Gibel carp population and its parasites in Madatapa Lake (South Georgia)

[Bella Japoshvili](http://www.frontiersin.org/people/BellaJaposhvili/287800)1\*, [Levan Mumladze](http://www.frontiersin.org/people/LevanMumladze/297961)1, 2, [Lali Murvanidze](http://www.frontiersin.org/Community/WhosWhoActivity.aspx?sname=&UID=0)1 and [Ani Bikashvili](http://www.frontiersin.org/Community/WhosWhoActivity.aspx?sname=&UID=0)1

* 1 Ilia State University. Institute of Zoology, Georgia
* 2 Ilia State Univerity, Institute of Ecology, Georgia

Madatapa Lake is an oligotrophic lake located in Javakheti plateau (Southern Georgia) at 2108 m a.s.l. and is the part of the Javakheti Protected Areas since 2011. The lake have a natural volcanic origin with a surface area of 8.8 km2 and with a maximum depth of 1.7 m. The lake is historically known to be free of fish species which is believed to be a result of severe winter conditions. After the middle 90th the gibel carp [Carassius gibelio (Bloch, 1782)] was firstly appeared there. However the exact date and the source of invasion of gibel carp in the lake is unknown and currently untraceable. While gibel carp is a very successful invasive fish species in Georgian inland waters, very limited data is available on its biology, ecology and even distribution as well as its ecological impacts and economic importance in the region. For the first time, we studied the population characteristics of gibel carp in Lake Madatapa (South Georgia) with the aim to reveal the extent of its morphological variability, sex ratio, length-weight relationship and its parasitic community. One hundred and forty one individuals presented a mean weight 37.5 g (SD=53, range [13.3-471.7]) and average length of 12.5 cm (SD=2.9, range[9.4-30]). The number of lateral line scales and gill rakers varied between 29-31, and 36-47, respectively. Sex was determined in 105 specimens (the gonads of remaining specimens were either strongly damaged by the parasites or were not developed) and the sex ratio was significantly female biased (1/1.8, Chi-square test p<0.01). There is no size or weight differences between males and females (t-test, p<0.05 for both cases). Overall length-weight relationship was within the published data. There is no significant difference (p>0.05) between the regression coefficients for males and females and the slope (b) do not differ significantly from 3. A sub-sample of thirty four individuals were examined for parasitic infections and 91% (31) were infected with one or two parasites. The plerocercoids of cestoda (Ligula intestinalis L., 1758) had highest prevalence (75%), whereas only 38% of studied fishes were infected with metacercariae of digenean trematode (Diplostomum spathaceum Rud., 1819). Both parasites were detected in only 9 specimens (27%). Cestodes were found in 5 female whereas sex was not determined for other 8 specimens. In 29 specimens infected with L. intestinalis, 24 (83%) had completely degenerate gonads. From other remaining five specimens for which the sex were determined, only one was the male. In the three specimens without parasites two were females. Since we are not able to infer the difference in parasitism intensity between sexes directly, the healthy specimens have indistinguishable sex ratio as an overall population (Chi-square test p>0.05).

**Acknowledgements**

We would like to thank Marina Gioshvili, Gia Nozadze and the staff of Javakheti Protected Areas for their help in the field. The work was supported by the Shota Rustaveli National Science Foundation grant N FR/479/7-130/13.

**References**

Deinhardt M. 2013. The invasive potential of Prussian carp in Finland under the light of a novel semi-clonal reproductive mechanism.
Elanidze PF. 1983. Fishes of Lakes and Rivers of Georgia. Tbilisi: Metsniereba.
Gaygusuz Ö, Tarkan AS, Gaygusuz ÇG. 2007. Changes in the fish community of the Ömerli Reservoir (Turkey) following the introduction of non-native gibel carp Carassius gibelio (Bloch, 1782) and other human impacts. Aquatic Invasions 2: 117–120.
Haldane JBS. 1949. Disease and evolution. La Ricercha Scientifica Suppl 19: 68–76.
Japoshvili B, Ertan O, Diler O. 2004. A study of morpho-ecolo- gical characters of Carassius auratus L. and Carassius caras- sius (L). Proceedings of Institute of Zoology 12: 280–283.
Japoshvili B, Mumladze L, Küçük F. 2013. Invasive Carassius carp in Georgia : Current state of knowl- edge and future perspectives. 59: 1–8.
Kottelat M, Freyhof J. 2007. Handbook of European freshwater fishes.
Lusková V, Lusk S, Halačka K, Vetešník L. 2010. Carassius auratus gibelio - The most successful invasive fish in waters of the Czech Republic. Russian Journal of Biological Invasions 1: 176–180.
Paulovits G, Tatrai I, Matyas K, Korponai J, Kovats N. 1998. Role of Prussian Carp (Carassius-Auratus Gibelio Bloch) in the Nutrient Cycle of the Kis-Balaton Reservoir. International Review of Hydrobiology Vol 83: 467–470.
Perdikaris C, Ergolavou A, Gouva E, Nathanailides C, Chantzaropoulos A, Paschos I. 2012. Carassius gibelio in Greece: The dominant naturalised invader of freshwaters. Reviews in Fish Biology and Fisheries 22: 17–27.
Smith JM. 1978. The evolution of sex. Cambridge: Cambridge University Press.
Stoskopf MK. 1993. Fish medicine. Philadelphia: Saunders Company.
Tarkan a. S, Gaygusuz O, Gürsoy Gaygusuz C, Saç G, Copp GH. 2012. Circumstantial evidence of gibel carp, Carassius gibelio, reproductive competition exerted on native fish species in a mesotrophic reservoir. Fisheries Management and Ecology 19: 167–177.
Tsoumani M, Liasko R, Moutsaki P, Kagalou I, Leonardos I. 2006. Length-weight relationships of an invasive cyprinid fish (Carassius gibelio) from 12 Greek lakes in relation to their trophic states. Journal of Applied Ichthyology 22: 281–284.
Vergara D, Jokela J, Lively CM. 2014. Infection dynamics in coexisting sexual and asexual host populations: support for the red queen hypothesis. The American naturalist 184 Suppl: S22–30.
Vetemaa M, Eschbaum R, Albert A, Saat T. 2005. Distribution, sex ratio and growth of Carassius gibelio (Bloch) in coastal and inland waters of Estonia (north-eastern Baltic Sea). Journal of Applied Ichthyology 21: 287–291.

**Keywords:**Gibel carp, invasive species, Parasites, Alpine lakes, Georgia (Republic)

**Conference:**XV European Congress of Ichthyology, Porto, Portugal, 7 Sep - 11 Sep, 2015.

**Presentation Type:** Poster Presentation

**Topic:** Ecology, Conservation and Invasive Species

**Citation:** Japoshvili B, Mumladze L, Murvanidze L and Bikashvili A (2015). Gibel carp population and its parasites in Madatapa Lake (South Georgia). *Front. Mar. Sci. Conference Abstract: XV European Congress of Ichthyology.*doi: 10.3389/conf.FMARS.2015.03.00138

**Received:** 27 Nov 2015;**Published Online:** 27 Nov 2015.

**\* Correspondence:** Dr. Bella Japoshvili, Ilia State University. Institute of Zoology, Tbilisi, 0179, Georgia, bela\_japoshvili@iliauni.edu.ge