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Characterization of artisanal fishery in a coastal area of the Strait of Sicily (Mediterranean Sea): Evaluation of legal and IUU fishing

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ABSTRACT

The present study analyses the artisanal fishery of Sciacca (Mediterranean Sea) through the investigation of fishing activities, resources and yields, in order to characterize for the first time one of the most important traditional coastal activities of the area. Further, the study evaluates the incidence of illegal artisanal fishing, this being one of the major threats to the good management of fishery. Landing surveys and interviews with professional fishermen (i.e. those operating on vessels provided with a fishing licence) were carried out from May 2006 to April 2007 in order to record catches, type of fishing gear used and fishing areas. At the same time, illegal artisanal fishing vessels – i.e. vessels without a licence whose catch is illegally sold in local markets – were also monitored. The artisanal fishery of Sciacca is multi-specific, exploring various resources with different techniques. The most used gear by both professional and illegal fishing vessels throughout the study period was the trammel net. Other less frequently used gear has seasonal use related to source availability, and some is mainly or exclusively used by one or the other category of fishing vessels. Overlapping between professional and illegal fishing vessels emerged in the exploitation of some fishing areas, mainly coastal (within 3 nautical miles). A strong competition between the two categories for commercial resources was highlighted. The present study reports for the first time data on professional and illegal artisanal fishing in one of the most important Sicilian fisheries.

1. Introduction

‘Artisanal fishery’ is defined as any small capital investment fishery, mostly by the owner fisherman, as opposed to ‘industrial fishing’, which implies significant investments by companies or financial groups (Colloca et al., 2004). An artisanal fleet includes vessels of low tonnage, usually operating in areas reachable in a short time and using different kinds of gear, excluding towed ones.

In the Mediterranean Sea, artisanal fishery has a great economic, social and cultural value, and is characterized by local systems composed of professional small-scale coastal fishing communities (Guidetti et al., 2010 and literature therein). They possess high professional competence, culture and traditions handed down from generation to generation, which have developed due to the high biodiversity that the Mediterranean Sea traditionally offers. Mediterranean artisanal fishery is multi-specific as it exploits different kinds of resources using various

fishery techniques and gear. This fishery accounted for 80% of the Mediterranean fleet numbering about 83,400 vessels (Sauzade and Rousset, 2013). The first Council Regulation (No 1626/94) that defined the first management measures for the conservation of fishery resources in the Mediterranean dates back to 1994 (European Commission, 1994). This act was repealed by the Council Regulation (No 1967/2006) ‘concerning management measures for the sustainable exploitation of fishery resources in the Mediterranean Sea’ (European Commission, 2006), which deals broadly with artisanal fishery gear and use for each specific fishery. Furthermore, more recently the European Commission and other local fishery managers have paid more attention to artisanal fishery in order to expand knowledge on this activity and on fishery resources, to improve management and to safeguard the cultural heritage of fishing traditions (Vitale et al., 2011a). Most studies on artisanal fishery date back to recent years only, mainly because of the high interest previously paid to demersal resources from trawling, the

Abbreviations: P, professional fishing vessels; NP, non professional fishing vessels; GTR, trammel net; SV, boat seine; LLD, drifting longline; LLS, set longline; GNS, entangling net; GN, monofilament gillnet; PS, purse seine net; LX, hooks and lines

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most important fishery in the Mediterranean in terms of economic value. In addition, artisanal fishery is a very complex system, which interacts with the environment and other socio-economic sectors, and its complete description is hard (García and Reveret, 1991). The main difficulties in the investigation into artisanal fishery activities concern its broad heterogeneity, which implies differences in duration of fishing trips, in time and place of landings (a multitude of ports and shelters) and different destinations of products (retail, wholesale markets, fishmonger shops and restaurants) (Battaglia et al., 2010; Farrugio and Le Corre, 1993). Moreover, the suspicious nature of fishery operators, who are afraid of additional tax measures by legislators, toward scientific surveyors contributes to the difficulties in monitoring their activity.

The recent scientific interest for artisanal fishery increased for its involvement in Integrated Coastal Management (ICM) and in Marine Protected Areas (MPAs) management (Leleu et al., 2014; Rodríguez-Rodríguez, 2014). Since artisanal fishery is one of the main users of the coastal environment, its involvement in decision-making processes can make the management measures more effective for the conservation and the sustainability objectives (Jeudy de Grissac et al., 2015). Furthermore, through the active involvement of fishermen in management processes (co-management), it is possible to define and to integrate fisheries management plans into those of MPAs and ICM. These are useful tools for the strengthening of artisanal fishery and for its appropriate integration with the environmental aspects and other human uses of coastal areas (Gómez et al., 2006).

Following this new approach, artisanal fishery in the Mediterranean has been studied not only for its composition and structural characteristics of the fleet and for its fishery resources (e.g. Colloca et al., 2004; García-Rodríguez et al., 2006; Silva et al., 2002), but also for its socio-economic aspects (e.g. Battaglia et al., 2010; Falautano et al., 2008; Freire and García-Allut, 2000; Jabeur et al., 2000; Matic-Skoko et al., 2011; Maynou et al., 2013; Tzanatos et al., 2006). In recent years, artisanal fishery has been facing a major crisis, due to environmental, economic and structural factors (Gómez et al., 2006; Maynou et al., 2013), as revealed by the contraction of the artisanal fleet in several Mediterranean fisheries. Examples come from the French regions of Languedoc-Roussillon and Provence-Alpes-Côte d'Azur, where the number of artisanal boats nearly halved between 1986 and 1996 (Guillou and Crespi, 1999); in the Cilento area (Italy) the artisanal fleet underwent a reduction of around 25% between 1995–1996 and 2001 (Colloca et al., 2004). In order to adopt management measures that could enable the recovery of artisanal fishery it is crucial to investigate the various aspects of this activity.

From this perspective, a study on ICM focused on the sustainable development of artisanal fishery has been carried out since 2006 in the coastal zone of Sciacca (Strait of Sicily, Mediterranean Sea), extending for about 18 km (Andaloro, 2007). This area is characterized by high environmental heterogeneity, due to the co-occurrence of sandy, silt-clay and rocky bottoms, wide zones colonized by seagrass *Posidonia oceanica*, the presence of artificial reefs, and hosts Sites of Community Importance (i.e. sites that contribute significantly to the maintenance of or restoration to a favourable conservation status of a natural habitat type or of a species, European Commission Habitats Directive 92/43/EEC) (Perzia et al., 2011). Noteworthy ecosystems, fishery activity, tourism, harbour activities and small industries (e.g. fish-canning industries) coexist in this area. Trawling represents the main fishery activity, operated by 100 vessels (according to the National Register of Fishery Licenses updated to 2006) making daily trips within 40–50 km from the coast and targeting mainly deep-water rose shrimp (*Parapenaeus longirostris*), red mullet (*Mullus barbatus*) and European hake (*Merluccius merluccius*). Pelagic fishery (with surrounding nets and pelagic trawl) is also important as it supports the food packaging industry using European anchovy (*Engraulis encrasicolus*) and European pilchard (*Sardina pilchardus*) (Falautano et al., 2008). Artisanal fishery is still a traditional activity, mainly based on fishermen's experience and supported by basic technologies for fish capture. For centuries, artisanal

fishery has represented a driving sector of the local economy, also supplying manufacturers of fishery gear. Despite the importance of this fishery in this area, a study on the used gear, caught species, yields and existing conflicts has never been carried out. More than 20 years ago, the artisanal fleet of Sciacca was composed of 66 vessels, which practised various fishing activities (according to the local Register of Vessels 'Registro delle Navi Minori e Galleggianti' updated to 31/12/1992). Today, several artisanal métiers typical of this area, such as pots for crustaceans and cephalopods and drifting gillnets for anchovies and sardines, have disappeared due to decreasing resources; other gear like the set longline is disappearing because it is laborious to use, requiring a long time for baiting and dexterity during hauling operations (Falautano et al., 2008). Furthermore, a fishing activity operated by unlicensed non-professional vessels (hereafter indicated as NP as opposed to P, which denotes professional vessels provided with a fishing licence), using the same gear and methods of professional artisanal fishery and whose catch is illegally sold in local markets, has been reported in the area (Andaloro, 2007). This fishing activity is not ascribable to recreational fishing, which is defined as all non-commercial fishing that is carried out mainly for pleasure, where the catch – the selling of which is illegal – is used for one's own consumption (or for one's family and friends) (Font and Lloret, 2014). It should rather be considered as one type of IUU (Illegal, Unreported and Unregulated) fishing, as defined by the Food and Agriculture Organization of the United Nations (FAO, 2001) and, in particular, as an illegal/poaching activity. In addition, the Council Regulation No 1005/2008 (European Commission, 2008a) defines 'illegal fishing' as fishing activities 'conducted by national or foreign fishing vessels in maritime waters under the jurisdiction of a State, without the permission of that State, or in contravention of its laws and regulations'. In particular, article 3 (paragraph 1a) states that 'a fishing vessel shall be presumed to be engaged in IUU fishing if it is shown that it has fished without a valid licence'. As denounced by the FAO and reported in the above-mentioned Regulation, IUU fishing is one of the most serious threats to the sustainable exploitation of living aquatic resources and jeopardizes the very foundation of the Common Fisheries Policy and international efforts to promote better ocean governance. As the catches by IUU fishing are not declared, the overall exploitation of fishing resources can be extremely underestimated, and this compromises the effectiveness of management measures adopted to contrast fish stocks overexploitation. IUU fishing also adversely affects the economy, as the selling of illegal catches on the market produces price fluctuations with repercussions on both buyers and producers. Furthermore, IUU fishing also contributes to unfair competition between those fishermen and operators abiding by the rules, and those who do not (European Commission, 2009).

Although the concept of IUU refers to all types of fishing activity, the European Commission (EC) makes reference mainly to industrial fisheries operating with large boats in international marine areas. Illegal fishing on a small scale represents an unknown situation that often exploits the same spaces, resources and practices of professional artisanal fishery.

The collection of specific, accessible and reliable data from fisheries is a common challenge among all fishery types (artisanal, recreational, industrial, IUU). Current and accurate information on fisheries' catch and effort is a necessary component to facilitate sustainable fisheries management, to reduce the occurrence of by-catch and discards, to track fishing capacity and to monitor illegal fishing. Quantifying catch and effort in IUU fishing is extremely hard due to the scarcity of data but also to the difficulty in monitoring such activity (McCluskey and Lewison, 2008). An example of such evaluation comes from eastern Indonesia where, in the year 2006, illegal and unreported catch was found to exceed the reported catch by a factor of 1.5, with a total economic value of 40 million USD (Varkey et al., 2010). In the Mediterranean, IUU fishery is reported to potentially cause serious threats to sustainable fishing (Öztürk, 2015) although no quantitative evaluation of this impact has been carried out.

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