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(ESC Agenda item 8)

Otolith collection and direct aging of SBT caught by Taiwanese longliners in 2014–2017

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Taiwan has instituted an observer system to collect fishery data and biological samples for southern bluefin tuna (*Thunnus maccoyii*, SBT) in the Indian Ocean since 2002. The collected data and samples (otoliths) have provided valuable information on the SBT catch by Taiwanese longliners. The direct aging of SBT otoliths collected in 2006–2013 was reported in CCSBT-ESC-21. This document updated the size composition of the SBT caught by Taiwanese longliners and the direct aging of the SBT otoliths collected by scientific observers in 2014–2017. The observers collected 126, 122, 64, and 23 SBT otoliths in 2014, 2015, 2016, and 2017 respectively, and their ages were determined according to "A manual for age determination of southern bluefin tuna *Thunnus maccoyii*." In 2014, the size of the SBT sampled for otoliths covered the size range of the majority of the total catch, except for size > 155 cm. The age composition based on otolith direct aging ranged from 2 to 7 years, with 2 fish aged 10 and 11 years. SBT aged 3–6 years contributed > 70% of the samples. However, the SBT sampled for the otoliths were skewed toward small-sized fish in 2015-2017. In addition, a greatly reduced numbers of otoliths were collected in 2016 and 2017. Therefore, the estimated ages of the SBT also skewed toward the younger age groups of 2–4 years, and aging data based on the otoliths collected by the observers in 2015–2017 could not effectively represent the age compositions of the total catch for these 3 years. We have developed an alternative, more effective approach for collecting a larger number of SBT otoliths in the tuna processing factories in Kaohsiung harbor. So far, 184 SBT were sampled for otoliths from 2 tuna processing factories. The length composition of these 184 SBT showed bimodal distribution, suggesting insufficient samples at the size between 130-140 cm. The estimated age composition based on 153 SBT ranged from 1–23 years with major fish aged between 2-5 years and minor fish aged > 6 years. This result suggested that scientific observers tended to collect otoliths from small size and young SBT, resulting in underestimation of the age composition of the SBT caught by Taiwanese longliners. We expect more samples will be collected from the tuna processing factories for direct aging this year. Collecting otoliths in tuna processing factories seems to be a promising replacement for otolith sampling on longline vessels by observers.

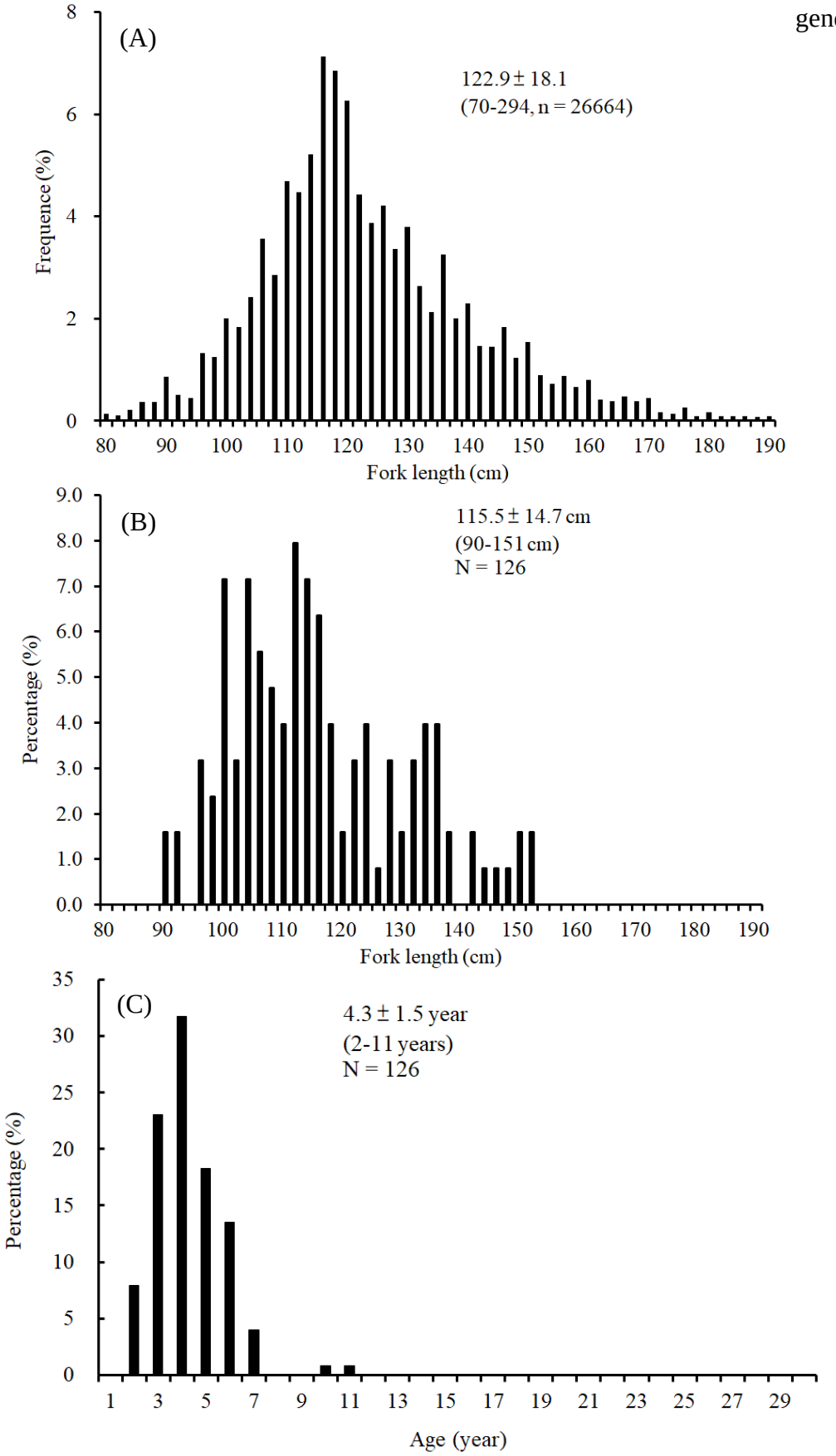

Figure 1. SBT size and age in 2014. (A) Total catch, (B) SBT sampled for otoliths, (C) otolith direct aging.

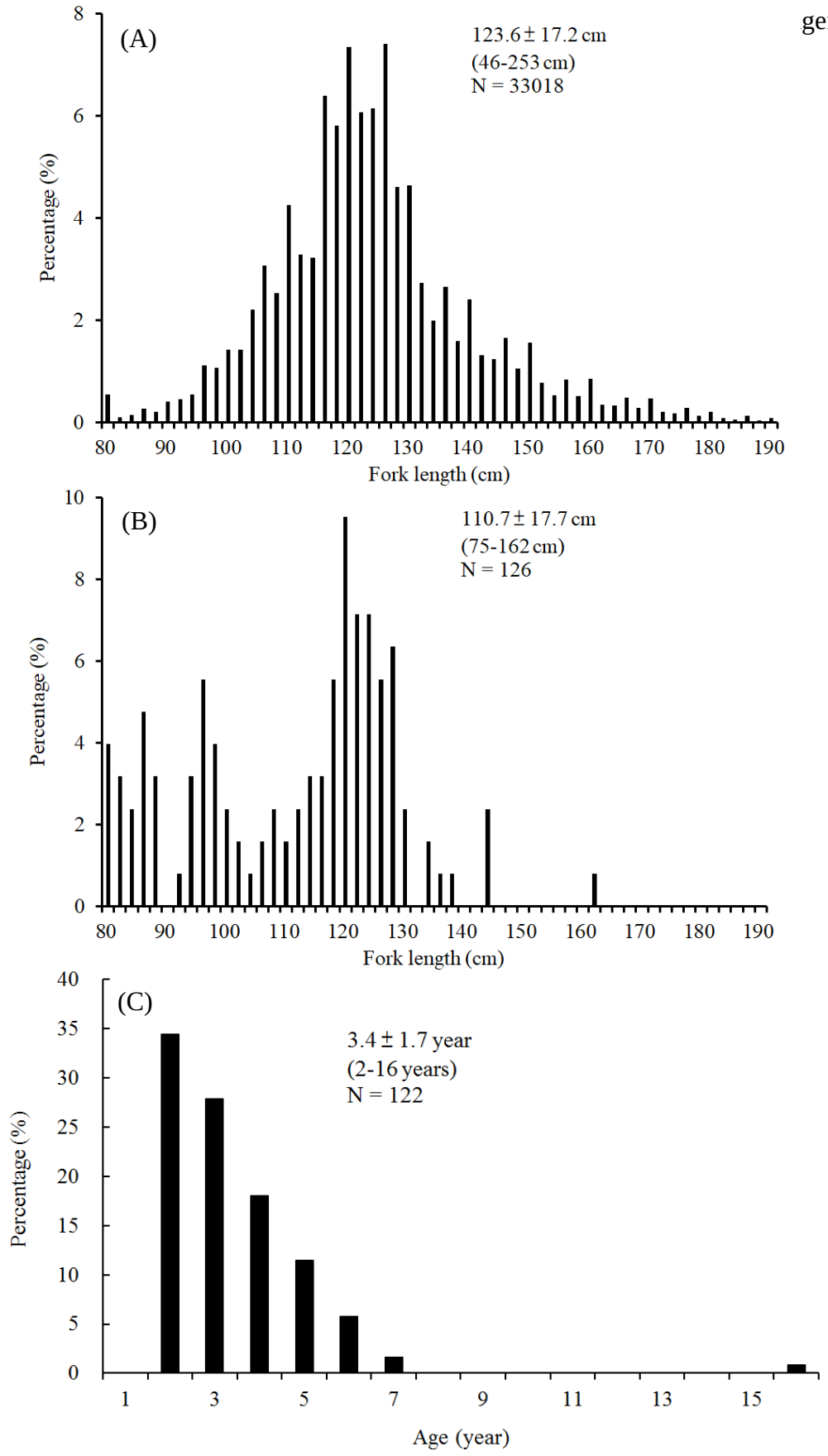

Figure 2. SBT size and age in 2015. (A) Total catch, (B) SBT sampled for otoliths, (C) otolith direct aging.

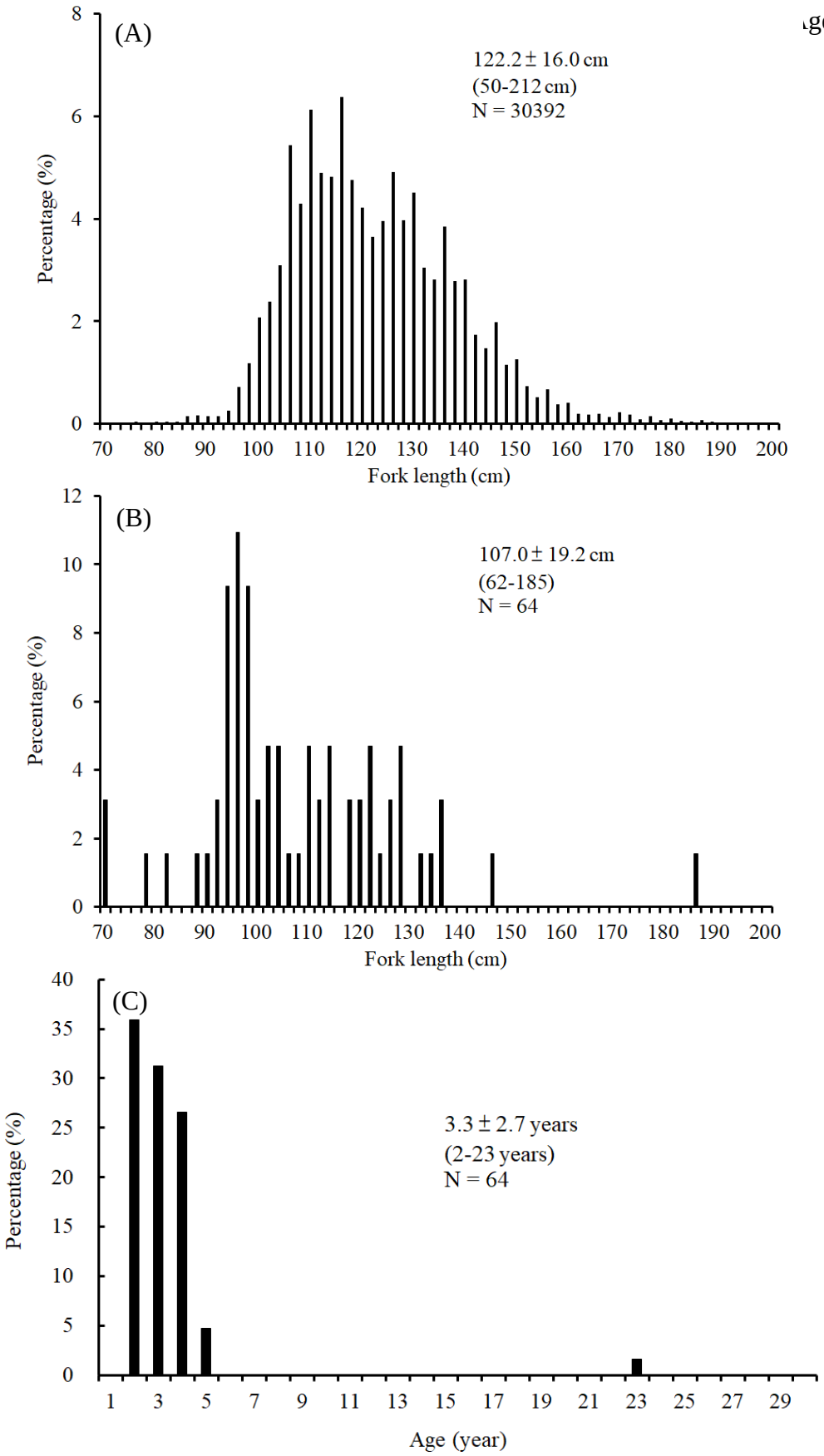

Figure 3. SBT size and age in 2016. (A) Total catch, (B) SBT sampled for otoliths, (C) otolith direct aging.

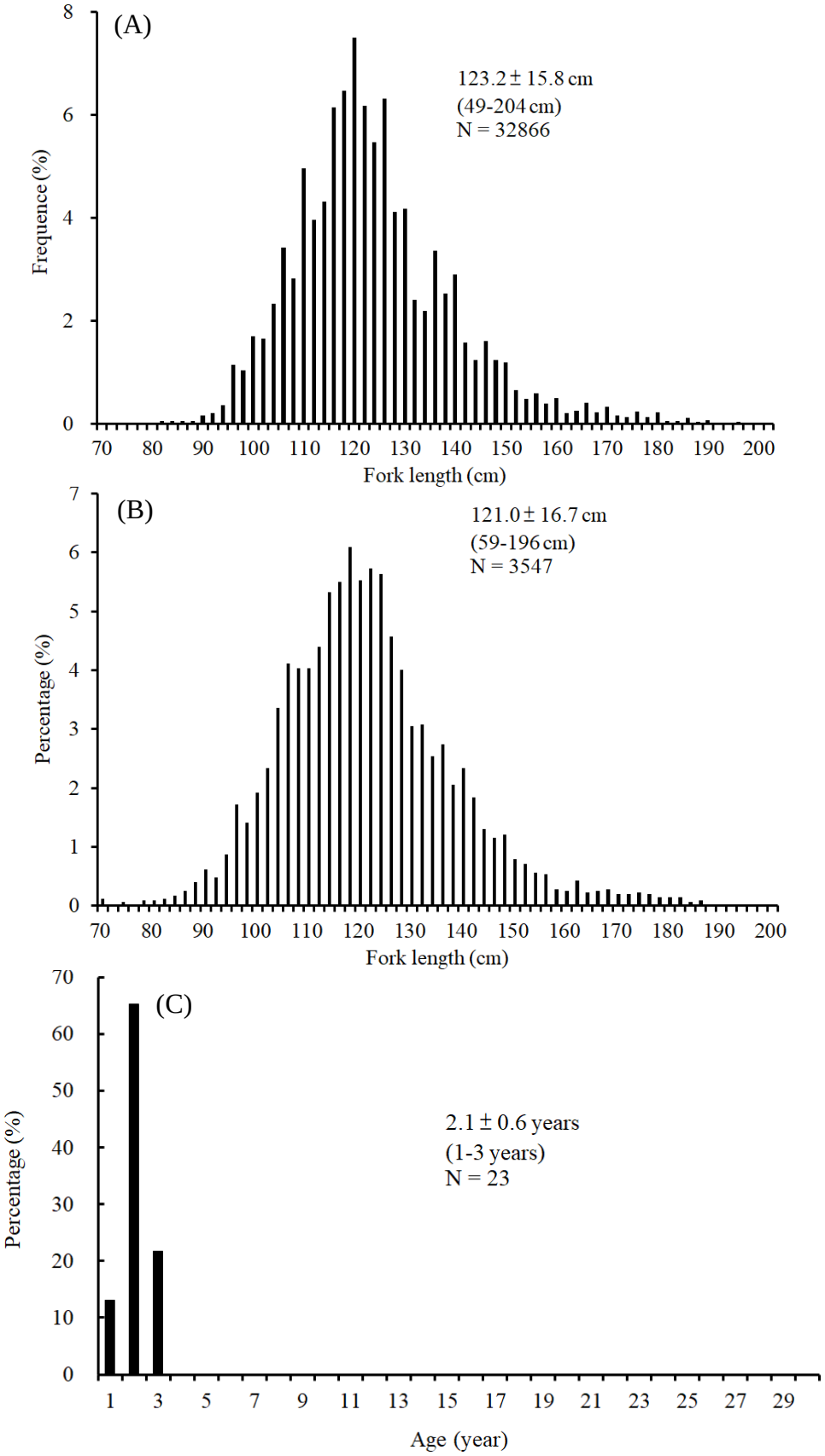

Figure 4. SBT size and age in 2017. (A) Total catch, (B) SBT sampled for otoliths by the observers, (C) otolith direct aging.

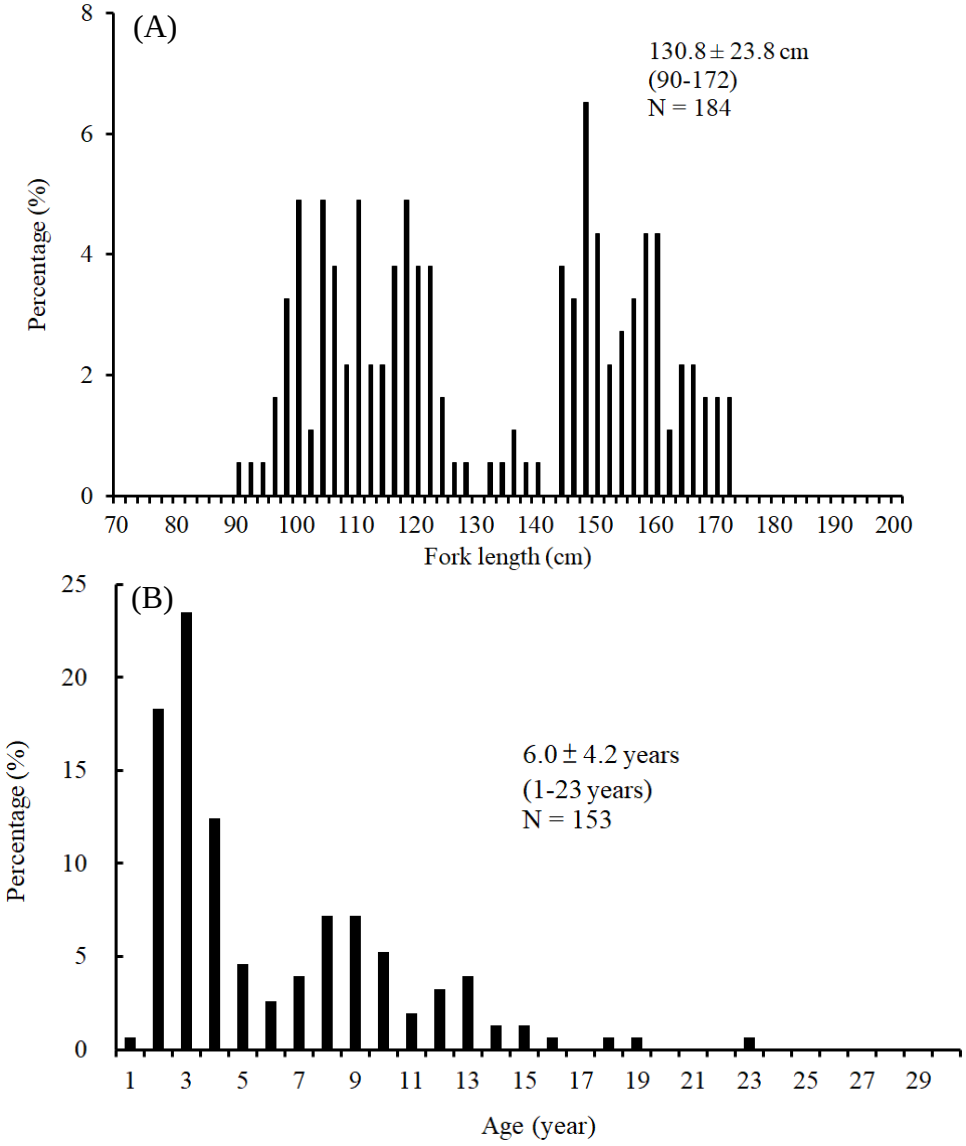

Figure 5. Size (panel A) and age (panel B) composition estimated from the SBT otoliths collected from tuna processing factories.