

AGE ESTIMATION OF ALBACORE (*THUNNUS ALALUNGA*) CAUGHT BY PURSE SEINE IN TURKISH WATERS BASED ON DORSAL SPINE READING

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Abstract

Lengths of 151 albacore (*Thunnus alalunga*) were measured from 1999 to 2004 in the northern Levantine and Aegean Sea. Fork lengths ranged between 65.0 and 91.5 cm. Age and growth were estimated from seasonally formed bands on the first dorsal spines of 95 specimens. The parameter estimates for the combined sexes were $L_{\infty}=100.74$ cm, $k=0.167$ years⁻¹ and $t_0=-4.878$ years. Growth performance index Φ' was 7.435 of all individuals studied. The maximum age was 8 years.

Keywords: Fishes, Pelagic, Growth, Eastern Mediterranean

Introduction

Albacore (*Thunnus alalunga*) is a highly migratory species, found in both subtropical and temperate waters of the three oceans, including the Mediterranean Sea. This species, which has been caught as a by-catch species from bluefin tuna fishery in the Turkish waters, has increasingly been caught by gillnets as the target species in recent years [1]. The catch quantity of albacore has increased remarkably from 73 t in 2006 to 852 t in 2007 [2]. The objective of our study was to estimate albacore age and growth in Turkish waters from growth rings on sections of the first dorsal spine.

Material and Methods

A total of 151 samples were collected during the 1999-2004 from catches by Turkish fishing fleets operating in the northern Levantine and Aegean Seas in bluefin tuna purse seine fisheries. Fishing area depth was 200-2400 m. The first spine of the first dorsal fin was removed from each specimen and fork length (FL), date and area of capture were recorded.

Mean length at age data were used to estimate the growth parameters of the von Bertalanffy growth function $L_t = L_{\infty} [1 - e^{-K(t-t_0)}]$, where L_t is the total length of fish at time t ; K is a growth constant; L_{∞} is the asymptotic length; and t_0 the theoretical age at length 0. Growth performance indexes ($\Phi' = \ln k + 2 \ln L_{\infty}$) were calculated to compare results obtained in this study with results published elsewhere [3].

Results and Discussion

Fork length of all individuals collected ranged from 65.0 to 91.5 cm FL (average value 80.23 ± 0.53 cm). Dominant length class in the total sample was 80-84 cm (Fig.1).

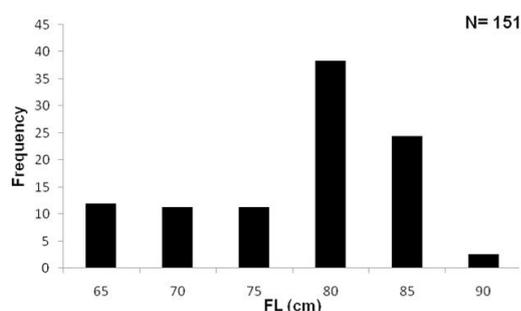


Fig. 1. The fork length distribution of albacore caught in Turkish waters

Age determination and back-calculation analysis was determined from 95 fish of 65.0 to 91.5 cm FL. The age range was between 2 and 8 years. 5- and 6-year-old fish were the most abundant in the samples from the albacore population studied (Tab.1A). The estimated von Bertalanffy growth parameters for sexes combined were $L_{\infty}=100.74$ cm, $k=0.167$ years⁻¹ and $t_0=-4.878$ years.

Growth performance index Φ' was 7.435 for all individuals. The comparison of growth parameters and growth performance indexes estimated in the present study and those obtained in previous studies are shown in Tab.1B. The mean growth performance index was significantly lower ($P<0.05$) for the Mediterranean than for Atlantic populations. Compared to Mediterranean sample, north Atlantic populations showed a higher fitted L_{∞} (134.4 -140.1

cm).

Tab. 1. A) Observed minimum, maximum and mean length at age for albacore collected in Turkish waters. B) Von Bertalanffy growth parameters and growth performance indexes (Φ') for albacore from different regions

A		FL (cm)		
Age	Sample size	Min.	Max.	Mean±sd
2	7	68.0	72.0	69.3±1.3
3	10	65.0	81.0	72.1±5.5
4	17	71.0	86.0	79.1±5.9
5	25	74.5	89.0	83.2±3.7
6	24	78.0	89.0	83.4±2.9
7	10	83.5	89.5	86.4±1.7
8	2	87.5	91.5	89.5±2.8

B		L_{∞}	K	t_0	Φ'
Stock- Reference	Methodology				
North Atlantic [4]	scales	134.4	0.183	-0.350	8.103
North Atlantic [5]	dorsal spines	140.1	0.129	-1.570	7.837
Mediterranean [6]	dorsal spines	94.7	0.258	-1.354	7.746
This study	dorsal spines	100.7	0.167	-4.878	7.435

The absence of 0- and 1-years-old individuals in the purse seine fisheries of the Turkish waters may be associated with the habitat and behaviour of these young fish. 5- and 6-year-old fish were the most abundant in the purse seine fisheries. However, 2 and 3 years old individuals are more dominant for the long-line fisheries in the Aegean Sea [6]. This situation may be attributed to the selectivity of the fishing gear.

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