CCSBT-ESC/2608/30

(ESC Agenda item 7.1)

Korean SBT otolith collection activities in 2025

Republic of Korea

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ABSTRACT

To investigate the age and growth of southern bluefin tuna (SBT) we collected 85 otolith samples in 2025, totally 1,360 otoliths since 2015. The relationship between fork length (FL) and total weight (TW) was $TW=8E\text{-}05 \times FL^{2.713}$ ($R^2=0.916$). The von Bertalanffy growth's parameters estimated from the non-linear method using length-at-age data were $L_\infty=177.8$ cm, $K = 0.182$/year, $t_0 = -1.296$ years.

1. Sampling activities and process of otolith

A total of 1,360 SBT otoliths have been collected by Korean scientific observer program since 2015 (Fig. 1). Biological data were measured, and then otoliths were extracted for each specimen by sex onboard. The otolith samples were subsequently transported by observer to the laboratory of the National Institute of Fisheries Sciences (NIFS). The age was determined from annuli in otolith, based on the CCSBT manual (CCSBT, 2002). We analyzed the relationship between fork length and total weight, and estimated the von Bertalanffy growth parameters (Bertalanffy 1938). We first calculated the growth parameters using Walford method (Walford 1946) and the mean fork length by age. With the calculated parameters as initial (or starting) values, they were re-estimated by the non-linear method using length-at-age data which consists of length and age estimated to each fish at the time the fish was captured, and their confidence intervals were constructed througth boostrappng with 1,000 iterations using R package *FSA* (Ogle et al. 2018) in the R stats package (R Core Team 2018).

2. Analysis of age and growth using otolith

The SBT otolith samples were collected from April to September during 2015-2025. The length distributions collected for analyzing age of SBT are shown in Table 1. The length

ranged from 66 cm to 181 cm with a mean of 131.4 cm in fork length.

The relationship between fork length and total weight is shown in Fig. 2, which was $TW = 8E\text{-}05 \times FL^{2.713}$ ($R^2 = 0.916$).

Fig. 3 shows the von Bertalanffy growth model for SBT. With initial values (L_∞=171.7 cm, K=0.165/year, t_0=-1.647 years) estimated by Walford method (1946) using the back-calculated mean fork length, the von Bertalanffy's growth parameters estimated from the non-linear method using length-at-age data were L_∞=177.8 cm, K=0.182/year, t_0=-1.296 years.

REFERENCES

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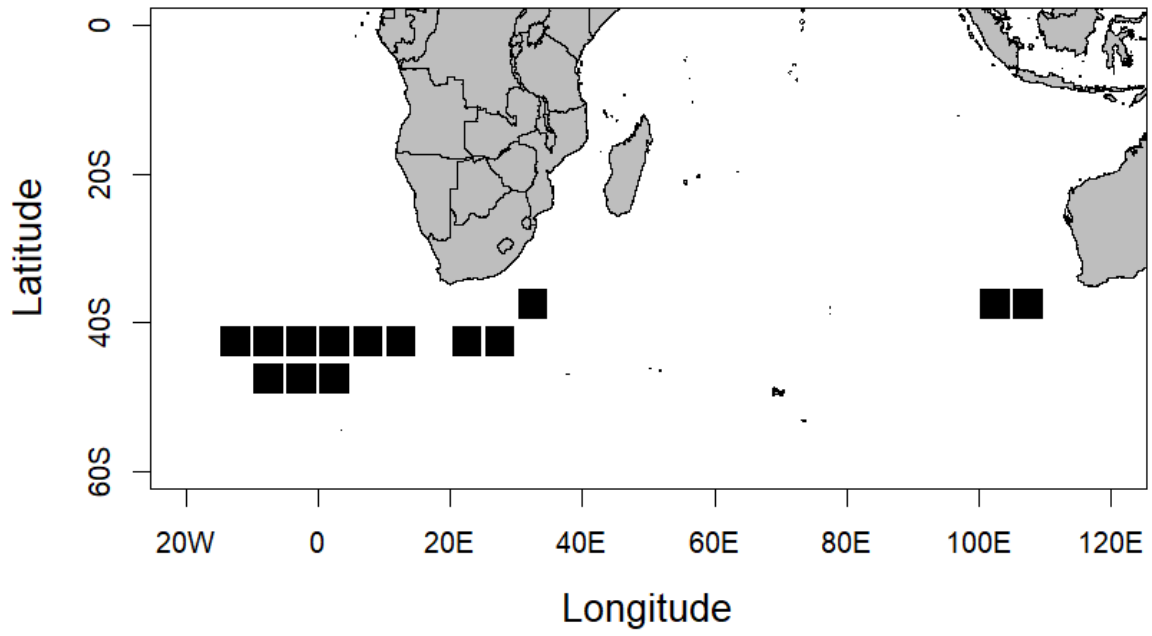


Fig. 1. Map showing the sampling area of SBT otoliths collected by Korean scientific observer program during 2015-2025.

Table 1. Length distributions of SBT collected by Korean observer programs, 2015-2025

Month	Area 8			Area 9			Total		
	No. samples	FL (cm)		No. samples	FL (cm)		No. samples	FL (cm)	
		Range	Mean		Range	Mean		Range	Mean
Apr.				413	90-180	134.9	413	90-180	134.9
May				330	87-174	136.1	330	87-174	136.1
Jun.				327	82-177	128.4	327	82-177	128.4
Jul.				167	83-181	123.6	167	83-181	123.6
Aug.	68	66-178	127.6	23	90-127	105.0	91	66-178	121.9
Sep.	32	86-168	135.2				32	86-168	135.2
Total	100	66-178	130.0	1,260	82-181	131.5	1,360	66-181	131.4

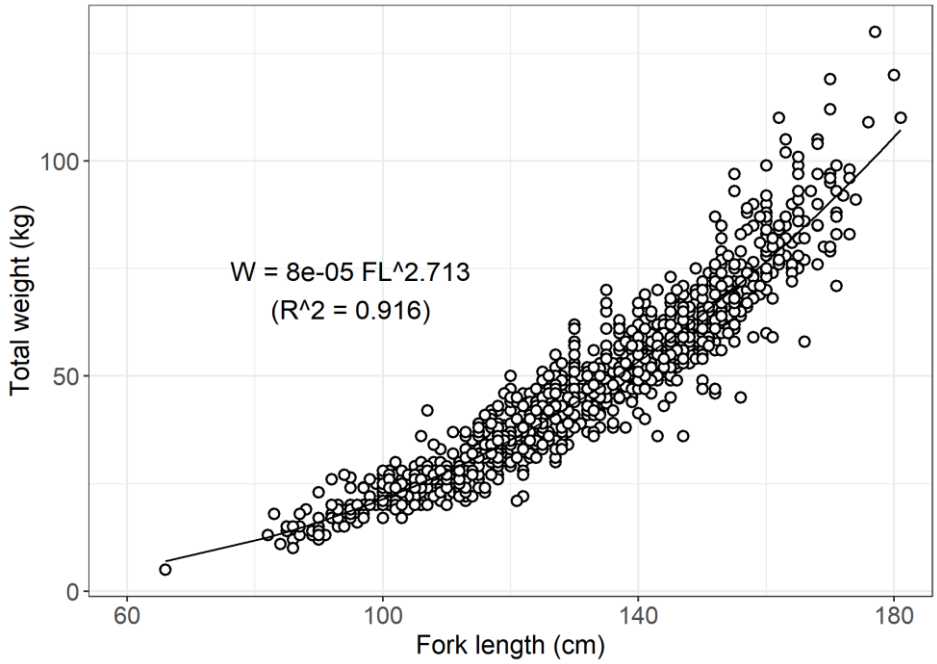


Fig. 2. Relationship between fork length and total weight of SBT collected during 2015-2025.

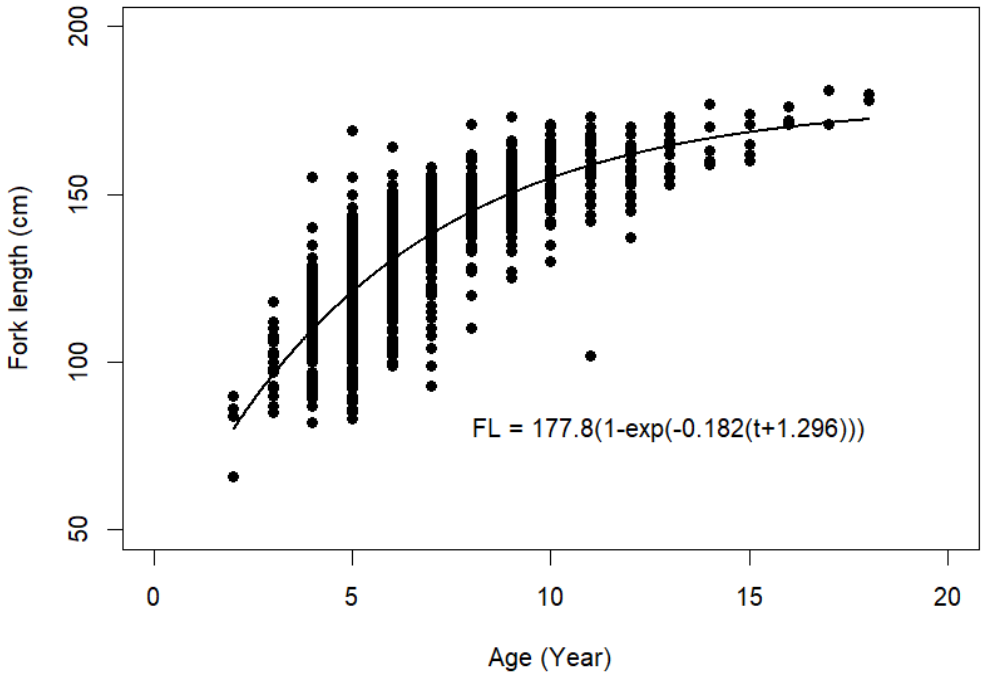


Fig. 3. The von Bertalanffy growth curve of SBT.