

**Conference Abstract** 

# GAPeDNA: Assessing and mapping global species gaps in genetic databases for metabarcoding studies

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## Abstract

Environmental DNA metabarcoding has recently emerged as a non-invasive tool for aquatic biodiversity inventories, frequently surpassing traditional methods for detecting a wide range of taxa in most habitats. One of the major limitations currently impairing the large-scale application of DNA-based inventories, such as eDNA or bulk-sample analysis is the lack of species sequences available in public genetic databases. These gaps are still largely unknown spatially and taxonomically for most regions of the world, which can hinder targeted future sequencing efforts. We propose GAPeDNA, a user-friendly web-interface (Fig. 1) that provides a global overview of genetic database completeness for a given taxon across space and conservation status. As an initial application, we synthetized data from regional checklists for marine and freshwater fishes along with their IUCN conservation status to provide global maps of species coverage using the European Nucleotide Archive public reference database for 19 metabarcoding primers. This tool automatizes the scanning of gaps in these databases to guide future sequencing efforts and support the deployment of DNA-based inventories at larger scale. It is flexible and can

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be expanded to other taxa and primers upon data availability. Using our global fish case study, we show that gaps increase toward the tropics where species diversity and the number of threatened species were the highest. It highlights priority areas for fish sequencing like the Congo, the Mekong and the Mississippi freshwater basins which host more than 60 non-sequenced threatened fish species. For marine fishes, the Caribbean and East Africa host up to 42 non-sequenced threatened species. As an open-acces, updatable and flexible tool, GAPeDNA can be used to evaluate the completeness of sequence reference libraries of various markers and for any taxonomic group.

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	All	Al	AL	All	AL
	Mediterranean Sea	Bylemans, 125	Abalistes stellatus	Not evaluated	No
	Mediterranean Sea	Bylenans_125	Abranis_brana	LC	Yes
	Mediterranean Sea	Bylemans_125	Abudehlud, notatus	LC	Yes
	Mediterranean Sea	Bylemans_125	Abudefdul_savatilis	LC	Yes
	Mediterranean Sea	Dylemans_125	Abudetdut_socfasciatus	LC	Yes
	Mediterranean Sea	Bylemans_125	Abudefdul, sondidus	LC	Yes
	Mediterranean Sea	Bylemans_125	Abudetdut_valgiensis	LC	Yes
	Mediterranean Sea	Bylemans_125	Acartholabrus, pallori	LC	No
	Mediterranean Sea	Bylemans_125	Acanthopagrus, bifasciatus	LC	No
					No
	Mediterranean Sea	Bylemann 125	Acanthurus_dussumieri	LC	

## Keywords

genetic markers, shiny, marine and freshwater fish, threatened species, IUCN, nonindigenous species, environmental DNA, reference database

### **Presenting author**

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