STATE AND PERSPECTIVE OF *SCORPAENA SCROFA* AND *MULLUS SURMULETUS* – TWO HIGHLY VALUED SPECIES OF EASTERN ADRIATC ARTISANAL FISHERIES

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Abstract
The state and perspective of two main target species of Croatian artisanal fisheries: largescaled scorpionfish, *Scorpaena scrofa* and striped red mullet *Mullus surmuletus* were investigated by detailed analysis of experimental catches. Basic demographic characteristics of those species and recommendations for sustainable use of coastal resources are presented.

Keywords: Adriatic Sea, Fisheries, Coastal Management

Introduction

Croatian artisanal fisheries takes place in a relatively small area which corresponds to about 6% of the Croatian Adriatic total fishing grounds. Nevertheless, it generates a substantial yield taking second place in the overall catch statistics, indicating that coastal area is subjected to high level of exploitation. As a biologically diverse and lush area Vis aquatorium has historically been one of the most important eastern Adriatic fishing grounds, especially for highly valued species such as largescaled scorpionfish, *Scorpaena scrofa* and striped red mullet, *Mullus surmuletus*. Therefore, it was chosen as a pilot area where we assessed in detail the status of the two aforementioned fish species.

Material and methods

Largescaled scorpionfish, *S. scrofa* and striped red mullet, *M. surmuletus* were caught by employing 'poponica' - trammel bottom sets with standard construction characteristics.

Results

S. scrofa specimens ranged between 14 - 45.1 cm total length (average 24 cm) and 30-1347 g weight (average 273.33). Scale reading of caught specimens gave the age range of 3-8 years. Assessing the destructiveness of 'poponica' nets for *S. scrofa* population by taking into account minimal landing size of this species (25 cm) ordained by [3] it can be seen that the overall catch is dominated by undersized specimens (62.5%) (Fig.1). Situation is even more concerning if biologically justified size at first sexual maturity is applied (TL 30 cm). The proportion of immature specimens is in that case as high as 90%. All of the above-mentioned indicates a rather alarming status of *S.scrofa* populations.
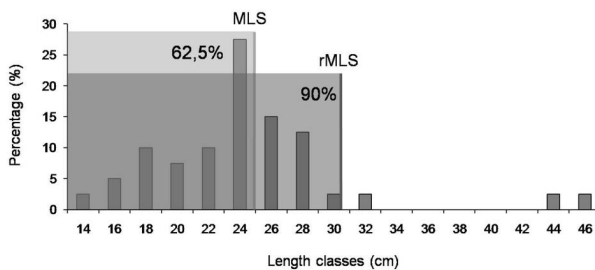

Fig. 1. Length frequency distribution of *Scorpaena scrofa* catch from trammel nets, Adriatic Sea (MLS – minimal landing size; rMLS – recommended minimal landing size)

In wider Vis aquatorium area a high number of *M. surmuletus* specimens were caught in trammel nets due to the fact that most of fishing operations have taken place during the warm summer-autumn period when this species comes closer to shore for feeding and is therefore more easily caught. Total length, weight and age ranges of caught specimens are 17-30.9 cm (average 24.12 cm), 33-337 g (average 159.2 g) and 3-6 years, respectively. Taking into account minimal landing size of this species (11 cm) ordained by [3] no undersized specimens were present in the overall catch. Even when demersal long line destructiveness is assessed considering biologically justified size at first sexual maturity (18 cm), then catches contained a rather low, satisfying 1.2% of immature specimens.

Discussion

Negative impacts related solely to fishing activities of those target species are as follows: decline in total CPUE (average CPUE with unit effort being one 32 m long trammel net is 0.66-3.31 kg/net), increase in the CPUE of Scorpaenidae family (the incline is, however, mostly due to *S. porcus* and not to commercially more valuable *S. scrofa*); decrease in average catch length and weight of targeted fish and increased proportion of immature specimens.

Nevertheless, the situation is quite favourable in the project area when compared to any other in the Adriatic. However, it is not without concern. Namely, looking at biometry characteristics of commercially important species S. scrofa and M. surmuletus, it is evident that large specimens are only rarely caught. Average landing sizes are more than twice smaller than those maximally attainable.

Changes in quantitative and qualitative catch structure of coastal fish populations can be due to various reasons. It is generally acknowledged they are mainly due to intensive fishing. However, different species vulnerability to fishing activities, density dependent effects as a result of complex ecological relationships in coastal communities, predation, growing marine pollution and climate change all play a part [4].

Regarding the fishing gear used for catching fore mentioned target species, it can, first of all, be said that trammel net 'poponica' is highly nonselective and its use coincides with reproduction period of most species. Other used gillnets are selective and generally catch adult specimens if are not misused. Recommendation therefore, is a more responsible conduct encouraged by a more efficient surveillance. Temporal restriction should be considered in order to allow undisturbed reproduction of targeted species. It is necessary to increase minimal landing size of 11 cm for *M. surmuletus* because in [3] this value is given for both Mullidae species. In order to insure sustainable small-scale coastal fisheries, all of the aforementioned issues need to be taken into consideration. Most importantly continuous monitoring and effective implementation of existent regulation measures should be established.

References
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