

# Global overview on groundwater fauna

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## Abstract

Groundwater is an important global resource, providing water for irrigation, industry, geothermal uses, and potable water all over the world. Moreover, groundwater contains the world's largest terrestrial freshwater biome. Groundwater faunal communities undertake important ecosystem services including the provision of clean water. Despite this, investigations on the spatial and temporal variations and the influence of environmental parameters on these organisms, are still rare. The aim of this study is to provide a global overview on groundwater fauna (stygo fauna) research, including the historical evolution of research topics and development of sampling methods. To achieve this, an extensive review of accessible groundwater fauna data was conducted. Over time, there has been an exponential increase in the number of studies together with changing paradigms in the research focus, particularly as sampling methods have developed and molecular analyses become common. Studies on groundwater fauna are spatially uneven and are dominated by studies in Europe and Australia, with few studies in Africa, Asia and the Americas. This has resulted in a potential geographic and climatically biased global view of stygo fauna and groundwater ecology. In the future, a more evenly distributed sampling effort in underrepresented areas is necessary to enable global studies, thus allowing a more comprehensive perspective on stygo fauna biodiversity, roles, and functional significances. This is increasingly important with the accumulating knowledge of the sensitivities of these ecosystems to anthropogenic activities, including climate change, and is fundamental to effective management of these ecosystems.

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