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Mediterranean fish biodiversity: an updated inventory with focus on the Ligurian and Tyrrhenian seas

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Abstract

In this paper we update the Mediterranean fish inventory, analyse the biogeographic features of this fauna and provide exhaustive biodiversity data for the Ligurian and Tyrrhenian seas. According to the data available in 2010, the Mediterranean fish diversity can be summarized as follows: 602 (including sub-species) bony fish species (Osteichthyes), 79 cartilaginous fish species (Chondrichthyes) and 3 cyclostomes (Agnatha); making a total of 684 species belonging to 173 families (147 Osteichthyes, 24 Chondrichthyes, 2 Agnatha). Most species 403 (58.9%) have an Atlantic origin, 128 (18.7%) species are cosmopolitan, 90 (13.2%) species are Indo-Pacific, and 63 (9.2%) are endemic to the Mediterranean. In the Ligurian Sea, northern Tyrrhenian and southern Tyrrhenian Sea, the richness can be estimated at 454, 426 and 447 species, respectively. The most speciose families for the Mediterranean as a whole, but also for the three intra-mediterranean areas studied are the Gobiidae, Sparidae, Labridae and Blenniidae; whereas Carangidae is a numerically important family mainly at the Mediterranean level. The percentage of endemic fishes within the intra-mediterranean areas studied gradually decrease across latitude from the Ligurian Sea (9.4%) to the northern (8.7%) and southern (8.0%) Tyrrhenian Sea. The updated fish inventory contains 81 Lessepsian and 48 Atlantic immigrant species, which represent 11.8% and 7.0% of the whole Mediterranean fish community, respectively. The Ligurian Sea (3.1%) houses a higher amount of immigrants with respect to the northern (1.6%) and southern (2.7%) Tyrrhenian sectors.

Field observations made during this study indicate that both the Ligurian and Tyrrhenian seas are presently subjected to increasing colonization events by thermophilic species spreading from the southern Mediterranean and to a lesser degree by the arrival of exotic species either of Atlantic or Indo-Pacific origin.

Key words: Marine fishes, diversity, checklist, exotic species, biogeography, Mediterranean Sea

Introduction

The Mediterranean is the largest (2,969,000 km^2) and deepest (average 1,460 m, maximum 5,267 m) enclosed sea on Earth. It is comprised between three continents (Africa, Europe and Asia) and stretches for almost 4,000 km from 5°W to 41°E and for about 1,600 km from 46°N to 31°N. It connects through the Strait of Gibraltar to the Atlantic Ocean in the west, through the Dardanelles to the Sea of Marmara and the Black Sea in the northeast and through the man-made Suez Canal to the Red Sea and Indian Ocean in the southeast. Two main basins, a western (area = 0.85 million km^2) and an eastern (area = 1.65 million km^2) one are readily recognizable. They are separated by the Strait of Messina and by the channel between Sicily and Tunisia, where the depth of the ridge joining Sicily and Africa is only 400 meters. Several smaller basins are recognizable within the two main sections which show remarkable differences in terms of general oceanographic conditions; the eastern Mediterranean is deeper, warmer, saltier and more oligotrophic than the western.

Despite its small dimensions (0.82% of the ocean surface), the Mediterranean harbours somewhat between 4% and 18% of the world marine species, with large differences according to the group considered (Bianchi and Morri, 2000).

With regards to fishes, general knowledge of the Mediterranean ichthyofauna is built on a long tradition of study dating from the times of Greeks and Romans. Historical documentation began with Aristotele (384–322

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