

First record of the freshwater jellyfish *Craspedacusta sowerbii* LANKESTER, 1880 (Cnidaria: Hydrozoa: Limnomedusae) in South Tyrol (Italy)

The Museum of Nature South Tyrol and the Biological Laboratory of the Environmental Agency of Bolzano were notified during the summer of 2015 of the presence of jellyfish in the Large Lake of Monticolo / Montiggl (46°25'20"N 11°17'21"E in the Bolzano/Bozen Province, Italy). The lake is located at 492 m a.s.l. and has a surface area of 17,8 hectares, a maximum length of about 700 m, a maximum width of about 300 m and a maximum depth of about 11,5 m. It is a natural lake of glacial origin; chemical data classify it as meso-eutrophic. On 23th August 2015 we took several underwater pictures with scuba diving equipment of a jellyfish swimming in the lake at about -0.5 m depth and we also obtained 3 live specimens. In one hour underwater (between 12 a.m. and 1 p.m.), we found only one specimen in the lake. Two others specimens had been collected the day before by a swimmer and given to the first author of this paper. One specimen has been first frozen and than fixed in formalin 4% for the scientific collection of Museum of Nature South Tyrol (*C. sowerbii* collection number NMS Bolzano/Bozen EVV1). The two other specimens have been maintained live for a few days for video shooting in a 20-liters aquarium without filtration system in water at 23-24°C. The two jellyfish have been fed with live cladocera and cyclopid copepods and they lived in the tank respectively for two and three weeks. The three jellyfish had a diameter between 15 and 20 mm. The water of the lake was cloudy, with about 2 meters visibility underwater; the water temperature at -0.5 m depth was 25°C as measured by a scuba dive computer suunto vyper. The jellyfish was identified as *Craspedacusta sowerbii* LANKESTER, 1880 (Cnidaria: Hydrozoa: Limnomedusae). Based on high-resolution images of the jellyfish, Dr. Peter Schuchert of the Natural History Museum of Geneva (Switzerland), curator of World Hydrozoa database and an expert in this field, confirmed the determination of the species. It is the first record of *C. sowerbii* in South Tyrol. HELLRIGL (1996) hypothesized in his zoological check-list the presence of the taxon in South Tyrol, but it has never been found until now.

In the neighbouring Province of Trento, *C. sowerbii* has been recorded in several lakes: during the 1990's, in Lake Santo di Cembra and Lake Lavarone; in 2003 in Lake Poiani in Vallarsa (CIUTTI et al. 2015); in 2008 in Lake Garda (CIUTTI et al. 2011); and during summer 2015 in Lake Levico (CIUTTI et al. 2015). Few records of the species in other Provinces of Italy have been published (STEFANELLI 1948, RAMAZZOTTI 1962, ROSSI & LODI 1971, BADINO & LODI 1972, TRENTINI 1993, STEFANI et al. 2010). Recently Italian newspapers reported two new sightings of *C. sowerbii* in Northern Italy: in July 2015 in the Po River (Province of Alessandria) and in August 2015 in Lake Brissogne (Province of Aosta).

The first descriptions of the freshwater jellyfish *C. sowerbii* were published within a few months after its discovery in a water lily tank in Regent's Park, London, England in 1880 (ALLMAN 1880, LANKESTER 1880a, 1880b, 1880c). But the species originated from the Yangtze River system in China (KRAMP 1950). Currently, eleven species of genus *Craspedacusta* have been recognized (SCHUCHERT 2015). Although all of these freshwater

Author's addresses

Massimo Morpurgo
Museum of Nature South Tyrol
Via Bottai 1
39100 Bolzano
massimo.morpurgo@naturmuseum.it

Renate Alber
Biological Laboratory
Environmental Agency of the Autonomous Province Bolzano South Tyrol
Via Sottomonte 2
39055 Laives
Renate.Alber@provinz.bz.it

jellyfish occupy similar habitats, only *C. sowerbii* is an invasive species. The only continent where it is not found is Antarctica. Its minute polyps and its medusa show a worldwide distribution in temperate, freshwater habitats, which is unique (ACKER & MUSCAT 1976, PAYNE 1924, PENNAK 1956, RAYNER 1988). It is mainly observed in artificial bodies of water, such as gravel pits, garden ponds, reservoirs, aquaria, and is even found in wastewater treatment facilities and the cooler water of nuclear power stations (AUGUSTIN et al. 1987, DAVIS 1955, SCHMITT 1939, TATTERSALL 1933, THOMAS 1951, PROTASOV et al. 1981). There are, however, some reports from natural lakes (DEEVEY & BROOKS 1943, DEXTER et al. 1949, FANTHAM & PORTER 1938) as well as backwaters or slow flowing waters (FRITZ 2007). Indications are that the medusa has a far wider distribution than previously thought and that the often overlooked polyp may have an even wider distribution.

The life cycle of *C. sowerbii* consists of two alternating stages: polyp and medusa. The polyp is the asexual stage and the medusa is the sexually reproducing stage of the life cycle. The tiny polyps, of maximally 1 mm in height, live alone or in small colonies attached to stable underwater surfaces such as plants, rocks, or tree stumps. Polyps reproduce asexually by budding, producing others polyps or jellyfish. Moreover they can produce asexual larvae, “frustules”, which can move slowly. The movement of the frustules helps dispersal of polyps throughout the site they live in. At a later stage, frustules settle down to the substrate and develop into polyps. The jellyfish reproduce sexually in open water. Fertilized eggs develop into small ciliated larvae called planula. The planula then settle to the bottom, and develop into polyps. During the cold winter months, polyps encyst as resting bodies called podocysts, dormant cellular balls surrounded by a protective chitin-like membrane. Once conditions become favourable, they develop into polyps again (ACKER & MUSCAT 1976, FRITZ 2007, <http://www.freshwaterjellyfish.org> 2015). *C. sowerbii* ingests various zooplankton and benthic prey in the 0.1–3.0 mm size range.

When the water temperature is high (25–30°C), the medusa grows up to 25 mm (WESENBERG-LUND 1939). It was frequently observed during the summer of 2015, when the temperatures were exceptionally high.

It is difficult to say exactly how *C. sowerbii* arrived into the Large Lake of Monticolo / Montiggel. The larvae (planula or frustules) may have been transported in the water of fish imported to repopulate the lake for sport fishing; its polyps or podocysts may have been brought into the lake on the keels of boats; or they may have been introduced on aquatic plants or other materials from the home tanks of aquarium hobbyists. It is known that the alien species red-eared slider *Trachyemis scripta elegans*, which lives in the Large Lake of Monticolo / Montiggel, was introduced by aquarium hobbyists. Some authors believe that podocysts of *C. sowerbii* may be transported in mud on the feet of birds.

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Fig. 1: Underwater picture of *Craspedacusta sowerbii* LANKESTER, 1880 taken on 23th August 2015 in the Large Lake of Monticolo / Montiggli (Photo Massimo Morpurgo).

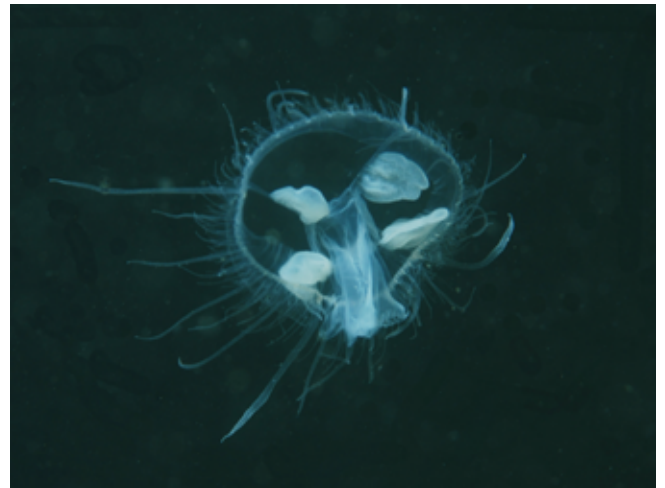


Fig. 2: Underwater picture of *Craspedacusta sowerbii* LANKESTER, 1880 taken on 23th August 2015 in the Large Lake of Monticolo / Montiggli (Photo Massimo Morpurgo).



Fig. 3: One specimen of *Craspedacusta sowerbii* LANKESTER, 1880 being collected by Massimo Morpurgo on 23th August 2015 in the Large Lake of Monticolo / Montiggli (Photo Andrea Falcomatà).



Fig. 4: Massimo Morpurgo underwater with scuba diving equipment keeping in the hand a jar with collected jellyfish on 23th August 2015 in the Large Lake of Monticolo / Montiggli (Photo Andrea Falcomatà).

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