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Preliminary analysis for accuracy of catch amount by species caught by purse seine comparing observer data and landing data

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Abstract

The object of the project 60 is to improve the collection and representative nature of species composition data for tuna caught by purse-seine fisheries. For the project we have provided landing data of four Japanese purse seine trips. We investigated preliminarily accuracy of catch amount by species comparing the four landing data and corresponding observer data. The catch amounts of skipjack estimated by spill and grab sampling were 1.2 times larger than that of landings. There is no any conclusion because there were only four data points (four trips). We need further investigation for accuracy of the catch amount of the fisheries comparing these informative observer data and landing statistics from CCMs. If we use the port sampling data, we can estimate much better the amount of not only skipjack but also yellowfin and bigeye tuna.

Introduction

Under WCPFC Project 60, paired grab and spill samples were collected by observers onboard purse seiners in order to correct historical data of purse seine fishery in WCPO, which was estimated by grab samples collected by onboard observer (Lawson 2009, 2010, 2012, 2013). Comparison among these observer data, cannery data and landing data have been also presented in Lawson (2014). These studies quantify the selectivity bias of grab samples and correct the species composition (percentage of catch by species) of historical data. However it is not fully evaluated precision of estimated value of catch amount, which is essential information for stock assessment. In fact, the catches per trip determined from purse seine observer data have been not directly used in the stock assessment, however the comparison among four data sources (logbook, observer estimation of grab sampling, spill sampling and market data) should give information about accuracy of the amount of catch of purse seine. Therefore we preliminary compare catch amount of skipjack tuna per set estimated by three data sources of Japanese purse seine operated in the tropical area of western and central Pacific Ocean..

Methods and materials

Market data and observer data of four trips of Japanese purse seine fishery was used, which were same data used in the analysis in Lawson (2014). The observer data were

collected by onboard observer under WCPFC Project 60, and the market data is record of the first sale (from vessel owner to the first buyer) at port. The first buyer is composed of cannery, processor of dried bonito, local fish store and agent who then sell to several buyers. The market data (landing) by trip is provided by fisheries cooperative association who conduct sorting and sizing for fish at port and arrange auction of fish for the first buyer. Therefore the associations have data amount of catch by species and fish size. In most cases the Japanese purse seine vessel unload all fish caught in one trip all at once.

Catch amount of skipjack per set of four data source were compared for the four trips. The four data source were catch amount of skipjack 1) recorded in logsheet, 2) estimated by grab sampling, 3) by spill sampling and 4) of market data (landing). Observer did not always estimate for all set mainly because of small catch in a set (Lawson 2014). Therefore the catch amount per set was compared. We did not compare the catch amount of yellowfin and bigeye tuna.

Results and discussion

The catch amounts per set by each data source ranged from 18 to 58 mt from logsheet, 22 - 69 mt from grab sampling, 22 - 85 mt from spill sampling and 16 - 61 mt from market data (Table1). The catch amounts per set by each data source were also presented as relative value of market data. The average (standard deviation) of four trips of logsheet, grab sampling and spill sampling were 1.01 (0.09), 1.20 (0.13) and 1.24 (0.18), respectively. There is no any conclusion because there were only four data points (four trips). We need further investigation for accuracy of the catch amount of the fisheries comparing these informative observer data and landing statistics.

We did not analyze for yellowfin and bigeye tuna. The market data of small size (less than ca. 1.5 kg) fish of these species were not sorted by species because there was no difference of market value of such small size by species. Therefore the catch amount of both species reported in the market data should be corrected by species composition of the small size fish, which have been collected by port sampling data since 1995 in Japanese ports. However there is no port sampling for the four trips, so we did not compare the catch amount of bigeye and yellowfin tuna. The coverage of the port sampling is about 10% for the purse seine fishery operated in the tropical area of WCPO. We can estimate much better the amount of not only skipjack but also yellowfin and bigeye tuna using these port sampling data.

Acknowledgements

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References

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Table 1 Comparison of catch amount of skipjack tuna by estimation method for four trips of Japanese purse seine vessels operated in the tropical area of Pacific Ocean. SD: standard deviation. A: total catch (mt), B: number of set, C: catch per set (= A / C), D: relative catch per set to that of landing.

A

total catch (mt)	logsheet	grab	spil	landing
trip 1	1094	1109	1024	1152
trip 2	534	549	581	469
trip 3	425	462	430	445
trip 4	504	481	460	510

B

number of set	logsheet	grab	spil	landing
trip 1	19	16	12	(19)
trip 2	30	25	27	(30)
trip 3	13	12	11	(13)
trip 4	17	14	15	(17)

C

catch per set	logsheet	grab	spil	landing
trip 1	58	69	85	61
trip 2	18	22	22	16
trip 3	33	38	39	34
trip 4	30	34	31	30

D

relative value to landing	logsheet	grab	spil	landing
trip 1	0.9	1.1	1.4	1.0
trip 2	1.1	1.4	1.4	1.0
trip 3	1.0	1.1	1.1	1.0
trip 4	1.0	1.1	1.0	1.0
average	1.01	1.20	1.24	
SD	0.09	0.13	0.18	