

SIZE STRUCTURE OF THE TURBOT (*PSETTA MAXIMA MAEOTICA*) LANDINGS FROM THE NORTH BULGARIAN BLACK SEA COAST

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DUŽINSKA I TEŽINSKA STRUKTURA IVERKA (*PSETTA MAXIMA MAEOTICA*) IZLOVLJENOG DUŽ SEVERNE OBALE BUGARSKOG DELA CRNOG MORA

Apstrakt

Iverak (*Psetta maxima maeotica*) je demerzalna vrsta ribe koja se može naći na sprudovima duž obala svih zemalja koje okružuju Crno more. Iverak predstavlja veoma važnu demerzalnu vrstu ribe u Crnom moru, sa velikom potražnjom na tržištu i visokom cenom. Uprkos merama koje su preduzete za zaštitu populacija iverka, uočen je trend opadanja u proračunu relativne biomase ove vrste od 2008. godine na prostoru bugarskog dela Crnog mora. Zbog nepostojanja informacija koje se odnose na validne ribarske statistike i dostupne biološke podatke, ova istraživanja na ulovima iverka duž bugarske obale Crnog mora su imala za cilj sakupljanje bioloških podataka za analizu njegovog ulova. Težinska (W, g) struktura istraživanih iveraka (600 jedinki) iz 20 ulova pokazala je da je prosečna težina ribe iznosila 2.63 kg, sa maksimalno zabeleženom vrednošću od 7.0 kg i minimalnom od 1.25 kg. Najveći procenat u težinskoj strukturi izlovljenih jedinki imala je težinska grupa od 2.0 do 3.0 kg (44%), a zatim težinska grupa od 1.25 do 2.0 kg (31%). Grupa od 3.0 to 4.0 kg je činila 16%, grupa od 4.0 do 5.0 kg je činila 6%, grupa od 5.0 do 6.0 kg je činila 2% i grupa od 6.0 do 7.0 kg je činila samo 1% od ukupnog izlova. Iverak težine od 1.5 do 2.5 kg činio je 56% od svih izmerenih jedinki. Prosečna totalna dužina (TL, cm) merenih riba je bila 52.8 cm, sa maksimalnom vrednošću od 77.0 cm i minimalnom od 45 cm. U okviru svih dužinskih grupa najbrojnije su bile dužinske grupe od: 45-48 cm sa 24,6%, 48-51 cm sa 23.3% i 51-54 cm sa 20.1% od celokupnog uzorka. RIBE sa totalnom dužinom od 45 cm, koja je minimalna mera dozvoljena za izlov, su činile samo 2.8%, ali su jedinke u okviru dužinske grupe od 45-48 cm obuhvatile jednu četvrtinu uzorka. Generalno, analiza podataka dobijena na osnovu 600 iveraka sa prosečnom težinom od 2.63 kg ili totalnom biomasom

od 1 578 kg dovela je do pretpostavke da se značajni deo ulova sastoji od riba sa relativno malom težinom tela. Buduće monitoring studije će podržati ili odbaciti ovu pretpostavku.

Ključne reči: iverak, Psetta maxima maeotica, Crno more, prijavljeni ulov, dužinska i težinska struktura

Keywords: turbot, Psetta maxima maeotica, Black sea, landings, size structure

INTRODUCTION

Turbot (*Psetta maxima maeotica*) is a demersal species and occurs all over the shelf area of all Black Sea coastal states at depths up to 100 m -140 m, grouped in local shoals. It has a life span of 10-12 years and reaches up to 87 cm in length and up to 15 kg in weight (Karapetkova, Zivkov 2006). The spawning process takes place in spring season between April and June. Species inhabits sandy or silt bottoms, mussel beds or mixed types. Turbot in the Black Sea is represented by several local populations, which migrate and mix in the adjacent zones. The fish is not a highly migratory species but relocates seasonally towards the coast and offshore related to reproduction, feeding and wintering.

Turbot is the one of the most important demersal fish species in the Black Sea with high market demand and prices. Higher turbot catches are registered in spring and autumn periods. Main fishing gear for turbot in Bulgaria are gillnets. According to Art. 35 of the Bulgarian Law on Fisheries and Aquaculture (LFA) the use of bottom trawling and dredging means is prohibited since 1984. The minimum legal mesh size for bottom-set nets used in turbot fisheries is 400 mm (Art. 11 of the Council Commission Regulation 850/98), and the minimum allowable total length at landing is 45 cm (Annex XII of Council Regulation 850/98 and Annex II of the LFA). Not allowed is the catch, retain on board, trans-bordering, landing, first sale and transport of turbot during the reproduction period between April 15 and June 15. Turbot quotas are introduced since 2004 in national waters and after 2008 in community waters, regarding to Council Regulations (EC, 2008 - 2013).

Despite the measures taken to protect turbot populations a decreasing trend in the estimated relative biomass of turbot since 2008 is observed in the Bulgarian Black Sea area. Due to existing gaps of information in terms of accurate fisheries statistics and availability of biological data, the present study on turbot catches at the Bulgarian Black Sea shore aims to collect biological data for analysis of catches and for buildup of a database to follow-up of the structure of catches over the years. The main tasks of the study included measurements of body weight, total length of turbot from landing operations in order to determine the size structure of catches and to analyze the results.

MATERIALS AND METHODS

The data collection was performed in December 2014 in the northern Bulgarian Black Sea aquatory. From ports where landings of turbot are permitted, the Kavarna, Balchik and Varna ports were used for biological data collection. Out of 156 ships authorized for catch of turbot in 2014, 20 vessels (and 20 catches) were used for collection of biological data. The total number of fish used for biological data collection was 600. The catches were from the aquatory between latitudes 43° 12' N and 43° 45' N and longitudes 28° 19' E and 29° 11'

E. The depth of places where fish were caught varied from 60 to 67 m. For the 8 vessels, no data for the places of catch and their depth were available, but they were similar to aforementioned ones. The measurements of fish were made on the board of ship immediately after docking of ships at the port, on fresh ice-cooled subjects. The weight measurement was done with a precision of 1 g, while that of total lengths – with a precision of 0.1 cm. The data processing, graphs and tables were elaborated by means of statistical software.

RESULTS AND DISCUSSION

Number of fish caught from each ship

The number of fish caught from each vessel and their percentage distribution is presented on Fig. 1 and Fig. 2. Thirty turbot were caught from each ship on the average, with maximum number of 86 and minimum number of 5 fish. Eight vessels or 40% of all 20 have caught between 10 and 20 fish, 4 ships (20%) between 30 and 40 fish, and 2 ships (10%) between 40 and 50 fish. Catches with less than 5 turbot, 70-80 and 80-90 turbot were each registered in one vessel (Fig 1.).

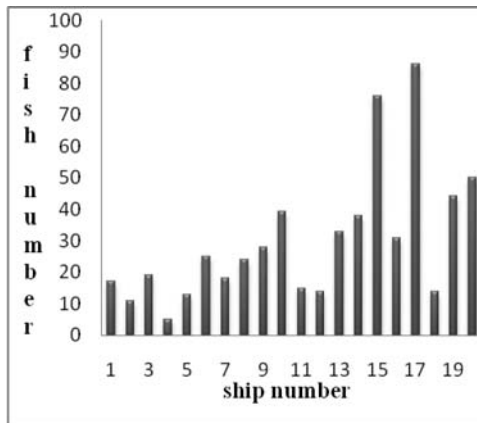


Figure 1. Number of fish caught at each ship

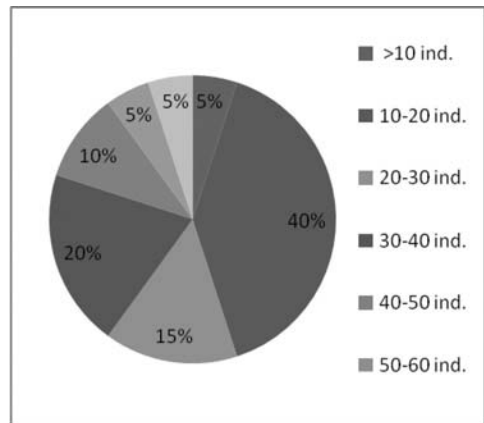


Figure 2. Percentage distribution of catches from each of ship, %

Weight structure of catches

The average, maximum and minimum weights of the landings of turbot are depicted on Fig. 3. The average weight of measured turbot was 2.63 kg, and the maximum-minimum range: 7.0-1.25 kg.

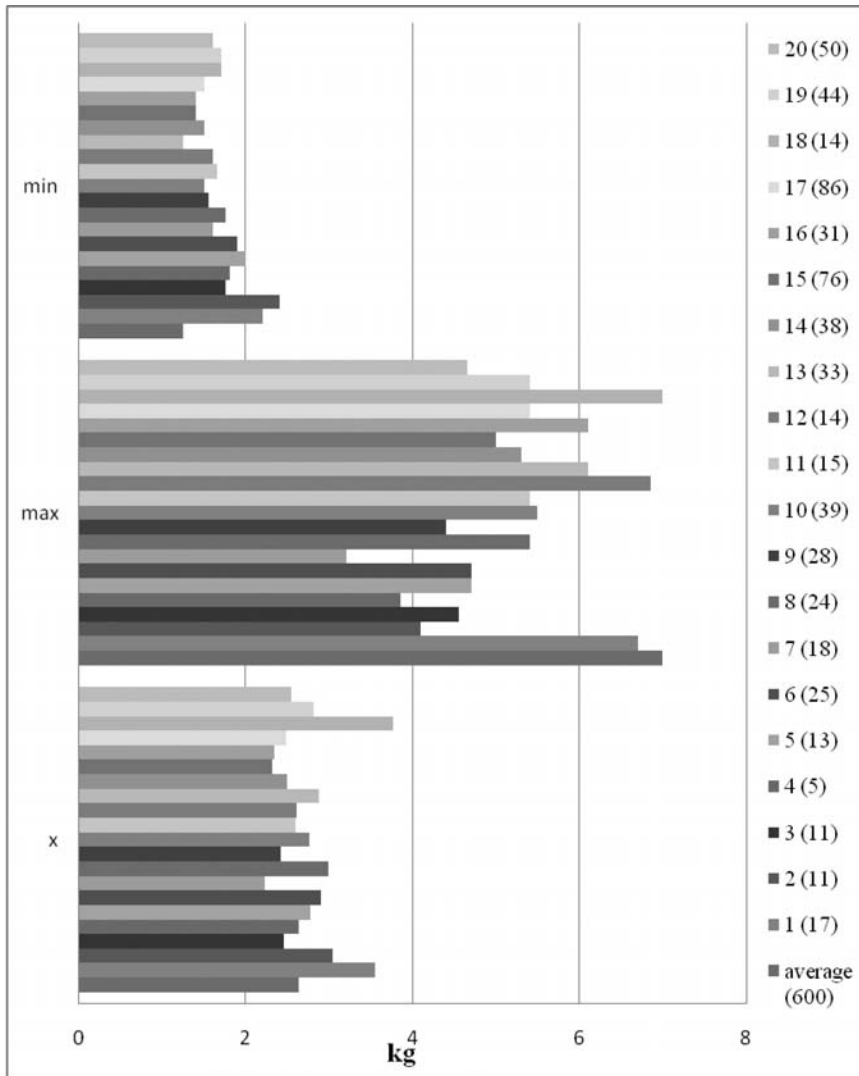


Figure 3. Minimum and maximum weights (W, kg) of turbot from 20 landings.

The number of fish from each ship is given in brackets.

Average weights of turbot from the different catches varied between 3.8 and 2.21 kg, maximum weights – between 7.0 and 3.2 kg, and minimum ones between 2.4 and 1.25 kg.

Figure 4 acquaints with the percentage distribution of the different weight groups for all 600 weighed turbot. The highest share was that of the weight group from 2.0 to 3.0 kg (44%), followed by the weight group from 1.25 to 2.0 kg (31%). The share of the weight group between 3.0 and 4.0 kg, 4.0 to 5.0 kg, 5.0 to 6.0 kg, and 6.0 to 7.0 kg was 16%, 6%, 2% and 1%, respectively.

The graph shows that turbot weighing between 1.25 and 3.0 kg comprised 75% of all weighed fish.

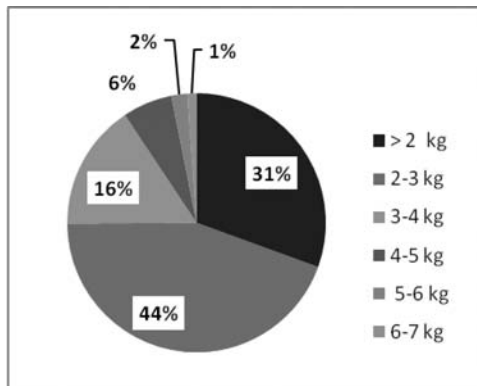


Figure 4. Proportions of the different weight groups of turbot.

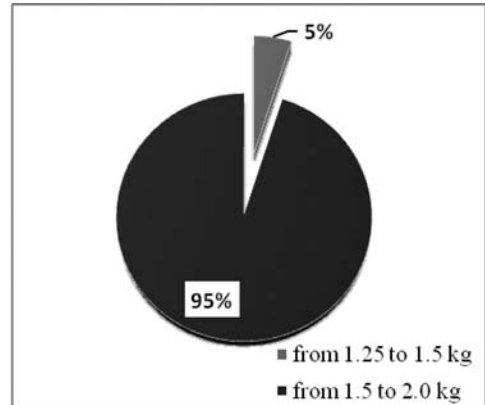


Figure 5. Proportions of fish within the weight group from 1.25 to 2.0 kg

When the first weight group (from 1.25 to 2 kg) was divided into two subgroups: from 1.25 to 1.5 kg and from 1.5 to 2.0 kg, it becomes obvious that only 5% of turbot weighed from 1.25 to 1.5 kg, while those weighing between 1.5 and 2.0 kg were 95% (Fig. 5).

The division of the second weight group (2.0 to 3.0 kg) into subgroups of 2.0-2.5 kg and 2.5-3.0 kg demonstrates that the major part of fish (59%) weighed between 2.0 and 2.5 kg. Summing up the results from the analysis of the first two weight groups, it could be seen that turbot with body weight from 1.5 to 2.5 kg were more than one half (56%) of the entire group of 600 fish.

The average, minimum and maximum total body lengths (TL, cm) of turbot from the landings are presented on Fig. 6. The average total length of measured fish was 52.8 cm, the maximum was 77.0 cm, while the minimum was 45 cm. The average total lengths of fish varied from 60.6 and 51.1 cm among the catches, the maximum was between 77.0 and 56.0 cm, and the minimum between 50.5 and 45.0 cm.

The shares of the different size groups (at 3 cm-intervals) showed that three size groups were the most frequently encountered: 45-48 cm, 48-51 cm and 51-54 cm (Fig. 7).

Turbot with total body length from 45 to 54 cm comprised 68% of the entire sample, whereas those with TL 45-51 cm were almost one half from all measured fish (47%). Fish with total body length of 45 cm, which is the minimum allowance for catch, were only 2.8% of all turbot, but one-quarter of all studied fish had TL within the range 45-48 cm.

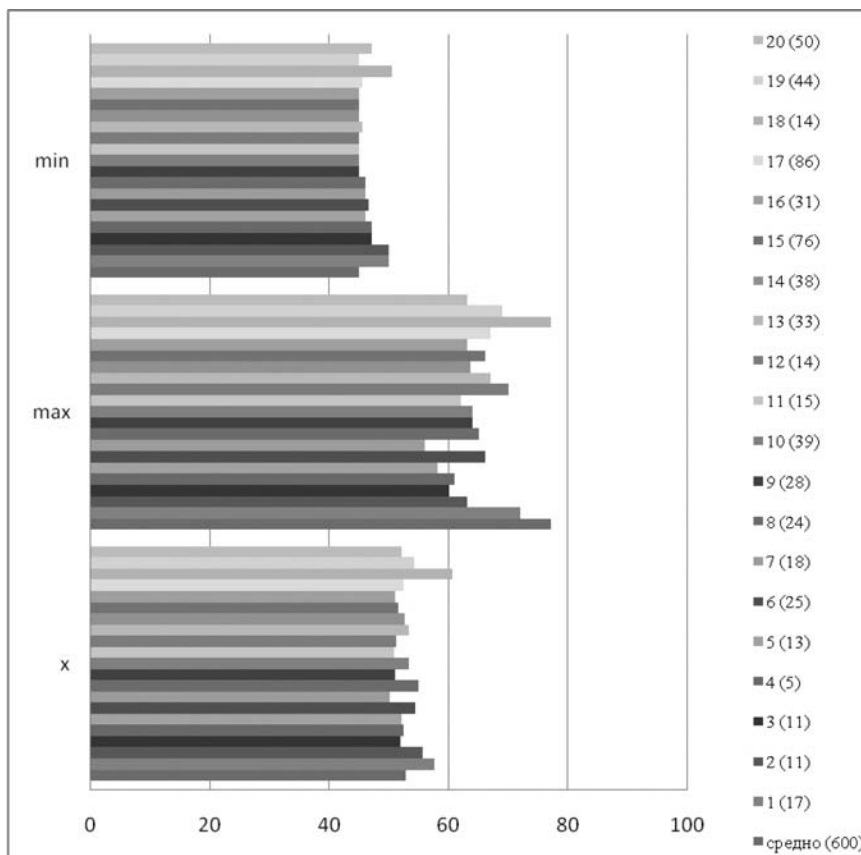


Figure 6. Average, minimum and maximum total body lengths (TL, cm) of turbot from 20 unloadings. The number of fish from each ship is given in brackets

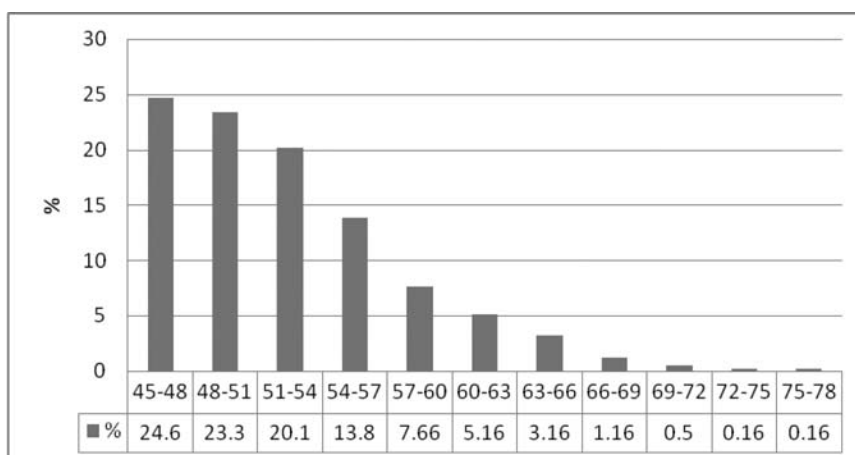


Figure 7. Proportions of the different body size groups (TL, cm) at 3 cm-intervals of turbot from 20 landings, December 2014.

CONCLUSIONS AND RECOMMENDATIONS

In general, the analysis of data obtained from 600 turbot with average weight of 2.63 kg or total biomass of 1 578 kg allowed assuming that a substantial part of catches consisted of fish with relatively low weight. Future monitoring studies would support or reject this suggestion. According to the EC legislation, the mesh size for turbot nets must be at least 400 mm, which, according to professional opinions in the branch should prevent catching specimens weighing less than 2.3-2.5 kg. The results from the present study showed that turbot weighing from 1.25 to 2.0 kg were one-third (31%) of the entire sample whereas those weighing from 1.5 to 2.5 kg more than half of the sample (56%). We suggest that the low weight of turbot with body size around the minimum allowed (45 cm) could be due to the poorer body condition of fish during the study period, as also supported by the results from turbot meat biochemical analysis. We recommend continuation of the biological monitoring on turbot landings at the Bulgarian Black Sea shore in the future in order to obtain a more complete and more objective image of catch structure over the years, which is a parameter for the population structure of the species. Spring catches could be also included in the analysis, as they are considerably bigger than those in the autumn. This would permit to perform a comparative analysis of data from both periods.

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REFERENCES

Karapetkova, M. and M. Zivkov (2006). Ribiti v Balgaria. Zemisdat.pp.153. Bulgarian Law on Fisheries and Aquaculture Council Commission Regulation 850/98 Council Regulations (EC, 2008 - 2013).