

The First Record of the Freshwater Jellyfish *Craspedacusta sowerbii* Lankester, 1880 (Hydrozoa) in Kosovo

Tatjana R. Jaksic^{1*}, Predrag S. Vasic¹, Aleksandar Dj. Valjarevic¹, Nikola N. Djukic¹,
Vera Vukanic² & Vladan V. Rakonjac³

¹ Faculty of Sciences and Mathematics, 29 Lole Ribara Str., 38220 Kosovska Mitrovica, Kosovo; E-mails: tatjana.jaksic@pr.ac.rs, predrag.vasic@pr.ac.rs, aleksandar.valajrevic@pr.ac.rs, nikola.djukic@pr.ac.rs

² State University of Novi Pazar, Vuka Karadzica Str. bb, 36300 Novi Pazar, Serbia; E-mail: vvukanic@np.ac.rs

³ Sinsic MonMilk D.O.O., Lazine, b.b., Danilovgrad, Montenegro; E-mail: rakonjac73@yahoo.com

Abstract: We report the first record of the alien freshwater jellyfish *Craspedacusta sowerbii* in Gazivode Lake, northern Kosovo. Gazivode Lake is a drinking-water reservoir, with a depth of up to 107 m, located on the Ibar River. The occurrence of the jellyfish was recorded in August and September 2016. The abundance of the population was estimated at 50-60 ind./m² of water surface. The medusae were bell-shaped, with a diameter up to 20 mm and well-defined gonads that indicated mature female specimens.

Key words: Freshwater medusae, *Craspedacusta sowerbii*, Gazivode Lake, Kosovo

Introduction

Craspedacusta sowerbii Lankester, 1880, one of the few freshwater jellyfish species, is distributed throughout North and South America, Europe, Asia and Australia (ACKER & MUSCAT 1976). There are 11 species within the genus *Craspedacusta* Lankester, 1880 (reviewed by JANKOWSKI 2001). *C. sowerbii* is native to the Yangtze River basin in China (KRAMP 1961) and has been recognised as a worldwide invader (RAYNER 1988, DUMOND 1994). According to BOULLON & BOERO (2000), this is due to its adaptations, e.g. the capacity to develop a durable, chitin covered, resting body and several forms of vegetative reproduction (REISINGER 1957) as well as long-term survival without sexual reproduction (FRITZ et al. 2007). The species inhabits all types of freshwater: lakes, large river systems, natural lakes, reservoirs, modified water bodies, aquaria and ornamental ponds (KANAEV 1949, BECKETT & TURANCHIK 1980, DEVRIES 1992, TITTIZER et al. 2000, PEARD 2005). It seems to favour standing water.

This paper reports the first finding of *C. sowerbii* in the northern part of Kosovo, in Gazivode Lake, which is also the first record for Kosovo.

Materials and Methods

The field study was conducted in Gazivode Lake (Fig. 1), which is a drinking-water reservoir that was formed in 1975 following the dam construction on the Ibar River. The reservoir is located at an altitude of 695 m a.s.l. and has a depth of up to 107 m. The samples were collected at three different sites, with the following geographic coordinates: N 42.961355, E 20.552540 (Site 1); N 42.960475, E 20.574642 (Site 2); and N 42.936331, E 20.627356 (Site 3) (Fig. 1).

The sampling was made in several occasions during August and September 2016.

The samples were collected by sweeping through water surface with a planktonic net (mesh size 50 µm). The number of individuals was counted within the frame dimensions of 40 cm x 40 cm and then calculated per m². The specimens were preserved in 70% alcohol and measured. Some of them were kept live in an aquarium, and photographed with a digital camera. Their taxonomic status was determined according to KANAEV (1949) and JANKOWSKI (2001), using a stereomicroscope Optika (10x10 and 10x40). The identified specimens were stored in the collection of biological materials

*Corresponding author

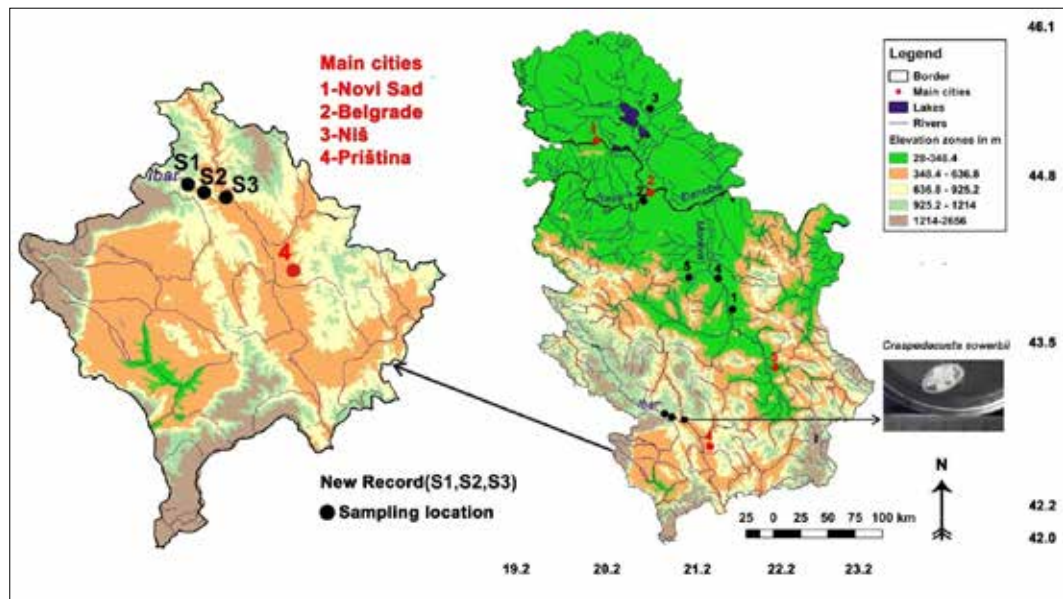


Fig. 1. Gazivode Lake, northern Kosovo, and precise sites where *Craspedacusta sowerbii* was collected, combined with data from JAKOVČEV-TODOROVIĆ et al. (2010)

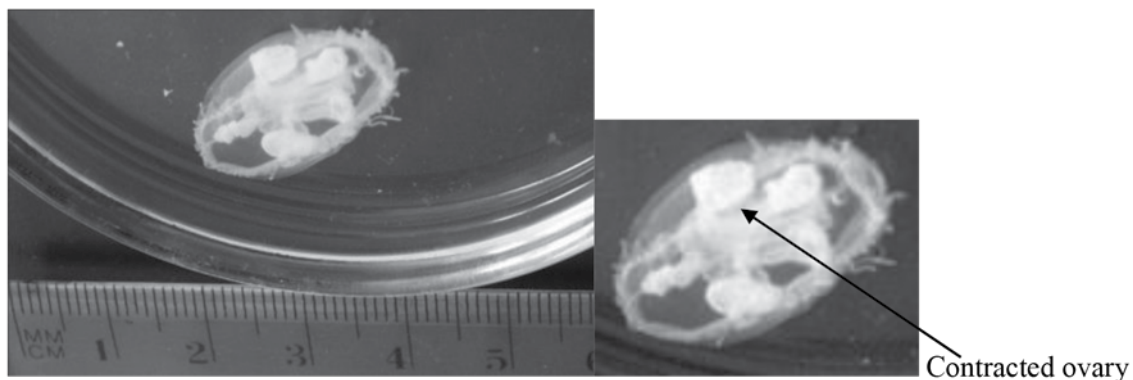


Fig. 2. *Craspedacusta sowerbii* Lankester, 1880, from Gazivode Lake sampled in September 2016 (Photo: Biljana Kitanovic)

of the Department for Biology, Faculty of Sciences and Mathematics, Kosovska Mitrovica.

The water temperature was measured using a thermometer with red filling installed in a Ruttner water sampler. Water transparency was determined using a Secchi disc, 30 cm in diameter.

Results and Discussion

A total of 50 specimens of *C. sowerbii* were collected in Gazivode Lake in August – September 2016. The occurrence of the species was massive throughout the lake, reaching 50 to 60 ind./m². The collected medusae were bell-shaped, with a diameter up to 20 mm (range 13–20 mm) (Fig. 2). The gonads, which are normally situated on the radial canals, appeared to be well-developed and contracted, thus indicating mature female specimens as specified in POPE (2007) (Fig. 2).

The local development of medusae of *C. sowerbii* depends on the environmental conditions such as temperature. Their blooms usually occur during summer and autumn, from July to October, in still or slow-moving freshwaters when temperature rises at least to 25°C (KANAEV 1949, DEVRIES 1992). The medusae can be found as deep as 3 m below the water surface (BECKETT & TURANCHIK 1980). In our study, the specimens of *C. sowerbii* (Fig. 2) were collected from the water surface. The average surface temperature was 26.5°C in August and 23.8°C in September. The water temperature decreased from surface to the depth of 40 m and this difference was 12°C in August and 13.5°C in September. The water transparency ranged from 2.2 m to 4.5 m due to high density of the planktonic organisms.

Craspedacusta sowerbii is reported for the first time for Gazivode Lake situated in the northern

part of Kosovo. There are no published data about the zooplankton community in this reservoir until now. The hydrobiological studies showed that *Oscillatoria rubescens* (D. C.) Gom. dominated the phytoplankton community (UROŠEVIĆ 1993).

Our finding is the first record of *C. sowerbii* for Kosovo. In 1958, this jellyfish was registered in Serbia for the first time (JAKOVČEV-TODOROVIĆ et al. 2010). According to the authors, the species

was found at five different sites, mostly in the central region of the country, and at one in the northern province of Vojvodina, near the town of Zrenjanin. In Serbia, *G. sowerbii* inhabits only natural and artificial ecosystems with standing water (KALAFATIĆ et al. 1999, JAKOVČEV-TODOROVIĆ et al. 2010).

Acknowledgement: We thank our former student Marko Radojevic, MSc Biologist, for his help and support during the field studies.

References

- ACKER T. S. & MUSCAT A. M. 1976. Ecology of *Craspedacusta sowerbii* Lankester, a freshwater hydrozoan. American Midland Naturalist 95: 323-326.
- BECKETT D. C. & TURANCHIK E. J. 1980. Occurrence of the freshwater jellyfish *Craspedacusta sowerbyi* Lankester in the Ohio River. Ohio Journal of Science 32: 323-324.
- DEVRIES D. R. 1992. The freshwater jellyfish *Craspedacusta sowerbyi*: A summary of its life history, ecology and distribution. Journal of Freshwater Ecology 7: 7-16.
- BOUILLON J. & BOERO F. 2000. The hydrozoa: A new classification in the light of old knowledge. Thalassia Salentina 24: 3-45.
- DUMOND H. J. 1994. The distribution and ecology of the fresh and brackish-water medusae of the world. Hydrobiologia 272: 1-12.
- FRITZ G. B., SCHILL R. O., PFANNKUCHEN M. & BRÜMMER F. 2007. The freshwater jellyfish *Craspedacusta sowerbii* Lankester, 1880 (Limnomedusa: Olindiidae) in Germany, with the brief note on its nomenclature. Journal of Limnology 66: 54-59.
- JAKOVČEV-TODOROVIĆ D., ĐIKANOVIĆ V., SKORIĆ S. & ČAKIĆ P. 2010. Freshwater jellyfish *Craspedacusta sowerbyi* Lankester, 1880 (Hydrozoa, Olindiidae) – 50 years' observation in Serbia. Archive of Biological Sciences, Belgrade 62: 123-127.
- JANKOWSKI T. 2001. The freshwater medusae of the world – a taxonomic and systematic literature study with some remarks on other inland water jellyfish. Hydrobiologia 462: 91-113.
- KALAFATIĆ V., MARTINOVIĆ-VITANOVIĆ V. & TANASKOVIĆ M. 1999. The freshwater medusa *Craspedacusta sowerbii* (Lankester, 1880) in FR. Yugoslavia. Contribution to the Zoogeography and Ecology of the Eastern Mediterranean Region I: 343-349.
- KANAEV I. I. 1949. Coelenterates (Coelenterata). In: ZHADIN V. I. (Ed.): Life in Freshwaters of USSR, Moscow-Leningrad, pp. 220-228.
- KRAMP P. L. 1961. Synopsis of the Medusae of the World. Order Limnomedusae. Journal of Marine Biology 40: 213-236.
- PEARL T. 2005. Freshwater Jellyfish! Indiana University of Pennsylvania, Indiana, PA 25 URL: <http://nsml.nsm.iup.edu/tpearl/jellyfish.html>
- POPE L. G. 2007. Sexual dimorphism and symmetry variation in the freshwater jellyfish *Craspedacusta sowerbii* (Lankester). MSc Thesis, Southern Illinois University, Carbondale, USA, 108 p.
- RAYNER N. A. 1988. First record of *Craspedacusta sowerbyi* Lankester (Cnidaria: Limnomedusae) from Africa. Hydrobiologia 162: 73-77.
- REISINGER E. 1957. Zur Entwicklungsgeschichte und Entwicklungsmechanik von *Craspedacusta* (Hydrozoa, Limnotrachylina). Zeitschrift für Morphologie und Ökologie der Tiere 45: 656-698.
- TITTIZER T., SCHÖLL F., BANNING M., HAYBACH A. & SCHLEUTER M. 2000. Aquatische Neozoen im Makrozoobenthos der Binnenwasserstraßen Deutschlands. Lauterbornia 39: 1-72.
- UROŠEVIĆ V. 1993. Changes of plankton primary production of Gazivode Lake. Bulletin de L'Institut et du Jardin Botaniques de L'Universite de Beograd 24-25: 105-113.

