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AGE COHORT ANALYSIS OF RED MULLET,
MULLUS BARBATUS (L., 1758) (PISCES: MULLIDAE),
IN THE STRAIT OF SICILY (GSA 15 & 16)

ANALISI DI COORTE PER ETÁ DELLA TRIGLIA DI FANGO,
MULLUS BARBATUS (L., 1758) (PISCES: MULLIDAE),
NELLO STRETTO DI SICILIA (GSA 15 & 16)

Abstract - The exploitation status of red mullet, *Mullus barbatus* (L., 1758) in the Northern sector of the Strait of Sicily (GSA 15 & 16) was assessed through an age cohort analysis. Data from commercial trawling fisheries were used. The results showed that the resource is in a state of "overfishing". A reduction of about 40% of the current fishing mortality is suggested to reach the target reference point $F_{0.1}$.

Key-words: red mullet, current exploitation, landings, growth overfishing, Strait of Sicily.

Introduction - Red mullet (*M. barbatus*) is one of the main coastal demersal resources of commercial interest in the Mediterranean. In the Northern sector of the Strait of Sicily (GSA 15 and 16) the species is caught almost exclusively by trawlers operating on the shelf of GSA 16 and 15, i.e. the Malta and Adventure Banks. The Italian trawlers produce more than 95% of the total yield (GSA 15 and 16 together), which decreased from 1409 t in 2005 to 760 t in 2010. In the same period, the landings of the artisanal fisheries were 1-2% and 3% for Italy and Malta respectively. Analysis of data on commercial landings from GSA 15 & 16 performed under the STECF umbrella allowed an assessment of the current exploitation status of red mullet.

Materials and methods - Biological data proceed from monthly sampling of landings from 2006 to 2010 in GSAs 15 & 16 (Data Collection Framework). The length composition of landings was prepared keeping sexes separated. Because of their low amount, discards were not included in the analyses. Due to the catch composition by fleets, two main fishing segments were considered: the coastal trawlers (LOA 12_24 m) and off shore trawlers (LOA 24_40 m) fleets. The length frequency distributions by sex (LFDs) were converted into numbers by age group using the "slicing" routine of the LFDA package (Kirkwood *et al.*, 2001) and successively gathered. The current exploitation state was assessed by age cohort analysis (CA) as implemented in VIT (Leonart and Salat, 1992), assuming a steady state (pseudocoort) status. The used biological parameters are reported in Tab. 1. A yield per recruit analysis was performed for deriving reference Points. The natural mortality vector by age was calculated using the Prodbiom approach version 2009 (Abella *et al.*, 1998).

Results and conclusions - Fishing mortality rates (F) for combined sexes by age class and year are shown in Fig. 1. The main "BRP" estimated by year, including the current mortality rates, are listed in Tab. 1. The current value of fishing mortality (F_{curr}) was estimated as a median calculated taking into account ages 1-4 of the 2006-2010 results. A value of 0.81 was obtained. Since F_{curr} is higher than $F_{0.1}$ (0.45) (Tab. 1), the stock of red mullet in the Strait of Sicily is considered in an overfishing status. A reduction of about 40% of the current fishing mortality should drive to a more

sustainable exploitation status of this stock ($F_{0.1}$ used as target reference point). Due to the very scanty contribution of Maltese boats to the catch, this reduction should be applied only to the Sicilian trawlers, mainly the coastal ones, which exerted most of fishing mortality since 2009. The increasing trend in SSB and recruitment indices from trawl surveys (Gancitano *et al.*, 2011) suggests an improving status of the stock. This could be related with the observed reduction of illegal trawling in the coastal areas within the 50 m depth where recruitment occur in late summer-early autumn, the reduction of fishing effort in the last ten years and the already described positive effect of warming of the surface seawater on the recruitment success (Levi *et al.*, 2003).

Tab. 1 - Biological parameters used, main BRP and current F (F_c) obtained by CA analysis of red mullet (*M. barbatus*).

Parametri biologici utilizzati, principali BRP e mortalità da pesca corrente ottenuti dall'analisi di coorte in età di triglia di fango (M. barbatus).

Parameters	Main BRP and current F					
	Female	Male	Years	$F_{0.1}$	F_{max}	$F_{c(1-4)}$
L_{∞}	23.61	20.16	2006	0.28	0.55	0.54
k	0.45	0.57	2007	0.44	0.86	0.81
t_0	-0.8	-0.8	2008	0.45	0.88	0.79
a	0.0134	0.0176	2009	0.59	1.16	0.89
b	2.9419	2.8226	2010	0.51	1.17	0.87
			Median 2006-2010	0.45	0.88	0.81

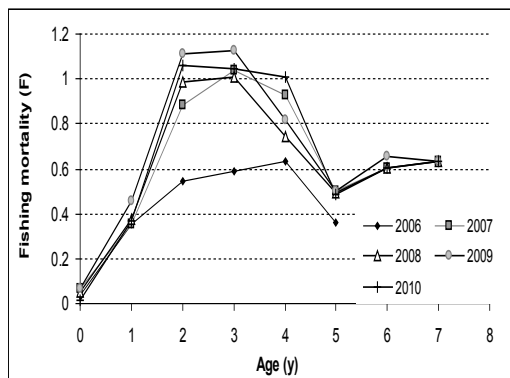


Fig. 1 - Fishing mortality by age class and years of red mullet (*M. barbatus*).

Mortalità da pesca per classe di età e nei diversi anni di triglia di fango (M. barbatus).

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