



## A new species of *Cletocamptus* Schmankeiwitsch, 1875 (Crustacea, Copepoda, Harpacticoida) and the description of the male of *C. nudus* from Colombia

JUAN M. FUENTES-REINÉS<sup>1\*</sup>, EVELYN ZOPPI DE ROA<sup>2</sup> & RUBÉN TORRES<sup>2</sup>

<sup>1</sup>Universidad del Magdalena, Grupo de investigación en Biodiversidad y Ecología Aplicada. A.A 731 Santa Marta, Magdalena, Colombia.

<sup>2</sup>Universidad Central de Venezuela, Facultad de Ciencias, Instituto de Zoología y Ecología Tropical, Centro de Ecología y Evolución, Laboratorio de Ecología de Sistemas acuáticos (Plancton). A.P. 47058 Caracas 1041.

\*Corresponding author: [juanmanuel Fuentesreines@yahoo.com](mailto:juanmanuel Fuentesreines@yahoo.com)

**Abstract:** Plankton samples from a small temporal pond in Puebloviejo, Magdalena Department, yielded two species of the genus *Cletocamptus* Schmankeiwitsch 1875: *Cletocamptus samariensis* sp. nov and *Cletocamptus nudus* Gómez, 2005. The new species is closely related to *C. schmidtii* Mielke, 2000 and *C. nudus* Gómez, 2005 based on the armature formula of P1-P4, but can be separated from these two congeners by a combination of characters including: 1) anal operculum, 2) antennal exopod, 3) anal somite and 4) setation of the fifth leg of female and male. The male of *C. nudus* Gómez 2005 is described for the first time.

**Keywords:** distribution, taxonomy, pond, Puebloviejo, Neotropic.

**Resumen.** Una nueva especie de *Cletocamptus* Schmankeiwitsch, 1875 (Crustacea, Copepoda, Harpacticoida) y la descripción del macho de *C. nudus* de Colombia. En muestras de zooplankton de una charca pequeña temporal ubicada en Puebloviejo, Departamento del Magdalena, se encontraron dos especies del género *Cletocamptus* Schmankeiwitsch 1875: *Cletocamptus samariensis* sp. nov. y *Cletocamptus nudus* Gómez, 2005. La especie nueva está estrechamente relacionado con *C. schmidtii* Mielke, 2000 y *C. nudus* Gómez, 2005 basado en la formula de la armadura de P1-P4, pero pueden ser separada de estas dos congéneres por una combinación de caracteres incluyendo: 1) ornamentation of opérculo anal, 2) exopodo de la antena, 3) somita anatal y 4) setacion de la quinta pata de la hembra y del macho.

**Palabras claves:** distribución, taxonomía, charca, Puebloviejo, Neotrópico.

### Introduction

The genus *Cletocamptus* is considered cosmopolitan (Suárez-Morales et al, 2013) and its species occur in a wide salinity range, being reported in estuaries, coastal and beach lagoons but few species are found in full freshwater, for example, *C. cecurirensis* Gómez, Sheihing & Labarca, 2007, was reported from Salar de Surire (Chile), (Boxshall & Defaye 2008, Gómez et al., 2007). Following Gómez & Gee (2009), Gómez et al., 2013, Chang, 2013; Suárez-Morales, et al., 2013 and the new species presented herein, there are 26 valid species within

this genus and 15 species have been described for America: *C. helobius* Fleeger, 1980, *C. axi* Mielke, 2000, *C. schmidtii* Mielke, 2000, *C. sinaloensis* Gómez, Fleeger, Rocha-Olivares & Foltz, 2004, *C. fourchensis* Gómez, Fleeger, Rocha-Olivares & Foltz, 2004, *C. deborahdexteræ* Gómez, Fleeger, Rocha-Olivares & Foltz, 2004, *C. stimpsoni* Gómez, Fleeger, Rocha-Olivares & Foltz, 2004, *C. levis* Gómez, 2005, *C. nudus* Gómez, 2005, *C. cecurirensis* Gómez, Scheihing & Labarca, 2007, *C. assimilis* Gómez & Gee, 2009, *C. tertius* Gómez & Gee, 2009, *C. pilosus* Gómez & Gee 2009, *C.*

*spinulosus* Gómez & Gee 2009 & *C. gomezi* Suárez-Morales *et al.*, 2013. Of these *C. helobius*, *C. axi*, *C. schmidt*, and *C. nudus* has been recorded in South America (Chile, Brazil, Argentina and Colombia) (Mielke, 2000, Gomez, 2005, Gómez *et al.*, 2007, Fuentes-Reinés & Suárez-Morales, 2014). Nevertheless *C. deitersi* (Richard, 1897) has been recorded from Ecuador, (Löffler 1963), Uruguay (Dexter 1995), Venezuela (Escaravage & Castel 1989), Perú and Bolivia (Harding 1955), however this species is considered a *species inquirenda* (Gómez *et al.* 2004).

This paper describes a new species of *Cletocampus*, and the male description of *C. nudus* for the first time.

### Material and methods

The samples were collected from October to December 2011 in a temporal pond located in Pueblo Viejo, Magdalena Department, Colombia (10°59'47.66"N and 74°16'42.60" W), (Figure 1). That is an estuarine pond located in the Caribbean littoral area, with mangroves and open water.

The specimens were measured in ventral or lateral position, from the head (tip of rostrum to the posterior part of caudal rami) and preserved in 70% ethanol. The terminology proposed by Huys & Bosxhal (1991) for morphological descriptions was adopted. The following abbreviations are used in the text and table: P1-P6, first to sixth swimming legs; EXP, exopod; ENP, endopod.

The specimens are stored in the Museum of the *Instituto de Investigaciones Marinas y Costeras* (INVEMAR), Santa Marta- Colombia.

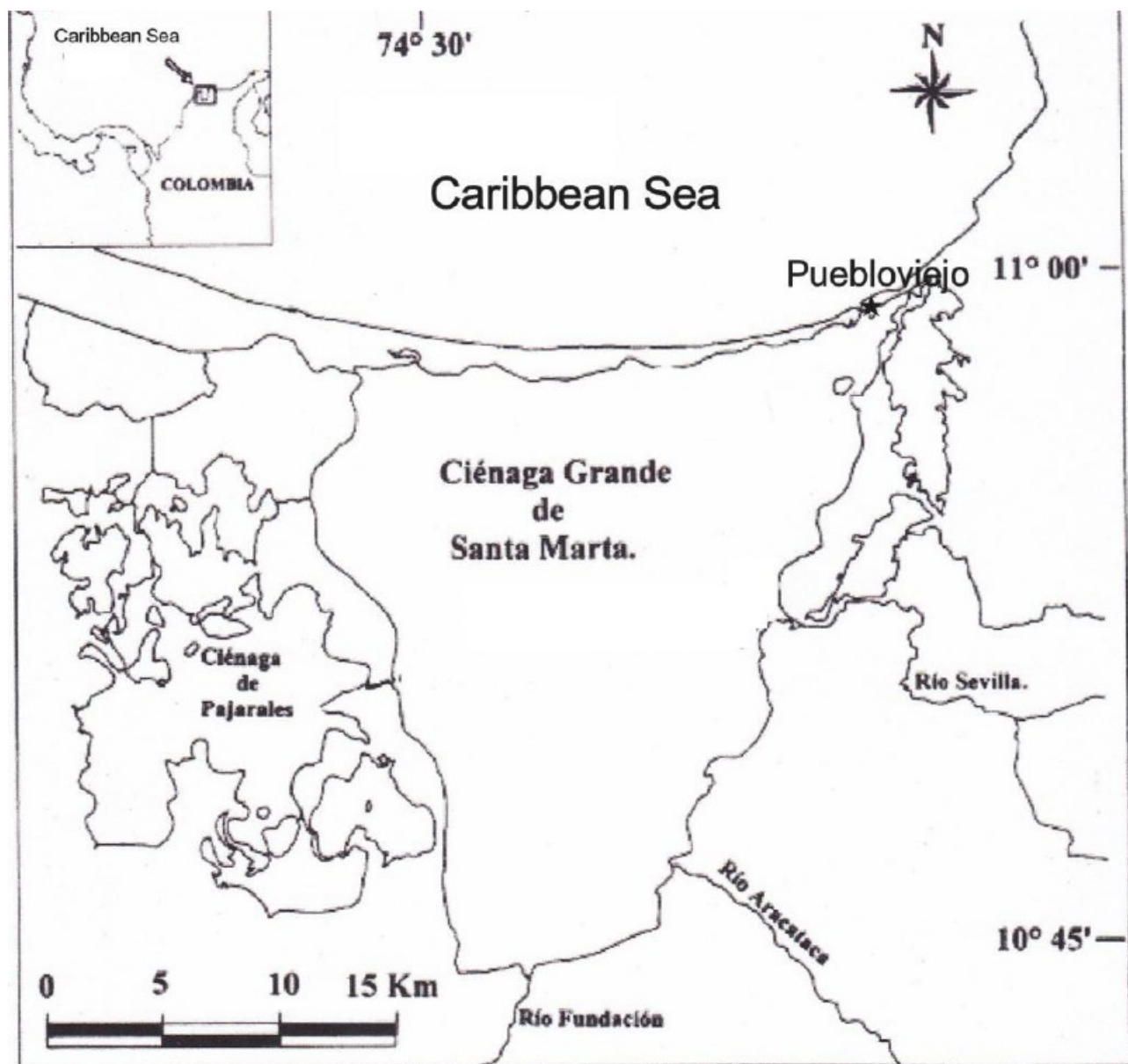


Figure 1. Study area.

*Taxonomic descriptions:*

Family CANTHOCAMPTIDAE Brady, Brady, 1880  
(*incertae sedis*) sensu Por, 1986

Genus *Cletocamptus* Schmankewitsch, 1875

*Cletocamptus samariensis* sp. nov. (Figure 2-8)

Examined material: Holotype (INV ZOO605) female. Allotype (INV ZOO606) male. Paratypes (INV ZOO602 and INV ZOO603) 13 females and 10 males.

Etymology. The new species is named in honor to native of Santa Marta called “*samarios*”.

Type locality: Puebloviejo, Magdalena Department, Colombia (10°59'47.66"N and 74°16'42.60" W).

*Adult female description.* Habitus cylindrical (Figure 2A); total body length ranging from 560 to 630  $\mu\text{m}$ . (Average = 595  $\mu\text{m}$ ,  $n=14$ ; holotype: 630  $\mu\text{m}$ ). Rostrum defined at base, semicircular with 15 long spinules on ventral view as in Figure 2B. Dorsal surface of urosomite with horizontal rows of minute spinules. Ventral surface of urosomites two-five as figures 2C-E. Anal operculum with a marginal row of spinules at the posterior edge and another one at the proximal part (Figure 2 F). Caudal rami about 1.5-1.6 as long as wide (Figures 2G-H). Caudal rami with 6 setae in the caudal rami, the setae IV and V are spinulose. Middle caudal apical seta (V) longest, between 50 and 70% of total body length. Seta IV about 3.8 times as long as inner seta (caudal seta VI). Outer caudal seta (caudal seta III) absent. Outer lateral setae (I, II) inserted on proximal third of ramus, anteriormost (I) being less than half the length of the other (II). Dorsal seta (VII) about 1.3 times as long as ramus.

Antennule (Figure 3A): with six segments; surface of segments smooth except for two rows of spinules on first segment. Armature formula, 1-(1), 2-(10), 3-(5), 4-(2 + [1+ae]), 5-(1), 6-(9 + [1+ae]).

Antenna similar to that of the genus, with small coxa. Allobasis armed with two abexopodal setae. Free endopodal segment ornamented with inner strong spinules proximally and subdistally; with two lateral inner spines and a slender seta and five distal elements. Exopod one-segmented; with few spinules, and one lateral and one distal spinulose setae (Figure 3B).

Mandible (Figure 3C): robust; chewing edge with two strong teeth, one bicuspidate tooth, one multicuspidate tooth, one pyriform element and one lateral seta. Palp one-segmented, with two setae unequal in length.

Maxillule (Figure 3D): arthrite of praecoxa with few spinules, with one surface seta, six distal elements, with one spiniform seta on frontal surface and one lateral spinulose seta. Coxa cylindrical with some spinules and with two slender setae. Basis with

surface spinules, with three apical. Exopod and endopod represented by three setae each.

Maxilla (Figure 3E): syncoxa with minute spinules along inner margin; with two endites, each bearing three setae as figured. Allobasis drawn into strong claw bearing one accompanying seta. Endopod represented by three setae.

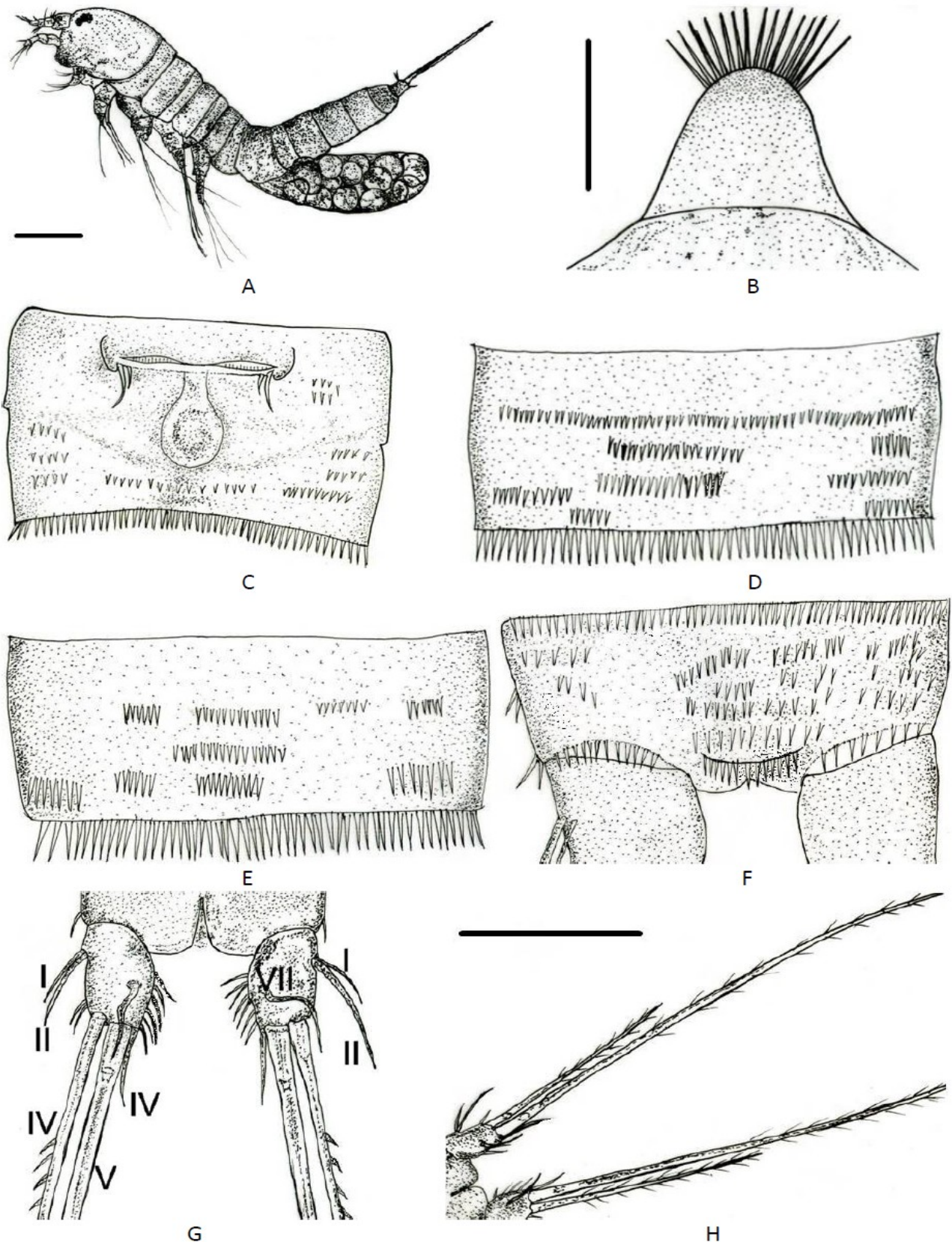
Maxilliped (Figure 3F): subchelate; syncoxa with rows of spinules and a small seta on inner distal corner. Basis without armature; with one anterior row of long spinules along inner margin and an inner seta on superior surface. Endopod drawn into long and slender claw with one accompanying small seta.

P1 (Figure 4A-B). praecoxa with spinules close to joint with coxa (Fig. 4A). The latter with four rows of anterior spinules on the surface. Basis with spinules between insertion site of endopod and exopod, and in the middle of the segment with stronger spinules at base of exopod. Outer element spine-like, the inner basal spine serrated reaching about 77% of endopod. Exopod three segmented, first and second exopodal segment with strong outer and distal margins spinules and without and with inner seta respectively, third exopodal segment with four elements. Endopod two segmented, shorter than exopod, first endopodal segment with inner seta, second endopodal segment with one inner and two apical setae.

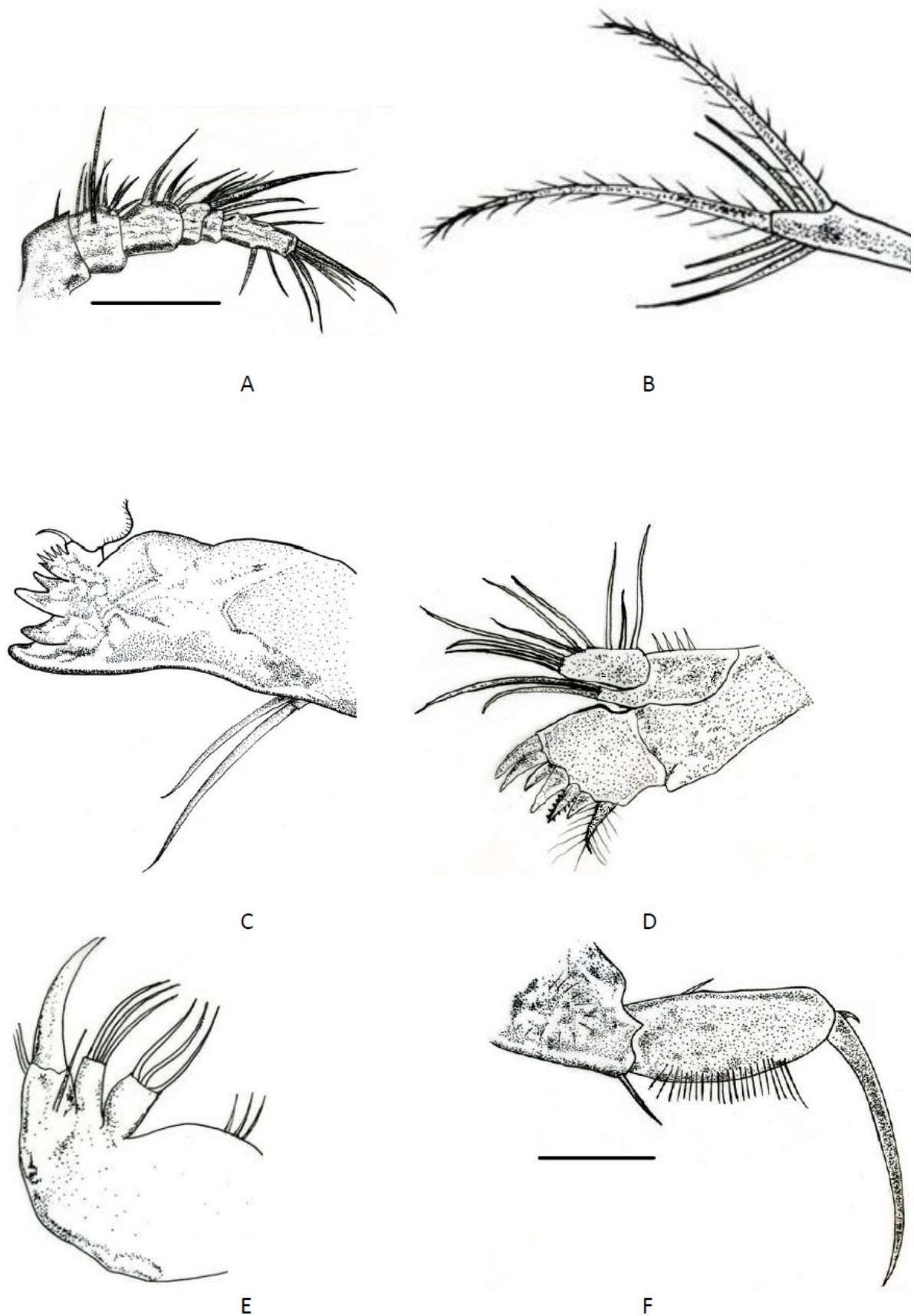
P2 (Figure 4B) praecoxa as in P1. Coxa with a transversal row of spinules. Basis with spinules and triangular projection between insertion site of endopod and exopod, and in the middle of the segment. Outer element spine-like. Exopod three segmented, first and second exopodal segment with strong outer and distal margins spinules and without and with inner seta respectively, third exopodal segment with five elements. Endopod two segmented, 2.4 times shorter than exopod, endopod not reaching distal margin of second exopodal segment, first endopodal segment without inner seta, second endopodal segment with two short setal elements on subdistal position, each one on outer and inner margin, and one longer seta on apical position.

P3 (Figure 4C) praecoxa, coxa and basis as P2, except for longer outer seta of basis. Exopod three segmented, first and second exopodal segment with strong outer and distal margins spinules and without and with inner seta respectively, third exopodal segment with six elements. Endopod two segmented, 3 times shorter than exopod, barely reaching beyond distal margin of first exopodal segment. First endopodal segment, without inner seta, second endopodal segment with two short setal elements on subdistal position, each one on outer and inner margin, and one longer seta on apical position.



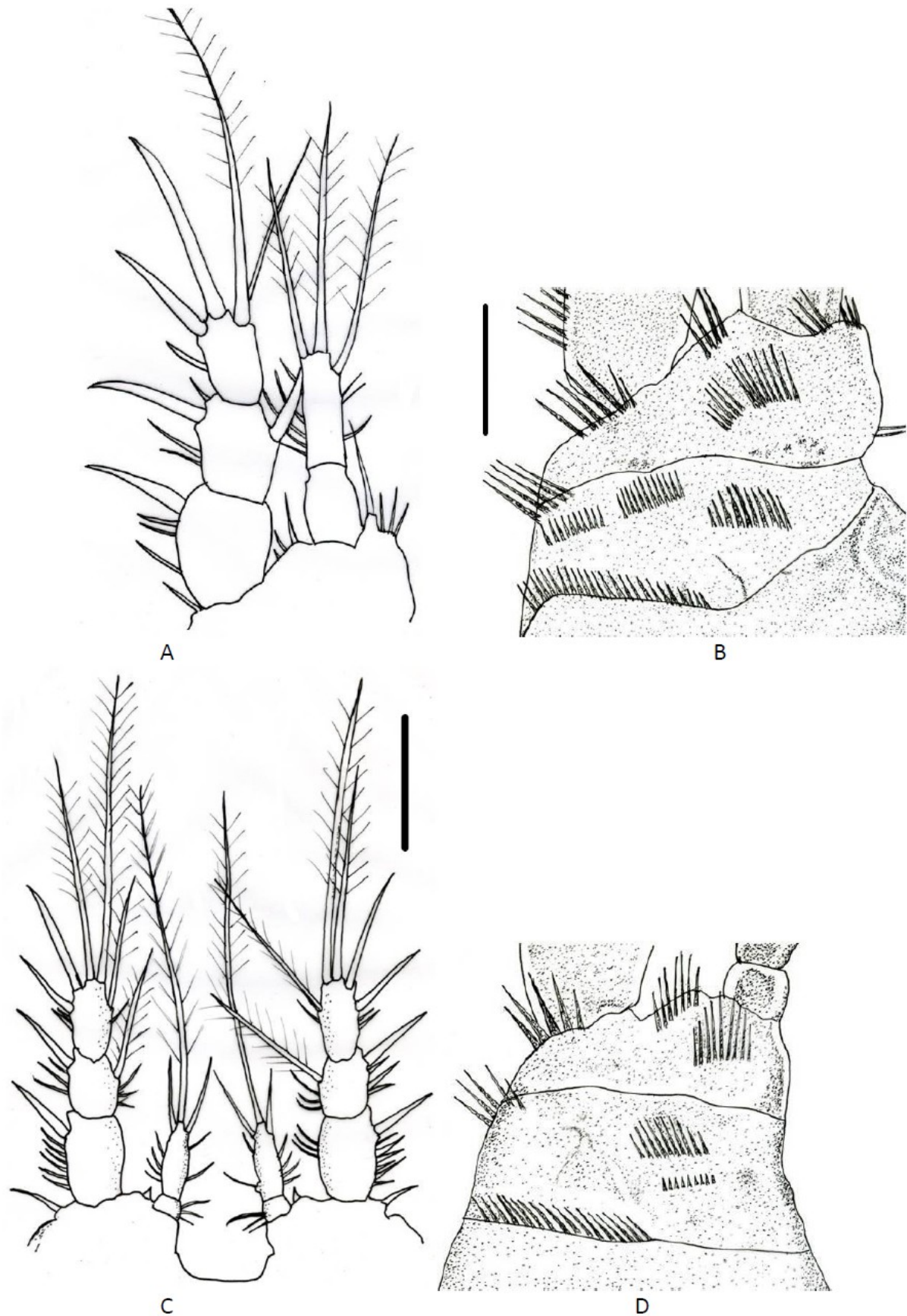


**Figure 2.** *Cletocamptus samariensis* sp. nov. Female. A. Habitus, lateral view. B. Rostrum. C. Urosomite 2-3, ventral view. D. Urosomite 4, ventral view. E. Urosomite 5, ventral view. F. Anal operculum. H-G. Caudal rami, ventral view. Scale bars: A = 100  $\mu$ m; B-G = 20  $\mu$ m; H = 50  $\mu$ m



**Figure 3.** *Cletocamptus samariensis* sp. nov. Female. A. Antennule B. Exopodal antenna. C. Mandible. D. Maxillule. E. Maxilla F. Maxilliped. Scale bars: A= 50  $\mu$ m; B-F = 20 $\mu$ m





**Figure 4.** *Cletocamptus samariensis* sp. nov. Female. A. P1, Anterior view. B. Idem, coxa C. P2, Anterior view. D. Idem, Coxa. Scale bars: A, C = 25  $\mu\text{m}$ ; B, D = 20  $\mu\text{m}$

P4 (Figure 4D) praecoxa, coxa and basis as P3, exopod three segmented, first and second exopodal segment with strong outer and distal margins spinules and without and with inner seta respectively, third exopodal segment with five elements. Endopod two segmented, reaching about the half of first exopodal segment, first endopodal segment without inner seta, second endopodal segment with two setal elements, the short one on inner subdistal position, and the longest is on apical.

P5 (Figures 5 A-B): exopod and baseoendopod fused. Endopodal lobe 1.8 times as long as exopod, ornamented with sets of inner and outer spinules, with spinules at base of apical seta, armed with six plumose setae. Relative length of elements from inner to outer margin as follows: 0.4; 0.38; 0.4; 0.56; 1; 0.28. Exopodal lobe armed with four setae plus outer seta at basis, with spinules at base of apical seta. Relative length of elements from inner to outer margin as follows: 0.52; 1; 0.36; 0.36. Armature formula of female P1–P5 as in Table I.

P6 (Figure 2C): represented by median plate in anterior half of second urosomite (first genital somite); each vestigial leg represented by one outer long and one slender inner seta. Seminal receptacle oval, located at the middle of genital double-somite.

*Adult male description.* Habitus cylindrical (Figure 6A); total body length from 490 to 588  $\mu\text{m}$  (Average = 568  $\mu\text{m}$ ,  $n=11$ ; holotype: 574  $\mu\text{m}$ ), Rostrum with small spinules ventrally (Figure 6B), urosomites 2-6 with rows of spinules as in figures 6 C-F. The last segment of antennules with three teeth (Figure 7A), anal operculum, caudal rami, caudal rami setae, maxilla, maxillule, mandible and maxilliped as in female.

P1 (Figure 7B) as in female except for inner projection of basis (the latter indicated by arrow in Figure 7B) and inner spine which is slender and shorter than female.

P2 (Figures 7C): as in female except for stronger outer spines on EXP3.

P3 (Figure 7D): as in female except for stronger outer spines on EXP3; endopod dimorphic, three-segmented, second segment with apophysis reaching far beyond ENP3.

P4 (Figure 8A): as in female except for stronger outer spines on EXP3.

P5 (Figures 8B-C): baseoendopod and exopod fused, baseoendopodal lobe as long as exopod, with three pinnate setae, with sets of spinules along inner and outer margin and on the base of apical seta; exopod with three distal pinnate setae plus outer seta of basis, with four spinules at the base of apical seta.

*Distribution.* The species is known only from its type locality.

*Variability.* One female was observed to possess a very small outer spine on P4 EXP3. The left exopod of P5 of one female was observed to possess five instead of six setae. The right exopod of P5 of one female was observed to possess four instead of six setae.

The last segment of P1 ENP of one male was observed to possess two setae instead of three. The inner projection at the base of P1 ENP of one male was observed like a round bulge. The right endopod of P5 was observed to possess four instead three setae.

*Cletocamptus nudus* Gómez, 2005

(Figures 8D-E, 9-13)

Examined material: 41 females and 41 males (INV ZOO600 and INVZOO601).

Type locality: Pueblviejo, Magdalena Department, Colombia (10°59'47.66"N and 74°16'42.60" W).

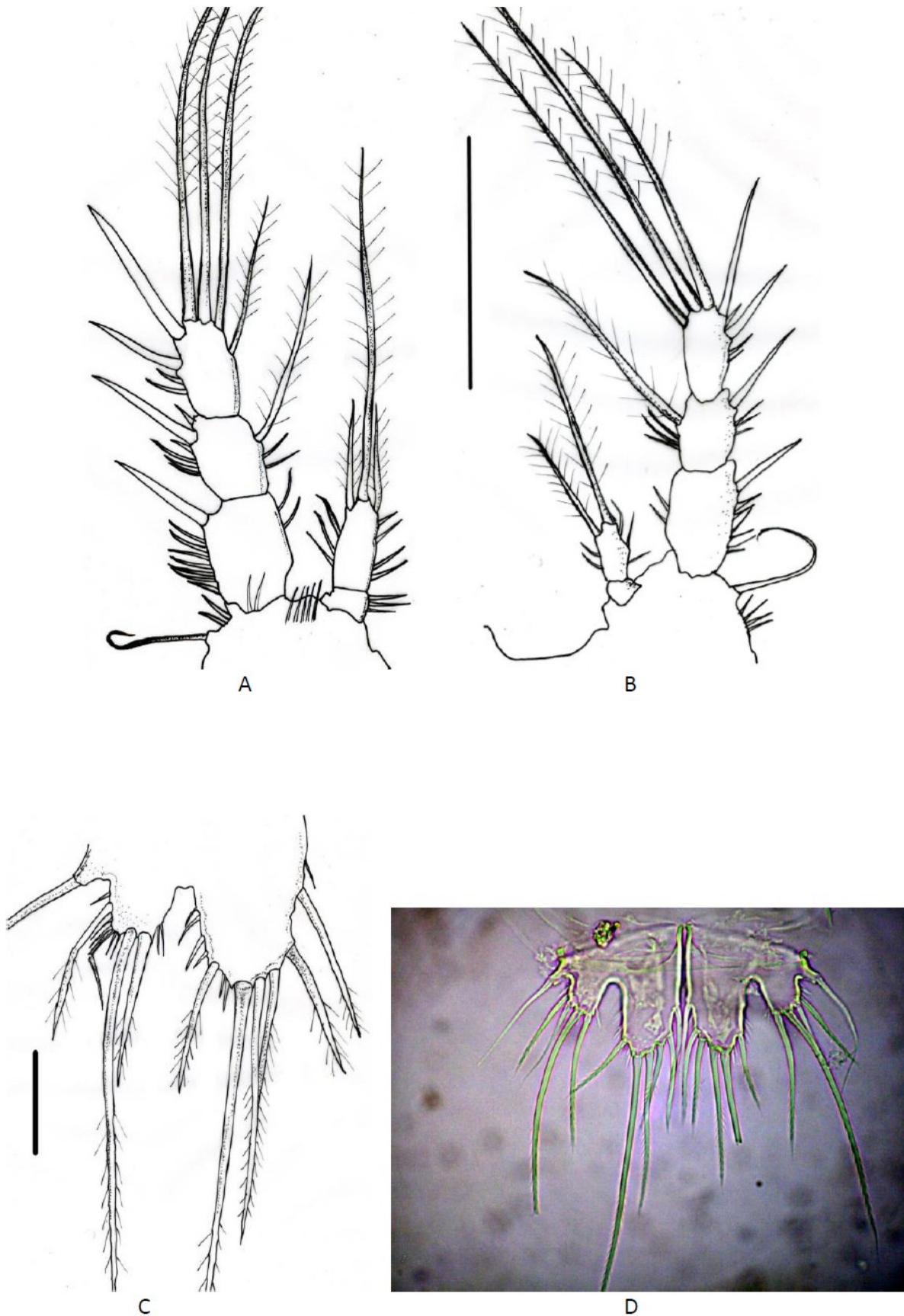
*Adult female redescription.*

Total body length ranging from 574 - 728  $\mu\text{m}$  (Average = 693  $\mu\text{m}$ ,  $n=16$ ) from tip of rostrum to posterior margin of caudal rami. Antennule, mandible, maxillule, maxilla, maxilliped, P1–P6 and caudal rami identical to those described by Gómez (2005).

Maxilliped and anal operculum (Fig 8D-E), corresponds largely to those of *C. nudus* from Brazil as described by Gómez (2005, Figs. 1D, 3F) except for the small seta on the inferior side of the distal corner of syncoxa of maxilliped (present paper, indicated by arrow in Figure 8D) and the small spinules at the border in the proximal part in the anal operculum (present paper, indicated by arrow in Figure 8E) P1-P4 ENP two-segmented and EXP three-segmented (Figs 9A-D), P3ENP2 with three setae and EXP3 with two inner setae, P4EXP3 with one inner seta and EXP1 with 3 small spinules on ventral view (Figure 10A), P5 EXP and ENP with five and six setae respectively (Figures 10B-C), caudal rami about 1.4 -1.6 time as long as wide (Figure 10D)

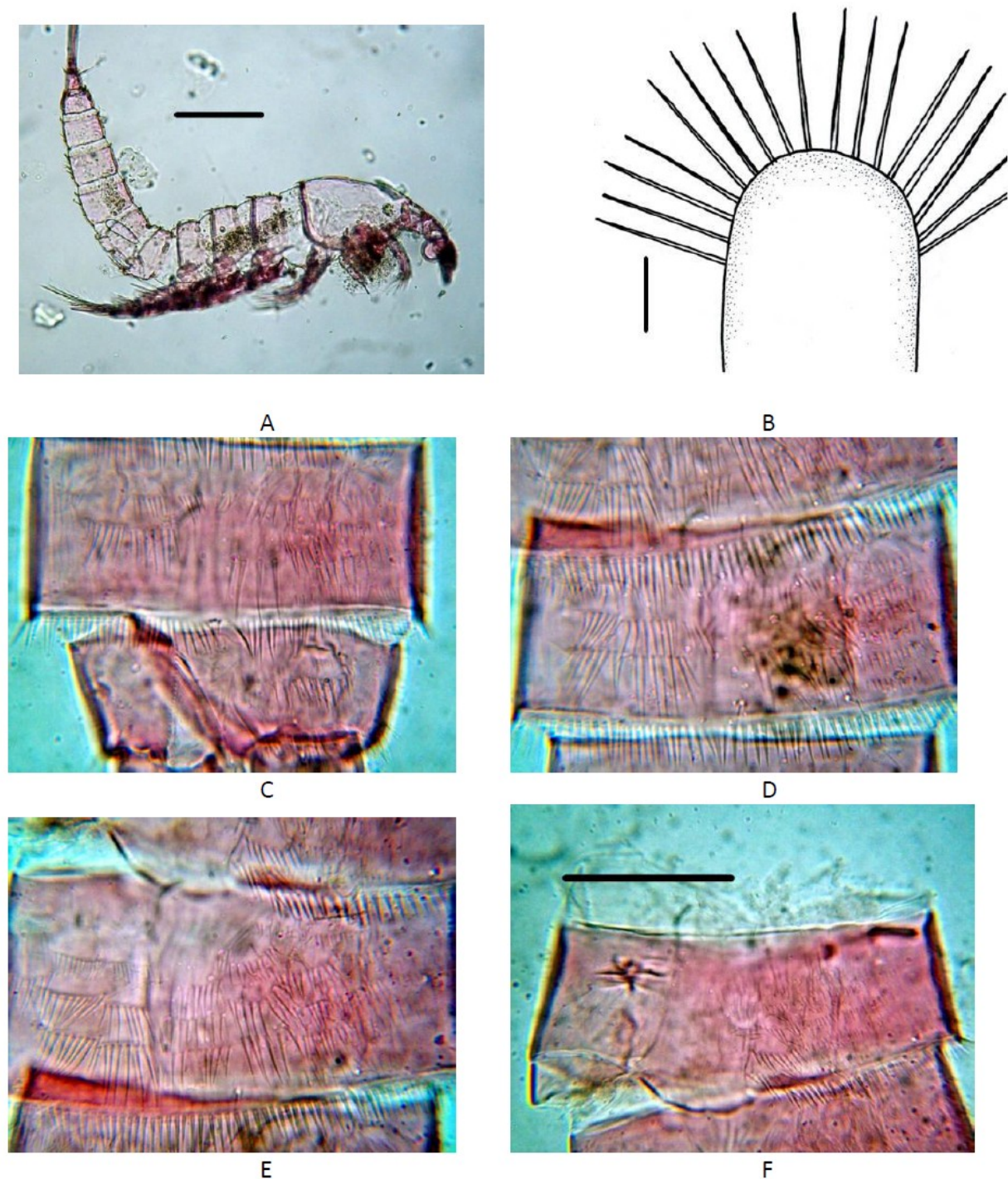
*Adult male description.* Body as in female (Figure 11A); total body length from 490 to 574  $\mu\text{m}$ . Rostrum slender and with more spinules than in female (Figure 11B); ventral surface of urosomites 2-6 with rows of spinules (Figures 11C), anal operculum smooth, with small spinules on proximal margin (Figure 11D); caudal rami and caudal setae as in female.

Antennules (Figure 11E): six-segmented, subchirocer. The first segment with two rows of spinules and one seta, the second segment with seven setae, fourth segment bulbous, last segment as in Figures 11F-G



**Figure 5.** *Cletocamptus samariensis* sp. nov. Female. A. P3, Anterior view. B. P4, anterior view. C-D. P5, anterior view. Scale bars: A-B = 50µm; C-D = 20µm





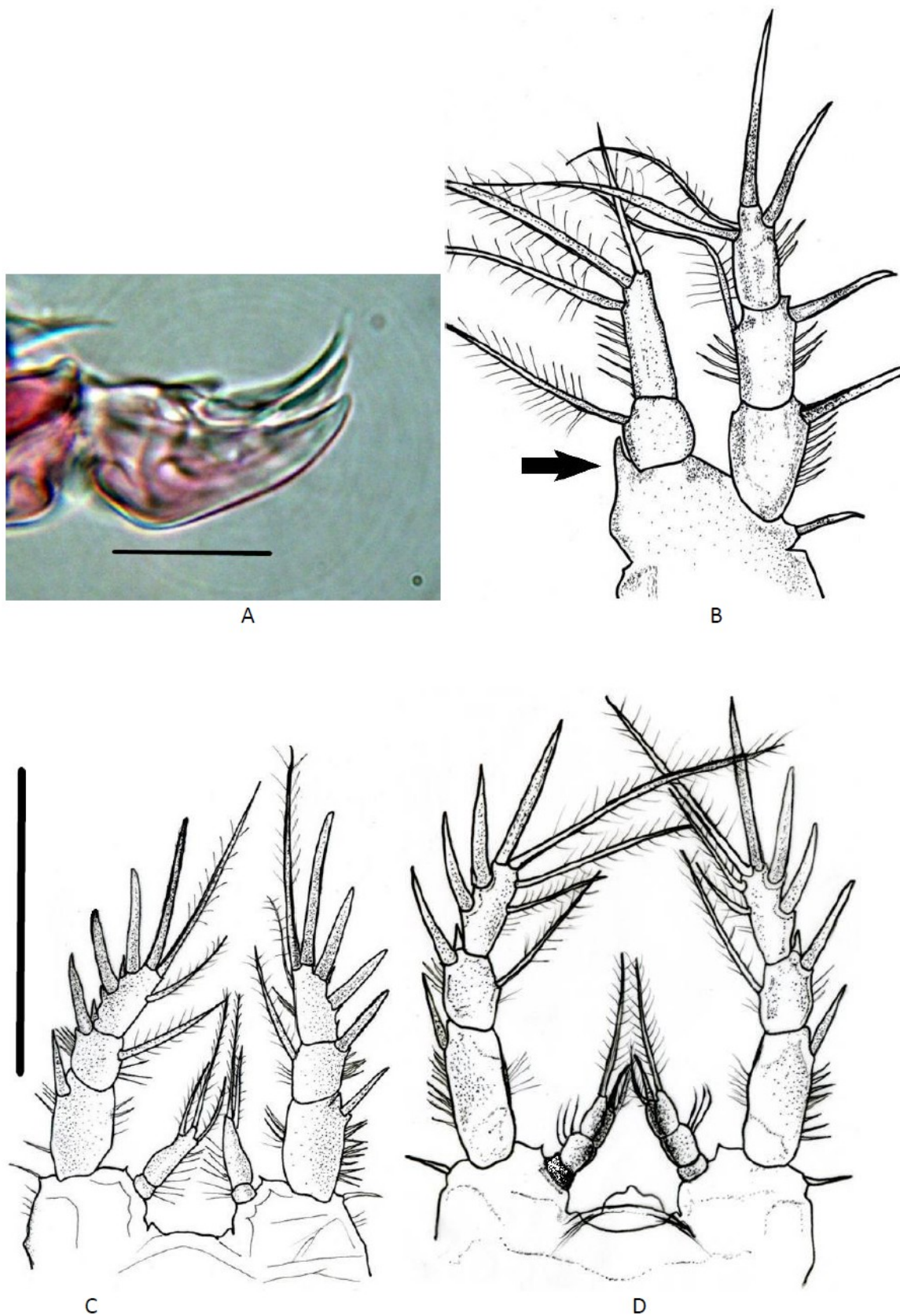
**Figure 6.** *Cletocamptus samariensis* sp. nov. Male. A. Habitus, lateral view. B. Rostrum, ventral view. C. Ventral surface of urosomites 5 and 6. D. Ventral surface of urosomite 4. E. Ventral surface of urosomite 3. F. Ventral surface of urosomite 2. Scale bars: A = 100µm; B= 10µm; C-F= 20µm.

Antenna, mandible, maxillule, maxilla and maxilliped (not illustrated) as in female, except for the maxilliped claw is serrate (indicated by an arrow in the figure 11H).

P1 (Figures 12A): as in female except for inner projection of basis (the latter indicated by arrow in Figure 12A) and the slender seta on the base.

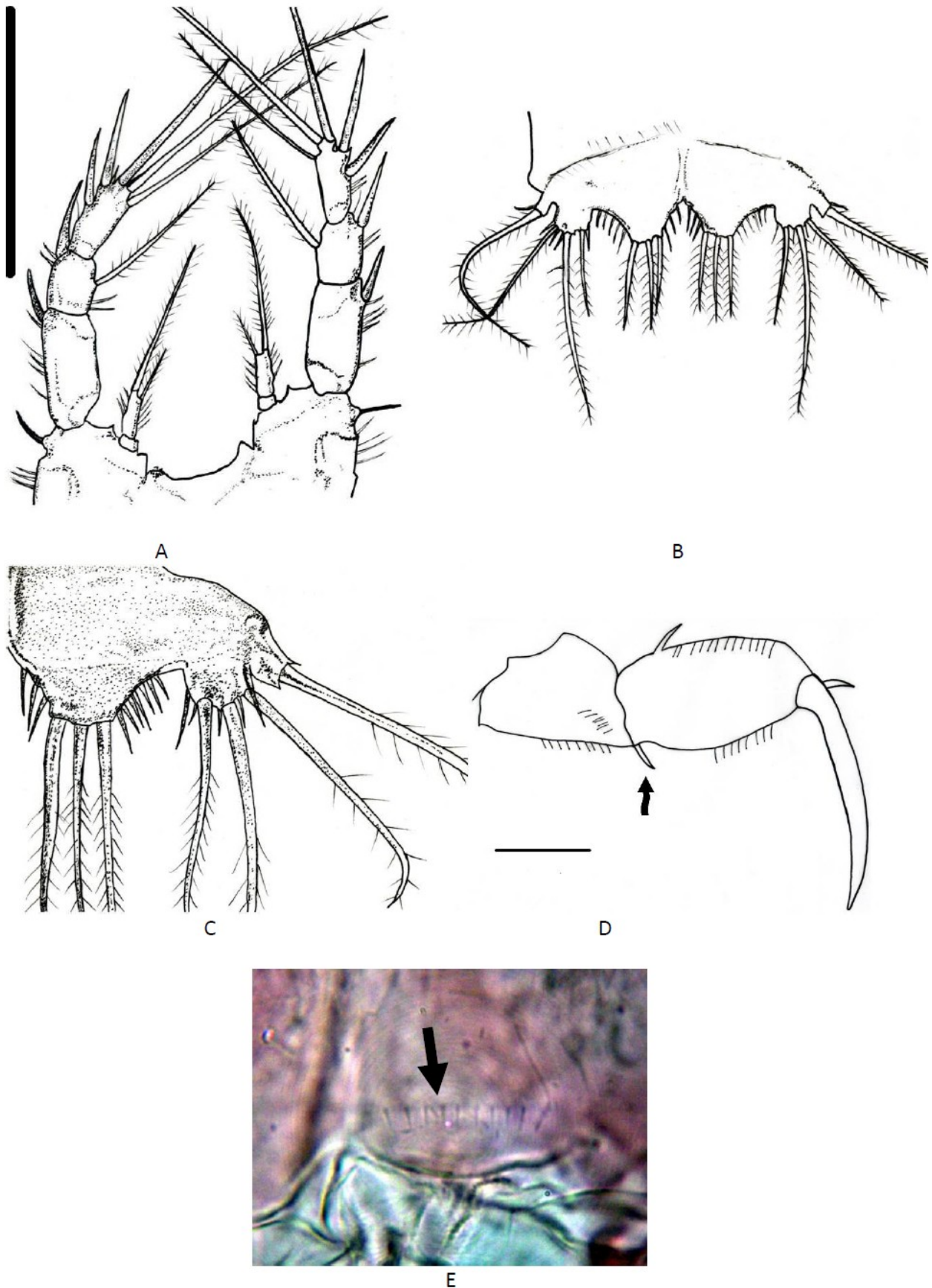
P2 (Figure 12B): as in female except for the stronger and bare outer dimorphic spines of EXP 1–3.

P3 (Figures 12C): exopod as in female except for stronger and bare outer dimorphic spines; endopod dimorphic, three-segmented, second segment with apophysis reaching far beyond ENP 3.



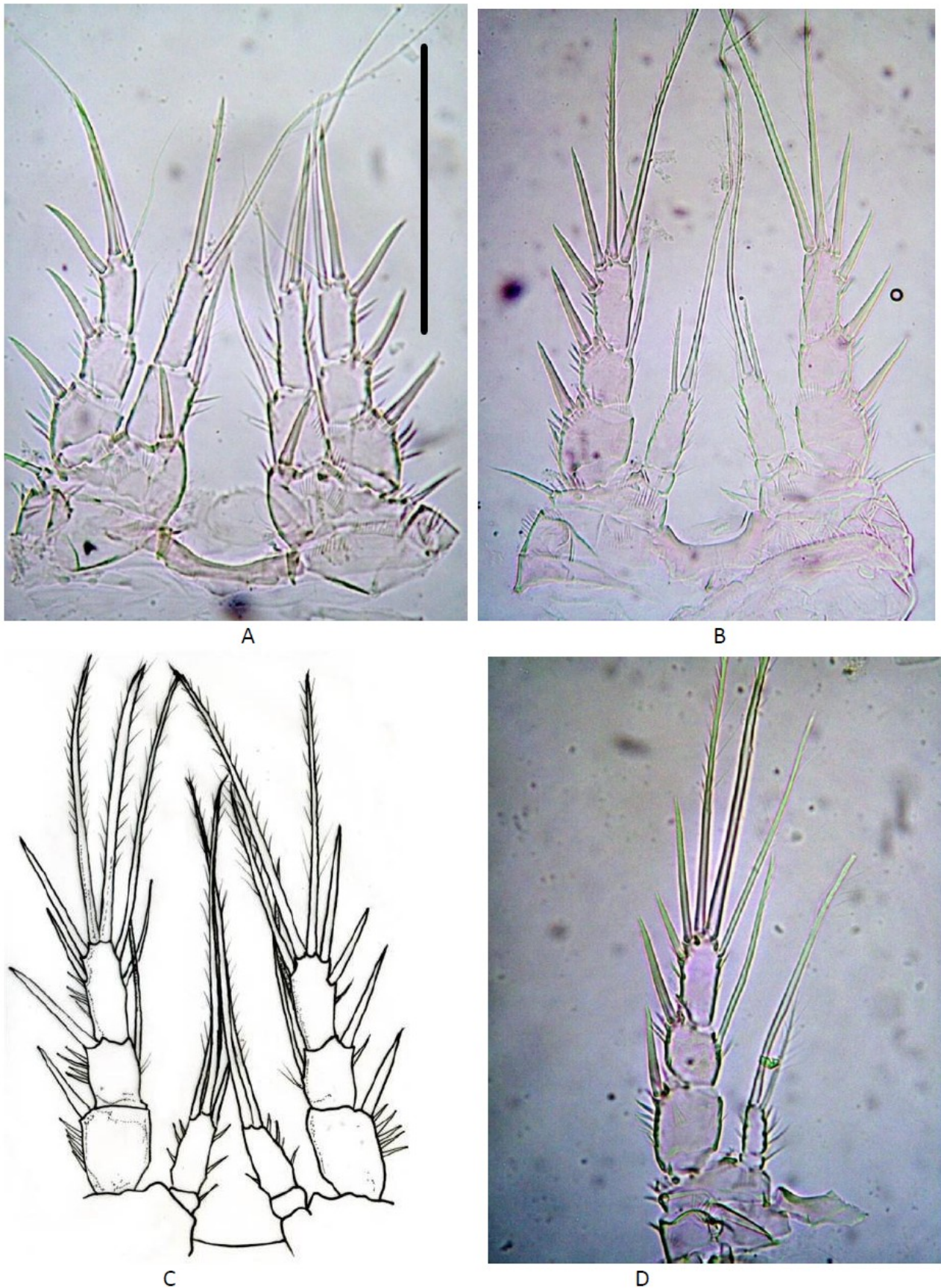
**Figure 7.** *Cletocamptus samariensis* sp. nov. Male. A. Distal par of antennule. B. P1, anterior view. C. P2, anterior view, D. P3, anterior view. Scale bars: A = 20µm; B-D = 50µm





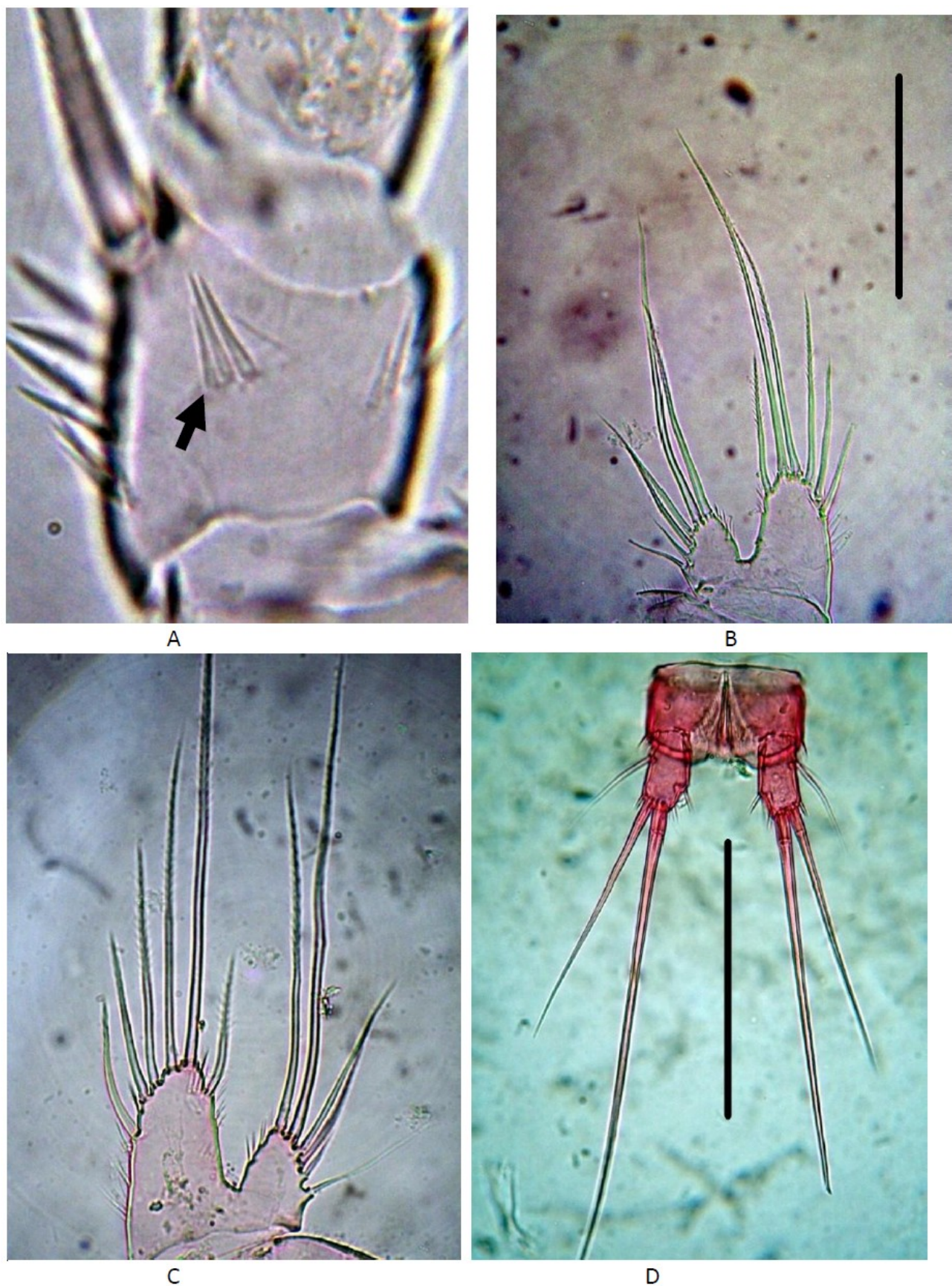
**Figure 8.** *Cletocamptus samariensis* sp. nov. Male . A. P4, anterior view, B-C. P5, anterior view. *Cletocamptus nudus* Female D-E. D. Maxilliped. E. Anal operculum (the arrow points at the small spinules). Scale bars: A = 50  $\mu$ m; B-E = 20  $\mu$ m





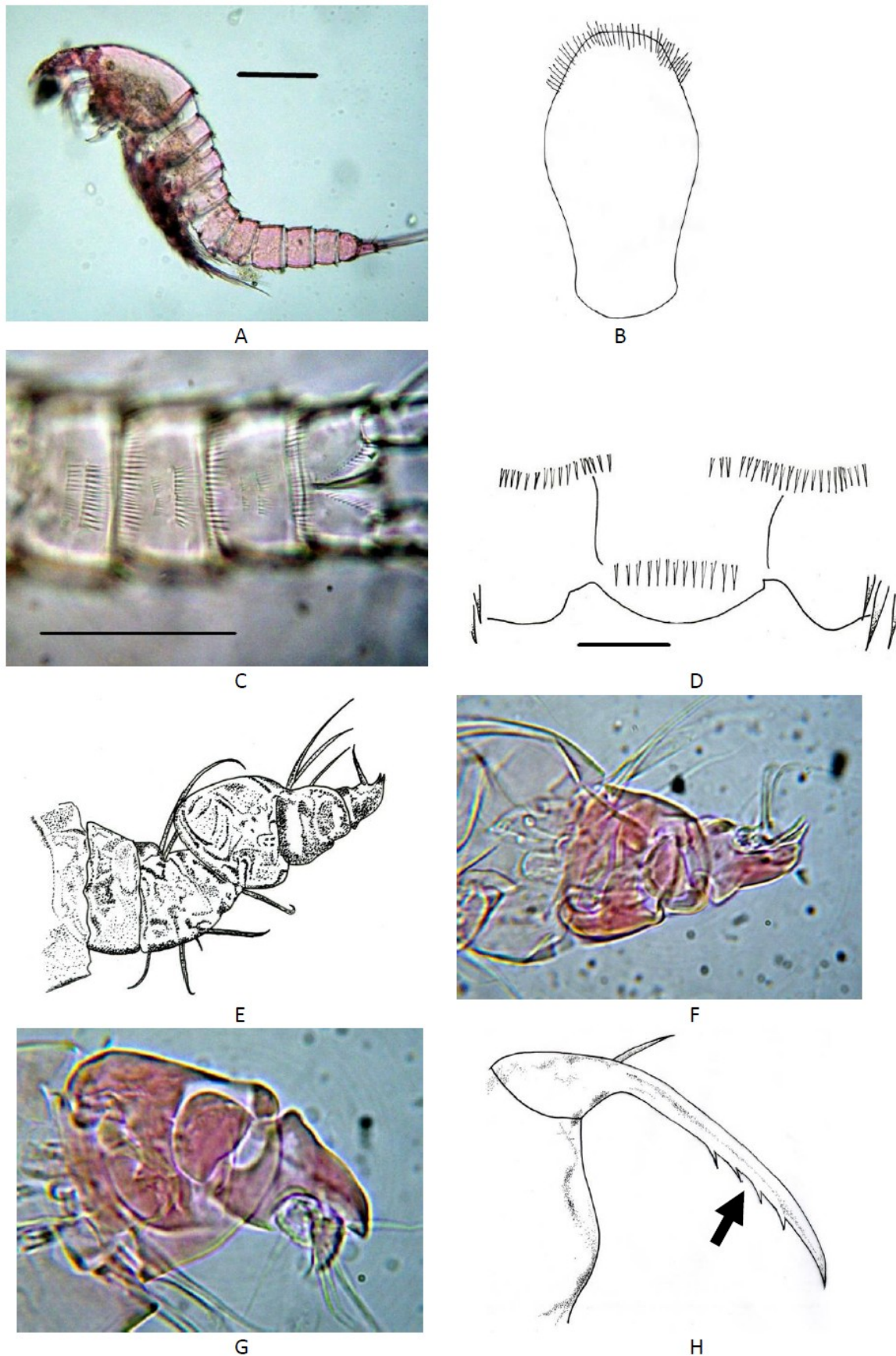
**Figure 9.** *Cletocamptus nudus* Gómez, 2005. Female. A. P1, anterior view, B. P2, anterior view. C. P3, anterior view. D. P4, anterior view. Scale bars: A-D = 50 $\mu$ m





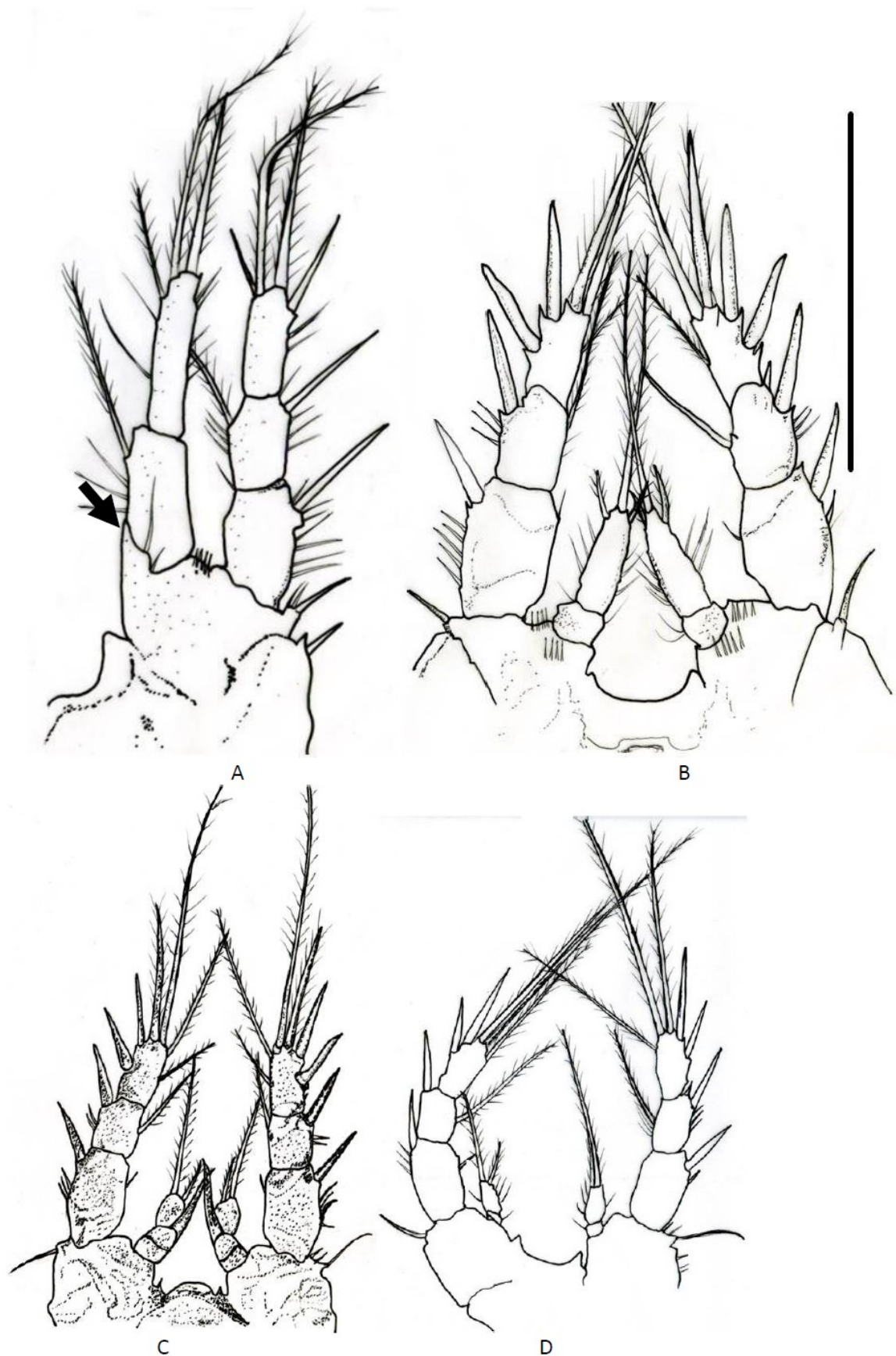
**Figure 10.** *Cletocamptus nudus*. Female. A. P4EXP1 (the arrow points at the three spinules), anterior view. B-C P5, anterior view. D. Caudal rami. Scale bars: A-C= 20  $\mu$ m; D= 50 $\mu$ m



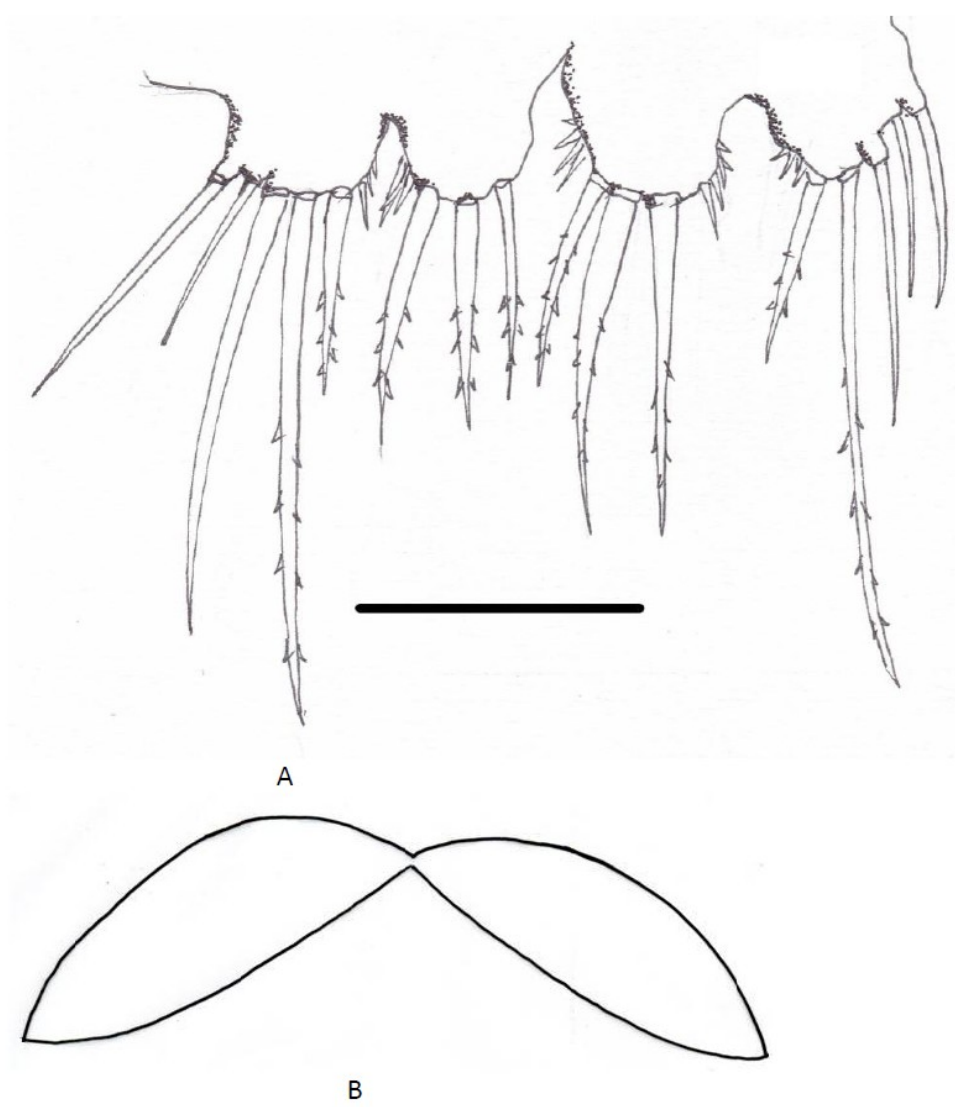


**Figure 11.** *Cletocamptus nudus*. Male. A. Habitus, lateral view. B. rostrum. C. Urosomite 5. D. Anal operculum. E. Antennule. F-G. Last segment of antennule. H. Maxilliped claw. Scale bars: A= 100 $\mu$ m; C-E= 50  $\mu$ m; B, D, F-H = 20 $\mu$ m





**Figure 12.** *Cletocamptus nudus*. Male. A. P1, Anterior view, B. P2, anterior view, C. P3, anterior view, D. P4, anterior view. Scale bar: A-D = 50µm



**Figure 13.** *Cletocamptus nudus*. Male. A. P5, anterior view. B. P6. Scale bar: A-B = 20µm

**Table 1.** Armature formula swimming P1-P5 of females *C. samariensis* sp nov. (Roman numeral indicating spines, Arabic numeral representing setae).

P1		P2		P3	
EXP	ENP	EXP	ENP	EXP	ENP
I-0; I-1; I,I,1,1	0-1; 0,I,1,1	I-0; I-1;II,II,1	0-0; I,1,1	I-0; I,1; II,II,2	0-0; I,1,1
<i>C. samariensis</i> sp. nov					
P4		P5			
EXP	ENP	EXP	END		
I-0; I-1; II,I,1,1	0-0; 0,2,0	4	6		

P4 (Figures 12D): as in female except for stronger outer dimorphic spines.

P5 (Figure 13A): both legs distinct; baseoendopod and exopod fused; baseoendopodal

lobe as long as exopod, with two apical and one inner seta, all of them pinnate; with some spinules at base of apical seta of baseoendopodal lobe and in the outer and inner margin; exopod armed with four

distal setae, the innermost and adjacent seta pinnate, outermost and adjacent seta bare, the longest one reaching the tip of urosomite 4.

P6 (Figure 13B): represented by median plate in anterior half of first genital somite.

**Distribution.** *C. nudus* was only known from females collected in Brazil. The male is here described for first time. *Cletocamptus nudus* has also been recorded in La Guajira Department, Colombia (Fuentes-Reinés & Suárez-Morales, 2014).

**Variability.** The rostrum of one female possesses many spinules. The left P1ENP of one female was observed to possess two instead of three setae on the last segment. The left P3ENP of one female was observed to possess two instead of three setae on the last segment. The left P4ENP of one female was observed to possess three instead of two setae on the last segment. The first exopodal segment of P4 of three females lacked three spinules. The left exopod of P5 of one female lacked the inner seta. The proximal portion of the anal operculum of seven females was observed to be bare. The two longest setae (IV and V) of the caudal rami of three females were observed to possess large spinules. The right caudal ramus of one female was 0.8 times as long as broad.

The basis of P2 of one male lacks the triangular projection. The left exopodal segment of P4 of two males was observed to possess two and four small instead of three spinules. The baseoendopodal lobe of P5 of two males was observed to possess four instead of three setae.

**Habitat.** The temporary pond has a surface area of 486 m<sup>2</sup> with a depth range of 0.26 - 0.38 m; it is characterized by the presence of mangroves in the littoral zone. Water temperature ranged between 26 and 28 °C, salinity range was 4-6.7 psu, pH values were 8.5-9.1 and oxygen range 6.6 to 8. mg/l.

## Discussion.

*Cletocamptus samariensis* sp. nov. seems to be related to *C. schmidtii* by the armature of P1-P4, the spinulation pattern on the anal operculum, and number of setae on the antennal exopod. The new species can be separated from *C. schmidtii* by its ornamentation of anal somite (with a row of spinules above the anal operculum in *C. samariensis* sp. nov., without spinules in *C. schmidtii*), the presence of spinulose setae in the antennal exopod (2 spinulose setae in *C. samariensis* sp. nov., but one in *C. schmidtii*); armature formula of the baseoendopod and exopod of P5 of the female (11 setae in *C. samariensis* sp. nov., but 12 in *C. schmidtii*), length of the outer and outermost exopodal setae of P5 in

the female (equal in *C. samariensis* sp. nov., but unequal in *C. schmidtii*), armature formula of P5 of the male (7 setae in *C. samariensis* sp. nov., but eight in *C. schmidtii*).

The anal operculum with two rows of spinules is shared by the new species and *C. schmidtii*. Bare anal operculum is characteristic of *C. nudus*. Values of the female P5 baseoendopod/exopod length ratio is about 2.0 in *C. nudus*, but 1.8 in *C. samariensis* sp. nov.; also, the setae of P5 are shorter in *C. samariensis* sp. nov. than in *C. nudus*.

The P1ENP of *C. samariensis* sp. nov. reaches almost half of P1EXP3, while in *C. nudus* is about the same length as exopod. The first endopodal segment of P1 in *C. nudus* reaches approximately half of the second exopodal segment of P1, but in *C. samariensis* sp. nov. rarely reaches the tip of P1EXP2, ratio of first endopodal segment of P1 in *C. samariensis* sp. nov. about 1 while in *C. nudus* 1.8. Inner basal spine of P1 in *C. samariensis* sp. nov. is longer than the first endopodal segment of P1, while in *C. nudus* this spine is as long as the first endopodal segment.

The spinules in the caudal rami setae IV and V of *C. samariensis* sp. nov. are bigger than in *C. nudus*. Besides, *C. nudus* has three small spinules on the first exopodal segment of P4 which do not appear in *C. samariensis* sp. nov.

P4EXP 1 of *C. samariensis* sp. nov. bears 3-four small spinules while in *C. samariensis* sp. nov. these spinules are absent. P5 EXP of the male of *C. nudus* bears four setae, while in *C. samariensis* sp. nov. 3.

*C. nudus* male differs from *C. samariensis* sp. nov. in the anal operculum (bare at the edge with proximal spinules in *C. nudus* and with small spinules at the edge in *C. samariensis* sp. nov.).

## Acknowledgements

We especially would like to give our special thanks to Dr. Samuel Gómez for his invaluable bibliographic supply. We are deeply indebted to the students of Institución Educativa Departamental San José for helping on the fieldwork.

## References

- Boxshall, G. & Defaye, D. 2008. Global diversity of copepods (Crustacea: Copepoda) in freshwater. **Hydrobiologia**, 595:195–207.
- Chang C.Y. 2013. A New Species of *Cletocamptus* Copepoda (Harpacticoida, Canthocamptidae) from Salt Marshes in Korea, **Animal Systematics, Evolution and Diversity**, 29(3): 227-237



- Dexter, D. M. 1995. Salinity tolerance of *Cletocamptus deitersi* (Richard 1897) and its presence in the Salton Sea. **Bulletin Southern California Academy of Sciences**, 94: 169–171.
- Escaravage, V. & Castel, J. 1989. Application de la notion de confinement aux peuplements méiobenthiques des lagunes endiguées du Bassin d'Arcachon (Côte atlantique), **Acta Oecologica Oecologia Generalis**, 10: 1–17.
- Fuentes-Reinés, J.M. & Suárez-Morales, E. 2014. Annotated checklist and new records of Harpacticoida (Copepoda) from a coastal system of northern Colombia, South America. **Crustaceana**, 87 (2): 212–255
- Gómez, S. 2005. New species of *Cletocamptus* and a new and fully illustrated record of *C. sinaloensis* (Copepoda: Harpacticoida) from Brazil. **Journal of Natural History**, 39:3101–3135.
- Gómez, S., Fleeger, J. W., Rocha-Olivares, A. & Foltz, D. 2004. Four new species of *Cletocamptus* Shmankevich, 1875, closely related to *Cletocamptus deitersi* (Richard, 1897) (Copepoda: Harpacticoida). **Journal of Natural History**, 38:2669–2732.
- Gómez S., Scheihing, R. & Labarca, P. 2007. A new species of *Cletocamptus* (Copepoda: Harpacticoida) from Chile and some notes on *Cletocamptus axi* Mielke, 2000. **Journal of Natural History**, 41:39–60.
- Gómez, S. & Gee, J. M. 2009. On four new species of *Cletocamptus* Shmankevich, 1875 (Copepoda: Harpacticoida) from inland waters of Argentina, **Journal of Natural History**, 43 :( 45): 2853 -2910.
- Gómez, S., Ingole, B., Sawant M. & Singh R. 2013. *Cletocamptus goenchim* sp. nov., a new harpacticoid (Copepoda: Harpacticoida) from India. **Proceedings of the biological society of Washington**, 126(3):259–275.
- Harding, J. P. 1955. The Percy Sladen Trust Expedition to Lake Titicaca in 1937. XV. Crustacea: Copepoda. **Transactions of the Linnean Society of London**, 3:219–247
- Huys, R. & Boxshall, G. A. 1991. Copepod evolution. London: The Ray Society. 468 p
- Löffler, H. 1963. Zur Ostrakoden- und Copepodenfauna Ekuadors. **Archiv für Hydrobiologie**, 59: 196–234.
- Mielke, W. 2000. Two new species of *Cletocamptus* (Copepoda: Harpacticoida) from Galápagos, closely related to the cosmopolitan *C. deitersi*. **Journal of Crustacean Biology**, 20:273–284.
- Suárez-Morales, E., Barrera-Moreno, O. & Ciro-Pérez, J. 2013. A new species of *Cletocamptus* Schmankevitch, 1875 (Crustacea, Copepoda, Harpacticoida) from a high altitude saline lake in Central Mexico. **Journal of Limnology**, 72(2): 313–325.

Received July 2014

Accepted November 2014

Published online April 2015