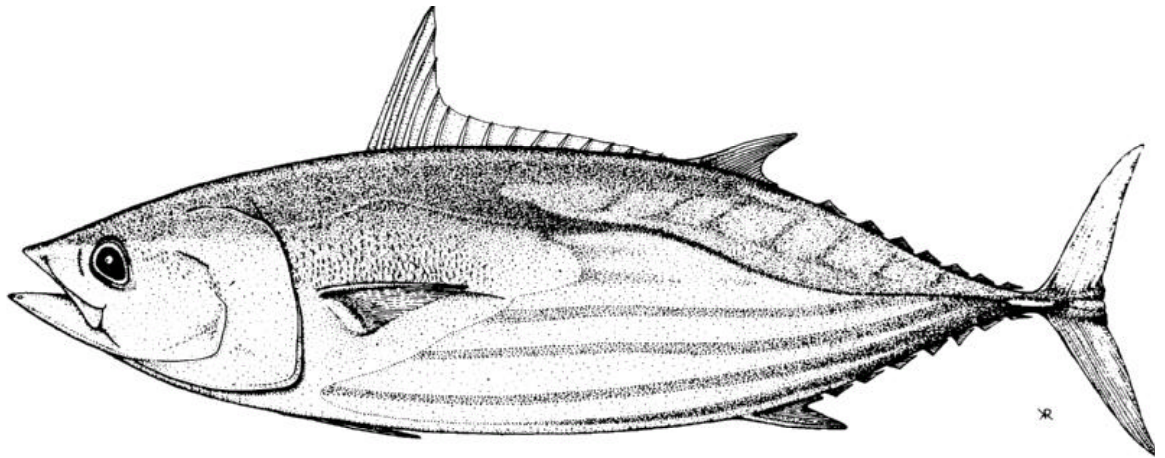




SCTB15 Working Paper

**SKJ-4**

**Biological data collection and study on skipjack tuna  
caught by Taiwanese tuna purse seine fishery - 2001**



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## **Introduction**

For decades skipjack tuna *Katsuwonus pelamis*, the main target species of the tuna purse seiners, has contributed about 70% 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.

## **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 NTU lab.
3. In NTU lab, the dorsal spines, otolith, gonads, muscle and vertebrae 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 (Fig.1)**

Four tuna purse seiners<sup>1</sup> returned to Kaohsiung port in 2001. Among them, only Fu-Kwan 707 landed the catch of her last trip in Kaohsiung, from which we measured 859 fish. The remaining three PS sold the fish from their last trip in other countries before returning to Kaohsiung. Hence, very small amounts of fish, between 8 to 36 fish, were measured. In total, 932 fish were measured for length and 486 for weight. The fork length ranged between 29.8 and 75.2 cm with a mean fork length of 50.1cm for total fish sampled (Fig. 2, Table1). The weight ranged between 0.55 and 10.56 kg with a mean weight of 3.8 kg. The relationship between the fork lengths and weights of 486 skipjack were shown in Fig. 3.

#### **2. Observer sampling**

The Fisheries Administration (FA) hired Mr. Chiu to conduct on-board sampling on the Fong-Hsiang 727 during August 29 to November 18, 2001. In total, 1,240 fish fork lengths were measured (Fig. 2), of which 311 (ranging from 31.8 to 83 cm, with a mean of 48.1 cm) were from school sets and 929 (ranging from 29.5 to 72.5 cm, with a mean of 45.3 cm) were from FAD sets. 85 fish weights were recorded, of which 25 (ranging from 1 to 11.5 kg, with a mean of 4.4 kg) were from school sets and 60 (ranging from 0.6 to 7.8 kg, with a mean of 2.5 kg) were from FAD sets. The relationship between fork lengths and weights of the 85 fish are shown in Fig. 3.

### **Biological sample**

#### **1. Port sampling**

From the above four tuna purse seiners, 109 whole fish were collected and shipped back to NTU lab for further processing.

#### **2. Observer program,**

Mr. Chiu collected 10 gonad samples, and 45 head (for otolith study), dorsal spine and muscle samples respectively (Table 1).

### **Lab's work**

For the 109 whole fish brought to our NTU lab from port sampling, we measured the fork lengths and weights, cut the heads (Fig. 4) and extracted the otoliths (Fig. 5) and stored them for further study. The whole gonad was weighted,

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<sup>1</sup> Fong-Kwo 817, Hwa Wei 707, Fong-Hsiang 767, and Fu-Kwan 707

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 (Figs. 6-7). Samples of the dorsal spine, vertebrae and muscle were also taken and kept frozen in labeled plastic bags respectively for later processing (Figs. 8-9). 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 past years. This situation will likely persist in 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 last year 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.

### **Acknowledgements**

This study is supported financially in part by the Fisheries Administration, Council of Agriculture in Taiwan through grant 90AS-1.4.5-FA-F2(3) to Chi-Lu Sun.



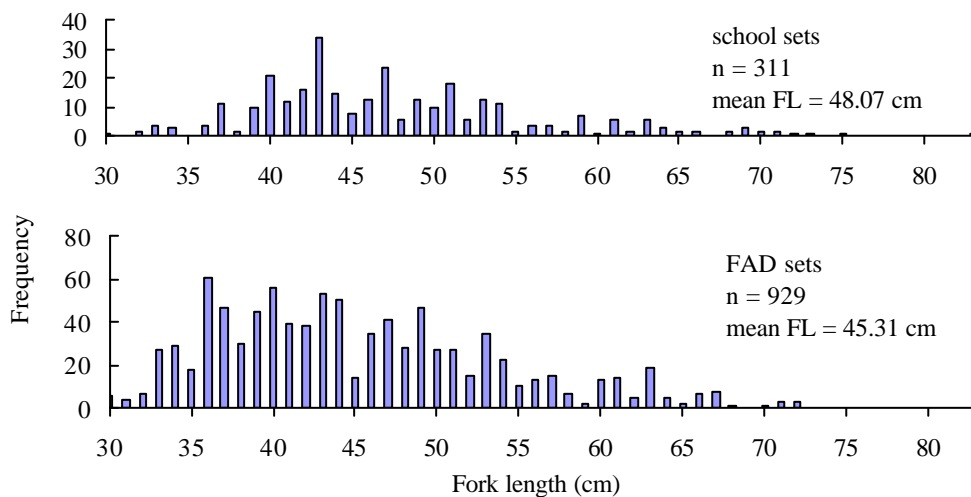
Fig. 1. Port sampling.





Fig. 1. Port sampling (continued).

Observer  
sampling



Port  
sampling

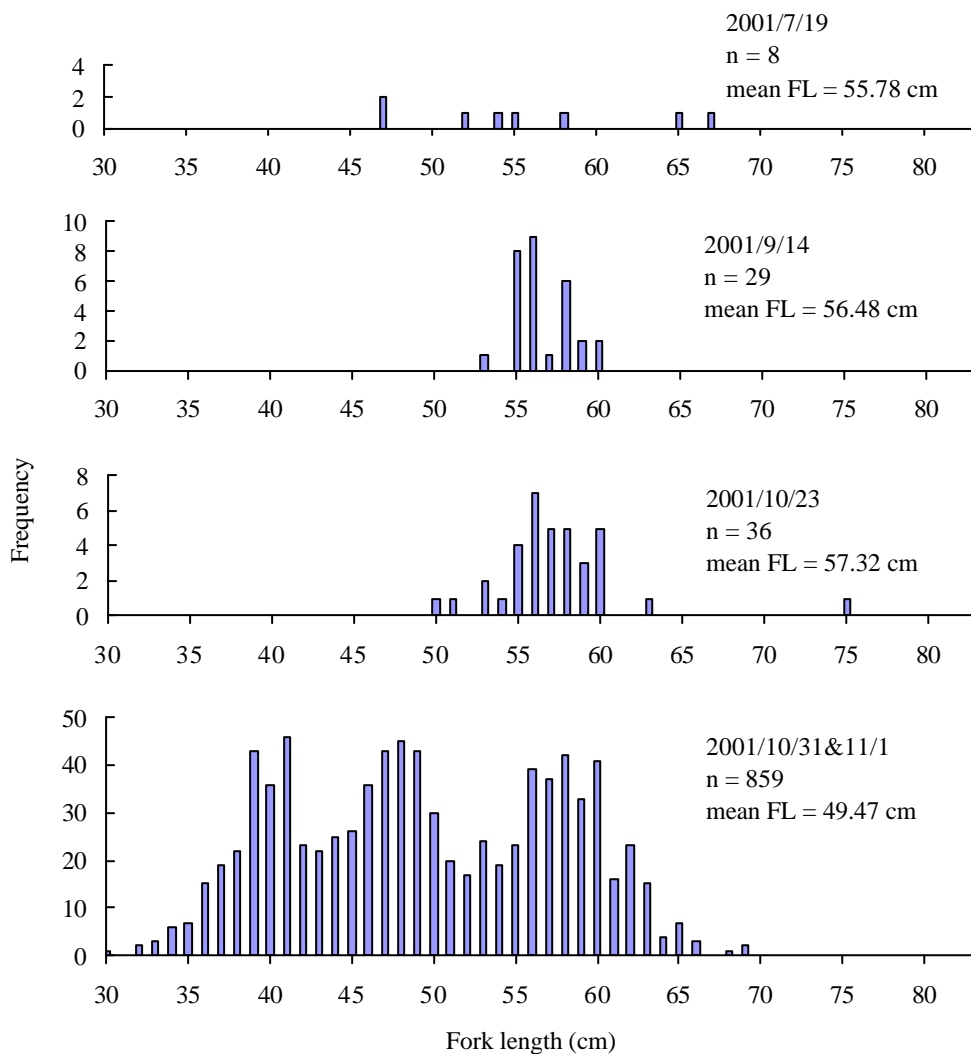
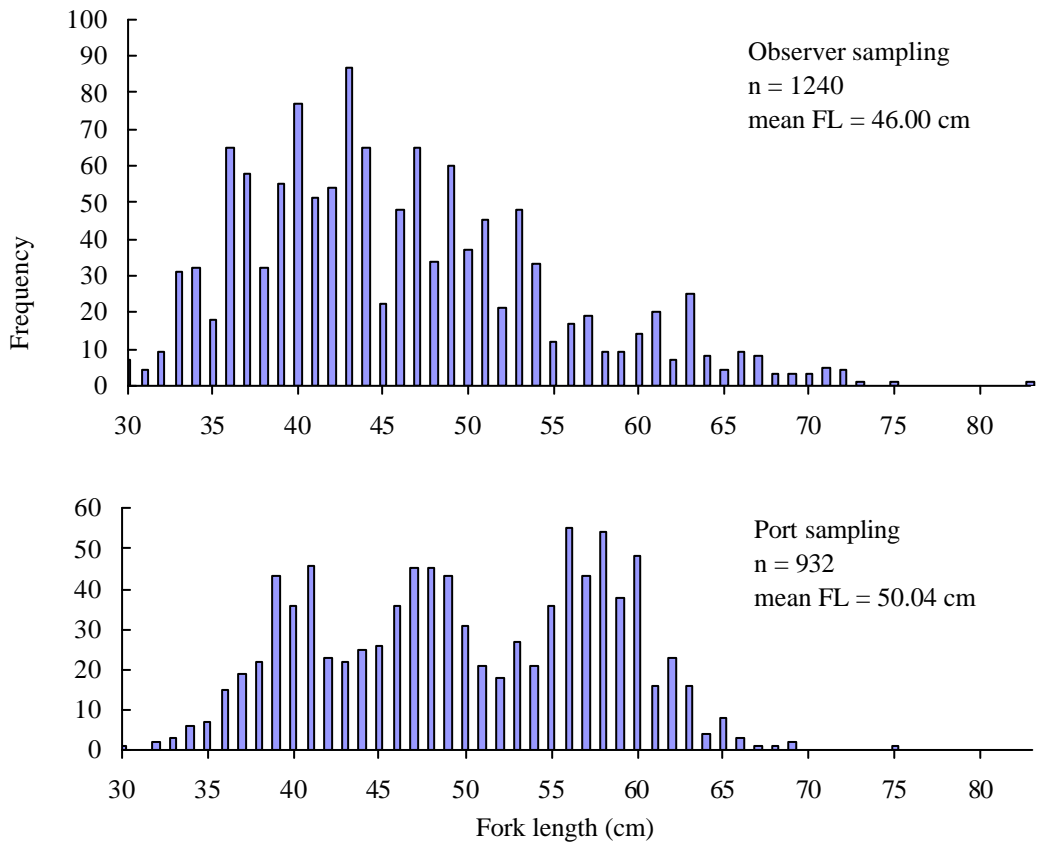


Fig. 2. Length frequency distributions of the skipjack tuna sampled.

Subtotal



Total

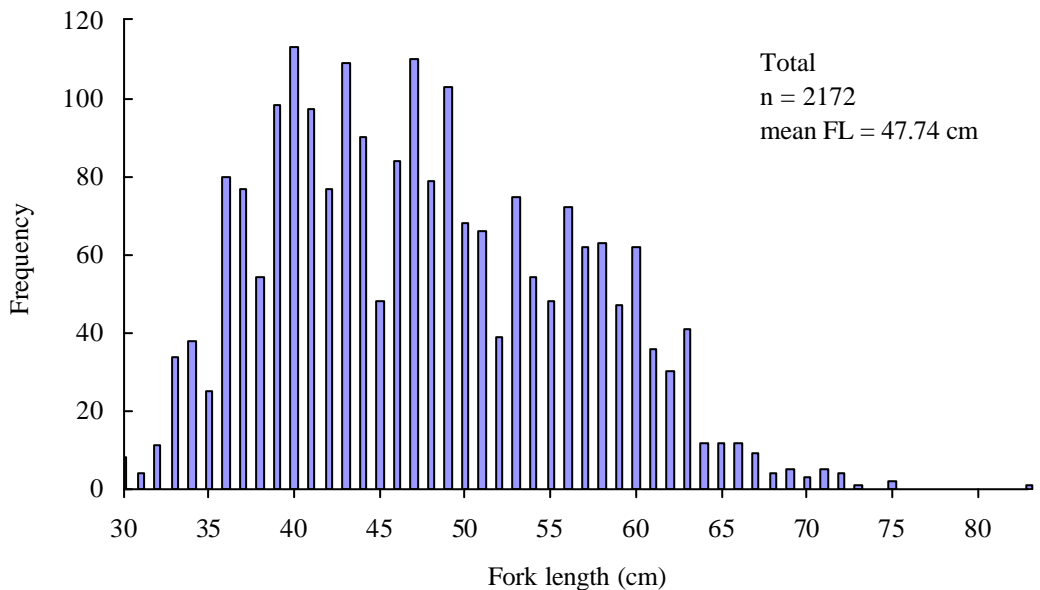
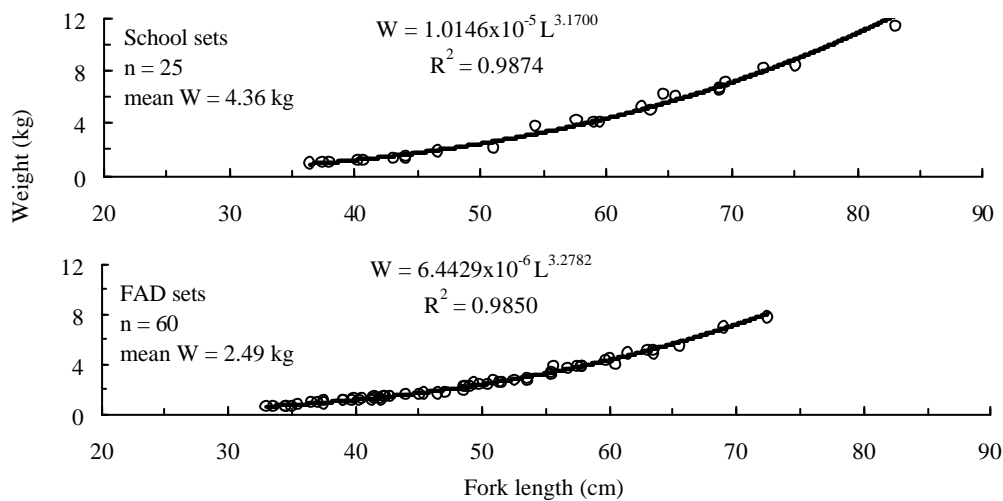


Fig. 2. Length frequency distributions of the skipjack tuna sampled (continued).



## Observer sampling



## Port sampling

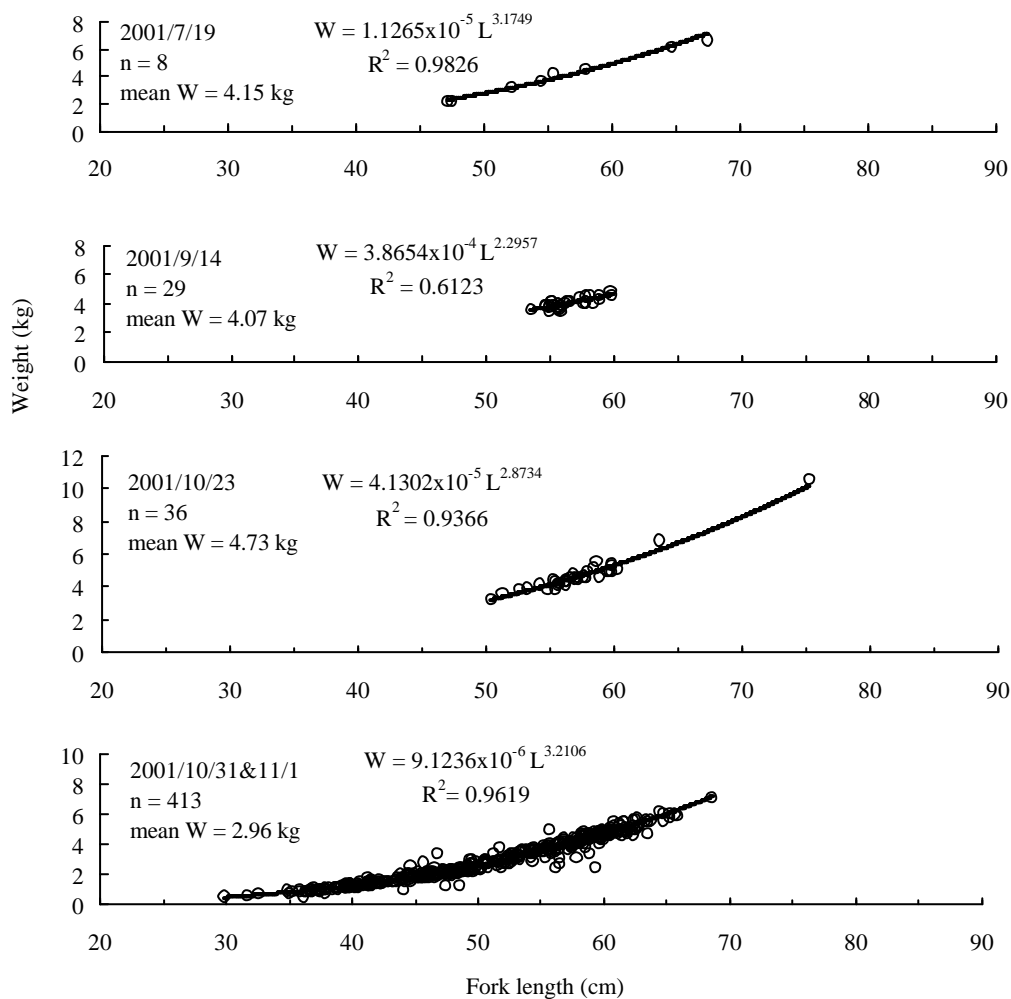
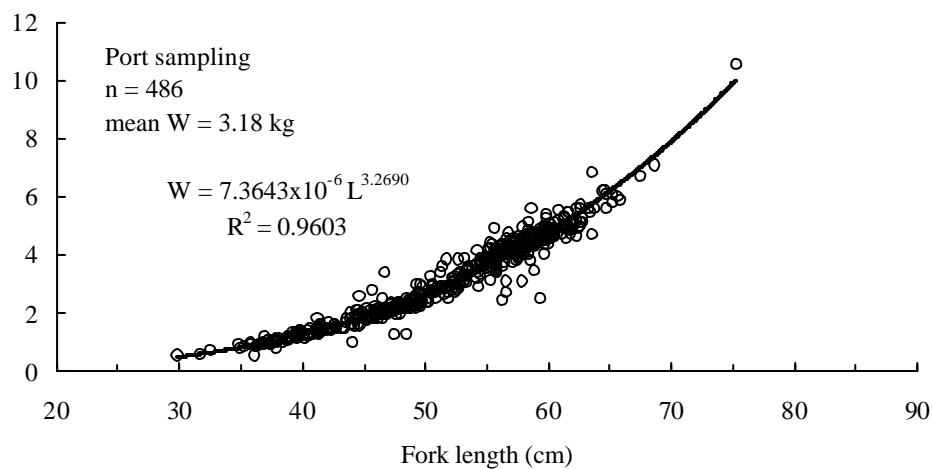
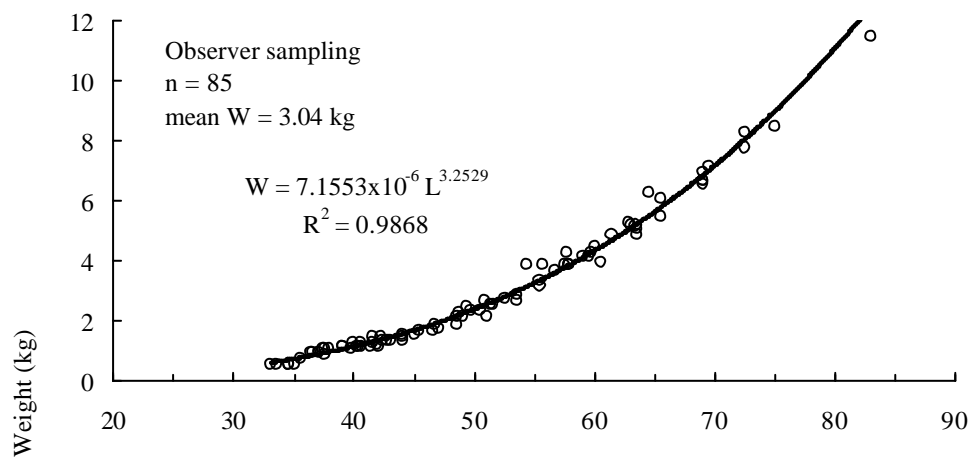


Fig. 3. Length-weight relationship for the skipjack tuna sampled.

Subtotal



Total

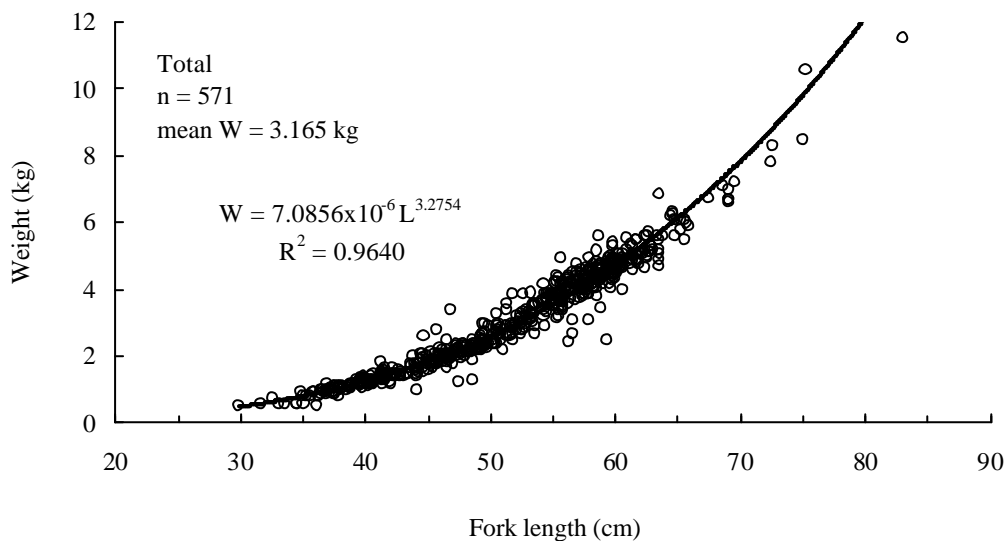


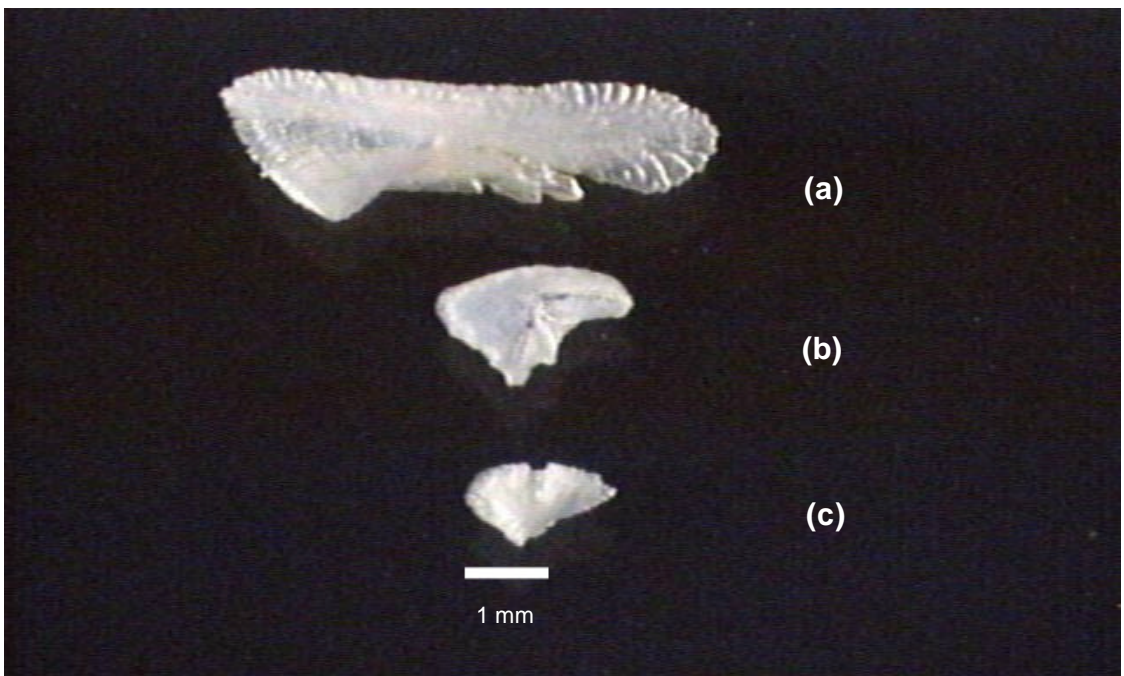
Fig. 3. Length-weight relationship for the skipjack tuna sampled (continued).



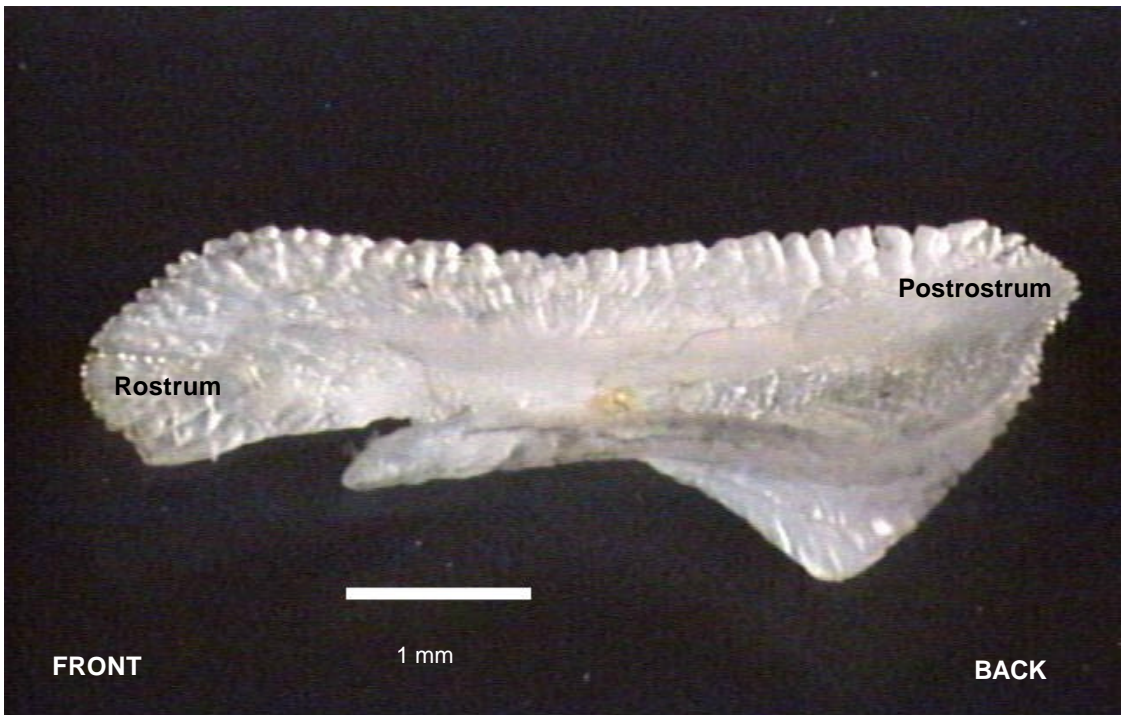
Skipjack tuna 59.4 cm FL



Fig. 4. Length measurement and head sampling.



The otoliths of a skipjack tuna (Weight 4.58 kg, Fork length 57.9 cm) sampled on July 19, 2001. (a) sagitta (b) asteriscus (c) lapillus.



The sagitta of a skipjack tuna (Weight 2.2 kg, Fork length 47.1 cm) sampled on July 19, 2001.

Fig. 5. The otoliths of skipjack tuna.





Fig. 6. Gonad sampling.

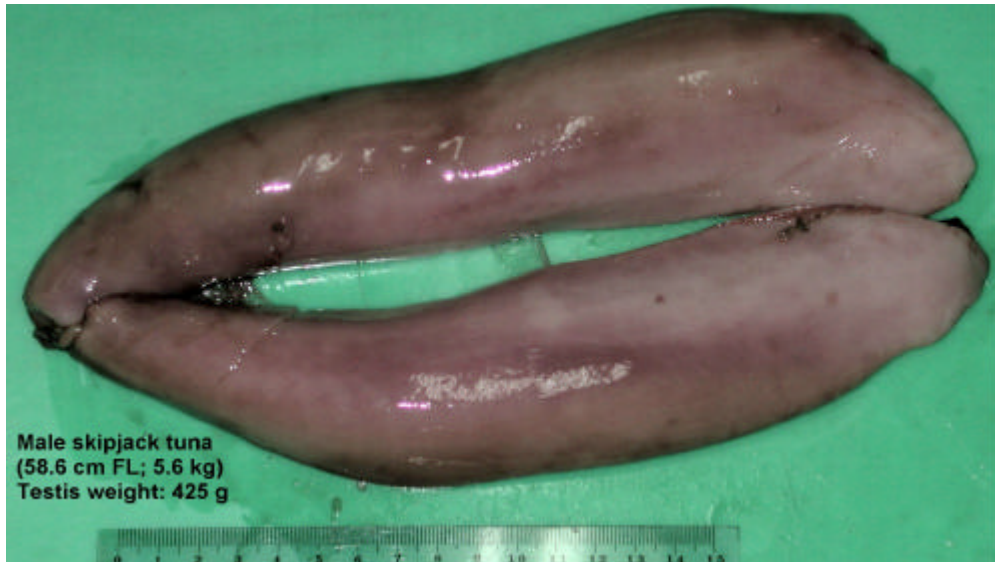


Fig. 7. Male and female gonads of skipjack.

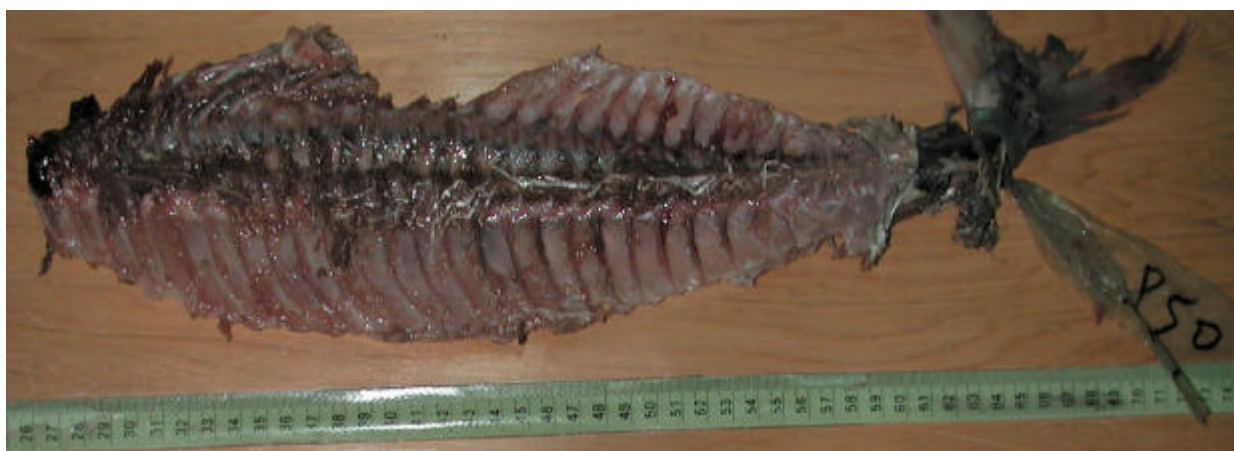




75.2 cm FL



75.2 cm FL



56.2 cm FL

Fig. 8. Spine, muscle and vertebrae sampling.



Fig. 9. Sample classification and storage.