

THE CATCHES OF BLUEFIN TUNAS BY TAIWANESE IN THE ATLANTIC, INDIAN
AND PACIFIC OCEANS

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SUMMARY

To comply with the Resolution of the meeting of the Bluefin Tuna Working Group in Tokyo, catches of bluefin tuna by Taiwanese fisheries were clarified and reclassified by oceans. Three kinds of landing data and some information from interviews were applied and referred to for the estimates in the present work. The final results for the years 1983-1991 are shown in related tables and figures were discussed, and it was shown that they were very compatible with Japanese import records. The data on catches from the Atlantic, submitted by month and by 5x5 squares, should be raised.

RESUME

Les prises de thon rouge capturées par les pêcheries du Taiwan ont été examinées et reclassifiées par océan pour répondre à la résolution de la réunion du groupe de travail sur le thon rouge de Tokyo. Trois types de données de débarquement et quelques informations obtenues par interviews ont été appliquées et peuvent être consultées dans l'estimation effectuée dans ce document. Les résultats définitifs de la période 1983-91, indiqués dans les tableaux et figures correspondants ont été discutés et on a pu constater qu'ils étaient très compatibles avec les registres d'importation du Japon. Les données transmises à l'ICCAT par mois et carrés de 5° pour les prises de l'Atlantique devraient être extrapolées.

RESUMEN

De acuerdo con la resolución del Grupo de Trabajo sobre el Atún Rojo (Tokio), las capturas de atún rojo de las pesquerías taiwanesas, fueron esclarecidas y reclasificadas por océanos. Se usaron tres tipos de datos de desembarque y alguna información obtenida en entrevistas, y se presentan como estimación en el presente documento. Se debatieron los resultados finales de los años 1983-1991, que figuran en las Tablas y Figuras, y se demostró que son compatibles con los registros japoneses de importaciones. Los datos de capturas del Atlántico, presentados a ICCAT por mes y cuadrículas de 5°, deberían ser extrapolados.

INTRODUCTION

Bluefin tunas are incidentally caught by Taiwanese fishermen in the coastal and off-shore waters around Taiwan and open Oceans. As knowledge, none of Taiwanese fishing boats is registered and/or evidenced for directly targeting on bluefin tunas. Bluefin tuna, *Thunnus thynnus*, and southern bluefin tuna, *Thunnus maccoyii*, are mixed as by-product in the catches of tunas and tuna-like species fisheries. And catches of bluefin tunas are usually in a larger proportion made by longline. Other fishing gears catching bluefin tunas are purse seine, gillnet, troll, and set net, etc., which comparatively are in a lesser proportion.

A significant proportion of bluefin tunas catches are exported, and the rest portion are domestically consumed. In particular, most of the coastal and off-shore catches usually keeping on fresh or ice-chilled treatment are the main 'sashimi' material which is one of the favorite sea food in Japan and Taiwan as well. And those fresh or chilled catches are transported mainly to Japan by air, and less amount are consumed locally; some parts of coastal or off-shore catches are in frozen treatment due to limited facility of fishing vessels, those frozen catches are sold as the fresh or chilled ones but lower price (personal comm. with Mr. C. Y. Lu, Chief of Tungkang Fishermen Association, Tungkang, Pingtung, Taiwan). And the tunas catches by Taiwanese fishermen from deep seas fisheries could be classified into two parts in according to the storage facility, i.e., the so-called regular and deep longlines. The bluefin tunas are caught mostly by deep longline operation incidentally.

In general, Taiwanese tuna regular longline fishery targets on albacore whose proportions in overall tuna catches are about 80%, 19%, and 78% in Pacific, Indian and Atlantic Oceans, respectively in recent years. The low proportion of albacore catch in Indian Ocean is owing to the predominance of deep longline pattern which targets on bigeye and yellowfin tunas in tropical Indian. In other words, Taiwanese deep longline fishery targets on bigeye and yellowfin tunas in tropical area in three Oceans, and most of those deep longline fleets are operated in Indian Oceans (personal comm. with Mr. R. B. Shin, Secretary of Taiwan Deep Sea Tuna Boatowners and Exports Association, Kaohsiung). However, the regular longline operation is possibly caught southern bluefin tuna incidentally in high latitude Indian, and large-scale pelagic gillnet fishery which targets on albacore (about 95% in total catch) as well.

To meeting resolution of the Working Group Meeting of Catches of Bluefin Tuna by Non-contracting Parties held in Tokyo from May 19-22, 1992, the bluefin tunas catches by Taiwanese fisheries were reclarified and refigured.

To apportion the bluefin tunas catches by Taiwanese fisheries into fishery and region sectors, three sorts of published data were referred: (1) Fisheries Yearbook, Taiwan Area, 1983 - 1991 (Anon. 1984b - 1991b), published by Taiwan Fisheries Bureau, Department of agriculture and Forestry, Taiwan Province, the Government of Republic of China; (2) Annual Catch Statistics of Taiwanese Tuna Longline Fishery, 1983 - 1991 (Anon. 1983a - 1990a, and data of 1991 Tuna catches were communicated with Tuna Research Center, Institute of Oceanography, National Taiwan University), published by Institute of Oceanography, National Taiwan University, and ; (3) the Imports of Commodity by Country by the Government of Japan.

Further, the following items related to bluefin tunas catches were verified in using the information above mentioned: (1) the estimation of total bluefin tunas catches by Taiwanese is reasonably compatible to the corresponding items of imports of commodity of Japanese customs; (2) to separate total Taiwanese bluefin tunas catches from three Oceans and possibly by species, i.e., bluefin and southern bluefin tunas; (3) to apportion catch of bluefin tunas to any sort of deep seas fisheries, such as longline, gillnet, and purse seine fisheries, and to Oceans (Task I catch), and; (4) to clarify and apportion catches of bluefin tunas in the Atlantic by Taiwanese to monthly and 5-degree square statistical data basis (Task II catch).

RESULTS AND DISCUSSION

1. Comparison between total bluefin tunas catch with statistics of imports of commodity by Japan

The Japanese imports of bluefin tunas originated from Taiwanese flag was listed in Table 1 by fresh or chilled and frozen categories, and correspondingly total Taiwanese catches was listed in Table 2 by landed districts. Firstly the annual grand total of each table was compared with amount of Japanese imports year by year. According to data at hand, the annual catch of 1983 to 1990 by Taiwanese boats was absolutely greater than the amount of Japanese imports in corresponding year, The fact is evidenced that Taiwanese fishermen have possibly exploited those amounts tabulated in Table 2 by incident catch. However the 1991 statistics of bluefin tunas catches was in significance with about 400 MT difference between the summing figures of catches and Japanese imports (Table 2). The difference may be coming from two sources: (1) no report of large purse seine, and (2) only landings of large scale gillnet fishery in the Indian from January to June of 1991 were reported.

And Table 2, a breakdown of catches by landed districts was shown to feasibly classify the catches whichever belong to either fresh or chilled treated category or frozen, this is meant that a significant portion of catches landed at local ports seems to be fresh or chilled, though a very small part of

bluefin tunas by catch is frozen due to the storage facility on board. And the catches from deep seas are absolutely frozen in *vis-a-vis* with coastal and off-shore fisheries.

2. Landings of bluefin tunas catch by district and by gear

To classify the regions where bluefin tunas were caught by Taiwanese should clarify the landing statistics first, since the fishing grounds and transportation may influence the quality and price of bluefin tunas. As shown in Table 2, the district of bluefin tunas landings could be divided into three categories, i.e., As fig. 1 shown, landings from overseas bases (for deep sea fisheries), from local ports which includes ports of Ilan, Taitung, Pingtung and Kaohsiung Hsiens (County) (coastal and off-shore fisheries), and Kaohsiung ports (mixture of landings from deep seas and off-shore fisheries).

As Table 3 summarized, it is apparent that landings from oversea bases were all the catches from deep sea fisheries which included most by longline (>50 GRT), and some parts by large purse seine and large scale gillnet etc. And the fishing regions included the Pacific, the Indian and the Atlantic Oceans in according to which gear was used. Subsequently a primary result could be concluded that all of Taiwanese large purse seine (44 sets in 1990) were operated in tropical Pacific near Micronesian Waters, and target mainly on skipjack, and yellowfin and bigeye tunas by catch. Therefore it is reasonable to classify the bluefin catches by large purse seine into the Pacific catches. Further catches by large scale gillnet which commenced from 1986, and mainly operated in the South Pacific and the Indian during 1986-1988, and in the Indian Ocean after 1989 for targeting on albacore, and in the North Pacific for targeting on squid and albacore. The numbers of large scale gillnet were controlled to decline to about 70 in the Indian and 50 in the North Pacific in 1991, and will be banned in the end of 1992. Therefore, the bluefin tunas catches by large scale gillnet were mostly classified into the catches from the Indian Ocean, and owing to that the operation grounds were located in the high latitude south regions (around and southward 30°S), the catches were probably the southern bluefin tunas.

Landings from local ports of Taiwan were mainly by longlines (<50 GRT), which operate in the South China Sea, southeast Asian Waters by Indonesian and Australian Waters for targeting on yellowfin tunas; And others are coastal gillnet, troll, and trap net etc. for seasonally non-targeting pelagic or migratory species.

Finally, landing with mixtures of bluefin tunas catches in Kaohsiung Port were most from deep sea fisheries; and about 85%, 8%, and 7% from the Indian, the Pacific and the Atlantic catches as estimated by the landing survey data of 1991 (Table 4). Landings from the Indian were mostly by longline and large-scale pelagic gillnet fisheries, and those catch possibly were the southern bluefin tuna judged from their operation fishing grounds. Depending on the segregation of bluefin tunas catches unloaded in Kaohsiung Port, the landings of bluefin tunas (as Task I) from deep sea fisheries were estimated as shown in Table 5.

3. Catches of bluefin tunas by Oceans

To summarize the results of landings by district, Table 6 tabulated the total landings of bluefin tunas caught by Taiwanese fisheries by Oceans.

In order to estimate coastal and off-shore catches of bluefin tunas as accurate as possible, landing records of Tungkang Port (Pingtung) were extracted from computer files of Tungkang Fishermen Association (Table 7) to compare with the landings of Pintung Hsien (County). I believed that the larger catch data between these two figures was much more correct through interviewing with officers of Tungkang Fishermen Association except of the landing data in 1985. In consequence of those evidence, the figures in column of Pingtung Hsien of Table 2 were corrected as: 2100 MT was replaced by 786 MT in 1985; 70 MT by 110 MT in 1986; 83 MT by 98 MT in 1989, and; 16 MT by 107 MT in 1990.

All of those final results of landings by Oceans were listed in Table 6.

4. Catches of bluefin tunas by monthly and 50 square area

The estimates of annual bluefin tunas catches (Task II) in according to recovery logbooks were listed in Table 8. The coverage rate of logbooks return each year were not completely in 100 percent, and the catches of bluefin tunas were highly incident (the highest percentage was 1.5% in 1991, and other years were less than 1% in weight). Therefore, for the Atlantic, the bluefin tunas catches by monthly and 50 square data (Fig. 2, and Table 8) should be raised to the figures of Table 6.

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LITERATURE CITED

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Table 1 Bluefin tunas imports which are originated from Taiwan by Japan. The amounts are abstracted from imports commodity by country, Japan under the categories of 0302.39-010 (fresh or chilled Bluefin tunas), and 0302.49-010 (frozen bluefin tunas) other than those of subheading No. 0302.31, 0302.32 or 0302.33 excluding fish fish fillet, other fish meat, livers and roes) and 0302.49-010 (frozen bluefin tunas).

Year	Unit: Kg		
	Fresh or chilled	Frozen	Total
1983	12,911	102,241	115,152
1984	170,357	211,443	381,800
1985	53,547	100,313	153,860
1986	78,267	61,134	139,401
1987	79,863	146,348	226,211
1988	51,858	243,420	295,278
1989	65,534	889,475	955,009
1990	112,047	714,497	826,544
1991	231,783	1,156,875	1,388,658
1992 (*)	161,407	182,476	343,883

(*): amount cumulated from January, 1992 to June, 1992.

Table 2 Catches of bluefin tunas grouped by district of landing for Taiwanese fisheries

Unit: Metric Tons

Year	Grand total	District of Landings					
		Overseas Bases	Kaohsiung City	Ilan Hsien	Taitung Hsien	Pingtung Hsien	Kaohsiung Hsien
1983	323	63	104	2		155	
1984	607	96	40	87	59	326	
1985	2389	41	248			2100 *	
1986	531	54	407			70 *	
1987	1001	115	521	231		134	
1988	1046	44	895			108	
1989	1486	181	1100	120		83 *	2
1990	1231	212	830	159	14	16 *	
1991	960	425	193	136		195	11

Source: Taiwan Fisheries Bureau (1984-1992). Fisheries Yearbook, Taiwan Area, 1983 - 1991.

* : Data were changed by referring Table 7.

Table 3 Catches of bluefin tuna by type of fishery for Taiwanese fisheries.

Type of Fishery	Year	1983	1984	1985	1986	1987	1988	1989	1990	1991
1. Longline (>50 tons)		127	124	142	364	528	507	698	595	604
2. Large purse seine		9	5	80	16	21	197	264	149	*1
3. Gillnet (L)		12	8	67	81	87	234	319	305	107 *2
Subtotal		148	137	289	461	636	938	1281	1049	711
4. Longline (<50 tons)		173	379	1899	68	365	108	205	167	237
5. Gillnet (S)		6						16	12	
6. Troll				201						
7. Trap net		2	86		2					
Subtotal		175	471	2100	70	365	108	205	183	249
Total		323	607	2389	531	1001	1046	1486	1231	960

Source: Taiwan Fisheries Bureau (1984-1992). Fisheries Yearbook, Taiwan Area, 1983 - 1991.

*1: Data unavailable

*2: Data for the period during January-June, 1992.

Table 4 The estimation of ratios for reclassified bluefin tunas catch unloaded in Kaohsiung Port to each possible Ocean origin, the numbers of fishing boats used were sampled in 1991 from computer files of Kaohsiung Fishing Market

Total boats sampled	Pacific	From Indian	Atlantic
66	6	56	4
Ratio	0.09	0.85	0.06

Table 5 The landings of bluefin tunas from three Oceans for Taiwanese tuna longline fishery, and figures in parentheses show the reclassified landings of Kaohsiung Port to each possible Oceans. The reclassified ratios were shown in Table 4

Unit: Metric Tons									
Year	1983	1984	1985	1986	1987	1988	1989	1990	1991
Ocean									
Atlantic	13 (6)	1 (2)	13 (15)	16 (24)	38 (31)	8 (54)	3 (66)	5 (50)	1 (12)
Indian	48 (89)	95 (34)	19 (211)	22 (346)	74 (443)	20 (761)	174 (935)	198 (706)	456* (164)*
Pacific	2 (9)	0 (4)	0 (22)	0 (37)	0 (47)	6 (81)	4 (99)	3 (75)	2 (17)
Subtotal	63 (104)	96 (40)	32 (248)	38 (407)	112 (521)	34 (895)	181 (1100)	206 (830)	459 (193)
Total	167	136	280	445	633	929	1281	1036	652

Source: Annual Catch Statistics of Taiwanese Tuna Longline Fishery, 1983 - 1991.

* : Data of large-scale gillnet fishery from July-December, 1991 were not ready to be included.

Table 6 The reclassified catches of bluefin tunas from three Oceans for Taiwanese fisheries

Unit: Metric Tons									
Year	1983	1984	1985	1986	1987	1988	1989	1990	1991
Ocean									
Atlantic	1. 19 2. -	3 -	28 -	40 -	69 -	62 -	69 -	55 -	13 -
Indian	1. 137 2. -	129 -	230 -	368 -	517 -	781 -	1109 -	904 -	620 -
Pacific	1. 11 2. 157	4 472	22 786	37 110	47 365	81 108	103 220	78 280	19 342
Total	324	608	1066	555	998	1032	1501	1317	994

1. From deep sea fisheries.
2. From coastal and off-shore fisheries

Table 7 Landings records of bluefin tuna at Tungkang Port, Tungkang is located at the southwestern Taiwan, and mainly is one of the largest fresh and chilled tuna export ports in Taiwan

Unit: Kg										
Year	C A T C H B Y M O N T H									
	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.-Dec.	Total
1983					84010	56089				140099
1984			66721	4328	99945	79578				250572
1985				1065	39716	43047	2227			86055
1986				2754	47492	59364				109610
1987		465		643	50322	53488	3899			108817
1988	310			1158	32260	33733	23776	2686		93923
1989				4783	46708	33897	11798	882		98068
1990				3075	60035	41872	1693	654		107329
1991				16708	78486	79234	1646			176074
1992				6634	102917	78705	3985	1413		193654

Source: Tungkang Fishermen Association, Tungkang, Pingtung

Table 8 The estimates of catches of bluefin tunas from three Oceans for Taiwanese tuna longline fishery

Unit: Metric Tons

Year	1983	1984	1985	1986	1987	1988	1989	1990	1991	
Ocean										
Atlantic	12	3	11	27	37	15	50	13	30	
East(*)1	2	0	0	2	10	14	0	47	6	
West(*)2	19	3	28	38	59	48	69	8	7	
Indian	20	96	3	2	58	74	139	141	134	
Pacific	5	3	1	2	5	0	0	3	1	
Total	37	102	15	31	100	89	189	157	165	

Source: Annual Catch Statistics of Taiwanese Tuna Longline Fishery, 1983 - 1991.

* : rasied to Task I as in Table 6.

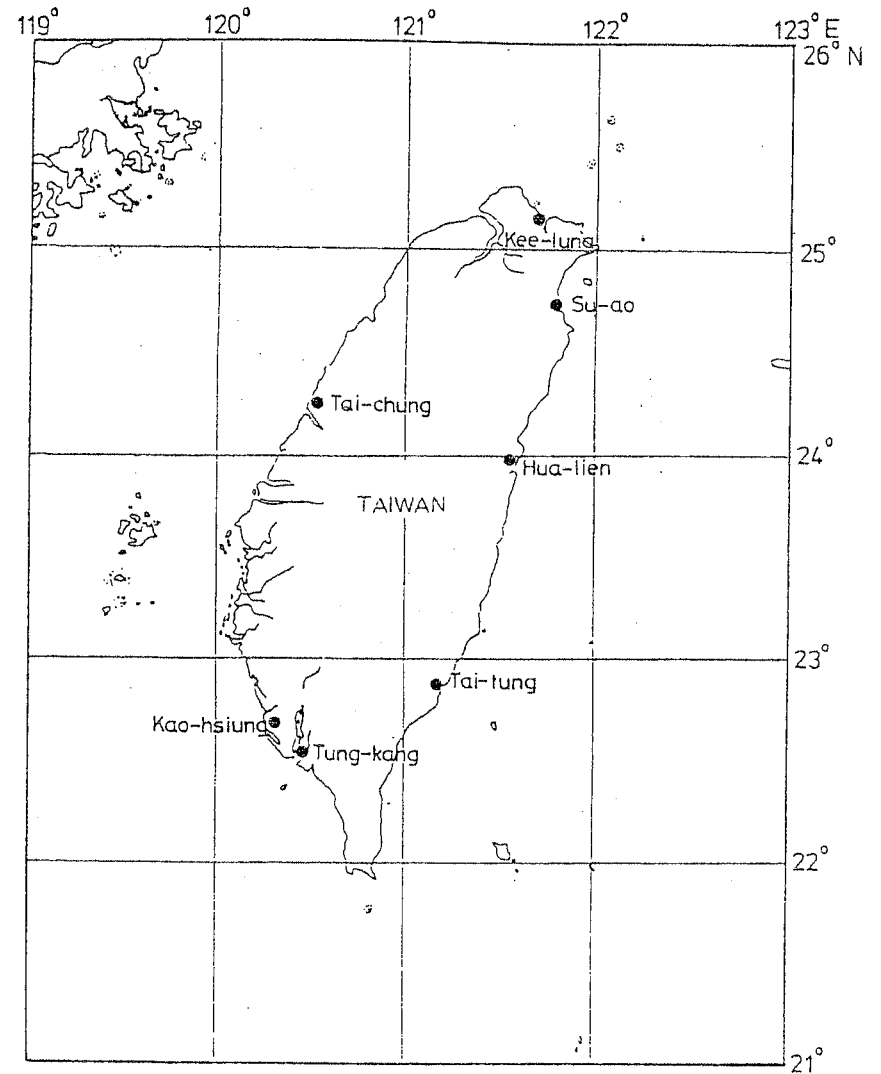


Fig. 1 Main tunas and tuna-like fishes landing ports in Taiwan.

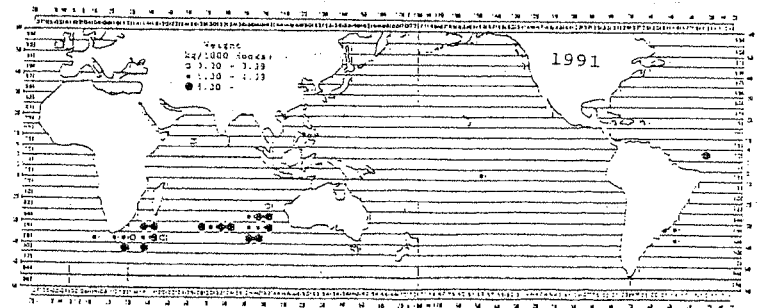
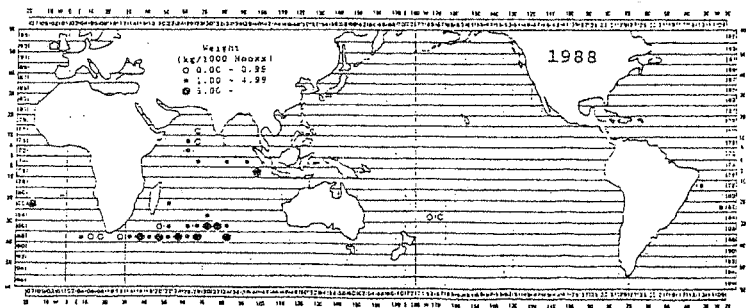
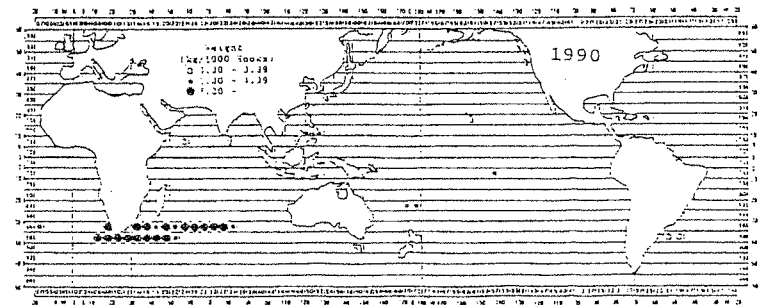
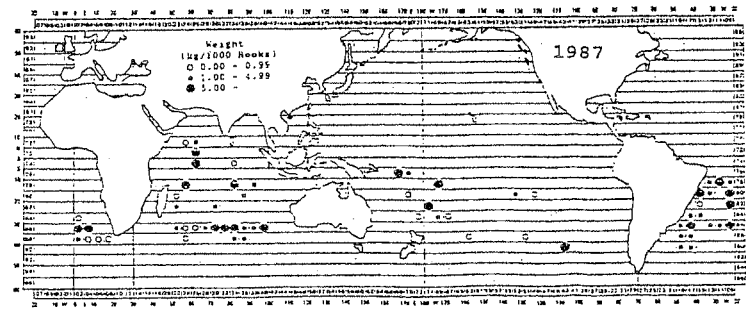
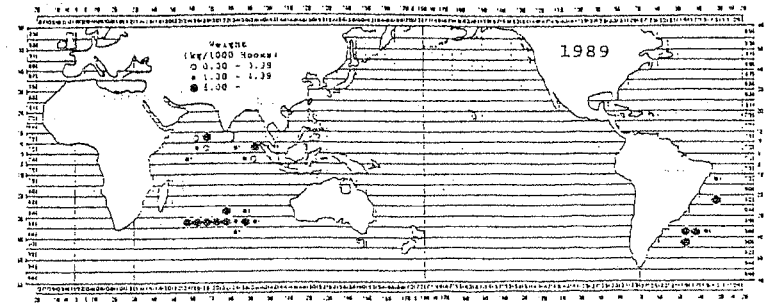
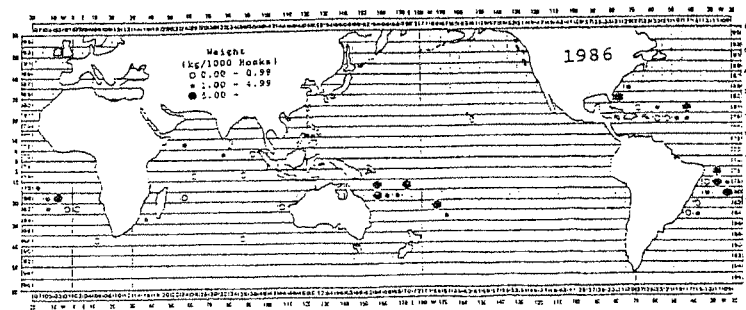


Fig. 2 Catch rate distribution (in weight) of bluefin tunas caught by Taiwanese tuna longline (>50 GRT) fisheries for the years 1986 - 1991. (To be continued)

Fig. 2 (continued)