

The non-native quagga mussel is spreading in Switzerland and impacting lake ecosystems

March 24 2022



Quagga mussels in Lake Geneva. Credit: Linda Haltiner, Eawag

New research findings, and a resulting fact sheet, provide insights into

the problematic spread of the invasive quagga mussel in Switzerland. The authors of the fact sheet are concerned that the aggressive spread of this mussel species will have a substantial detrimental effect on lake ecosystems.

The issue of invasive species is one of the main factors contributing to the loss of species diversity in ecosystems around the world. One such invasive species that is currently proliferating in Swiss waters is the quagga mussel (*Dreissena bugensis*), which originates from the Black Sea region and is now widespread in large parts of Europe and North America. Along with the zebra mussel (*Dreissena polymorpha*), it is one of the most aggressively invasive species.

The zebra mussel has been around in Switzerland since the 1960s, whereas the quagga mussel was first found here in 2014. Since then, it has been introduced into several Swiss lakes. It has almost completely replaced the zebra mussel in Lake Constance. The quagga mussel is able to reproduce almost all year round and can inhabit the soft substrate in deep-water zones. These characteristics, together with the fact that it is more efficient at absorbing nutrients, are considered to be the main reasons why the quagga out-competes the zebra mussel in deep water lakes, and why it is increasingly crowding it out.

Proliferation in Switzerland

Since its first appearance in Switzerland in 2014 in the River Rhine near Basel, the quagga mussel has rapidly spread throughout Switzerland, as ascertained by a team led by Linda Haltiner from the Swiss Federal Institute of Aquatic Science and Technology, Eawag and by Hui Zhang from the University of Konstanz. It has so far been found to be present in the following lakes: Lake Geneva, Lake Constance, Lake Neuenburg, Lake Biemme, Lake Murten and Hongrin Lake.

The mussels either spread naturally by floating in the current in their larval state and being carried downstream, or by unintentionally being transported by humans in the ballast, bilge or engine-cooling water of boats and leisure craft used on numerous lakes. In addition, the adult mussels adhere firmly to boats and other objects, and if these are not cleaned or properly dried before being moved to different lakes, the mussels can spread in this way, too. According to the researchers, this extremely rapid spread of the quagga mussel has implications for the Swiss lakes that have not yet been invaded by the species.

Proliferation in Lake Constance

In lakes which have a quagga mussel infestation, the species dominates with far-reaching consequences. This is also evident from its rapid spread in Lake Constance, where it first appeared in 2016. By 2017 it was already present in every corner of the lake, and it has been continuing to spread in the shallow water zone ever since. It is now even colonizing the lake in the deeper waters, and is expected to further increase in population density in the deepest zones.

A new [fact sheet](#) (in German), compiled as a part of the research project "SeeWandel" (LakeChange), summarizes the reasons for the quagga mussel's rapid and widespread colonization of Lake Constance, and the potential consequences of this for the lake's ecosystem.

Consequences for the ecosystem and society

According to Piet Spaak, a researcher at Eawag and project lead for the SeeWandel project, the detailed consequences of the quagga mussel's colonization of perialpine lakes are as yet unknown. He says: "On the basis of observations that we have from North America, we fear that the presence of the quagga [mussel](#) will have far-reaching consequences for our lakes' ecosystems, the balance of which could potentially be upset."

Possible consequences may include:

- Reduction in plankton, as the mussels filter large volumes of phytoplankton
- Increase in the visibility depth due to the reduction in plankton
- Increase in nutrients on the lake bed, and decrease in nutrients in the open waters, as the mussels live close to the lake bed
- Alterations in species communities and in the food web
- Reduction in fish stock due to an altered food web
- Mussel shells in shore areas
- Increased maintenance and costs, e.g. on outflow pipes, boats, fishing nets etc.

Management and remedial measures

The researchers recommend that waters not yet affected be protected as far as possible against introduction of the species. According to current knowledge, the most important measure that can be taken is to prevent further spread: The utmost efforts should be made to protect as-yet unaffected waters from importation of the species. This can be achieved, for example, by awareness-raising campaigns, or by mandating cleaning for boats that have previously been used on another lake. It is also vitally important, says Piet Spaak, to introduce regular and coherent monitoring for the purposes of early identification as well as to better understand the propagation patterns and population dynamics of the [quagga mussel](#).

More information: Linda Haltiner et al, The distribution and spread of quagga mussels in perialpine lakes north of the Alps. *Aquatic Invasions* (2022). doi.org/10.3391/ai.2022.17.2.02

Provided by EAWAG: Swiss Federal Institute of Aquatic Science and

Technology

Citation: The non-native quagga mussel is spreading in Switzerland and impacting lake ecosystems (2022, March 24) retrieved 5 June 2023 from <https://phys.org/news/2022-03-non-native-quagga-mussel-switzerland-impacting.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.