Updated report of direct ageing of the SBT caught by Taiwanese longliners in 2018

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The preliminary ageing data of the SBT caught by Taiwanese longliners in 2018 were reported in CCSBT-ESC-23 (Shiao 2019). This report updated the analysis of ageing data for the SBT caught in 2018. The direct ageing data include 82 otoliths sampled by the scientific observers in the central Indian Ocean and 230 otoliths collected in the tuna processing factories in Kaohsiung harbor, Taiwan. The experimental steps of age determination mostly follow the ageing manual (Anonymous 2002) with some modifications mentioned in Shiao et al. (2017).

The SBT sampled for the otoliths by the observers were relatively small with mean fork length of 96.1 ± 13.0 cm (range: 64-146 cm, Figure 1) and the mean age of 2.9 ± 1.4 years (range: 1-10 years, Figure 2). For the otoliths sampled in the factories, the fish sizes were relatively larger, ranging from 85 to 173 cm with the mean fork length of 114.4 ± 14.2 cm (Figure 1). The ages ranged from 2-18 years with the mean age of 3.9 ± 2.3 years (Figure 2). All these direct ageing data and the fork length data were used to construct an age-length key (Table 1) these SBT, which was used to covert the length frequency data (Figure 3) to age composition of the SBT total catch in 2018 (Figure 4).

The estimated age compositions of the total catch in 2018 ranged from 1-18 years, with approximately 75% catches between 3-5 years. The 3-year-old fish (40%) was the most abundant age class followed by 4 (28%) and 5 (9%) year-old fish. However, direct ageing data were too few for the fish >130 cm or > 6 years. Therefore, the estimated percentages for the fish ≥ 6 years were not reliable and shall be interpreted with cautions.

Reference

Anonymous (2002) A manual for age determination of southern bluefin tuna *Thunnus maccoyii*: otolith sampling, preparation and interpretation. Report of the Direct Age Estimation Workshop. 11-14 June 2002, Victoria, Australia.

Shiao JC (2018) Updated analysis of size and age composition of the SBT caught by Taiwanese longliners in 2017 and the preliminary ageing data in 2018. Report to CCSBT_ESC_24

Shiao JC, Lu HB, Hsu J, Wang HY, Chang SK, Huang MY, Ishihara T (2017) Changes in size, age, and sex ratio composition of Pacific bluefin tuna (*Thunnus orientalis*) on the northwestern Pacific Ocean spawning grounds. ICES Journal of Marine Science. 204–214. doi:10.1093/icesjms/fsw142
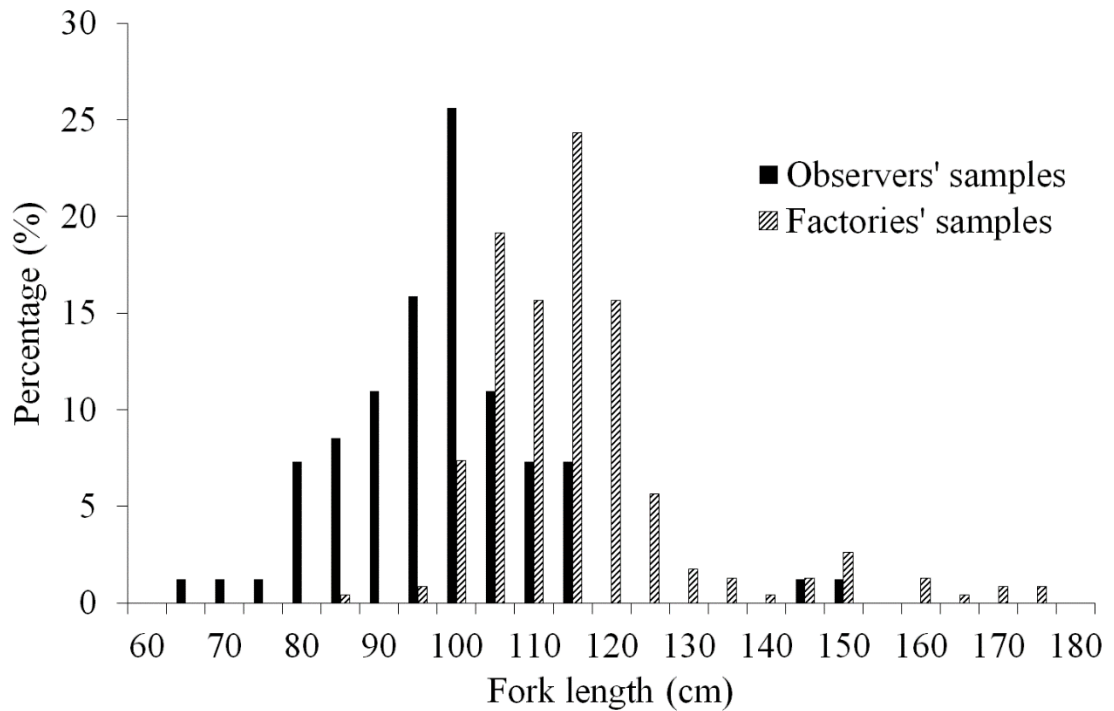
Figure 1. The size distribution of the SBT collected for the otoliths by the scientific observers and the samples collected in the tuna factories in Kaohsiung city.
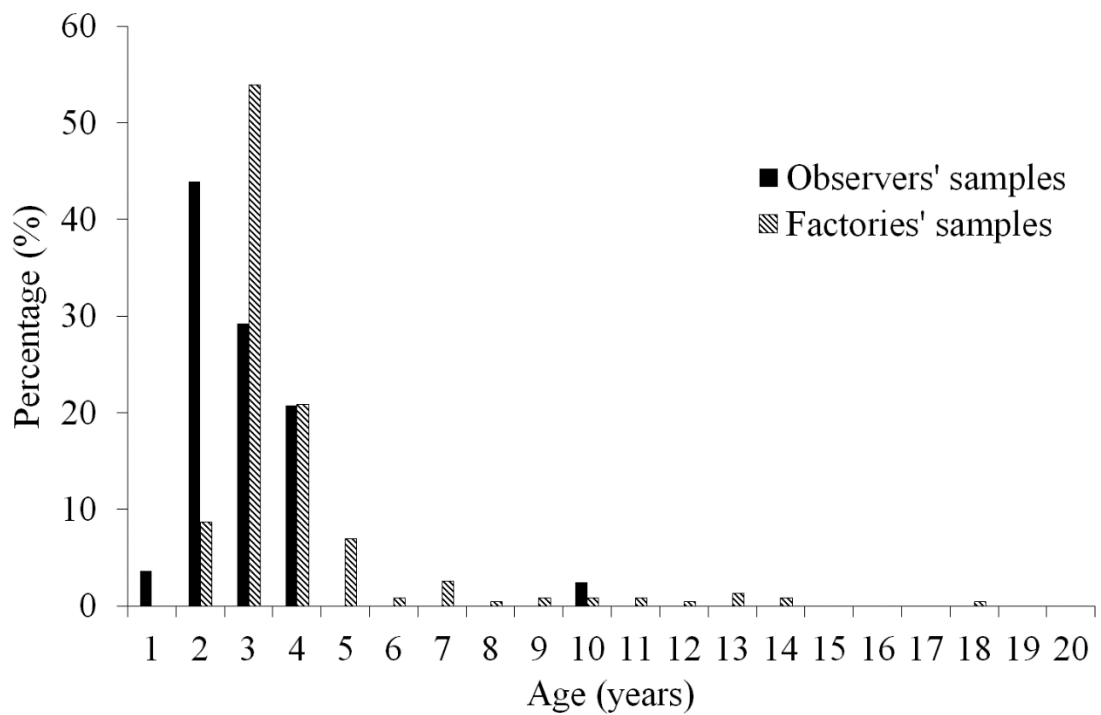

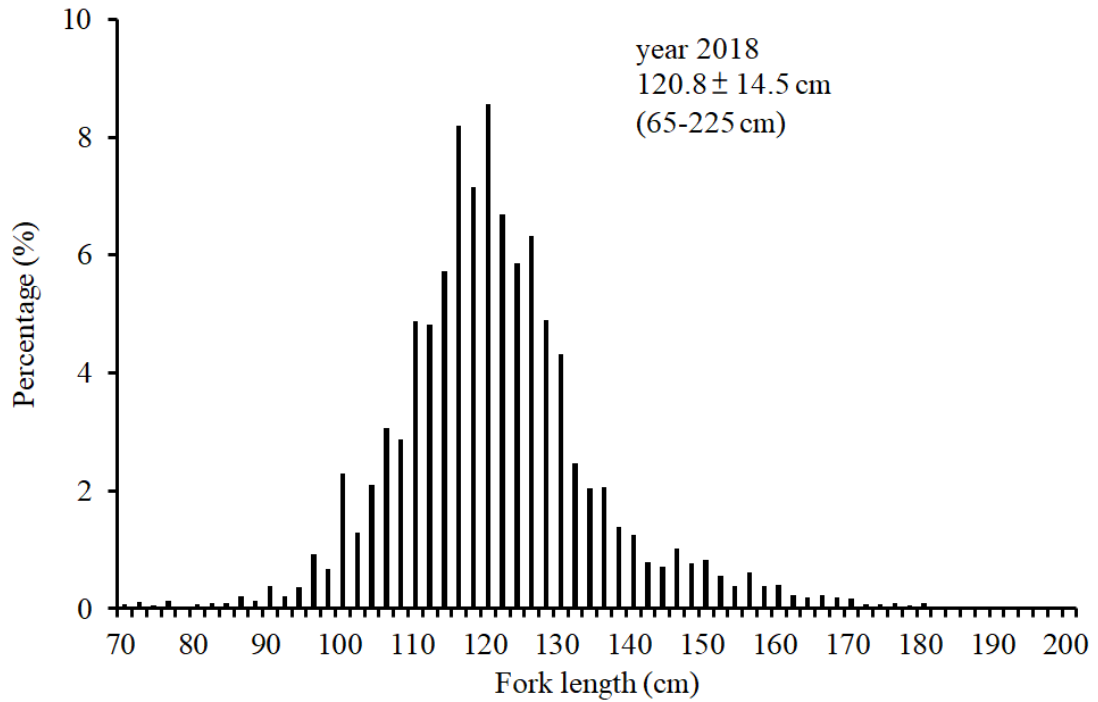Figure 2. The age distribution of the SBT sampled for the otoliths in 2018.

Figure 3. The size distribution of the SBT caught by Taiwanese longliners in 2018.
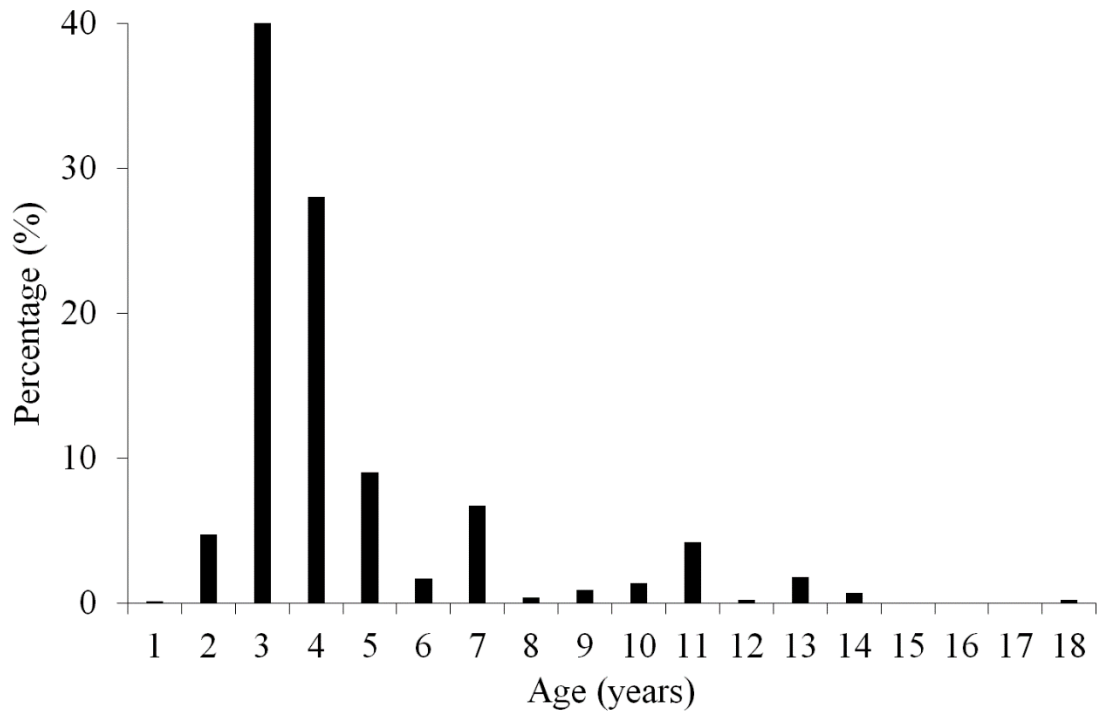

Figure 4. The estimated age distribution of the total SBT caught by Taiwanese longliners in 2018.

Table 1. The age-length key constructed from the direct ageing data of the SBT sampled for the otoliths in 2018. A1-A25 were age estimated by otolith annuli. FL: fork length. N: sample size.

FL\Age	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15	A16	A17	A18	N-FL
< 100	0.048	0.635	0.270	0.048	0	0	0	0	0	0	0	0	0	0	0	0	0	0	63
100-110	0	0.130	0.620	0.217	0.033	0	0	0	0	0	0	0	0	0	0	0	0	0	92
110-120	0	0.037	0.593	0.296	0.074	0	0	0	0	0	0	0	0	0	0	0	0	0	108
120-130	0	0	0.385	0.308	0.192	0.038	0.077	0	0	0	0	0	0	0	0	0	0	0	26
130-140	0	0	0	0.500	0	0	0.250	0	0	0	0.250	0	0	0	0	0	0	0	4
140-150	0	0	0	0	0	0.100	0.300	0.100	0.200	0.200	0	0	0	0.100	0	0	0	0	10
150-160	0	0	0	0	0	0	0	0	0	0	0.500	0	0.500	0	0	0	0	0	2
160-170	0	0	0	0	0	0	0	0	0	0.400	0	0	0.400	0	0	0	0	0.200	5
170-180	0	0	0	0	0	0	0	0	0	0	0	0.500	0	0.500	0	0	0	0	2
N-Age	3	56	148	65	16	2	6	1	2	4	2	1	3	2	0	0	0	1	312