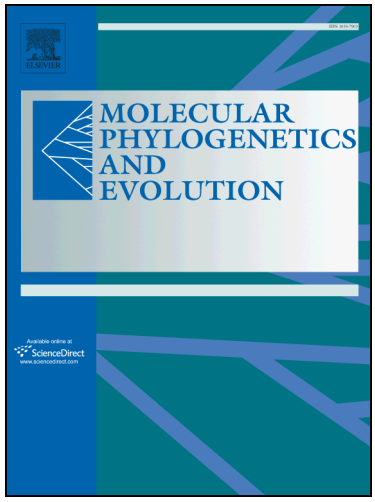

Epigean gammarids survived millions of years of severe climatic fluctuations in high latitude refugia throughout the Western Carpathians

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Epigean gammarids survived millions of years of severe climatic fluctuations in high latitude refugia throughout the Western Carpathians

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Abstract

Isolated glacial refugia have been documented in Central Europe for a number of taxa, but conclusive evidence for epigean aquatic species has remained elusive. Using molecular data (mitochondrial and nuclear markers), we compared the spatial patterns of lineage diversity of the widely distributed *Gammarus fossarum* species complex between two adjacent biogeographically and geomorphologically distinct Central European regions: the Bohemian Massif and the Western Carpathians. We investigated if the observed patterns of spatial diversity are more likely to stem from historical or present-day factors. Phylogenetic and phylogeographic analyses revealed eight phylogenetically diverse lineages: two exhibiting local signatures of recent demographic expansion that inhabit both regions, while the other six display a relict distributional pattern and are found only in the Western Carpathians. Molecular dating indicates that these lineages are old and probably diverged throughout the Miocene (7 to 18 Ma). Furthermore, their distribution does not seem to be constrained by the present boundaries of river catchments or topography. The contrasting spatial patterns of diversity observed between the two regions thus more likely results from historical rather than