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PRELIMINARY INFORMATION ON THE CATCH OF SMALL-SIZED TUNA BY SET TYPE OF KOREAN TUNA PURSE SEINE FISHERY IN THE WCPO

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Preliminary information on the catch of small-sized tuna by set type of Korean tuna purse seine fishery in the WCPO

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Abstract

To investigate the effect of set type on the catch of small-sized tuna, onboard observers monitored fishing operation of two Korean tuna purse seiners in the WCPO. Fifty experimental FADs with hanging net of various length were deployed for comparison of the effect of underwater structure on the catch of bigeye and yellowfin tuna. Up to date, the experimental survey is still underway so this paper presents only preliminary data collected during June and July 2008. Of 51 observed sets, 37 sets were from unassociated schools of tuna and 14 sets from FAD-associated schools, accounting for 27% of the total sets. The FAD sets caused catch of small-sized bigeye tuna with fork length smaller than 60cm. There was no significant differences in catch and size of bigeye and yellowfin tuna by the depth of underwater structure of FAD.

Introduction

Since it is known that purse seine fishery targeting tunas associated with floating objects such as natural logs and fish aggregating devices (FAD) are responsible for the significant catch of small-sized tunas, WCPFC has endeavored to make necessary measures and urged ccms to conduct research on how to mitigate catch of small tuna on FADs. To implement CMM 2006-01, Korea, as one of the major fishing nations in WCPO area, started this year to investigate the effects of set types of its purse seine fishery on the catch of small-sized bigeye and yellowfin tuna. The experimental survey is still underway so this paper presents some preliminary data obtained during June-July 2008.

Methods

To investigate the effect of set types of purse seine fishery on the catch of small-sized bigeye and yellowfin tuna, NFRDI dispatched observers onboard two Korean purse seiners operating in WCPO (Fig. 1). While the observers monitored usual fishing practices of respective vessel, 50 sets of experimental FADs with hanging net of

different length of 40m, 60m and 90m were deployed for comparison of the effect of underwater structure on the catch of bigeye and yellowfin tuna. However, since in general FADs gather tunas in about one month after deployment, current results did not include data from the experimental FADs.

The onboard observers recorded catch, effort, set type either natural log or FAD or unassociated, bycatch species, size of tuna, oceanographic condition, depth of purse seine net using TDR. As for the specification of floating objects, they recorded material, structure, depth of underwater structure of FAD, anchored or drifting. Deployed FADs were identified by its own number.

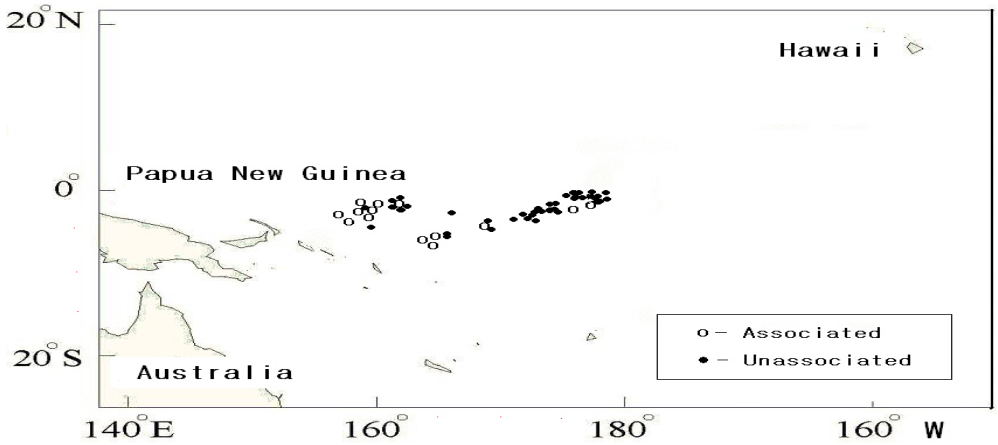

Fig. 1. Survey area, 0° 56' N ~ 6° 13' S, 156° 39' E ~ 179° 23' E.

Fig. 2. An experimental FAD with hanging net and rope strands (left), and identification of FAD (right) .

Results and Discussion

During June-July 2008, a total of 51 sets were monitored, of which 37 sets were made on free-swimming schools of tuna and 14 were on tuna associated with FAD made of nets and ropes. There were no sets on natural logs. Among 37 unassociated sets, 11 sets were considered to be failed due to low catch of less than 1mt, while all FAD sets were successful. Catch of unassociated sets consisted of 1,312mt of skipjack accounting for about 83%, followed by yellowfin of 257mt (16%) and small quantity of bigeye tuna. Catch composition of FAD sets was similar to that of unassociated sets; 88% of skipjack, 18% of yellowfin and 0.04% of bigeye tuna (Table 1). FAD sets caused 17 bycatch species consisting of mainly smaller fish species of low commercial value. In contrast, unassociated sets showed only 7 bycatch species composed of bigger size fish including shark and billfish. All of them except for billfish species were discarded.

Table 1. Summary of catch during survey period, June-July 2008

Set type	Catch by species (mt)			
	SKJ	YFT	BET	Bycatch (number)
FAD	792.2	106.1	0.4	1.6 (1,270)
Unassociated	1312.8	257.2	0.6	2.0 (61)
total	2105.0	363.3	1.0	3.6 (1,331)

FADs deployed by Korean purse seiners consist of two parts, a bundle of buoys at top and underwater structure made of nets and rope strands. The FADs observed during the period were designed and manufactured by fishing companies and were attached with net of various length, ranged 40-100m and the FADs with 41-80m nets were dominant comprising 71% (Table 2). Catch of tuna by the depth of FAD was presented in Table 2. Due to small sample size, it was hard for us to interpret the results statistically but it appeared that higher CPUE (mt/set) was resulted from both the shallower FADs, 40m or less, and deeper FADs, deeper than 80m. Bigeye catch was observed in all sets but the quantity was very minor, with only less than 0.1% of the total catch.

Table 2. Details of catch from FAD sets. Depth indicates the length of underwater structure of FAD.

Depth of FAD (m)	set	Catch (mt) / CPUE (mt/set)			
		SKJ	YFT	BET	Bycatch
~40	2	195 (97.5)	35.1 (17.6)	0.028 (0.01)	0.3 (0.15)
41~60	5	280 (56)	30.106 (6.0)	0.182 (0.04)	0.7 (0.14)
61~80	5	143.5 (28.7)	39.5 (7.9)	0.036 (0.01)	0.7 (0.14)
81~100	2	173.73 (86.9)	1.363 (0.7)	0.15 (0.1)	0.2 (0.1)

Fork length of bigeye tuna caught from FAD sets ranged from 30cm to 52cm and 35-36cm class was dominant, while that of yellowfin tuna ranged 28-132cm with a mode at 37-38cm (Fig. 3). Unlike bigeye tuna, yellowfin tuna of medium to large size were also caught from FAD sets. Bigeye and yellowfin tuna caught from unassociated sets were bigger than those from FAD sets, with fork length ranged 92-133cm and 102-145cm, respectively (Fig. 4). However, more samples for bigeye tuna are needed for statistical analysis.

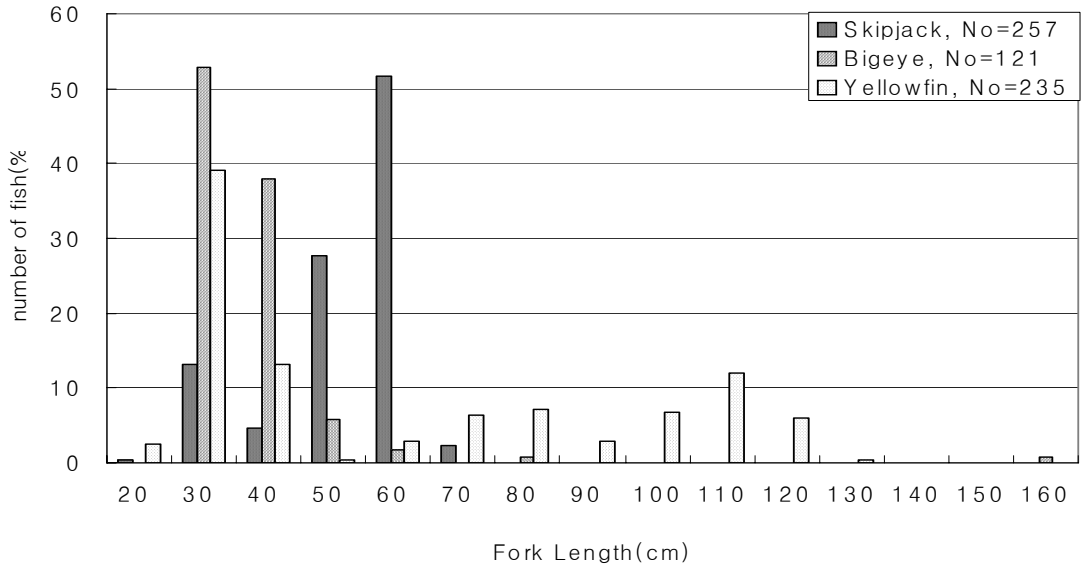

Fig. 3. Length frequency of tuna caught from FAD-associated sets.

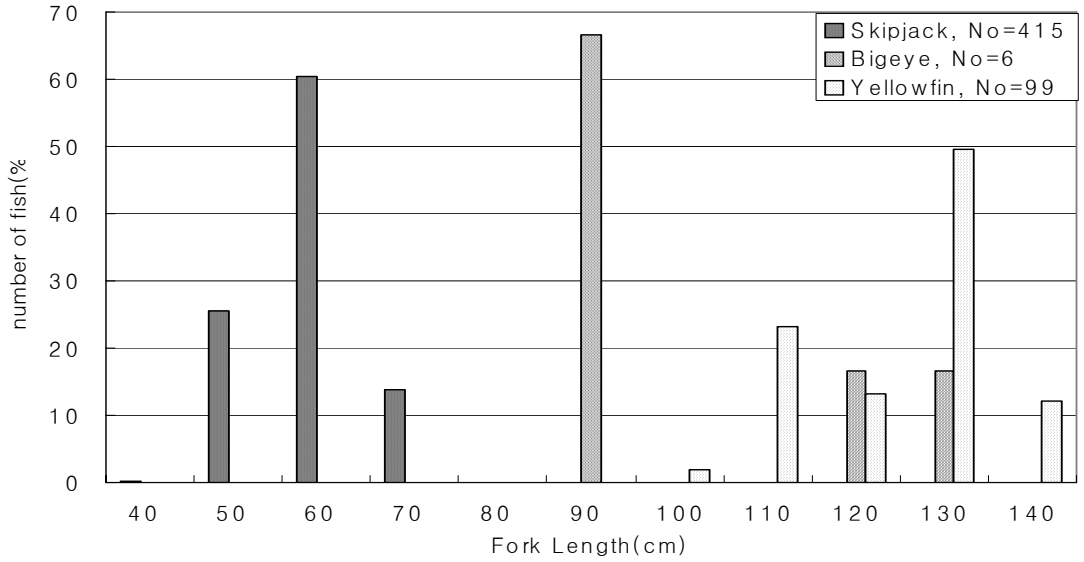

Fig. 4. Length frequency of tuna caught from unassociated sets.

There was no significant difference in the catch of small-sized bigeye and yellowfin tuna between FADs with different length of underwater structure (Figs. 5 and 6). In both FAD groups, 30cm class (30-39cm fork length) was dominant, occupying 60% in shallow group and 53% in deep group. The proportion of bigeye of 40cm class (40-49cm) was higher in deep group but vise versa in the case of 50cm class.

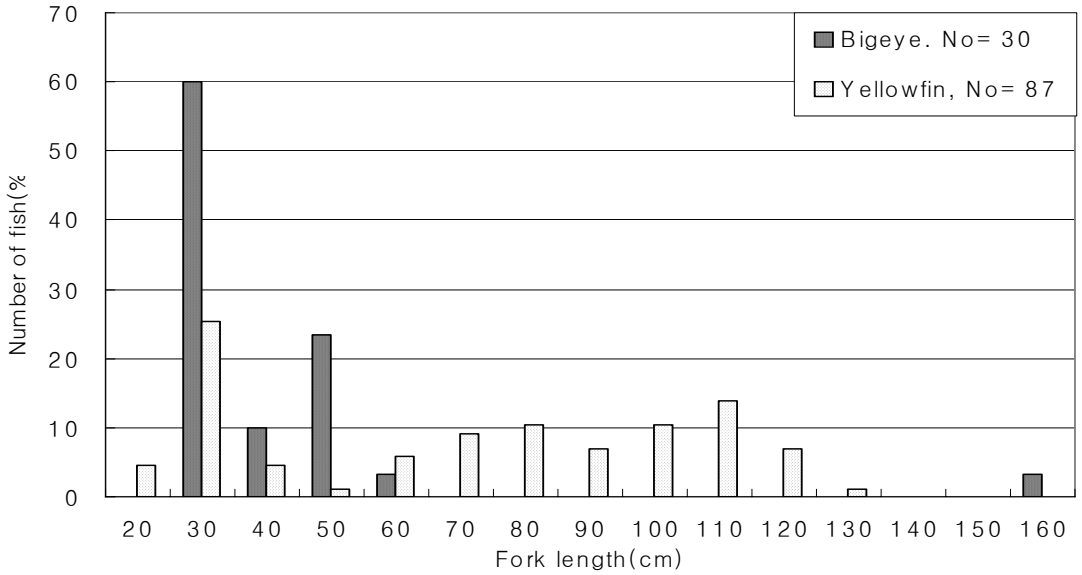

Fig. 5. Length frequency of bigeye and yellowfin tuna caught from FADs with underwater structure of 40-60m depth

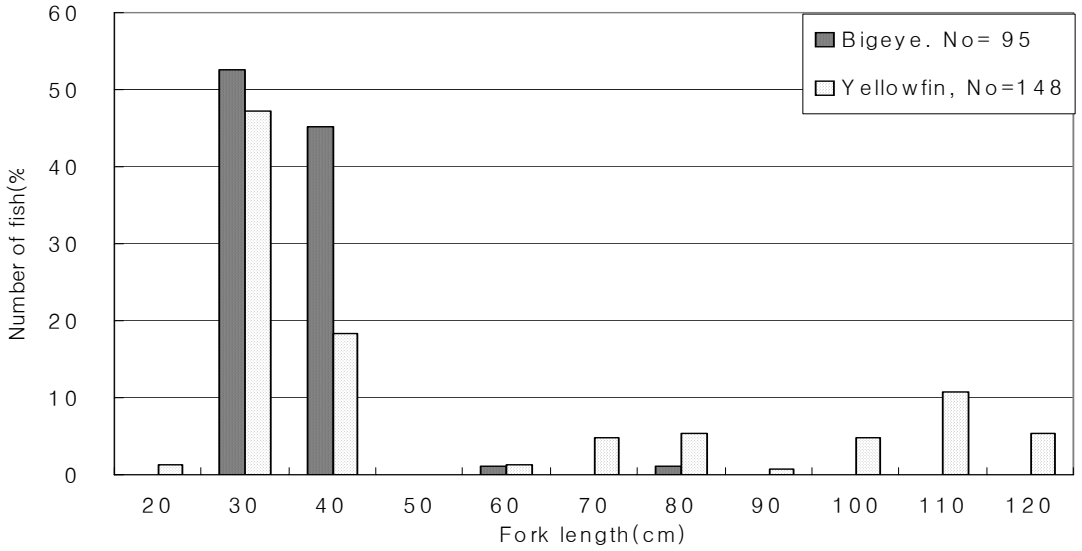

Fig. 6. Length frequency of bigeye and yellowfin tuna caught from FAD with underwater structure of 70-100m depth

Korean purse seiners usually search for free swimming schools of tuna for higher catch rate and so compared with other major distant-water fishing nations lower proportion of log-associated sets remained until recent years. However, the proportion of log and FAD sets increased from 5% in 2001 to 27% in 2006. According to fishermen (personnel communication), they recently began to deploy more FADs due to difficulty in spotting free swimming schools in the WCPO.

From current study, it is obvious that FAD sets take more small-sized bigeye and yellowfin tuna than unassociated sets but various length up to 100m of underwater structure of FADs deployed by Korean purse seiners did not show any differences in the take of small-sized bigeye and yellowfin tuna, which is similar to previous study (Satoh et al., 2007). However, it is suggested that the results of current study be considered as preliminary since the survey has not finished yet and still is underway. In addition, the experimental FADs were deployed in July by two purse seiners at different site and accordingly the data will be taken from these FADs at least one month after deployment. Therefore, comprehensive results of the research will be provided at next meeting of the Scientific Committee.

References

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