AGE AND GROWTH OF FATTENING BLUEFIN TUNA (*THUNNUS THYNNUS* L., 1758) IN THE EASTERN MEDITERRANEAN SEA

Nicky Milatou [1]* and Persefoni Megalofonou [1]

[1] Department of Zoology and Marine Biology, Faculty of Biology, University of Athens, Greece - nmoceanology@msn.com

Abstract

A total of 188 specimens of bluefin tuna (*Thunnus thynnus* L., 1758) were sampled from the Greek Bluefin Tuna farm, in the Ionian Sea, between December 2007 and January 2008. The samples ranged from 127 to 272 cm in fork length and from 43 to 475 kg in round weight. Their age was estimated from 5 to 16 years, using caudal vertebrae and the length-weight relationship revealed a positive allometric growth.

Keywords: Eastern Mediterranean, Aquaculture, Growth, Pelagic, Teleostei

Introduction

Bluefin tuna (*Thunnus thynnus* L., 1758) is a large pelagic fish with a highly migratory behavior and trans-oceanic movement. It is found in the Atlantic Ocean including the Mediterranean Sea and sustains important recreational and commercial fisheries as well as the aquaculture industry [1, 2]. The aim of this study is to estimate the age of fattening bluefin tuna using caudal vertebrae and to determine the length-weight relationship.

Materials and Methods

Fork length (FL) and round weight (RW) measurements were taken from 188 bluefin tuna specimens sampled from the Greek Bluefin Tuna farm, in the Ionian Sea, from December 2007 to January 2008. Length measurements were taken to the nearest centimeter (cm) and weight to the nearest gram (g) and the length- weight relationship was calculated using the equation $RW=a*FL^b$.

A total of 99 caudal vertebrae were used to estimate age by counting the annual growth zones observed on the inner surface of the cones of the whole vertebrae. One ridge and one groove were interpreted as one annulus. Mean lengths at age and the precision of the ageing method were calculated.

Results and Discussion

Fork length and round weight data ranged from 127 to 272 cm and 43 to 475 kg, respectively. The more frequent length classes were between 220 and 240 cm and the more frequent weight classes were between 240 and 270 kg. The slope of the length-weight relationship was bigger than 3 indicating positive allometric growth (Fig. 1). However, the length-weight relationships for the wild individuals present mostly negative allometric growth [2].

Several studies have estimated the age and growth of wild bluefin tuna using calcified structures, but no one has estimated the age of fattening bluefin tuna. The range of the estimated ages was from 5 to 16 years with mean fork lengths 139 cm and 267 cm, respectively (Fig. 2). The age group 10 was dominant. From the samplings we had no young specimens, because at the aquaculture there are only older, from 5 years and over, specimens. A comparison of our results with similar studies revealed that the fattening bluefin tuna present higher mean lengths at age values than these of the wild bluefin tuna [3].

The Average Percent Error (APE), the Coefficient of Variation (CV) and the Index D were 2.21%, 2.89% and 1.67%, respectively. The values of precision estimated keep up with the values of the existing bibliography [3]. The present study revealed the difficulty in distinguishing between the closely spaced increments on the centrum margin of the vertebra that becomes severe at the age of 8 years and onwards. The same difficulty has also been noticed in previous studies [3]. This probably constitutes the major disadvantage of the vertebra method and it is likely to underestimate the age of older fish.

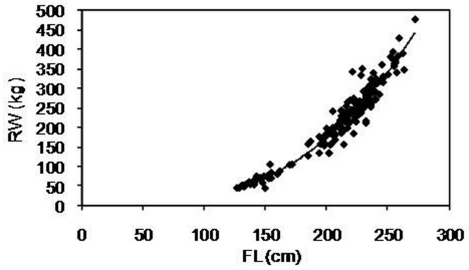

Fig. 1. Fork length-round weight relationship of fattening bluefin tuna, *Thunnus thynnus* ($RW=1.3*10^{-5}*FL^{3.09}$, $R^2=0.96$, n=188)

Fig. 2. Fork length versus age estimates from caudal vertebrae band counts of fattening bluefin tuna, *Thunnus thynnus* (n=99)

References

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