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

Chi-Lu Sun and Su-Zan Yeh

Institute of Oceanography
National Taiwan University
Taipei, Taiwan
Biological data collection and study on skipjack tuna caught by Taiwanese tuna purse seine fishery -- 2001

Chi-Lu Sun and Su-Zan Yeh
Institute of Oceanography
National Taiwan University
Taipei, Taiwan

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

Observer sampling
n = 85
mean W = 3.04 kg

\[ W = 7.1553 \times 10^{-6}L^{3.2529} \]
\[ R^2 = 0.9868 \]

Port sampling
n = 486
mean W = 3.18 kg

\[ W = 7.3643 \times 10^{-6}L^{3.2690} \]
\[ R^2 = 0.9603 \]

Total

\[ W = 7.0856 \times 10^{-6}L^{3.2754} \]
\[ R^2 = 0.9640 \]

Fig. 3. Length-weight relationship for the skipjack tuna sampled (continued).
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. 7. Male and female gonads of skipjack
Fig. 9. Sample classification and storage