

Occurrence of abnormalities on labral keel of *Coronatella monacantha* (Cladocera, Anomopoda, Chydoridae) in a population from Ceará, Brazil

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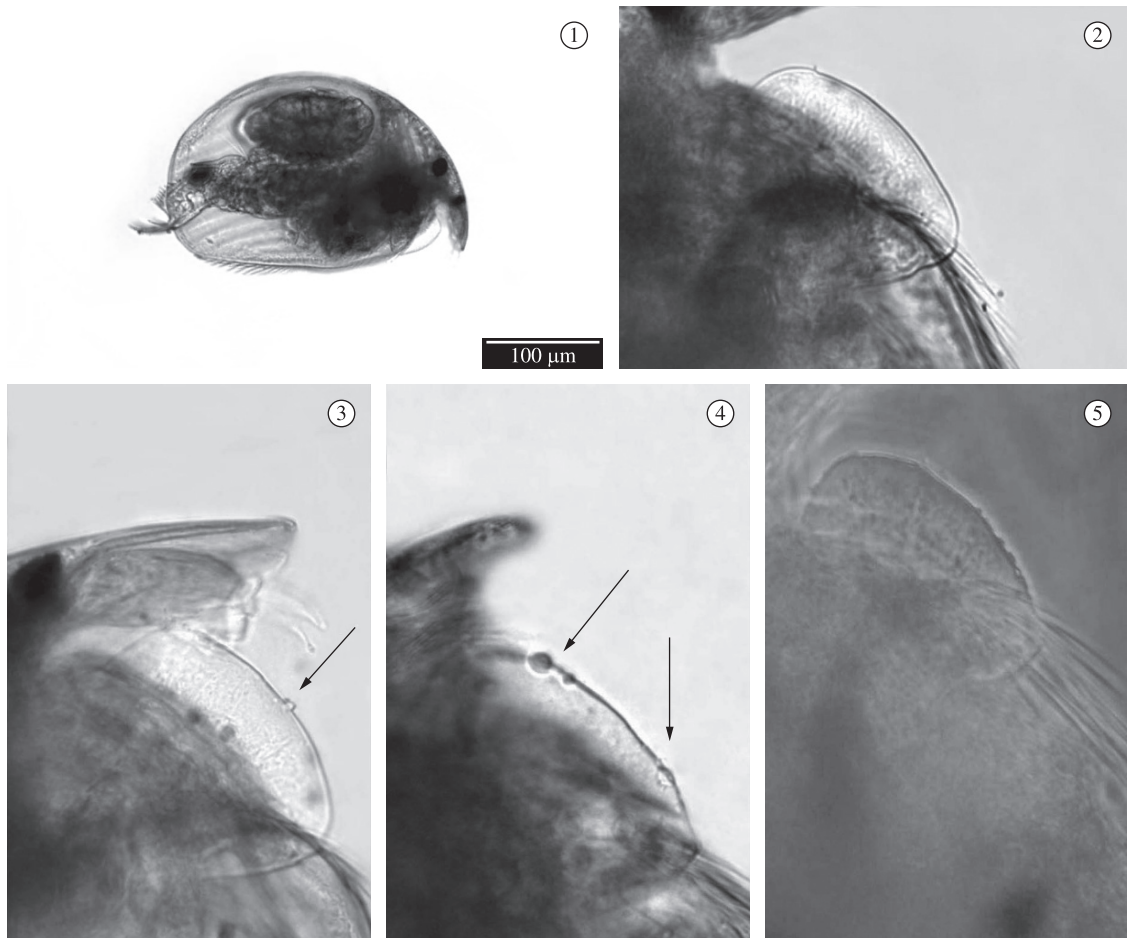
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(With 5 figures)

As a result of agricultural and industrial activities, the contamination of aquatic environments by trace-elements has been increasing (Zou and Bu, 1994). This kind of contamination affects water quality directly, and consequently, biological communities, which can cause modifications at an individual level. Martinez et al. (2006) observed deformities in *Chironomus tentans* larvae when exposed to arsenic. Bioassays have shown that mercury

and methylmercury induce abnormalities in the gills of Trichoptera and Ephemeroptera juveniles (Skinner and Bennett, 2007). However, studies on the effects of trace-elements on aquatic invertebrates are still incipient.

In a survey of fauna carried out in Ceará State, the occurrence of *Alona monacantha* Sars 1901, was reported (Sousa et al., 2009). This species has recently been transferred to genus *Coronatella* (Van Damme et al., 2010).



Figures 1-5. *Coronatella monacantha* (Sars 1901) from Garibas Stream, Ceará, Brazil. 1) adult female; 2) normal labral keel; and 3-5) abnormal labral keel.

The analysis of *Coronatella monacantha* specimens revealed the occurrence of some tumor-like modifications on the labral keel (Figures 1-5) of individuals sampled from Garibas Stream (São Gonçalo do Amarante; 3° 33' 19" S and 38° 52' 27" W). The sampling was conducted on December 19th, 2007, using a plankton net agitated among aquatic vegetation; the sample was preserved in 4% formalin.

Values of pH, dissolved oxygen and heavy metals dissolved in water were measured, revealing a low dissolved oxygen level (<2.0 mg/L), acid pH (<6.0) and high concentrations of total and soluble iron (>0.6 mg/L). The observed levels of dissolved oxygen and pH are compatible with freshwater environments with intense iron metabolism (Esteves, 1998). The concentration of iron observed exceeded the limit established by the Brazilian environmental legislation, which is 0.3 mg/L for freshwater intended for the protection of aquatic organisms and human consumption (Brasil, 2005).

A total of 47 individuals of *C. monacantha* from Garibas Stream were observed, and 27.70% of these presented modifications on the surface of the labral keel, which was irregular and variable in appearance (Figures 3-5). No morphological alteration was observed in the general shape, carapace, antennas, antennules and post-abdomen.

The occurrence of morphological abnormalities in Cladocera has been occasionally reported (Smirnov, 1996; Shurin and Dodson, 1997; Sinev, 2000). Elmoor-Loureiro (2004) observed modifications in the post-anal spines and claws of *Ilyocryptus spinifer*, and Zanata et al. (2008) reported abnormalities in the valves of three species of *Daphnia*. Nevertheless, the causes and consequences of these morphological abnormalities for microcrustaceans have not been properly investigated.

Most trace-elements are fundamental for aquatic organisms' health, such as iron, which is directly involved in the metabolic process. However, exposure to high concentrations of this metal can generate free radicals, which actively participate in organic molecule oxidation, causing cell damage (Buratini and Brandelli, 2006). The high concentrations of total and soluble iron observed in Garibas Stream suggest that this metal could be accumulated in *C. monacantha* tissues, and consequently, could be responsible for the observed modifications in the labral keel of some individuals. Nevertheless, the actual cause of high concentrations of iron in Garibas Stream is still unknown.

Although the data here are not conclusive about the causes of morphological abnormalities, they suggest that cladocerans are very sensitive to environmental conditions, which corroborates the idea that they are suitable organisms for use as a bioindicator of water quality.

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