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## Occurrence of the freshwater jellyfish *Craspedacusta sowerbii* (Lankester, 1880) (Hydrozoa, Limnomedusae) in a calcareous lake in Mato Grosso do Sul, Brazil

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### Abstract

Silva, W.M. & Roche, K.F. **Occurrence of the freshwater jellyfish *Craspedacusta sowerbii* (Lankester, 1880) (Hydrozoa, Limnomedusae) in a calcareous lake in Mato Grosso do Sul, Brazil.** *Biota Neotrop.* Jan/Apr 2007 vol. 7, no. 1 <http://www.biotaneotropica.org.br/v7n1/pt/abstract?short-communication+bn02107012007> ISSN 1676-0603.

The occurrence of the freshwater jellyfish *Craspedacusta sowerbii* (=sowerbyi) Lankester, 1880 was recorded in April 2006 in the Lagoa Misteriosa water body, a calcareous lake (doline) in Mato Grosso do Sul State, Brazil. Only Rotifera composed the zooplankton community was composed only of Rotifera and the environment was meso-eutrophic system. The nomenclature of *C. sowerbii* is discussed with regard to the use of the correct spelling and an alternative one. The distributions of *C. sowerbii* in Brazil include eight states and in South America the distribution includes four countries.

**Keywords:** *Craspedacusta sowerbii* (=sowerbyi), calcareous lake, freshwater jellyfish, Brazilian centre-west, South America.

### Resumo

Silva, W.M. & Roche, K.F. **Ocorrência da água-viva de água doce *Craspedacusta sowerbii* (Lankester, 1880) (Hydrozoa, Limnomedusae) em um lago calcário no Estado do Mato Grosso do Sul, Brasil.** *Biota Neotrop.* Jan/Apr 2007 vol. 7, no. 1 <http://www.biotaneotropica.org.br/v7n1/pt/abstract?short-communication+bn02107012007> ISSN 1676-0603.

A ocorrência da água-viva de água doce *Craspedacusta sowerbii* (=sowerbyi) Lankester, 1880 foi registrada em abril de 2006, na lagoa Misteriosa, um lago calcário (dolina) no estado do Mato Grosso do Sul, Brasil. A comunidade zooplantônica foi composta apenas por Rotifera e a qualidade da água do sistema apresentou uma classificação de meso-eutrófico. A nomenclatura foi discutida quanto às formas usuais de grafia do nome e proposta uma alternativa. A distribuição da *C. sowerbii* no Brasil inclui oito estados e na América do Sul a distribuição apontou quatro países onde a espécie foi registrada.

**Palavras-chave:** *Craspedacusta sowerbii* (=sowerbyi), lagos calcários, medusa de água doce, centro-oeste, América do Sul.

## Introduction

The freshwater jellyfish *Craspedacusta sowerbii* (Lankester 1880) was first identified in London, England, and has since been recorded around the world (Jankowski 2001). In many freshwaters, this animal appears in blooms in the warm season (Dumont 1994, Silva & Oliveira 1988, McKercher et al. 2006). *Craspedacusta sowerbii* is a hydrozoan with two adult forms, the fixed polyp, and free-living medusae. The latter form, the sexual form, occurring sporadically when environmental conditions permit, is more commonly found during the summer in the temperate regions, while no precise information on seasonal occurrence exists for the tropics. The morphology of the medusae of *C. sowerbii* according to Jankowski (2001) presents a number of tentacles ranging between 200 and 400 (with a diameter from 8.5 to 20 mm) and four prominent perradial tentacles. It is a carnivorous species, with a diet including zooplankton, and eggs and larvae of fish (Dodson & Cooper 1983, Dumont 1994). Jankowski & Ratte (2001) have demonstrated that medusae of this species can exert high predation pressure on populations of cladocerans and cyclopoid copepods.

Figure 1 shows the South American countries, namely Brazil, Argentina, Venezuela and Chile, and Brazilian states where *Craspedacusta sowerbii* has been recorded. In Brazil, the species has been recorded in eight states (Table 1). In Argentina there are three records, Ringuelet (1950), Vannucci & Tundisi (1962) and Boltovskoy & Battistoni (1981). Vannucci & Tundisi (1962) reported also a record in Valparaíso in Chile. In Venezuela, *C. sowerbii* was recorded by Infante & Infante (1994). The present work presents the first record for *Craspedacusta sowerbii* in Mato Grosso do Sul State in the centre-west region of Brazil.

## Material and Methods

Lagoa Misteriosa and its location in Mato Grosso do Sul State and Brazil are shown in Figure 1, while Figure 2 shows a picture of the lake. This lake is a calcareous doline, with a surface area of approximately 1650 m<sup>2</sup>, and a depth of more than 220 m. The geology of the region is characterized by the calcareous Corumbá Group formation (Dias, 2000).

Samples were collected in April 2006, with a cup, from the surface water by the shore; some of the jellyfish were preserved in 50% alcohol and measured using a stereoscopic microscope, while others were maintained live in an aquarium for a few days and photographed. The jellyfish were noted to be present over the entire lake surface, in high densities. At the center of the lake, water was sampled for analysis of chlorophyll *a* (ethanol extraction, after Nusch (1980)), total phosphorus (tin chloride reaction (APHA, 1995)), total alkalinity



**Figure 1.** South America and countries where *Craspedacusta sowerbii* was recorded: 1) Brazil; 2) Argentina; 3) Venezuela and 4) Chile and Brazilian states of occurrences: 1) Rio Grande do Sul; 2) Minas Gerais; 3) Rio de Janeiro; 4) São Paulo; 5) Paraná; 6) Goiás; 7) Tocantins and 8) Mato Grosso do Sul; and Lagoa (Lake) Misteriosa location in Mato Grosso do Sul State.

**Figura 1.** América do Sul e os países onde foram registradas a espécie *Craspedacusta sowerbii*: 1) Brasil; 2) Argentina; 3) Venezuela; 4) Chile e os estados brasileiros onde a espécie foi registrada: 1) Rio Grande do Sul; 2) Minas Gerais; 3) Rio de Janeiro; 4) São Paulo; 5) Paraná e 6) Goiás; 7) Tocantins e 8) Mato Grosso do Sul e a localização da Lagoa Misteriosa no estado do Mato Grosso do Sul.



**Figure 2.** Picture of Lagoa Misteriosa in the dry season.

**Figura 2.** Foto da Lagoa Misteriosa no período seco.

**Table 1.** List of the form, localities, type of water body, and year/month that *Craspedacusta sowerbii* (Lankester, 1880) was recorded in Brazil.

**Tabela 1.** Lista de ocorrências registradas de *Craspedacusta sowerbii* no Brasil, incluindo a forma, tipo de corpo de água, a cidade, estado, mês, ano e autores dos registros.

Form	Waterbody	City/State	Month/year	Author
Polyp and Medusae	Artificial pond	Porto Alegre/RS	1930*	Gliesch*
Medusae	Fisheries tank	Belo Horizonte/MG	July/1939	Martins (1941)
Medusae	Artificial pond	Rio de Janeiro/RJ	Feb/1957	Sawaya (1957)
Polyp	Artificial pond	São Paulo/SP	Mar/1962	Froelich (1963)
Mesdusae	Artificial pond	Curitiba/PR	Jan/1986	Silva & Oliveira (1988)
Mesdusae	Artificial reservoir	Minaçu/GO	Sept/1997-Jan/1999	De Filippo et al. (1999)
Mesdusae	Artificial reservoir	Palmas/TO	Jan/2002	Tundisi et al. (in press)
Medusae	Calcareous pond (doline)	Jardim/MS	Apr/2006	Silva & Roche, present work

\*Registered in Sawaya (1957) without month being recorded.

(Titration method (APHA, 1995)) and plankton (a 50 m vertical haul using a net of 20  $\mu\text{m}$  mesh size). Conductivity, temperature, oxygen and pH were measured *in situ* using meters. The trophic state was calculated using the Trophic State Index of Carlson (1977).

## Results and Discussion

With regard to the nomenclature of *Craspedacusta sowerbii*, two different specific name spellings are common in the scientific literature, namely “*sowerbii*” that was originally proposed by Lankester (Lankester 1880), and “*sowerbyi*” adopted by many authors, including almost all records in South America. Important zoology textbooks, such as Ruppert & Barnes (1994) and Storer et al. (1998), as well as Silveira & Schlenz (1999) in their revision of the freshwater Cnidaria of Brazil, have adopted the latter spelling; this might, at least partially, explain the latter’s greater popularity. In a search using [www.google.com](http://www.google.com), in January 2007, around 906 citations of the name *Craspedacusta+sowerbii* were found, while *Craspedacusta+sowerbyi* was recorded around 12900 times, including in the NCBI Tax-Browser (<http://www.ncbi.nlm.nih.gov>), one of the most utilized internet sites on taxonomy. Thus, it is suggested that in publications on this species, both spellings should be presented in the title, or, at least, as the following key-word *C. sowerbii* (=sowerbyi), thereby facilitating electronic searches for information on this species. This suggestion is supported by article 33.3.1 of the International Code of Zoological Nomenclature (1999).

The physical and chemical analysis of the water indicates the system to be meso-eutrophic (Table 2). The date of the study was at the end of the rainy season, when the water has elevated levels of suspended material originating from the surrounding area that is used for extensive cattle culture. Boggiani et al. (1999) noted an increase in the degree of degradation of the region where good water quality is essential for tufa formation, and increases in water phosphate concentrations could inhibit carbonate deposition. In fact, the lake received the name Misteriosa (=Mysterious) because, in the rainy season, the water is turbid and, in the dry season, the water is extremely clear; increases in the influx of phosphorus, due to irregular soil use, could decrease the degree of water clarity in the dry season.

Figure 3 shows, show photographs of live individuals of the jellyfish. The mean diameter measured was 7.8 mm ( $n = 15$ ,  $SD = 0.8$  mm), all individuals being juvenile; the adults have been found to measure around 25 mm (Jankowski, 2001). The most common phytoplankton taxa recorded were *Peridinium*, *Oscillatoria* and *Aulacoseira*. The zooplankton was represented only by rotifers, the

most abundant being *Trichocerca similis*, *Keratella americana* and *Polyarthra vulgaris*. The possibility that the absence of other zooplankton taxa such as Cladocera and Copepoda was due to jellyfish predation, as observed by Jankowski & Ratte (2001) in an hypertrophic lake, might merit further investigation. The presence of the fish genus *Astyanax*, widely distributed in the region, was noted.

Records of the distribution of *Craspedacusta sowerbii* in South America might be related to the geographical distribution of the number of specialists. In addition, some records seem to have been



**Figure 3.** A and B photographs of live individuals of the jellyfish *Craspedacusta sowerbii*, from Lagoa Misteriosa Lake.

**Figura 3.** A e B fotografias de espécimes vivos da água-viva *Craspedacusta sowerbii* da Lagoa Misteriosa.

**Table 2.** Values for some limnological variables of Lagoa Misteriosa.

**Tabela 2.** Valores de alguns parâmetros limnológicos da Lagoa Misteriosa.

Variable	Value
Chlorophyll a	75 $\mu\text{g L}^{-1}$
Total phosphorus	31 $\mu\text{g L}^{-1}$
Conductivity	300 $\mu\text{S m}^{-1}$
Total alkalinity	160 mg $\text{HCO}_3^-/\text{L}$
pH	7.5
Surface water temperature	25.5 $^{\circ}\text{C}$
Transparency (Secchi disc)	3.2 m
Dissolved oxygen	3.5 $\text{mg L}^{-1}$
TSI Carlson Phosphorus	54
TSI Carlson Chlorophyll	80
TSI Carlson Secchi	43



published in local journals, in Portuguese or Spanish, thus impeding access for an international audience. Almost all records are of the medusa form, which, although the rarer of the two forms, is more visible and thus more readily detected by non-specialists. Such difficulties have given rise to errors in information on the species distribution; for example, in the review of Schlenz (1981), the records made by Ringuelet (1950) and Vannucci & Tundisi (1962) in Argentina are not included. It is probable that the true distribution of this species in South America includes all the countries of the La Plata and Amazonian Basins.

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