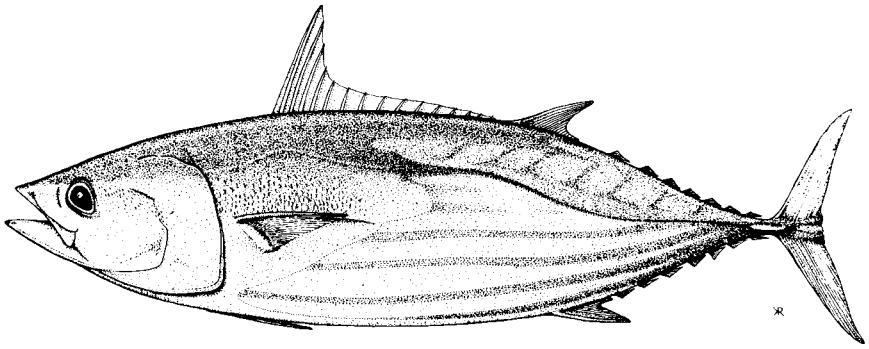
SCTB16 Working Paper

SKJ–10

Biological data collection and study on skipjack tuna caught by Taiwanese tuna purse seine fishery – 2002



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Biological data collection and study on skipjack tuna caught by Taiwanese tuna purse seine fishery – 2002[1]

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Abstract

During its second year, this project established an effective routine for collecting biological data from Taiwanese distant water tuna purse seiners. This included on-board samples of length frequency as well as samples from the port of Kaohsiung in Taiwan. Also, otolith separation from skipjack tuna head and section preparation techniques were investigated. In total, 1,537 fish lengths and 912 fish weights were measured from port samples and 5,447 fish fork lengths were measured from the observer program. Biological samples including head (otolith), dorsal spine, gonad, and muscle of 81 skipjack tuna were collected from port sampling. The observer program collected the following skipjack samples: 172 heads, 132 spines, 124 gonads, and 67 muscles. This accumulated data and biological samples will be used for age, growth, and reproductive biological studies as the project evolves in the next three years.

Introduction

For decades skipjack tuna *Katsuwonus pelamis*, the main target species of the tuna purse seiners, has contributed about 75% to the total annual purse seine catch in the western Pacific Ocean. Collection of length frequency and other biological data information from this important species is an essential element in assessing this stock. The objective of this project is to develop a standard routine in collection and study of the skipjack biological data. This includes length frequency through on-board sampling as well as port sampling in Kaohsiung, Taiwan for the Taiwanese distant water tuna purse seiners.

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[1] A working document submitted at the 16th Meeting of the Standing Committee on Tuna and Billfish, July 9-16, Mooloolaba, Australia.

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Methods

1. The captains of tuna purse seiners and staff of the Tuna Association are routinely visited on a monthly basis to understand the current fishing condition and fishing ground of the tuna purse seiners. Length and weight of skipjack are measured and recorded as much as possible when the fish of tuna purse seiners are landed at Kaohsiung port. Also, some fish are randomly collected and shipped to our laboratory in the National Taiwan University (NTU lab) for further processing.
2. Observers collect biological data, including length frequency, through on-board sampling, and the biological samples taken were also shipped to the NTU lab.
3. In the NTU lab, the dorsal spines, heads, gonads and muscle of the sample fish are removed and stored respectively for further study.
4. Length data are compiled to plot the length frequency and calculate the mean length.

Results

Length frequency

1. Port sampling

Four tuna purse seiners[5] returned to Kaohsiung port in 2002. Among them, only Chi-Tai 616 landed the catch of her last trip in Kaohsiung, from which we measured 1,424 fish. The remaining three PS sold the fish from their last trip in other countries before returning to Kaohsiung. Hence, the very small amounts of fish in the sample. In total, 1,537 fish were measured for length and 912 fish for weight. The fork length ranged between 29.5 and 68.4 cm with a mean fork length of 49.83 cm for total fish sampled (Fig. 1). The weight ranged between 0.65 and 7.8 kg with a mean weight of 3.12 kg. The relationship between the fork lengths and weights of 912 skipjack are shown in Fig 2.

2. Observer sampling

The Fisheries Administration (FA) hired an observer to conduct 6 trips of on-board sampling during May through October 2002. In total, 5,447 fish fork lengths were measured (Fig. 1), of which 3,448 (ranging from 35 to 75.6 cm, with a mean of 57.1 cm) were from school sets and 1,399 (ranging from 35.6 to 71.3 cm, with a mean of 50.46 cm) were from associated sets. The remaining 600 fish do not have set type information. 217 fish weights were recorded. The relationship between fork lengths and weights of the 217 fish are shown in Fig. 2.

[5] Chi-Tai 616, Yu-Wen 101, Suen-Tien 606, and Yu-Wen 301.

Biological sample

1. Port sampling: From the above four tuna purse seiners, 81 whole fish were collected and shipped back to the NTU lab for further processing.

2. Observer program: The observer collected 132 dorsal spines, 172 heads (for otolith study), 124 gonad samples and 67 muscle samples.

Lab's work

For the 81 whole fish brought to our NTU lab from port sampling, we measured the fork lengths and weights, cut the heads and extracted the otoliths and stored them for further study. The whole gonad was weighed, and then each gonad was dissected and a small portion of it stored in a labeled plastic bag containing 10% buffered formalin solution for future study. Samples of the dorsal spine and muscle were also taken and kept frozen in labeled plastic bags respectively for later processing. Similar storage techniques were followed for the samples taken in the observer program. The gonads were stored in formalin solution; the dorsal spines, muscles and the heads were all frozen for later processing and otolith extraction.

Remarks

Taiwanese distant water tuna purse seiners in the central and western Pacific have caught significant amounts of skipjack over the past years. This situation will likely persist for the near future. Collection of length frequency and other biological data information from this important species is an essential element in assessing this stock. Therefore, the Taiwan Fisheries Administration funded a five–year project entitled "Biological data collection and study on skipjack tuna caught by Taiwanese tuna purse seine fishery". The study began 2001 and is being conducted by National Taiwan University. This is our first attempt at collecting biological data from an observer program and port sampling, which demonstrates Taiwan government's deep concern about the importance of this work to the assessment and conservation of this species. This year we hope to collect more biological data through this project in order to facilitate the data analysis and improve its application to future stock assessment.

Acknowledgments

This study is supported financially in part by the Fisheries Administration, Council of Agriculture in Taiwan through grant 91AS-2.5.2-FA-F1(4) to Chi-Lu Sun.

Observer sampling

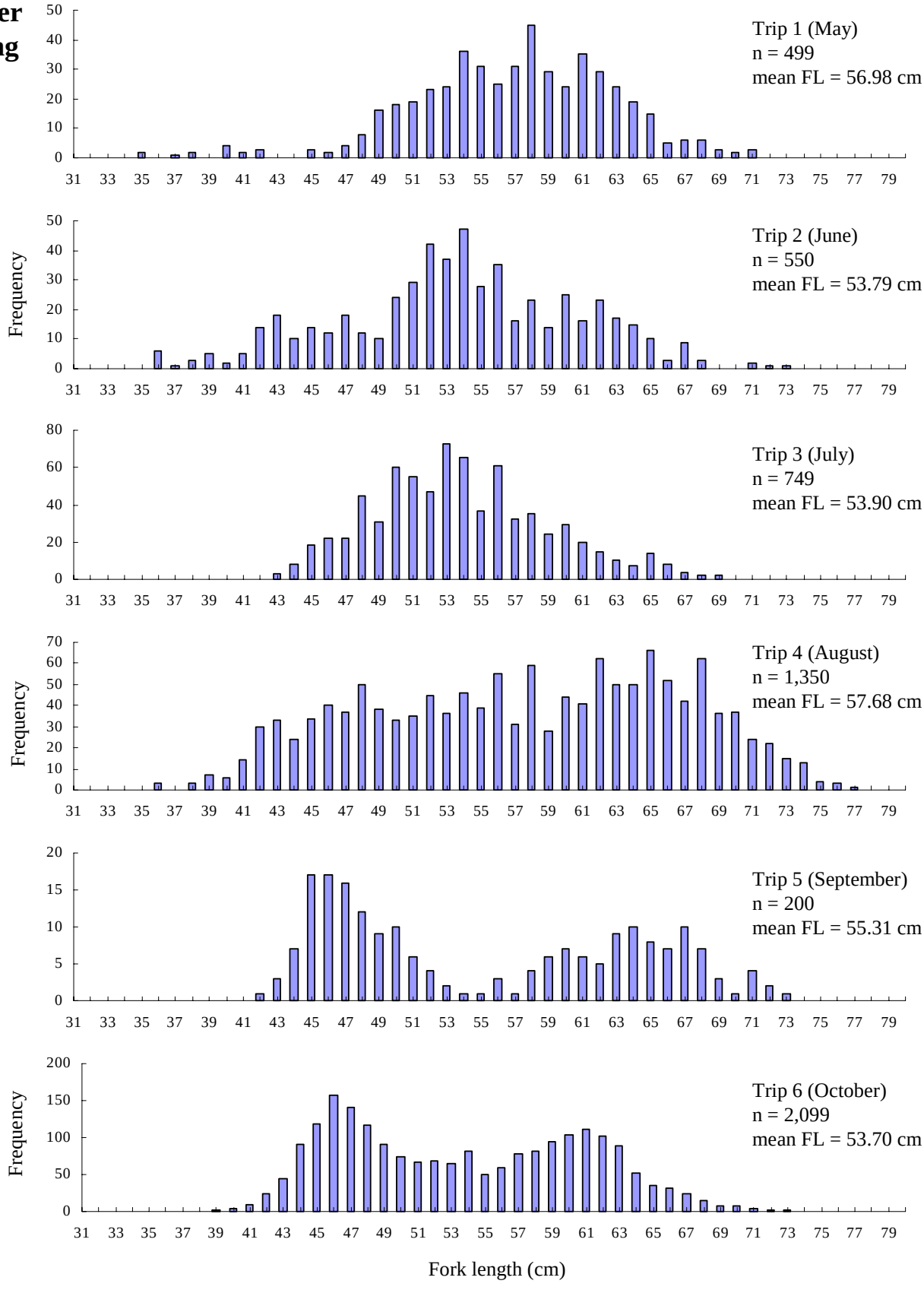


Fig. 1. Length frequency distribution of the skipjack tuna sampled.

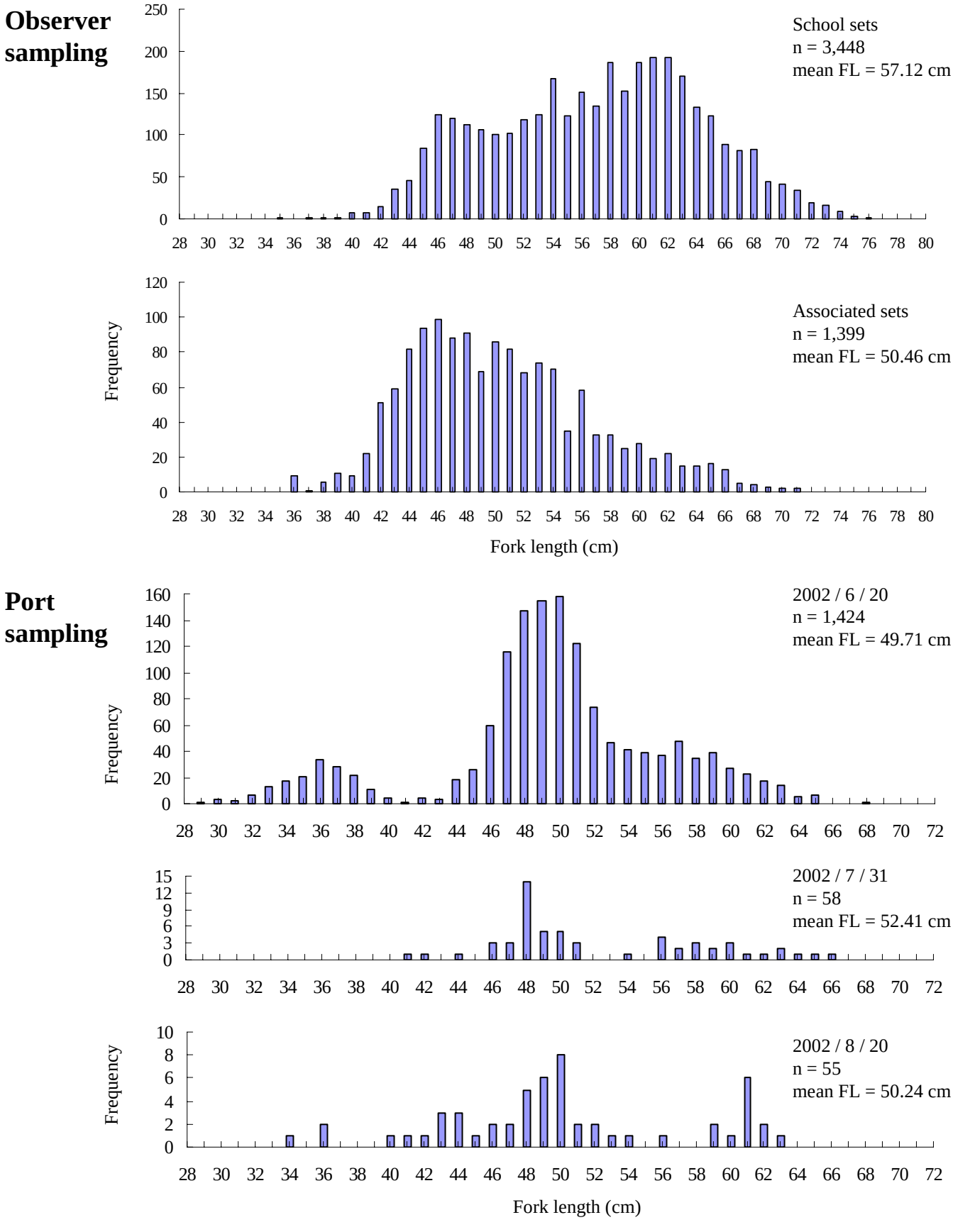
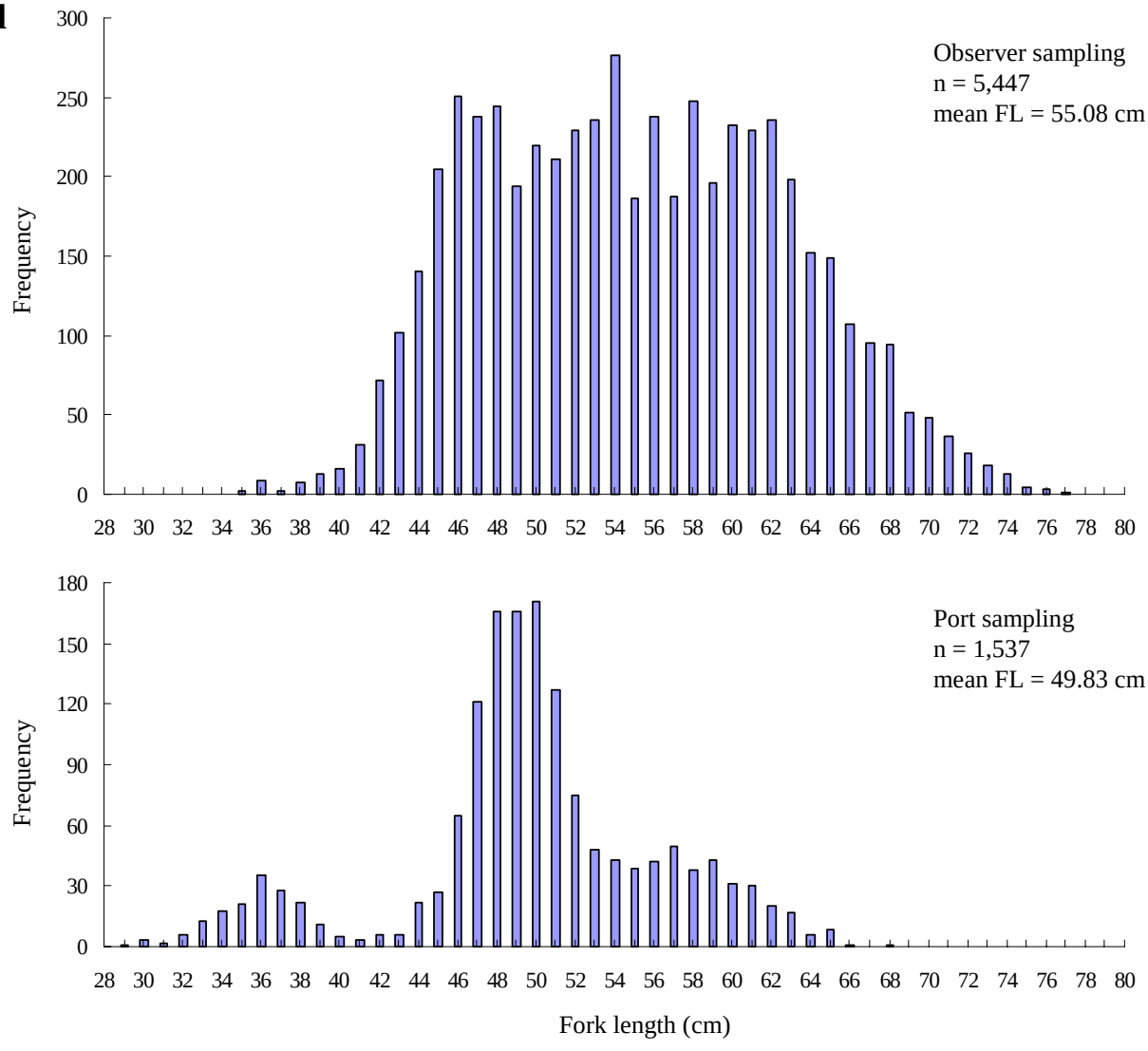


Fig. 1. Length frequency distribution of the skipjack tuna sampled (continued-1).

Subtotal



Total

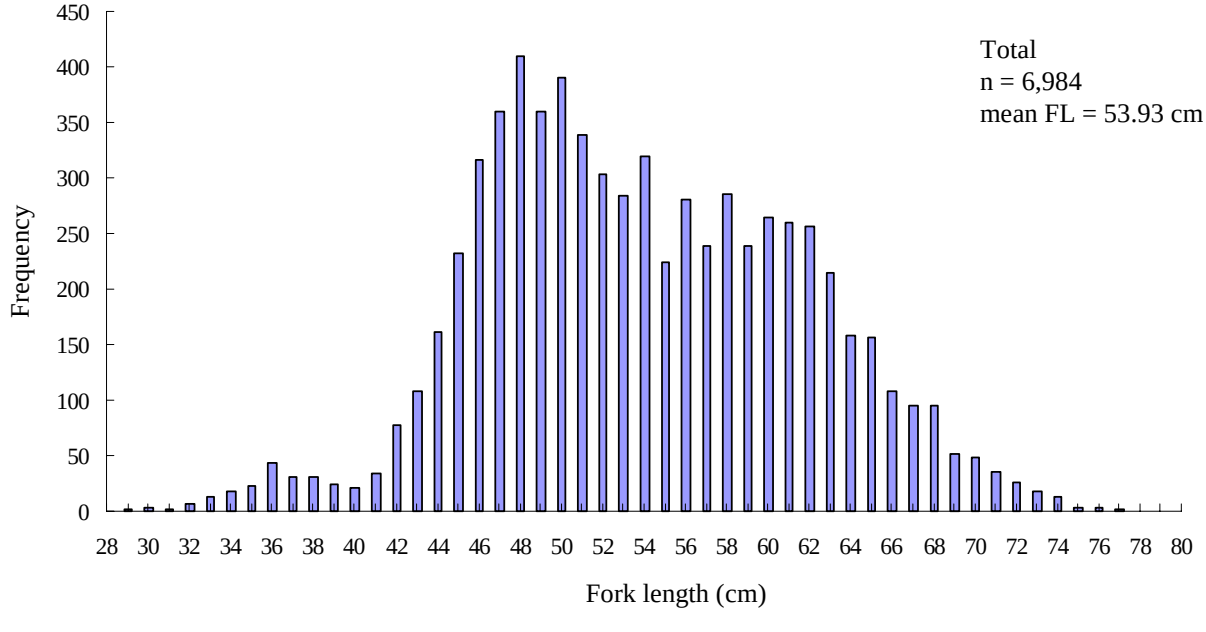
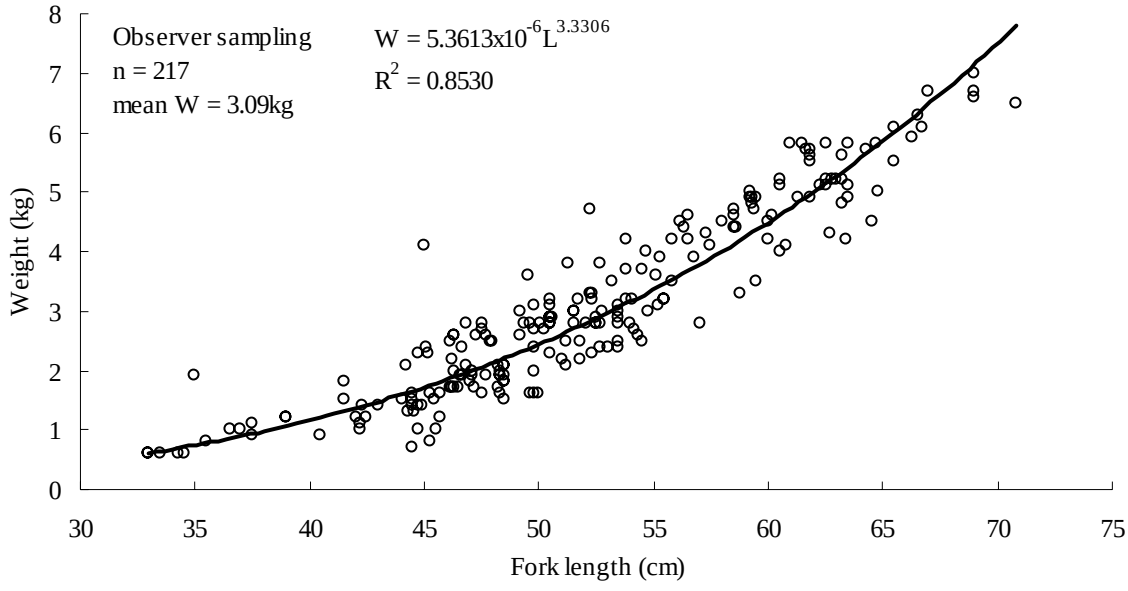
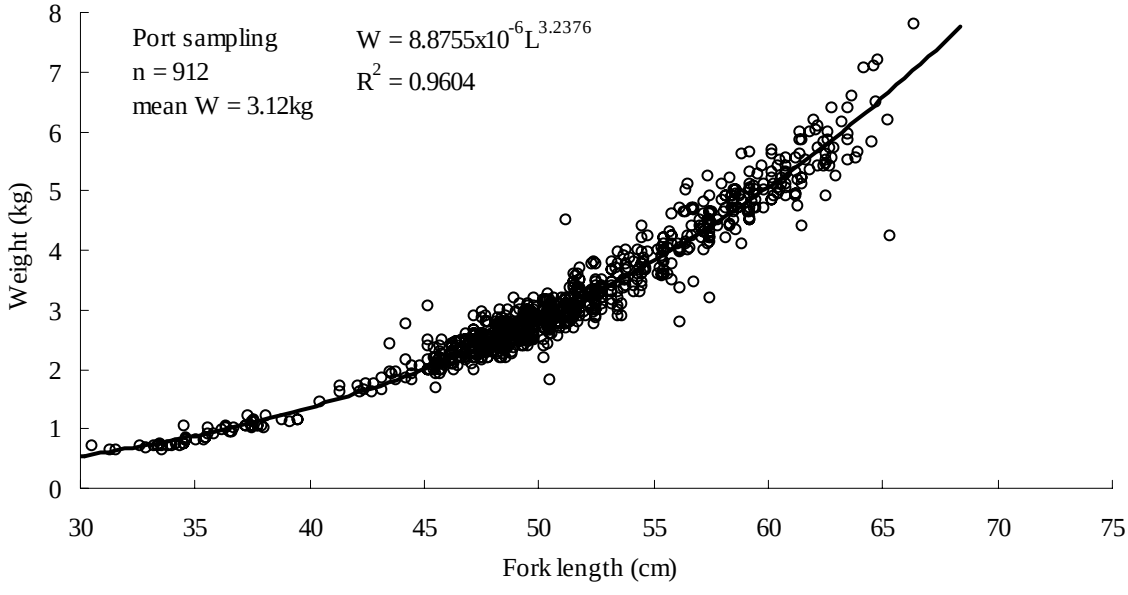


Fig. 1. Length frequency distribution of the skipjack tuna sampled (continued-2).

Subtotal





Total

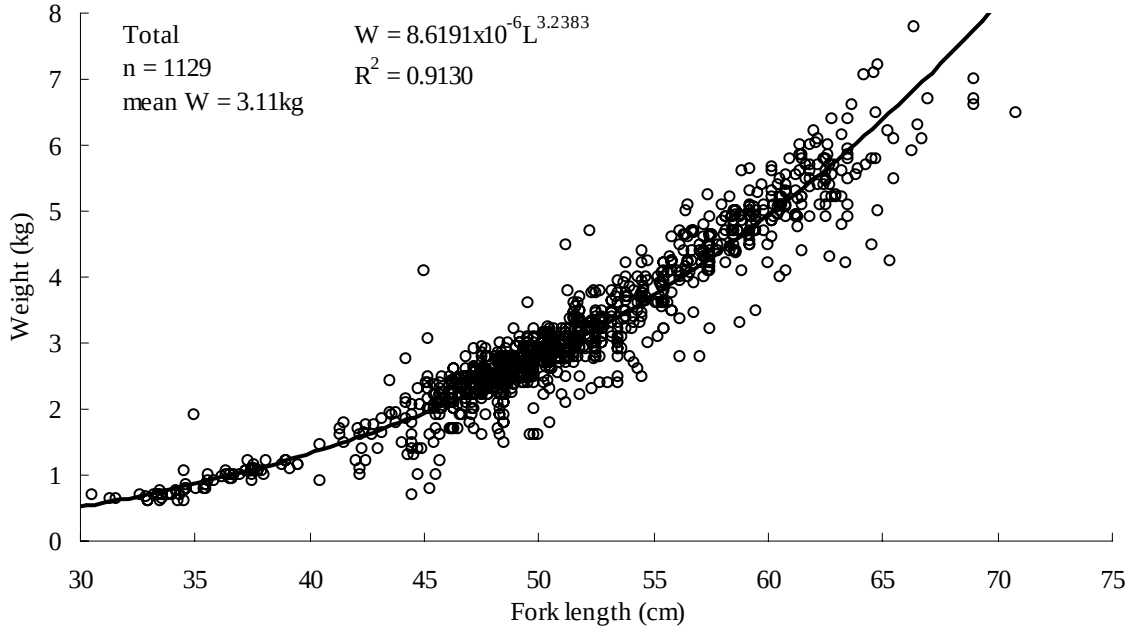


Fig. 2. Length-weight relationship for the skipjack tuna sampled.