

## STANDARDIZED CPUE FOR THE ATLANTIC SWORDFISH CAUGHT BY JAPANESE LONGLINERS

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### SUMMARY

The standardized CPUEs of swordfish caught by Japanese longliners, age-specific for the North Atlantic and single biomass for the South Atlantic, were updated to 1997. The relative value of CPUE in 1997 remained at a low level in the North Atlantic, while the rapidly decreasing CPUE trend which started at the end of the 1980s, became obvious in 1997 in the South Atlantic.

### RÉSUMÉ

La CPUE standardisée, spécifique du sexe pour l'Atlantique Nord et à biomasse unique pour l'Atlantique Sud, des espadons capturés par les palangriers japonais, a été actualisée jusqu'à 1997. La valeur relative de la CPUE de 1997 est demeurée faible dans l'Atlantique Nord, alors que la tendance décroissante rapide de la CPUE qui avait commencé à la fin des années 1980 est devenue évidente en 1997 dans l'Atlantique Sud.

### RESUMEN

Se actualizaron a 1997 las CPUE estandarizadas específicas de la edad para el Atlántico norte y de una biomasa única para el Atlántico sur de pez espada capturado por palangreros de Japón. El valor relativo de la CPUE en 1997 permaneció a un nivel bajo en el Atlántico norte, mientras que la tendencia rápidamente decreciente de la CPUE que se inició a finales de 1980 se hizo evidente en el Atlántico sur en 1997.

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## Introduction

The standardized CPUE of longliners has been used as an index for stock status in the stock analysis of the Atlantic swordfish and the swordfish catch of Japanese longliners has been one of major one in the Atlantic (ICCAT, 1997). This document offers the updated standardized CPUE data of the swordfish caught by Japanese longliners for the use of stock analysis.

## Materials & Methods

Standardized CPUE series for swordfish caught by Japanese longliners were updated to 1997. The age specific CPUE (age 1 – 5+) were estimated for the northern stock by using the same method for Uosaki (1997) and the single biomass CPUE series for the southern stock by using same method for Uozumi(1997). The factors included in the model as main effects were selected for the value of AIC to be lowest. Selected model for both of the northern and the southern stocks are:

$$\ln(\text{CPUE}_{ijk} + \text{const}) = \ln(\mu) + \ln(\text{YR}_i) + \ln(\text{QT}_j) + \ln(\text{AR}_k) + \ln(\text{GE}_l) + \ln(\text{INTER}) + \varepsilon_{ijkl}$$

where  $\ln$ : natural logarithm,  $\text{CPUE}_{ijk}$ : nominal CPUE (catch in number per 1,000 hooks, in year  $i$ , quarter  $j$ , area  $k$ ),  $\text{const}$ : 1/10 of overall mean,  $\mu$ : overall mean,  $\text{YR}_i$ : effect of year  $i$ ,  $\text{QT}_j$ : effect of quarter  $j$ ,  $\text{AR}_k$ : effect of area  $k$ ,  $\text{GE}_l$ : effect of gear  $l$ ,  $\text{INTER}$ : combinations of two way interaction of  $\text{YR} \times \text{QT}$ ,  $\text{AR} \times \text{QT}$ ,  $\text{AR} \times \text{GE}$  and  $\text{QR} \times \text{GE}$ , and  $\varepsilon$ : normal error term.

Analysis was made though the GLM procedure of computer software, "SAS Ver. 6.11".

## Results & Discussions

### Northern Stock

The standardized CPUEs by age were shown in Fig. 1 with their upper and lower 95% confidence limits. All the values were expressed as the relative values which the mean value of age 4 were set at 1.0. General trend of the standardized CPUE for each age was similar to that in Uosaki (1997) and the values for all age groups were in historically low level. Although the slight downward trend of younger age group (age 1 – 3) and upward trend of older age group (age 4 – 5+) observed in 1997 can be explained by the change of catch at size data in areas 4A and 4B where most of the catch were obtained, these trend should be interrupted with care as the sample number of size data was not large enough (about 400 – 500 fish per year) to reflect a small change of the stock status by age group.

### Southern Stock

A single biomass CPUE was standardized for the period between 1975 and 1997 (Fig. 2). In 1996 and 1997, the values of the standardized CPUE showed continuous sharp decreases. The value of 1997 was about 30% of the average value in the period between 1975 and 1990 when the values of the standardized CPUE were rather stable in relative high level.

## Reference

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- Uozumi, U. 1997: Standardization of biomass CPUE for swordfish caught by Japanese longline fishery in the south Atlantic. ICCAT, CVSP. Vol. XLVI (3): 369-372.

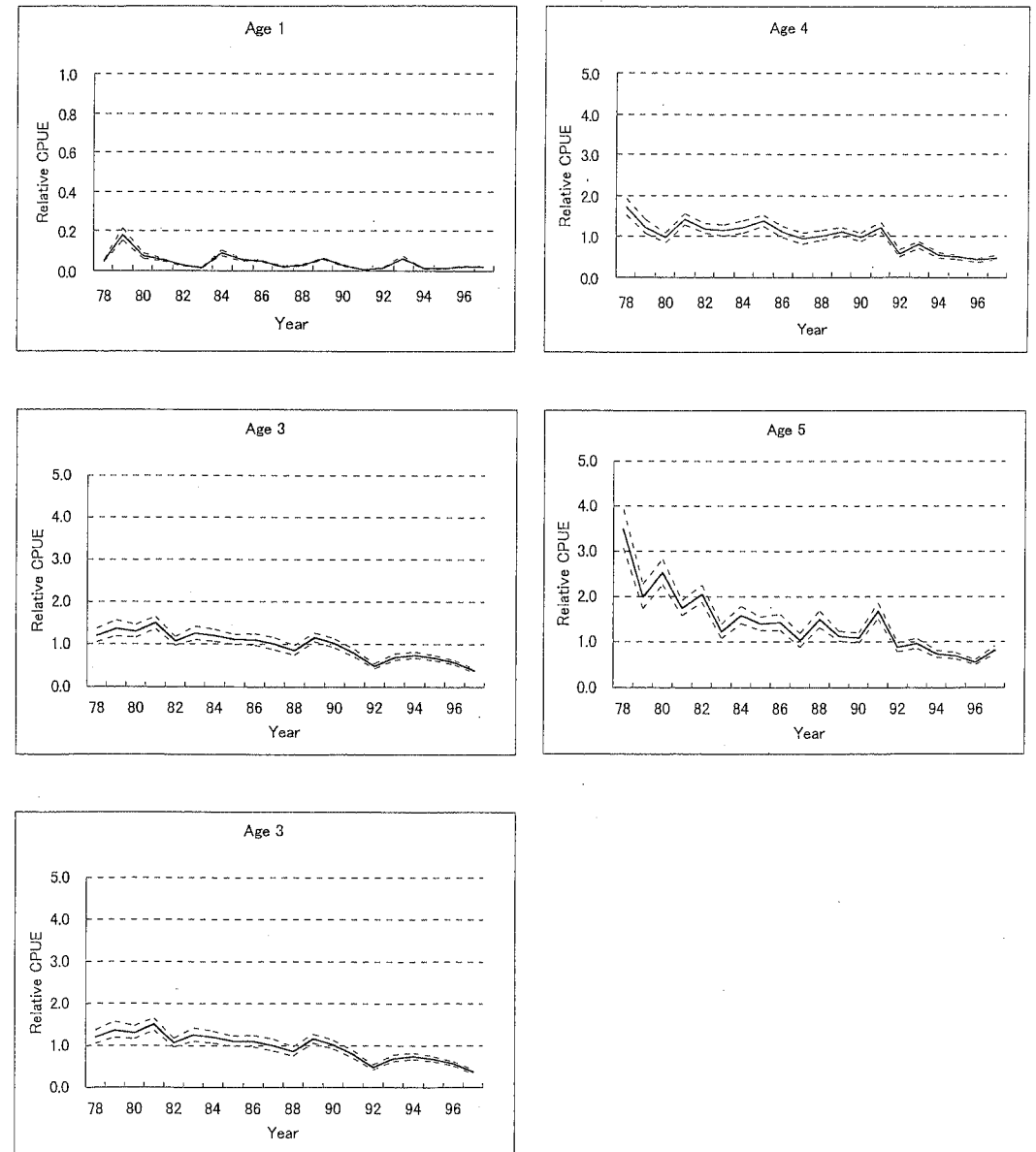


Fig. 1. The standardized age specific CPUE of the north Atlantic swordfish caught by Japanese longliners.

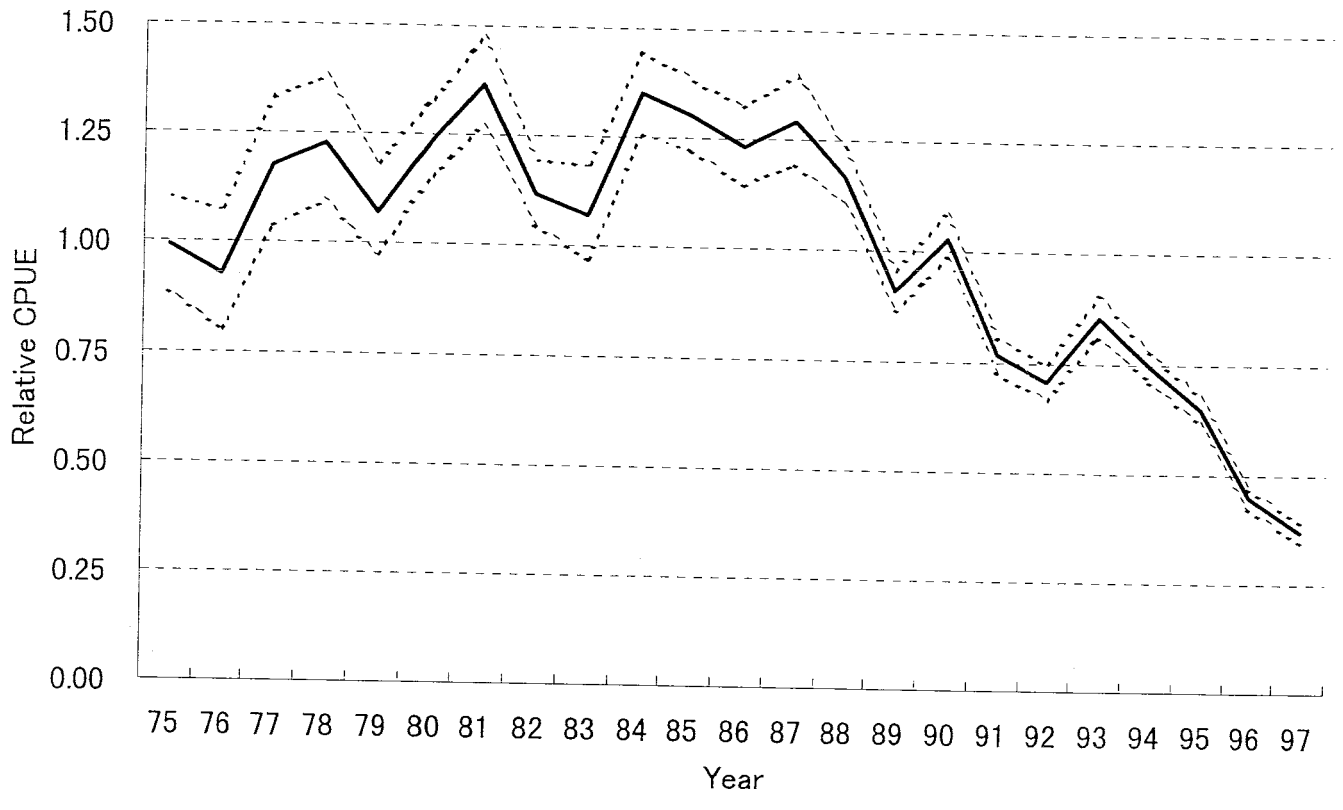


Fig. 2. Standardized biomass CPUE of the south Atlantic swordfish caught by Japanese longliners.