZMH) and the Zoological Institute, Russian Academy of Sciences, St. Petersburg (ZIN).

SYSTEMATICS

Superfamily Clausocalanoidea Giesbrecht, 1893

Family Diaixidae Sars, 1902

Genus *Vensiasa* gen. n.

Type species: *Vensiasa incerta* sp. n., designated here.

Description. *Female.* Small copepods. Cephalosome and pediger 1, pedigers 4–5 incompletely se-

parate. Posterior corners in dorsal view triangular; as rounded lobes in lateral view. Rostrum as a poorly developed plate with two filaments. Antennule of 24 free segments. Coxa of antenna with 1 seta; basis with 2 setae; endopodal segment 1 with 1 seta, exopod setal formula 0,0-0-1,1,1,1,1,3. Gnathobase of mandible with 7–8 teeth; exopod of 5 segments with 1,1,1,1 and 2 setae; endopod segment 1 with 3 setae, second endopod with 9 setae; basis with 3 setae. Maxillule praecoxal arthrite with 9 terminal spines, 2 posterior setae and 1 anterior seta; coxal endite with 3 setae, coxal epipodite with 8–9 setae; proximal basal endite with 3 setae, distal basal endite with 2–3 setae; endopod with 5 setae, exopod with 8 setae. Maxilla praecoxal endite bearing 5 setae and attenuation, coxal and basal endites with 3 setae each; enditic-like lobe of proximal endopodal segment with 4 seta; 2 setae of distal basal endite and 2 setae of enditic-like lobe equal in length and curved distally; endopod with 6 worm-like and 2 brush-like sensory setae, 3 terminal worm-like setae long, 3 proximal worm-like setae short and very thin and 2 brush-like setae: 1 thick with brush well developed and 1 thin with poorly developed brush. Maxilliped syncoxa with 1, 2 and 3 setae on praecoxal endites. P1–P4 of typical clausocalanoidean setation and segmentation. P5 uniramous, symmetrical, 3-segmented, with 4 setal elements terminally.

Male. Small copepods. Rostrum as in female. Cephalosome and pediger 1, pedigers 4 and 5 separate. Prosome posterior corners as short rounded lobes. Right antennule of 23, left of 24 free segments, ancestral segments X–XI fused. Oral appendages sexually dimorphic and moderately reduced compared to females. Setation of antennal coxa, basis, endopod segment 1 and exopod setal formula as in female. Number of setae on mandibular basis and endopod segment 2 as in female, endopod segment 1 with 2 setae. Armament of maxillule differs from female in: praecoxal arthrite with 1 posterior seta; coxal epipodite with 7 setae; proximal basal endite with 2 setae, and exopod with 7 setae. Maxilla praecoxal endite with 4 setae, other lobes with the same setal numbers as in female, setae not curved distally; endopod armament as in female. Maxilliped setation of syncoxa as in female, distal endopod setae more than 1.6 times longer than basis. P1–P4 as in female. P5 nearly as long as urosome; protopods asymmetrical, right leg uniramous, 3-segmented; left leg biramous, endopod longer than 3-segmented exopod.

Etymology. The generic name *Vensiasa* is an anagram of *Sensiava*, the name of the most closely related genus among diaixids. Gender feminine.

Differential diagnosis. *Vensiasa* gen. n. is defined among “Bradfordians” by the morphology of the sensory setae on the maxillary endopod (6w+2br), their structure is an apomorphy for the genus: the 3 proximal worm-like setae are remarkably short and thin, 1 brush-like seta is very thin with poorly developed brush and 1 brush-like seta is very thick, brush well developed. Maxillule endopod with 5 setae (*vs* 7–12 in other diaixids) and male’s P5 protopods asymmetrical; left P5 endopod longer than 3-segmented exopod (*vs* in other diaixids if protopods asymmetrical, then left endopod rudimentary or absent), these characters are the most relevant to distinguish the new genus from the other members of the Diaixidae. The new genus appears to be more closely related to the genus *Sensiava* (Diaixidae) with which it shares the following combination of character states: 1) antennary endopod segment 1 with 1 seta; 2) antennary exopod setal formula 0,0-0-1,1,1,1,1,3; 3) setae of maxillary basal endite and enditic-like lobe of proximal endopodal segment distally curved or curled, and 4) very long endopodal terminal maxillipedal setae in males. *Vensiasa* gen. n. can be easily distinguished from *Sensiava* by the setation of the maxillule, maxilla and maxilliped, e.g., the female maxillule setation formula is 12, 3, 3, 3(or 2), 5, 8, 9 in the new genus *vs* 14, 4–5, 4, 4, 9, 8, 8–9 in *Sensiava*, and the maxilla endopod setation formula of *Vensiasa* gen. n. is 6w+2br *vs* 3w+5br or 3w+5br+1sc in *Sensiava*. The oral appendages are more sexually dimorphic in the male of the new genus and the P5 protopods are asymmetrical, left exopod 3-segmented (*vs* symmetrical protopods, 2-segmented left exopod in *Sensiava*).

Some characters defining *Vensiasa* gen. n. among Diaixidae, are most likely homoplasies with the not related “Bradfordian” genera. For instance the setal number of the maxillary endopod (5) is also known for *Diaiscolecithrix* Markhaseva, Schulz et Renz, 2010 (Scolecitrichidae), *Kyphocalanus* Markhaseva et Schulz, 2009 (Kyphocalanidae), some species of *Undinella* Sars, 1900 (Tharybidae). In addition, a maxillary endopod sensory setae composition (6w+2br) is also present in the taxonomically unresolved genus *Rythabis* Schulz, 1995 but the setal morphology differs.

Vensiasa incerta sp. n.
(Figs. 1–4)

Holotype. Adult female, dissected (body in a vial, left antennule, antenna, mandible, maxilla, maxilliped, both maxillule and P1–P5 in 2 slides mounted in glycerine), body length 2.90 mm (ZMH K–42159); tropical Atlantic, 00°01.2'S, 02°28.7'W, DIVA–II, station 63, 15 March 2005, above sea bed at depth of 5058 m.

Paratypes: 1 adult female, dissected, body length 2.90 mm; (ZMH K–42160), same label data as for holotype; 1 adult female, dissected, body length 2.75 mm; (ZIN–91126); tropical Atlantic, 00°42.7'S, 05°31.2'W, DIVA–II, station 90, 20 March 2005, above the sea bed at depth of 5140 m.

Etymology. The specific name is derived from the Latin adjective *incerta* meaning “indistinct” and refers to the difficulties in its differentiation from its congeners.

Additional material: 1 adult female, body length 3.05 mm (ZIN), same label and collection data as holotype; 1 adult female, 3.10 mm (ZMH), tropical Atlantic, 36°00.61'S, 49°01.55'W, DIVA–III, station 534, 16 July 2009, above the sea bed at depth between 4605–4585 m.

Description. *Female*, total length 2.75–3.1 mm; prosome 3.5–4.1 times as long as urosome. Rostrum (Fig. 1B–C) as a poorly developed plate with two filaments. Suture between cephalosome (Fig. 1A–B) and pediger 1 incompletely visible (lateral and dorsal views) and between pedigers 4–5 sometimes incomplete in lateral view. Posterior corners in dorsal view triangular; as rounded lobes in lateral view (Fig. 1A–B, D–F). Urosome of 4 somites. Right posterior border of genital double-somite undulated or not (Fig. 1F). Spermathecae of moderate size, narrow, upturned anteriorly (Fig. 1E–F). Caudal ramus (Fig. 1D–F) with 4 terminal plus 1 small dorsolateral and 1 small ventral setae each.

Antennule (Fig. 2A–C) nearly as long as prosome, of 24 free segments; armature as follows: I – 3s, II–IV – 6s + 1ae, V – 2s + 1ae, VI – 2s, VII – 2s + 1ae, VIII – 2s, IX – 2s, X–XI – 4s + 1ae, XII to XIII – 1s each, XIV – 2s + 1ae, XV – 1s, XVI – 2s+1ae, XVII–1s, XVIII–2s, XIX – 1s, XX – 2s, XXI – 1s + 1ae, XXII to XXIII – 1s each, XXIV to XXVI – 2s each, XXVII–XXVIII incompletely separate with 4s + 1ae.

Antenna (Fig. 2D), coxa with 1 seta; basis with 2 setae; endopodal segment 1 with 1 seta, endopodal

segment 2 with 13 or 15 setae; exopod 8-segmented, setal formula 0,0-0-1,1,1,1,1,3.

Mandible (Fig. 2E–G), gnathobase cutting edge with 7–8 teeth; exopod of five segments with 1,1,1,1 and 2 setae; endopod segment 1 with 3 setae, second endopod with 9 setae; basis with 3 setae.

Maxillule (Fig. 3A), praecoxal arthrite with 9 terminal spines, 2 posterior setae and 1 anterior seta; coxal endite with 3 setae, coxal epipodite with 9 setae (sometimes with 8 setae); proximal basal endite with 3 setae, distal basal endite with 3 setae; endopod with 5 setae, exopod with 8 setae.

Maxilla (Fig. 3B–E), praecoxal endite bearing five setae and attenuation, coxal with 3 setae; proximal basal endite with 3 setae; distal basal endite with 3 setae, 2 setae equal in length and curved distally; enditic-like lobe of proximal endopodal segment with 4 setae, 2 setae long, equal in length and curved distally and 2 setae short, sensory, worm-like. Endopod with 8 sensory setae (6w+2br), 3 terminal worm-like setae long, 3 proximal worm-like setae short and very thin and 2 brush-like setae: 1 thick with brush well developed and 1 thin with poorly developed brush.

Maxilliped (Fig. 4A), syncoxa with 1 sclerotized seta on proximal praecoxal endite, 2 sclerotized setae on middle endite, and 3 setae on distal praecoxal endite, distalmost poorly sclerotized terminally; coxal endite with 3 setae. Basis with 3 medial setae plus 2 setae distally; endopod of 5 free segments with 4, 4, 3, 3+1 and 4 setae.

P1 (Fig. 4B–D), basis with medial distal seta curved, spinules present near the base of the seta; endopod one-segmented with 3 medial and 2 terminal setae; lateral lobe well developed; exopod 3-segmented, segment 1 with lateral spine, not reaching, or nearly reaching the base of spine at segment 2; segment 2 with lateral spine and medial seta; segment 3 with lateral spine, 3 medial setae and terminal setae.

P2 to P4 biramous with 3-segmented exopods, endopod 2-segmented in leg 2 and 3-segmented in legs 3 and 4.

P2 (Fig. 4E), coxa with medial seta; basis with row and patch of spinules on posterior surface distomedially and distolaterally, respectively; endopod segment 1 with single medial seta and posterior spinules laterally, segment 2 with 2 medial, 2 terminal and 1 lateral setae and furnished with scattered spinules on posterior surface. Exopod segment 1 with lateral spine and medial seta, segment 2 with lateral

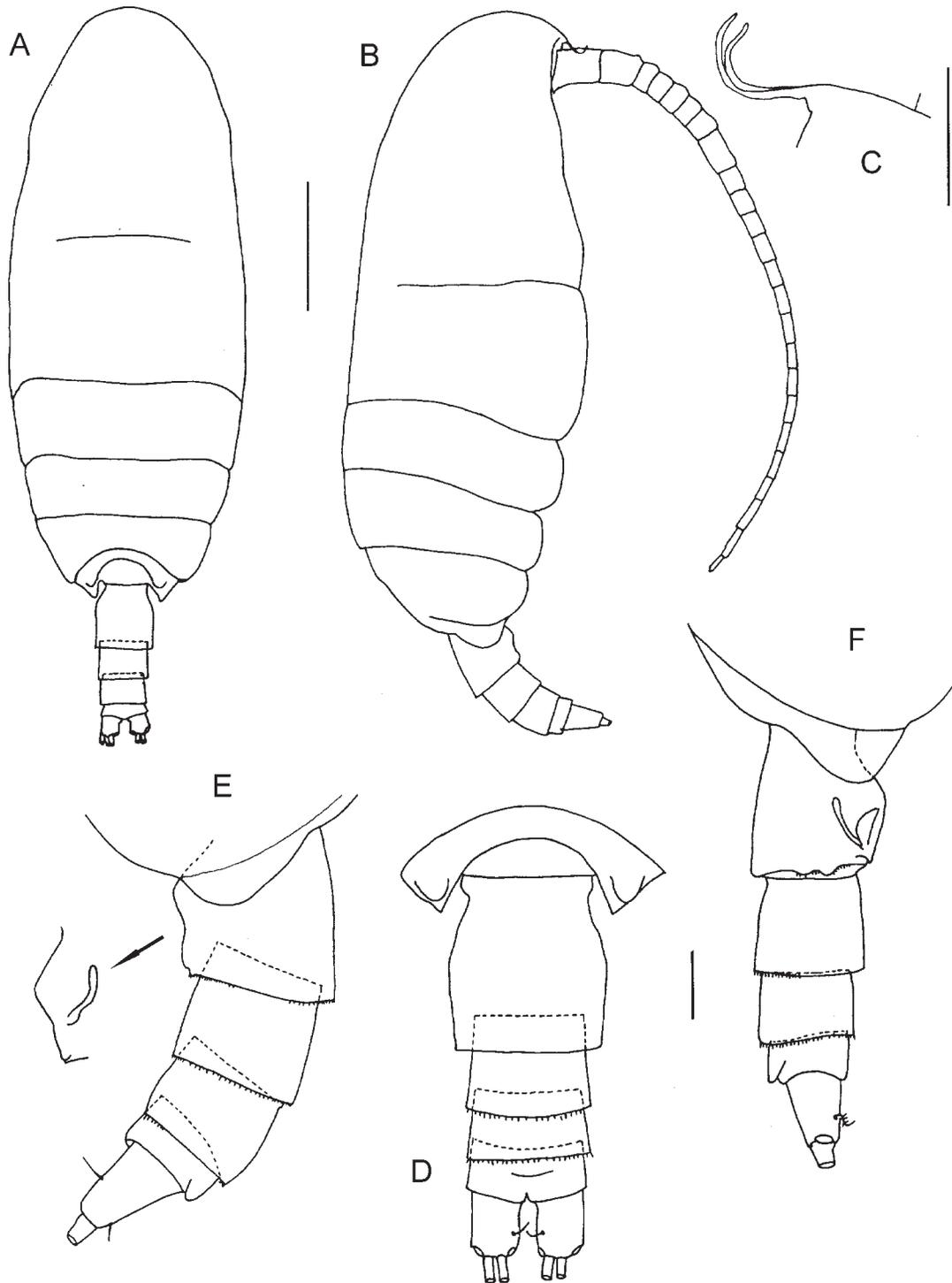


Fig. 1. *Vensiasa incerta* gen. et sp. n. female, A – habitus, dorsal; B – habitus, lateral; C – rostrum, lateral; D – posterior prosome and urosome, dorsal; E, F – posterior prosome and urosome, lateral. A–C, E, holotype, D, paratype [K–42160], F, additional female specimen from Sta. 534, DIVA–III. Scale bars: A–B = 0.5 mm; C–F = 0.1 mm.

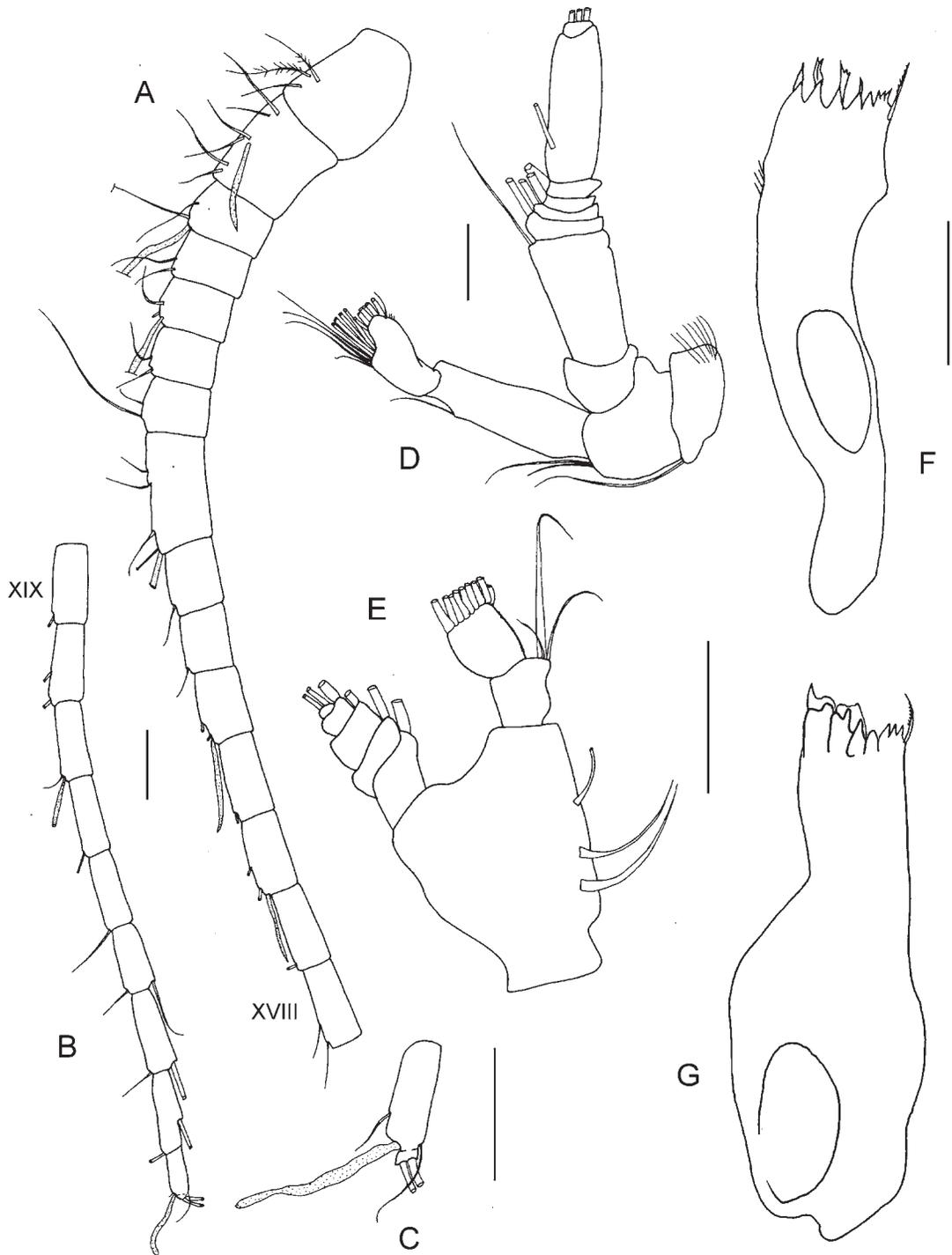


Fig. 2. *Vensiasa incerta* gen. et sp. n., female, A – antennule, ancestral segments I–XVIII; B – antennule, ancestral segments XIX–XXVIII; C – antennule, ancestral segments XXVII–XXVIII; D – antenna; E – mandible, palp; F, G – mandible, gnathobase. A–C, E, holotype; D, F–G, paratype [K–42160]. Scale bar = 0.1 mm.

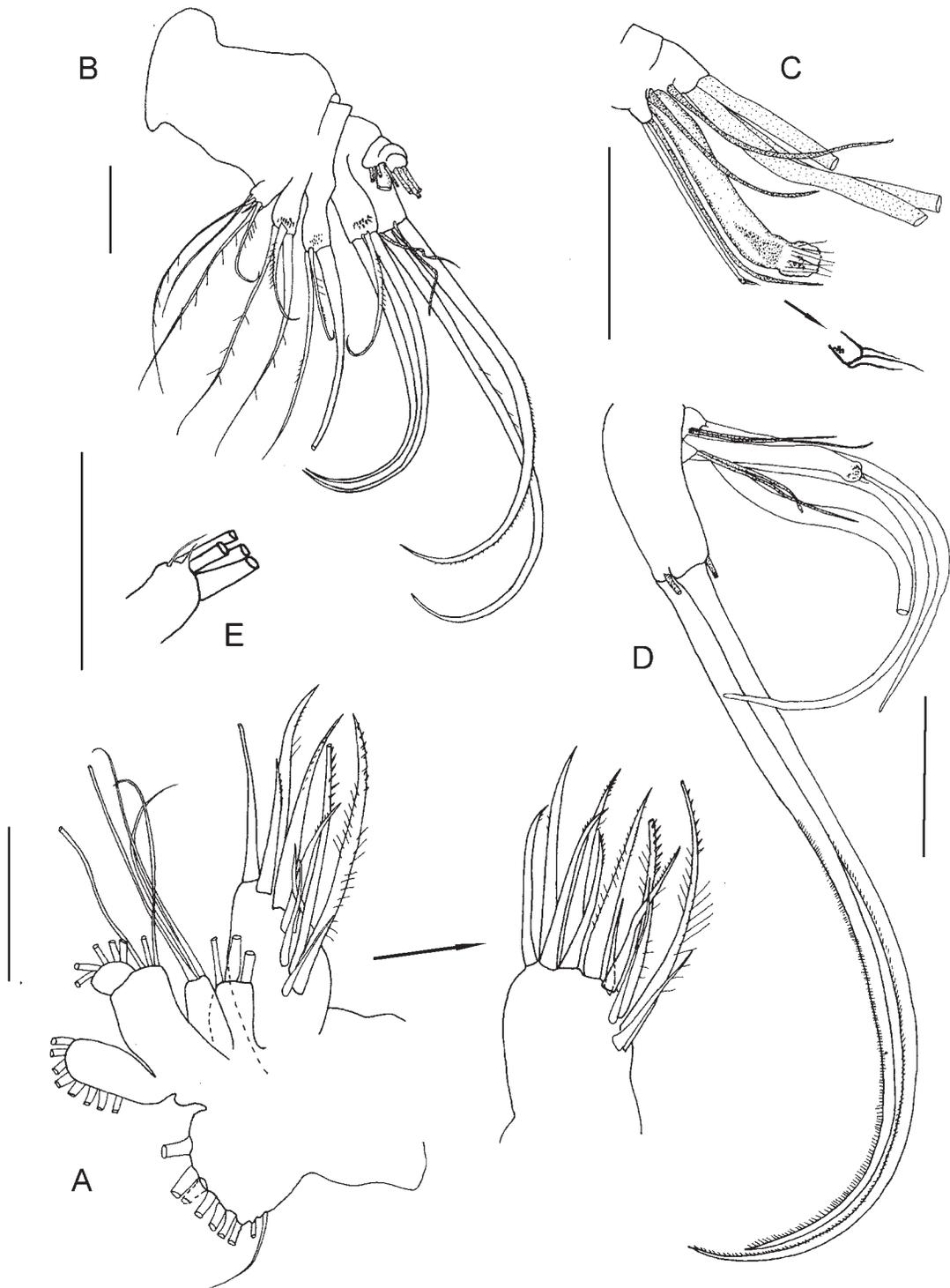


Fig. 3. *Vensiasa incerta* gen. et sp. n., female, A – maxillule, arrow marks praecoxal arthrite, other position; B – maxilla; C – maxilla, endopod, arrow marks head of a thin brush-like seta; D – maxilla, endopod and enditic-like lobe of proximal endopodal segment; E, maxilla, praecoxal endite. A–C, paratype [K-42160], D–E, holotype. Scale bar = 0.1 mm.

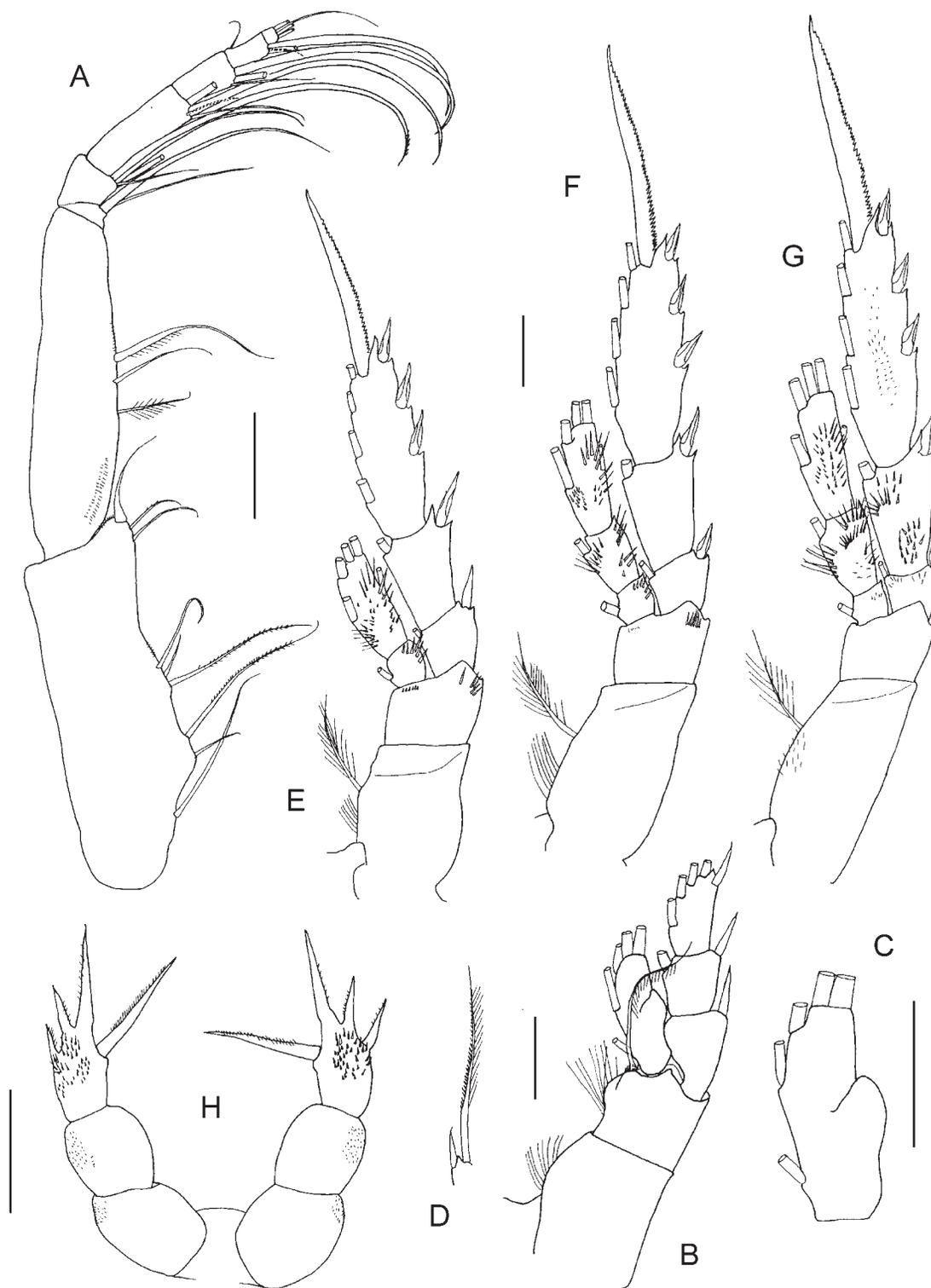


Fig. 4. *Vensiasa incerta* gen. et sp. n. gen. et sp. n., female, holotype, A – maxilliped; B – P1; C – P1, endopod; D – P1, lateral and terminal spines of exopod segment 3; E – P2; F – P3; G – P4; H – P5. Scale bar = 0.1 mm.

spine and medial seta, segment 3 with 3 lateral spines, 4 medial setae and terminal spine.

P3 (Fig. 4F), coxa with medial seta; basis posterior surface with row of tiny spinules distomedially and patch of spinules distolaterally; endopod segment 1 with medial seta and posterior spinules laterally, segment 2 with medial seta and posterior spinules, segment 3 with 2 medial, 2 terminal and 1 lateral setae and posterior spinules; exopod segment 1 with lateral spine, medial seta, segment 2 with lateral spine and medial seta, segment 3 with 3 lateral spines, 4 medial setae and terminal spine.

P4 (Fig. 4G), coxa with medial seta and tiny posterior spinules medially; endopod segment 1 with medial seta and few tiny posterior spinules laterally, segment 2 with medial seta and posterior spinules, segment 3 with 2 medial, 2 terminal and 1 lateral setae and posterior spinules; exopod segment 1 with lateral spine and medial seta, segment 2 with lateral spine and medial seta, segment 3 with 3 lateral spines, 4 medial setae and terminal spine.

P5 (Fig. 4H) uniramous, symmetrical, 3-segmented with single medial spine, 1 lateral spine-like, partly articulated extension and 2 spine-like unarticulated and unequal extensions terminally.

Male: unknown.

Vensiasa sp.

(Figs. 5–8)

Material examined. Seven adult females and 1 male collected above the sea bed in the tropical Atlantic: 1 female, body length 2.55 mm (ZIN), 28°00.9'S, 07°17.9'E, DIVA-II, station 40, 04 March 2005, at depth between 5062–5057 m; 1 female, body

length 2.35 mm (ZMH), 1 male, body length 2.65 mm (ZIN), 28°01.9'S, 07°18.6'E, DIVA-II, station 41, 04 March 2005, at depth between of 5053 m; 1 female, body length 2.10 mm (ZMH), 00°01.2'S, 02°28.7'W, DIVA-II, station 63, 15 March 2005, of 5058 m; 1 female, body length 2.25 mm (ZIN), 00°08.5'S, 02°30.2'W, DIVA-II, station 64, 15 March 2005, of 5050 m; 2 females, body length 2.20 mm, 2.60 mm (ZMH), 14°58.91'S, 29°56.48'W, DIVA-III, station 580, 30 July 2009, between 5139–5142 m; 1 female, body length 2.20 mm (ZMH), 03°57.54'S, 28°03.07'W, DIVA-III, station 609, 06 August 2009, between 5170–5181 m.

Description. *Females* in poor condition for taxonomic examination, body length 2.10–2.60 mm; prosome 3.6–4.6 times as long as urosome. Rostrum and habitus as in *V. incerta* sp. n. Spermathecae mostly as in *V. incerta* sp. n., however, in some specimens spermathecae are relatively shorter and wider (Fig. 5A).

Antenna, maxilla and maxilliped as in *V. incerta* sp. n. Mandible (Fig. 5B) as in *V. incerta* sp. n., except relatively small distalmost seta of the basis. Maxillule as in *V. incerta* sp. n., except distal basal endite bearing 2 or 3 setae. P1–P4 as in *V. incerta* sp. n., except one specimen having a longer lateral spine of P1 on exopod segment 1, reaching the base of spine of succeeding exopodal segment 2. P5 (Fig. 5C) as in *V. incerta* sp. n., except specimen from sta. 580 having a relatively shorter lateral spine-like unarticulated extension.

Adult male, total length 2.65 mm, prosome 2.6 times as long as urosome. Rostrum (Fig. 6C) as in female. Cephalosome (Fig. 6A–B) and pediger 1, pedigers 4 and 5 separate; posterior corners as short rounded lobes (Fig. 5B, E). Caudal rami (Fig. 5D–E)

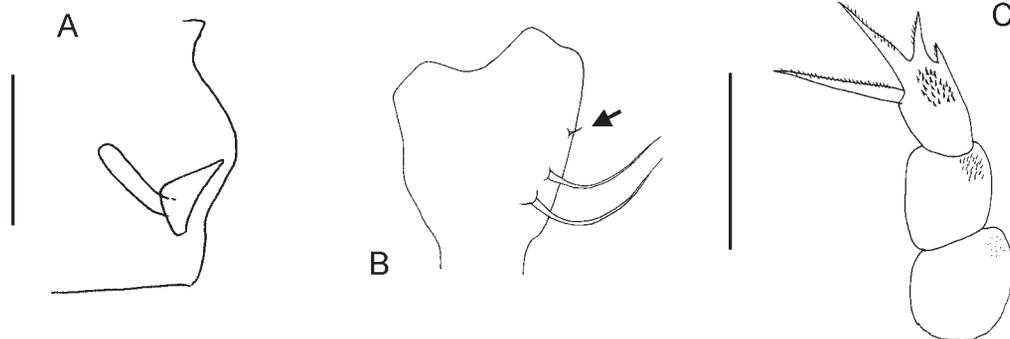


Fig. 5. *Vensiasa* sp., female, additional specimens, A – spermathecae, lateral; B – mandible, basis, arrow marks distalmost small seta; C – P5. A, specimen from Sta. 609, DIVA-III, B – C, specimens from Sta. 580, DIVA-III. Scale bar = 0.1 mm.

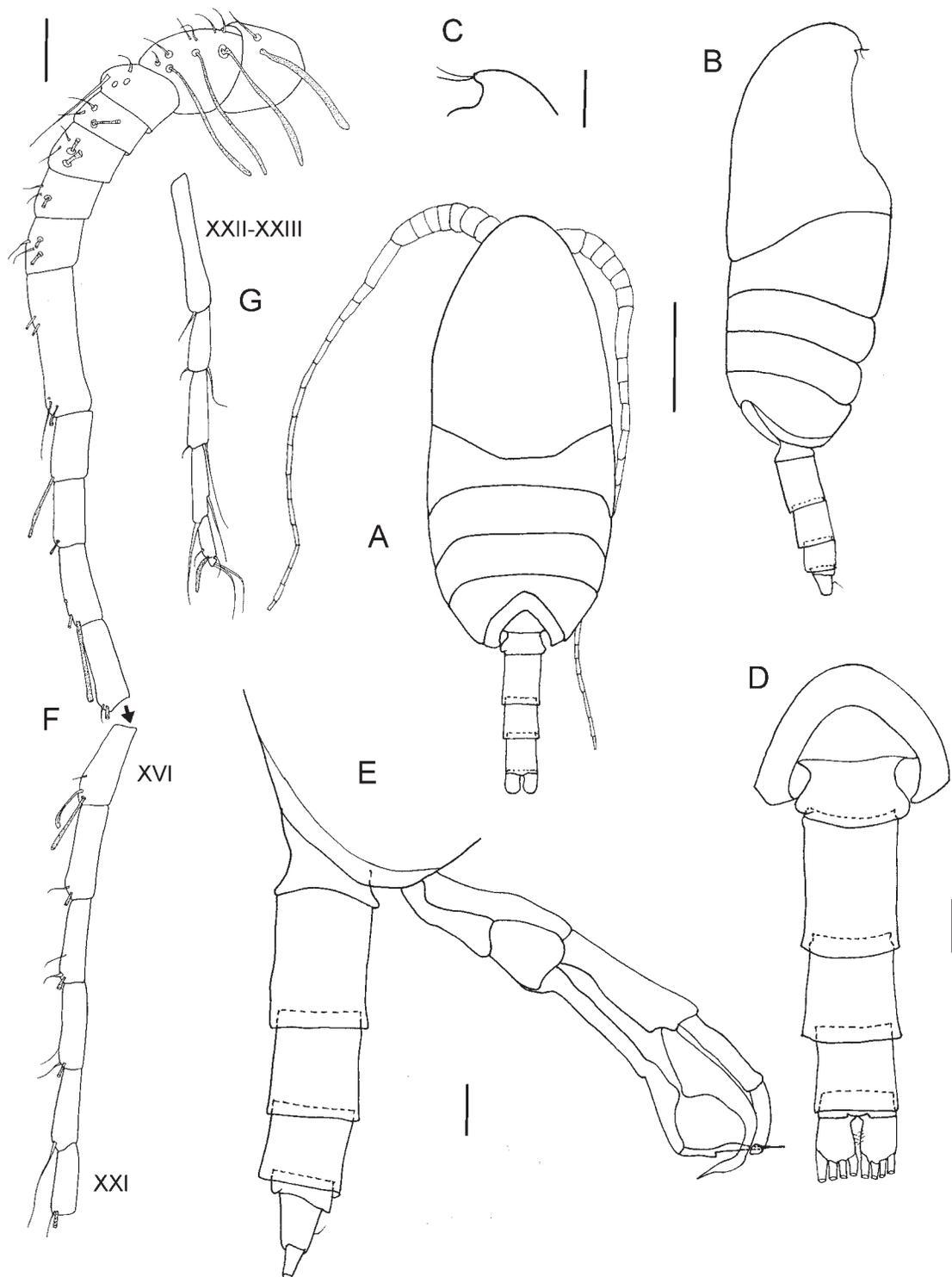


Fig. 6. *Vensiasa* sp., male, A – habitus, dorsal; B – habitus, lateral; C – rostrum, lateral; D – posterior prosome and urosome, dorsal; E – posterior prosome, urosome and P5, lateral; F – right antennule, ancestral segments I – XXI; G – right antennule, ancestral segments XXII – XXVIII. Scale bars: A–B = 0.5 mm, C–G = 0.1 mm.

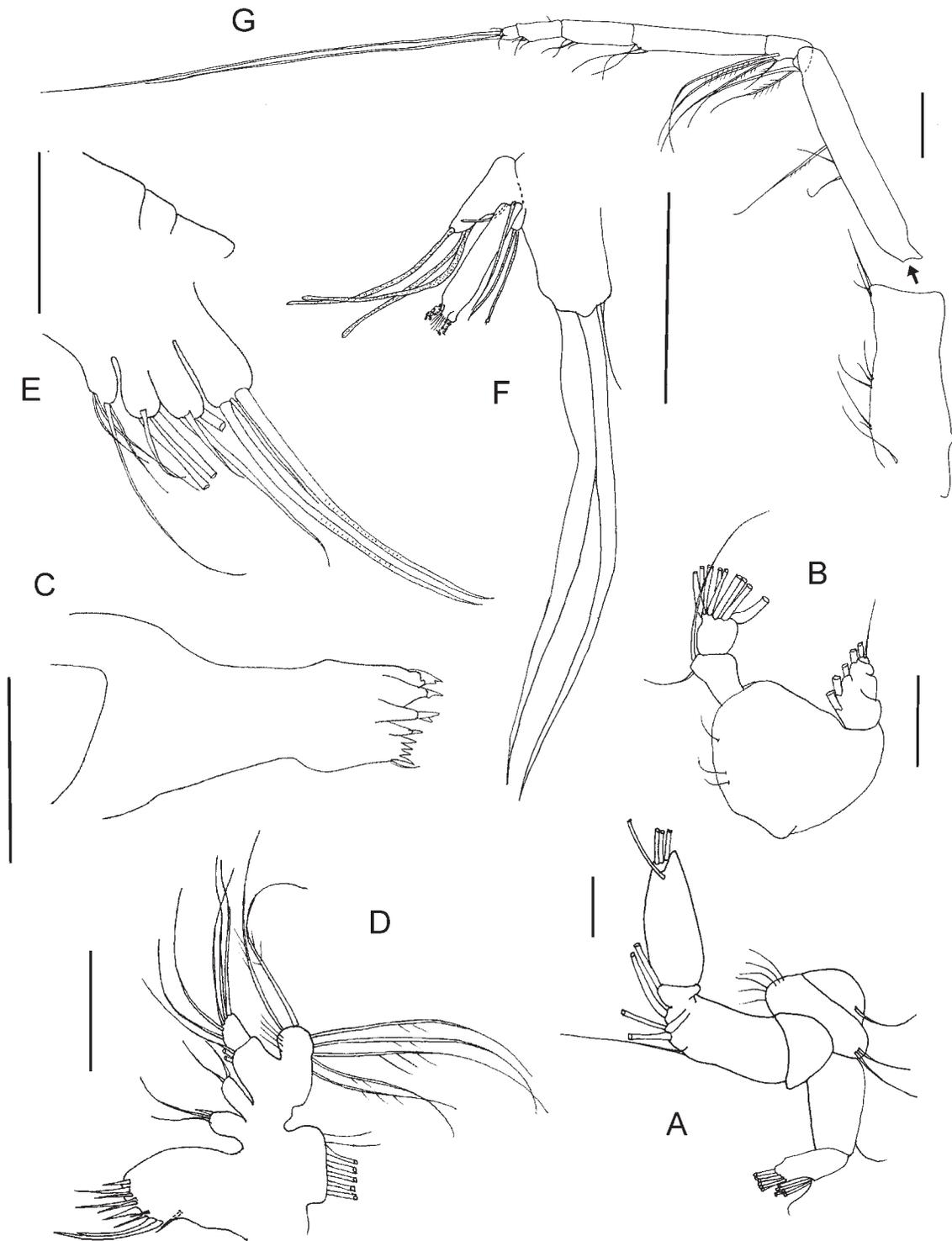


Fig. 7. *Vensiasa* sp., male, A – antenna; B – mandible, palp; C – mandible, gnathobase; D – maxillule; E – maxilla, proximal praecoxal, coxal and basal endites; F – maxilla, endopod and enditic-like lobe of proximal endopodal segment; G – maxilliped. Scale bar = 0.1 mm.

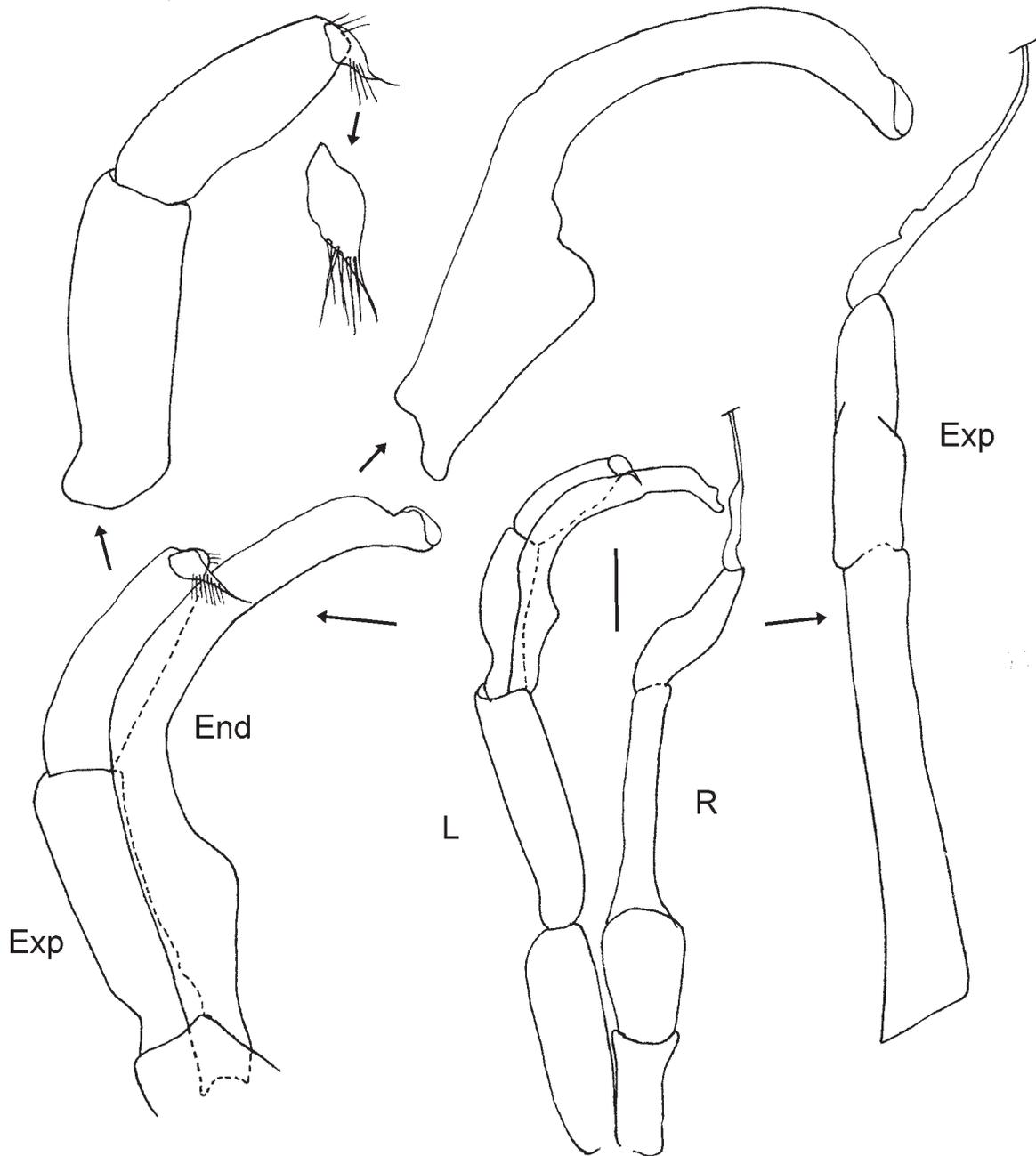


Fig. 8. *Vensiasa* sp., male, P5, L, left leg; R, right leg; End, endopod; Exp, exopod. Scale bar = 0.1 mm.

with four terminal plus ventral setae each, dorso-lateral seta was not observed. Antennule reaching posterior border of urosome somite 4. Right antennule (Fig. 6F–G) of 23 free segments, armature as follows: I – 1s + 1ae, II–IV – 6s + 3ae, V – 2s + 2?, VI – 2s + 1ae, VII – 2s + 2ae, VIII – 2s + 1ae, IX –

2s + 2ae; X–XI – 3s + 1ae + 1?, XII–1ae, XIII – 1ae; XIV – 1s + 1ae + 1?, XV – 1s + 1ae, XVI – 2s + 1ae, 1 seta curved, XVII – 1s + 1ae, XVIII – 2s + 1ae, XIX – 2s + 1ae, XX – 1s, XXI – 1s + 1ae, XXII fused to XXIII – 1s, XXIV to XXVI – 2s each, XXVII–XXVIII – 4s + 1ae. Left antennule differs from right

in segment XIX armament as 1s + 1?, segments XXII and XXIII separate, segment XXII without seta, segment XXIII – 1s.

Oral appendages sexually dimorphic and moderately reduced compared to females.

Antenna (Fig. 7A), setation as in female of *V. incerta* sp. n., except for endopod segment 2 with 12 setae; medial seta of exopod segment 7 placed distally.

Mandible (Fig. 7B–C), mandibular palp armament as in female of *V. incerta* sp. n., except for endopod segment 1 with 2 setae; basis setae very small, thin.

Maxillule (Fig. 7D), praecoxal arthrite with 9 terminal spines, 1 posterior seta and 1 anterior seta; coxal endite with 3 setae, coxal epipodite with 7 setae; proximal basal endite with 2 setae, distal basal endite with 3 setae; endopod with 5 setae, exopod with 7 setae.

Maxilla (Fig. 7E–F), praecoxal endite with 4 setae, coxal, basal endites and enditic-like lobe of proximal endopodal segment with 3 setae each, setae not curved distally. Endopod as in female with 8 sensory setae (6w+2br), 3 terminal worm-like setae longer, 3 proximal worm-like setae short and very thin and 2 brush-like setae: 1 thick with well-developed brush and the other thin, with poorly developed brush.

Maxilliped (Fig. 7G), setation of syncoxa and basis as in female of *V. incerta* sp. n., compared to female setae slender; endopod of 5 free segments, segment 2 nearly as long as 3 following segments; endopod armament as 4, 3, 3, 3+1 and 4 setae, distal setae more than 1.6 times longer than basis.

P1–P4 in general as in female of *V. incerta* sp. n., except for P1 basis without spunules near the base of medial seta, exopod lateral spines shorter and slender, and P2–P4 posterior spinulation slightly less developed.

P5 (Fig. 6E, 8) nearly as long as urosome; right leg uniramous, coxa and basis separate and together nearly as long as the left basis, exopod segments 1 and 2 incompletely separate; left leg biramous, endopod longer than 3-segmented exopod.

Remarks. The status of this species remains unresolved and thus, names are not given here for the 7 females of the new genus because their poor condition. They differ from the type species of *Vensiasa* in the following character states: 1) smaller size (2.10–2.60 mm); 2) different shape of spermathecae in 2 females, which is short and wide (sta. 41, DIVA–II and 609, DIVA–III, Fig. 5A vs Fig. 1E–F); 3) mandible ba-

sis distalmost seta very short in 3 females (Sta. 63, DIVA–II and Sta. 580, 609, DIVA–III, Fig. 5B vs Fig. 2E); 4) maxillule distal basal endite with 2 setae in 2 females (Sta. 63–64, DIVA–II); 5) P1 exopod segment 1 lateral spine reaching the base of spine at exopod segment in 1 female (Sta. 64, DIVA–II), and 6) P5 shorter terminal and lateral spine-like unarticulated extensions in 3 females (Sta. 63, DIVA–II and Sta. 580, DIVA–III, Fig. 5C vs Fig. 4H). The above mentioned 7 examined specimens of *Vensiasa* sp. differ from the type species and between each other. Their poor shape does not give possibility to speculate whether this is an intraspecific variation of *Vensiasa* sp., or these specimens belong to a different species.

The described male shares the diagnostic characters of the new genus including: the morphology and composition of the sensory setae at the maxilla endopod; maxillule endopod with 5 setae; antenna endopod segment 1 with 1 seta, setal formula of antenna exopod as 0,0-0-1,1,1,1,1,1,3; maxilliped endopodal 2 terminal setae very long. The male is sexually dimorphic, thus making uncertain its attribution to the type species, described after the female. Its assignment to the species and the definition of its taxonomic status is postponed until new specimens are obtained.

ACKNOWLEDGEMENTS

The author thanks Prof. Pedro Martinez Arbizu for providing the unsorted copepod fractions of both DIVA II and III expeditions, which yielded the specimens analyzed in this paper and to two reviewers for their valuable comments. Research at the German Centre for Marine Biodiversity Research (DZMB), Biocentre Grindel and Zoological Museum was funded by Senckenberg.

REFERENCES

- Andronov V.N. 1974.** Phylogenetic relations of large taxa within the suborder Calanoida (Crustacea, Copepoda). *Zoologicheskii Zhurnal*, **53**: 1002–1012. [In Russian].
- Andronov V.N. 2014.** Phylogeny and revision of calanoid copepods system. Smartbooks, Kaliningrad, 206 pp. [In Russian with English summary].
- Blanco-Bercial L., Bradford-Grieve J. and Bucklin A. 2011.** Molecular phylogeny of the Calanoida (Crustacea: Copepoda). *Molecular Phylogenetics and Evolution*, **59**: 103–113.
- Brenke N. 2005.** An epibenthic sledge for operations on marine soft bottom and bedrock. *Marine Technology Society Journal*, **39**: 10–19.

- Ferrari F.D. and Ivanenko V.N. 2001.** Interpreting segment homologies of the maxilliped of cyclopoid copepods by comparing stage-specific changes during development. *Organisms, Diversity and Evolution*, **1**: 113–131.
- Ferrari F.D. and Ivanenko V.N. 2008.** The identity of protopodal segments and the ramus of maxilla 2 of copepods (Copepoda). *Crustaceana*, **81**: 823–835.
- Ferrari F.D. and Markhaseva E.L. 2000a.** *Brachycalanus flemingeri* and *B. brodskyi*, two new copepods (Crustacea: Calanoida: Phaennidae) from benthopelagic waters of the tropical Pacific. *Proceedings of the Biological Society of Washington*, **113**: 1064–1078.
- Ferrari F.D. and Markhaseva E.L. 2000b.** *Grievella shanki*, a new genus and species of scolecitrichid calanoid copepod (Crustacea) from a hydrothermal vent along the southern East Pacific Rise. *Proceedings of the Biological Society of Washington*, **113**: 1079–1088.
- Ferrari F.D. and Steinberg D. 1993.** *Scopalatum vorax* (Esterly, 1911) and *Scolecithricellalobophora* Park, 1970 calanoid copepods (Scolecitrichidae) associated with a pelagic tunicate in Monterey Bay. *Proceedings of the Biological Society of Washington*, **106**: 467–489.
- Huys R. and Boxshall G.A. 1991.** Copepod Evolution. The Ray Society, London, 468 p.
- Markhaseva E.L. 2014.** New *Sensiava* species (Copepoda: Calanoida: Diaixidae) from the deep South Atlantic and first description of the female. *Zootaxa*, **3802**: 217–239.
- Markhaseva E.L. and Ferrari F.D. 2005.** New benthopelagic bradfordian calanoids Crustacea: Copepoda) from the Pacific Ocean with comments on generic relationship. *Invertebrate Zoology*, **2**: 111–168.
- Markhaseva E.L., Laakmann S. and J. Renz. 2014.** An interim synopsis of the Bradfordian families with a description of *Thoxancalanus spinatus* (Copepoda: Calanoida), a new diaixid genus and species from the deep Atlantic Ocean. *Marine Biodiversity*, **44**: 63–88.
- Park T. 1986.** Phylogeny of calanoid copepods. *Syllogeus*, **58**: 191–196.

Submitted March 5, 2015; accepted March 11, 2015.