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FishMed: traits, phylogeny, current and projected species distribution of Mediterranean fishes, and environmental data

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Abstract. The FishMed database provides traits, phylogeny, current and projected species distribution of Mediterranean fishes, and associated sea surface temperature (SST) from the regional oceanic model NEMOMED8. Data for the current geographical distributions of 635 Mediterranean fish species were compiled from a published expert knowledge atlas of fishes of the northern Atlantic and the Mediterranean (FNAM) edited between 1984 and 1986 and from an updated exotic fish species list. Two future sets of projected species distributions were obtained for the middle and end of the 21st century by using an ensemble forecasting approach for 288 coastal Mediterranean fish species based on SST according to the IPPC/SRES A2 scenario implemented with the Mediterranean climatic model NEMOMED8. The functional part of the database encompasses 12 biological and ecological traits (maximal and common lengths, vertical distribution, habitat, migration type, mode of reproduction, sex shift, semelparity, diet type (larvae and adults), social behavior, species origin, and depth) for the 635 fish species. To build the phylogeny we inferred the timing and geographic origins of Mediterranean teleost species diversity using nucleotide sequences collected from GenBank including 62% of Mediterranean teleost species plus nine outgroups. Maximum likelihood Bayesian phylogenetic and dating analyses were calibrated using 20 fossil species. An additional 124 fish species were grafted onto the chronogram according to their taxonomic affinity to obtain a phylogenetic tree including 498 species. Finally we also present the associated SST data for the observed period (1961–1980) and for the middle (2040–2059) and the end of the 21st century (2080–2099) obtained from NEMOMED8 according to the IPCC A2 scenario. The FishMed database might be of interest in the context of global anthropogenic changes as coastal Mediterranean ecosystems are currently recognized as one of the most impacted ecosystems on earth.

Key words: climate change; coastal fishes; functional diversity; Mediterranean fish species; Mediterranean Sea; NEMOMED8; phylogenetic diversity; species distribution models; taxonomic diversity.

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