The ghost of introduction past: Spatial and temporal variability in the genetic diversity of invasive smallmouth bass

Understanding the demographic history of introduced populations is essential for unravelling their invasive potential and adaptability to a novel environment. To this end, levels of genetic diversity within the native and invasive range of a species are often compared. Most studies, however, focus solely on contemporary samples, relying heavily on the premise that the historic population structure within the native range has been maintained over time. Here, we assess this assumption by conducting a three-way comparison of the genetic diversity of native (historic and contemporary) and invasive (contemporary) smallmouth bass (Micropterus dolomieu) populations. Analyses of a total of 572 M. dolomieu samples, representing the contemporary invasive South African range, contemporary and historical native USA range (dating back to the 1930s when these fish were first introduced into South Africa), revealed that the historical native range had higher genetic diversity levels when compared to both contemporary native and invasive ranges. These results suggest that both contemporary populations experienced a recent genetic bottleneck. Furthermore, the invasive range displayed significant population structure, whereas both historical and contemporary native US populations revealed higher levels of admixture. Comparison of contemporary and historical samples showed both a historic introduction of M. dolomieu and a more recent introduction, thereby demonstrating that undocumented introductions of this species have occurred. Although multiple introductions might have contributed to the high levels of genetic diversity in the invaded range, we discuss alternative factors that may have been responsible for the elevated levels of genetic diversity and highlight the importance of incorporating historic specimens into demographic analyses.

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