

Occurrence of *Guernella raphaelis* Richard, 1892 (Crustacea: Cladocera: Macrothricidae) in Ciénaga Grande de Santa Marta, Colombia

Juan M. Fuentes-Reines^{1*} and Lourdes M.A. Elmoor-Loureiro²

¹ Universidad del Magdalena, Grupo de investigación en Limnología. A.A 731. Santa Marta, Magdalena, Colombia.

² Universidade Católica de Brasília, Laboratório de Zoologia, UCB, QS 7, Lote 1, Bloco M, sala 331. CEP 71966-700. Taguatinga, DF, Brazil.

* Corresponding author. E-mail: juanmanuel Fuentesreines@yahoo.com

ABSTRACT: The occurrence of *Guernella raphaelis* Richard, 1892 in Ciénaga Grande de Santa Marta, Colombia, is reported. The specimens are briefly described and compared with literature data. The Colombian specimens are very similar to previously described Brazilian and Argentinean populations, presenting four setae on the inner distal lobe of trunk limb I and ciliated lamella on postabdominal claws. On the other hand, they differ from New Guinean specimens which present three setae on the inner lobe of trunk limb I. The present observations support the idea that *Guernella raphaelis* could be a complex of species, reinforcing the necessity of a revision of this genus.

Guernella raphaelis Richard, 1892 is a tropicopolitan species (Frey 1988), described from Congo specimens and has been reported from Asia (Sri Lanka, China, Thailand, and Malasia), Africa (Somalia, Uganda, Nigeria, and Chad), and Oceania (New Guinea) (Richard 1892; Thomas 1961; Rey and Saint-Jean 1968; Frey 1988; Jeje 1989; Smirnov 1992; Sanoumang 1998; Garfías-Espejo and Elías-Gutiérrez 2003). In the American continent, *Guernella raphaelis* has been recorded from Southern United States of America (Frey 1988), Mexico (Elías-Gutiérrez *et al.* 2001), Venezuela (Zoppi de Roa and Vasquez 1991), Brazil (Serafim Jr *et al.* 2003; Hollwedel *et al.* 2003; Elmoor-Loureiro *et al.* 2010), and Argentina (Paggi 1976). The present paper reports the occurrence of *Guernella raphaelis* in Colombia and presents a brief description of the specimens.

The samples were taken from Southern Ciénaga Grande de Santa Marta, Magdalena State, Colombia (10°52'11.25" N and 74°19'31.64" W), from March to November 2009, in floating and submerged vegetation (macrophytes) of the littoral zone. Twenty liters of water were taken from the littoral zone with vegetation and open water, filtered with a zooplankton net (45 µm) and preserved in formalin 4% with previous addition of a narcotic-like carbon dioxide of soda. The specimens were measured in lateral position, from the head to the posterior part of the valves. The voucher specimens were deposited at Museo de Colecciones Biológicas de la Universidad del Atlántico – Colombia (UARC52M).

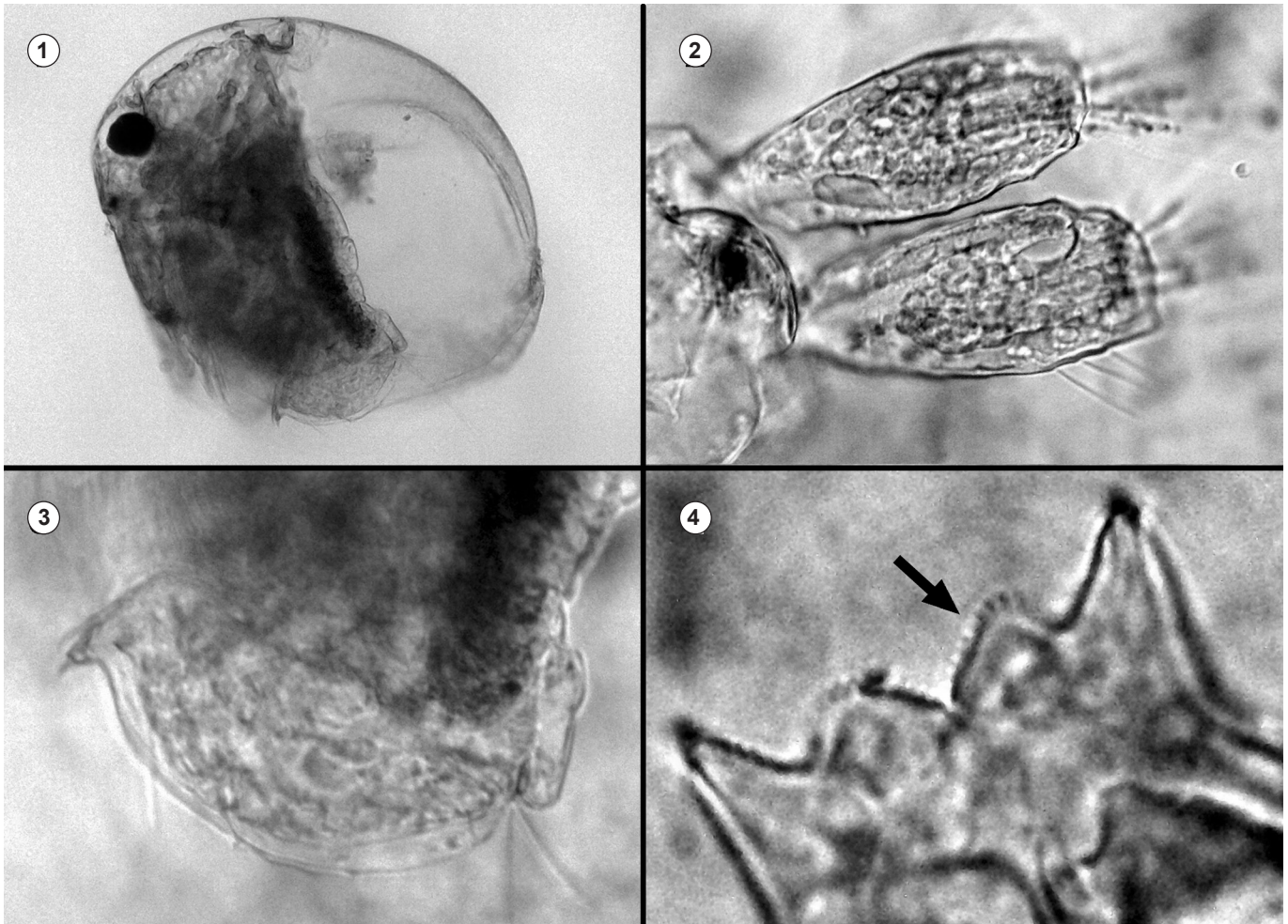
The analyzed specimens (Figures 1-6) are round, the length ranging from 315 to 330 µm. Carapace and head without reticulation (Figure 1). Antennules robust, with setae in the lateral part and at the end. There are three setules in the lateral part of antennules decreasing to distal extreme (Figure 2), similar to Smirnov's illustration (1992). Paggi (1976) observed in Argentine specimens, antennules with three or four setules suggesting that

it is a variable character. The antenna is typical for Macrothricidae family. There are four setae on the inner distal lobe of trunk limb I, one of them much shorter than the others (Figure 5). On trunk limb II, eight scrapers are present; the filter comb has four setae. Exopodite of trunk limb III with 5 setae (Figure 6). The postabdomen is wide, oval and short (Figure 3), dorsal margin round, with a discrete preanal lobe; postabdominal claw (Figure 4) presents lamella with spinules (named "ciliated lamella" in Paggi 1976).

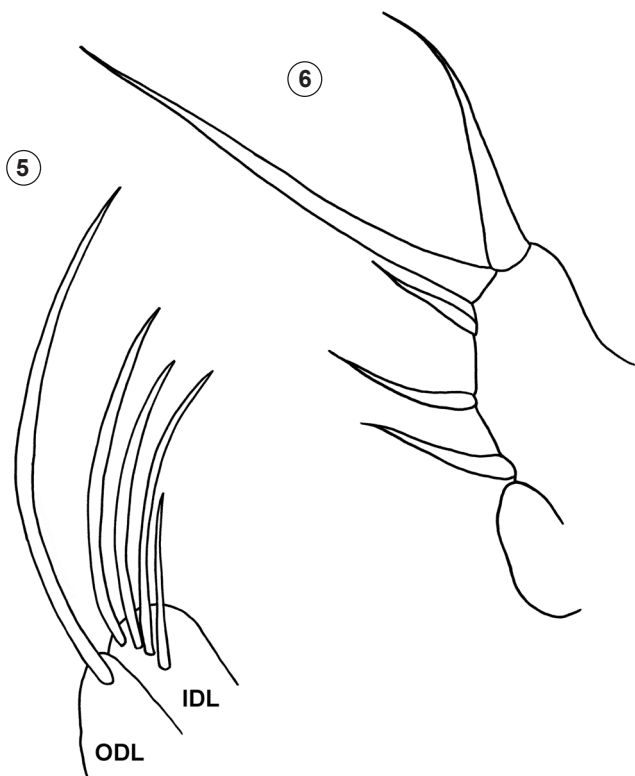
Until now, the number of setae on IDL was reported only for Mexican, Brazilian, Argentine, New Guinean, and Somalian populations. Similar to what we observed for the Colombian ones, specimens from Mexico, Brazil, Argentina, and Somalia have four setae on IDL (Paggi 1976; Smirnov 1992; Garfías-Espejo and Elías-Gutiérrez 2003; Elmoor-Loureiro *et al.* 2010); however, New Guinean specimens present three IDL setae (Garfías-Espejo and Elías-Gutiérrez 2003).

Specimens from Mexican and South American populations have eight scrapers on trunk limb II, while New Guineans present only seven (Garfías-Espejo and Elías-Gutiérrez 2003). Differences in number of setae on the exopodite of trunk limb III have also been reported for different populations: seven setae in Mexican, five-six in Argentine, and four in New Guinean specimens (Paggi 1976; Garfías-Espejo and Elías-Gutiérrez 2003). In this character, the Colombian specimens match the Argentine population, presenting five setae.

The ciliated lamella on postabdominal claw, observed in dorsal view (Figure 6), is reported in the *Guernella raphaelis* populations from Argentina (Paggi 1976) and Brazil (Elmoor-Loureiro *et al.* 2010); it is also present in the figures of Somalian specimens (Smirnov 1992), although its spinules were not drawn. This lamella was not observed in Mexican and New Guinean specimens (Elías-Gutiérrez *et al.* 2001; Garfías-Espejo and Elías-Gutiérrez



FIGURES 1-4. *Guernella raphaelis* from Ciénaga Grande de Santa Marta, Magdalena State, Colombia. (1) female, general view; (2) antennules; (3) postabdomen; (4) claws in dorsal view, the arrow indicating ciliated lamella.



FIGURES 5-6. Schematic drawings (setules omitted) of trunk limbs of *Guernella raphaelis* from Ciénaga Grande de Santa Marta, Magdalena State, Colombia. (5) ODL and IDL of trunk limb I; (6) exopodite of trunk limb III.

2003); however, Elías-Gutiérrez *et al.* (2001) observed a row of spinules between the claws, probably homologous to the ciliated lamella. The number of IDL setae and the occurrence of the lamella on postabdominal claw were not discussed for specimens from Africa and Sri Lanka (Richard 1892; Thomas 1961; Rey and Saint-Jean 1968, Frey 1988).

In type material from Congo, Richard (1892) observed that the carapace was conspicuously reticulated. Elías-Gutiérrez *et al.* (2001) also reported a reticulated carapace for Mexican populations. However, the specimens observed from Colombia do not present reticulation. Carapace reticulation is also lacking in some Brazilian populations (Elmoor-Loureiro, unpublished data).

The outcomes suggest that Colombian populations are morphologically closer to Brazilian and Argentine populations than to the ones from other regions. Moreover, the present observations support the idea that *Guernella raphaelis* could be a complex of species, reinforcing the necessity of a revision of this genus, with comparison of material from the type locality and from different continents, as suggested before (Frey 1988; Elías-Gutiérrez *et al.* 2001; Kotov and Ferrari 2010).

LITERATURE CITED

- Elías-Gutiérrez, M., N.N. Smirnov, E. Suárez-Morales and N. Dimas-Flores. 2001. New and little known cladocerans (Crustacea: Anomopoda) from southeastern Mexico. *Hydrobiologia* 442: 41-54.
- Elmoor-Loureiro L., P.M. Lopez, S.B. Jesus, L.R. Bozelli and F.T.F. Aleluia. 2010. New records of *Guernella* Richard 1892 (Cladocera, Macrotrichidae) from Brazil. *Brazilian Journal of Biology* 70(3): 687-688.

- Frey, D.G. 1988. Are there tropicopolitan Macrothricid Cladocera? *Acta Limnologica Brasiliensia* 2: 513-525.
- Garfias-Espejo, T. and Elías-Gutiérrez, M. 2003. Taxonomy and distribution of Macrothricidae (Crustacea: Anomopoda) in southeastern Mexico, northern Guatemala and Belize. *Anales del Instituto de Biología* 74(2): 1051-134.
- Hollwedel, W., A.A. Kotov and G.O. Brandorff. 2003. Cladocera (Crustacea: Branchiopoda) from the Pantanal (Brazil). *Arthropoda Selecta* 12(2): 67-93.
- Jeje, C.Y. 1989. The Cladoceran fauna of Nigeria: checklist, review of literature and distribution. *Revue d'Hydrobiologie Tropicale* 22(1): 3-11.
- Kotov, A.A. and F.D. Ferrari. 2010. The taxonomic research of Jules Richard on Cladocera (Crustacea: Branchiopoda) and his collection at the National Museum of Natural History, U.S.A. *Zootaxa* 2551: 37-64.
- Paggi, J.C. 1976. Cladoceros Macrothricidae nuevos para la fauna Argentina. *Physis* 35(91): 103-112.
- Rey, J. and L. Saint-Jean. 1968. Les Cladocères (Crustacés, Branchiopodes) du Tchad (Première note). *Cahiers Orstom, Serie hydrobiologie* 2 (3/4): 79-118.
- Richard, J. 1892. *Grimaldina brazzai*, *Guernella raphaelis*, *Moinodaphnia mocquerysi*, cladocères nouveaux du Congo. *Mémoires de la Société Zoologique de France* 5: 1-4.
- Sanoamuang, L. 1998. Contributions to the knowledge of the Cladocera of north-east Thailand. *Hydrobiologia* 362: 45-53.
- Serafim Jr., M., F.A. Lansac-Tôha, J.C. Paggi, L.F.M. Velho and B.A. Robertson. 2003. Cladocera fauna composition in a river-lagoon system of the upper Paraná River floodplain, with a new record for Brazil. *Brazilian Journal of Biology* 63(2): 349-356.
- Smirnov, N.N. 1992. The Macrothricidae of the world. Amsterdam: SPB Academic Publishing. 143 p.
- Thomas, I.F. 1961. The Cladocera of the swamps of Uganda. *Crustaceana* 2 (2): 108-125.
- Zoppi de Roa, E. and W. Vásquez. 1991. Additional cladoceran records for Mantecal and new for Venezuela. *Hydrobiologia* 225(1): 45-62.

RECEIVED: May 2011

LAST REVISED: October 2011

ACCEPTED: November 2011

PUBLISHED ONLINE: December 2011

EDITORIAL RESPONSIBILITY: Rodrigo Johnsson