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Original Article

New records of *Coronatella* (Crustacea, Branchiopoda, Chydoridae) from Colombia with the first report of Coronatella *undata* and of the male of *Coronatella monacantha*

Novos registros de *Coronatella* (Crustacea, Branchiopoda, Chydoridae) na Colômbia com o primeiro relato de *Coronatella undata* e o macho de *Coronatella monacantha*

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Abstract

Biological samples obtained from a small temporary pond of northern Colombia yielded the first record *Coronatella undata* Sousa, Elmoor-Loureiro and Santos, 2015 and of the male of *C. monacantha* (Sars, 1901) for Colombia. In this study, the morphology of female of *Coronatella undata* and female and male of *C. monacantha* was described and compared to other species within the genus. *C. undata* was originally described from Brazil and, among the species of the *Coronatella monacantha* complex, seems to be closely related to *C. acuticostata* (Sars, 1903). *C. undata* shows some similarities with *C. monacantha,* but it can be identified by important diagnostic characters such as: 1) posterior-ventral corner of valve with two denticles, 2) seta on exopodite of trunk limb II rudimentary, 3) filter comb of trunk limb II with six setae, 4) ODL seta of trunk limb I shorter than longest seta of IDL. *C. monacantha* is the most reported species in the Neotropical region and the male most resemble *C. paulinae* Sousa, Elmoor-Loureiro & Santos, 2015 in relation to (i), length/wide of postabdomen ratio (ii) basal spine almost straight and (iii)) long basal spine reaching the mid-length of basal spine. However, they can be separated by (i) number of lateral seta on the antennule, (ii) postanal angle, (iii) position of gonopore (iv) presence of a denticle on posterior-ventral corner of valve

Keywords: neotropical region, taxonomy, temporary pond, microcrustacean, Pivijay.

Resumo

Amostras biológicas obtidas de uma pequena lagoa temporária do norte da Colômbia proporcionaram o primeiro registro de *Coronatella undata* Sousa, Elmoor-Loureiro e Santos, 2015 e do macho de *Coronatella monacantha* (Sars, 1901) na Colômbia. Neste estudo, foi descrita a morfologia de fêmeas de *C. undata* e de fêmeas e machos de *C. monacantha*, comparando-a com outras espécies do gênero. *Coronatella undata* foi descrita originalmente no Brasil e, entre as espécies do complexo *C. monacantha*, parece estar intimamente relacionada com *Coronatella acuticostata* (Sars, 1903). *Coronatella undata* apresenta algumas semelhanças com *C. monacantha*, mas pode ser identificada por seus principais caracteres, tais como: 1) ângulo posterior ventral da valva com dois dentículos; 2) cerda rudimentar no exopodito do ramo do tronco II; 3) filtro da gnatobase do apêndice torácico II com seis cerdas; 4) cerda ODL do membro do tronco I mais curta que a cerda mais longa do IDL. *Coronatella monacantha* é a espécie mais relatada na região neotropical, e o macho se assemelha mais a *Coronatella paulinae* Sousa, Elmoor-Loureiro & Santos em relação à/ao: (i) razão comprimento / largura do pós-abdômen, (ii) espinho basal quase reto e (iii) espinho basal longo com a metade do comprimento do espinho basal. No entanto, eles podem ser separados pelo/pela: (i) número de cerdas laterais na antênula, (ii) ângulo postanal, (iii) posição do gonóporo e (iv) presença de dentículo no canto ventral posterior da valva.

Palavras-chave: Região neotropical, taxonomia, lagoa temporária, microcrustáceo, Pivijay.

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1. Introduction

The genus *Coronatella* was created by Dybowsky & Grochowski, 1894 to allocate *Alona coronata* Kurz, 1875 (Van Damme and Dumont, 2008a). Nevertheless, the name of *Coronatella* fell into disuse because posteriorly *A. coronata* Kurz, 1875 was considered an *Alona* member (Smirnov, 1971; Korovchinsky and Kotov, 2021). Now, *A. coronata* is the junior synonym of *Alona rectangula* Sars, 1862, this taxon being the type species of *Coronatella*. Later, *Coronatella* was revalidated again by Van Damme and Dumont (2008b) to allocate *Alona rectangula*, *A. holdeni* Green, 1952, *Coronatella anemae* Van Damme & Dumont, 2008 and several other taxa which needs revision (Van Damme et al., 2010).

The genus *Coronatella* has a worldwide distribution (Sinev, 2020) with records in Africa, Asia, South America, Central America, North America, and Europe (Van Damme and Dumont, 2008b; Van Damme et al., 2010; Van Damme, 2016). Members of this genus inhabits chiefly all type of freshwater bodies, such as: lakes, rivers, swamps, temporary ponds (Fuentes-Reinés and Zoppi de Roa, 2013; Sousa et al., 2015), and some species - e.g. *C. rectangula* - can tolerate a wide range of salinity and *C. salina* Alonso, 1996 is adapted to saline to hyperhaline waters (Van Damme and Dumont, 2008a; Sinev et al., 2009; Sinev, 2020). Further advances on the systematics of the genus led Sinev (2020) to divide it in two subgenera: *Coronatella* s. str. and *Coronatella* (*Ephemeralona*), and he recognized distinct species-groups in the former subgenus such as: *monacantha*-group, and *circumfimbriata*-group, *rectangula*-group and *trachystriata*-group.

Currently, we know that *Coronatella* is the most speciose genus in the subfamily Aloninae with 22 valid species (Korovchinsky and Kotov, 2021; Sinev, 2020), and only six of them have been recorded from America: *C. poppei* (Richard, 1897), *C. monacantha*, *C. circumfimbriata,* Megard, 1967 (and a similar taxon waiting for description in Andean Chile), *C. paulinae* Sousa, Elmoor-Loureiro and Santos, 2015, *C. serratalhadensis* Sousa, Elmoor-Loureiro and Santos, 2015, *C. undata*. Within these species, hitherto, only *C. monacantha* has been recorded in Colombia from Ciénaga Grande de Santa Marta (Fuentes-Reinés and Zoppi de Roa, 2013).

During a survey of the plankton community of a temporary pond at Pivijay, Magdalena-Colombia, were collected specimens of *Coronatella monacantha* and *C. undata*. In this work, we report for the first time the occurrence of *C. undata* for Colombia and expand the characterization of *C. monacantha,* providing the description of the male. Moreover, we present a brief diagnosis of the parthenogenetic females in order to support the identification of found specimens.

2. Materials and Methods

Plankton samples were collected from a small temporary pond, located at the town of Pivijay, Departamento del Magdalena, Colombia (10°27'10.93"N, 74°23'33.16"W) in November 2020, mainly in the littoral areas with aquatic vegetation (macrophytes). Environmental parameters were measured with a WTW 3111 conductivity meter gear. Biological samples were taken with a 25 L bucket within the vegetation area until filtering 175 L. Samples were filtered with a zooplankton net (mesh size 55 µm) and then preserved in 96% ethanol with previous addition of carbon dioxide from soda water as narcotic.

In the laboratory, samples were stained with Bengal rose and concentrated to 50 mL volume. A Bogorov chamber was used to sort and count cladocerans, with the aid of a stereomicroscope and then processed for taxonomical identification. Specimens were measured in lateral position, from the anterior end of the head to the posterior margin of carapace, and dissected to examine the taxonomically relevant appendages. Dissected specimens and appendages were mounted in glycerine and sealed with Canada balsam. The appendages with taxonomic relevance were photographed using a Kodak Easy Share C140 digital camera adapted to a compound microscope at 1000× magnification. Identifications of these species were made according to Sinev (2004) and Sousa et al. (2015, 2016b). The dissected animals (slides) were deposited at the Centro de Colecciones Biológicas held at the Universidad del Magdalena, Colombia (CBUMAG) where they are available for consultation and/ for further examination.

3. Results

3.1. Taxonomy

Class Branchiopoda Latreille, 1817

Order Anomopoda Sars, 1865

Family Chydoridae Dybowsky & Grochowski, 1894 *emend*. Frey, 1967

Subfamily Aloninae Dybowsky & Grochowski, 1894 *emend*. Frey, 1967

Genus *Coronatella* Dybowsky & Grochowski, 1894

Coronatella undata Sousa, Elmoor-Loureiro & Santos, 2015

Figures 1A-2D

Material examined two parthenogenetic females from a small temporary pond, Pivijay, Magdalena, Colombia (10°27'10.93"N; 74°23'33.16"W). Material collected on February 2020 (accession number: CBUMAG:MEI:0834-0840).

3.2. Diagnosis parthenogenetic female

The specimens from Colombia share the diagnostic features from specimens of *Coronatella undata* previously reported from Brazil (Sousa et al., 2015). Body oval-rectangular (Figure 1A), small animal-sized, with length ranging 224-249 µm (n =2, average = 236 µm), length /height ratio about 1.44. Valves arched anteriorly and striated, posteroventral corner with two denticles (Figure 1G), followed by spinules not arranged in groups. Rostrum short, blunt and projected downward, ocellus smaller than eye, antennules not exceeding the tip of rostrum (Figure 1B). Head shield with three main connected head pores, middle one being the smallest (Figure 1C); IP/PP ratio

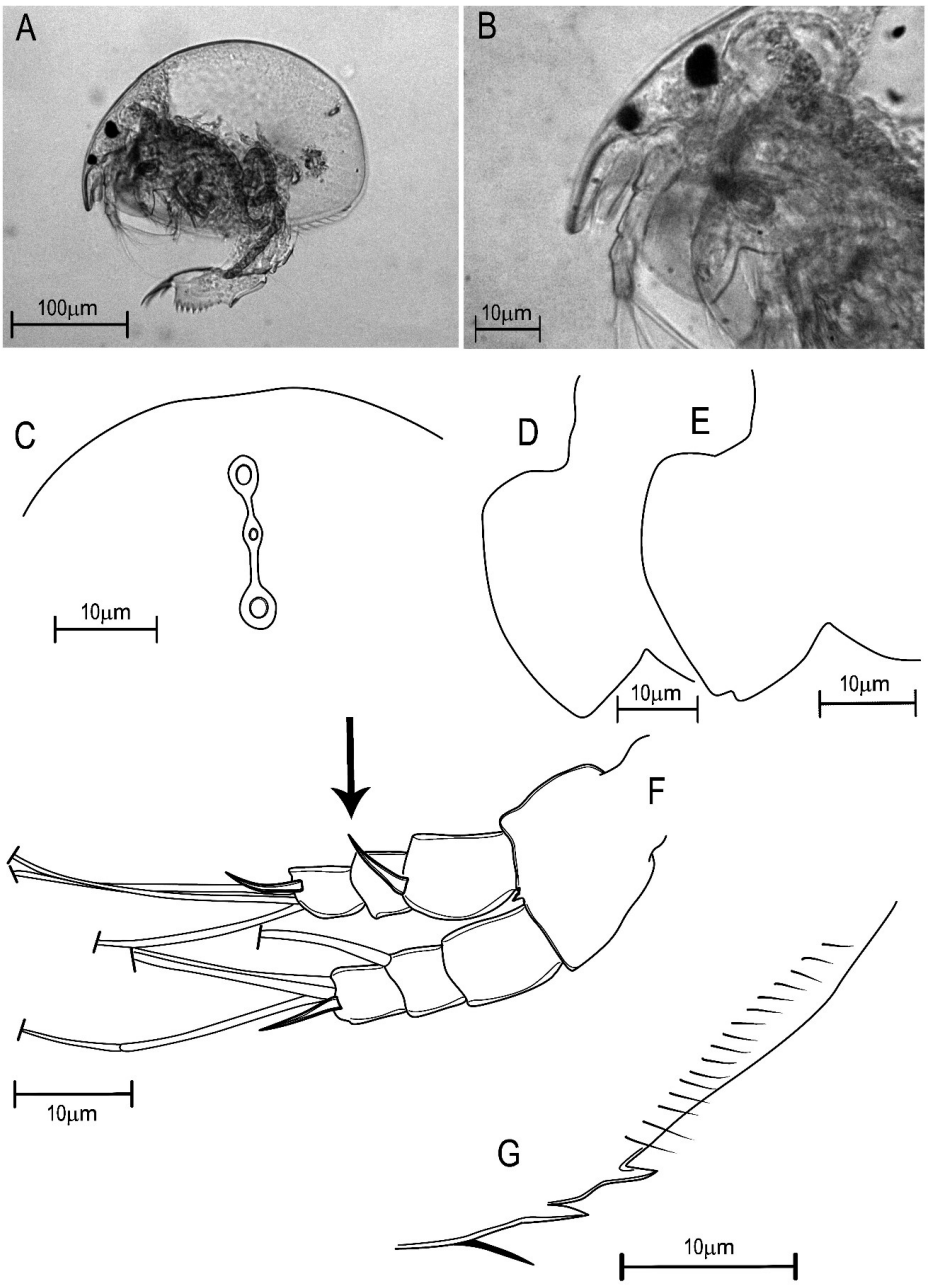

Figure 1. *Coronatella undata* Sousa, Elmoor-Loureiro and Santos, 2015, parthenogenetic female from a temporary pond in Pivijay, Magdalena-Colombia. (A) Habitus; (B) Rostrum; (C) Head pores; (D, E) Labrum of 2 different females; (F) Antenna (seta on the first segment of exopodite not shown); (G) Posterior-ventral corner of valve.

about 3.1. Labrum triangular, labral keel without denticles or ornamentation (Figures 1D-E). Antenna setal formula: 1-1-3/0-0-3., (seta on the first segment of exopodite not represented in the figure), spine on the first endopodal segment thick about 1.4 longer than the second segment (arrow, Figure 1F). Postabdomen short, length/height ratio about 2.7 times (Figure 2A), preanal margin about 1.87 and 1.5 longer than anal and postanal margins, respectively. Postanal part with 7 denticles and 5 lateral fascicules. Postabdominal claw about 1.66 longer than the anal margin, basal spine about two times as long as claw width at base, reaching half of postabdominal claw length (Figure 2B). IDL of trunk limb I with two unequal setae armed with strong and long spines (Figure 2C). ODL with a seta shorter than longest IDL seta (Figure 2C). Trunk limb II with a rudimentary seta on exopodite (arrow, Figure 2D), inner portion with eight scrapers gradually decreasing in size towards gnathobase, eighth scraper shortest, gnathobase

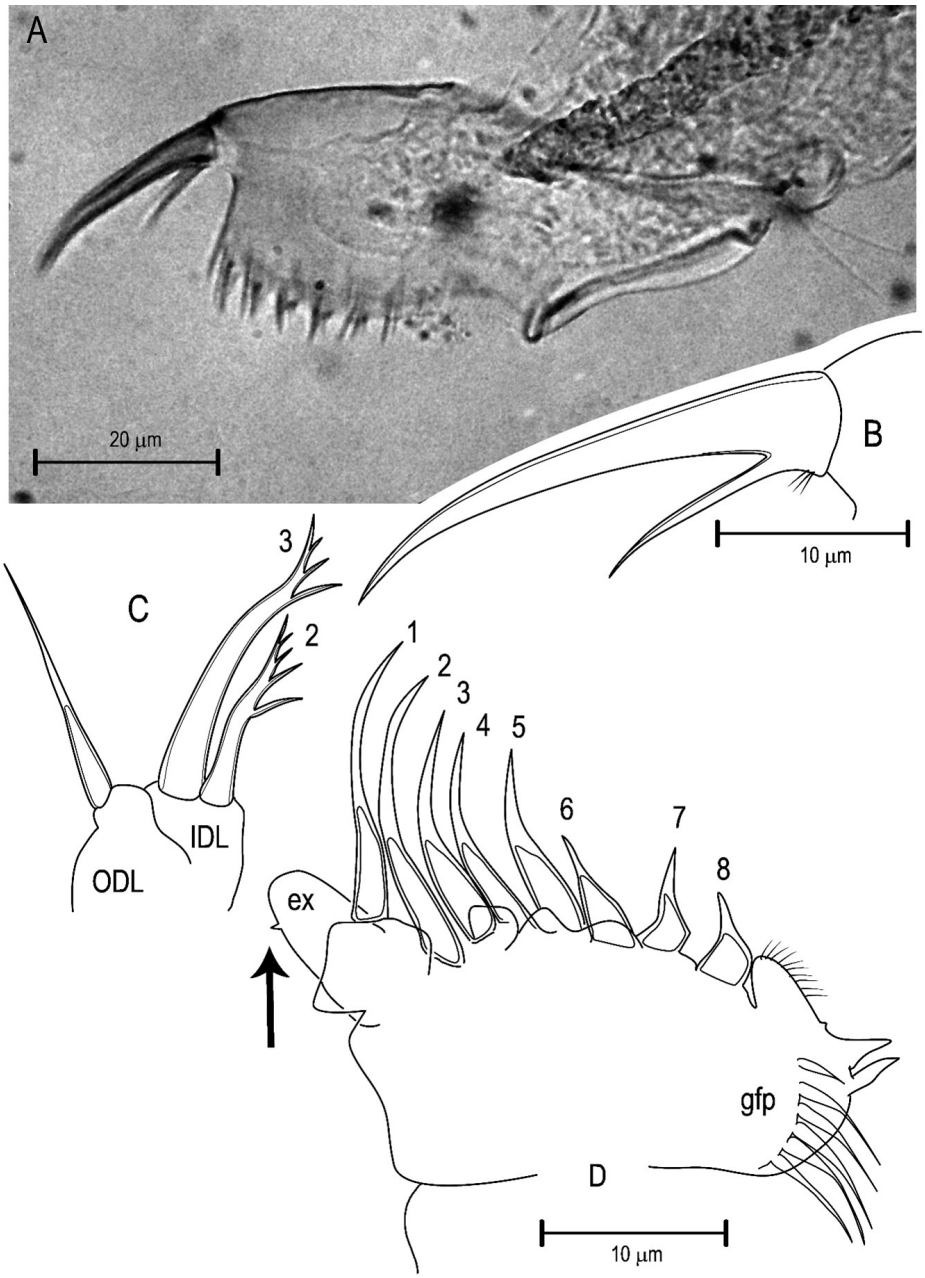

Figure 2. *Coronatella undata* Sousa, Elmoor-Loureiro and Santos, 2015, parthenogenetic female from a temporary pond in Pivijay, Magdalena-Colombia. (A) Postabdomen; (B) Postabdominal claw; (C) IDL and ODL of Limb I; (D) Limb II, gfp = gnathobase filter plate, number 1-8 = scrapers.

with three modified elements, filter comb with six setae, the first one shorter than the other (Figure 2D).

Morphological variability: One female presented a notch at the apex of the labrum (Figure 1E)

Male: unknown

Coronatella monacantha (Sars, 1901)

Figures 3A-4G

= *Alona monacantha* in Sinev, 2004; Fuentes-Reinés and Zoppi de Roa, 2013.

Material examined: Two parthenogenetic females (CBUMAG:MEI:0852) and two males (CBUMAG:MEI:0841-0846) from a small temporary pond, Pivijay, Magdalena, Colombia (10°27'10.93"N; 74°23'33.16"W). Material collected on February 2020.

3.3. Diagnosis of parthenogenetic female

Body oval-rectangular (Figure 3A), small animal-sized, body length ranging 252-280 µm (n =5, average = 268 µm).

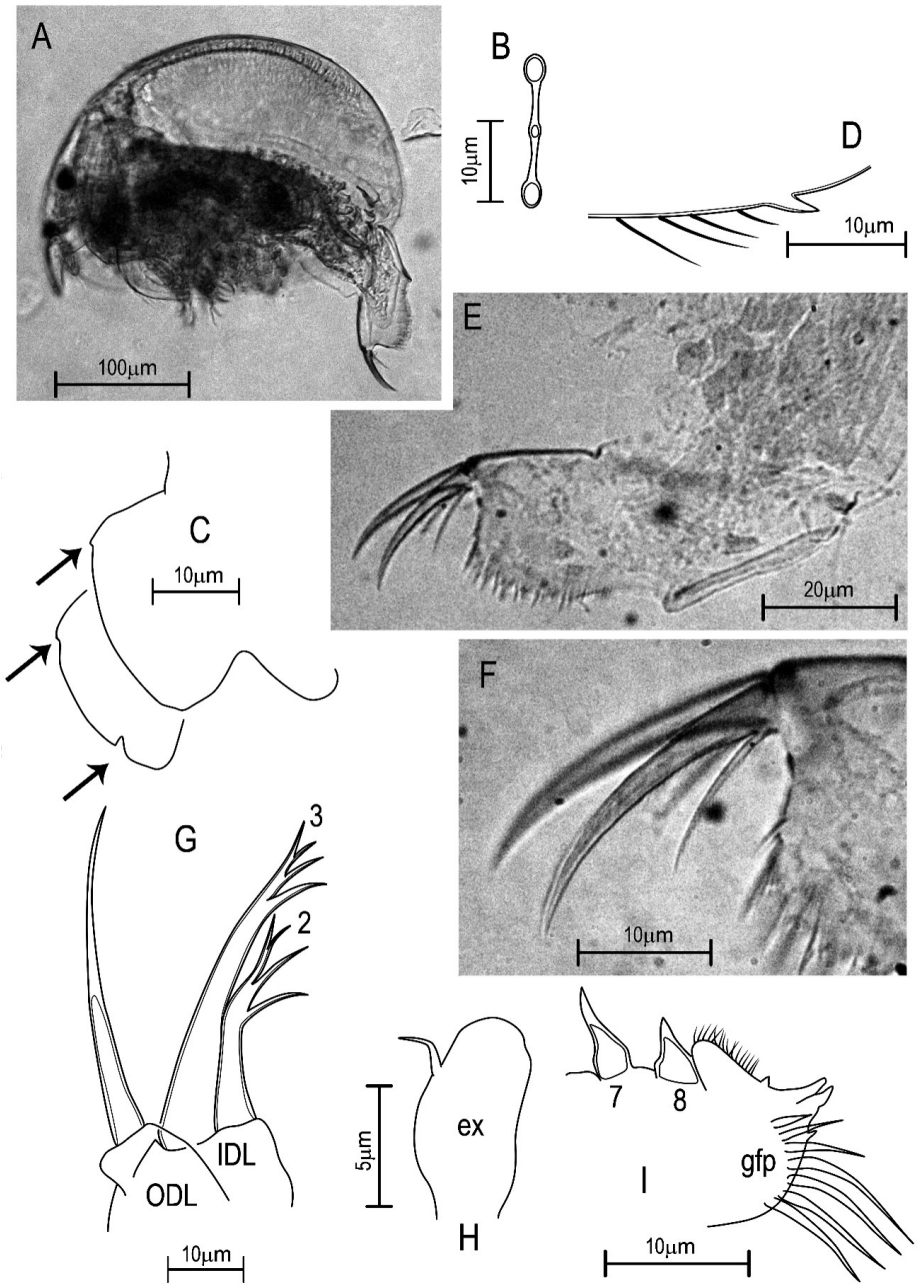

Figure 3. *Coronatella monacantha* (Sars, 1901), parthenogenetic female from a temporary pond in Pivijay, Magdalena-Colombia. (A) Habitus; (B) Head pores; (C) Labrum, arrow indicates tiny denticle; (D) Posterior-ventral corner of valve; (E) Postabdomen; (F) Postabdominal claw; (G) IDL and ODL of limb I; (H) Expodite of limb II; (I) Filter comb of limb II, exp = exopodite, gfp = gnathobase filter plate.

Body 1.5 times as long as high. Valves arched anteriorly and striated, posteroventral corner with one denticle (Figure 3D), followed anteriorly by spinules arranged in groups. Head shield with three main connected head pores, the middle one being the smallest (Figure 3B); IP/PP ratio about 2.1. Labrum triangular, labral keel with tiny denticle (Figure 3C). Rostrum, antennule and antenna as *C. undata*. Postabdomen short, length/ height ratio about 2.4 times (Figure 3E), preanal margin about 1.95 longer than both anal and postanal margin respectively; postanal part with 7 denticles and 6-8 lateral fascicules. Postabdominal claw about 1.5 longer than the anal margin, base armed with setules; basal spines about two times as long as claw width at base, reaching half of postabdominal claw length (Figure 3F). IDL of trunk limb I with two unequal setae armed with strong and long spines (Figure 3G). ODL with a seta longer than longest IDL seta (Figure 3G). Exopodite of trunk limb II with a seta about 1/3 of the exopodite length

(Figure 3H); inner margin as in *C. undata*; gnathobase with three modified elements, filter comb with seven setae, the first one being the shortest (Figure 3I).

Morphological variability: One female showed a notch on labral keel, at 1/3 from the apex (arrow in Figure 3C).

3.4. Description of male

Habitus. Body rectangular, smaller than female (Figure 4A), total length 224 µm (n = 2). Rostrum as in female, ocellus 1.6 larger than the eye. Carapace with striation, postero-ventral corner of the valves as in females, with a denticle (Figure 4D). Antennules not exceeding the tip of the rostrum (Figure 4A), with nine aesthetascs of different length at the apical margin (four aesthetascs were not illustrated), with two lateral sensory setae; antennule of one male carries a short seta inserted at the distal third of the inner margin (Figure 4B). Antenna as in female. Labrum triangular shaped, labral keel with a tiny

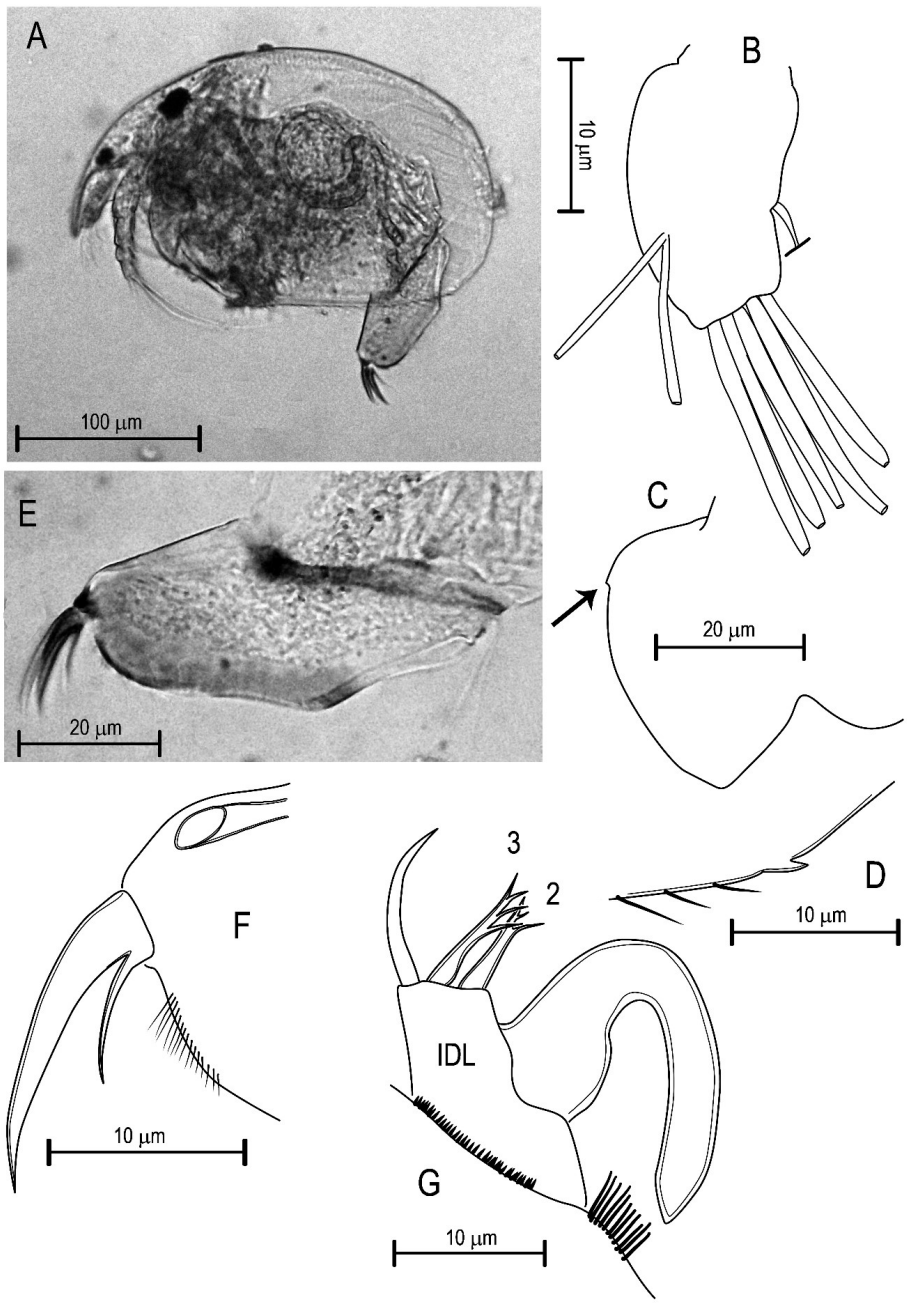

Figure 4. *Coronatella monacantha* male (Sars, 1901) from a temporary pond in Pivijay, Magdalena-Colombia. (A) Habitus; (B) Antennule; (C) Labrum (arrow indicates tiny denticle); (D) Posterior ventral corner of valve; (E) Postabdomen; (F) Postabdominal claw; (G) IDL and ODL of limb I.

denticle (Figure 4C). Postabdomen smaller than female (Figure 4E), tapering distally, about 2.26 times as long as height; preanal angle well defined, anal margin two times longer than postanal margin; postanal margin armed with small distal setulae (Figure 4F) and six small groups of fascicles. Postabdominal claw long (Figures 4E, 4F), about 2 times as long as the basal spine and as long as the anal margin; basal spines slender and slightly curved near the tip (Figure 4F), longer than the mid-length of the postabdominal claw; gonopores situated ventrally to the postabdominal claw base.

Trunk limb I (Figure 4G), proportionally smaller than on female, copulatory hook U-shaped, arms relatively similar in length, copulatory brush present, IDL with two setae (2-3) of different length and armed with short spines; male seta similar in length to the smallest IDL seta; ODL seta about 1.5 longer than IDL seta.

Habitat. The temporary pond "El Paraiso" is a shallow waterbody (depth 1.5-3m). Both species *Coronatella undata* and *C. monacantha* were found among aquatic vegetation. Water chemistry at sampling time: temperature 28.8°C, pH value 6.3, conductivity 95 µS·cm-1, dissolved oxygen 0.72 mg/mL, phosphate 350 µg/L, and nitrite 0.5 mg/L

4. Discussion

Coronatella undata is included in the subgenus *Coronatella* and belongs to the *C. monacantha*-complex which comprises at least another Neotropical species (i.e., *C. monacantha* Sars, 1901), one Afrotropical (*C. hadingi*, Brehm, 1957) and one Oriental species (*C. acuticostata* Sars, 1903) (Van Damme, 2016). Among the species of the *Coronatella monacantha* complex, *C. undata* seems to be closely related to *C. acuticostata* sharing the presence of two denticles on posterior-ventral corner of the valve, ODL seta shorter than longest IDL seta, and similar length of the basal spine, but they can be separated by (i) labral keel with denticle in *C. acutiscostata* while in *C. undata* without denticle, (ii) shorter IDL seta with two thin spines in *C. acutiscostata* vs. three thick spines in *C. undata,* (iii) and postanal margin wider in *C. undata* than in *C. acutiscostata.*

In the Neotropical region, *C. undata* can be confused with its congener *Coronatella monacantha,* but they can be distinguished by 1) the presence of two denticles in the posterior ventral corner of the valve in *C. undata* (Sousa et al., 2015, figs 9B, C, 12L; present data, fig. 1G) vs. one denticle in *C. monacantha* (Sinev, 2004, fig 5; Fuentes-Reinés and Zoppi de Roa, 2013, fig 12 D; Sousa et al., 2015, fig. 11K; present data, fig. 3E), 2) limb I with ODL seta shorter than the longest IDL seta of trunk limb I in *C. undata* (Sousa et al., 2015, figs 10B, C; present data, fig. 2C) whereas in *C. monacantha* it is longer (Sinev, 2004 fig 15, present data, fig. 3H), 3) trunk limb II with seta on exopodite rudimentary in *C. undata* (Sousa et al., 2015, Fig. 10E, present data, fig. 1D) whereas in *C. monacantha* reach about 1/3 length exopodite itself (Sinev, 2004, fig 18, present data, fig. 3H), 4) filter comb of trunk limb II with six seta in *C. undata* (Sousa et al., 2015, fig. 10D; present data, fig. 2D) vs. seven in *C. monacantha* (Sinev, 2004, fig. 17, present data, fig. 3J), 5) spinules on posterior ventral corner of valve not arranged in group in *C. undata* (Sousa et al., 2015, figs 9; present data, fig. 1G) vs. the opposite condition is presented in *C. monacantha* (Sinev, 2004, figs. 5, 6), 6) labral keel often with denticles in *C. monacantha* (Sinev, 2004, fig. 11, Fuentes-Reinés and Zoppi de Roa, 2013, fig. 12B, Sousa et al., 2015, figs. 11E, F) whereas in *C. undata* without denticles (Sousa et al., 2015, figs. 9G, H, present data, figs. 1D,E)

Coronatella undata can be easily identified by its important diagnostic characters such as: 1) posterior-ventral corner of valve with two denticles, 2) exopodite of trunk limb II with rudimentary seta, 3) filter comb of trunk limb II with six setae, 4) seta of ODL of trunk limb I shorter than the longest seta of IDL. These distinctive traits are present in the specimens from Colombia. However some subtle differences were observed in our specimens, 1) length ratio of spine on first endopodal segment/second endopodal segment about 1.4 in the Colombia specimens vs. 1.3 in the Brazilian populations (Sousa et al., 2015, fig. 9J), 2) labral keel not wavy in the Colombia specimens vs. wavy in Brazilian populations (Sousa et al., 2015, figs. 9G, H), 3) length ratio IP/PP about 2.0-3.6 in Brazilian populations vs 3.1 in Colombian specimens. *Coronatella* constitutes a genus in which are frequent intra- (e.g., *C. anemae*) as well as interspecific (e.g., *C. holdeni*) morphological variability (Van Damme and Dumont, 2008b), therefore, we do not consider such differences as signs of a separate status of the Colombia populations.

C. monacantha seems to be the most reported species of the genus in the Neotropical region since it has been recorded in Colombia (Fuentes-Reinés and Zoppi de Roa, 2013, present data), Brazil (Sousa et al., 2015), Argentina and Paraguay (Debastiani-Júnior et al., 2015). Some morphological variability has been reported for this species, such as the labrum with or without denticle, the size of denticle on the posteroventral corner of the valve, size of limb V, position of the lateral head pores (Sinev, 2004; Sousa et al., 2015). Nevertheless, there are some consistent characters that can be useful and easy to identify in parthenogenetic females of *C. monacantha*, such as: (i) the presence of a denticle on the posteroventral corner of the valve, (ii) ODL seta longer than longest IDL seta, and (iii) exopodite length seta ratio about 1/3 the length of exopodite itself and (iv) PP/IP ratio about 2-2.1

Among the males of subgenus *Coronatella*, *C. monacantha* most resemble *C. paulinae* when observing (i), the radio length/wide of the postabdomen (ii) basal spine almost straight and (iii)) length of basal spine reaching the mid-length of postabdominal claw. However, they can be separated by (i) antennule with one lateral seta in *C. paulinae* (Sousa et al., 2016a, fig. 3) vs. two setae in *C. monacantha* (present data, fig 4B), (ii) postanal angle well expressed or defined in *C. paulinae* (Sousa et al., 2016a, figs 5, 6) vs. not expressed in *C. monacantha* (present data, fig 4E), (iii) gonopores opened in ventral base of postabdominal claws in *C. monacantha* (Present data, Fig. 4E), whereas in *C. paulinae* the gonopores are located far from the base (Sousa et al., 2016a, Fig 5, 6), and (iv) posterior-ventral of valve without denticle in *C. paulinae* (Sousa et al., 2016a, fig. 2) vs. with one denticle in *C. monacantha* (present data, Fig 4D). Comparison with other known males of subgenus *Coronatella,* see Table 1.

Table 1. Morphological character of selected males of genus *Coronatella*

Characters	*monacantha*	*paulinae.*	*anemae*	*rectangula*	*circumfibriata*	*poppei*	*hardingi*	*bukobensis*	*begoniae*	*novae-zealandiae*
Postabdomen elongated, about 3-3.3 times longer than its height	no	no	yes	no	no	no	no	no	no	no
Gonopore overhangs the distal ventral portion of postabdomen	yes	no	yes	no	no	no	yes	no	no	no
Basal spine slightly curved or curved	yes	yes	no	no	no	yes	no	yes	no	
Basal spine longer than the mid-length of postadominal claw	yes	yes	no	no	no	yes	no	no	no	
Length of basal spine/ length of postabominal claw	about 0.58	about 0.47	0.3	0.27	about 0.3	about 0.57	0.18	0.36-0.4	0.32-0.4	
Postanal angle well defined/expressed	no	yes	no	no	no	no	no	no	no	no
Length of postanal margin/length of anus ratio	1.23	0.89		1.2	0.75	1.17	____	0.9	0.74	0.84
Length/ height of postabdomen ratio	2.3	2.4	3.3	1.76	2.6	2.6	2.6	2.64	2.6	2.7

In other hand, among males of the subgenus *Ephemeralona*, *Coronatella monacantha* seems to be closely similar to *C. elegans elegans* Kurtz, 1875 both bearing two lateral setae on the antennule and same form of postabdomen, but they can be distinguished by (i) postabdominal claw/anal margin ratio about 1.16 in *C. monacantha* (present data, fig 4E) vs. 1.6-1.7 in *C. elegans elegans* (Kurz, 1875) (Sinev, 2020, Fig. 3J), (ii) distal ventral portion of postabdomen straight in *C. elegans elegans* (Sinev, 2020, Fig. 3J), vs. curved in *C. monacantha* (present data, fig 4E).

The genus *Coronatella* seems close to genera *Anthalona* Van Damme, Sinev & Dumont, 2011 and *Magnospina* Sousa, Elmoor-Loureiro & Santos, sharing a similar postabdomen and in the reduction of the limbs (Van Damme and Dumont, 2008b, Van Damme et al., 2011). When comparing the male of *C. monacantha* with the males of the latter genera, they are also alike by possessing a naked male seta and two modified setae on the IDL of limb I; nevertheless they differ by (i) antennules with two lateral setae in *C. monacantha* (present data, fig. 4B) and *Magnospina* (Sousa et al., 2016b, Fig 28) vs. one lateral seta in *Anthalona* (Alonso, 1996, Fig 141O, Sinev and Hollwedel, 2002, Fig. 10, Van Damme et al., 2011, Fig. 15D), (ii) basal spine long, about half-length of postabdominal claw in *C. monacantha* (present data, figs. 4E,F) and *Magnospina* (Sousa et al., 2016b, Fig. 30) vs. short in *Anthalona* (Alonso, 1996, fig 141R, Sinev and Hollwedel, 2002, Fig. 9, Van Damme et al., 2011, figs. 6B,C, 15B,C; 23B), (iii) distalmost spine in each lateral fascicle on postabdomen reaching beyond dorsal margin of postabdomen in *Anthalona* (Alonso, 1996, Fig 141R, Sinev and Hollwedel, 2002, fig. 9, Van Damme et al., 2011, Fig. 6B,C, 15B,C; 23B) whereas in *C. monacantha* and *Magnospina* (Sousa et al, 2016b, fig 30) the distal spine of lateral fascicles do not reach beyond the margin of postabdomen, (iv) gonopore position is at the base of postabdominal claw in *Magnospina* (Sousa et al., 2016b, fig 30) while in *C. monacantha* (present data, fig. 4E) and *Anthalona* (Alonso, 1996, Fig. 141R, Sinev and Hollwedel, 2002, Fig. 9, Van Damme et al., 2011, figs 6B,C, 15B,C; 23B) is above the projection for claw insertion.

Cladocerans are microcrustaceans that exhibit a wide range of plasticity (Miyakawa et al., 2013), therefore, it is not surprising the high variability observed in morphological structures in the genus *Coronatella*. Hence, their identification is not an easy task, likewise, some members of this group can form species complexes - e.g., *rectangula* group-complex, *monocantha* group-complex, etc. - that make more difficult the identification. However, the *Coronatela* male provides important characters - e.g.

the postabdomen- which is a potential structure that allow to distinguish among *Coronatella* species (Sousa et al., 2015). This fact has also been observed in others group of cladocerans (Korovchinsky and Sheveleva, 2009, Kotov and Fuentes-Reinés, 2015; Kotov, 2015).

Such morphological variabilities in microcrustaceans have been few investigated (Korovchinsky, 1997). In cladocerans, these variations have been associated with abiotic and biotic factors (Havens and Beaver, 2011). However, these factors have not been properly researched (Sousa et al., 2011).

The values of environmental variables measured in the temporary pond of Pivijay, suggest that this waterbody presents eutrophic conditions. This fact could possibly be influencing the cladoceran populations. An eutrophic waterbody could induce morphological changes in cladocerans. For instance, it has been observed in *Bosmina freyi* a wide variation in body size and length of antennules and mucron probably due to abiotic factors like both high temperature and concentration of nutrients (López-Cardona et al., 2021), but further research should be done in order to clarify this statement.

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