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Conference Abstract

Spatio-temporal changes in the distribution and abundance of non-native *Misgurnus bipartitus* and native *Misgurnus fossilis* revealed through ddPCR eDNA assays

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Abstract

Globalization is accelerating species translocations beyond natural dispersal boundaries, increasing the introduction of non-native species into new ecosystems. Although most introduced species fail to establish, those that do have the potential to become invasive and negatively affect native biodiversity, especially when closely related to native taxa. This process is currently unfolding along the Belgian–Dutch border, where a large metapopulation of the endangered European weather loach (*Misgurnus fossilis*) is increasingly threatened by the expansion of the non-native Asian weather loach (*Misgurnus bipartitus*). *Misgurnus bipartitus* was first detected in the Netherlands in 2012 and subsequently expanded into Flanders (Belgium), where it was first recorded in 2019. Shortly after this initial Belgian record, an environmental DNA (eDNA) survey was conducted across 32 sites to provide the first regional-scale assessment of the native and non-native weather loaches, using a droplet digital PCR (ddPCR) protocol for species-specific detection and quantification. In 2025, we conducted an expanded follow-up survey, revisiting the original sites and extending the

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sampling to over 100 locations to: update the current distribution of both species, assess spatio-temporal changes in their distribution and relative abundance across the two surveys, and identify zones of sympatry to prioritize for management. Our results reveal the presence of novel sympatric populations and several locations where spatio-temporal shifts have occurred since 2019, captured through changes in eDNA concentrations. Overall, these findings illustrate the value of repeated ddPCR eDNA monitoring for tracking native and non-native species through space and time.

Keywords

Freshwater, Misgurnus weather loaches, Environmental DNA (eDNA), Droplet digital PCR (ddPCR)

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Conflicts of interest

The authors have declared that no competing interests exist.