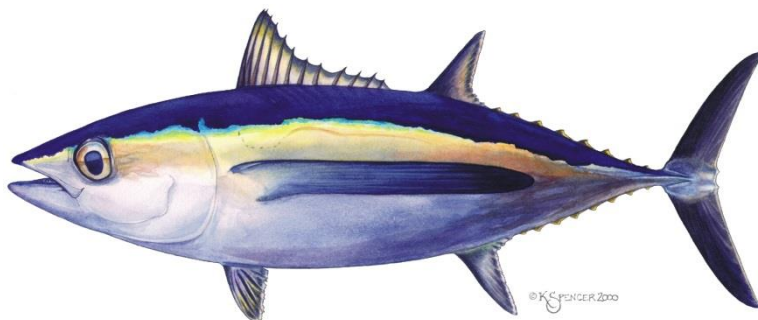


**Sex specific size data for North Pacific albacore
(*Thunnus alalunga*) in Japanese research/training vessels**

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Summary

1. We prepared and summarized the length composition data of North Pacific albacore caught by Japanese Research/Training Vessels for longline and pole-and-line fisheries in the period from 1994 to 2021.
2. Sampling locations for the longline fishery were concentrated on southern areas, whereas those for the pole-and-line were located on northern areas.
3. Fork lengths of individuals caught by the longline fishery (mainly 80-120 cm) were generally larger than those of individuals caught by the pole-and-line fishery (mainly 45-90 cm).
4. Sex ratio is skewed towards the male in the large individuals, but the trend is not found in the small individuals.

Introduction

Sex-specific length frequency data has been requested by ISC albacore working group through the meeting held in December 2022 to add sex information in the current stock assessment. This document summarize the characteristics of the sex-specific length frequency data obtained from the research/training vessels of Japan through longline and pole-and-line fisheries especially focusing on the spatio-temporal trends of the data.

Data and Methods

Data sets and process

The size data collected by Japanese research/training vessels have been newly updated and the descriptions are available in Aoki et al., 2022. Briefly, the Japanese size data for albacore consists of three different files (SizeORG, SizeCSV, SKJNAS), and some of the hand-written data books were newly digitized and stored in SKJNAS. By updating the SKJNAS, the number of available data for sex-specific size has increased from the data used in the last assessment (Fig. 1). The filtering processes below were applied to extract sex specific size data in research vessels.

Species: *albacore*

Gear: *longline, pole-and-line*

Area: *north Pacific Ocean and inside the stock assessment areas*

Area level: *1x1, 5x5*

Year: *1994-2021*

Vessel: *Research/Training vessel*

Error: *remove length \geq 160*

Results and Discussion

Characteristics of sex specific data of Japanese longline research vessels

Sampling locations, median lengths in each location (1x1 grid), histogram in each year for male and female of longline fishery were shown in Figs. 2-5. Overall, samplings were concentrated in southern areas (area4) of 10-20N, 170E-160W, where Japanese commercial samplings are scarce (Aoki et al., 2022) and the number (median length) of male tended to be greater (larger) than that of female for all quarters (Figs. 3 and 4). These trends can be also found from most years (Fig. 5), and there is a sex bias (Sex ratio is skewed towards males in large individuals) in length frequency, which is consistent with the common trend that has been well reported (e.g., Ashida et al., 2020; Nikolic et al., 2017).

Characteristics of sex specific data of Japanese pole-and-line research vessels

Sampling locations of the pole-and-line fishery are concentrated on the northern areas in quarters 2 and 3 (Figs. 5 and 6). Smaller individuals (FL<90 cm) tended to be caught compared to those in longline fishery (FL≥90). This would be due to the difference in areas between the longline and pole-and-line fisheries as juvenile distributes in northern areas (Nikolic et al., 2017). There are no differences in size frequency of males and females in small individuals (Fig. 7), but it should be noted that the sex identification for small individuals has relatively greater uncertainty compared to larger individuals as the sex identification by macroscopic examination would be uncertain until sex maturation which is relatively late in albacore with minimum size of 75 cm FL in the Pacific Ocean (Farley et al., 2014).

Reference

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Figure

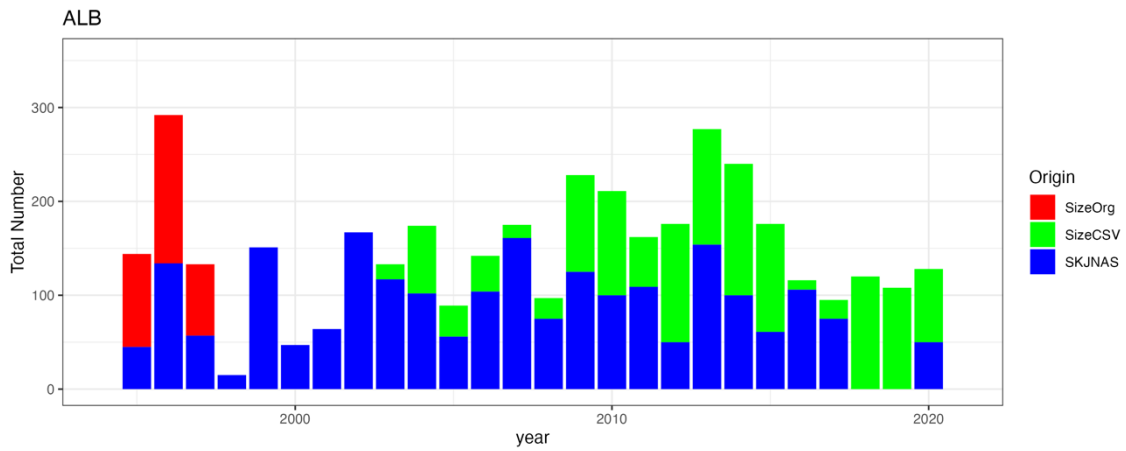


Fig. 1. The number of size data in each database (Sizeorg, Sizescv, SKJNAS) from 1994 to 2021.

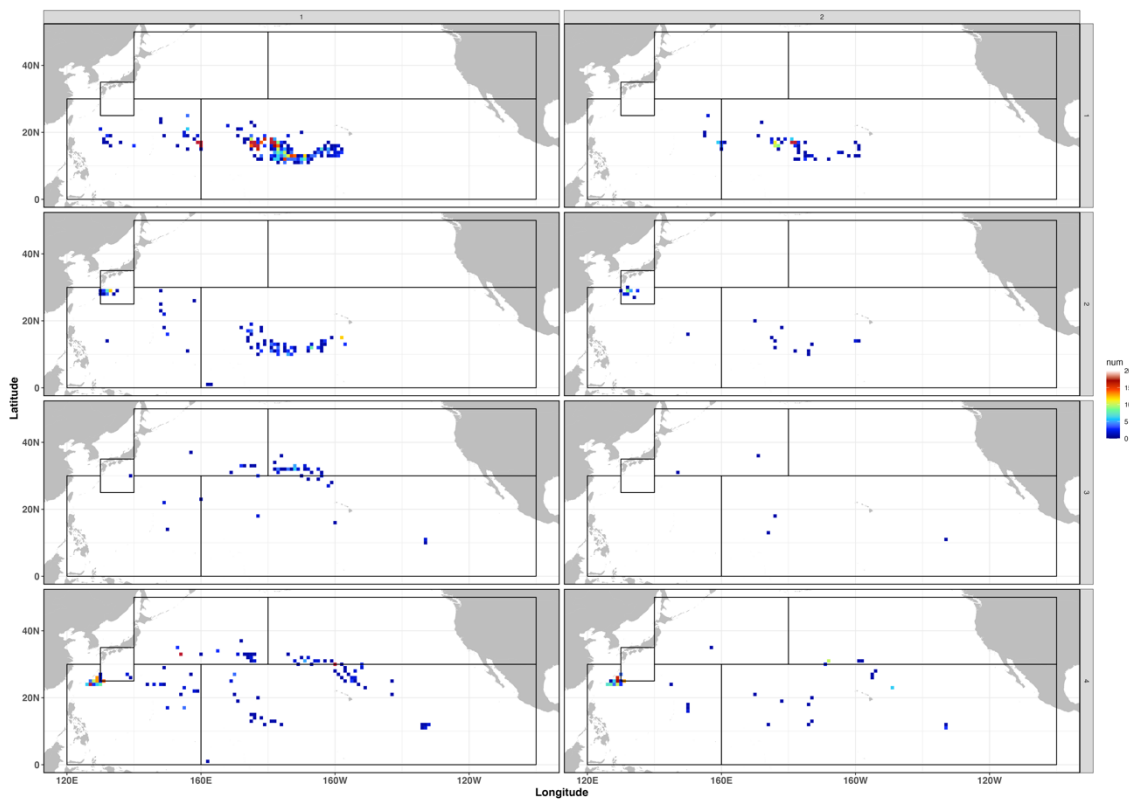


Fig. 2. The number of data in each quarter and sex (Male: 1, Female:2)of the longline fishery.

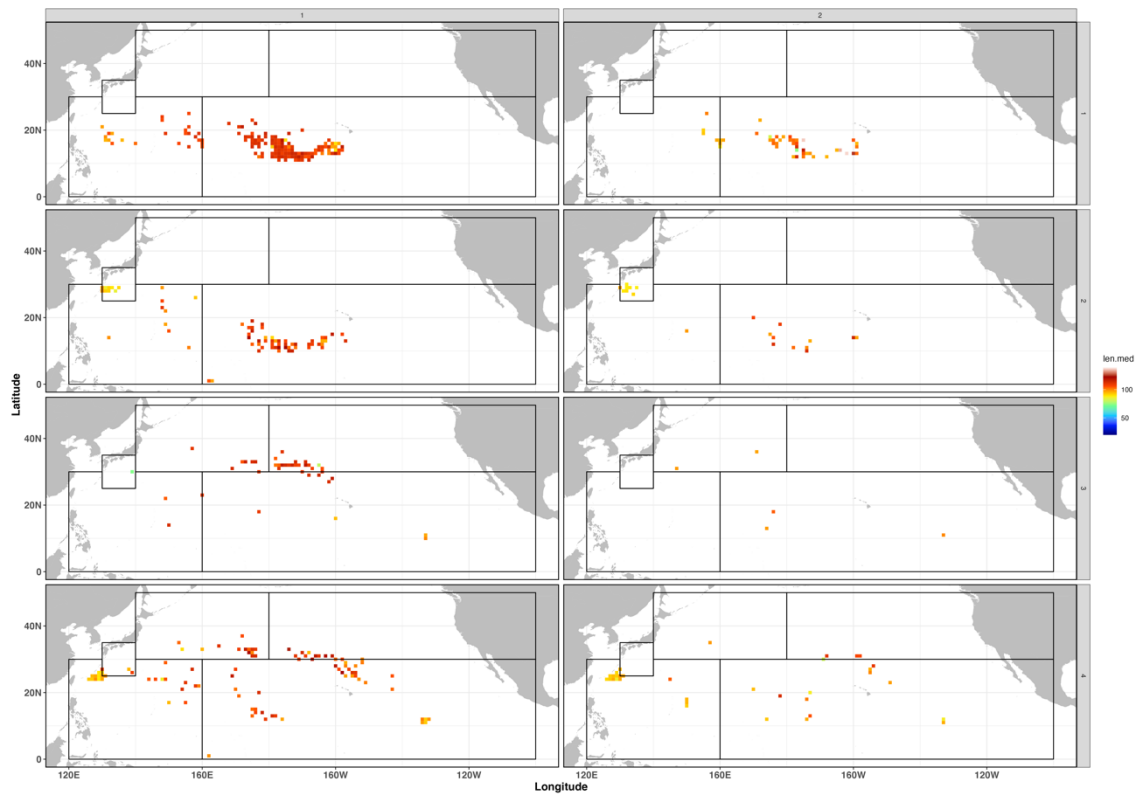


Fig. 3. The number of median lengths in each quarter and sex (Male: 1, Female:2)of the longline fishery.

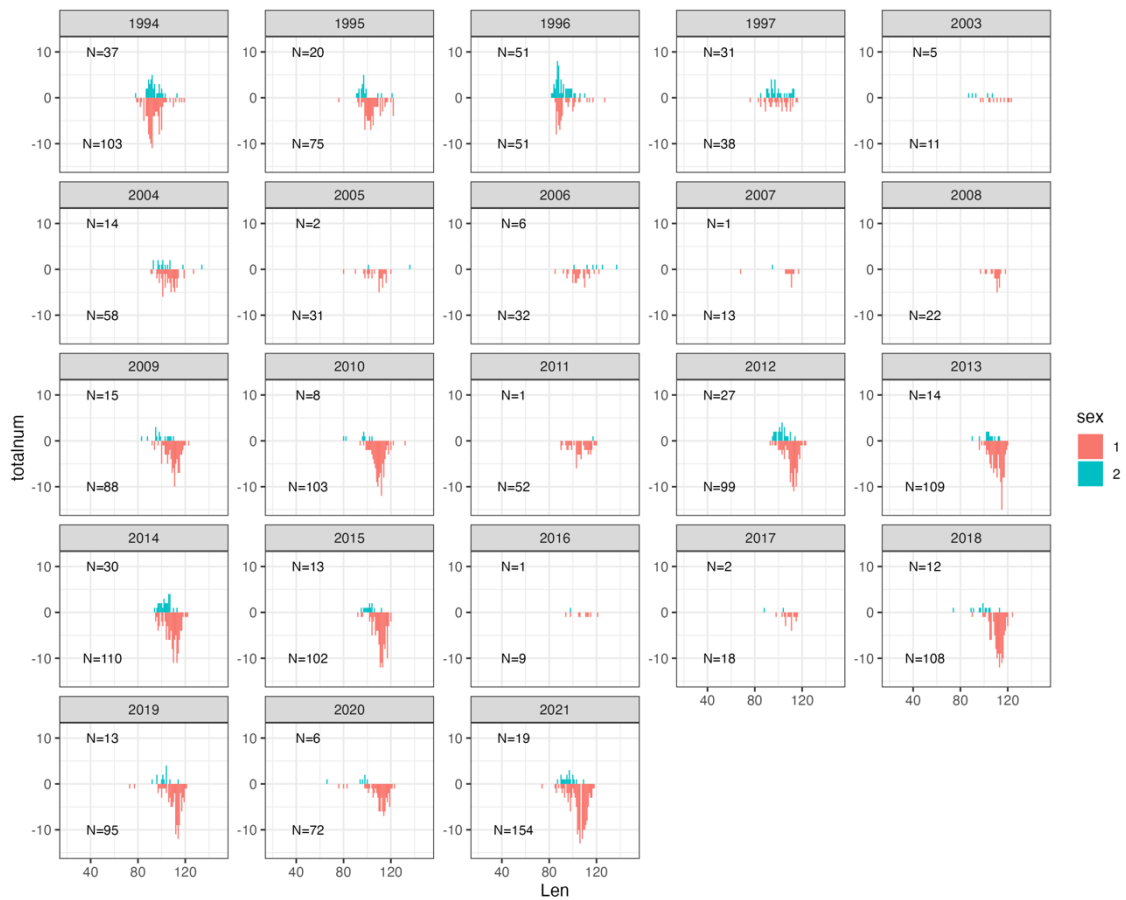


Fig. 4. Sex specific length frequency of albacore caught by the longline fishery. Sex codes for male and female are 1 and 2, respectively. The number (N) indicates the sampling number in each sex.

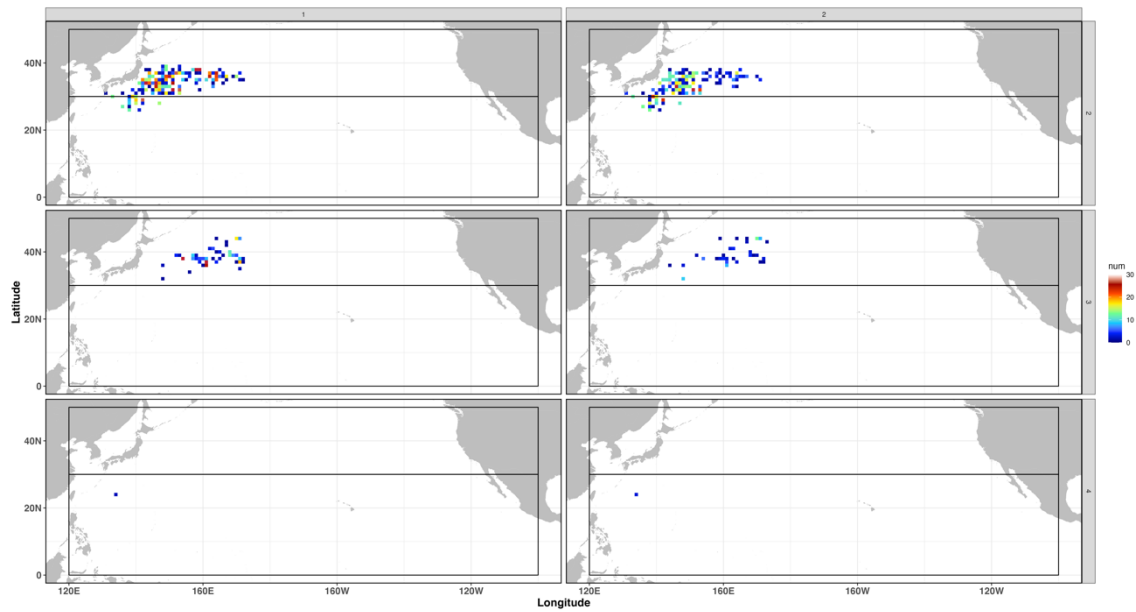


Fig. 5. The number of data in each quarter and sex (Male: 1, Female:2) of the pole-and-line fishery.

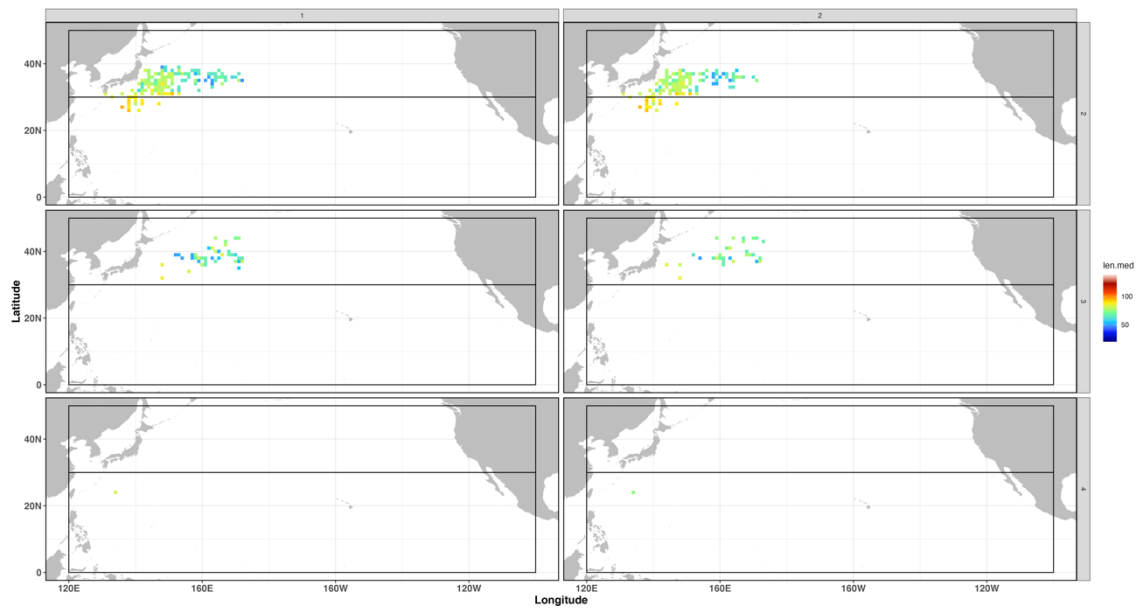


Fig. 6. The number of median lengths in each quarter and sex (Male: 1, Female:2) of the pole-and-line fishery.

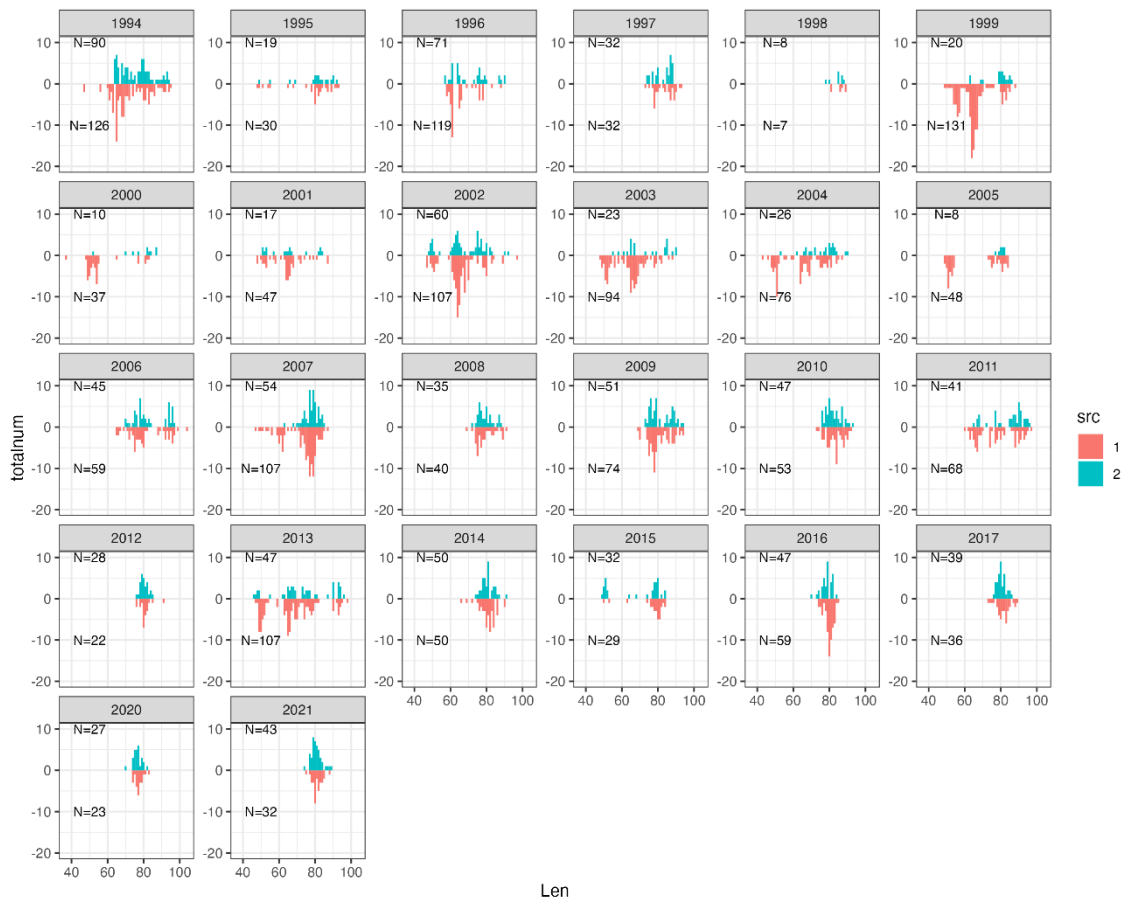


Fig. 7. Sex specific length frequency of albacore caught by the pole-and-line fishery. Sex codes for male and female are 1 and 2, respectively. The number (N) indicates the sampling number in each sex.