Available online at www.sciencedirect.com

Revista Mexicana de Biodiversidad

Revista Mexicana de Biodiversidad 86 (2015) 1091–1094

Instituto de Biología UNAM
www.ib.unam.mx/revista/

Research note

First record of *Karualona penuelasi* (Cladocera: Anomopoda: Chydoridae) from Colombia

Primer registro de Karualona penuelasi *(Cladocera: Anomopoda: Chydoridae) de Colombia*

Juan M. Fuentes-Reines [a,*], Lourdes M.A. Elmoor-Loureiro [b]

[a] *Grupo de investigación en Biodiversidad y Conservación de Ecosistemas, Calle 25, Núm. 2-124, Santa Marta, Magdalena, Colombia*
[b] *Laboratório de Biodiversidade Aquática, Universidade Católica de Brasília, QS 7, Lote 1, Bloco M, sala 204, CEP 71966-700, Taguatinga, DF, Brazil*

Received 7 November 2014; accepted 2 June 2015
Available online 10 November 2015

Abstract

The cladoceran *Karualona penuelasi* (Dumont & Silva-Briano, 2000) (Anomopoda: Chydoridae) was found associated with the aquatic macrophytes *Eichhornia crassipes* in Cerro de San Antonio Swamp, Magdalena Department, Colombia. This record represents the first one of the species in Colombia and in South America. Comments on *Karualona muelleri* (Richard, 1897) and *Karualona karua* (King, 1853) are included.

Keywords: Cladocera; Swamp; Colombia; New record

Resumen

El cladócero *Karualona penuelasi* [Dumont y Silva-Briano, 2000] (Anomopoda: Chydoridae) fue encontrado asociado con la macrofita acuática *Eichhornia crassipes* en la ciénaga Cerro de San Antonio, Departamento del Magdalena, Colombia. Este registro representa el primero de la especie en Colombia y en Sudamérica. Se incluyen comentarios sobre *Karualona muelleri* [Richard, 1897] y *Karualona karua* [King, 1853].

Palabras clave: Cladocera; Ciénaga; Colombia; Registro nuevo

According to Van Damme, Maiphae, and Sa-Ardrit (2013), the genus *Karualona* comprises 7 species: *K. karua* (King, 1853), *K. muelleri* (Richard, 1897), *K. iberica* (Alonso & Pretus, 1989), *K. alsafadi* (Dumont & Brancelj, 1994), *K. penuelasi* (Dumont & Silva-Briano, 2000), *K. socotrana* (Dumont & Silva-Briano, 2000), and *K. serrulata* (Van Damme et al., 2013). Of these species, *K. muelleri* and *K. penuelasi* surely occur in the Neotropics, while the presumed records of *K. karua* are doubtful (Sinev & Hollwedel, 2005). Apparently, more species of this genus are present in the tropics, but they are waiting for their formal description (Kotov, Van Damme, et al., 2013).

The study of composition and distribution of the genus *Karualona* in Colombia is still lagging. Up to now, the single valid species known to exist in Colombia is *K. muelleri* (Fuentes, Zoppi-de Roa, Gámez, Morón, & López, 2012). Pearse (1916) reported *Alonella karua* in the Magdalena Department, but this record probably refers to *K. muelleri, K. penuelasi* or an undescribed species. Since no figures or description were presented in Pearse's paper, the specific identity cannot be confirmed. A recent biological survey of the aquatic fauna of a swamp of southern Magdalena yielded 2 parthenogentic females of *K. penuelasi* (Dumont & Silva-Briano, 2000), which was originally described from Peñuelas Dam, Aguascalientes, Mexico. This study reports the first Colombian record of *K. penuelasi*,

* Corresponding author.
E-mail address: juanmanuelfuentesreines@yahoo.com (J.M. Fuentes-Reines).
Peer Review under the responsibility of Universidad Nacional Autónoma de México.

http://dx.doi.org/10.1016/j.rmb.2015.06.015

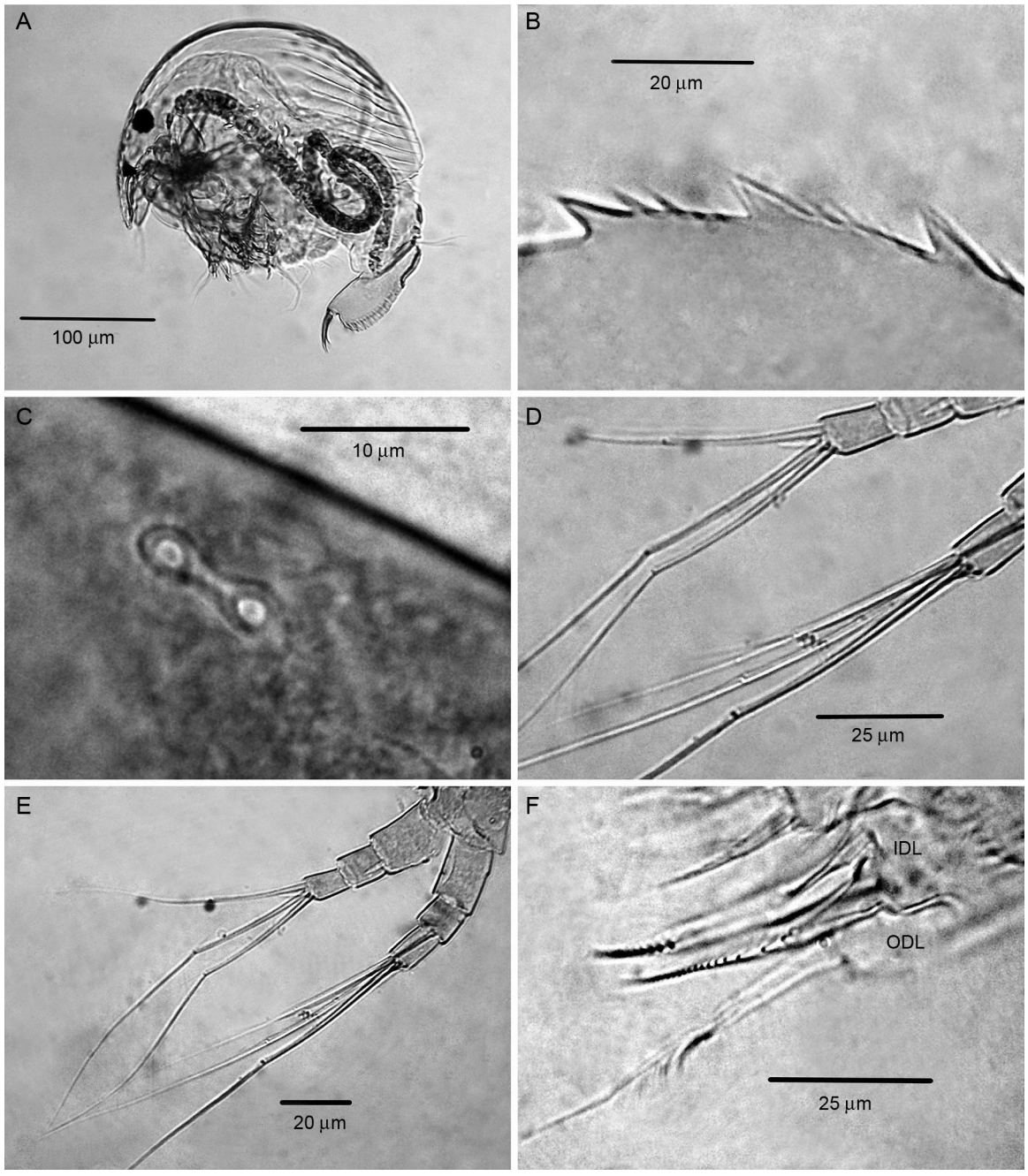

Figure 1. *Karualona penuelasi*, parthenogenetic female: (A) habitus; (B) posteroventral angle of valve; (C) head pores; (D) distal portion of the endopod and exopod of antenna; (E) antenna; (F) limb I.

and indicates an important expansion of the known distributional range of this species, from Central America to South America.

Samples were taken from the aquatic vegetation in Cerro de San Antonio Swamp, Magdalena Department (10°19′30″N, 74°52′05″W), Colombia in June 2004. Water samples were collected using a 65 L bucket. Samples were filtered with a standard zooplankton net (45 µm mesh) and preserved in 70% ethanol. The specimens were dissected and the taxonomically relevant appendages were mounted in semi-permanent slides that were deposited in the Museo de Colecciones Biológicas of the Universidad del Atlántico, Barranquilla-Atlántico, Colombia (UARC210M-UARC214M). The appendages were photographed using a Kodak Easy Share C140 digital camera adapted to a compound microscope. The specimens were measured in lateral position, from the head to the posterior margin of the valves. Identifications were according with Dumont and Silva-Briano (2000), Elías-Gutiérrez et al. (2008) and Van Damme et al. (2013).

Karualona penuelasi was found associated with the aquatic macrophyte *Eichhornia crassipes* (Mart.) Solms. The analyzed specimens showed the typical characteristics of *K. penuelasi*. Body oval (Fig. 1A); body length from head to posterior part of valve ranging from 0.25 to 0.28 mm ($n = 2$, mean = 0.27 mm); length:height ratio 1.4, sculpture of valve with 10 striae

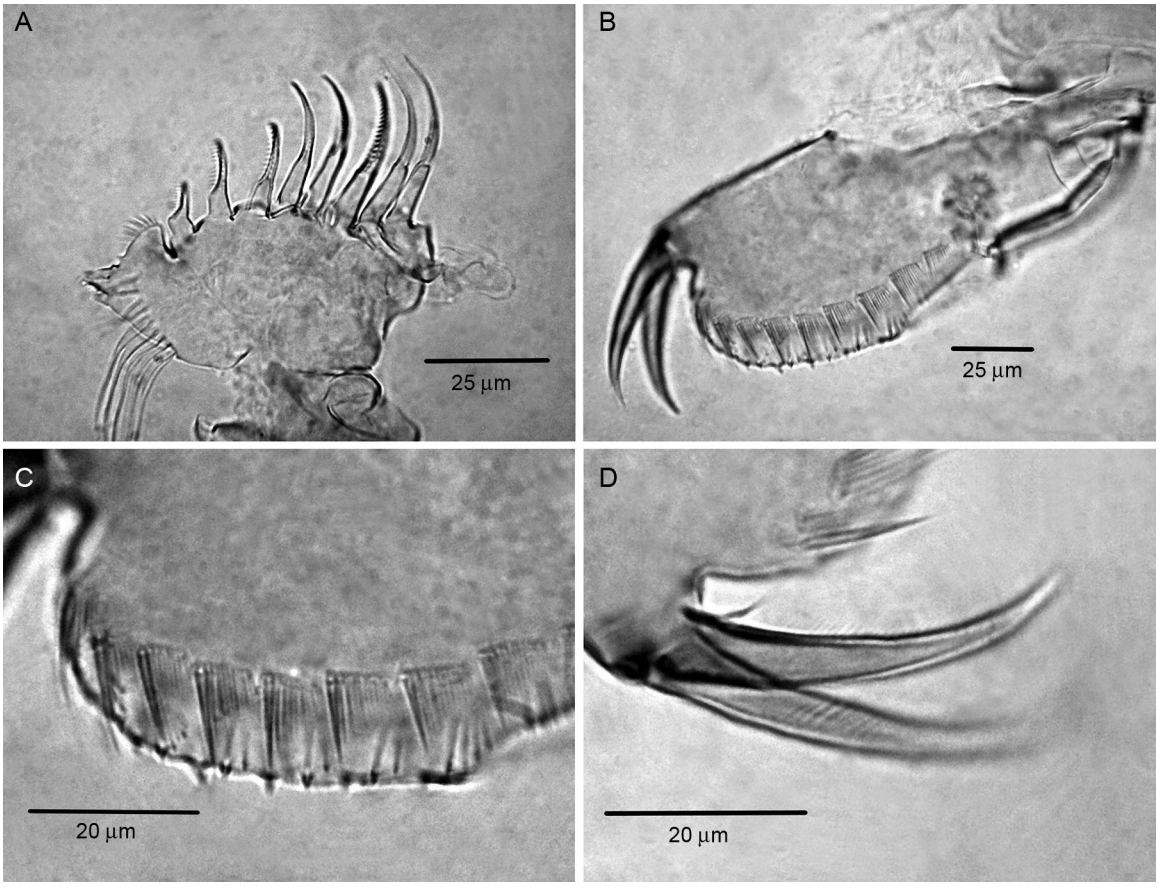

Figure 2. *Karualona penuelasi*, parthenogenetic female: (A) limb II; (B) postabdomen; (C) lateral fascicles of postabdomen; (D) postadbominal claw.

(Fig. 1A); postero-ventral corner of valve with 3–4 setules between each pair of denticles (Fig. 1B); 2 main head pores; connected, as the genus (Fig. 1C); antenna II with setal formula 0-1-3/0-0-3; all apical setae of antennal exopod of same thickness (Fig. 1D and E). Inner distal lobe (IDL) of trunk limb I with 3 setae; inner and outer setae of different size; outer distal lobe (ODL) of limb I with long seta (Fig. 1F); all scrapers on trunk of limb II with denticles of equal thickness (Fig. 2A); postabdomen robust, lateral fascicles thin, short; distal setules length of lateral fascicles of postabdomen/postabdominal claw base width ratio about 1.5 (Fig. 2B and C); postabdominal claw with fine pecten and small basal spine on base (Fig. 2D).

Karualona penuelasi is considered as a Neotropical species (Dumont & Silva-Briano, 2000; Kotov, Forró, Korovchinsky, & Petrusek, 2013; Van Damme et al., 2013) and most closely resembles *K. muelleri* and *K. karua* in the body shape and valve sculpture, but these species can be separated by the following characters: (1) setae on the antennal exopod are of the same thickness in *K. penuelasi* and *K. karua* (Dumont & Silva-Briano, 2000; figs. 2 and 3) while in *K. muelleri* the longest seta is thicker than the others (Sinev & Hollwedel, 2005; fig. 19); (2) lateral fascicles of postabdomen are thin and short in *K. penuelasi* (Dumont & Silva-Briano, 2000; fig. 15-2, present paper, Fig. 2C) while in *K. muelleri* and *K. karua* they are thick and long (Sinev & Hollwedel, 2005; figs. 20–22; Dumont & Silva-Briano, 2000; fig. 15-5); (3) length of distal setules in lateral fascicles located on the postabdomen/diameter of postabdominal claw base ratio about 1.5 in *K. penuelasi* (Dumont & Silva-Briano, 2000; fig. 15-2, present paper, Fig. 2C) while in *K. muelleri* and *K. karua* about 2 (Sinev & Hollwedel, 2005; figs. 20–22; Dumont & Silva-Briano, 2000; fig. 15-5); (4) outer and inner setae of IDL of limb I of different size in *K. penuelasi* and *K. karua* (Dumont & Silva-Briano, 2000; fig. 6-2; 6-3, present paper, Fig. 1F) while in *K. muelleri* both setae are of the same size (Sinev & Hollwedel, 2005; fig. 25); (5) all scrapers of limb II with denticles of equal thickness in *K. penuelasi* and *K. karua* (Dumont & Silva-Briano, 2000; figs. 9-2, 9-3, present paper, Fig. 2A) while in *K. muelleri* scrapers 3 and 6 present more robust denticles (Sinev & Hollwedel, 2005; fig. 26); (6) length of scrapers 1 and 2 of limb II of the same size in *K. penuelasi* and *K. muelleri* (Dumont & Silva-Briano, 2000; fig. 9-3; Sinev & Hollwedel, 2005; fig. 26; present paper, Fig. 2A) of different in size in *K. karua* (Dumont & Silva-Briano, 2000; fig. 9-2); (7) postero-ventral corner of valve with 1–4 setules between each pair of denticles in *K. penuelasi* (Dumont & Silva-Briano, 2000; fig. 5-1, Sinev & Hollwedel, 2005: 100; present paper, Fig. 1B), 5–7 in *K. muelleri* (Sinev & Hollwedel, 2005; fig. 17) and 4 in *K. karua* (Dumont & Silva-Briano, 2000; fig. 5-2).

In the surveyed area, *K. penuelasi* was found associated to the aquatic vegetation, where water temperature was 32.6 °C, conductivity 260 µS m^{-1}, total dissolved solids 120, and pH 8.4. The presence of *K. penuelasi* in nearby waters seems

very likely, so a wider distribution in South America might be expected.

We are very grateful to Dr. Silva-Briano and Dr. Sinev Artem for their valuable consultations. This study was financially supported by the Fundación para la Participación, Capacitación y la Investigación Social "FUPARCIS".

References

Dumont, H. J., & Silva-Briano, M. (2000). *Karualona* n. gen. (Anomopoda, Chydoridae), with a description of two new species, and a key to all known species. *Hydrobiologia*, *435*, 61–82.

Elías-Gutiérrez, M., Suárez, E., Gutiérrez, M., Silva, M., Granados, J., & Garfia, T. (2008). *Cladocera y Copepoda de las aguas continentales de México*. México D.F.: Comisión Nacional para el Conocimiento y Uso de la Biodiversidad, Facultad de Estudios Superiores-Iztacala (UNAM), El Colegio de la Frontera Sur.

Fuentes, J., Zoppi-de Roa, E., Gámez, D., Morón, E., & López, C. (2012). Conocimiento de la fauna de Cladocera (Crustacea: Branchiopoda) de la ciénaga Grande de Santa Marta, Colombia. *Boletín de Investigaciones Marinas y Costeras*, *41*, 121–167.

Kotov, A., Forró, A. L., Korovchinsky, N. M., & Petrusek, A. (2013). *World checklist of freshwater Cladocera species. World Wide Web electronic publication*. Retrieved from: http://fada.biodiversity.be/group/show/17

Kotov, A. A., Van Damme, K., Bekker, E. I., Siboualipha, S., Silva-Briano, M., Adabache-Ortiz, A., et al. (2013). Cladocera (Crustacea: Branchiopoda) of Vientiane province and municipality, Laos. *Journal of Limnology*, *72*(S2), 81–108.

Pearse, A. S. (1916). An account of the Crustacea collected by the Walker Expedition to Santa Marta Colombia. *Proceedings of the United States National Museum*, *49*, 530–556.

Sinev, A. Y., & Hollwedel, W. (2005). Translocation of *Alona muelleri* Richard, 1897 into the genus *Karualona* Dumont and Silva-Briano, 2000 (Branchiopoda: Anomopoda: Chydoridae). *Arthropoda Selecta*, *14*, 93–101.

Van Damme, K., Maiphae, P., & Sa-Ardrit, P. (2013). Inland swamps in South East Asia harbour hidden cladoceran diversities: species richness and the description of new paludal Chydoridae (Crustacea: Branchiopoda: Cladocera) from Southern Thailand. *Journal of Limnology*, *72*(S2), 174–208.