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EC REG. 1967/2006: IS SQUARE-MESH BETTER SELECTIVE THAN LARGER MESH-SIZE? COMPARATIVE EXPERIMENT IN SICILIAN TRAWL FISHERIES

EC REG. 1967/2006: LA MAGLIA QUADRA HA UNA MIGLIORE SELETTIVITÀ DI UNA MAGLIA A LOSANGA DI MAGGIORI DIMENSIONI? ESPERIMENTI COMPARATIVI NELLA PESCA A STRASCICO SICILIANA

Abstract - We investigated the effect of mesh configuration and mesh size on the codend selectivity of the species *Aristaeomorpha foliacea* and *Mullus barbatus*, commonly captured in the Sicilian trawl fisheries. For each mesh configuration, square- and diamond-mesh, two nominal mesh sizes of 44 mm and 54 mm were tested. For both the species, the mesh configuration plays a role which is as important as mesh size.

Key-words: codend selectivity, Sicilian trawl fisheries, diamond-mesh, square-mesh.

Introduction – Sicilian trawl fisheries are noteworthy for the large number and variety of commercially important species caught. Sicilian trawl fisheries traditionally operate using small diamond-shape meshes in the codend, which tend to retain almost all animals. At the moment, in Italy the MMS (Minimum Mesh Size) of trawl codends is 40 mm (EC Reg. 1967, 2006), resulting in the capture of many fish below the MLS (Minimum Landing Size). Improving trawl net selectivity is therefore of prime importance. Relatively little scientific work has been done to assess the selectivity of square-mesh codends in the highly variable multi-species conditions prevailing in the Sicilian trawl fisheries. This study was undertaken to analyse the effect, according to Fryer (1991), of inserting square-mesh and larger diamond-mesh codends in a commercial Sicilian trawl, on selectivity of two commercially important species.

Materials and methods – The gear employed in the sea trials was a typical Sicilian commercial trawl net. Using netting having meshes with ca. 44 and 54 mm nominal opening, two diamond- (DM44 and DM54) and two square-mesh codends (SM44 and SM54) were made. Selectivity trials were conducted on the commercial vessel “*Papà Carmelo*”. Sea trials were conducted on two different fishing grounds of the South Tyrrhenian normally exploited by local fishermen. The haul-by-haul maximum likelihood estimation of the selectivity parameters for individual hauls was carried out using the software CC2000 (Constat, 1995). Models, incorporating between-haul variation, were estimated using the software EModeller (Constat, 1995) which implements the methodology proposed by Fryer (1991).

Results – To deal with the multi-species characteristics of the Sicilian fishery, the comparison focused on the main commercial species of this area. In the current studies, information from the seasonal trawl surveys carried out along the Italian coasts (Ardizzone and Corsi, 1997) have been used to identify locations and times with sufficient animals so that a between haul analysis of the selectivity of the main commercial species could be carried out (Fryer, 1991). Overall, 29 valid hauls were performed in the first cruise and 28 in the second. The data analysed in this study were obtained

in the course of two different cruises, but the selectivity results for each species were derived only from one or the other within the same area. The collected data allowed analysis of the selection characteristics for deep water red shrimp (*Aristaeomorpha foliacea*) and red mullet (*Mullus barbatus*). For both the species, the L50 estimates, according to Fryer's model (1991), demonstrate a highly significant ($p < 0.001$) change both with the use of square-mesh and mesh size increase. The DM44 codend had very poor selectivity and did not provide sufficient length classes in particular hauls and/or a sufficient number of fish both retained and released; therefore, some of these hauls have been discarded. Red mullet (*M. barbatus*) was the most abundant fish species and, for several hauls, the catch was more than 70% of the total catch weight. In the Mediterranean Sea, red mullet is subject to an MLS of 11 cm (EC Reg. 1967, 2006). L50 increased of 55% and only 33% with the use of square-mesh and larger mesh size respectively (DM44: 8.21 cm; SM44: 13.30 cm; DM54: 11.36 cm; SM54: 16.91 cm). Only mesh size had a significant effect on SR ($p < 0.001$) and changing from 44 mm to 54 mm increased SR from around 1.56 cm to 3.25 mm. In the Mediterranean Sea, deep water red shrimp (*A. foliacea*) is not subject to any MLS and may always be landed legally. Similar L50s were obtained with DM54 and SM44 (about 21 mm) and around 40% lower SR was estimated with the use of square-mesh.

Conclusions – In the current experiment we have tested four codends with two different mesh sizes across two mesh configurations, therefore mesh size and mesh configuration were included as explanatory variables in the statistical analysis. For this reason we can discuss on the advantage/disadvantage of using a for example 40-mm square-mesh codend instead of 50-mm diamond-mesh codends as requested in the new Council Regulation (EC) No 1967/2006. From the literature we know that the increase in mesh size produces both an increment in L50 and an unwanted increment in SR. The results attained in the present study allow to inference that the use of 44 mm square-mesh codend (SM44) results in a similar L50 of the 54 mm diamond-mesh codend and with a better SR. In agreement with other studies (Ordines *et al.*, 2006; Sala *et al.*, 2008), we confirm that the species analysed, make the best use of the square-mesh opening, either because of their body shape or because of forcing the mesh to penetrate their body through.

In conclusion, enforcement of installation of square-mesh codends in Mediterranean demersal trawl fisheries can be a suitable technical solution to decrease the capture of immature individuals.

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