THE RELATIONSHIP BETWEEN OTOLITH AND SIZE OF MEDITERRANEAN HORSE MACKEREL (TRACHURUS MEDITERRANEUS, STEINDACHNER, 1868) IN THE SOUTH-EASTERN BLACK SEA

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ODNOS OTOLITA I VELIČINE MEDITERANSKE SKUŠE (TRACHURUS MEDITERRANEUS, STEINDACHNER, 1868) U SEVERO-ISTOČNOM DELU CRNOG MORA

Abstract

Mediterranean horse mackerel has an important commercial value for the Turkish fisheries. It was the second important species after anchovy in Turkey with a 115000 t production in 1986. Due to collapse of anchovy stocks since the early 1990's, amount of catch has gradually decreased and production of horse mackerel in 2004 and 2005 decreased to 6301 t and 8287 t, respectively. It was 2651 t and 5982 t in the Southeastern Black Sea in respective years.

Knowing the relationship between otolith length and fish length provides important information in determining the length of fish from the otoliths found in archaeological areas and stomach of the predators, validate ageing studies and mainly for the back calculation for the length of the rare species (Echeverria, 1987; Panfili and Tomás, 2001). Moreover, in some fish species the fish age can be determined by the otolith weight due to a high correlation existing between these two parameters (Pawson, 1990; Mardinale *et al*. 2000). There are no studies on ageing of Mediterranean horse mackerel in the Black Sea. There is only one comprehensive research on the relationships between otolith dimensions and fish length which has been carried out on *Trachurus mediterraneus* in the Sea of Marmara (Bostanci, 2009). Polat and Kukul (1990) studied ageing methods of Atlantic horse mackerel *Trachurus trachurus* in the Black Sea.

In the present study it was aimed to derive all possible relationships between otolith dimensions and fish size using samples of Mediterranean horse mackerel caught in the South-Eastern Black Sea. These models can be used to estimate fish age from selected independent parameters especially for the routine monitoring studies for fisheries management.

As a result, mean otolith length, width and weight of all samples was derived as 4.321 mm, 2.507 mm and 0.0109 g, respectively. Otolith length (OL)-otolith weight (OW), otolith length (OL)-otolith width (OW_i), fish total weight (TW)-otolith weight (OW), fish length (TL)-otolith length (OL), otolith length (OL)-age (A), otolith weight (OW)-Age (A), otolith length (OL)-fish total weight (TW), otolith weight (OW)- fish length (TL), otolith width (OW_i)- fish length (TL), otolith width (OW_i)- otolith weight (OW) relationships were derived as $OW=0.0006OL^{1.8971}$ (n=394, r=0.853), $OW_i=0.923+0.367OL$ (n=551,r=0.814), OW=0.0039+0.0003TW (n=455,r=0.868), OL=1.0035+0.2458TL (n=557,r=0.811), A= 3.3398+0.4554OL (n=531, r=0.711), A=0.0051+0.0021OW (n=453, r=791), $TW=0.5218OL^{2.473}$ (n=531, r=0.774), TL=8.1884+598.31OW (n=453, r=869), TL= 0.5874+5.635, OW (n=551, r=0,793), $OW=0.031+5.635OW_i$ (n=551, r=0.793), respectively.

Regarding the relationships between fish and otolith size the highest correlation was found between fish length and otolith weight (r=0.869).

It was also observed that there are significant differences between same relationships derived from the two research studies due to work on the samples obtained from different habitats as Sea of Marmara and the Eastern Black Sea.

Key words: *Age determination, otolith size, fish size, Trachurus mediterraneus, South-eastern Black Sea*

REFERENCES

Bostanci, D. (2009): Otolith Characteristics and Some Population Parameters of Mediterranean Horse Mackerel, *Trachurus mediterraneus* (Steindachner, 1868) Fırat Univ. Journal of Science 21 (1), 53-60, 2009.

Echeverria, T. W. (1987): Relationship of otolith length to total length in rockfishes from Northern and Central California Fishery Bulletin, 85(2), 383–386

Mardinale, M., Arrhenius, F., Johnsson, B. (2000): Potential use of otolith weight for the determination of age-structure of Baltic cod (*Gadus morhua*) and plaice (*Pleuronectes platessa*), Fisheries Research, 45, 239–252

Panfili, J. Tomás, J. (2001): Validation of age estimation and back-calculation of fish length based on otolith microstructures in Tilapias (Pisces, Cichlidae), Fish. Bull. 99:139–150 (2001).

Pawson, M. G. (1990): Using otolith weight to age fish. J. Fish Biol., 36, 521-531.

Polat, N., Kukul, A. (1990): Age Determination Methods of Atlantic Horse Mackerel *Trachurus trachurus* in the Black Sea. X. National Biology Congress. Erzurum.