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CPUE analysis for Japanese Purse seine in Sea of Japan

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Introduction

Purse seine is one of the major fisheries for Pacific bluefin tuna (PBF: *Thunnus orientalis*) in Japan but no abundance index was provided for this fishery to use in the stock assessment in 2008 by ISC (Anon. 2008). Because the relationship between catch and effort may not be linear in purse seine fishery (Gaertner & Dreyfus-Leon 2004), it may be difficult to estimate abundance index for this fishery. Kanaiwa et al. (2008) compared several candidates of abundance indices and showed that there was no evidence that nominal CPUE (i.e. average catch per each landing) does not represent the stock abundance due to some bias. In same time, age separated analysis was required.

In this paper, nominal CPUE is updated between 1987 and 2010 to be used at the next stock assessment. Preliminary age specific CPUE analyses are also provided to have better understanding of the characteristics of Japanese purse seine catch in the Sea of Japan.

Material and Method

The landing data in Sakai-minato port collected by the Tottori Prefectural Fisheries Experimental Station between 1987 and 2007 (except 1990) were analyzed. The data include fish length, frequencies of fish sampled, number of fish caught, vessel name and landing date for each landing. The data which have length composition were used for age specific analysis. The fish smaller than 80 cm called "Yokowa" were removed from analysis because sampling coverage was different. For conversion of length to age, sex combined equation (Shimose et al. 2012) was used. Each measured individual was assigned to one of the following age classes, i.e. younger than 2, ages 3, 4, and 5+ at the time of capture and age compositions for each landing was estimated. Based on these age compositions, age specific catch (catch at age) was estimated.

Result and Discussion

Nominal CPUE and 95% confidence interval are shown in Fig. 1. Since the confidence intervals are wide it is difficult to see the trend. However, the figure is almost flat except for 1994. In 1994, the CPUE became large because the CPUE of age 4 increased extremely (Fig 2). This makes the CPUE of age 5+ in 1995 was high.

Regression analysis is conducted between stock abundance estimated by the former stock assessment (Anom. 2008) and CPUE series derived by this study for ages 3, 4 and 5+ (Fig. 3). All coefficients of regression are positive but R^2 is not high. In this analysis, the averages catch by operation are treated as stock abundance for each year. For purse seine, the average catch may show only the size of school but also stock abundance. This may be one of the reasons why R^2 between this stock index and SS2's estimation become not high.

Standardized method, e.g. GLM, was not conducted at this time because there are little information available to decide which factors should be included.   It should be considered in future.

References

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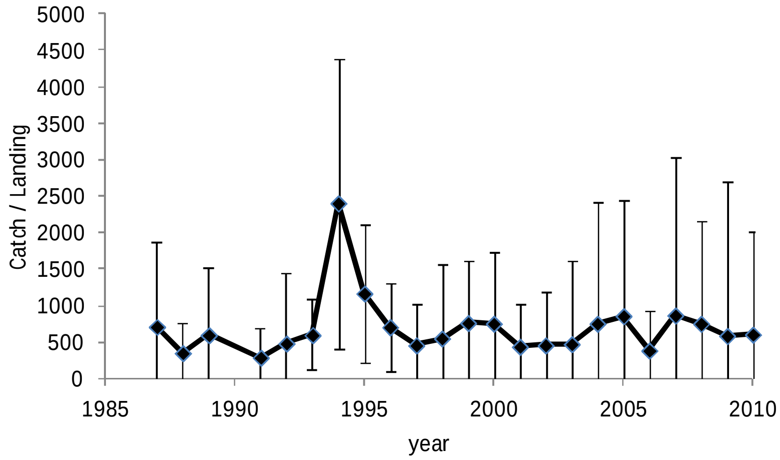

Figure 1. Nominal CPUE and 95% confidence interval of Japanese purse seine in sea of Japan.

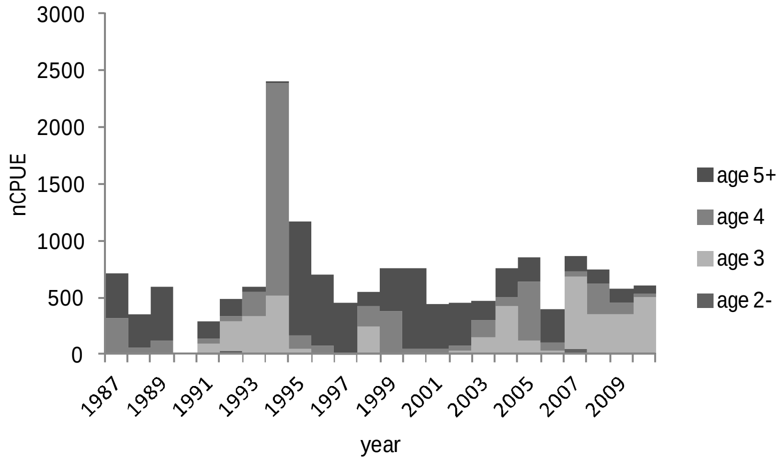

Figure 2. Nominal CPUE for each age

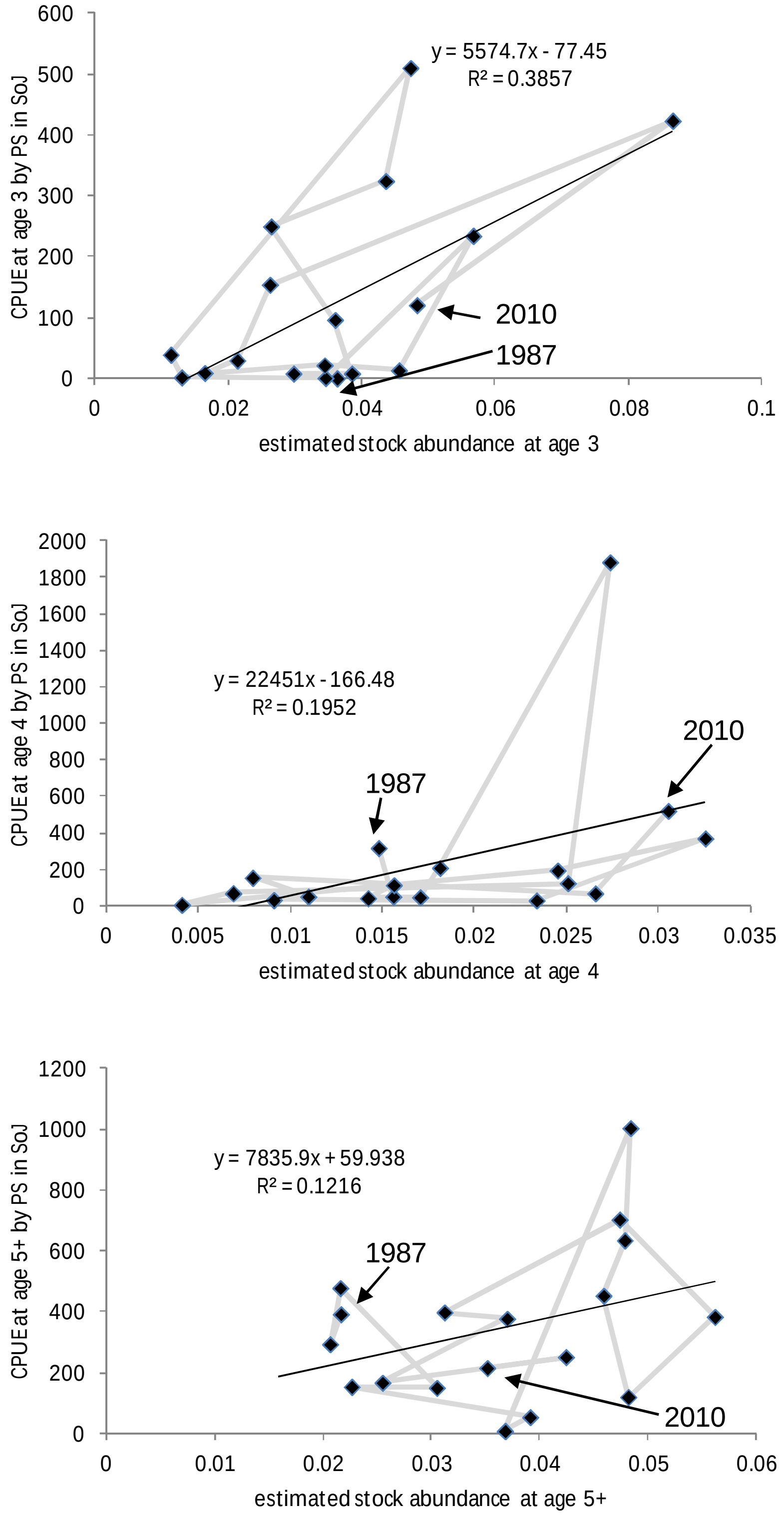

Figure 3. Scatter plot between estimated stock abundance by former stock assessment and nominal CPUE by purse seiner in Sea of Japan.