

GAPS IN BIOLOGICAL KNOWLEDGE OF THE MEDITERRANEAN MARINE FISHES

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Abstract

We estimated the current level of knowledge concerning several biological characteristics of the Mediterranean fishes by performing a gap analysis based on information extracted from FishBase, aiming to identify research trends and future needs in the field of Mediterranean fish biology that can be used in ecosystem based fisheries management.

Keywords: *Growth, Mediterranean Sea, Diet, Mortality, Spawning*

The ecosystem approach to fisheries management requires that decision making should be based not only on the characteristics of a particular stock, but on all components of the ecosystem [1], as fish species respond differently to protection according to their life-history and ecological traits [2]. This holistic approach demands, apart from large scale research on commercial fish life-history traits, studies of regional interest and on a wide number of species, including non-commercial ones. It seems though that such studies are considered of low interest and are therefore discouraged by major scientific publishers, thus creating a knowledge gap in the Mediterranean Sea, especially in its southern part [3].

In order to examine what is already known about Mediterranean marine fishes and what remains to be studied (i.e. gap analysis, Figure 1), we collected data on all fish species that have been recorded in this large marine ecosystem as listed in FishBase [4]. We came up with a list of 714 species, after having excluded the ones that were misidentified or questionable (i.e. excluded 35 species). For each species the available information on age and growth (growth parameters, length-weight relationships, and maximum age), mortality rate, reproduction (spawning, size at maturity, and fecundity) and diet composition was recorded.

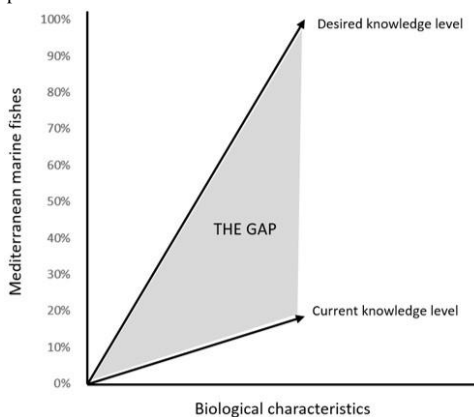


Fig. 1. Gap analysis regarding biological knowledge of the Mediterranean marine fishes.

According to our gap analysis, the most studied Mediterranean fish species were the European hake *Merluccius merluccius*, the surmullet *Mullus surmuletus*, the red mullet *Mullus barbatus barbatus*, the European pilchard *Sardina pilchardus*, and the annular seabream *Diplodus annularis*, all of which belong to the most diverse and well studied Mediterranean families (Sparidae, Mullidae, Merlucciidae, Clupeidae, and Labridae) [5]. There is no information of any biological characteristic for half (50%) of the Mediterranean fish species, while for approximately 18% of them there is information about just one characteristic. As far as the various biological characteristics are concerned, length-weight relationships are the most common ones as they have been studied for 34% of the species, followed by spawning (28%), growth parameters (23%), diet composition (19%), maturity (17%), and maximum age (13%) (Figure 2). Information on mortality and fecundity is scarce, with each characteristic accounting for 6% of the species (Figure 2).

Our analysis shows that the majority of the studies focus on fish species of high commercial interest and specifically on length-weight relationships, while at the same time a high proportion of the Mediterranean fishes and important biological characteristics are being neglected (6). Regarding future research priorities, we suggest that scientists focus on the biological characteristics of non-commercial and not exploited species and especially mortality and fecundity, which are the least studied ones. Primary research in fish biology should be encouraged, as the more knowledge about the species inhabiting the Mediterranean Sea, the better the understanding of this complex ecosystem and therefore the more realistic and effective the fisheries management plans that can be developed and implemented.

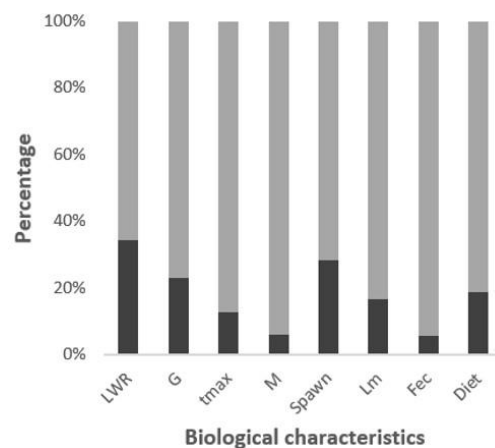


Fig. 2. Percentage of Mediterranean fish species with (dark) and without (light) information on several biological characteristics (LWR: length-weight relationship, G: growth parameters, t_{max}: maximum age, M: mortality, Spawn: spawning period, L_m: size at maturity, Fec: fecundity).

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