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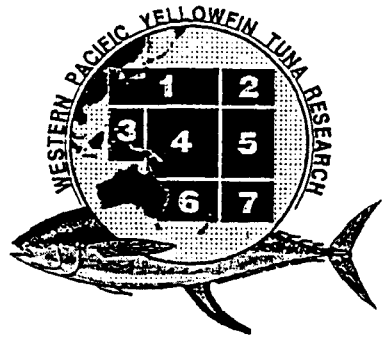

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PRELIMINARY REPORT OF 1995 RESEARCH CRUISE BY R/V SHOYO-MARU EXPERIMENTAL TUNA LONGLINE OPERATION WITH NYLON MONOFILAMENT LINE

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Preliminary Report of 1995 Research Cruise by R/V Shoyo-maru Experimental Tuna Longline Operation with Nylon Monofilament Line

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Introduction

Research cruise of pelagic longline operation by the Japan's fishery research vessel was started in 1956 in the South Pacific Ocean, and undertaken almost every year until 1984.

During the first decade, the main objective was to explore effective fishing ground and to grasp the oceanic environment in fishing area. In the late 1970s, deep longlining began to be used to catch bigeye tuna effectively. Since the better catch rates for bigeye were actually confirmed (Suzuki 1977, Koido 1985), investigations on the mechanism of hooking in the longline sets as well as on the behavior of tunas became major objective of those cruises.

In these ten years after the last investigation in 1984, several new problems has arisen. One is the change of materials of longline gear which cause changes in CPUE for tuna. Another one is by-catch problem.

Research cruise of longline operation by R/V Shoyo-maru (1,362.86 gross tonnage) was undertaken from May 5 to July 6 (trip duration was from April 21 to August 4) in the tropical and sub-tropical waters of Eastern Pacific Ocean. The track of daily position of vessel is shown in Fig. 1. Main objectives are to investigate the real depth of hooks by time and different setting of gear and to know behavior of adult tunas by sonic tracking. 22 longline operations were made using about 700 hooks at each set (Fig. 2). Species identification as well as ordinal biological observation (record of length, weight, sex, alive or death, gonad weight etc.) were performed for all catches. During the cruise, oceanographic observations (CTD, XBT and EPCS) was made. Up to now, data analyses has not progressed so much, rough results are introduced below.

Preliminary Results

1) Change of hook depth

To grasp the state of longline gear under the sea, TDR (Time Depth Recorder) were used. This equipment can record the change of depth (accuracy is $\pm$1m) and temperature (accuracy is $\pm 0.1^{\circ}$C) in 2 Mb memory. Size of TDR is 21 mm (diameter) $\times$ 161 mm (length) and weight is about 50g in air (weight in water can be negligible). In each operation, about 40 TDRs, which were programmed to sample temperature and depth at every 30 seconds, were attached to the branch line (about 2m above the hook). In case of 13 branch lines were set in a basket, hooks of the first and 13th branch line should be the shallowest and that of 7th branch line should be the deepest. In many cases, however, this was not true. Hook depth tended to change remarkably among the operations (Fig. 3). CTD observations were made at the start and end points of each longline set, and XBT observations were performed at the mid point. Moreover, the drift of buoy of longline gear was also recorded. By using these data, the

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characteristics of new type of gear (nylon monofilament) will be analyzed.

2) Time and depth of hooking

When fish are hooked on which TDR is attached, time and depth at hooking and the movement profile of fish can be known. These information should reflect the feeding behavior. Unfortunately, no bigeye hooking was recorded on TDR, while hooking of significant number of shark and several marlins were recorded. Example of such hooking is shown in Fig. 4.

3) Preliminary trials for sonic tracking of adult tuna.

In the past, not many sonic tracking were made for tunas, especially for large adults(Koido and Miyabe 1990). Most of tunas tracked were caught mainly by pole and line. Tunas caught by longline are adult or sub-adult, so swimming behavior should be different between young and adult fish.

When adult tuna is caught by longline for tracking, several problems exist in the process of release. First, because longline operation takes about five hours (in the case of 700 hooks), tracking can't be started unless the hauling is suspended leaving longline gears in the water. In this case, remained part of gear continues to drift until it is recovered again after tracking. One way to overcome this situation is that after a pinger is attached to tuna, release it while branch line is still on whose end is connected to buoy. Then, after the retrieve of all gears, tracking can be started if the fish is still in a good condition. This trial was made two times. Although fish used were bigeye tuna whose fork length are 160 cm and 120 cm respectively, both individuals were already dead when recaptured after about 4 hours of kept to buoy. Although reason of death is not known, several possibility can be supposed as follows, 1) the rope (80m and 200m long, respectively) gives tuna too much resistance for swimming, 2) bigeye may feel certain stress by quick change in pressure and temperature, and 3) individuals were already received non-recoverable damage.

Secondly, because adult tunas are too big to rift on deck without damage, maybe hapooning would be the only way to attach the pinger on them. On this cruise, a kind of crane which is called "scooper", was tested to scoop tuna from water by its basket and lift it to the same height of deck. One can ride on the basket, attach the pinger easily, and release the tuna slowly. Although the reason is not known, in two trials (adult yellowfin and adult bigeye), tuna did not struggle on the basket and start swimming again after release. Similar observation was reported by another longline vessel.

References

Koido, T. 1985. Comparison of fishing efficiency between regular and deep longline gears on bigeye and yellowfin tunas in the Indian Ocean. Coll. Vol. Work. Doc. 62-70.

Koido, T. and N. Miyabe 1990. II. Field Observation 5. Tunas *In* "Application of Telemetry to Aquatic Animal Behavior." (H. Soeda ed.), Koseisha-Koseikaku, Tokyo, 1990, pp.55-66.

Suzuki, J., W. Warashina and M. Kishida 1977. The comparison of catches by regular and deep tuna longline gears in the Western and Central Equatorial Pacific. Bull. Far Seas Fish. Res. Lab., 15, 51-89.

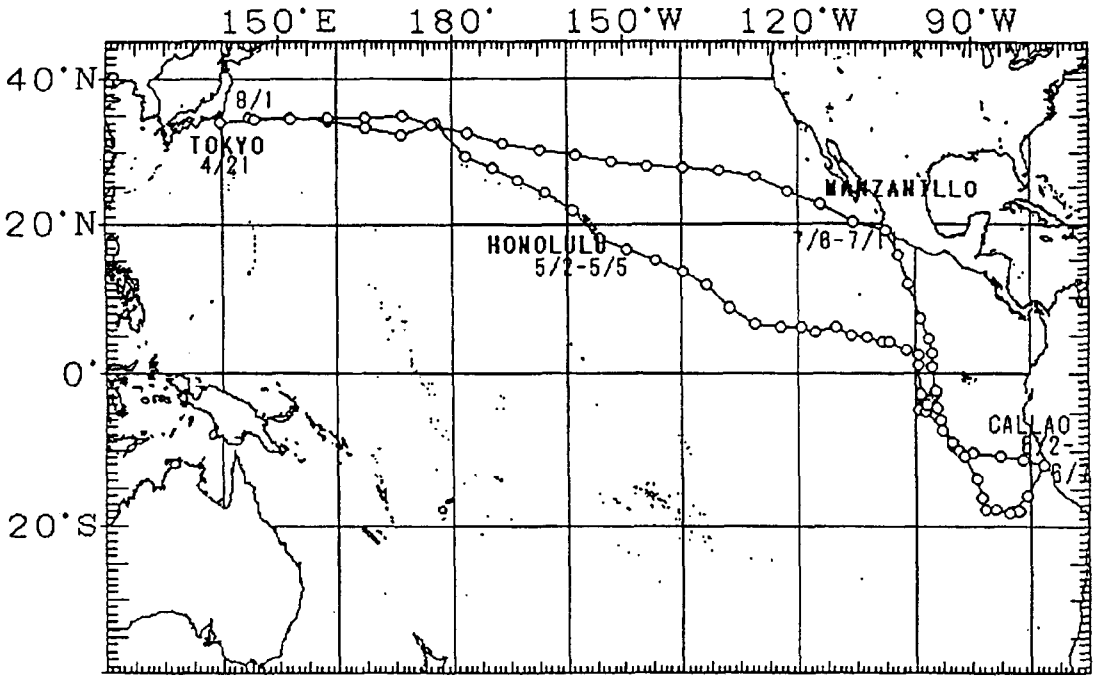

Fig. 1 The course of this research cruise with daily noon positions (open circles).

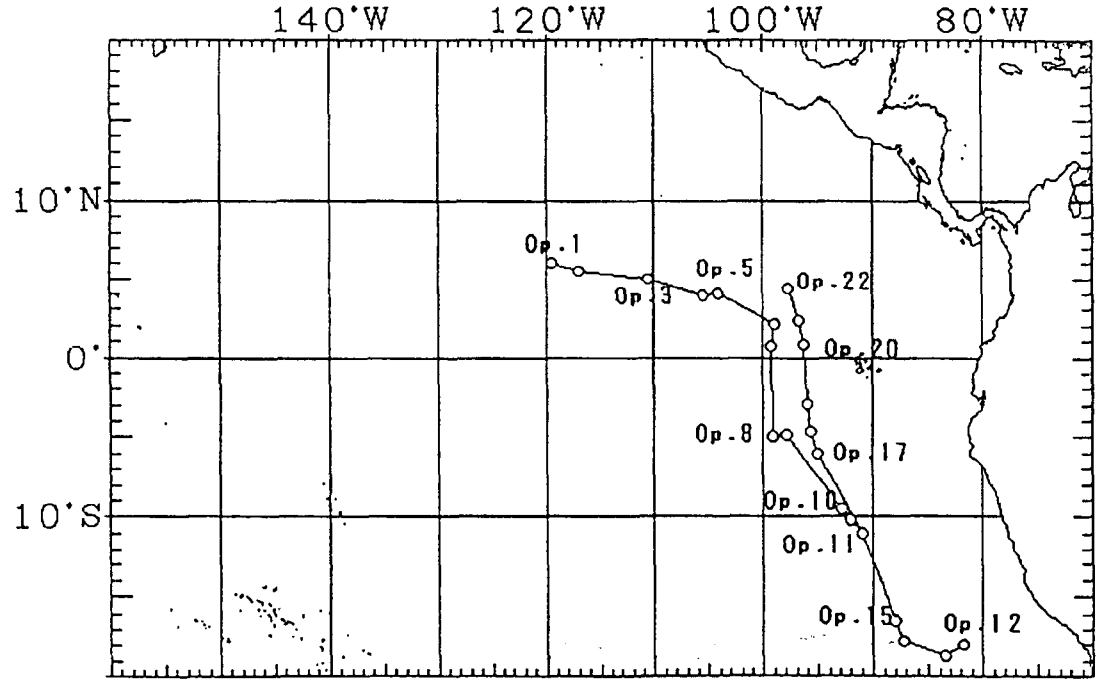

Fig. 2 The locations of 22 longline operations.

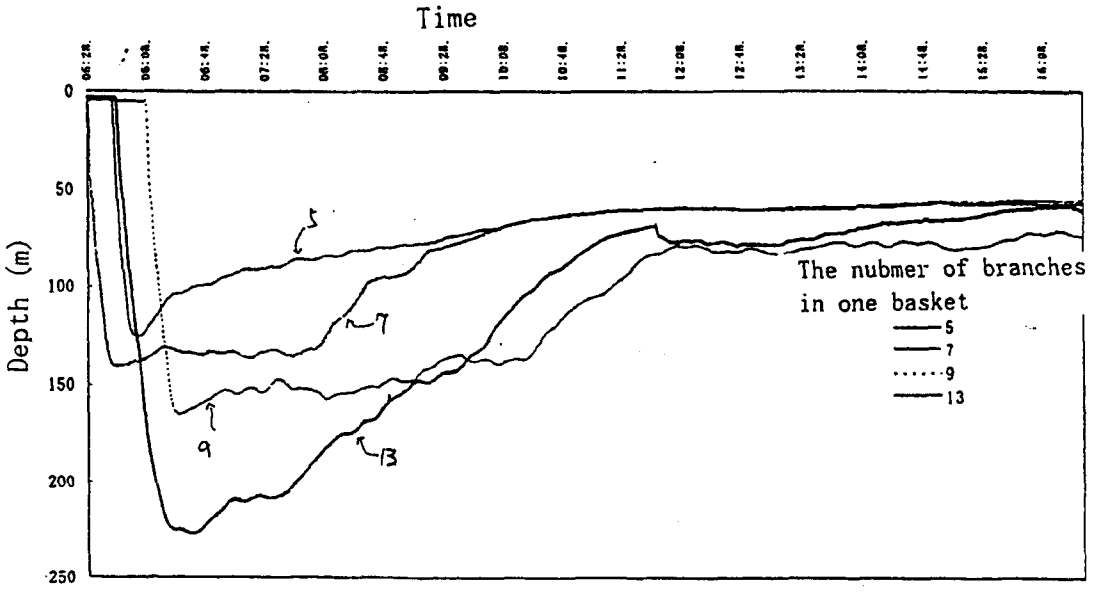

Fig. 3 Change in depth of deepst branch line in each of four basket types which has different number of branches.

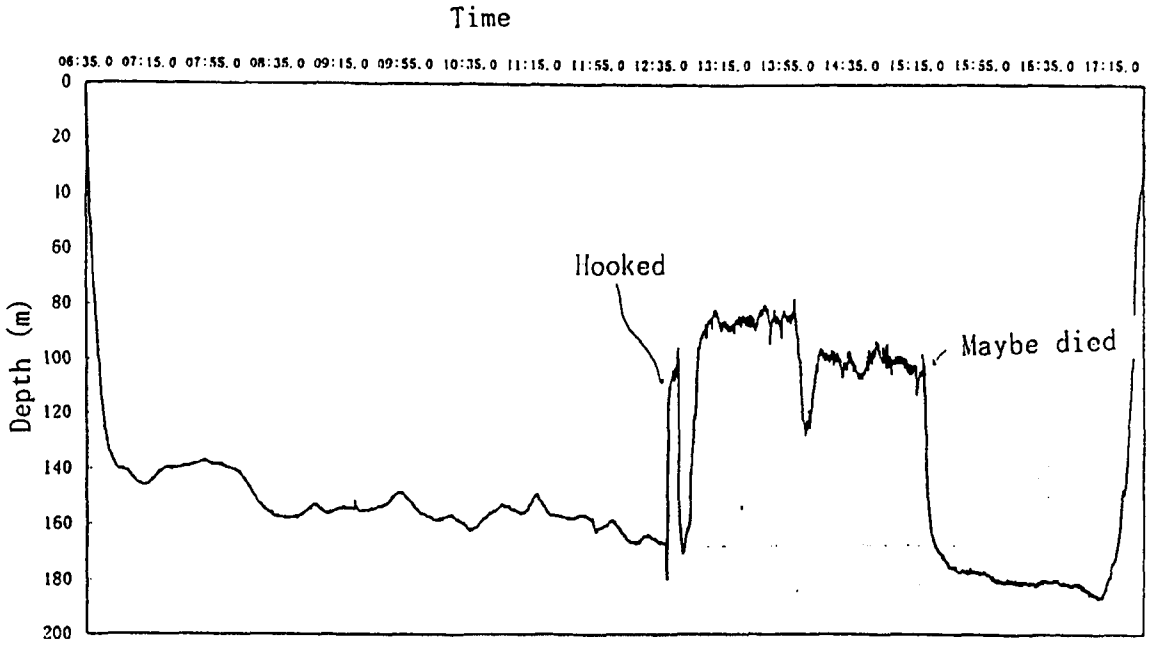

Fig. 4 The record of the movement of albacore tuna which was hooked to 7th branch in 9 branches.

Table 1. The number of tunas and marlins caught in each operation.

			Tuna			Marline		Sword
Operation No.	Date	No. Hook	Bigeye	Yellowfin	Albacore	Striped	Blue	fish
1	1995/5/14	299				1		
2	1995/5/15	520				4	1	
3	1995/5/17	702	1	3		8	1	
4	1995/5/19	702	3	1				3
5	1995/5/20	702	2			2		
6	1995/5/22	702	1			1		
7	1995/5/23	702	1					
8	1995/5/25	702		1		1		1
9	1995/5/26	702				2		
10	1995/5/28	651				4		1
11	1995/5/29	700		1		2		1
12	1995/6/10	697			5			1
13	1995/6/15	698	3		50	1		1
14	1995/6/17	698		2	4			
15	1995/6/18	698	1	2	3			
16	1995/6/20	704				2	1	1
17	1995/6/22	701						1
18	1995/6/23	701						4
19	1995/6/24	701						
20	1995/6/30	701	1	1		5	1	
21	1995/7/1	701	1			2		
22	1995/7/2	701	1			4	2	
Total		14785	15	11	62	39	6	14