



Freshwater gastropods of Neogene and Quaternary lake systems of Europe - state of the art and outlook

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Globally, about 4000 extant species of freshwater gastropod species have been described. In contrast, only 225 species are listed by MollBase2012 for North- and Central Europe. Many of these are rare species, limited to certain springs and in fact the typical diversity of gastropods in lakes of North and Central Europe is much lower. The high number is boosted by several highly speciose endemic radiations in long-lived ancient lakes, which are hotspots for biodiversity. These long-lived ancient lakes provide key examples for understanding evolutionary processes and therefore are intensively studied. During the Neogene, Europe's geodynamic history gave rise to several such long-lived lakes with conspicuous endemic radiations. However, these lacustrine systems are rare today as well as in the past compared to the enormous numbers of "normal" lakes. Most extant European lakes are mainly results of the Ice Ages and are due to their geologically temporary nature largely confined to the Pleistocene-Holocene. Also deposits of streams, springs, and groundwater, which today are inhabited by species-rich gastropod assemblages, are rarely preserved. Thus, the pre-Quaternary lacustrine record is biased towards long-lived systems.

Apart from few general overviews precise studies on the γ -diversities of the post-Oligocene European lake systems and the shifting biodiversity in European freshwater systems through space and time are entirely missing. Even for the modern faunas, literature on large-scale freshwater gastropod diversity in extant lakes is scarce and lacks a statistical approach.

Building upon a great amount of existing literature, a new project will provide the first detailed assessment of the composition of European freshwater gastropods during the Neogene and Quaternary at species, genus and family levels, with emphasis on lake faunas. The γ -diversity of several hundred modern and fossil European lakes will be evaluated. Data will be made available permanently for the public via the FreshGEN-database (Freshwater Gastropods of the European Neogene).

The most important topics to be tackled based on the data are to search for factors, which explain the γ -diversities through time and to look for geographic gradients in species richness and/or faunal composition. Diversity data and inter-lake comparison will allow estimating endemism rates and quantitatively defining biodiversity hotspots in present and past lakes. Shells-sizes of all taxa will be evaluated to search for general patterns and to define phases of conspicuous „gigantism“. The well resolved climate history of Europe during the last 23 million years will be a frame for linking species- and supraspecific compositions with climatic trends and events. Ideally, the project will shed light on the origin of modern lake faunas by the intense cooperation between zoologists and paleontologists. A major aim is to map and define a statistics-based Pan-European biogeography and palaeobiogeography of Neogene to Quaternary freshwater systems. Once established, this database will be open for geographic and/or stratigraphic expansion.