A new species of *Attheyella* (*Canthosella*) from Colombia and redescription of *Attheyella* (*Delachauxiella*) *freyi* (Copepoda: Harpacticoida: Canthocamptidae)

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Abstract

Occasional collections of organisms from water bodies of the Andean Region and the Pacific coast of Colombia yielded two species of canthocamptid harpacticoids belonging to the genus *Attheyella* Brady, 1880. A new species, *Attheyella* (*Canthosella*) *chocoensis* **n. sp.**, inhabiting phytotelmata of the forest at the Pacific Chocó State is described. *Attheyella (Delachauxiella) freyi* Löffler, 1963, described from Ecuador, was found in a high mountain pond in the southern Colombian
Andes, and redescribed here. Both species are illustrated with line drawings and SEM photographs. A special morphological
structure was discovered on the antenna of male and female *Attheyella* (*D.*) *freyi*: it is probably present in other species of the subgenus *Delachauxiella* Brehm, 1926, as well. An identification key to Colombian species of the family Canthocamptidae is provided.

Key words: taxonomy, Colombia, Pacific forest, phytotelmata, “páramo” region, Andes

Introduction

Harpacticoid copepods from Colombian fresh waters have been little studied compared to calanoid and cyclopoid copepods (Gaviria 1994; Gaviria & Aranguren 2007). To date, 14 species of harpacticoids belonging to 4 families have been reported. *Nitocra lacustris colombianus* Reid, 1988 was reported within the Ameiridae, *Parastenocaris colombianus* Noodt, 1972, *Parastenocaris kubitzkii* Noodt, 1972 and *Parastenocaris roettgeri* Noodt, 1972 within the Parastenocarididae, *Phyllognathopus viguieri* (Maupas, 1892) within the Phyllognathopodidae, and 9 species within the Canthocamptidae. The family Canthocamptidae is represented by two species of *Attheyella* (*Chappuisiella)* Brehm, 1926, namely *Attheyella* (*Chappuisiella*) *fuhrmanni* (Thiébaud, 1912) (syn. *Attheyella derelict* Brian, 1927) and *Attheyella* (*Chappuisiella*) *pichilafquensis* Löffler, 1961 (Gaviria 1993), one species of *Attheyella* (*Delachauxiella*) Brehm, 1926, *Attheyella* (*Delachauxiella*) *freyi* Löffler, 1963 (added in Gaviria & Aranguren 2007), as well as by 5 species of *Elaphoidella* Chappuis, 1929, namely *Elaphoidella bidens* (Schmeil, 1893), *Elaphoidella colombiana* Gaviria, 1993, *Elaphoidella grandidieri* (Guerne & Richard, 1893), *Elaphoidella radkei* Reid, 1987 and *Elaphoidella suarezi* Reid, 1987, and by *Epactophanes richardi* Mrázek, 1893 (Sturm 1978). The Colombian records of *Parastenocaris bidens* Noodt, 1955, *P. hexacantha* Kiefer, 1936, *P. staheli* Menzel,
1916 and *P. surinamensis* Menzel, 1921, listed by Löffler (1981), are erroneous records and these species are not present in Colombia. The only investigator of Parastenocarididae in Colombian water-bodies was Noodt (1972), who did not include these species in his publication. Moreover, *Parastenocaris staheli* and *Parastenocaris surinamensis*
were described by Menzel (1916 and 1921, respectively) with material from Suriname, but Löffler (1981) made no mention of this country as being inhabited by both species. Finally, Löffler did not name Brazil as a country
of occurrence of *Parastenocaris hexacantha*, whereas Kiefer (1936) described that species from material from Rio Serido in Brazil.

A new species of *Attheyella* (*Canthosella*) was found in samples from phytotelmata of the forest near the

Pacific coast of Chocó State, and constitutes the first report of the subgenus *Canthosella* Chappuis, 1931, in Colombia.
Attheyella (*Delachauxiella*) *freyi* was collected in southern Colombia, in a high Andean pond of the "páramo" region (wet climatic zone above the Andean forest in Ecuador, Colombia and Venezuela). Considering the high degree of endemism in mountain harpacticoids (Löffler 1968; Ebert & Noodt 1975) and in order to avoid misidentification,
type material deposited at the Naturhistorisches Museum in Vienna was studied. No appreciable morphological differences were found between specimens from Puracé (Colombia), El Angel (northern Ecuador) and Antisama (central Ecuador). The description of the species (Löffler 1963) was based on the morphology and ornamentation
of body somites and caudal rami, and on the armature of legs. It did not include a description of genital field and cephalic appendages. Moreover, description of swimming legs was limited to last segments of endopodites
and exopodites. A complete illustrated description of both female and male, including the complete armature of all appendages was desirable. However, any one of the syntypes (14 females and 17 males dissected on slides) is complete and no undissected specimens exist in the collection. Thus, we decided to redescribe the species
using material from Colombia.

Material and methods

Samples collected from phytotelmata of *Calathea* sp. (Marantaceae) growing on trees in the regions of Utria (approx. 6° 2' N, 77 ° 18' W, altitude about 50 m) and Nuquí (approx. 5° 43' N, 77° 22' W, altitude about 50 m) , Chocó State, Pacific coast of Colombia, were taken using a syringe to suck water and animals out of leaf axils. The sample from a pond adjacent to Laguna de San Rafael, located in the "páramo" region of Puracé (approx. 1° 41' N, 76° 25' W, altitude about 3500 m), Cauca State, was collected using a handnet of 100 µm mesh size. Samples were fixed with formaldehyde (final concentration approx. 5 %).
The specimens were dissected in glycerol with "00" entomological needles. Illustrations were made using a drawing tube mounted on a Leica DMLB compound microscope. Lengths were measured from the anterior tip of the rostrum to the end of the caudal ramus.
Specimens were deposited at the Instituto de Ciencias Naturales, Museo de Historia Natural, Universidad Nacional de Colombia, Bogotá (ICN-MHN), the Muséum national d'Histoire naturelle, Paris (MNHN), the Naturhistorisches Museum Wien (NHMW) and the Museu Nacional, Universidade Federal do Rio de Janeiro (MNRJ).
In order to study the taxonomy of the new species of *Atheyella* (*Canthosella*), material of related species was examined:
1) *Attheyella* (*Canthosella*) *pilagaensis* Janetzky, Martínez Arbizu and Reid, 1996, one female (MNHN-Cp2492) from Argentina (Rio Pilaga), originally identified as *Attheyella* (*Canthosella*) *kalima* (Delachaux, 1924) by Dussart and Frutos (1986).
2) *Attheyella* (*Canthosella*) *aliena* Noodt, 1956, one female (MNRJ 4147) and one male (MNRJ 4148) from Brazil State of Rio de Janeiro, Município de Petrópolis, Fazenda Inglesa, collected in phytotelmata in bromeliads on 25 May 1998 by Janet W. Reid, Paulo S. Young, Willis-A. Reid, Jr. and Simone-N. Brandão.
Scanning electronic microscope (SEM) photographs were obtained using a Jeol JSM-840A scanning microscope after dehydration in ethanol, critical-point drying and coating with gold.
Nomenclature follows Huys and Boxshall (1991). Setae of endopod of leg 5 on females are numbered I (the innermost seta) to VI (the outermost seta). We call intercoxal plate the structure connecting each pair of legs.

Taxonomic descriptions

Family Canthocamptidae Brady, 1880
Genus *Attheyella* Brady, 1880
Subgenus *Canthosella* Chappuis, 1931
***Attheyella* (*Canthosella*) *chocoensis* n. sp.**
(Figs. 1–3, 5–10, 11A, 11C, 11D, 12–13)
Holotype. ICN-MHN-CR 2220. Female, dissected on 1 slide, coll. M. Wolf and J. Betancur, 19 February 1999, from a phytotelm of *Calathea* sp. (Marantaceae) in Nuquí, Jurubida, Chocó, Colombia.
Allotype. ICN-MHN-CR 2221. Male, dissected on 1 slide, same collectors, date and locality as holotype.
Other paratypes. ICN-MHN-CR 2223, 5 females and 4 males, undissected, ethanol preserved; NHMW 20682, 1 female dissected on 1 slide; NHMW 20683 and 20684, 2 males each dissected on 1 slide; MNHNCp2296,

1 female dissected on 1 slide and MNHN-Cp2297, 1 female dissected on 1 slide, same locality, collectors and date as holotype. Phytotelm of *Calathea* sp. in Utría, Chocó, Colombia, same collectors, 17 February 1999: ICN-MHN-CR 2222, 1 male, dissected on 1 slide; NHHW 20560, 1 female, dissected on 1 slide; NHMW 20561, 1
male dissected on 1 slide; NHMW 20562, 8 females and 4 males, undissected, ethanol preserved; MNHN-Cp2299,
1 female, dissected on 1 slide; MNHN-Cp2298, 1 male, dissected on 1 slide; MNHN-Cp2300, 9 females and 8 males, undissected, ethanol preserved. Additionally, 1 female was treated for SEM photography and its morphology
studied for comparison.

Etymology. The new species is named after the Colombian State "Chocó", where the sampling localities Nuquí and Utría are located.

Diagnosis. Female. Genital double-somite ventrally partially divided, dorsally partially divided or not, with short copulatory tube reaching the middle of the double-somite, with or without a row of spinules near the posterior
margin and without spinules near the seminal receptacle. Urosomites 3 and 4 always with a posterior continuous row of long spinules ventrally. Anal operculum with 5 to 9 teeth. Caudal ramus with dorsal seta inserted on the middle of the segment, dorsal surface with a spinule row that never reaches the posterior margin, central apical seta
with slightly broad base, length of outer seta more than 2 times the dorsal length of the ramus, inner seta clearly shorter than ramus. Leg 3: endopod with 2 spines of same length on inner margin. Leg 4: endopod small, 2-segmented,
first segment very short. Male. Urosomites 2, 3 and 4 ventrally always with a continuous and complete row of long spinules. Posterior margin of anal urosomite ventrally with 7 spinules at each side. Anal operculum with 3 to 9 triangular teeth. Caudal rami dorsally without row of spinules. Leg 3: endopod 3-segmented, second segment with apophysis, last segment with 2 apical setae. Leg 4: endopod short, 2-segmented, outer apical seta 2 times longer than in female. Antennula: aesthetasc of segment 4 long, tip almost reaching the distal margin of segment
6.

Description of female. Length of holotype 428 μm, exclusive of caudal setae. Mean length of paratypes from Nuquí 448 μm (n = 8, range 426–465 μm), from Utría 392 μm (n =19, range 337–465 μm).

Body cylindrical (Figs. 1A and 2A), broadest section at the posterior margin of cephalosome. Integumentary window long, narrowed anteriorly (Fig. 1A) with 2 lateral pores located at the base of the narrow section (not visible in Figure 1A and 2A). Cephalosome and body somites dorsally and laterally with sensilla. Fourth and fifth pedigerous somites and genital double-somite dorsally with ornamentation consisting of row of denticules (visible in Figure 2A). Body somites: posterodorsal edges smooth. Genital double-somite: posterolaterally with spinules and ventrally smooth. Ventral part of the genital double-somite showing incomplete fusion and not ornamented with spinules (Figs. 1B and 3A). Dorsal part of the genital double-somite of one paratype also shows incomplete fusion (Fig. 1C). Copulatory pore at the middle of the genital double somite (Fig. 3A). Urosomites 3 and 4 posterolaterally
and posteroventrally with a continuous row of long spinules (Figs. 1B and 3C). Anal urosomite ventrally with a short row of 7 spinules at base of each caudal ramus, laterally with 4 spinules near posterior margin. Anal operculum (Figs. 1A and 3B) not protruding, with 9 strong marginal teeth. Female used for SEM photography (Fig.
2B) with anal operculum bearing 9 marginal teeth, the right-most tooth broken.

FIGURE 1. *Attheyella* (*Canthosella*) *chocoensis* **n. sp.** Female (holotype): A, habitus, dorsal; B, habitus, lateral; C, genital double-somite in lateral view of paratype NHMW 20560, D, genital double-somite in lateral view of paratype MNHN-Cp2299. Position of structures of C and D indicated by asterisk on B.

FIGURE 2. *Attheyella* (*Canthosella*) *chocoensis* **n. sp.** Female (paratype from Utria). SEM photographs. A, habitus, dorsal view; B, anal somite and caudal rami, dorsal (most right teeth of anal operculum broken); C, caudal ramus in lateral view.

FIGURE 3. *Attheyella* (*Canthosella*) *chocoensis* **n. sp.** Female (holotype). A, genital double-somite, ventral, showing setae of 6_{th} pair of legs; B, last abdominal somites, dorsal; C, last abdominal somites, ventral.

FIGURE 4. Females. *Attheyella* (*Canthosella*) *aliena.* A. caudal rami with anal operculum, dorsal; B, caudal ramus, ventral. *Attheyella* (*Canthosella*) *pilagaensis.* C, caudal rami with anal operculum, dorsal; D, caudal ramus, ventral.

Caudal rami subquadrate, slightly longer than wide, inner margin smooth; posterodorsally a row of 3 short spinules at the distal third (Figs. 1A, 2B, 3B and 5A); dorsally a longitudinal carina splitting in two, extending anteriorly
to the insertion point of the dorsal seta (well visible in Figs. 2B and 2C); outer margin with 2 setae, the proximal one inserted on the first third of the segment and accompanied by 1 row of 3 spinules, the distal one inserted

on the distal third of the segment and accompanied by 2 spinules (Fig. 5C); 3 terminal setae: median seta well developed with base slightly enlarged, outer setae 2.2 x longer than caudal ramus, inner seta shorter than the caudal ramus (Fig. 5A).

FIGURE 5. *Attheyella* (*Canthosella*) *chocoensis* **n. sp.** Female (paratype NHMW 20682). A, caudal rami with anal operculum, dorsal; B, caudal ramus, ventral; C, caudal ramus, lateral.

Antennule 8-segmented (Fig. 6A) with setation formula: 1, 9, 4, 1 + aesthetasc (seta and aesthetasc with conjoined bases), 1, 2, 2, 5 and 1 + aesthetasc (seta and aesthetasc with conjoined bases). Antenna (Fig. 7A): Allobasis with 1 seta and 6 spinules on inner margin; endopod 1-segmented, inner margin of endopod with 3 proximal spinules followed by 2 spines, and 2 spinules near distal outer corner, apical margin of endopod with 2 strong, unequal spines and 3 geniculate setae. Exopod 1-segmented, with 1 inner and 3 apical setae.

Mandible (Fig. 7B): gnathobase with 5 main strong teeth and one lateral seta, palp 1-segmented, with 3 apical setae, outer seta longer than inner setae.

Maxillule (Fig. 7C): with arthrite of the praecoxa ending in 4 spines and bearing 4 setae, coxal endite with 2 setae; basal endite with 1 spine and 2 setae, inner margin with 1 spinule.

FIGURE 6. *Attheyella* (*Canthosella*) *chocoensis* **n. sp.** Female (holotype A, B and C). A, antennule; B, leg 5; C, inner spine of exopod; D, leg 5, inner spine of exopod, paratype NHMW 20560; E, leg 5, spine of exopod, paratype MHHN-Cp2229.

Maxilla (Fig. 7D): composed of syncoxa with 2 endites and basis; proximal endite of syncoxa with lateral spine ending in a spiniform tip, distal endite with 1 spine and 1 seta; basis ending in spiniform tip with 1 lateral seta. Proximal margin of maxilla with 1 seta.

Maxilliped (Fig. 7E): with coxa ornamented with two groups of spinules, basis with an inner lateral row of 4 strong spinules and a long row of spinules, a group of subapical spinules and an external group of apical spinules; endopod 1-segmented, bearing long claw and short seta.

FIGURE 7. *Attheyella* (*Canthosella*) *chocoensis* **n. sp.** Female (holotype). A, antenna; B, mandible; C, maxillule; D, maxilla; E, maxilliped.

Leg 1 (Fig. 8A): intercoxal plate unarmed. Coxa, anterior surface with row of 3 spinules near outer margin; basis with outer spine and row of 4 spinules on anterior surface near base of exopod, 1 seta and row of spinules near base of endopod. Exopod 3-segmented; first segment with 1 bipinnate spine and row of spinules on outer margin;

second segment with 1 bipinnate spine and row of spinules on outer margin as well, inner margin with 1 spinule; third segment with 1 unipinnate spine and a row of spinules on outer margin, apically with 1 unipinnate spine and 2 geniculate setae. Endopod 2-segmented, almost as long as exopod; first segment with 1 long unipinnate inner seta and a row of spinules on outer margin; second segment with 1 spinule on the middle of inner margin and

1 naked seta inserted subapically, apical margin with 1 geniculate seta and 1 naked seta, outer margin with row of spinules.

FIGURE 8. *Attheyella* (*Canthosella*) *chocoensis* **n. sp.** Female (holotype). A, leg 1; B, leg 2.

Leg 2 (Fig. 8B): anterior surface of intercoxal plate with 1 spinule at base of each lateral prominence. Coxa unarmed. Basis with 1 outer spine and 1 spinule. Exopod 3-segmented; outer margin of first segment with spinules

and 1 bipinnate spine; outer margin of second segment with spinules and 1 bipinnate spine and as well, inner margin

with spinules and 1 long seta, unipinnate at its extremity; third segment with a few spinules on the external margin and 1 bipinnate spine inserted subapically, apical margin with 1 bipinnate spine and 2 setae, inner margin with 1 long seta unipinnate at its extremity. Endopod 2-segmented; first segment short and unarmed; second segment

with spinules and 1 distal bipinnate seta on outer margin, 2 bipinnate setae apically and 1 unipinnate median seta on inner margin.

Leg 3 (Fig. 9A): intercoxal plate as in leg 2. Basis with 1 long outer naked seta. Exopod 3-segmented, outer margin of first and second segments with spinules and 1 bipinnate spine and, inner margin of first segment without

seta; inner margin of second segment with a short naked seta and proximal spinules, outer margin of third segment with spinules and 2 bipinnate spines, inner margin with 2 setae unipinnate in their distal part, apical margin with 2 setae, outer seta with row of strong setulae, inner seta bipinnate in its distal half. Endopod 2-segmented, first segment

short and unarmed, outer margin of second segment with spinules and 1 distal bipinnate seta, apical margin with 2 partly bipinnate setae, inner margin with spinules and 2 naked similar spines.

FIGURE 9. *Attheyella* (*Canthosella*) *chocoensis* **n. sp.** Female (holotype). A, leg 3; B, leg 4.

Leg 4 (Fig. 9B): intercoxal plate as in legs 2 and 3. Basis with 1 long outer naked seta and a row of spinules on

anterior surface near the exopod. Exopod 3-segmented; first segment with row of spinules and 1 bipinnate spine on
outer margin and spinules on anterior surface near apical border; outer margin of second segment with 1 bipinnate spine and spinules, inner margin with naked distal seta and a few proximal spinules; outer margin of third segment with 1 spine and spinules, apical margin with 2 spines (outer spine bipinnate, inner spine unipinnate) and 1 bipinnate
seta, inner margin with 2 setae, proximal seta distally unipinnate, distal seta naked. Endopod 2-segmented, first segment very short and unarmed, inner margin of second segment with 2 spinules (right leg) or smooth (left leg); apical margin with 1 outer naked spine and 1 long inner seta unipinnate at its extremity.
Legs 1-4 with following formula of spines (Roman numerals) and setae (Arabic). Spinules are not included in the formula.

	Coxa	Basis	Exopod	Endopod
Leg 1	0-	0I-1I-	0; I-0;	I, I+2, 00-1; 0,2,1
Leg 2	0-	0I-0I-	0; I-1;	I,I+2,10-0; 1,2,1
Leg 3	0-	1-0I-0I-	0; I-1;	II,2,20-0; 1,2,II
Leg 4	0-	1-0I-0I-	0; I-1;	I,II+1,20-0; 0,I+1,0

Leg 5 (Fig. 6B and 6C): baseoendopods separated at base, bearing 1 outer seta and 6 inner apical bipinnate setae; exopod with 1 bipinnate seta on outer margin, apically with 3 setae (two outermost naked, the third one bipinnate)
and 1 inner spine, this spine modified, with 2 secondary spinules as in Figure 6C.
Leg 6 (Fig. 3A): each reduced to a small plate, located posterior to seminal receptacle, bearing 1 seta.
Description of male. Length of allotype 300 μm, exclusive of caudal setae. Mean length of paratypes from Nuquí 316 μm (n = 6, range 267-336 μm), mean length of paratypes from Utria 274 μm (n = 15, range 238–327 μm). Differences from female are the following:
FIGURE 10. *Attheyella* (*Canthosella*) *chocoensis* **n. sp.** Male (allotype). A, urosome, dorsal; B, urosome, ventral.
FIGURE 11. Males. *Attheyella* (*Canthosella*) *aliena*. A, antennule. *Attheyella* (*Canthosella*) *chocoensis* n. sp. (allotype, B, C and D). B, antennule; C, leg 5; D, leg 5, inner spine.
Second urosomite (Fig. 10B) posterolaterally and posteroventrally with row of long spinules. Anal somite with 2 lateral spines at each side of posterior outer corner (Fig. 10A). Anal operculum with 4 strongly developed triangular
teeth. Caudal rami posterolaterally without row of spinules, in contrast to female, with short, poorly delimited dorsal carina.
Antennule (Fig. 11 B) geniculate, 8-segmented, setation formula: 0, 3, 3, 6+aesthetasc and seta with conjoined bases, 0, 0, 0, 5+aesthetasc and seta with conjoined bases; seta and aesthetasc with conjoined bases of fourth segment
almost as long as fifth and sixth segments together; fifth segment with two tubercles.
FIGURE 12. *Attheyella* (*Canthosella*) *chocoensis* **n. sp.** Male (allotype, A and B). A, leg 1; B, leg 2; C, leg 2, first 2 segments of endopod of paratype NHMW 20684.
Swimming legs showing differences with female, particularly in the armature of segments. Thus, they are described fully.
Leg 1 (Fig. 12A): intercoxal plate unarmed; coxa unarmed, except one spinule on outer margin; basis with outer unipinnate spine, anterior surface with proximal row of 4 spinules and 1 naked seta, with distal row of 6 spinules. Exopod 3-segmented; first segment with 1 bipinnate spine and row of spinules on outer margin and row of spinules near distal margin; second segment with 1 unipinnate spine and row of spinules on outer margin as well,
and two spinules near distal margin; third segment with 1 unipinnate spine and a row of spinules on outer margin, apically with 1 unipinnate spine and 1 geniculate seta, inner margin with 1 geniculate seta. Endopod 2-segmented, as long as exopod; first segment with row of spinules on outer margin, with 1 long and strong bipinnate seta and 1 spinule on inner margin; second segment with row of spinules on outer margin, apical margin with 1 normally developed unipinnate seta and 1 geniculate long seta, inner margin with 1 naked seta inserted subapically and 1 spinule.
Leg 2 (Figs. 12B and 12C): intercoxal plate and coxa as in female. Basis with 1 outer bipinnate spine, anterior surface with 2 spinules near distal margin. Exopod 3-segmented; first segment with 1 bipinnate spine and row of spinules on outer and distal margins; second segment with 1 bipinnate spine and row of spinules on outer margin, with 1 naked seta and 2 spinules on inner margin; third segment with 1 bipinnate spine and 1 spinule on outer margin,
apically with 1 bipinnate spine and 2 unipinnate setae, inner margin with 1 long seta, unipinnate at its end. Endopod 2-segmented; first segment short without armament; second segment with row of spinules and 1 naked spine inserted subapically on outer margin, with 1 long and 1 short setae (both bipinnate) on distal margin, with 1 unipinnate seta and 1 spinule on inner margin.

Leg 3 (Figs. 13A and 13B): intercoxal plate and coxa as in leg 2. Basis with 1 outer spine. Exopod 3-segmented; first segment with 1 outer spine and spinules, distally with two rows of surface spinules; second segment with 1 spine and spinules on outer margin, with 1 naked seta and 1 spinule on inner margin, with 1 apical surface spinule; third segment with two spines and spinules on outer margin, with 2 apical setae of different length, the inner the longest, bipinnate in its distal half, the outer unipinnate, with 2 setae on inner margin, proximal seta short,
apical seta almost as long as longest terminal seta, both unipinnate at their distal part; outer spines of all exopod segments naked. Endopod 3-segmented; first segment very short and unarmed; second segment with long inner apophysis ending in a barb, as long as the terminal inner seta, third segment with 2 short apical setae, inner seta unipinnate, outer seta naked.
Leg 4 (Fig. 13C): intercoxal plate and coxa as in leg 2 and 3. Basis with one outer naked seta and 1 spinule. Exopod 3-segmented; first segment with 1 naked spine and spinules on outer margin; second segment with 1 naked
spine and spinules on outer margin, with 1 naked spine and 1 spinule on inner margin, distally with two rows of surface spinules; third segment with 1 bipinnate spine on outer margin, with 2 spines (outer spine bipinnate, inner spine unipinnate) and 1 bipinnate seta on distal margin, inner margin with 2 setae, distal seta long and proximal seta
short, both unipinnate. Endopod 2-segmented; first segment very short and unarmed, second segment with 1 bipinnate
spine and 1 seta (unipinnate in its distal half) on apical margin, seta much shorter than corresponding seta of female.
Legs 1–4 with following formula of spines (Roman numerals) and setae (Arabic). Spinules are not included in the formula.

Coxa	Basis	Exopod	Endopod
Leg 1	0-0	I-1	I-0; I, I+1, 10-1; 0,2,1
Leg 2	0-0	I-0	I-1; I,I+2,10-0; I,2,1
Leg 3	0-0	I-0	I-1; II,2,20-0; 0,2,0
Leg 4	0-0	1-0	I-1; I,II+1,20-0; 0,I+1,0

Leg 5 (Figs. 11C and 11 D): Baseoendopods fused at base, unarmed; exopod with 3 setae and 1 spine: outer seta short, middle and inner setae long, inner seta reaching apical margin of second urosomite; spine with lateral spinule.
Variability. Females. Dorsal side of genital double-somite partially separated, as is also the case ventrally (paratype NHMW 20560) (Fig. 1C). Anal somite with a variable number of spinules: laterally, 3, 4 as in holotype or 5 as in specimen of Figure 2C; ventrally, 7 as in holotype, 8 as in paratype NHMW 20682 (Fig. 5B), to 9 as in paratype MNHN-Cp 2296. Leg 1, second segment of exopod with 1 or 2 spinules on inner margin. Number of spines of anal operculum variable, from 5 to 10 (Figs. 2B, 3B and 5A). Spine of exopod of leg 5 with variable number
(2 to 4) of secondary spines (Figs. 6C, 6D and 6E). Males. Exopod of leg 2 of one paratype (NHMW 20684) with 2 setae on inner margin (Fig. 12C) in contrast to allotype (1 seta). Endopod of leg 3 with 1 short and 1 long seta (paratype ICN-MHN-CR 2222) (Fig. 13A) instead of 2 short setae as in allotype. Number of lateral spines of anal somite varies from 2 to 5. Number of teeth of anal operculum varies from 3 to 8.
FIGURE 13. *Attheyella* (*Canthosella*) *chocoensis* **n. sp.** Male (allotype, A and C). A, leg 3; C, leg 4; B, leg 3, last segment of endopod of paratype ICN-MHN 2222.
Remarks. Within the subgenus *Canthosella*, 16 species have been described so far, 11 of them from the Neotropical
region and 5 from the Oriental region (Table 1). We accept the relocation of 5 species into the subgenus *Canthosella* as suggested by Janetzky *et al*. (1996) based on the definition of the subgenus, particularly the posterior
margins of the body somites being smooth, the segmentation and armature of legs 1–4 and the ornamentation of the anal operculum. The relocated species are *Attheyella* (*Canthosella*) *aliena* Noodt, 1956 and *Attheyella* (*Canthosella*)
kalima (Delachaux, 1924) from the subgenus *Chappuisiella*, *Attheyella* (*Canthosella*) *siolii* (Kiefer, 1967) from the genus *Elaphoidella* Chappuis, 1929, *Attheyella* (*Canthosella*) *striblingi* (Reid, 1990) originally called *Canthocamptus* (*Elaphoidella*) *striblingi*, and *Attheyella* (*Canthosella*) *pilagaensis* Janetzky, Martínez Arbizu Reid, 1996. *Attheyella (Canthosella) pilagaensis* was proposed by Janetzky *et al*. (1996) as a new name for the female specimen of *Attheyella* (*Chappuisiella*) *kalima* identified by Dussart and Frutos (1986) from Argentina, based on the differences (according to Delachaux's description) in the insertion point of the lateral caudal setae and
in the relative lengths of several setae of the swimming legs of females. We agree with this statement because the

type-material of *Attheyella* (*Canthosella*) *kalima* from Suriname has not been re-examined, but this synonymy will
have to be confirmed subsequently with the description of new material. Both species, *Attheyella* (*Canthosella*) *pilagaensis*
Janetzky *et al*., 1996 and *Attheyella* (*Canthosella*) *kalima*, are then considered as belonging to the subgenus *Canthosella*. The three species *Attheyella* (*Canthosella*) *bromelicola*, *Attheyella* (*Canthosella*) *goeldii* and *Attheyella* (*Canthosella*) *montana* described by Ebert (1976) have to be considered as unavailable names because the thesis was never published (Table 1).

TABLE 1. List of species of the subgenus *Canthosella*, taxonomic status, known (+) and unknown (-) females and males, and geographic distribution. * species belonging to the group bearing a row of spines on the dorsal surface of the caudal ramus. ** species relocated by Janetzky *et al.* (1996)

The description of the subgenus *Canthosella* Chappuis, 1931 includes the following main characters: a not
cylindrical body shape, a short rostrum, the posterior margin of the somites smooth, the caudal rami in both sexes being as long as or slightly longer than wide, with a short row of spines between second and third quarter of the inner margin. Antennula 8-segmented in male, with its fourth segment not very thickened. Endopod of antenna 1-segmented. Leg 1 with 2-segmented endopod, endopod shorter than exopod. Legs 2 to 4 of female with 2-segmented
endopods, first segment of endopod of leg 4 can be very short. Second segment of endopod of leg 4 in both sexes with one apical seta. Endopod of leg 3 of the male 3-segmented, with spine of second segment transformed into an apophysis ending in a barb. Endopods of legs 2 to 4 with second segment bearing at least 1 seta on inner margin and 1 spine on outer margin. Baseoendopod of leg 5 on female strongly expanded, with 6 setae, exopod with 5 setae. Baseoendopod of male leg 5 with 2 setae.

As American species were included in the subgenus, the following morphological characteristics added complementary
details to the original description of the subgenus: Endopod of second to fourth legs with last segment bearing 1 or 2 armaments and baseoendopod of fifth leg of the male with 0–2 setae.

Nr.	Species	Status	Female	Male	Distribution
1	*aliena* Noodt, 1956 *	relocated **	+	+	neotropical (Brazil), introduced into Germany
2	*antillica* (Petkovski, 1973)		+	+	neotropical (Cuba)
3	*bromelicola* Ebert, 1976	not published	-	+	neotropical (Brazil)
4	*chocoensis* n. sp. *		+	+	neotropical (Colombia)
5	*fluviatilis* Chappuis, 1931		+	+	oriental (Indonesia, Sumatra)
6	*goeldii* Ebert, 1976 *				

not published
+
-
neotropical (Brazil)
7
kalima (Delachaux, 1924) *
relocated **
+
-
neotropical (Surinam)
8
lacustris Chappuis, 1931
+
-
oriental (Indonesia, Sumatra)
9
mervini Janetzky, Martinez Arbizu & Reid, 1996
+
+
neotropical (Jamaica)
10
montana Ebert, 1976
not published
+
+
neotropical (Peru)
11
muscicola (Chappuis, 1928)
relocated
+
+
oriental (Indonesia, Java)
12
pilagaensis Janetzky, Martinez Arbizu & Reid, 1996 *
relocated **
+
-
neotropical (Argentina)
13
silvicola Löffler, 1973
+
+
oriental (Indonesia, Borneo)
14
siolii (Kiefer, 1967) *
relocated **
-
+
neotropical (Brazil)
15
striblingi (Reid, 1990)
relocated **
-
+
neotropical (Costa Rica)
16
vera Por & Hadel, 1986 *
+
+
neotropical (Brazil)
17
vietnamica Borutzki, 1967
+
+
oriental (Vietnam)

The Asian species *Attheyella* (*Canthosella*) *muscicola* (Chappuis, 1928), *Attheyella* (*Canthosella*) *fluviatilis* Chappuis, 1931, *Attheyella* (*Canthosella*) *lacustris* Chappuis, 1931, *Attheyella* (*Canthosella*) *vietnamica* Borutzky,
1967 and *Attheyella* (*Canthosella*) *silvicola* Löffler, 1973 have an endopod of leg 4 bearing only 1 seta, instead of 1
spine and 1 seta as in all American species (except *Attheyella* (*Canthosella*) *antillica* Petkovski, 1973). Another morphological difference of the American species is the absence of setae on the baseoendopod of leg 5 in males; in
Asian species this baseoendopod bears 2 setae.
Janetzky *et al.* (1996) proposed a division of the American species into two groups according to the presence or absence of a row of spines on the dorsal surface of the caudal ramus. *Attheyella* (*C.*) *antillica*, *Attheyella* (*C.*) *mervini* Janetzky *et al*., 1996 and *A.* (*C.*) *striblingi* belong to the group lacking such spines.
The new species *A.* (*C.*) *chocoensis*, as well as *Attheyella* (*C.*) *aliena*, *Attheyella* (*Canthosella*) *vera* Por and Hadel, 1986, *A.* (*C.*) *kalima*, *A.* (*C.*) *pilagaensis*, *A.* (*C.*) *goeldii* and *A. (C.) siolii*, belong to the group of species bearing a row of spines on the dorsal surface of the caudal ramus. Nevertheless, males of the new species lack this row of spines. The morphological differences within this group are summarized in Table 2 (females) and Table 3 (males).
Females of the new species differ from females of the species of the group in having a genital double-somite that is ventrally and sometimes dorsally partially divided, and in the morphology and ornamentation of the caudal rami (Table 2). The insertion point of the dorsal seta of the caudal ramus is located in the middle of the segment in *A.* (*C.*) *chocoensis*. In contrast, this seta is inserted on the posterior quarter of the ramus in the other species, as is shown in *A.* (*C.*) *aliena* and *A.* (*C.*) *pilagaensis* (Figs. 4A and 4C). Moreover, the size of the posterodorsal spines of
the new species is much smaller than in the other species (compared e.g. with *A. aliena* (Figs. 4A and 5A).
Additionally, there are small differences in the setation of leg 1. With the exception of *A.* (*C.*) *pilagaensis* and *A.* (*C.*) *chocoensis*, no other species bears spinule(s) on the inner margin of the second segment of the exopod of leg 1.
Other particular similarities and differences with the species of the group are:
Females of the new species are close to *A.* (*C.*) *goeldii* from Brazil, particularly in having a similar ornamentation of the genital somite and the urosomites 3 and 4, and in the similar armature of legs 2 to 4. *A.* (*C.*) *goeldii* differs from *A.* (*C.*) *chocoensis* in having more spines (14 instead of 7 in *A.* (*C.*) *chocoensis*) on the posterior margin of the anal somite, the proximal lateral seta of the caudal ramus is inserted in the middle of the segment (in *A.* (*C.*) *chocoensis* in the proximal third) and the apical inner spine on the endopod of leg 1 is much better developed. Males of *A.* (*C.*) *goeldii* are unknown.
The new species differs from females of *A.* (*C.*) *pilagaensis* particularly in the morphology of the caudal ramus. In *A.* (*C.*) *pilagaensis* it is oval (Figs. 4C and 4D) and in *A.* (*C.*) *chocoensis* it is subquadrate (Figs. 5A and 5B); the proximal lateral seta is inserted in the third distal part of the caudal ramus in *A.* (*C.*) *pilagaensis* (in the third proximal part of the ramus in *A.* (*C.*) *chocoensis*). Additionally, there are differences in the size of the apical spines of the endopod of leg 1 (the outer spine is longer than the inner one in *A.* (*C.*) *chocoensis* and shorter in *A.* (*C.*) *pilagaensis*).
A. (*C.*) *chocoensis* differs from females of *A.* (*C.*) *aliena* particularly in the morphology of the base of the central apical seta of the caudal rami. This seta in *A.* (*C.*) *aliena* has a very broad base in contrast to *A.* (*C.*) *chocoensis* (Figs. 4A and 5A) and to the other species of the group, and small outer apical setae.
Differences from females of *A.* (*C.*) *vera* can be observed in the ornamentation of the urosome: *A.* (*C.*) *vera* has no spines on the ventral surface of urosomites 3 and 4. The mandibular palp of *A.* (*C.*) *vera* bears 2 setae, while
that of *A.* (*C.*) *chocoensis* bears 3. According to the diagnosis of Por and Hadel (1986), the endopod of leg 3 has 1 spine on the inner margin in *A.* (*C.*) *vera*, but 2 in the other species including *A.* (*C.*) *chocoensis*.. However, it is possible that they oversighted the second spine which is located very near the first one.
Females of *A.* (*C.*) *kalima* differ from *A.* (*C.*) *chocoensis* particularly in having a longer copulatory tube that reaches to the posterior quarter of the genital segment. The description of Delachaux (1924) refers to a 1-segmented
endopod of leg 4 compared with a 2-segmented endopod in *A.* (*C.*) *chocoensis*; however, this author probably missed the very short first segment of the endopod. Males of *A.* (*C.*) *kalima* are unknown.
Males of the new species differ from those of *A.* (*C.*) *aliena*, *A.* (*C.*) *siolii* and *A.* (*C.*) *vera* by the lack of a row of spinules on the dorsal surface of the caudal rami. Additionally, it was noted a size difference between the aesthetascs
of segment 4 of the antennula: in *A.* (*C.*) *aliena* this aesthetasc is short, whereas in *A.* (*C.*) *chocoensis* it is

long, almost reaching the distal margin of segment 6 (Figs. 11A and 11B). An additional difference with *A.* (*C.*) *aliena* is related to the number of the apical setae of the endopod of leg 3: *A.* (*C.*) *aliena* bears 1 seta, *A.* (*C.*) *chocoensis* bears 2. Females of *A.* (C.) *siolii* are unknown.

The number of teeth on the anal operculum in both sexes does not constitute a useful feature to differentiate among species. Some species have been described based on only 1 male and 1 female or 1 specimen of each sex. In mounted specimens of *A.* (*C.*) *chocoensis*, we have found variability in the number of teeth: females 5 to 9 (n = 4), males 3 to 9 (n = 6). Por and Hadel (1986) noted the same for *A.* (*C.*) *vera*.

Although females of the new species differ from those of *A.* (*C.*) *mervini*, *A.* (*C.*) *antillica* and *A.* (*C.*) *striblingi* based on the presence of a spinule row on the dorsal surface of the caudal rami, males resemble those species because they lack such spinules. Differences have been noted within males, particularly in the endopod of leg 3: in *A.* (*C.*) *chocoensis* it is 3-segmented, in *A.* (*C.*) *mervini* 2-segmented. Additionally, the second segment of the endopod of leg 2 of *A.* (*C.*) *chocoensis* bears 4 setae instead of 3 in *A.* (*C.*) *mervini* and *A.* (*C.*) *antillica*. No hump was observed at the apical end of the segment of the new species, as is present in both these species. The endopod of leg 4 is 1-segmented in *A.* (*C.*) *antillica* and 2-segmented in *A.* (*C.*) *chocoensis*, with 1 seta in the former and 2 in the latter. The caudal ramus in males of *A.* (*C.*) *striblingi* is much longer than the anal somite.

A particular difference between females of *A.* (*C.*) *mervini* and of *A.* (*C.*) *chocoensis* was noted in the ornamentation of the intercoxal plates. The new species bears 1 spine on each distal apical corner of the intercoxal plate on legs 2 and 4, instead of 2 spines in *A.* (*C.*) *mervini*. Leg 3 of *A.* (*C.*) *mervini* has no spine there, but the new species has 1 spine.

***Attheyella* (*Delachauxiella*) *freyi* Löffler, 1963**

(Figs. 14–25)

Material examined. Colombia, Cauca State, Puracé, pond near Laguna de San Rafael, coll. S. Gaviria, 14.12.1991: MNHN-Cp2301, 1 female dissected on 1 slide; 1 MNHN-Cp2302, 1 male dissected on 1 slide; NHMW 25218, 1 female undissected mounted on slide; NHMW 25219 – 25220 and NHMW 25222, 3 females dissected on slides; NHMW 25223, 1 male undissected, mounted on slide; NHMW 25221, NHMW 25224 – 25227, 5 males dissected on slides. MNHN-Cp2303, 4 females and 1 male, undissected, ethanol preserved; NHWM-25228, 5 females and 5 males, undissected, ethanol preserved. Additionally, 1 female and 1 male were used for SEM analysis. Ecuador (syntypes, coll. Prescott, January-May 1958). Locality: El Angel, NHMW 22290, 23594 and 23596, each one with 1 female, dissected on slide; NHMW 23589, 23590, 23592 and 23593, each one with 2 females, dissected on 1 slide; NHMW 22291 and 23596, each one with 1 male, dissected on slide. Locality: Antisama, NHMW 22333 and 22334, each with 1 female, dissected on slide; NHMW 23595, 1 male, dissected on slide. **Diagnosis.** Female. Frills of posterior edge of body somites (except anal somite) serrated. Genital doublesomite not fused externally, genital tube long, genital pore located at 1/3 of the second urosomite. Genital doublesomite as well as urosomites 3 and 4 with row of spines ventrally and laterally near posterior edge, ventrally always with middle or lateral gaps. Row of spinules dorsally very variable. Ventral surface laterally with double row of spinules in genital double-somite, urosomites 3 and 4. Anal operculum rounded with long posterior arrow-head extention, margin fine serrated, extends to 2/3 of length of caudal rami. Leg 1 with 3-segmented endopod, legs 2-4 with 2-segmented endopod. Leg 1: endopod 1 extends to proximal half of exopod 3. Endopod last segment of leg 2, with 4 (in exceptional cases 5), of leg 3 with 5, of leg 4 with 5 (in exceptional cases with 6) spines or setae. Leg 5: baseoendopod with 6 setae, seta I (inner most), V and VI approximately with equal length and shorter than II-IV, exopod 2.5 times longer than width, with 4 setae, ventral surface of both segments with rows of spinules. Male. Thoracic somites and urosomites with posterior edge dorsally serrated. Urosomites with posterior edge ventrally serrated or smooth. Urosomites with row of spinules dorsally and ventrally very variable. Anal operculum strongly extended into a narrow arrow-head shape, edge finely serrated, extended beyond posterior edge of caudal rami. Legs 1 and 3 with 3- segmented endopod, legs 2 and 4 with 2-segmented endopod. Leg 1: endopod 1 extends to proximal half of exopod 3. Endopod 1 of leg 1, 2 and 4 with 1 seta on inner margin, of leg 3 without seta. Leg 3 with apophysis on second segment, with two terminal barbs. Apical segment of endopods of leg 2 with 3 (rarely 4), of leg 3 with 2, of leg 4 with 5 (2 small elements of outer margin are considered setae). Baseoendopod of leg 5 with 2 inner spines, exopod with 4 setae.

FIGURE 14. *Attheyella* (*Delachauxiella*) *freyi* Löffler, 1963. Female (specimen MNHN-Cp2301). A, habitus, dorsal view; B, habitus, lateral view; C, caudal ramus, terminal setae. Position of terminal setae indicated on figure B.

Supplementary description of female. Body cylindrical (Figs. 14 and 15A), cephalosome slightly broader than thorax and abdomen, broadest section at its posterior margin. Cephalosome and body somites dorsally and laterally with sensilla. Integument strongly sclerotized. Frills of posterior edge of body somites (except anal somite) serrated. Dorsal serration consists of fine sharp teeth. In contrast, ventral serration is weak and blunt. Body surface including anal operculum, dorsally with additional rows of tiny spinules (visible only in SEM photographs, Fig. 15). Abdominal somites with row of spinules near posterior edge, dorsally limited to lateral margins (extension of spinules rows dorsally very variable: see variability), ventrally incomplete in the middle of somites. Ventral surface laterally with double row of spinules on genital double-somite, third and fourth urosomites (Fig. 16A). Genital double-somite externally not fused, copulatory pore located at one-third of the second urosomite; genital field laterally with row of tiny spinules. Anal urosomite without spinules. Anal operculum rounded, with central, long posterior extension pointed at tip (Figs. 14, 16A, 16B and 16D) and border finely serrated (visible only in SEM photographs, Fig. 15B). Anal operculum extends to 2/3 the length of caudal rami. Caudal rami subquadrate, 1.7 times longer than wide (ventral view), with 2 lateral setae and 1 dorsal inserted in distal half of the ramus; with 3 terminal setae; inner seta very tiny, its length less than ½ of width of caudal rami; median seta longer than urosome; outer seta tiny, its length 1/3 of middle seta (Fig. 14B); outer margin of caudal ramus with 3 groups of 3 slender spines, ventral surface with 3 groups of paired robust spines (Fig. 16) inserted near inner margin.

FIGURE 15. *Attheyella* (*Delachauxiella*) *freyi* Löffler, 1963. Female (different specimen from that of figure 14). SEM photographs. A, habitus, dorsal; B, anal operculum (broken at its posterior extension) and caudal ramus in dorsal view.

FIGURE 16. *Attheyella* (*Delachauxiella*) *freyi* Löffler, 1963. Female. A, urosome, ventral view; B, urosome, last segment and caudal ramus, lateral view; C, caudal ramus, ventral view; D, caudal ramus, dorsal view.

Antennule (Fig. 17A) 8-segmented, segment 1 with 4 spinules. Setation formula: 1, 6, 6, 2 + aesthetasc (one seta and aesthetasc with conjoined bases), 1, 3, 2 and 6 + aesthetasc (one seta and aesthetasc with conjoined bases).

Setae conjoined with aesthetask of fourth segment longer than 4 apical segments together; setae conjoined with aesthetask of segment 8 longer than 5 apical segments together.

Antenna (Fig. 18A): Coxa unarmed, allobasis with 2 setae on inner margin; endopod 1-segmented with row of spinules on dorsal surface near apical margin, inner margin of endopod with 4 proximal spinules followed by 2 strong spines, 3 spinules and 1 spine inserted almost apically; apical margin with 2 spines and 3 geniculate setae, outer seta with inner margin carrying 3 secondary spines near geniculation point. Outer corner of endopod with fan-like spine with similar morphology as in male (see male Fig. 21E). Exopod 1-segmented, with 2 lateral and 2 apical setae.

Mandible (Figs. 17B and 17C): coxal gnathobase with cutting edge composed of 3 main large and coarse teeth, a row of fringed teeth and one lateral seta; lateral surface of gnathobase proximally with row of 11 spinules, a triangular process located on the 2/3 of the distance between the palp and the teeth, distally with strong medial teeth; palp 2-segmented, first segment with row of spinules at apical margin, second segment with 3 apical setae, middle seta longer than lateral setae.

Maxillule (Fig. 17D): inner margin of precoxa with proximal row of 7 spinules, distally with 1 spinule; arthrite of the praecoxa with 5 apical fringed spines and 1 subapical seta; coxal endite composed by one long spine; basal endite with one spine and 8 lateral setae.

FIGURE 17. *Attheyella* (*Delachauxiella*) *freyi* Löffler, 1963. Female. A, antennula; B, mandible; C, mandible, cutting edge in lateroventral view; D, maxillule; E, maxilla; F, maxilliped.

FIGURE 18. *Attheyella* (*Delachauxiella*) *freyi* Löffler, 1963. Female. A, antenna; B, leg 5; C, leg 5, baseoendopod, outer setae (setae V and VI). Position of outer setae of baseoendopod indicated on figure B.

Maxilla (Fig. 17E): composed of syncoxa with 2 endites and basis; proximal endite of syncoxa distally very narrow, with 2 lateral spines of different sizes, stronger spine distally with simple pinnate row of spinules, and 1 lateral seta; distal endite composed by 1 spine with 1 lateral seta, distal section with simple row of spinules; basis distally with simple row of spinules, ending in a narrow tip, with 3 lateral setae. Outer margin of maxilla with proximal

row of setulae.
Maxilliped (Fig. 17F): coxa bearing 1 seta on inner margin; basis ornamented with two long rows of tiny spinules on anterior margin and dorsal surface, respectively, posterior margin with 1 spinule; endopod 1-segmented,
bearing long claw and 1 long seta, claw with distal row of spinules.
Leg 1 (Figs. 19A, 19B and 19C): intercoxal plate with 2 groups of 5 spinules on anterior surface. Coxa, anterior surface with 2 spinules near outer margin and row of 5 spinules on outer apical corner; basis with one strong bipinnate outer and one strong naked inner spine, anterior surface with 2 rows of 3 spinules each, inserted near base
of outer spine, row of 7 spinules and row of 3 spinules on apical margin, hairs on inner margin and near insertion point of inner spine. Exopod 3-segmented; first segment with 1 bipinnate spine on outer margin, row of spinules near base of spine and near apical margin; second segment with expanded outer distal corner and hairs on inner margin, 1 bipinnate spine on outer margin and other ornaments as first segment; third segment with 1 bipinnate spine and a row of spinules near outer margin, apically with 1 long unipinnate spine and 2 geniculate setae (Fig. 19B). Endopod 3-segmented, longer than exopod; first segment longer than first two segments of exopod, with 1 short inner bipinnate spine and 2 small setae inserted distally and a row of spinules on outer margin; second segment
with 1 bipinnate spinule on inner margin inserted distally and row of spinules distally on outer margin; third segment with row of spinules on outer margin, with 1 outer unipinnate spine, 1 median geniculate seta and 1 short inner unipinnate seta on apical margin (Fig. 19C).
FIGURE 19. *Attheyella* (*Delachauxiella*) *freyi* Löffler, 1963. Female. A, leg 1; B, leg 1, apical armament of exopod; C, leg 1, apical armament of endopod; D, leg 2. Position of apical armament of leg 1 indicated on figure A.
FIGURE 20. *Attheyella* (*Delachauxiella*) *freyi* Löffler, 1963. Female. A, leg 3, anterior view; B, leg 4, anterior view; C, leg 4, exopod, first two segments, posterior view.
Leg 2 (Fig. 19D): anterior surface of intercoxal plate with one group of 3 and one group of 2 spinules near each distal corner. Coxa with 1 small spine on outer margin. Basis with 1 bipinnate outer spine, 1 row of spinules near insertion point of exopod and rows of hairs near insertion point of endopod and on inner margin. Exopod 3-segmented;
outer distal corner of segment strongly extended, outer margin of first segment with 1 bipinnate spine and spinules, row of spinules near distal margin and row of hairs on inner margin; second segment with outer distal corner
similarly extended as in first segment, outer margin with 1 bipinnate spine and spinules, inner margin with 1 long seta inserted distally unipinnate at its distal part, and bearing 4 spinules near its base on outer margin; third segment about 1.5 times longer than first and second segments together, outer margin with 3 bipinnate spines and spinules, inner margin with 1 long median bipinnate seta, apical margin with 1 outer unipinnate spine and 1 inner bipinnate seta. Endopod 2-segmented; first segment short, with 1 bipinnate spine on inner margin and hairs on outer margin; second segment with 1 distal unipinnate seta and spinules on outer margin, 2 bipinnate setae on apical
margin and 1 median seta unipinnate at its end on inner margin. Both endopods of one specimen with 1 additional seta on inner margin, two specimens with this additional seta in one of both endopods (see variability).
Leg 3 (Fig. 20A): intercoxal plate as in leg 2. Coxa with expanded outer apical corner, outer apical surface with a row of spinules. Basis with 1 short outer naked seta, with two rows of spinules near insertion point of exopod,
with row of hairs near insertion point of endopod and on inner margin. Exopod 3-segmented; first segment with expanded outer apical corner, outer margin with 1 bipinnate spine and spinules, inner margin with row of hairs; second segment with armature as in first segment, additionally with a long seta inserted on distal inner corner,
unipinnate at its distal part and bearing 3 spinules on outer margin near its base; outer margin of third segment with 3 bipinnate spines and spinules, inner margin with 2 setae unipinnate in their distal part, apical margin with 1 unipinnate spine and 1 seta, bipinnate at its extremity. Endopod 2-segmented, first segment short, with spine on inner margin; outer margin of second segment with 1 bipinnate distal spine and spinules, inner margin with 3 setae,
apical margin with 2 setae, the inner bipinnate, the outer unipinnate.
Leg 4 (Figs. 20B and 20C): intercoxal plate without ornaments. Coxa with spinule on outer margin. Basis with 1 long outer naked seta and a row of spinules on anterior surface near base of exopod, inner margin with row of hairs. Exopod 3-segmented; first segment with 1 bipinnate spine and row of spinules on outer margin, inner margin
with hairs; anterior (Fig. 20B) and posterior (Fig. 20C) surfaces of segment with spinules, distal margin of anterior

surface with row of spinules of two different sizes; outer margin of second segment ornamented as in first segment,
inner margin with long unipinnate seta and row of hairs; anterior (Fig. 20B) and posterior (Fig. 20C) surfaces with spinules, distal margin of anterior surface with row of spinules; third segment with 3 bipinnate spines and spinules on outer margin, inner margin with 2 setae unipinnate in their distal half, apical margin with 1 unipinnate spine, 1 unipinnate seta and row of spinules near base of armature. Endopod 2-segmented, first segment short, with bipinnate
spine on inner margin; inner margin of second segment with 2 long setae, unipinnate at their distal part, outer margin with 1 bipinnate spine and spinules, apical margin with 2 setae, the outer unipinnate, the inner bipinnate . One specimen bears an additional short seta on proximal inner margin of third segment (see variability).
Leg 5 (Figs. 18B and 18C): baseoendopods separated at base, bearing 1 thin naked seta on outer margin and 6 bippinate setae on distal margin, seta I (innermost), V and VI approximately equal in length and shorter than II-IV;
exopod 2.5 times longer than wide, bearing 4 unipinnate setae; row of spinules on anterior surfaces of baseoendopod
and exopod as in Figure 18B.
Legs 1–5 with following formula of spines (Roman numerals) and setae (Arabic numerals). Spinules are not included in the formula.

	Coxa	Basis	Exopod	Endopod
Leg 1	0-0	I-II-0;	I-0;	I, I+2, 0
Leg 2	I-0	I-0I-0;	I-1;	III, I+1, 10-I; 1,2,1
Leg 3	0-0	1-0I-0;	I-1;	III, I+1, 20-1; I,2,3
Leg 4	0-0	1-0I-0;	I-1;	III, I+1, 20-I; I, I+1, 2

Leg 6 (Fig. 16A): reduced to a small plate and located posterior to seminal receptacle, bearing 1 uniserially setulated
seta and 1 naked seta.
Supplementary description of male. Body with cephalothorax wider and considerably higher than urosome (Figs. 21A and 21B). Broadest body section at the posterior margin of the integumentary window. Integumentary window long, rectangular with rounded corners, with slightly narrow waistline at posterior third (Fig. 21B). Cephalosome
and body somites dorsally and laterally with sensilla. All body somites with frill of posterior edge dorsally serrated. Posterior margin of thoracic somites and urosomites dorsally serrated (Figs. 21A, 21B and 22A). Urosomite
1 with posterior margin ventrally smooth, urosomites 2 to 4 with posterior margin ventrally serrated or smooth; urosomites 1 to 4 dorsally with discontinuous rows of spinules, urosomites 2 to 4 ventrally with continuous
row of spinules near the posterior margin (Figs. 22A and 22B) (see morphological variability). Body somites and anal operculum ornamented on the surface with rows of spinules (visible only in SEM photographs, Figs. 21B and 21 C). Anal somite with two large sensillae near base of operculum; distal margin ventrally with 4 spines on each side. Anal operculum posteriorly strongly extended into a narrow arrowhead-shape, border finely serrated. Caudal rami outer margin with 2 proximal spines and 2 lateral setae, dorsal surface with one seta, apical margin with 3 setae, the meddle one tiny; ventral surface with 2 spines near inner margin.
FIGURE 21. *Attheyella* (*Delachauxiella*) *freyi* Löffler, 1963. Male. SEM photographs. A, habitus, lateral; B, cephalosome and
thoracic somites II-IV, dorsal; C, anal somite and caudal rami, dorsal; D, cephalosome, lateroventral view, showing antenna (arrow); E, antenna with fan-like transformed seta (arrow).
Antennula geniculate (Figs. 23A and 21B), with 8 segments, first segment with row of spinules on dorsal surface, setation formula (Fig. 23A): 0, 0, 3, 7 + aesthetasc and seta with conjoined bases, 0, 0, 0, 7 + aesthetasc and seta with conjoined bases.
Antenna as in female. Endopod with spine on outer apical corner transformed into a fan-like structure, clearly visible in SEM photograph (Figs. 21D and 21E). This structure is also present in female.
FIGURE 22. *Attheyella* (*Delachauxiella*) *freyi* Löffler, 1963. Male. A, urosome, dorsal; B, urosome, fifth (armament of exopods omitted) and sixth (armament of right leg omitted) legs, ventral.
Mandible, maxillule, maxilla and maxilliped not examined.
Leg 1 (Fig. 24A): intercoxal plate with 2 groups of 5 spinules on anterior surface. Coxa, anterior surface with 2 groups of 3 spinules on anterior surface and a group of 3 spinules on outer apical corner; basis with one large outer bipinnate spine and one large inner naked spine, anterior surface with two rows of 4 and 3 spinules each, inserted near distal margin, hairs on inner margin. Exopod 3-segmented; first segment with 1 bipinnate spine and spinules on outer margin, anterior surface with row of spinules near outer and distal margins; second segment with

one bipinnate spine and spinules on outer margin, with one naked seta and 2 spinules on inner margin; third segment
with 1 bipinnate spine and a row of spinules on outer margin, apically with 1 bipinnate spine and 1 geniculate seta, outer margin with 1 geniculate seta inserted subapically. Endopod 3-segmented; first and second segments with armature like in female, third segment with apical margin with 1 short outer simple seta and a geniculate inner
seta, inner margin with a distal bipinnate seta.

Leg 2 (Fig. 24B): anterior surface of intercoxal plate with 1 group of 2 and 3 spinules near each distal corner. Coxa with 3 spinules on outer distal corner. Basis with 1 bipinnate spine and spinules on outer margin. Exopod 3-segmented; first segment with outer distal corner strongly extended, outer margin with 1 bipinnate spine and spinules, anterior surface with row of spinules near insertion point of spine; second segment with outer distal corner
similarly extended as in first segment, outer margin with 1 bipinnate spine and spinules, anterior surface with 1 spinule near distal margin, inner margin with spinules and 1 seta inserted distally (shorter than in female), seta naked; third segment as long as first and second segments together, armature as in female but without spinule on outer margin and with spinules on inner margin. Endopod 2-segmented; first segment as in female, inner spine shorter than in female; second segment with spinules and without seta on outer margin, with 2 bipinnate setae apically
and 1 median unipinnate seta on inner margin. One specimen carries an additional seta distally on inner margin of the right leg (see variability).

FIGURE 23. *Attheyella* (*Delachauxiella*) *freyi* Löffler, 1963. Male. A, antennule; B, leg 5.

Leg 3 (Fig. 25A): intercoxal plate with group of 3 spinules near each distal corner. Coxa with row of 3 spinules near outer margin. Basis with 1 long naked seta and 2 spinules on outer margin. Exopod 3-segmented; first segment
as in female; second segment as in female but seta on inner margin much longer, seta unipinnate in its distal part and bearing 1 spinule on inner margin near its base; third segment shorter than in female, armature as in female but
distal seta on inner margin of third segment is bipinnate. Endopod 3-segmented, first segment short, unarmed; second
segment with long inner apophysis ending in 2 barbs, third segment with 2 setae of different size.

Leg 4 (Fig. 25B): intercoxal plate without ornaments. Coxa with spinules on outer margin. Basis with 1 long outer naked seta; anterior surface with a row of spinules near outer margin, inner margin with 1 hair. Exopod 3-segmented;
first segment with outer distal corner extended, with 1 bipinnate spine and row of spinules on outer margin, inner margin distally with hairs; second segment with outer margin ornamented as in first segment, inner margin with long bipinnate seta and row of hairs; third segment with 3 bipinnate spines on outer margin, 2 unipinnate
setae on inner margin and 1 unipinnate spine and 1 bipinnate seta on apical margin. Endopod 2-segmented, first segment short, with spine on inner margin; inner margin of second segment with 2 small setae, outer margin with 1 spine inserted distally, apical margin with 2 unequal bipinnate setae. All Colombian males carry 5 elements on the last segment of the endopod. Both small elements on the inner margin are definite setae because they are set
in notches on the edge. That condition was also noted by Wells (2007) regarding the illustrations of animals from Ecuador described by Löffler (1963).

Leg 5 (Fig. 23B): baseoendopods fused, anterior surface with row of spinules inserted as in figure, with 1 long outer seta and 2 inner bipinnate apical spines; exopod with 4 bipinnate setae, anterior surface with 5 spinules.

Legs 1–4 with following formula of spines and setae:

	Coxa	Basis	Exopod	Endopod
Leg 1	0,0	I,II-0; I-1;	I, I+1, 1	0-I; 0-1; 0, I+1, 1
Leg 2	0,0	I,0I-0; I-1;	III, I+1, 1	0-I; 0, 2, 1
Leg 3	0,0	1,01,0I-0; I-1;	III, I+1, 2	0-0; 0-0; 0, 2, 0
Leg 4	0,0	1+I,0I-0; I-1;	III, I+1, 2	0-I; I, 2, 2 (very small)

Leg 6 (Fig. 22B): represented by a small segment, bearing 3 setae, the innermost longer than the others and reaching the anal urosomite.

FIGURE 24. *Attheyella* (*Delachauxiella*) *freyi* Löffler, 1963. Male. A, leg 1; B, leg 2.

FIGURE 25. *Attheyella* (*Delachauxiella*) *freyi* Löffler, 1963. Male. A, leg 3; B, leg 4.

Variability of females. Females of the species from Ecuador and Colombia show more morphological variability than males, particularly in the ornamentation of body somites and in the chaetotaxy of legs. In all specimens the ventral rows of spinules at the genital double-somite and at the urosomites 3 and 4 have a midventral small or

large gap. The rows of spinules on the ventral surface of somites are generally double (but with different extension),
although in one specimen from Ecuador (NHMW 23592) the rows are simple. Genital double-somite and urosomite 3 and 4 always bear lateral row of spinules.
The dorsal rows of spinules show greater variability than the ventral rows. In general, the animals (4 specimens from Colombia, 9 from El Angel, 2 from Antisama) bear only a dorsolateral row of spinules, as illustrated in Figure 14A. Only two specimens from El Angel (NHMW 23592 and 22290) show dorsally complete rows of spinules on the genital double-somite and urosomite 4. Urosomite 3 shows a complete row in one of the latter specimens
(NHMW 23592) and shows a middle gap in the other one. Only one specimen from Colombia (animal used for SEM-photograph, Figure 15) bears dorsally row of spinules on the genital double-somite and on urosomites 3 and 4, all rows showing several gaps.
The chaetotaxy of legs is constant on the first, third and fifth legs, but variable on endopods of the second and fourth legs. Of the 4 Colombian specimens dissected, two bear 4 setae (NHMW 2518 and 25220), one bears 5 setae
(MNHN Cp-2301), and one (NHMW 25222) shows asymmetry, with 4 setae on the left endopod of leg 2 and 5 on the right one. Ten of eleven specimens of El Angel (Ecuador) bear 4 setae on the endopods of the second leg and one specimen (NHWW 23590) bears 5 setae on one leg and 4 on the other. Both specimens of Antisama (Ecuador)
bear 4 setae on endopods of the same leg. The chaetotaxy of the fourth legs is less variable: only one specimen from El Angel shows 5 setae on the left endopod and 6 setae on the right one (NHMW 23589), all remaining specimens
from Ecuador and all from Colombia bear 5 setae on these endopods.
Leg 5: there is no variability in the chaetotaxy of leg 5. The baseoendopod of Colombian females always bears 6 setae on its apical margin. Although the drawing of the female from Ecuador shows 5 setae (Löffler 1963), all studied syntypes of the locality El Angel bear 6 setae. The animal used by Löffler for his illustration probably has lost seta III. The place of insertion of the lost seta is clearly visible on the distal edge of the leg.
Length of Colombian females 588 – 756 μm (n=15). Length of Ecuadorian females 800 – 980 μm (n=13) (Löffler 1963).
Variability of males. Ornamentation of body somites and chaetotaxy of second swimming legs of Colombian and Ecuadorian specimens show morphological variability.
Urosomite 1, posterior margin smooth ventrally, whereas urosomites 2 to 4 are serrated (e.g. NHMW 25226) or smooth (Fig. 22B) (NHMW 25221). The same two types of ornamentation were observed in the Ecuadorian specimens (Löffler 1963).
Dorsal rows of spinules show great variability, as follows: 1) animals with urosomites 1 to 4 with discontinuous rows of spinules (Fig. 22A) (MNHN 2302), 2) animals with complete rows on urosomites 2 to 4 and no spines on urosomite 1 (NHMW 25226), 3) animals without spines on urosomites 1 to 3 and with a middle gap in the row on urosomite 4 (NHMW 25227) and 4) animals without spines on urosomites (NHMW 25223). Ecuadorian specimens
show any combination between complete dorsal rows (NHMW 23595, 23596) and a condition without spines (Löffler 1963). The ventral row of spines on urosomites also show variability: 1) animals with continuous rows on all urosomites (MNHN 2301, NHMW 25221), 2) animals with complete rows on urosomites 3 and 4 and two ventrolateral
gaps in the row on urosomite 2 (NHMW 25226) or a middle gap on the same urosomite (NHMW 25225) and 3) animals with urosomite 3 and 4 with ventrolateral gaps (NHMW 25226). In Ecuadorian specimens, most of those rows are complete (e.g. NHMW 22291, 23596), but they can be also incomplete with ventrolateral gaps (e.g.
NHMW 23595).
The number of ventral spines on the posterior margin of urosomite 5 varies in Colombian specimens from 4 (MNHN 2302, NHMW 25223, 25226) to 2 (NHMW 25221, 25225, 25227) on each side. In Ecuador, the illustrated
specimen (NHMW 23596) shows 3 spines on each side (Löffler, 1963).
Leg 2: the second endopod of most of the animals shows 3 setae on the last segment, but few specimens carry 4 setae: one specimen (NHMW 25226) bears an additional small seta inserted distally on the inner margin, and one
specimen (NHMW 25225) bears 3 seta on the left endopod and 4 on the right one. Within the three syntype males from Ecuador, two bear 3 setae and one animal bears 4 setae (Löffler 1963).
Length of Colombian males 493 – 588 μm (n=13); length of Ecuadorian males 540 – 700 μm (n=3) (Löffler 1963).

Distribution. Known only from Ecuador (Löffler 1963) and Colombia, inhabiting benthic habitats of water bodies in the "páramo" region, above 3000 m altitude.

Identification key for Colombian canthocamptids

Females

(female of *Elaphoidella radkei* unknown)

1. Leg 2, exopod last segment with 2 spines on outer margin . . . . . *Elaphoidella*… 3
- Leg 2, exopod last segment with 1 or 3 spines on outer margin 2
2. Legs 1 to 4 short; antenna, exopod very small, 1-segmented, with 2 slender setae . . . . . .*Epactophanes richardi*
- Legs 1 to 4 long; antenna, exopod with normal size, with 3 to 4 setae. . . . . .*Attheyella*…6
3. Legs 2 to 4, endopod last segment with 3, 5 and 4 setae respectively; anal operculum with edge smooth . *Elaphoidella suarezi*
- Legs 2 to 4, endopod last segment with 5, 6 and 4 setae respectively; anal operculum with edge ornamented. 4
4. Anal operculum long and strongly convex, extending to distal half of caudal rami. . . . . *Elaphoidella grandidieri*
- Anal operculum short and slightly convex, not reaching posterior edge of anal somite 5
5. Copulatory tube with conical neck; anal somite without ventral spines above each caudal ramus . . . . . .*Elaphoidella bidens*
- Copulatory tube with straight slender neck; anal somite with 1 ventral spine above each caudal ramus. . . . . .*Elaphoidella colombiana*
6. Leg 1, endopod 2-segmented; leg 5, exopod with 4 setae and 1 inner spine, spine short with accessory teeth (fused with spine) . . . . . *Attheyella* (*Canthosella*) *chocoensis* **n. sp.**
- Leg 1, endopod 3-segmented; leg 5, exopod with 4 or 5 setae 7
7. Leg 5, exopod with 4 setae or spines; anal operculum rounded, with long posterior arrow-head extension . . . . . *Attheyella* (*Delachauxiella*) *freyi*
- Leg 5, exopod with 5 setae or spines; anal operculum slightly convex, without posterior extension 8
8. Copulatory tube conical, with opening more than 2 times broader than base; leg 5, baseoendopod posterior surface without row of accessory spinules . . . . . *Attheyella* (*Chappuisiella*) *fuhrmanni*
- Copulatory tube almost rectangular, with opening less than 1.5 times broader than base; leg 5, baseoendopod posterior surface with row of accessory spinules near insertion of exopod . . . . . .*Attheyella* (*Chappuisiella*) *pichilafquensis*

Males

(male of *Elaphoidella suarezi* unknown, male of *Elaphoidella bidens* not existing (Wells 2007))

1. Leg 2, exopod last segment with 2 spines on outer margin . . . . . *Elaphoidella*… 3
- Leg 2, exopod last segment with 1 or 3 spines on outer margin 2
2. Leg 3, endopod 2-segmented, apical segment with apophysis on inner margin . . . . . .*Epactophanes richardi*
- Leg 3, endopod 3-segmented, second segment with apophysis on inner margin . . . . . .*Attheyella*…5
3. Anal operculum triangular, posterior edge with 4 strong teeth. . . . . *Elaphoidella grandidieri*
- Anal operculum convex, posterior edge with at least 8 teeth or spinules 4
4. Anal operculum, posterior edge with 8 teeth, outermost teeth at each side smaller than inner teeth; leg 4, exopod segment 3, outer margin with distal spine normal developed, apical margin with outer spine modified, short and stout, with outer teeth clawlike . . . . . *Elaphoidella radkei*
- Anal operculum, posterior edge with 18 to 20 spinules; leg 4, exopod segment 3, outer margin with proximal and distal spines modified, with strong accessory teeth (fused to spine), giving the spine an "antler-like" appearance…*Elaphoidella colombiana*
5. Leg 5, baseoendopod without inner distal setae or spines . . . . . *Attheyella* (*Canthosella*) *chocoensis* **n. sp**.
- Leg 5, baseoendopod with 2 inner distal spines 6
6. Leg 5, exopod with 4 setae or spines; anal operculum rounded, with long posterior arrow-head extension . . . . . *Attheyella* (*Delachauxiella*) *freyi*
- Leg 5, exopod with 5 setae or spines; anal operculum slightly convex, without posterior extension 7
7. Leg 4, exopod segment 3, outer spine of apical margin without or with at most 1 lateral tooth and 1 bifurcated terminal tooth, inner branch longer than outer branch. . . . . *Attheyella* (*Chappuisiella*) *fuhrmanni*
- Leg 4, exopod segment 3, outer spine of apical margin with 1 to 3 lateral teeth and 1 long simple terminal tooth (all teeth fused with spine) . . . . . .*Attheyella* (*Chappuisiella*) *pichilafquensis*

Conclusions

The known harpacticoid copepod fauna of Colombia has increased with the new record to 15 species. The genus *Attheyella* is now represented in Colombia by 3 subgenera, namely *Chappuisiella*, *Delachauxiella* and *Canthosella*. Nevertheless, the biodiversity of harpacticoids in the country is far from having been thoroughly investigated. For instance, two additional species with few animals were observed in the sample of the pond of Puracé. New samplings in this water body and in other cryptic sites such as phytotelmata, mosses, leaf litter and subterranean waters will no doubt yield new insights into this group.

Redescriptions of some species of the subgenus *Canthosella* such as *Attheyella* (*C.*) *vera* from Brazil, descriptions of males of *Attheyella* (*C.*) *kalima* from Suriname and *Attheyella* (*C.*) *pilagaensis* from Argentina as well as of the female of *Attheyella* (*C.*) *siolii* from Brazil could certainly help to clarify the taxonomy of the subgenus. Moreover, new descriptions are necessary to improve our knowledge of harpacticoid morphological structures. A case in point is the observation of the fan-like transformed spine described for the first time on the antenna of *A.* (*D.*) *freyi* and probably present in other species of the subgenus *Delachauxiella*.

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