REPORT OF THE PREDATION SURVEY BY THE JAPANESE COMMERCIAL TUNA LONGLINE FISHERIES

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ABSTRACT

This report summarizes the results of the predation survey conducted by the Japanese commercial tuna longline fisheries during September-October, 2000. We conducted the descriptive analyses and also depicted the distribution maps of damaged fish and predators.

INTRODUCTION

Predation problems by killer whales (*Orcinus orca)* and false killer whales (*Pseudorca crassidens*) on Japanese tuna longline fisheries have been continued to the present in three Oceans since the start of its fisheries in 1952. The first report was from the Palau water in 1952. In the earlier years, only some catch of the longliners where the predators had passed, were damaged. But, predation had become expanding to the whole catch of the longliners for some cases. In serious case, predators approach to the broadsides of the boats and attack the catch.

To investigate this predation problem and to find out possible mitigation methods, Fisheries Agency of Japan had conducted a number of surveys and research in the Pacific Ocean and the Indian Ocean, using public longline vessels (high school longline training vessels and prefecture fisheries stations' longline vessels) for 18 years in 1954, 1958 and 1965-81. Summary of these survey results are compiled and reported in the another document (IOTC/WPTT/01/___).

In recent years, predation problems in the western Indian Ocean became also serious, thus the IOTC Scientific Committee and Commissioner's meetings in 1998 and 1999 recommended to start investigating the situation of the predation problems. Upon this recommendation, Japan started the predation survey from September 1, 2000 for all the longliners belonging to Japan Tuna Federation in three Oceans. Currently about 450 longliners are cooperating to this survey.

Materials and methods

Survey form (in English) is attached in Appendix A (*Note: the original form is in Japanese*). In the predation survey, number of fish damaged data by species are collected, but the catch data by species are not collected as such information are collected by another logbook form, so that extra work to input duplicate (catch) information into the predation survey form can be reduced for the fishers who are busy for the fishing operations.

Thus, the predation rates (number of fish damaged/number of fish caught) could not be computed in this report, as the complete catch (logbook) information will be available in 1-1.5 years after operations. Hence, we need to wait to compute the predation rates until such catch statistics are ready.

To now, we have collected two months data (September-October, 2000) and will summarize these information in this report. We conducted the descriptive analyses and also depicted the distribution maps of damaged fish and predators using *Marine Explorer* version 3.2 (GIS software) developed by Environmental Simulation Laboratory.

Results

Table 1 shows number of boats that reported the survey. The average reporting rates in three Ocean are about 30%.

Map 1 shows sample area of the predation survey in the Indian Ocean (and adjacent waters in the Pacific Ocean) during September-October, 2000.

Table 2 shows the summary results of the survey in the Indian Ocean and Figs. 1-2 present species compositions of damaged fish and predators. Figs. 3-5 show species compositions of damaged fish by killer whales, sharks and false killer whale, respectively. Fig. 6 shows frequencies (occurrence) of damaged fish in terms of number of operations.

Map 2 shows distribution of the damaged fish for (a) all species combined, (b) yellowfin tuna, (c) bigeye tuna, (d) swordfish, (e) albacore, (f) blue marlin and (g) southern bluefin tuna and (h) black marlin.

Map 3 shows distribution of the predators that attached the longline caught tuna and billfish for (a) killer whale, (b) sharks, (c) false killer whale and (d) un-identified predators.

4. Summary

1 Information used in this report was those for only when there were damages in the catch. As there were additional operations without predations, we need to combine all information to see the global situation. To do that, we need to wait for the complete logbook information which will be available in 1-1.5 years after the fishing operations.

2 YFT, BET, ALB and SWO are four major damaged species by predations, which account more than 95%.

3 Sharks and killer whale are two major predator species which account more than 98%.

4 Unexpectedly, damages by false killer whale were extremely low (n=4).

5 In average, 5 fish were damaged in each operation in the case when there were predations.

6 There were many predations in the waters off South Africa and the tropical central Indian Ocean.

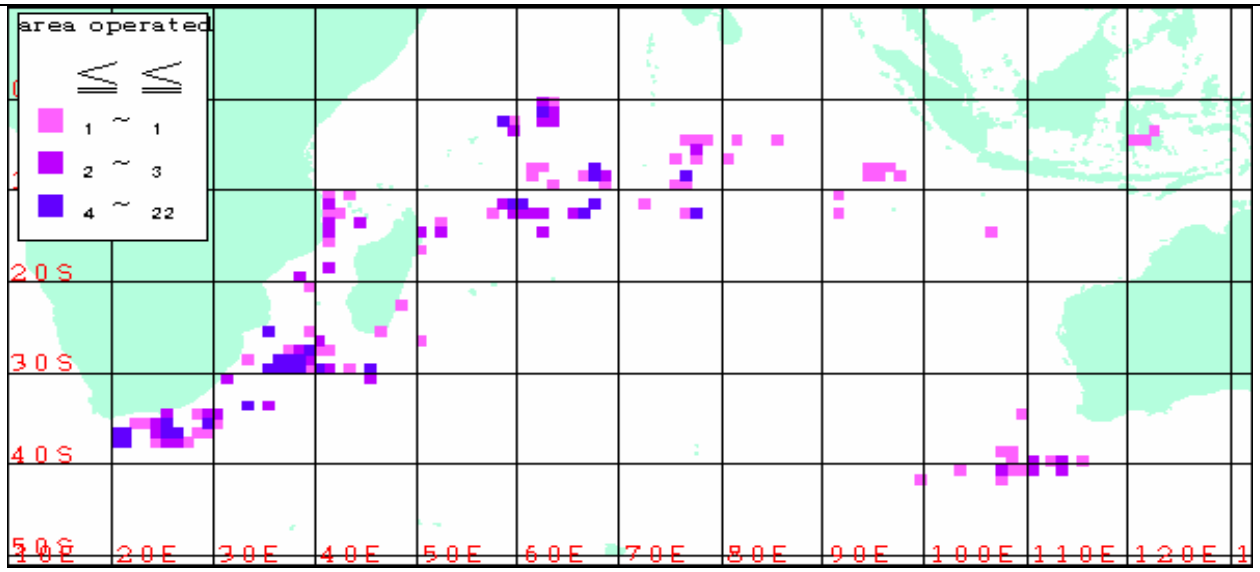
7 In average, on predator species attached in one operation. In a few cases, two predators species attached one longline operation.

8 There are two cases that shark attached the longline caught sharks.

Table 1 *Summary of the reports (number of boats reported) by month, Ocean and FAO area.*

September	Ocean		Number of boats Reported	Reporting rates
	Pacific	(total➔)	31	
		FAO area 31	5	
		34	15	
		41	3	
		47	8	
	Indian	(total➔)	28	31%
		FAO area 51	21	
		57	7	
	Atlantic	(total➔)	66	
		FAO area 71	6	
		77	35	
		87	25	
October	Ocean			
	Pacific	(total➔)	24	
		FAO area 31	4	
		34	2	
		41	5	
		47	13	
	Indian	(total➔)	26	29%
		FAO area 51	20	
		57	6	
	Atlantic	(total➔)	60	
		FAO area 71	2	
		77	27	
		87	31	

Map 1 *sample area of the predation survey in the Indian Ocean during September-October, 2001.*

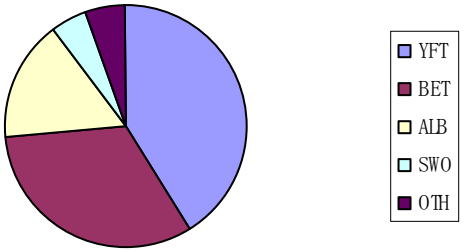


(Unit: number of operations)

Table 2 Summary of the predation survey in the Indian Ocean for September-October, 2001.

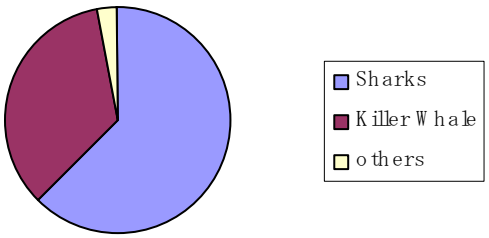
		September	October	Total
(Information on fishing operation)				
Number of boat reported		28	26	
Number of operations		199	214	413
(Information on numbers of fish damaged)				
Number of fish damaged by species	N. bluefin tuna	2	0	1
	S. bluefin tuna	8	5	13
	Albacore tuna	217	121	338
	Bigeye tuna	301	361	662
	Yellowfin tuna	437	407	844
	Swordfish	30	71	101
	Striped marlin	0	0	0
	Blue marlin	8	13	21
	Black marlin	1	0	1
	Sailfish	0	1	1
	Skipjack	0	0	0
	Shark	1	2	3
	Un-identified	7	28	35
	Other species	14	20	34
	(Total)	1,026	1,029	2,055
Average number of fish damaged per operation		5.2	4.8	5.0
(Information on predators)				
Number of predator identified by species	Killer whales	53	102	155
	False killer whales	4	0	4
	Sharks	163	111	274
	Un-identified	4	4	8
	(Total)	224	217	441
Average number of predators identified or sighted per operation		1.1	1.0	1.1

Fig. 1 Species composition of damaged fish by predators
(September-October, 2001: n=2,055)



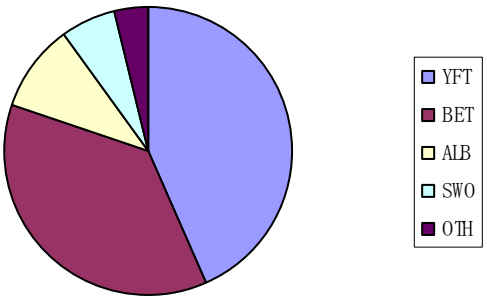
Note: Others include northern (n=1) & southern (n=13) bluefin tuna, black marlin (n=21), blue marlin (n=1), sailfish (n=1), shark (n=3), un-identified (n=35) and other species (n=34).

Fig. 2. Composition of predators attacked longline caught tuna & billfish (Sept-Oct, 2001: n=441)



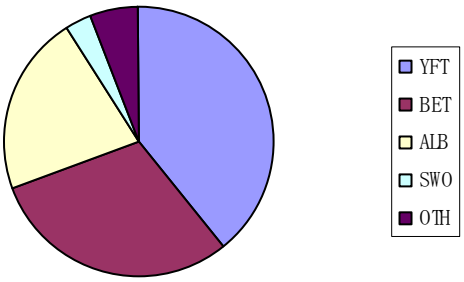
note: Others include false killer whales (n=4) and un-identified species (n=8)

Fig. 3 Species compositions of damaged fish by killer whale (Sept-Oct, 2000: n=1,262)



Note: Others (OTH) include black marlin (n=11), blue marlin (n=1), un-identified (n=27) and other species (n=9).

Fig 4 Species compositions of damged fish by sharks (Sept-Oct. 2000: n=1,174)



Note: Others include northern (n=1) & southern (n=12) bluefin tuna, black marlin (n=18), blue marlin (n=1), black marlin (n=1), sailfish (n=1), shark (n=3), un-identified (n=8) and other species (n=26).

Fig. 5 Species compositions of damaged fish by false killer whale (Sept-Oct. 2000: n=26)

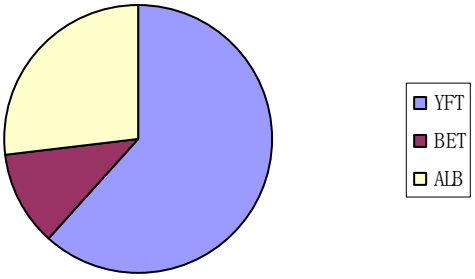
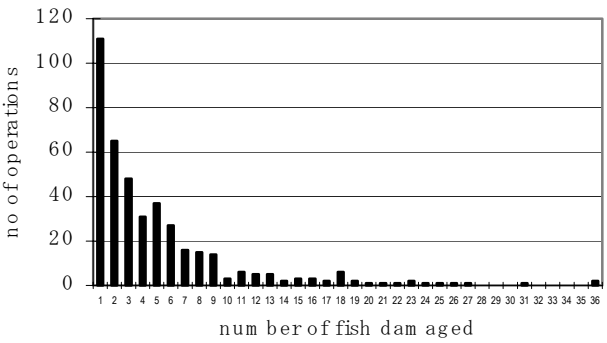
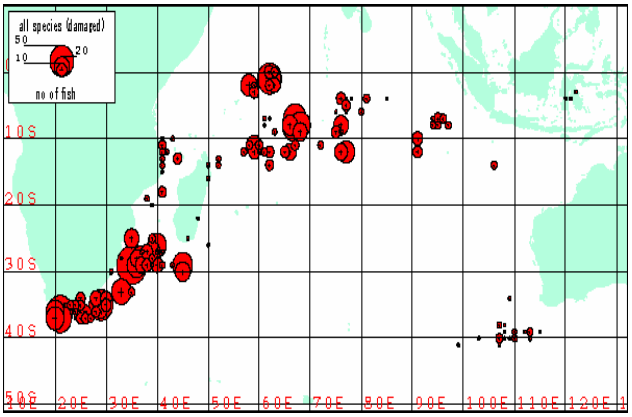
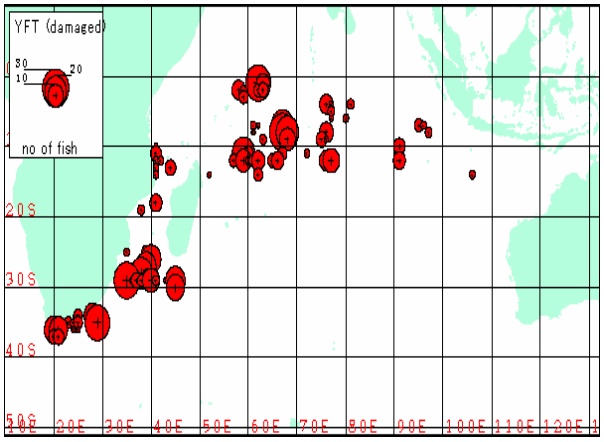


Fig. 6 Frequency distribution of damaged fish (Sept-Oct, 2000: n=413 operations) (mean=5.0 fish damaged/operation)

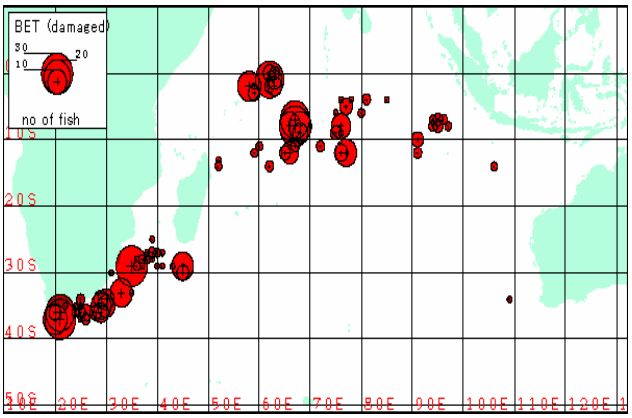




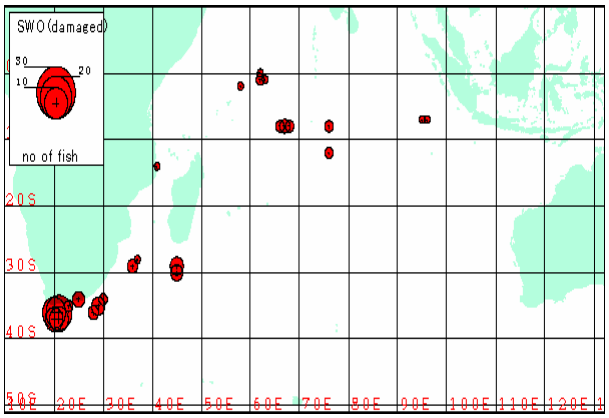
Map 2(a): Distribution of damaged fish (all species combined) in the predation survey during September –



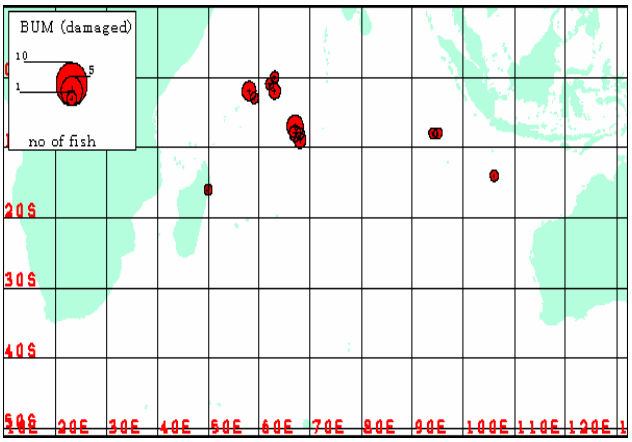
Map 2(b): Distribution of damaged yellowfin tuna in the predation survey during Sept – Oct, 2000 (n=844)



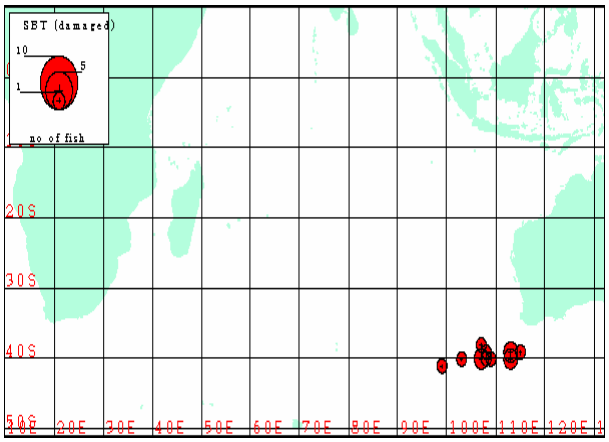
Map 2(c): Distribution of damaged bigeye tuna in the predation survey during Sept – Oct, 2000 (n=662).



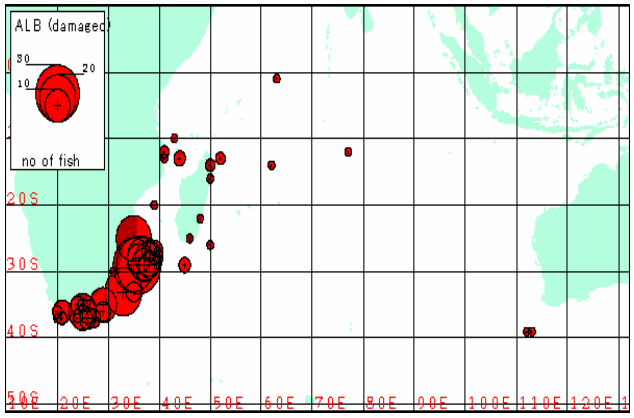
Map 2(d): Distribution of damaged swordfish in the predation survey during Sept – Oct, 2000 (n=101).



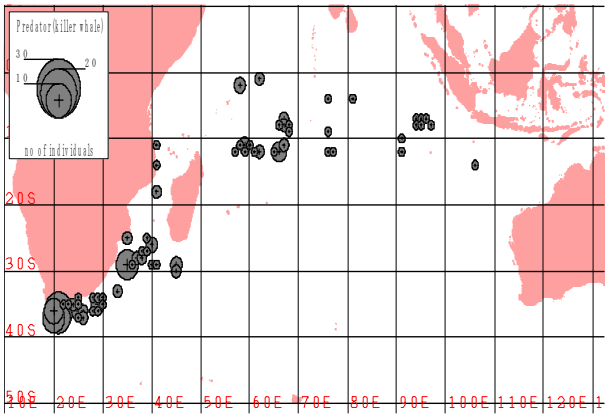
Map 2(e): Distribution of damaged albacore in the predation survey during Sept – Oct, 2000 (n=338).



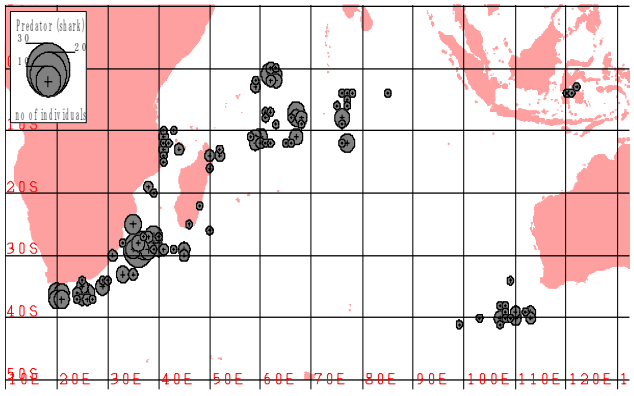
Map 2(f): Distribution of damaged black marlin in the predation survey during Sept – Oct, 2000 (n=338).



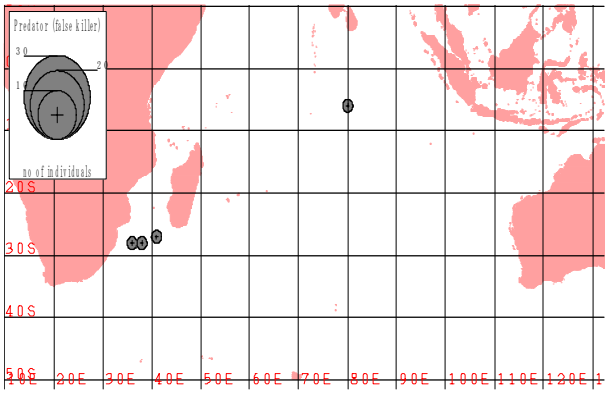
Map 2(g) Distribution of damaged S. bluefin tuna in the predation survey during Sept – Oct, 2000 (n=13).



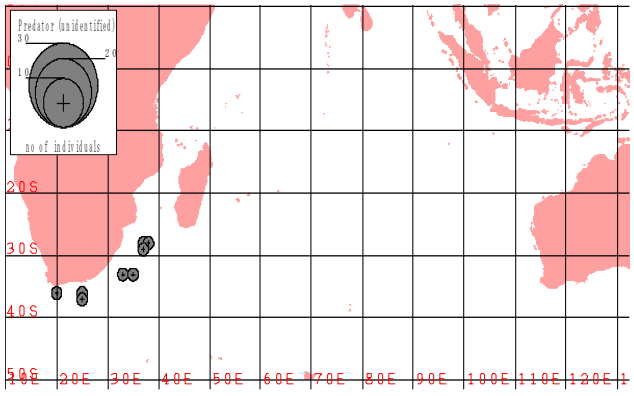
Map 3(a) Distribution of killer whales that attached the Japanese tuna longliners during September-October, 2000 (n=155)



Map 3(b) Distribution of sharks that attached the Japanese tuna longliners during September-October, 2000 (n=274)



Map 3(c) Distribution of false killer whales that attached the Japanese tuna longliners during September-October, 2000 (n=4)



Map 3(d) Distribution of false killer whales that attached the Japanese tuna longliners during September-October, 2000 (n=8)

Survey form of predation on distant water tuna longline fisheries

Ｐｌｅａｓｅ fill this form when predation occur

Name of Ship		Name of home port	

On the 1st day of every month, please fax survey forms to Union or Association via fishery companies (for September-November, 2000). From December, please submit to a Union or Association with catch report required by the Minister of Agriculture, Forestry and Fishery, via fishing companies whenever your boat arrive at domestic or foreign ports)

Date of Fishing			Noon position						Damaged species (select no.) and	Name of predators (choose alphabet below)	Others (*)
Year	Month	Date	Latitude			Longitude			number of damaged fish (example: ③2, ⑤1)	(fill out if species names known)	(other important information)
2000			deg.	min.	N・S	deg.	min.	N・S			
2000			deg.	min.	N・S	deg.	min.	N・S			
2000			deg.	min.	N・S	deg.	min.	N・S			
2000			deg.	min.	N・S	deg.	min.	N・S			
2000			deg.	min.	N・S	deg.	min.	N・S			
2000			deg.	min.	N・S	deg.	min.	N・S			
2000			deg.	min.	N・S	deg.	min.	N・S			
2000			deg.	min.	N・S	deg.	min.	N・S			
2000			deg.	min.	N・S	deg.	min.	N・S			
2000			deg.	min.	N・S	deg.	min.	N・S			

species code: ①northern bluefin, ②southern bluefin ③albacore, ④bigeye, ⑤yellowfin, ⑥swordfish, ⑦striped marlin, ⑧blue marlin, ⑨black marlin, ⑩sailfish, ⑪skipjack, ⑫sharks, ⑬not identified, ⑭others

Predator code [A] killer whale, [B] false killer whale, [C] other whales (including dolphin), [D] sharks, [E] not identified

Examples of 'Others' : (1) about fifty false killer whales (2) Three hours after casting a net, killer whale started follow our ship. Also damaged by sharks, (3) predator followed our boat for an hour at the right board. Species not identified..