LENGTH DISTRIBUTION AND MORTALITY RATES OF
MULLUS SURMULETUS EXPLOITED
BY TRAWLING FLEET OFF THE MALLORCA ISLAND

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Among other species, the red mullet (*Mullus surmuletus*, L. 1758) constitutes one of the main target species in the multispecific demersal fishery off Majorca. Due to its abundance and economic value, this paper describes the exploitation pattern of this species, developed by the trawling fleet on fishing grounds off south the Island, between 35 and 100 meters depth. The annual mean lenght frequency distributions of the catches for the period 1990–1992 were obtained from the monthly lenght sampling, carried out on the trawling fleet landings. These length distributions were used in order to estimate the instantaneous rate of total mortality by means of transforming the length frequency distributions in a length converted catch curve according to follows methodologies (PAULY, 1984), (BEVERTON & HOLT 1956) and finally by (WETHERAL *et al.,* 1987). Previously, the von Bertalanffy growth parameters and first maturity were estimated by (REÑONES *et al.,* submitted). Natural mortality rates were estimated according to (PAULY, 1979) assuming an average water temperature of 15.5° C (VIVES, 1989) and by TAYLOR (1958). Annual landings between 1990–1992 have remained at a similar level. In this period, annual catches obtained from official statistics were 125, 138 and 127 tons, respectively. Although the red mullet was also fished by trammel nets, the captures of trawl fleet constituted more than 90%. Recently studies carried out in the Western Mediterranean show that the range size is similar for both trawl an trammel nets, but the larger specimens are captured more frequently by trammel nets. The rates of mortality are ligthly underestimated for the larger specimens, as the number of larger specimens in the catches of both gears is little, and the length frequency distributions show that the majority of specimens captured corresponds to the small sizes (more captured with trawls nets) with a range comprised between 10 to 22 cm. In this paper, we consider only the mortality caused by trawl nets. Similarly, the range of exploited sizes during 1990–92 has not changed significantly (Fig. 1), and was comprised between 10 to 32 cm for females and 10 to 28 cm for males.
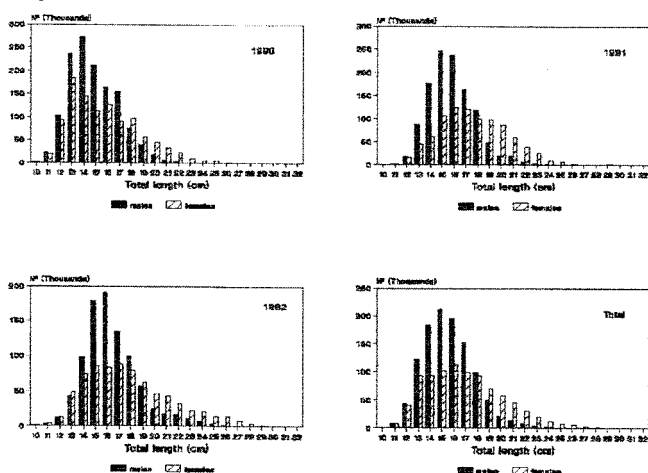

Fig. 1. Length composition of *M. surmuletus*

However, the mean length of catches increased during these years for both sexes as well as the smallest lengths fully recruited represented in the catch samples (l'), which was higher than the first maturity length, that was 15 cm for males and 16.8 for females, both females and males (Table I). Total mortality and natural mortality rate allows to obtain estimation of the fishing mortality rate (F) that was comprised between 0.36–0.44 for females, between 0.46–0.66 for males and between 0.42–0.48 for total population. On the other hand, the exploitation rate (E) was about 0.43 for both, females and males, and 0.46 for all the population (Table II). That all suggested the exploitation was near the optimum and relatively high, and the exploitation pattern is driven mainly towards the smallest lengths.

	l_{min}	l_{mean}	l_{max}	l'
FEMALES	10	19.627	32	16.5
MALES	10	17.525	28	15.5
TOTAL	11	19.035	32	16.5

Table 1. ¹mean length mean estimated from l' smallest length fully recruitment.

	Z^*	Z^{**}	Z^{***}	M^*	M^{**}	E
FEMALES	0.829	0.805	0.785	0.473	0.384	0.429
MALES	1.072	1.072	1.521	0.607	0.408	0.434
TOTAL	0.903	1.015	1.414	0.483	0.426	0.465

Table 2. Z* from the Catch Curve; Z** from BEVERTON & HOLT; Z*** from WETHERALL *et al.*; M* from PAULY; M** from TAYLOR; E rate of exploitation from Z of Catch Curve.

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