

Identifying and classifying small-scale fisheries métiers in the Mediterranean: A case study in the Patraikos Gulf, Greece

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Abstract

The main métiers practiced by small-scale fishermen in the Patraikos Gulf (western Greece, E. Mediterranean) were identified using data from 144 fishing operations carried out from August 2004 to July 2005. These operations were categorized by gear and subsequently classified hierarchically, based on target species declared by the skippers before the fishing operation. A total of 12 métiers was defined in terms of fishing gear, target species and season. Two métiers were active throughout the year whereas the remainder showed a more or less seasonal pattern of activity. The métiers differed significantly with regard to catch composition, production and income (all $P < 0.001$). For gears used in more than a single métier (trammel nets, longlines), comparisons of catch per unit effort revealed significant differences ($P < 0.001$) only among the trammel net métiers. The species with consistent contribution to catch and income were defined and by-catch species were identified for each of the métiers. In a subsequent step of the analysis, catch and income were used along with the pattern of activity to hierarchically classify métiers. This definition of métier groups could be useful for sampling stratification purposes. The fishing strategy and tactics along with the factors affecting choice and switching among the different métiers are discussed along with their management implications.

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1. Introduction

Small-scale fisheries comprise an important part of the fishing sector in the Mediterranean Sea (Farrugio et al., 1993). In Greece, their societal and economic importance is particularly high involving more than 97% of all fishing vessels. Catches from the small-scale fleet represent an important fraction of total fisheries production (47%) as well as market income (54%) (Tzanatos et al., 2005).

The principal characteristics of the small-scale fisheries are the high diversification of gears and techniques, the changing patterns of their use in time and space and the varying degree of fishermen's dependence on fishing. These characteristics increase the heterogeneity and complicate the management of this sector (Tzanatos et al., 2005). The design of an unbiased

and precise monitoring scheme for the small-scale fisheries is further complicated by the scattering of numerous fishing vessels and activities along an extended coastline and the usual practice of directly supplying the landings to local markets (Leonart and Maynou, 2003). Efficient sampling of this complex and poorly known sector is undoubtedly a difficult task.

The notion of a métier (Mesnil and Shepherd, 1990) is widely used to describe fisheries at a level incorporating the largest part of their heterogeneity. Each métier is a group of fishing operations defined by the combination of fishing gear, target species, area and season. A métier-based approach is likely to be useful for the design of stratified sampling surveys for the small-scale fisheries but also helpful for understanding the spatio-temporal patterns of fishing effort allocation.

In most cases, identification of métiers has been based on the analysis of large datasets on species composition, in terms of either catch or catch per unit of effort (CPUE), which were available from either logbooks or major projects for collecting landings data (e.g., Murawski et al., 1983; Biseau and Gondeaux,

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1988; Lewy and Vintheer, 1994; He et al., 1997; Pech and Laloe, 1997; Pelletier and Ferraris, 2000; Ulrich et al., 2001; Silva et al., 2002; Holley and Marchal, 2004; Jimenez et al., 2004; Ulrich and Andersen, 2004). In the Mediterranean, such information is seldom available, especially in the case of small-scale fisheries. The quantity and quality of existing data are usually poor and related papers have rarely appeared in the literature (Jabeur et al., 2000; Tzanatos et al., 2005). In cases of limited data availability, such as the Mediterranean, alternative approaches have to be developed in order to identify small-scale fisheries métiers.

Understanding the way that fishermen select and change métiers is an important step for the improvement of fisheries management. It can help to predict the outcome of different management actions and select appropriate management strategies (Cabrera and Defeo, 2001; Salas and Gaertner, 2004). In that sense, local métiers have to be identified. Subsequently, these métiers can be further classified into groups of “similar” métiers in terms of both production and income characteristics. Such a hierarchical approach would provide more insight into the agents that shape fishing tactics and enable the rationalisation of future sampling protocols.

The aim of the present study was to develop an approach in order to: (a) identify the main small-scale fisheries métiers practiced in the Patraikos Gulf, one of the most important fishing grounds in the Ionian Sea (Greece, Eastern Mediterranean), (b) describe the main characteristics of the identified métiers and (c) evaluate and classify métiers according to their activity patterns, production and income.

2. Methodology

2.1. Sampling

A total of 10 daily fishing trips of small-scale fishing vessels were sampled each month from August 2004 to July 2005. Due to adverse weather conditions only six trips were sampled in December 2004. In total, 116 daily trips were recorded. All vessels were based in five ports and operated in the Patraikos

Gulf (Fig. 1). The selected ports were the most important in the region and sampled fishing activity was distributed all over the gulf to avoid overestimating the importance of extremely localized métiers (Silva et al., 2002). In 24 fishing trips (20.7% of the total), more than one type of fishing gear was set (e.g., the vessel used both trammel nets and gillnets, or gillnets and longlines). The setting of different types of gears or gears of the same type but different technical characteristics (e.g., mesh size) was considered to comprise different fishing operations. Consequently, the study used data from 144 fishing operations.

In each month, sampled fishing trips were random with respect to vessel and date, provided that two or three trips corresponded to vessels with a total length greater than 12 m (25% of operations on average). The rest of the trips were allocated to smaller vessels (75% of operations). In this way, the effect of vessel size could be evaluated. The actual percentage of large vessels in the five ports, considering those vessels engaged in fully professional activity, was slightly smaller (7 out of 38 vessels or 18.4%) but large vessels can operate in some days when weather conditions prevent smaller vessels from fishing.

For each fishing operation, the data collection included: (i) the target species, as declared by the skipper interviewed before the operation, (ii) the type of the gear and its technical characteristics (length and mesh size for nets, number and size of hooks for longlines, number of pots for traps), (iii) the characteristics of the fishing ground (depth and type of substrate), (iv) catch weight by species and (v) market price (€/kg) by species.

Catch per unit of effort (CPUE) was expressed as weight (kg) per 1000 m of net (trammel nets, gillnets and combined nets), per 100 hooks (longlines) or per 100 pots (traps).

2.2. Identification and characterization of métiers

For the identification of métiers the fishing operations were categorized by main gear type used: trammel nets, gillnets, combined nets, longlines, and traps. When there was persistent targeting of the same species in all fishing operations of a specific gear type, these operations were *a priori* considered as forming

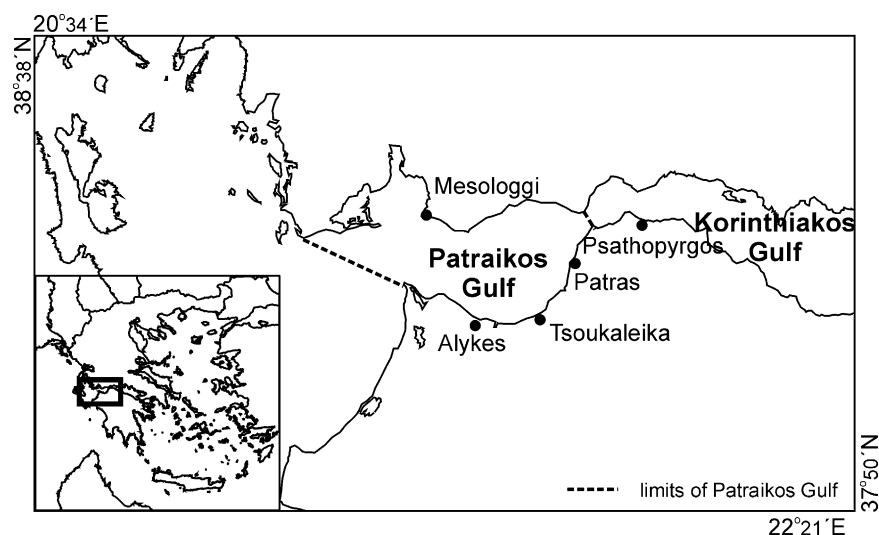


Fig. 1. Map of the Patraikos Gulf and the surrounding area, showing the vessel homeports sampled.

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