MONOFILAMENT GILLNET SELECTIVITY FOR THE RED MULLET (*MULLUS BARBATUS*) IN THE EASTERN BLACK SEA COAST OF TURKEY, TRABZON

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Abstract
The mesh size selectivity of monofilament gillnets for red mullet (*Mullus barbatus*) was investigated using four different stretched mesh sizes (32, 36, 40 and 44 mm). Experimental fishing operations were carried out in Trabzon (Turkey) coasts of the Black Sea in springtime of 2002 and 2003. Fifteen trials were conducted giving a total catch of 303 red mullet. Selectivity on *M. barbatus* was assessed using the Holt's method. The optimum lengths (100% retention probability) were 13.16cm, 14.8cm, 16.44cm, and 18.09cm for the nets of 32, 36, 40 and 44 mm mesh respectively with a common selection factor of 4.11. Considering the minimum allowable landing size (13 cm) in force, 36 mm mesh is advised to be the best as it result more conservative approach in terms of size selectivity.
Keywords: Fisheries, Black Sea

Introduction
M. barbatus is an important fish species of the Black Sea and its catch has recently been recorded to diminish [1]. There are some evidences that overfishing and illegal fishing are mainly responsible for this decrease [2]. Gillnets are the main fishing gear to catch red mullet in Turkish Black Sea coasts. Gillnets are very size selective and therefore the mesh size may be considered to be the most important characteristic of a gillnet [3]. Gillnets are made of monofilament, multifilament or multifilament nylon. Despite the importance of this fishing gear little is known about its selectivity especially in the eastern coasts of the Black Sea in Turkey. Thus, this study aims to investigate the selectivity features of this gillnets to enable the necessary data for Turkish fisheries management.

Materials and Methods
The study was performed in May to June 2002 and in April to June 2003 in the Black Sea, Trabzon coasts with monofilament gillnets of 32 mm, 36, 40 and 44 mm mesh sizes. Fifteen valid hauls were obtained during the study period. The net configuration was in four sheets attached together, each having 50 m length and 2 m depth with a constant hanging ratio of 0.50. Experimental trials were carried out on boards of a commercial fishing boat of 9 m long and 28 hp, at depths ranging from 10 to 20 m. Sample sizes were measured to the nearest cm in terms of total length. The selectivity analysis was done by Holt's method [4], which is based on standard linear regression. The calculations were carried out in Excell package.

Results and Discussion
The total number of fish caught during the experimental fishing operations was 303, of which 26% from 32 mm, 35% from 36 mm, 18% from 40 mm and 21% from 44 mm mesh sizes. The mean lengths caught by each mesh sizes were 13.72 cm, 14.54 cm, 15.92 cm and 16.85 cm. Regression and selectivity calculations are shown in Table 1. The common selection factor (SF) is found to be 4.11 and corresponding optimum lengths (L_{opt}=SF x mesh size) are calculated as 13.16 cm, 14.80 cm, 16.44 cm and 18.09 cm for 32 mm, 36 mm, 40 mm and 44 mm meshes. The selectivity curves for the four mesh sizes are presented in Figure 1.

Tab. 1. Regression and selectivity paramaeters for the red mullet obtained by Holt's method for monofilament gillnets of four different mesh sizes

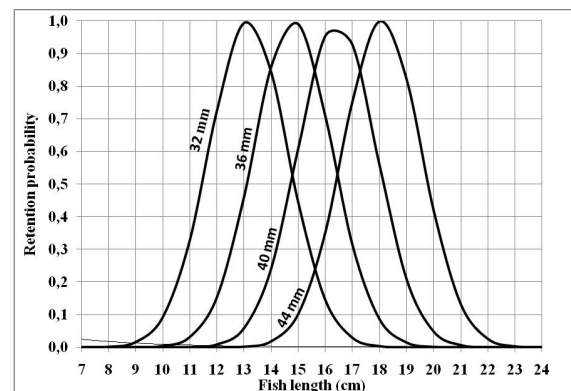| Smallest mesh size	32 mm	36 mm	40 mm	Overall mean
Largest mesh size	36 mm	40 mm	44 mm	
Intercept	-7.56	-12.97	-24.57	
Slope	0.540	0.796	1.493	
Selectivity factor	4.12	4.29	3.92	4.11
Variance	3.05	2.16	1.05	2.09
Standard deviation	1.75	1.47	1.02	1.41

Fig. 1. Selectivity curves for the red mullet caught by monofilament gillnets of four different mesh sizes

The optimum lengths for *M. barbatus* for all meshes were over minimum landing size of 13 cm [5]. These values are also well over length at first maturity, which was reported in a previous study [6]. The ratio of undersized fish caught by each mesh were17.9%, 10.4%,1.8% and1.5% for 32 mm, 36 mm, 40 mm and 44 mm meshes, respectively. Among these four mesh sizes the 36 mm mesh had the highest catch efficiency (35%). The selectivity results show that the most recommended mesh size would be 36 mm, in behalf of being more conservative with regards to fishing management policies.

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