

Abandoning pastures reduces the biodiversity of mountain streams

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Mazia valley. Credit: Eurac Research/Ivo Corrà

The abandonment of high-altitude mountain pastures and the climatic changes that are causing woodland boundaries to extend ever higher, may potentially result in the reduction of the number and variety of invertebrates living in mountain streams. Eurac Research ecologists have compared 15 streams and found that in streams running through extensive meadows with grazing animals—regardless of elevation—biodiversity is greater. The study was published in the renowned international journal *Freshwater Biology*.

After a detailed topographic analysis, Eurac Research's ecologists identified 15 stretches of streams throughout South Tyrol that flow into four distinct categories of land cover: rocky terrain (slightly over 2000m), pastures at [high altitudes](#) (around 2000m), conifer woodlands (around 1500/1600m) and valley floor pastures (between 1000/1200m).

Sample sites were selected to be as similar as possible in order to avoid factors that could cause interference. "We only selected and sampled streams born from springs and tracts with an upstream area of almost half a square kilometre of uniform land cover type, they also had to be devoid of human activities such as houses or stables," explains ecologist Alberto Scotti. "Our goal was to assess whether and how the life of invertebrates living in the riverbed is influenced by the characteristics of the surrounding land cover." To verify this, Scotti collected various samples. In total, 70 different genera or species of invertebrates were classified.

The analysis of their distribution and functional traits astonished the

researcher. Contrary to expectations, their presence was not in fact influenced exclusively by the elevation: there were more organisms and different species in the streams that flowed through the pastures, whether at 2000m or at the bottom of the valley. Moreover, in these watercourses aquatic macroinvertebrates perform several and more diversified tasks, for example there are organisms that feed on fragmented plants, others that filter particles dispersed in water and so on. In every sense, the diversity of these populations is greater than those that live in woodland and rocky areas.

"We already knew that the biodiversity of the terrestrial flora is more abundant where grazing or mowing takes place. We were surprised to discover that this relationship also applies to [aquatic ecosystems](#). Biodiversity is greater both in terms of the number of species and the number of functions that aquatic invertebrates carry out in the streams that cross pastures," says Scotti. "Regardless of the quality of the water—which is generally very high—the abandonment of extensive [pastures](#) at high altitudes risks depleting the streams from an ecological point of view." The study was published in *Freshwater Biology*.

More information: Alberto Scotti et al, Effects of land cover type on community structure and functional traits of alpine stream benthic macroinvertebrates, *Freshwater Biology* (2019). [DOI: 10.1111/fwb.13448](#)

Provided by Eurac Research

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