

NOTE:

PRESENCE OF *DIAPHANOSOMA SPINULOSUM* HERBST, 1975 (CRUSTACEA: CLADOCERA: CTENOPODA, SIDIDAE) IN A COASTAL SYSTEM OF NORTHERN COLOMBIA, WITH COMMENTS ON *D. BIRGEI* KOŘÍNEK, 1981

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RESUMEN

Presencia de *Diaphanosoma spinulosum* Herbst, 1975 (Crustacea: Cladocera: Ctenopoda, Sididae) en un sistema costero del norte de Colombia, con comentarios sobre *D. birgei* Kořínek, 1981. *Diaphanosoma spinulosum* Herbst, 1975 está ampliamente distribuida en la región neotropical con registros en Colombia en los departamentos de Amazonas, Córdoba y Santander. El presente manuscrito reporta, por primera vez, la ocurrencia de *D. spinulosum* en el departamento de La Guajira. Este espécimen fue encontrado en la laguna Navío Quebrado, Camarones, La Guajira, Colombia. *Diaphanosoma spinulosum* superficialmente se asemeja a su congénere *D. birgei* y ambas pueden ser fácilmente confundidas. Se discuten las diferencias morfológicas entre ellas.

PALABRAS CLAVES: Cladocera, *Diaphanosoma*, laguna Navío Quebrado, Colombia.

The genus *Diaphanosoma* has a wide distribution in the world, except in the Antarctic and New Zealand (Korovchinsky, 1992). It comprises 34 valid species and two subspecies (Kotov *et al.*, 2013). Species of genus *Diaphanosoma* are characterized by being limnetic (Elías-Gutiérrez *et al.*, 2008); nevertheless some species of the genus have been found in vegetation zones (Korovchinsky, 1992; Fuentes *et al.*, 2012).

The study of composition and distribution of genus *Diaphanosoma* in Colombia is still very incomplete. The first record of the genus *Diaphanosoma* Fischer, 1850 (Cladocera: Sididae) from the country was made by Barón-Rodríguez *et al.* (2006), who reported three species. Since then, the main contributions to study of this genus in Colombia have been made by Gallo-Sánchez *et al.* (2009), who recorded one species, Villabona-González *et al.* (2011), who reported four species and one morphotype, Aranguren-Riaño *et al.* (2011), who added six species, and Fuentes *et al.* (2012), who reported one species. The aim of this paper is to present a brief description of *D. spinulosum* from Colombia



and discuss some morphological differences with respect to its congener *D. birgei*. Comments are also provided about its distribution in Colombia together with a key for the identification of the species of this genus recorded in the country.

The samples were taken from the Laguna Navío Quebrado, La Guajira, northern Colombia (11°25'N and 73°5'W) (Figure 1). The sampling was from April to December 2012, in the littoral areas with vegetation (macrophytes) and open water with presence of an oyster bank. Water salinity ranged from 0 to 28. Water samples were collected using a bucket of 25 L at both vegetation areas and open water. Samples were filtered with a zooplankton net (45 μ m) and preserved in 70% ethanol. Dissected specimens and appendages were mounted in glycerin and sealed with Canada balsam. The mounted appendages were photographed using a Kodak Easy Share C140 digital camera adapted to a compound microscope.

The specimen was measured in lateral position, from head to the posterior part of the valve. Identifications were according to Paggi (1978), Elmoor-Loureiro (1997), and Korovchinsky (1992). A single specimen of *Diaphanosoma spinulosum* was found and dissected, semi-permanent slides were deposited in the collection of the Museum of the Universidad del Atlántico, in Barranquilla, Colombia (UARC169M-171M).

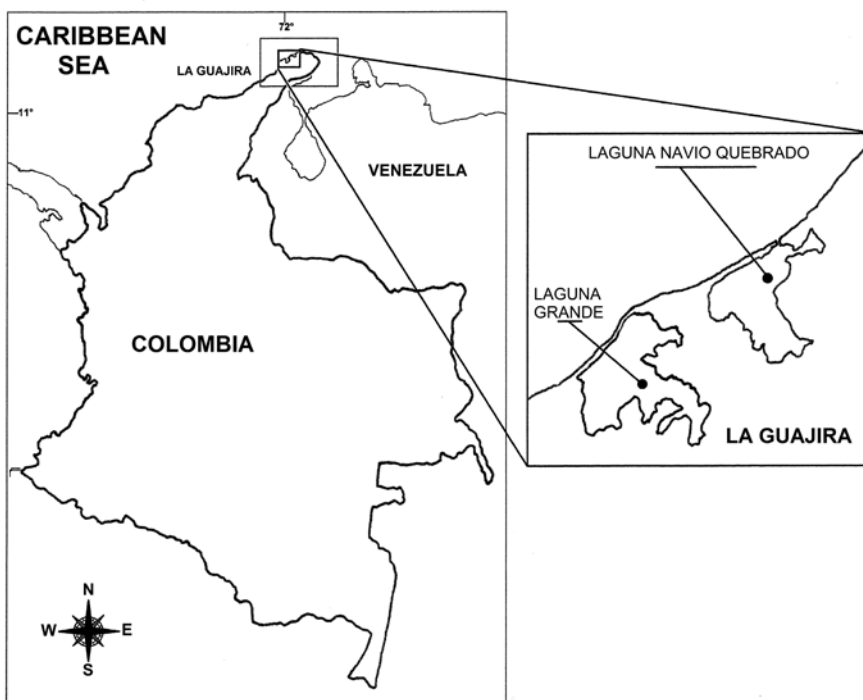


Figure 1. General location.

The specimen from Laguna Navío Quebrado agrees with the general description of *Diaphanosoma spinulosum* (Paggi, 1978). Habitus robust, with a rather developed dorsal part (Figure 2a), body length from head to posterior part of valve 602 μm , head rectangular, antenna large and robust, with setal formula 4-8/0-1-4; its basipodite rather longer than the biarticulated branch (Figure 2b), distal part of proximal segment of biarticulated antennal branch (exopodite) with one spine (Figure 2c), distal part of distal segment with one pointed prominence and one spine which is 2.2 times as long as the spine on distal part of proximal segment (Figure 2d). Ventral valve margin infolded (a *duplicadura* as named by Paggi 1978), posterior margin of inflexion bearing four long feathered setae (Figure 2e). Two dorsal spines near posterior margin of each valve with a row of spinules (Figure 2f). Postero-ventral valve margin with large curved denticles and two small spines between them (Figure 2g). Postabdomen robust, with anal teeth and three basal spines of moderate size, the distal one the largest (Figure 2h). The postabdominal claw with a row of rather large denticles along ventral side, decreasing distally (Figure 2i).

Diaphanosoma spinulosum is considered a Neotropical species (Kotov *et al.*, 2013). In Colombia it has been recorded in Amazonas, Córdoba, and Santander provinces (Barón-Rodríguez *et al.*, 2006; Gallo-Sánchez *et al.*, 2009; Aranguren-Riaño *et al.*, 2011; Villabona-González *et al.*, 2011). The occurrence of *D. spinulosum* at La Guajira Province is reported for the first time, expanding the occurrence of *D. spinulosum* in Colombia (Figure 3). At the present time, six species of *Diaphanosoma* are recognized to occur in Colombian water bodies: *D. birgei* Kofínek, 1981, *D. brachyurum* (Liévin, 1848), *D. spinulosum* Herbst, 1975, *D. dentatum* Herbst, 1968, *D. polyspina* Korovchinsky, 1982, and *D. brevireme* Sars, 1901, which is the most frequently reported species (Barón-Rodríguez *et al.*, 2006; Aranguren-Riaño *et al.*, 2011; Fuentes *et al.*, 2012).

The first record of *D. spinulosum* from the Neotropics could be attributed to Sars (1901), although he reported it as *D. sarsi*. The original description, however, was made by Herbst (1975) from Venezuela. Latter, it has been redescribed by Paggi (1978), Korovchinsky (1992) and Carruyo-Noguera *et al.* (2004). It is a common species; for example, in South America it has been reported by Elmoor-Loureiro *et al.* (2004) and Brito-Vieira *et al.* (2011), and has been also recorded in Central America (Collado *et al.*, 1984; Elías-Gutiérrez and Varela, 2009). This species has a wide distribution in Colombia, it has been known to occur in both the northern and southern regions of the country. According to Sousa *et al.* (2009), *D. spinulosum* is a planktonic species.

Diaphanosoma spinulosum belongs to the first group classified by Korovchinsky (1986) because it is a large species with powerful swimming antennae



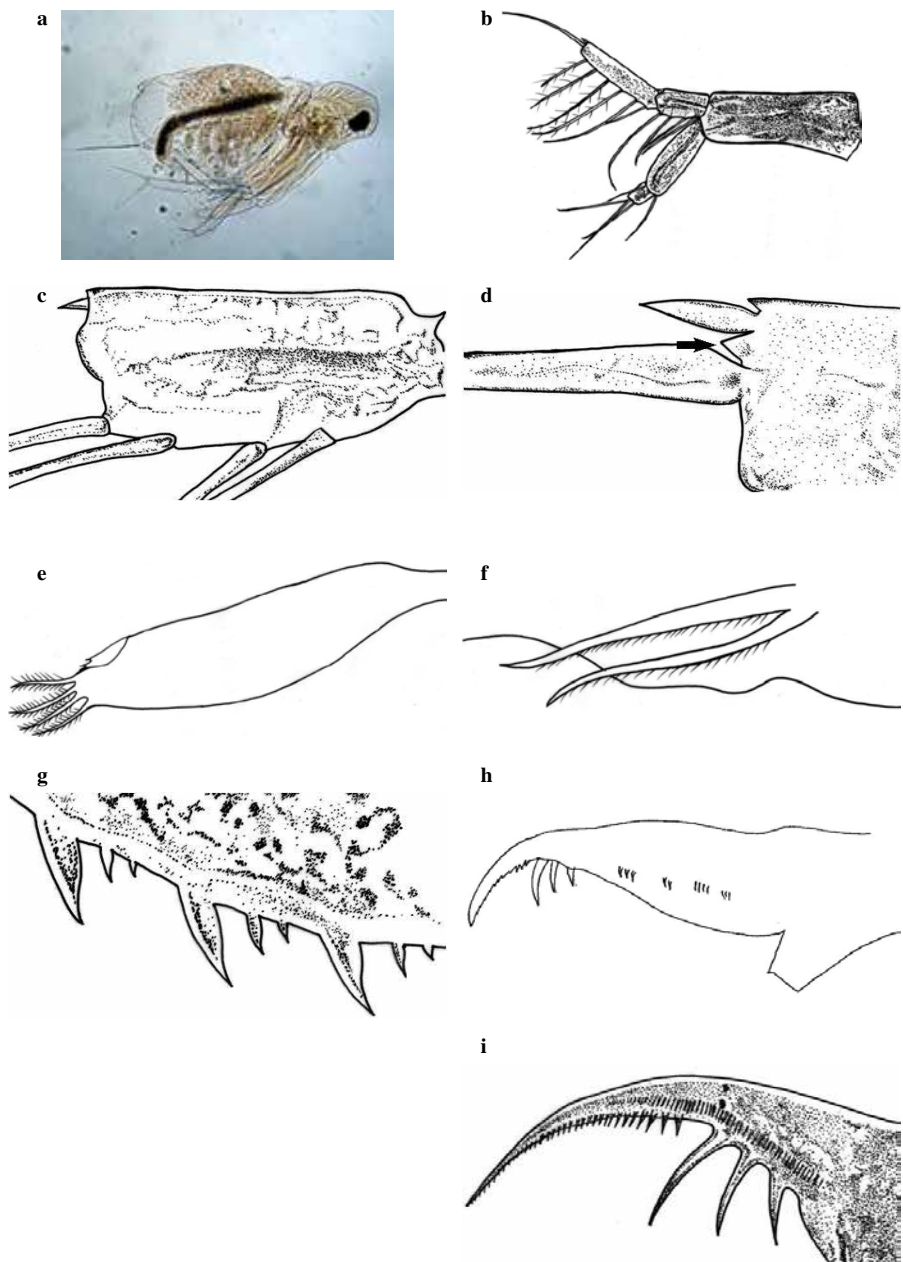


Figure 2. *Diaphanosoma spinulosum*. Parthenogenetic female. **a.** Adult. **b.** Antenna. **c.** Distal part of proximal segment of antenna. **d.** Distal part of distal segment of antenna (the arrow points at the pointed protuberances). **e.** *Duplicadura*. **f.** Dorsal spines near posterior valve margin. **g.** Postero-ventral valve margin. **h.** Postabdomen. **i.** Postabdominal claw.



Figure 3. Geographic distribution of *Diaphanosoma spinulosum* in Colombia. 1: Amazonas. 2: Santander. 3: La Guajira. 4: Córdoba.

and strong musculature and narrow free flap of the shell valves. This species superficially resembles its congener *D. birgei*, also a Neotropical species (Kotov *et al.*, 2013), and both can be easily confused. These two species can be distinguished by several subtle characters including: 1) Small intermediate denticles without setule between the large denticles in the posterior-ventral margin of the valves in *D. spinulosum* (present paper); in *D. birgei* with small denticles and a setule between large denticles (Košinek, 1981, fig 6; Elmoor-Loureiro, 1990, fig. 9; Korovchinsky, 1992, fig. 139). 2) Ventral valve margin infolded; a *duplicadura* in *D. spinulosum* (present paper), while *D. birgei* lacks *duplicadura* (Elmoor-Loureiro, 1990; Korovchinsky, 1992). 3) Dorsal part of the head not protruding in *D. spinulosum* (present paper), while it is noticeable protruding in *D. birgei* (Košinek, 1981; Elmoor-Loureiro, 1990; Korovchinsky, 1992). 4) Postabdominal claw with denticles decreasing distally in

D. spinulosum (present paper) and without them in *D. birgei* (Kořínek, 1981, fig. 7; Elmoor-Loureiro, 1990, fig. 8; Korovchinsky, 1992, fig. 142).

This key, prepared using the descriptions presented in this paper as well as those provided by Kořínek (1981), Korovchinsky (1992), and Elmoor-Loureiro (1990), might be useful for preliminary identification of the valid *Diaphanosoma* species from Colombia.

Key for the identification of the nominal species of *Diaphanosoma* recorded in Colombia

- 1A. Ventral valve margin without *duplicadura*2
- 1B. Ventral valve margin with *duplicadura*3
- 2A. Thin sharp spine on basipodital distal outer end..... *D. birgei* Kořínek, 1981
- 2B. Wide lanceolate spine on basipodital distal outer end.....*D. brachyurum*-group
- 3A. Postero-ventral valve margin with denticles almost of the same size.....
.....*D. polyspina* Korovchinsky, 1982
- 3B. Postero-ventral valve margin with denticles of different size4
- 4A. Denticles decreasing proximally*D. brevireme* Sars, 1901
- 4B. Denticles decreasing distally5
- 5A. With small denticles interspersed between large ones, head rectangular.....
.....*D. spinulosum* Herbst, 1967
- 5B. Without small denticles interspersed between large ones, head cone shaped
.....*D. dentatum* Herbst, 1968

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