

# Genetic assessment for biodiversity monitoring in three Italian freshwater fish species: the Italian chub (*Squalius squalus*), the Italian barbels (*Barbus spp.*) and the Italian riffle dace (*Telestes muticellus*)

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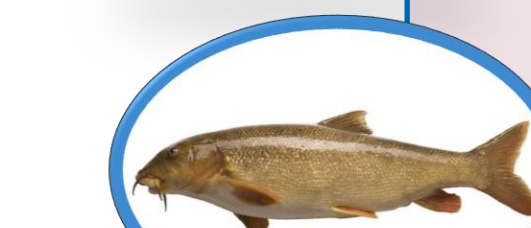
## Background

Freshwater fish biodiversity in the Mediterranean basin is remarkably high, making Italy a major conservation hotspot. Moreover, fish species play an important role as environmental bioindicators in freshwater ecosystems. For these reasons, a comprehensive genetic assessment is crucial to monitor variability and detect populations with reduced molecular variation which could compromise their adaptive potential.

## Target Species



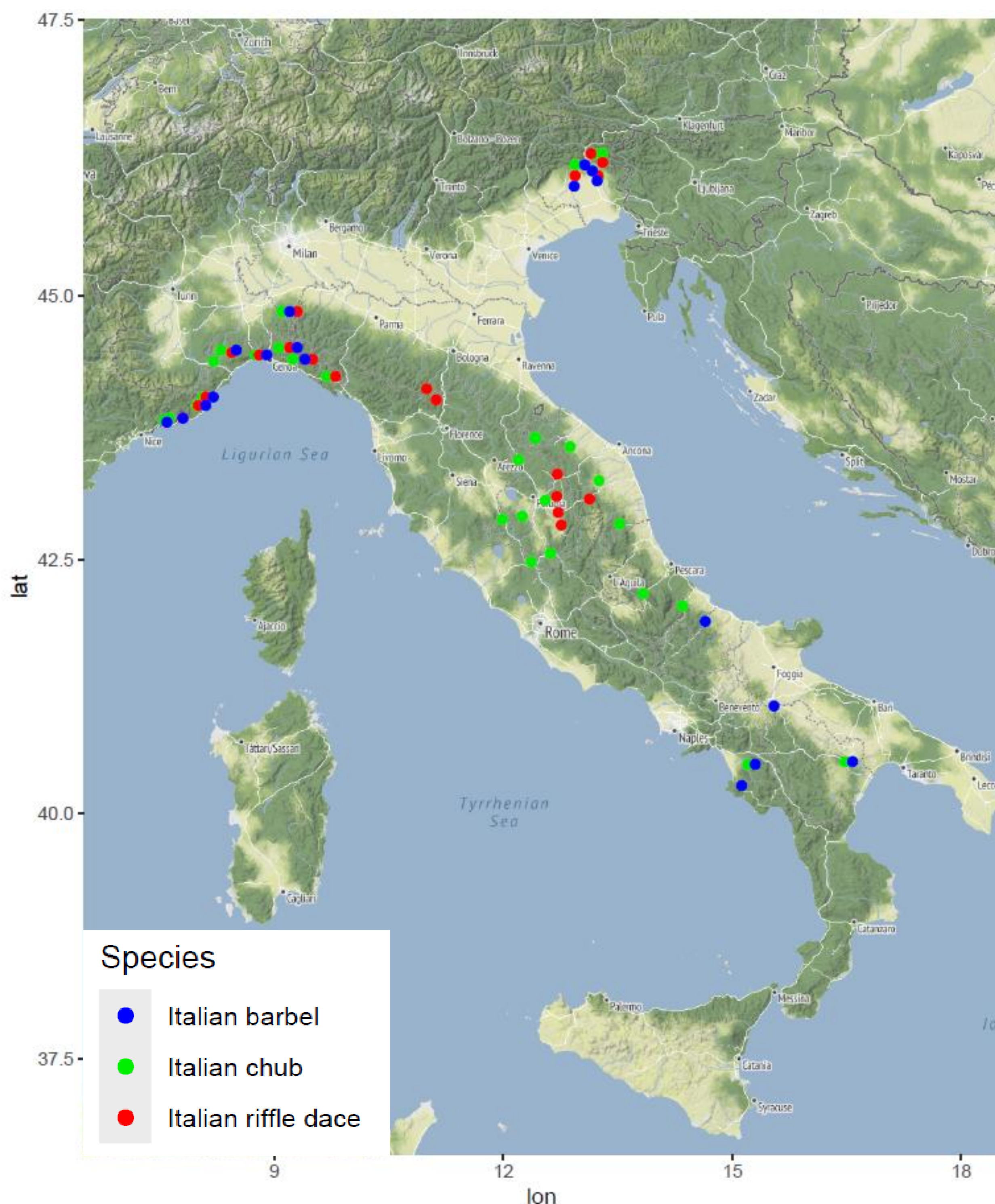
**Italian chub** (*Squalius squalus*): widespread across Italy and highly adaptable, thriving in a variety of freshwater habitats. Its presence on major islands is partly due to human introductions.



**Barbel** (*Barbus spp.*): a complex of species including multiple taxa mainly in well-preserved rivers in central and northern Italy, and to a lesser extent in the south (absent from the islands).



**Italian riffle dace** (*Telestes muticellus*): inhabits northern to central-southern Italy, preferring cold and clear waters.



## Materials

Samples collected across Northern (Liguria, Lombardy, Friuli-Venezia Giulia), Central (Tuscany, Umbria, Abruzzo), and Southern Italy (Campania, Basilicata).

- Italian chub: 452 individuals, 34 populations
- Barbels: 261 individuals, 19 populations
- Riffle dace: 262 individuals, 20 populations

## Methods

Molecular analyses to assess genetic variation:

- **Mitochondrial marker (mtDNA):** sequencing of an informative fragment of the Cytochrome Oxidase I (COXI) gene.
- **Nuclear markers (nDNA):** genotyping of nuclear genome loci using ddRAD-seq (double digest Restriction-site Associated DNA) technique.

## Expected Outcomes

Genetic analyses will help clarify population structure and evolutionary relationships, offering fundamental tools for biodiversity monitoring and conservation planning in Italy and the Mediterranean region.

## Acknowledgements

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