

Abstract

Non-Native Inland Fish Across the Circum-Mediterranean Region: A Comprehensive Inventory [†]

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Abstract

Introduction: The circum-Mediterranean region is a global biodiversity hotspot, hosting a highly distinctive freshwater fauna with a high degree of endemism and conservation concern. However, these ecosystems are increasingly threatened by biological invasions, particularly by non-native fish species, which represent a major driver of biodiversity loss. **Objective:** This study aims to compile a comprehensive and updated inventory of non-native inland fish species across the circum-Mediterranean region and to identify the main taxonomic, biogeographical, and socio-environmental drivers shaping their distribution. **Methodology:** We conducted an extensive review of the scientific literature, online databases (including EASIN, GISD, and CABI), and technical reports to compile records of non-native fish species across inland and transitional waters of Mediterranean-climate basins. Analyses focused on species composition, taxonomic representativeness, introduction pathways, native regions, and the relationship between species richness and selected environmental and socio-economic variables. **Results:** A total of 151 non-native fish species were recorded across the study area. Italy, Spain, Bosnia and Herzegovina, France, and Croatia exhibited the highest numbers of established species. Taxonomic representation was uneven, with Salmoniformes and Esociformes overrepresented among established non-native species, while Siluriformes and Characiformes were underrepresented. Most introductions originated from Europe, Asia, and North America, primarily through intentional releases and escape events. Non-native species richness was positively correlated with gross domestic product, precipitation, and the number of dams, highlighting the role of economic development and habitat modification in facilitating invasions. **Conclusions:** Biological invasions by non-native fishes are widespread across the Mediterranean basin and are strongly driven by human activities and environmental conditions. The high invasion levels observed in this biodiversity hotspot pose a significant threat to endemic freshwater faunas. These findings underscore the need for coordinated transnational management strategies, stricter regulation of introduction pathways, and prioritization of high-risk species to mitigate further impacts.

Keywords: non-native fish; biological invasions; freshwater fish; Mediterranean river basins



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