

## SHORT COMMUNICATION

# First record of *Craspedacusta sowerbii* Lankester, 1880 (Cnidaria: Limnomedusae) in the Azores

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Raposeiro, P.M., J.C. Ramos & A.C. Costa 2011. First record of *Craspedacusta sowerbii* Lankester, 1880 (Cnidaria: Limnomedusae) in the Azores. *Arquipelago. Life and Marine Sciences* 28: 11-13.

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## INTRODUCTION

*Craspedacusta sowerbii* (Lankester, 1880), is a freshwater planktonic medusa first discovered by Mr. Sowerby in 1880, in a water lily tank in Regent's Park, London (Rayner 1988; Moreno-Leon & Ortega-Rubio 2009). The 11 species originally described (Jankowski 2001), most of them from the Yangtze River (China), were synonymised into two species *C. sowerbii* and *C. sinensis*, following morphological (Jankowski 2001) and molecular phylogenetic analysis (Fritz et al. 2009; Zhang et al. 2009).

*C. sowerbii* is the most widespread freshwater medusa (Jankowski et al. 2008), recognised as a cosmopolitan invader and present in temperate climates almost globally and commonly occurs on all continents, except Antarctica (Rayner 1988; Dumont 1994). This species presents specific adaptations favouring dispersal such as the capacity to develop a durable, chitin covered, resting body (Bouillon & Boero 2000), several forms of vegetative reproduction, such as budding a polyp, which stays attached to form a colony and budding motile frustules that attach and build new long-term survival polyps without sexual reproduction (Fritz et al. 2007). *C. sowerbii* is found in nearly all types of freshwater habitats, i.e. streams, lakes and ponds, in particular in meso-

trophic to eutrophic habitats (Jankowski et al. 2008).

This short communication, reporting the occurrence of *C. sowerbii* in the Congro Lake (São Miguel), is a result of the ongoing monitoring work of freshwater ecosystems performed by the University of Azores (e.g. Gonçalves et al. 2008; Raposeiro & Costa 2009). Intense sampling has been carried out for the last six years in freshwater systems, but only now did we find this species.

## MATERIAL AND METHODS

A single medusa of *C. sowerbii* was collected from the Congro Lake by one of the authors (JCR), on 17 September 2010, in the water column with a vial during a sampling campaign. The lake is located on São Miguel Island at 37°45'20"N and 25°24'30"W, 420 m above sea level. It covers 330 km<sup>2</sup> and has a maximum depth of 16 m. A summary of the lake's chemical and biological variables is presented in Table 1. The specimen was fixed in 10% formalin and deposited in the collection of the Department of Biology (University of the Azores) under the provisional catalogue number, DB\_FW\_SMG\_0002 (Fig. 1).

Table 1. Chemical and biological variables of surface water at Congro Lake

<b>Physical-chemical data</b>	
Water temperature (°C)	21.70
pH	8.74
Dissolved Oxygen (% Saturation)	106.30
Conductivity at 20,0°C (µS/cm)	91.80
Turbidity (NTU)	2.10
Alkalinity (mg CaCO <sub>3</sub> /L)	25.00
Ammonium (mg NH <sub>4</sub> /L)	0.02
Kjeldahl nitrogen (mg N/L)	0.30
<b>Biological data</b>	
Chlorophyll <i>a</i> (µg/L)	7.36

## RESULTS AND DISCUSSION

Since the discovery of the original *Craspedacusta sowerbii* in Regent's Park in 1880, this species has been found to be widespread on all continents, except Antarctica (Rayner 1988; Dumont 1994). In mainland Europe, the first observations were reported in 1901 in France (Sowerby 1941) and in Portugal in 1985 (Ferreira 1985). This is the first record of *C. sowerbii* for Macaronesia. According to Gonçalves (2008), Congro Lake presents a eutrophic state with high phytoplankton biomasses dominated by *Aphanizomenon flos-aqua* and *Asterionella formosa*. *C. sowerbii* has not only been found in eutrophic conditions (e.g. eutrophic pond near Aachen, Germany (Jankowski et al. 2005), but also occurs in mesoeutrophic lakes, such as Lagoa Misteriosa in Brazil (Moreno-Leon & Ortega-Rubio 2009). According to Green (1992), Congro Lake presents zooplankton biomasses dominated by small rotifers *Hexarthra mira* (<0.25 mm) and small cladocerans *Chydorus sphaericus* (<0.50 mm).

A work by Smith & Alexander Jr. (2008), clearly showed that *C. sowerbii* kill and consume a variety of zooplankton with preference for small organisms between 0.1 and 0.5 mm in size.

The presence of *C. sowerbii* in the Azores is probably a result from the ongoing expansion of this species related to intercontinental human mediated co-transportation of drought-resistant resting stages with plants and fish (Dumont

1994), and climate changes (Jankowski et al. 2008). Other examples of the presence of *C. sowerbii* in oceanic islands were reported by Edmondson (1940) from Hawaii and Belk & Hotaling (1971) from Guam Island. Thus, *C. sowerbii* disperse easily and are able to colonise distant places, such as oceanic islands, typical of cosmopolitan species.



Fig. 1. *Craspedacusta sowerbii*, caught in September 2010 in Congro Lake on São Miguel Island, Azores.

During the 15 years of biological monitoring of Azorean lakes, *C. sowerbii* had never been previously found. In spite of insular systems being potentially highly vulnerable to invasive species due to low levels of diversity (and therefore competitors) and availability of ecological niches, the impact of this widespread jellyfish in Azorean lakes is unclear. It has been shown that *C. sowerbii* medusa blooms can significantly impact abundances of adult copepods and copepod nauplii (Jankowski & Ratte 2000; Jankowski et al. 2005). While blooms of *C. sowerbii* may be infrequent and sporadic, they have the potential to significantly impact aquatic food webs by removing a sizable proportion of the plankton (Davis 1955; Boothroyd et al. 2002). However, until more animals are found, it cannot be established if a successful population of *C. sowerbii* occurs in this lake. If so, future studies on feeding preferences and feeding habits will be important to determine the impact of *C. sowerbii* in Azorean lakes.

## ACKNOWLEDGEMENTS

Part of this study was financed by Fundação para a Ciência e Tecnologia (SFRH/BD/28798/2006). We also thank the anonymous referees that provided helpful comments and suggestions that improved the scope and content of the manuscript. We thank INOVA for providing the chemical data.

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Accepted 6 December 2010.