



## Annotated checklist and new records of Cladocera from the Ciénaga El Convento, Atlántico-Colombia

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**Abstract:** Thirteen species of cladoceran are reported from Ciénaga El Convento, Atlántico, Colombia. Zooplankton samples were collected from the littoral zone with vegetation (macrophytes) and open water. Most of these species were recorded in the macrophytes-related area. One of them: *Ceriodaphnia silvestrii*, Daday 1902 is new to the Colombian cladoceran fauna; comparative morphological comments and illustrations of this species are also provided. This is the second report on the cladoceran fauna in this hydrological system. Comments on the morphology and photographs of selected species are provided.

**Key words:** taxonomy, Neotropic, distribution

**Resumen:** Lista comentada y nuevos registros de Cladocera de la Ciénaga El Convento, Atlántico-Colombia. Trece especies de cladóceros son reportados de la Ciénaga El Convento, Atlántico, Colombia. Las muestras de Zooplancton fueron recolectadas de la zona litoral con vegetación (macrófitas) y aguas abiertas. La mayoría de estas especies fueron reportadas en el área relacionada a macrófitas. Uno de ellos: *Ceriodaphnia silvestrii*, Daday 1902 es nuevo para la fauna de cladóceros de Colombia; comentarios comparativos morfológicos e ilustraciones de esta especie son también suministradas. Este es el segundo reporte sobre la fauna de cladóceros en este sistema hidrológico. Comentarios sobre la morfología y fotografías de especies seleccionadas son suministrados.

**Palabras clave:** taxonomía, Neotrópico, distribución

### Introduction

The Ciénaga El Convento is a freshwater system, located at Atlántico Department to the north of Colombia. This Ciénaga covers approximately a surface of 250 Ha and together with Ciénaga de Malambo and Ciénaga de Sabanalarga constitute the Lagoon complex of Malambo. Up to now, only one record of cladoceran has been reported in this system (Fuentes-Reinés 2014b).

The cladocerans are consumers, like other zooplankton organisms and play an important role in the trophic webs, transferring energy from the

primary producers (phytoplankton) until secondary consumers (fish) (Melão *et al.* 2005).

The knowledge on the diversity of this group is still lagging in the entire Peri-Caribbean region of Colombia. Nevertheless, in the last four years, some studies have been carried out in this region (Fuentes-Reinés & Elmoor-Loureiro 2011, Fuentes-Reinés *et al.* 2012, Fuentes-Reinés & Zoppi de Roa 2013, Kotov & Fuentes-Reinés 2014, Fuentes-Reinés 2014a, Fuentes-Reinés 2014b, Fuentes-Reinés 2014c).

Taxonomic studies on cladoceran fauna in the Atlántico Department are scarce (Stingelin 1913,

Brehm 1956, Fuentes-Reinés 2014b). This study aims to investigate the cladoceran fauna of the Ciénaga El Convento, provide descriptions and appropriate illustrations of some remarkable taxa and improve our knowledge on the distribution of some cladoceran species in Colombia.

### Material and methods

Plankton samples were monthly taken from the Ciénaga El Convento Atlántico Department, Colombia (10° 38'N; 74° 55'W), between June and November 2014, mainly in the macrophyte zone, but also in the open water, using a bucket of 25 L at both vegetation areas and shallow open water. All samples were filtered through a zooplankton net (45 µm) and preserved in 70% ethanol. In the laboratory, specimens were selected from samples under a binocular stereoscopic microscope, and studied under a compound optical microscope in a drop of a glycerol-formaldehyde mixture *in toto*. Images were taken using a Kodak Easy Share C140 digital camera attached to a compound Olympus CX22 microscope. The specimens were measured in lateral position, from the anterior end of the rostral area to the posterior margin of the valve. Identifications were according to Elmoor-Loureiro (1997) and Elías-Gutiérrez *et al.* (2008). The specimens examined were deposited at the Museo de Colecciones Biológicas at the Universidad del Atlántico (UARC), Colombia.

### Results

The taxonomical analysis of the cladocerans collected yielded the identification of 13 species. Of these, 12 are new records for the Ciénaga El Convento. They belong to five families and ten genera (Table I). The family Chydoridae exhibited the highest species richness (4), followed by Moinidae (3), Sididae, Daphniidae and Macrothricidae (2). Brief remarks and descriptions, with illustrations, for the relevant species are given below.

Family SIDIDAE Baird, 1850

Genus *Latonopsis* Sars, 1888

***Latonopsis australis*-group.**

*Synonymy*: Korovchinsky (1992).

*Material examined*: 10 adult females, catalog number: UARC237M

*Remarks*. The specimens were collected within macrophytes and open water from July to September. The body is ovoid (Figure 1A), and *L.*

*australis* can be separated from its congeners by: 1) postabdomen with small 7-9 teeth closer to distal end, 2) postabdominal claw with two basal spines, 3) three long naked setae on the postero ventral corner of the valve (Figure 1B). This species was first described from Australia by Sars (1888), and it has been reported in all continents; it possible constitutes a complex species (Elías-Gutiérrez *et al.* 2008), therefore this genus urges to be revised. Body length is between 784-812 µm.

Genus *Diaphanosoma* Fischer, 1850

***Diaphanosoma brevireme* Sars, 1901**

*Synonymy*. Fuentes-Reinés *et al.* (2012):128, fig. 7; Kotov *et al.* (2013a):14.

*Material examined*: 5 adult females, catalog number: UARC241M

*Remarks*. This species was collected within macrophytes and open water during August.

The Body is ovoid (Figure 1D); in the neotropics, *D. brevireme* can be separated from its congeners by the folded ventral margin and denticles on postero-ventral valve margin which decrease proximally (Figure 1E). Body length is between 602- 644 µm.

Family DAPHNIIDAE Straus, 1820

Genus *Ceriodaphnia* Dana, 1853

***Ceriodaphnia cornuta* Sars, 1885**

*Synonymy*. Fuentes-Reinés *et al.* (2012):128, fig. 7; Kotov *et al.* (2013a):14.

*Material examined*: 25 adult females, catalog number: UARC239M

*Remarks*. This species was collected among macrophytes and open water during July, August and November, being more abundant in latter (rainy season). Body is oval (Figure 1F), this species can be presented in two forms (Figures 2A-B). One possesses horns on the head, fornix and posterior part of valve, while others do not have this specialized structure (Zaret 1969). This variability seems to be related to predation (Rietzler *et al.* 2008). On the other hand, such variability also could be related to existence of cryptic species. *Ceriodaphnia cornuta* was described from Australia and has been reported worldwide, but recent molecular investigation revealed a complex of species. This study also showed that *Ceriodaphnia* cf. *cornuta* populations from Mexico and Guatemala are genetically distinct when compared to the Australian complex (Sharma & Kotov 2013). Body length is between 350-352µm.

Table 1. General distribution of different species of Cladocera in the Ciénaga El Convento. Geographic category: NT (Neotropical), NA (Nearctic), C (Cosmopolitan), and PAN (Pantropical and pansubtropical). Departments: At (Atlántico), By (Boyacá), Co (Córdoba), Cu (Cundinamarca), Gu (La Guajira) Hu (Huila), To (Tolima) Mg (Magdalena), Sa (Santander). \* New records for the Atlántico department. \*\* New record for Colombia

| Family         | Taxon                             | Open water | Macrophytes | World distribution | Colombia distribution      | References to Colombia                                                                                                                                                                             |
|----------------|-----------------------------------|------------|-------------|--------------------|----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Sididae        | <i>Latonopsis australis</i> *     |            | X           | PAN                | Co, Mg                     | Álvarez 2010; Fuentes-Reinés <i>et al.</i> (2012)                                                                                                                                                  |
|                | <i>Diaphanosoma breverime</i> *   | X          | X           | NT                 | Sa, Co, Mg,                | Barón-Rodríguez <i>et al.</i> (2006); Álvarez 2010; Fuentes-Reinés <i>et al.</i> (2012)                                                                                                            |
| Daphniidae     | <i>Ceriodaphnia cornuta</i>       | X          | X           | PAN                | At, Hu, Co, Sa, Mg, Gu, To | Camargo-Fajardo 1994; Herrera-Martínez & Guillot 1999; Barón-Rodríguez <i>et al.</i> (2006); Guevara <i>et al.</i> (2008); Álvarez 2010; Fuentes-Reinés <i>et al.</i> (2012); Fuentes-Reinés 2014a |
|                | <i>Ceriodaphnia silvestrii</i> ** | X          |             | NT                 |                            |                                                                                                                                                                                                    |
| Moinidae       | <i>Moinodaphnia macleayi</i>      |            | X           | PAN                | Mg, At, Sa, Co, Gu         | Pearse 1916; Brehm 1956; Barón-Rodríguez <i>et al.</i> (2006); Álvarez 2010; Fuentes-Reinés <i>et al.</i> (2012); Fuentes-Reinés 2014a                                                             |
|                | <i>Moina micrura</i> *            |            | X           | C                  | Sa, Co, By, Mg             | Gaviria 2001; Barón-Rodríguez <i>et al.</i> (2006); Álvarez 2010; Fuentes-Reinés <i>et al.</i> (2012); Aranguren-Riaño & Monroy-González 2014                                                      |
|                | <i>Moina reticulata</i> *         |            | X           | NT                 | Co, Mg                     | Álvarez 2010; Fuentes-Reinés <i>et al.</i> (2012)                                                                                                                                                  |
| Macrothricidae | <i>Macrothrix elegans</i> *       |            | X           | NT                 | Co, Mg, Gu                 | Álvarez 2010; Fuentes-Reinés <i>et al.</i> (2012); Fuentes-Reinés 2014a                                                                                                                            |
|                | <i>Macrothrix spinosa</i> *       |            | X           | PAN                | Co, Mg, Gu                 | Álvarez 2010; Fuentes-Reinés <i>et al.</i> (2012); Fuentes-Reinés 2014a                                                                                                                            |
| Chydoridae     | <i>Ephemeroporus hybridus</i> *   |            | X           | NT-NA              | Cu, Co, Mg                 | Stingelin 1913; Álvarez 2010; Fuentes-Reinés <i>et al.</i> (2012)                                                                                                                                  |
|                | <i>Karualona muelleri</i>         |            | X           | NT                 | Co, Mg                     | Álvarez 2010; Fuentes-Reinés <i>et al.</i> (2012)                                                                                                                                                  |
|                | <i>Leydigia cf striata</i>        |            | X           | NT                 | Sa, At                     | Barón-Rodríguez <i>et al.</i> (2006); Fuentes-Reinés 2014b                                                                                                                                         |
|                | <i>Leberis colombiensis</i>       |            | X           |                    |                            |                                                                                                                                                                                                    |

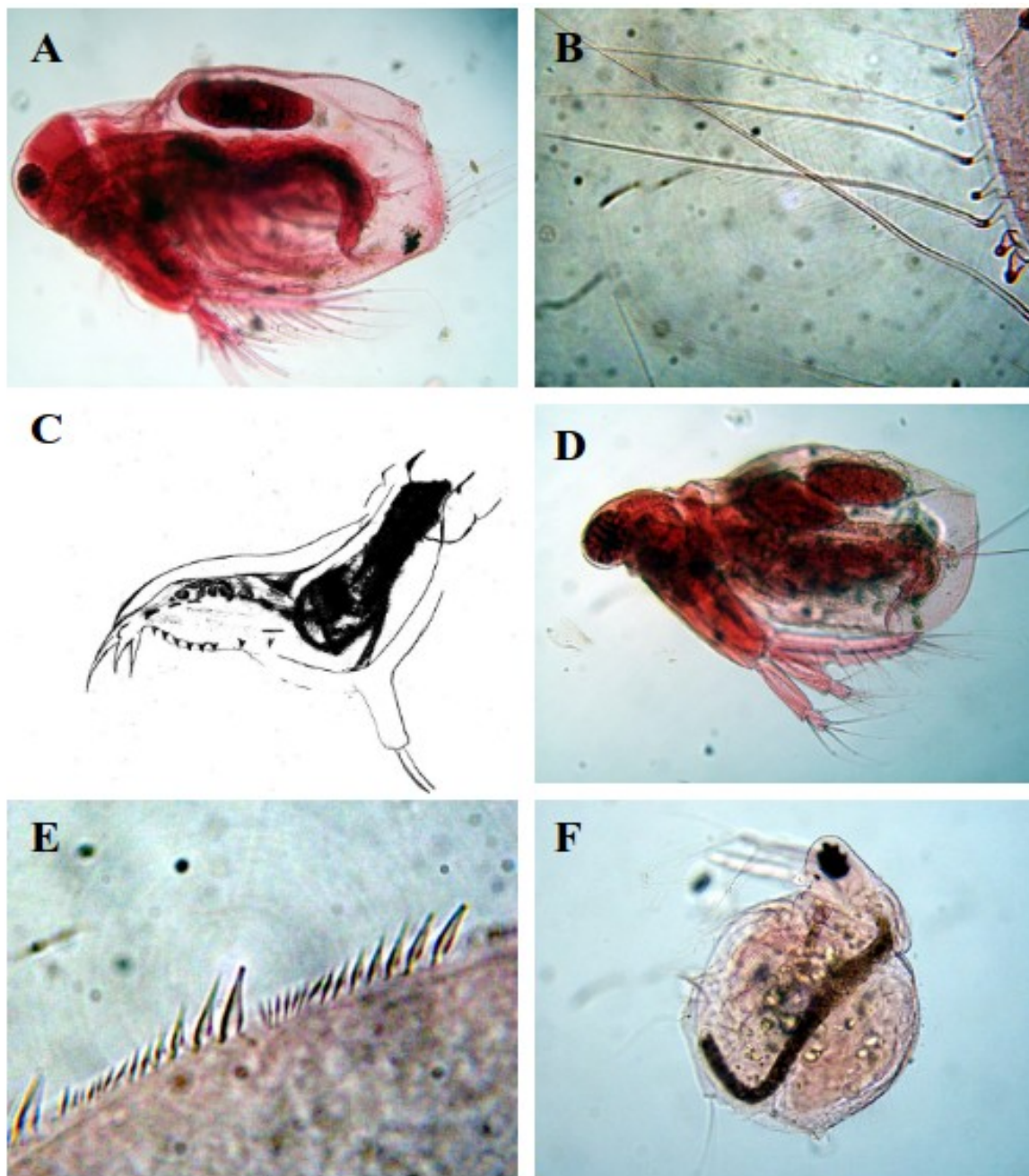
***Ceriodaphnia silvestrii*** Daday, 1902,

**Synonymy.** Olivier 1962: 212.

**Material examined:** One adult female and one juvenile female dissected and preserved on semi-permanent slides mounted in glycerine, catalog number: UARC231M-UARC235M

**Remarks.** This species was collected in open water during November, being the less abundant among

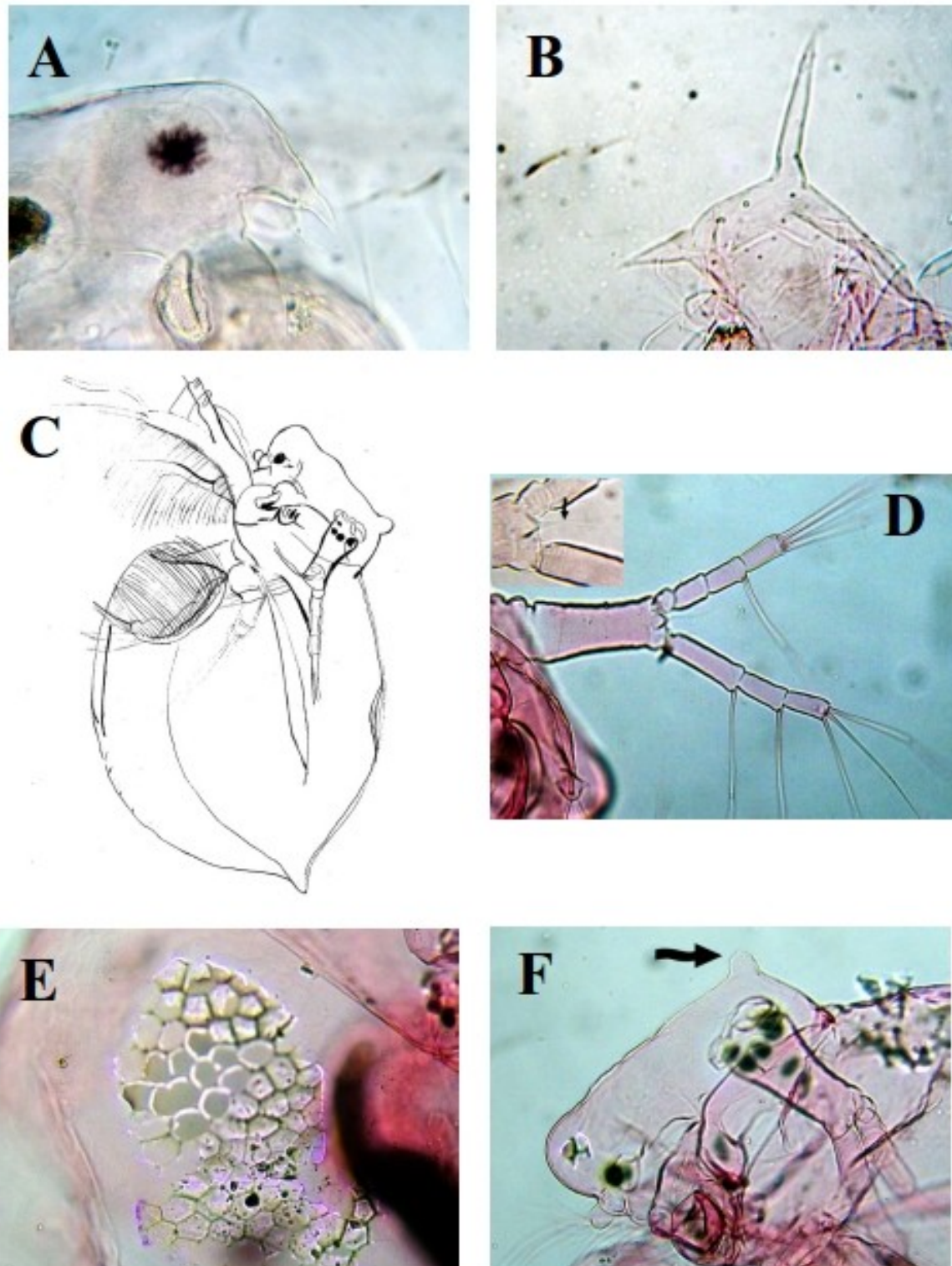
the observed *Ceriodaphnia* species. Body is oval (Figure 2C), with a long seta at the antennal base, setal formula of antenna 0-0-1-3/1-1-3 (Figure 2D), valve with reticulations (Figure 2E), fornix is laterally projected, (Figure 2F), posterodorsal angle of valve slightly pointed (Figure 2F), distal part of postabdomen with denticles decreasing proximally, except for distal one (Figure 3A).



**Figure 1.** Cladocerans from Ciénaga el Convento. A-C. *Latonopsis australis*. A. Habitus, B. Postero ventral corner of the valve, C. Postabdomen. D-E. *Diaphanosoma brevireme*. D. Habitus, E. Postero-ventral valve margin. F. Habitus of *Ceriodapnia cornuta*.

Morphological data on this species have been provided from Argentina (Daday 1902, Olivier 1962), Paraguay (Daday 1905), and Brazil (Elmoor-Loureiro 1997, Abreu *et al.* 2010). Our specimen agrees with the description by Daday 1905, nevertheless a subtle difference can be observed in the lateral expansion of fornix, being longer in Colombian specimen (Figure, 2C) than in the specimens from Paraguay (Daday 1905, Taf,

XIII, fig 19). Colombian specimen differs from those of Argentina in the proximal part of the postabdomen, which presents long abdominal process in Argentina populations (Daday 1902, Tab 11, fig 9) while Colombia specimen lacks it (Figure 3A). However, we do not regard such differences as signs of a separate status of the Colombian populations.



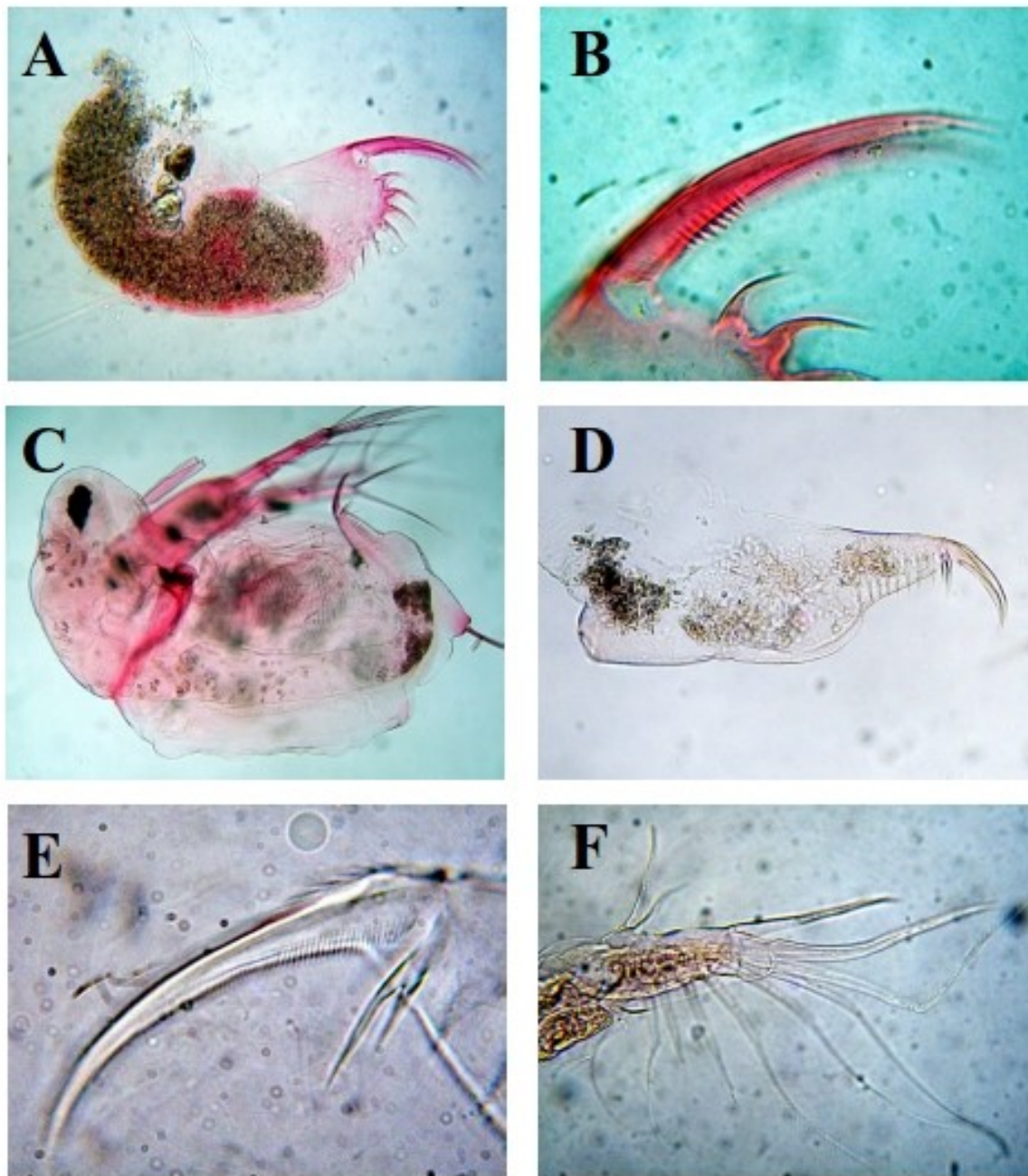
**Figure 2.** Cladocerans from Ciénaga el Convento. A-B. Horns on the head of *Ceriodaphnia cornuta*. C-F. *Ceriodaphnia silvestrii*. C. Habitus. D. Antenna (The arrow points at the long seta in the base). E. Valve. F. Fornix (The arrow points at laterally projection)

*Ceriodaphnia silvestrii* Daday, 1902 can be confused with *Ceriodaphnia lacustris* Birge, 1893 for the habitus, reticulations of valves and the lateral projection in the fornix, but they can be separated by

the postabdominal claw which presents fine inconspicuous denticulation in *C. lacustris* (Birge 1893. fig 9; Haney *et al.* 2015) while in *C. silvestrii* there are strong denticles (8-10) at the proximal part

(Daday 1902, Tab XI, fig 8; Daday 1905, Taf XIII, fig 18; Abreu *et al.* 2010, fig 1d, present paper, fig 3D). Body length for adult and juvenile is 700 and 532  $\mu\text{m}$  respectively. Nevertheless, these differences are subtle and can be influenced by ontogeny and

environmental factors. Multiple approaches, such as DNA analysis and detailed description of specimens from type localities, should be applied to further characterize these two species.



**Figure 3.** Cladocerans from Ciénaga el Convento. A-B: *Ceriodaphnia silvestrii*. A. Postabdomen. B. Postabdominal claw. C-F. *Moina micrura*. C. Habitus. D. Postabdomen. E. Postabdominal claw. F. Limb I

*Ceriodaphnia silvestrii* also resembles the wide distributed species *Ceriodaphnia reticulata* (Jurine, 1820) and *Ceriodaphnia dubia* Richard, 1894, however they can be differentiated by: 1) the fornix which is projected in blunt processes in *C.*

*silvestrii* (Daday 1905, Taf, XIII, fig 19; present paper, fig 2C) while *C. dubia* (Elías-Gutiérrez *et al.* 2008, fig 15.6) and *C. reticulata* lack it (Berner 1986, fig 2: 1-2, fig 3:4-5; Olivier 1962, lam X, fig 4); 2) the postabdominal claw which presents fine

denticulations in *C. dubia* (Eliás-Gutiérrez *et al.* 2008, figs 15.7-15.8; Abreu *et al.* 2010, fig 1b) while *C. silvestrii* (Daday 1902, Tab XI, fig 8; Daday 1905, Taf XIII, fig 18; Abreu *et al.* 2010, fig 1d, present paper, fig 3D) and *C. reticulata* (Berner 1986, fig 3: 1-3) have strong denticulation in the proximal part of claw.

The taxonomical studies of genus *Ceriodaphnia* in Colombia is still incomplete, with only four species reported: *Ceriodaphnia quadrangula* (O.F. Müller, 1785) (Stingelin 1913, Gaviria 2001), *C. dubia* (Stingelin 1913, Gaviria 1993, Gaviria 2001), *C. reticulata* (Jurine, 1820) (Camargo-Fajardo 1994, Stingelin 1913), and *C. cornuta* Sars, 1885 (Camargo-Fajardo 1994, Herrera-Martínez & Guillot 1999, Barón-Rodríguez *et al.* 2006, Guevara *et al.* 2009, Álvarez 2010, Fuentes-Reinés *et al.* 2012, Fuentes-Reinés 2014a). Nevertheless, the genus *Ceriodaphnia* is poorly known (Kotov *et al.* 2013b) and needs to be revised.

Family MOINIDAE Goulden, 1968

Genus *Moinodaphnia* Herrick, 1887

*Moinodaphnia macleayi* (King, 1853)

*Synonymy.* Fuentes-Reinés *et al.* (2012):136.

*Material examined:* 5 adult females, catalog number: UARC245M

*Remarks.* This species was collected within macrophytes during August. It is a valid taxon and, until now, represents the single species within the genus *Moinodaphnia*. Body length is between 728-840 µm.

*Moina micrura* Kurz, 1874

*Synonymy.* Fuentes-Reinés *et al.* (2012):136.

*Material examined:* 30 adult females, catalog number: UARC236M

*Remarks.* This species was collected within macrophytes during September, November and December, being more abundant in the last two months (rainy season). The body is oval, head with supraocular depression, large antennules (Figure 3C), long postabdomen (Figure 3D) with seven feathered teeth plus an unequal bident tooth (Figure 3E). In the Neotropical region, this species can be slightly confused with *M. minuta*, but they can be separated by the anterior seta on penultimate segment of limb I which is present in *M. micrura* (Figure 3F) and absent in *M. minuta*. It should be pointed that the molecular approach has demonstrated that *M. micrura* represent a complex of cryptic species (Petrusek *et al.* 2004), which still

need to be better investigated. Body length is between 756-854 µm.

*Moina reticulata* Daday, 1905

*Synonymy.* Fuentes-Reinés *et al.* (2012):136.

*Material examined:* 10 adult females, catalog number: UARC247M

*Remarks.* This species was collected within macrophytes from July to December; it was the most frequent species within Moinidae. The body is ovoid (Figure 4A), postadobmen with an equal bident tooth (Figures 4B-C). In the Neotropics, *Moina reticulata* resembles the Amazonian *Moina rostrata* McNair, 1980 and the Mexican *Moina dumonti* Kotov, Eliás-Gutiérrez & Granados-Ramírez, 2005, but *M. reticulata* can be distinguished by the lack of rostrum, which present in the other two. Body length is between 518-644 µm.

Family MACROTHRICIDAE, Norman & Brady, 1867

Genus *Macrothrix* Baird, 1843

*Macrothrix elegans* Sars, 1901

*Material examined:* 5 adult females, catalog number: UARC238M

*Remarks.* This species was collected within macrophytes in July and August. The body is ovoid (Figure 4D), valves with vertical striae (Figure 4E), swimming seta without proximal setules (Figure 4F). This is one of the most common Neotropical species, occurring from Argentina to Mexico, and presents variability in size, head pore diameter, post-pore distance, and relative size of the spines on second segment of the antennal exopodite (Kotov *et al.* 2004). Body length is between 602 – 672 µm.

*Macrothrix spinosa* King, 1853

*Synonymy.* Fuentes-Reinés *et al.* (2012):130

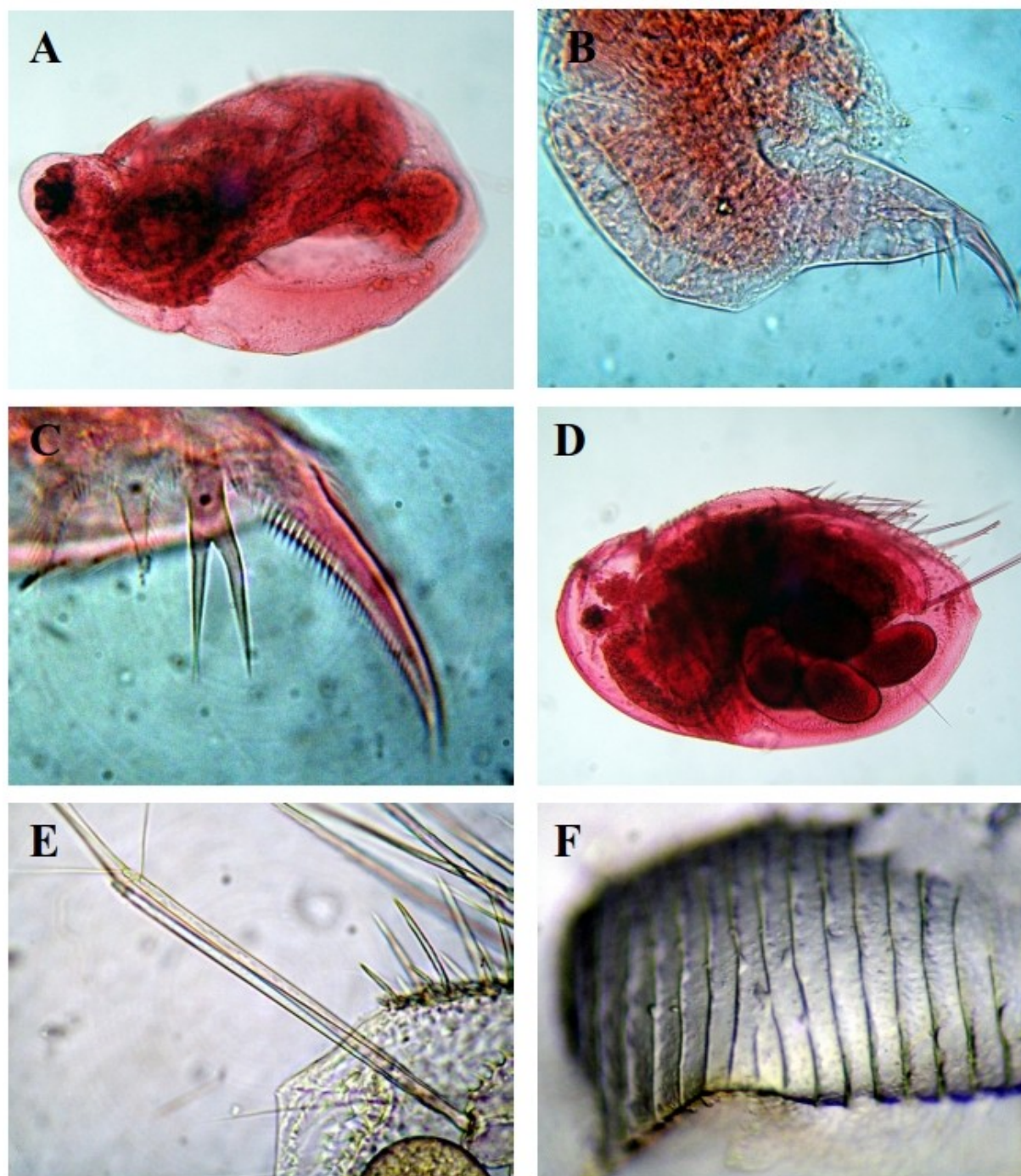
*Material examined:* 20 adult females, catalog number: UARC243M

*Remarks.* This species was collected within macrophytes in July and August. Body is ovoid in lateral view (Figure 5A). In the neotropics *M. spinosa* can be differentiated from its congeners by the serrations along the dorsal part of the valve and head (Figure 5B). Body length is between 416-420 µm.

According to Smirnov (1992), *M. spinosa*, originally described from Australia, is a Pantropical species. Nevertheless, results of more recent studies on *Macrothrix*, revealing cryptic species and reinstating junior synonyms as valid species, have suggested that these species tend to have continental or regional distribution (Silva-Briano *et al.* 1999, Dumont *et al.* 2002, Kotov *et al.* 2005, Kotov 2007).

Therefore, it is possible that *M. spinosa* also represent a species complex and that the South

American *Macrothrix squamosa* Sars, 1901, put in its synonymy, could be a separated species.



**Figure 4.** Cladocerans from Ciénaga el Convento. A-C. *Moina reticulata*. A. Habitus. B. Postabdomen. C. Postabdominal claw. D-F. *Macrothrix elegans*. D. Habitus. E. Swimming seta. F. Valve.

Family CHYDORIDAE Dybowski & Grochowski,  
1894 emend. Frey, 1967

Genus *Ephemeroporus* Frey, 1982

***Ephemeroporus hybridus*** (Daday 1905)

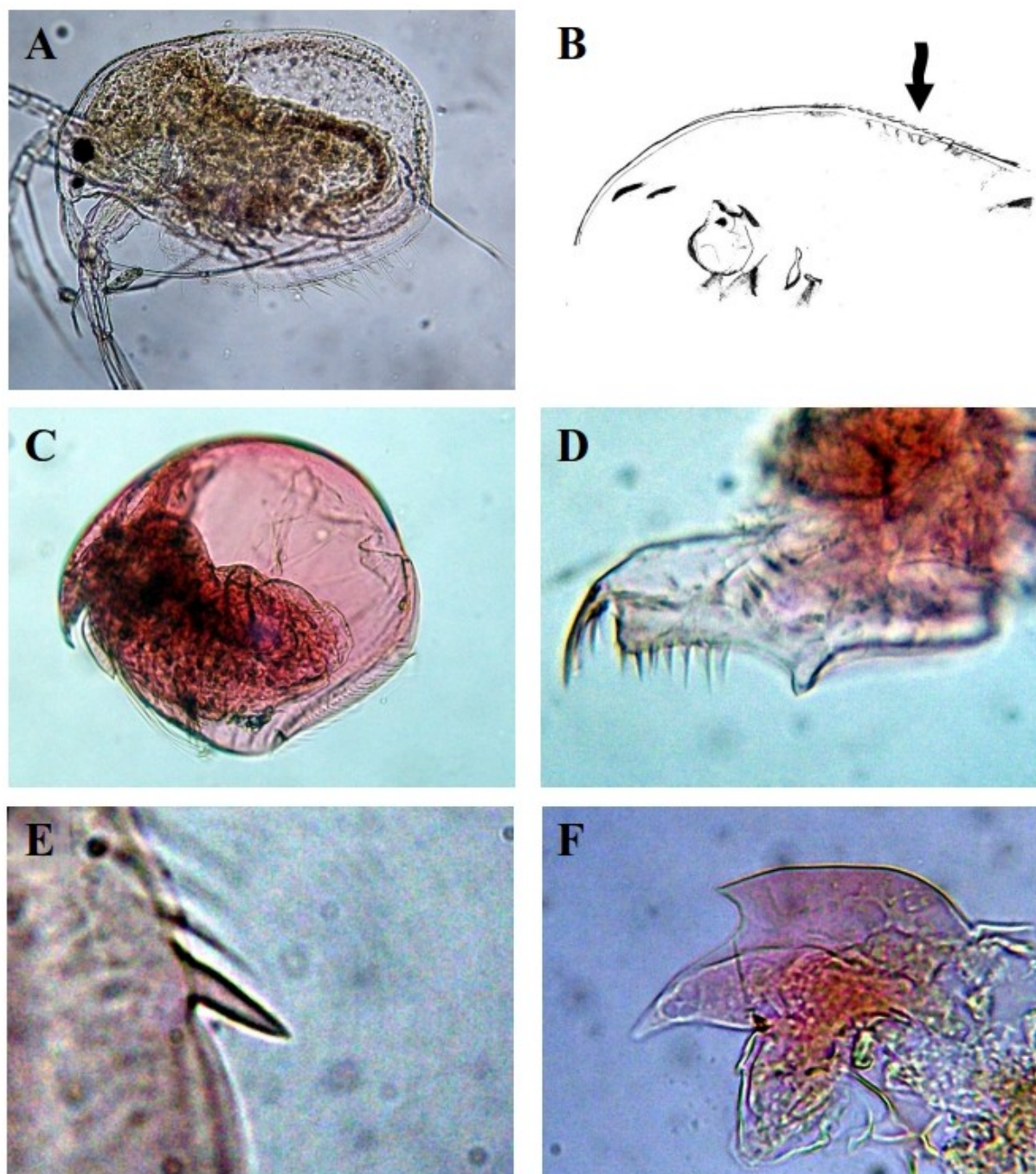
Synonymy. Fuentes-Reinés *et al.* (2012):154

*Material examined:* 2 adult females, catalog number: UARC240M

*Remarks.* This species was originally described as *Chydorus hybridus* by Daday 1905 and later allocated in the genus *Ephemeroporus* by Frey 1982.

It was found within macrophytes and together with *C. silvestrii*, was one the less abundant of all specimens. Its body is ovoid (Figure 5C),

postabdomen is long (Figure 5D) and the posterior part of valve present a small denticle (Figure 5E).



**Figure 5.** Cladocerans from Ciénaga el Convento. A-B. *Macrothrix spinosa*. A. Habitus. B. Dorsal part of the head (The arrow points at the serrations). C-F. *Ephemeroporus hybridus*. C. Habitus, B. Postabdomen. C. Posterior part of valve present. F. Labrum.

In the Neotropics, this species can be confused with *E. barroisi* but they can be separated by the labrum with one denticle (Figure 5F) in *E. hybridus* and four in *E. barroisi*. Body length is 210µm.

Genus *Karualona* Dumont et Silva-Briano, 2000

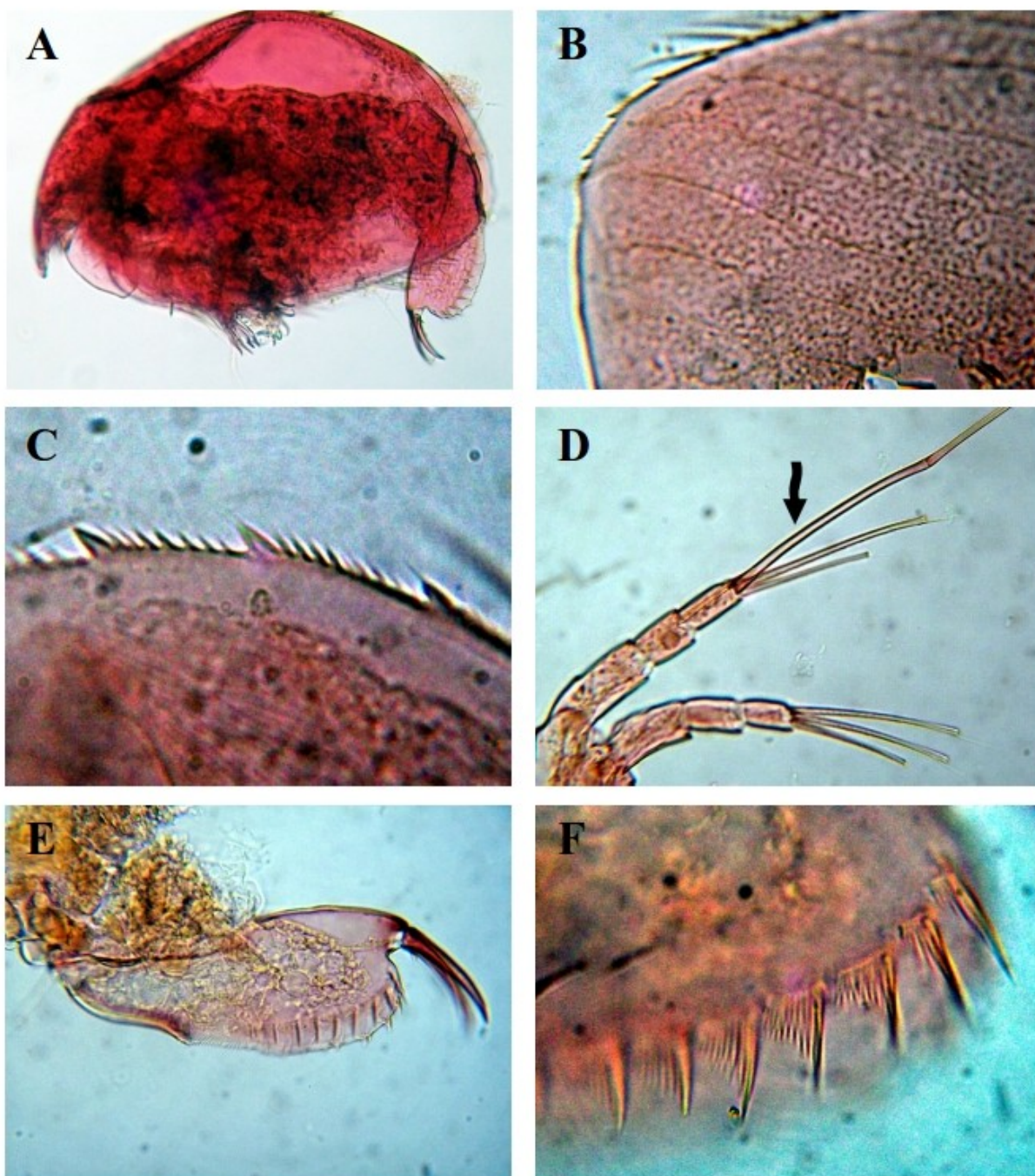
***Karualona muelleri*** (Richard 1897)

*Synonymy.* Van Damme & Dumont 2010:767

*Material examined:* 5 adult females, catalog number: UARC242M.

**Remarks.** This species was collected within macrophytes in July and August. The body is ovoid (Figure 6A), valve with striae in the ventral and posterior part; posterior ventral corner possesses robust denticles with 4 and 9 small setules between them (Figures 6B-C). *K. muelleri* can be

differentiated from its congeners by the longest seta of apical segment of endopod of antenna thicker than all other antennal setae (Figure 6D), and the more robust and long distal setules of the lateral fascicles of the postabdomen (Figures 6E-F). Body length is between 358-364  $\mu\text{m}$



**Figure 6.** Cladocerans from Ciénaga el Convento. A-F. *Karualona muelleri*. A. Habitus. B. Ventral and posterior part of valve. C. Idem, posterior ventral corner. D. Antenna (The arrow points at the longest seta). E. Postabdomen. F. Distal setules of the lateral fascicles of the postabdomen.

Genus *Leydigia* Kurz, 1875

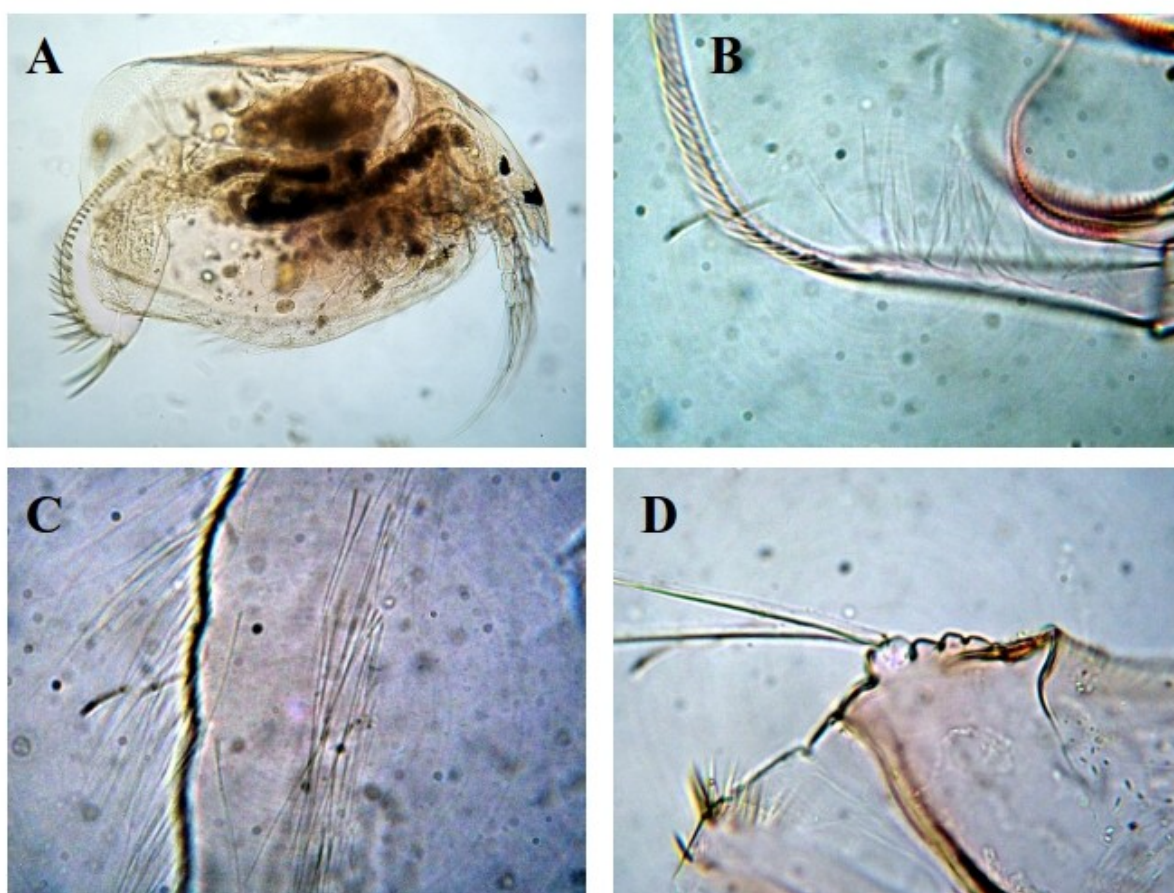
*Leydigia cf striata* Birabén, 1939

**Synonymy.** Kotov (2009):71

**Material examined:** Two adults female and one juvenile female dissected on semi-permanent slides mounted in glycerine, UARC201M- UARC209M

**Remarks.** Valid taxon and was found within macrophytes during July. In lateral view, the body is subovoid (Figure 7A). This species belongs to *acanthocerocoides* group and together with *L. cf ipojucae* possesses the basal segment of the distalmost scraper of limb II setulated (Figure 7B). *L. cf striata* is the most common Neotropical species (Kotov *et al.* 2003) and can be distinguished from *L.*

*cf ipojucae* for 1) the setules in lateral fascicles on labrum, which is shorter or the same size as marginal seta in *L. cf striata* (Figure 7C) while they are longer in *L. cf ipojucae* 2) preanal margin of the postabdomen of *L. cf striata* possesses hillocks (2-4) (Figure 7D) while in *L. cf ipojucae* are smooth (see Fuentes-Reinés 2014b). Body length is between 812-840  $\mu\text{m}$



**Figure 7.** Cladocerans from Ciénaga el Convento. A-D. *Leydigia cf striata*. A. habitus. B. Scraper 1 of Limb II. C. Setules in lateral fascicles on labrum. D. Pre-anal margin of postabdomen.

Genus *Leberis* Smirnov, 1989

***Leberis colombiensis*** Kotov &  
Fuentes-Reinés 2015

**Material examined:** 20 adult females, catalog number: UARC226M-230M.

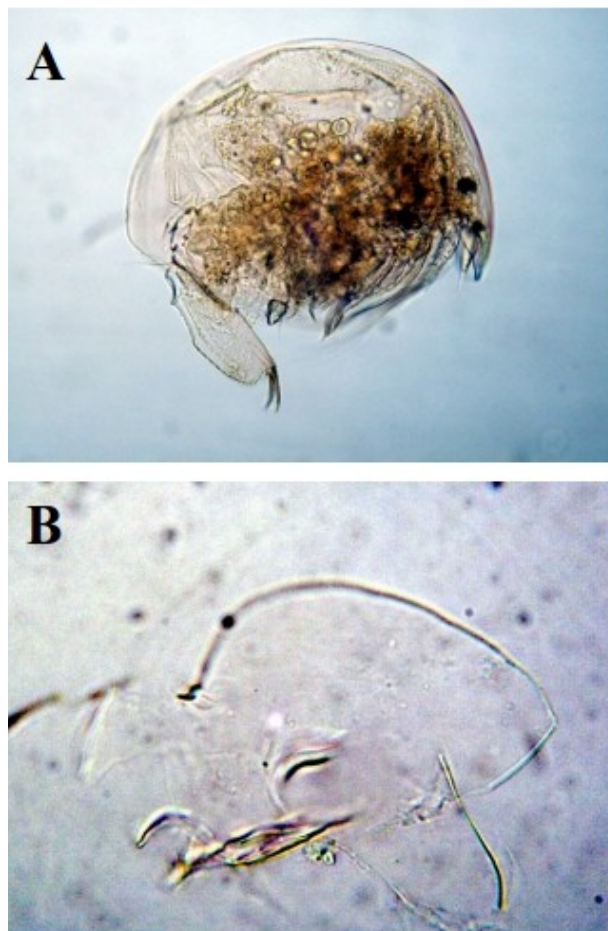
**Remarks.** This species was collected within macrophytes during July, August and September, being more abundant in July. *Leberis colombiensis* was recently described from Ciénaga Grande de Santa Marta (Kotov & Fuentes-Reinés, 2015). In lateral view, body ovoid (Figure 8A). In general appearance and morphology of postabdomen of *Leberis colombiensis* is somewhat similar to the most common Neotropical species of the genus, *L.*

*davidi*. These species can be easily differentiated by 1) labrum, which is convex in *L. colombiensis* (Figure 8B) while is wavy in *L. davidi*, 2) size, *L. colombiensis* is shorter (550  $\mu\text{m}$ ) than *L. davidi* (690  $\mu\text{m}$ ), but they can be easily confused if labrum and size are not studied carefully. Body length is between 420-550  $\mu\text{m}$

### Discussion

The cladoceran species found in the system Ciénaga El Convento are most tropical forms and have been found in other Colombian system (Fuentes-Reinés *et al.* 2012, Fuentes-Reinés 2014a). In the surveyed area, the littoral zone with

submerged vegetation showed a higher species richness (13 species) than the limnetic area (3 species). Cladocera are an especially abundant group among the invertebrates associated with macrophytes (Rocha & Por 1998).



**Figure 8.** Cladocerans from Ciénaga el Convento. A-B. *Leberis colombiensis*. A. Habitus. B. Labrum.

With these new records, the number of species in Colombia belonging to the genus *Ceriodaphnia* increases to five. Seven species are new records for Atlántico department and one for Colombia (see Table 1).

We found fewer taxa than expected; Fuentes-Reinés *et al.* (2012) and Fuentes-Reinés & Zoppy de Roa (2013) reported 45 species of cladocerans from Ciénaga Grande de Santa Marta in contrast to 13 species found in this study, which is probably a result of the sampling method, which emphasized littoral habitats at estuarine Ciénaga of Santa Marta.

It is expected that further studies with different sampling methods and equipment, as well sampling in littoral, limnetic and benthic zones, will reveal additional new records of cladocerans from

different environments. Studies of cladocerans in the area should be continued with a strong taxonomic base; only reliable determinations of species will lead to an adequate understanding of the national aquatic biodiversity.

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