

Rapid Communication

Craspedacusta sowerbii Lankester, 1880 in southern Portugal

José N. Gomes-Pereira^{1*} and Gisela Dionísio²

¹ Centre of IMAR of the University of the Azores, Department of Oceanography and Fisheries and LARSyS Associated Laboratory, Rua Prof. Frederico Machado no. 4, 9901-862 Horta, Faial, Açores, Portugal

² Departamento de Biologia & CESAM, Universidade de Aveiro, Campus Universitário de Santiago, 3810-193 Aveiro, Portugal; Marine Ecophysiology and Climate Change Assessment Group (MECCA), Laboratório Marítimo da Guia, Centro de Oceanografia, Faculdade de Ciências da Universidade de Lisboa, Av. Nossa Senhora do Cabo, 939, 2750-374 Cascais, Portugal

E-mail: josenunopereira@uac.pt (JNG-P), gisela.dionisio@ua.pt (GD)

*Corresponding author

Received: 2 January 2013 / Accepted: 27 March 2013 / Published online: 15 April 2013

Handling editor: Ian Duggan

Abstract

Craspedacusta sowerbii Lankester, 1880 is reported for the first time from one of the largest Portuguese hydrographic basins. Three specimens collected in October 2012 represent the third record from Portugal and the first on the Sado hydrographic basin (south Portugal). We provide evidence on the range extension of *C. sowerbii* within Portuguese freshwater habitats, and outline the current lack of knowledge on the distribution in the southwest Iberian Peninsula.

Key words: freshwater medusa; non-native species; Sado basin; Southwest Europe

Introduction

Craspedacusta sowerbii Lankester, 1880 is the most widespread freshwater cnidarian that possess medusae (Dumont 1994), having a cosmopolitan distribution (Jankowski 2008). It inhabits nearly all types of sub-tropical and warm-temperate freshwater habitats, with a preference for calmer water bodies, such as lakes, dams and ponds (Pennak 1956; Dumont 1994; Jankowski 2001). No freshwater cnidarians with medusa evolved in Europe or the Americas, but *Craspedacusta sowerbii* has succeeded in colonizing all continents, except Antarctica (Dumont 1994).

Craspedacusta sowerbii (Hydrozoa: Limnomedusae: Olindiidae) has spread from its home range in the Yangtze valley, east Asia (Kramp 1950; Jankowski 2001), reaching all temperate continents during the twentieth century (the global distribution is reviewed by Dumont 1994). The successful spread of this species derives from the possession of resilient life stages and

reproductive versatility, including drought-resistant resting stages (Dumont 1994; Bouillon and Boero 2000), and different vegetative reproduction methods, such as budding of polyps and motile frustules that allow long-term survival without sexual reproduction (Fritz et al. 2007). Human mediated transportation via fish and plants are thought to be among the major dispersal vectors (Dumont 1994).

Craspedacusta sowerbii was first reported in Portugal by Ferreira (1985) from a sudden occurrence in September 1983 in the Idanha reservoir, in the Tagus river basin. Ferreira (1985) also reports their previous occurrence in northern Douro river basin, in September 1981 and October 1982, in the Távora reservoir. There has been no systematic survey or available data on their occurrence in Portugal since 1983. Jankowski et al. (2008) compiled the world distribution records after Dumont (1994), and information on their occurrence in the southwest Iberian region remains scarce (García-Berthou et al. 2007).

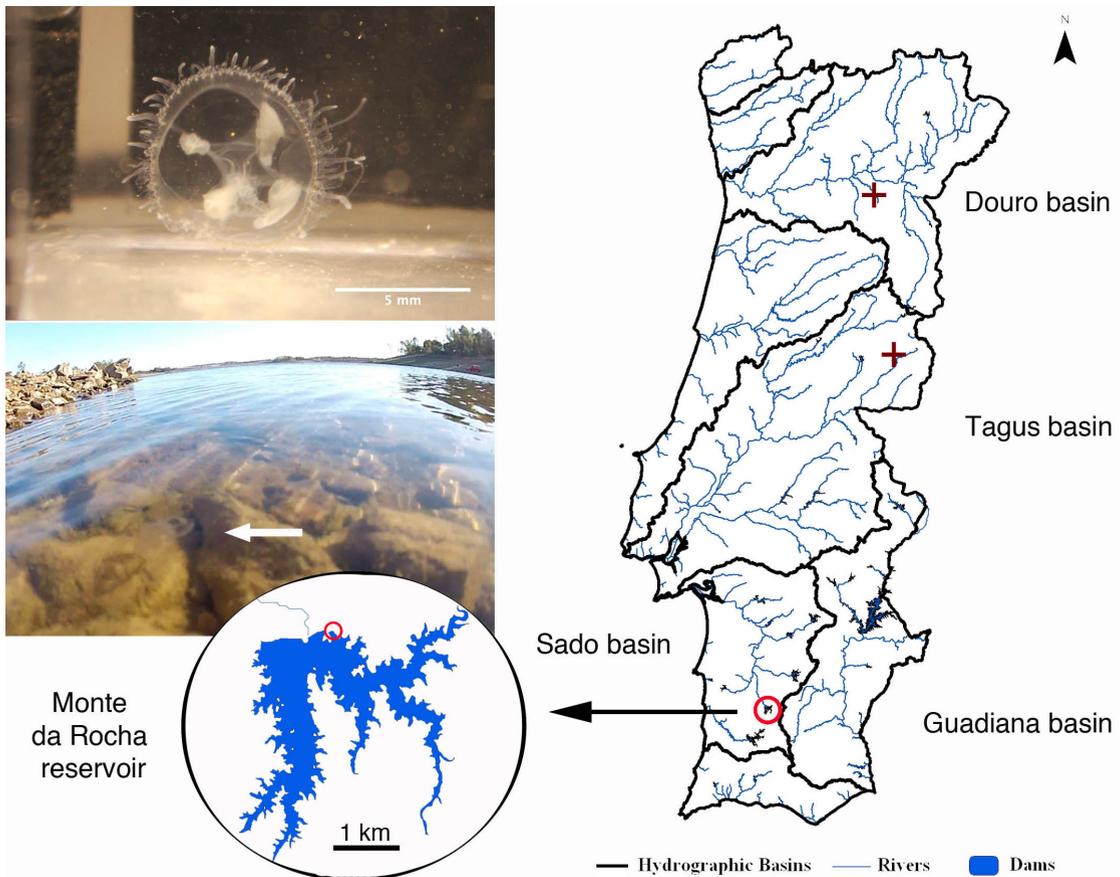


Figure 1. Occurrence of *Craspedacusta sowerbii* in major Portuguese hydrographic basins, including Sado basin, with an indication of the location of Monte da Rocha reservoir (red circle); (left) *C. sowerbii* collected on 16 October 2012, on the margin of Monte da Rocha reservoir (below) and photographed in the laboratory (above); + indicates previous occurrences of *C. sowerbii* in Portuguese reservoirs reported by Ferreira (1985) (Portuguese basins and freshwater bodies provided by the Portuguese Hydrographic Institute, photographs by J.N. Gomes-Pereira and G. Dionísio).

Following this, we provide further evidence of a southward movement of the species in the southern Portugal Sado basin, in the Monte da Rocha reservoir.

Methods

Observations occurred during an opportunistic survey on the Monte da Rocha reservoir, an artificial dam located in the south of Portugal (Figure 1). It occurs within the Sado hydrographic basin, and is supplied by a tributary from Rio Sado (Figure 1). This artificial lake was created in 1972, with a purpose predominantly of agricultural supply, having a useful capacity of 97,500,000 m³ (ARBCAS 2012).

Three specimens of *Craspedacusta sowerbii* were observed, photographed and collected in the north of the Monte da Rocha reservoir, close to the dam (37.729332 N, -8.280030 W; Figure 1). Samples were preserved in 95% ethanol and stored at Laboratório Marítimo da Guia, Faculty of Sciences, University of Lisbon, Portugal.

Results

The specimens were observed from the lake margin distanced 0.5 to 1.0 meters apart, swimming in shallow water (maximum depth 10 cm), entrapped between the water surface and the cobbles (Figure 1). From a close inspection

of the surrounding margin, no other specimens were observed. Species were identified from their transparent bell shape, with sizes ranging 7.29 ± 0.13 mm. A whorl of tentacles extends around the bell edge, and the four large gonads of opaque coloration also gave conspicuous evidence of the species identification. Water temperature during the sampling month averaged 25.3°C (average of daily maximum values; CORT 2012).

Discussion

Craspedacusta sowerbii is one of the few freshwater cnidarians with a pelagic life-stage. Medusae can occur at high abundance over several consecutive years, but may then be absent for several years subsequently (Acker and Muscat 1976). In temperate regions their occurrence is often restricted to summer months (Dumont 1994). Existing evidence suggests that warm temperatures (DeVries 1992) and food availability (Lytle 1961) may induce the budding of the medusa from the polyp stage. This combination causes temporary blooms, particularly with warmer waters (e.g. Ferreira 1985; Rayner 1988; Stefani et al. 2010), normally during summer or early autumn. As our observations suggest, Ferreira (1985) reported large blooms in north and central Portugal, in September and October (1981–83). The association of blooms with warm temperatures poses concerns regarding the present lack of knowledge of the species distribution in particular locations, in view of the current climate trends. While some studies have suggested a low trophic impact of *Craspedacusta* medusae on freshwater ecosystems (Dodson and Cooper 1983; Spadinger and Maier 1999), and co-occurrence with highly abundant fish (Jankowski et al. 2005), they do have the potential to impact zooplankton communities, with cascading effects on food webs (see review in Smith and Alexander 2008).

Craspedacusta sowerbii has been mostly reported in reservoirs in the Iberian Peninsula (Margalef 1974; Pérez-Bote 2006), as it has been frequently observed world-wide (DeVries 1992). Some authors have suggested that reservoirs provide better conditions for the development of the fragile medusa stage as well as for field observations (Duggan and Eastwood 2012). Iberian occurrences include lakes (e.g., Margalef and Prat 1979), irrigation pools (e.g. C. Rosell, unpublished data) or stream pools (e.g. Garrotxa

Volcanic Zone Natural Park staff, unpublished data), showing the species capacity to survive in a variety of habitats.

Monte da Rocha dam is filled from inputs from the Sado River, which indicates the probable origin of the species. The Sado hydrographic basin is entirely located within Portuguese territory, in contrast to both the Tejo and Douro international basins, which extend through the Iberian Peninsula. Its presence in the third largest basin, Guadiana, has not been reported in previous reviews (Dumont 1994; Jankowski et al. 2008). Duggan and Eastwood (2012) indicate that the actual distribution of *C. sowerbii*, as observed by polyps, is much wider than expected according to reports of the medusa alone, and further research in Portugal (and more broadly) should focus on systematic surveys for the presence of polyp stages.

Acknowledgements

The authors acknowledge the insightful refereeing and editorial commentaries on the first version of this manuscript. The motivation given by Mariana LDGP during sampling procedure was most appreciated. IMAR-DOP/UAz is Research and Development Unit no. 531 and LARSyS-Associated Laboratory no. 9 funded by the Portuguese Foundation for Science and Technology (FCT) through plurianual and programmatic funding schemes (OE, FEDER, POCI2001, FSE) and by the Azores Directorate for Science and Technology (DRCT). J.N. Gomes-Pereira is supported by the doctoral grant from the Regional Directorate for Science, Technology and Communications (DRCTC) of the Regional Government of the Azores (M3.1.2/F/062/2011) and G. Dionísio by a FCT PhD scholarship (SFRH/BD/73205/2010). The authors would like to acknowledge MECCA group, from Laboratório Marítimo da Guia, for the photographic material support.

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