

Korean SBT otolith and ovary collection activities in 2018

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ABSTRACT

To investigate the age and growth of southern bluefin tuna (SBT) we collected 127 otolith samples in 2018, totally 571 otoliths since 2015. The relationship between fork length and total weight was $TW = 3E-05 \times FL^{2.8857}$ ($R^2 = 0.9183$). The von Bertalanffy growth's parameters estimated were $L_\infty = 176.8$ cm, $K = 0.165/\text{year}$, $t_0 = -1.936$ years. In addition, we have collected 443 gonad samples of SBT since 2015, and are analyzing the gonadosomatic index (GSI), maturity stages, fecundity, etc.

1. Sampling activities of otolith and ovary and its process

Since 2015 a total of 571 otoliths of SBT have been collected by Korean scientific observer program (Fig. 1). The fork length and weight were measured onboard for each specimen by sex, and the age was determined from annuli in otolith, based on the CCSBT manual (CCSBT, 2002). We analyzed the relationship between fork length (FL) and total weight (TW), and estimated the von Bertalanffy growth equation (1938).

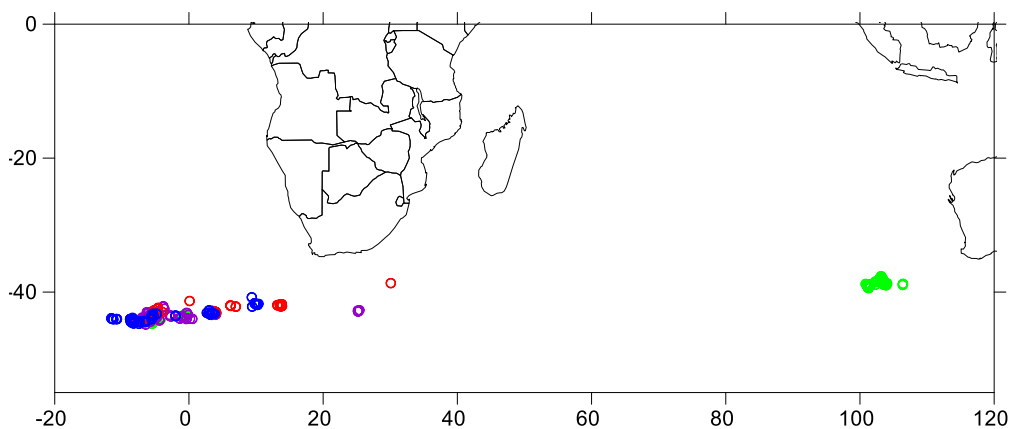


Fig. 1. Map showing the sampling area of SBT otoliths collected by Korean scientific observer program during 2015-2018 (green : 2015, red : 2016, blue : 2017, purple : 2018).

In addition, a total of 443 ovaries of SBT has been collected by observers since 2015 and has been analyzing, and some results were presented at CCSBT maturity workshop in 2019 (Kim and Lee, 2019).

2. Analysis of age and growth using otolith

The SBT otolith samples were collected from April to September during 2015-2018. 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 136.4 cm in fork length (FL).

Table 1. Length distributions of SBT collected by Korean observer programs

(a) 2015-2018

Month	Area 8			Area 9			Total		
	No. samples	Range of FL (cm)	Mean FL (cm)	No. samples	Range of FL (cm)	Mean FL (cm)	No. samples	Range of FL (cm)	Mean FL (cm)
Apr				92	111-165	143.6	92	111-165	143.6
May				123	97-174	142.4	123	97-174	142.4
Jun				156	95-176	135.3	156	95-176	135.3
Jul				91	107-181	132.3	91	107-181	132.3
Aug	68	66-178	127.6	9	109-127	115.4	77	66-178	126.2
Sep	32	86-168	135.2				32	86-168	135.2
Total	100	66-178	130.0	471	95-181	137.8	571	66-181	136.4

(b) 2018

Month	Area 8			Area 9			Total		
	No. samples	Range of FL (cm)	Mean FL (cm)	No. samples	Range of FL (cm)	Mean FL (cm)	No. samples	Range of FL (cm)	Mean FL (cm)
Apr				27	111-162	144.0	27	111-162	144.0
May				46	118-165	142.0	46	118-165	142.0
Jun				39	106-176	138.4	39	106-176	138.4
Jul				15	123-181	156.0	15	123-181	156.0
Total				127	106-181	143.0	127	106-181	143.0

The relationship between fork length and total weight is shown in Fig. 2, which was $TW = 3E-05 \times FL^{2.8857}$ ($R^2 = 0.9183$).

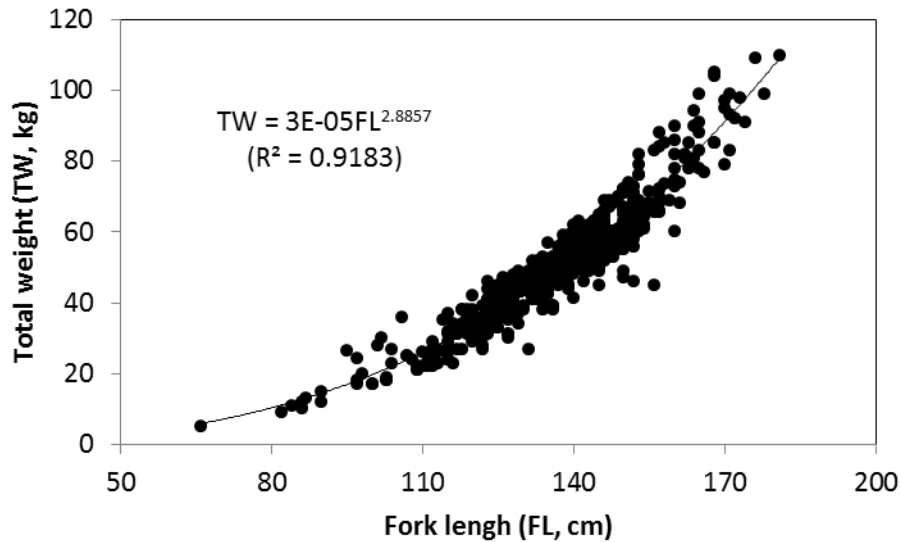


Fig. 2. Relationship between fork length and total weight of SBT collected during 2015-2018.

The von Bertalanffy's growth parameters estimated by a non-linear method were $L_{\infty} = 176.8$ cm, $K = 0.165/\text{year}$, $t_0 = -1.936$ years (Fig. 3).

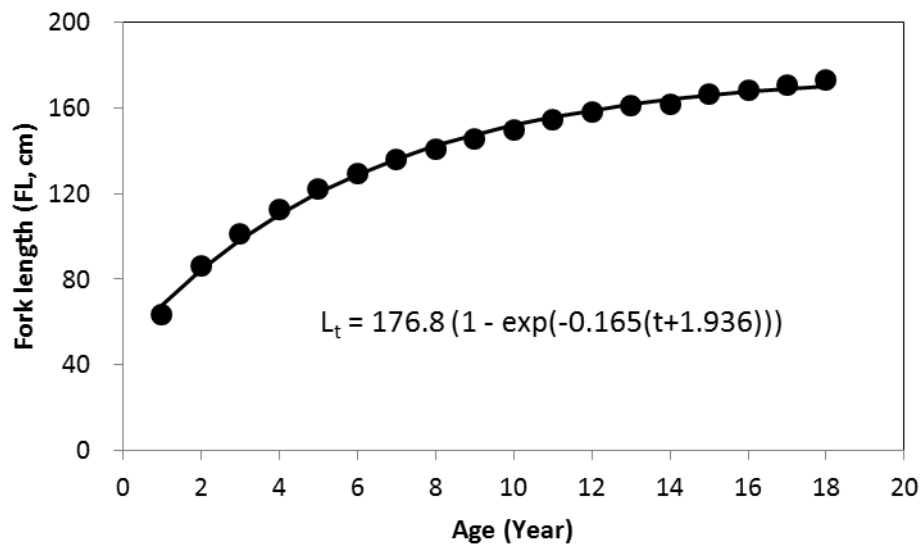


Fig. 3. The von Bertalanffy growth curve of SBT.

REFERENCES

- Bertalanffy, L. von. 1938. A quantitative theory of organic growth (Inquiries on growth laws. II). *Human Biology*, 10(2), 181-213.
- CCSBT. 2002. A manual for age determination of southern bluefin tuna *Thunnus maccoyii* - Otolith sampling, preparation and interpretation. The Direct Age Estimation Workshop of the CCSBT. 11-14 June, 2002. Queenscliff, Australia, 39pp.
- Kim, D.N. and S.I. Lee. 2019. Korean research activities for ovary samples of Southern Bluefin Tuna collected by scientific observer program. CCSBT-ESC/1909/41.