

Record of the alien species *Craspedacusta sowerbii* Lankester, 1880 (Cnidaria: Limnomedusae) in Lake Kinneret catchment area

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Abstract

A study of the invasive alien freshwater jellyfish *Craspedacusta sowerbii* (Lankester, 1880) in the drainage basin of Lake Kinneret (Sea of Galilee), the Golan Heights was carried out on August 27, 2011. Jellyfish were found in a small permanent pool located in the upper part of the Zavitan River. Chemical parameters and plankton composition were documented.

Key words: invasive species, freshwater jellyfish, zooplankton, Zavitan River

Introduction

Craspedacusta sowerbii (Lankester, 1880) is a worldwide freshwater jellyfish, which is known from all continents except Antarctica (Dumont 1994; Jankowski 2001; Raposiero et al. 2011). In the Middle-East this organism has been recorded in Egypt (Elster et al. 1960), Iraq (Saadalla 2006), Turkey (Balik et al. 2001; Bekleyen et al. 2011) and Israel (Gasith et al. 2011). Documentation of the presence of *C. sowerbii* in the Zavitan River, within the drainage basin of Lake Kinneret is presented here.

Materials and methods

A bloom of *Craspedacusta sowerbii* was observed on August 27, 2011. They were found in a small permanent pool located in the Zavitan River, the Golan Heights. The pool was located at 32°59'58.50" N; 35°44'22.20" E and at 512 m above sea level. Pond dimensions were approx. 40 m × 50 m, with a depth range of 3 – 4 m. The following parameters were recorded: temperature (10 cm below surface) – 25.8°C; pH – 8.2; electrical conductivity – 0.36 mS/cm; salinity – 0.2; DO – 7.1 ppm. Jellyfish specimens were collected for identification. Plankton samples were collected using 63 and 25 micron mesh size

nets. Table 1 outlines a list of plankton species identified.

Results

Specimen identification and verification were approved by indicative characteristics of *Craspedacusta sowerbii*: flattened bell shape; size (diameter) 3 – 5 cm; translucent body with a whitish tinge; four radial and one circular canal; solid tentacles of varied lengths arranged in clusters of 4 – 6 short tentacles between individual longer ones; eye spots at the base of the tentacles; four very long tentacles, each parallel to a radial canal at the edge of the velum; a large manubrium with four frilly lips observed below the center of the inside of the bell and opaque white gonads attached to the four radial canals. A comparative indication of the organism with published internet images was carried out as well. Density proportions (%) of plankton groups found in the pond were: phytoplankton – 75% and zooplankton – 25%; Copepoda and Cladocera contributed to 55% of zooplankton with Rotifera making up the remaining 45%. Small unidentified fishes, the frog *Pelophylax ridibundus* (Pallas, 1771) and the decapod *Potamon potamios* (Olivier, 1804) were also recorded.



Figure 1. *Craspedacusta sowerbii*
(actual diameter: 3.5 cm).



Figure 2. General view of the studied pool.

Discussion

Kinneret drainage basin was chosen as the site for research after Gasith et al. (2011) worked on *Craspedacusta sowerbii* in this area. Conditions in this pool on the Golan Heights were favorable to invasion by *C. sowerbii* i.e. high temperatures during the summer – fall season when spate winter flows ceased, leaving small bodies of water in local deep depressions where aquatic fauna developed. Water levels in the pond declined during the summer – fall period by approximately 70 – 90 cm. It is possible that Chitin covered the resting stages of *C. sowerbii*, and polyps over-wintered when temperatures dropped below 25°C. Jankowski (2001), and Dumont (1994) mentioned that 25°C is optimal for *C. sowerbii* (see also: Fritz et al. (2009); Stefani et al. (2010)). Dispersion carriers may

include: 1) the transfer of resting stages by migratory birds (Dumont 1994), which are very common in this region. 2) Dispersal by water from other populations in adjacent countries. No information was available regarding the presence of *C. sowerbii* in Syria or the Lebanon, but their presence in Turkey is known (Balik et al. 2001; Bekleyen et al. 2011). How far downstream from the Zavitan pool is *C. sowerbii* distributed? Does this pool provide populations found in ponds and reservoirs and possibly Lake Kinneret downstream. The Zavitan pool is productive as indicated by the composition richness of the plankton assemblages (Appendix 1). Schools of small unidentified fishes, the frog *Pelophylax ridibundus* (different tadpole stages and adults), and the decapod *Potamon potamios* (different life stages) were observed also.

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References

- Balik S, Ustaoglu MR, Ozbek M (2001) A new locality for the freshwater jellyfish *Craspedacusta sowerbii* Lankester, 1880 in Turkey. *Zoology in the Middle East* 22: 133-134
- Bekleyen A, Varol M, Gokot B (2011) A new record of the freshwater jellyfish *Craspedacusta sowerbii* Lankester, 1880 (Hydrozoa) in Southeastern Anatolia (Turkey). *Chinese Journal of Oceanology and Limnology* 29(2): 366-368, <http://dx.doi.org/10.1007/s00343-011-0047-1>
- Dumont HJ (1994) The distribution and ecology of the fresh and brackish-water medusae of the world. *Hydrobiologia* 272: 1-12, <http://dx.doi.org/10.1007/BF00006508>
- Elster HJ, Hawary M, Schroeder R, Schwoerbel I (1960) Population dynamics of zooplankton in the Nozha hydrotrome near Alexandria. *Alexandria Institute of Hydrobiology Notes and Memoires* 50: 1-27
- Fritz GB, Schill RO, Pfannkuchen M, Brümmer F (2007) The freshwater jellyfish *Craspedacusta sowerbii* Lankester, 1880 (Limnomedusa: Olindiidae) in Germany, with a brief note on its nomenclature. *Journal of Limnology* 66: 54-49
- Fritz GB, Pfannkuchen M, Reuner A, Schill RO, Brummer F (2009) *Craspedacusta sowerbii*, Lankester (1880) – Population dispersal analysis using COI and ITS sequences. *Journal of Limnology* 68(1): 46-52
- Gasith A, Gafni S, Hershkoviz Y, Goldstein H, Galil B (2011) The invasive freshwater Medusae *Craspedacusta sowerbii* Lankester, 1880 (Hydrozoa: Olindiidae) in Israel. *Aquatic Invasions* 6 (Suppl. 1): S147-S152, <http://dx.doi.org/10.3391/ai.2011.6.S1.033>
- 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
- Raposeiro PM, Ramos JC, Costa AC (2011) First record of *Craspedacusta sowerbii* Lankester, 1880 (Cnidaria, Limnomedusae) in the Azores. *Arquipelago Life and Marine Sciences* 28: 11-13, <http://dx.doi.org/10.1023/A:1013126015171>
- Saadalla HAA (2006) First record of the freshwater medusa *Craspedacusta* sp. (Cnidaria, Hydrozoa) from an artificial lake in Baghdad, Iraq. *Zoology in the Middle East* 37: 107-110
- Stefani F, Leoni B, Marieni A, Garibaldi L (2010) A new record of *Craspedacusta sowerbii*, Lankester 1880 (Cnidaria, Limnomedusae) in Northern Italy. *Journal of Limnology* 69 (1): 189-192

Appendix 1. List of planktonic organisms recorded in the studied pool.

Phytoplankton:

Microcystis aeruginosa (Kutzing, 1846)
Aphanizomenon spp.
Cylindrospermopsis spp.
Phacus longicauda (Dujardin, 1841)
Surirella sp.
Aphanocapsa sp.
Pediastrum duplex (Meyen, 1829)
P. simplex (Meyen, 1829)
Oscillatoria sp.
Melosira (= *Aulacoseira*) sp.

Zooplankton:

Protozoa:
Tintinids
Copepoda:
Eucyclops serrulatus (Fischer, 1851) - all life stages (more males than females)
Arctodiaptomus gracilis (Kiefer, 1932)
Mesocyclops ogunnus (Onabamiro, 1957)
Cladocera:
Bosmina longirostris (O.F.Muller, 1785)
Diaphanosoma excisum (Sars, 1885)
Rotifera:
Filinia longisaeta (Ehrb. 1834)
Kellicottia bostoniensis (Kellicot, 1879)
Keratella quadrata (O.F.Muller, 1786)
Keratella cochlearis (Gosse, 1851)
Brachionus angularis (Gosse, 1851)
B. falcatus (Zacharias, 1898)
Ascomorpha saltans (Bartsch, 1870)
Collotheca sp. (Harring, 1913)
Asplanchna sp.
Polyarthra sp.