National Report of JAPAN 2005*

National Research Institute of Far Seas Fisheries
Fisheries Agency, Government of Japan

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1. General Fisheries Statistics

1.1 Tuna Longline fishery

The latest available tuna longline data are those for 2005 although they are still preliminary. The data of 2004 are nearly final. All catch and effort statistics were compiled using logbook data whose coverage at present is about 86% and 48% for 2004 and 2005, respectively.

(1) Fishing vessels

Japanese longline fishery is classified into three categories (*coastal, offshore and distant water*) according to the operation areas and boat sizes, i.e., (a) *coastal*: 10-20 GRT (gross tonnage) within Japan's EEZ, (b) *offshore*: 10-120GRT, mainly in the Western Pacific Ocean (for 10-20 GRT excluding Japan's EEZ) and (c) *distant*: 120-500GRT, in all Oceans. Basically, longline vessels operating in the Indian Ocean have been the distant water category. Although some offshore longliners are also allowed to operate in this Ocean, there have been no operations by them recently. In the last fifteen years, the number of vessels operated in this Ocean was around 180-250 vessels per year. Although the number of operating vessels was relatively large in number (224-251) during 1995-1999, afterwards it decreased down to less than 200 except for 228 in 2002 (Table 1) due to the capacity reduction program. In 2003 and 2004, it declined to 170 vessels.

Table 1 Number of Japanese-vessels operated in the Indian Ocean.

Data of 2004 and 2005 for longliners are preliminary.

Fleet/Year	2001	2002	2003	2004	2005
Longliner	199	228	170	170	106
Purse seiner	2	1	1	1	1

** Activities in 2006 are partially included.*

(2) Fishing effort

Although the total fishing effort (the number of hooks) by Japanese longliners (including offshore and distant water longliners) in all Oceans has been decreased from 556 million hooks in 1988 to 400 million hooks in 1999, that in the Indian Oceans has been kept relatively in similar level in the latest decade, i.e. around 100 million hooks, which is about 20 - 25% in the total effort (Fig. 1 and 2).

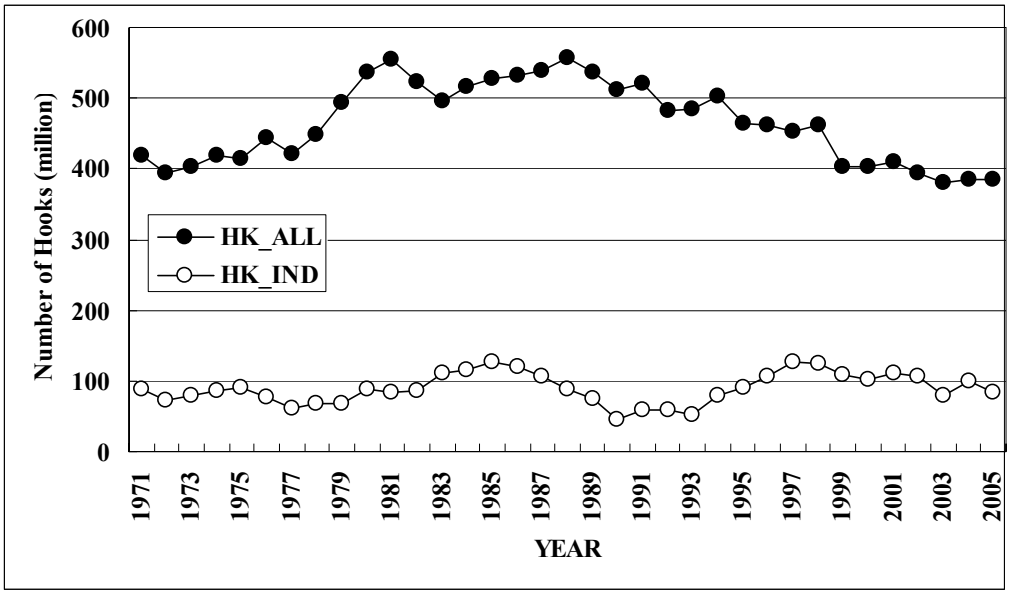


Fig. 1. Trends of the Japanese longline effort in the all Oceans (solid circle) and the Indian Ocean (open circle) (1971-2005).

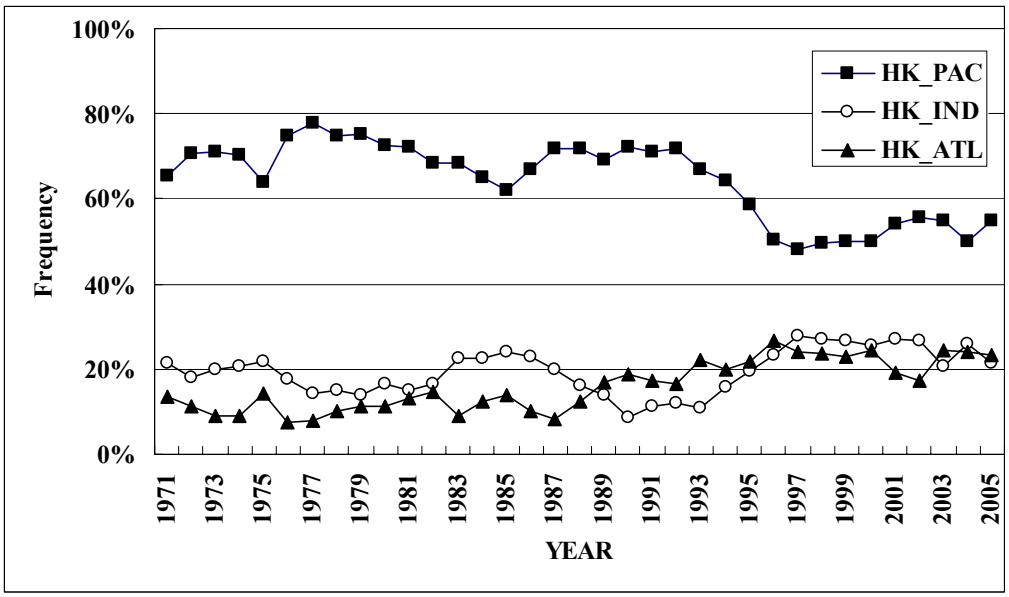
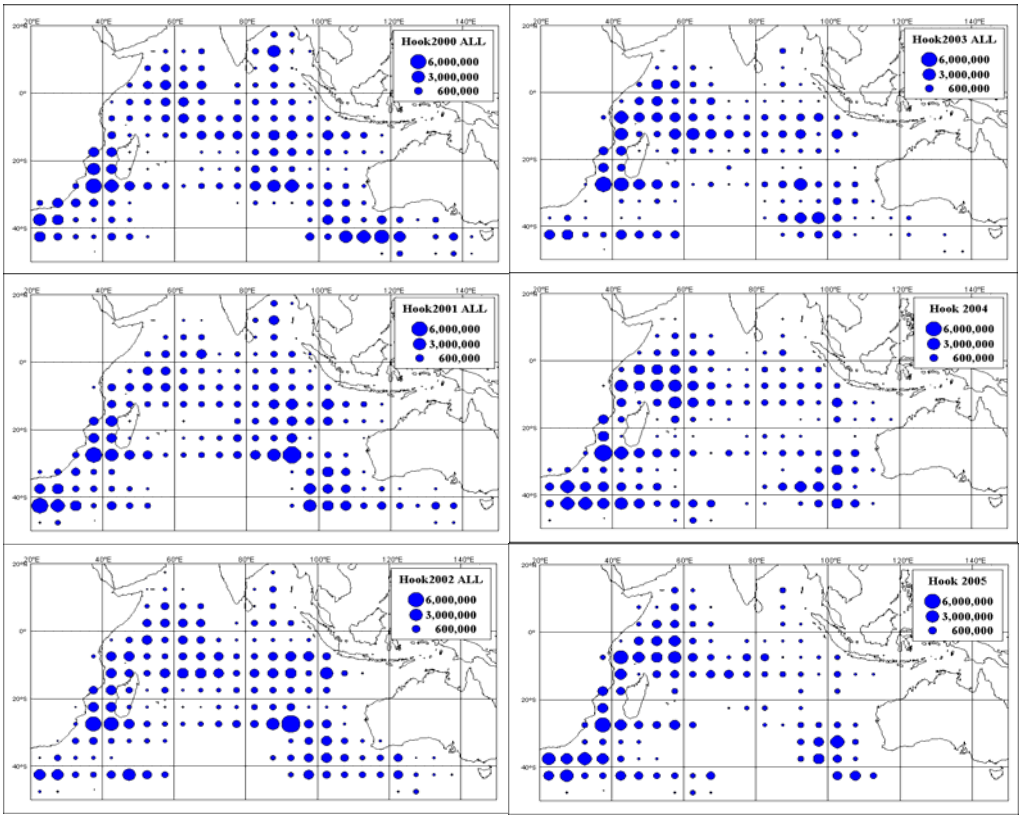


Fig.2. Trends in the compositions of the Japanese longline efforts among three Oceans (1971-2005).

Yearly distributions of longline efforts from 1999 to 2004 are shown in Map 1. Although the geographical distributions of the efforts are basically similar, the effort off Tanzania seems relatively large and the effort in eastern Indian Ocean decreased in the latest three years (2003 and after). This is probably due to the shift of the longliners to the western tropical waters off Tanzania where extremely good fishing grounds were formed during 2003-2004. Normally, fishing efforts have been in the similar level in both eastern and western Indian Ocean until 2002 (Fig. 3). However, the effort in western Indian Ocean has suddenly increased to more than 70% since 2003. Quarterly distributions of fishing effort in 2003 and 2004 are shown Map 2.



Map1 Distribution of longline efforts in the Indian Ocean from 2000 to 2005.

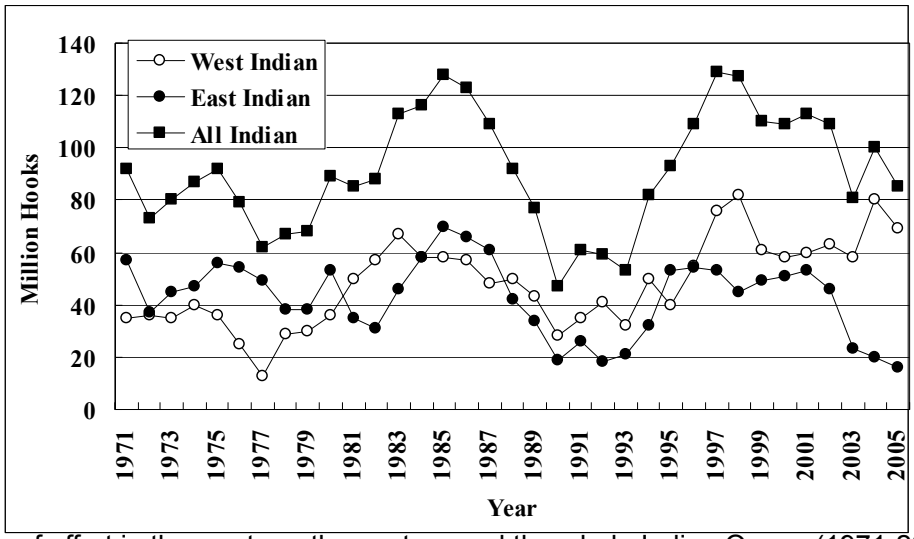
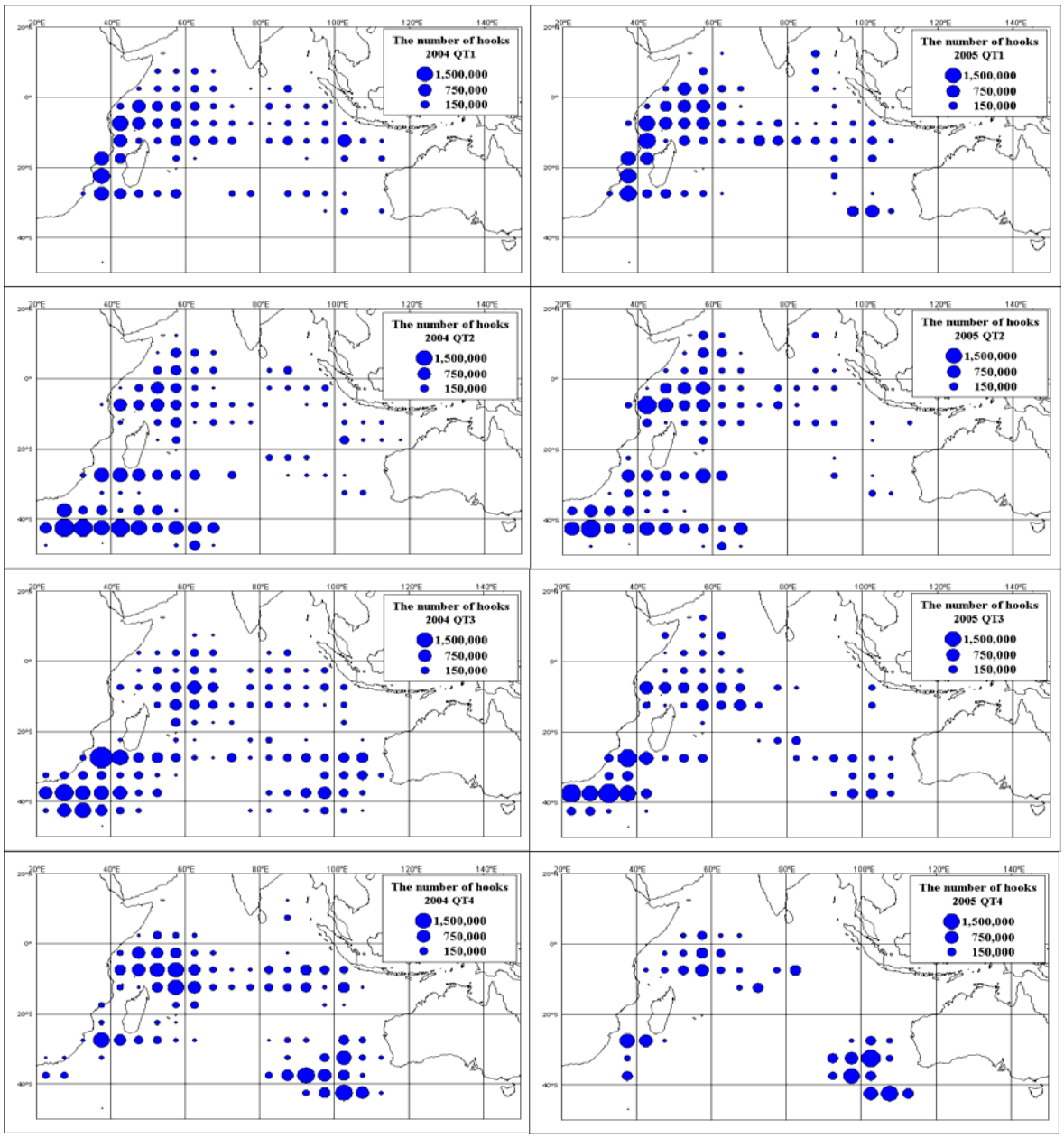


Fig.3 Trends of effort in the western, the eastern and the whole Indian Ocean (1971-2005).



Map 2 Geographical distribution of quarterly longline effort in the Indian Ocean in 2004 (left) and 2005 (right).

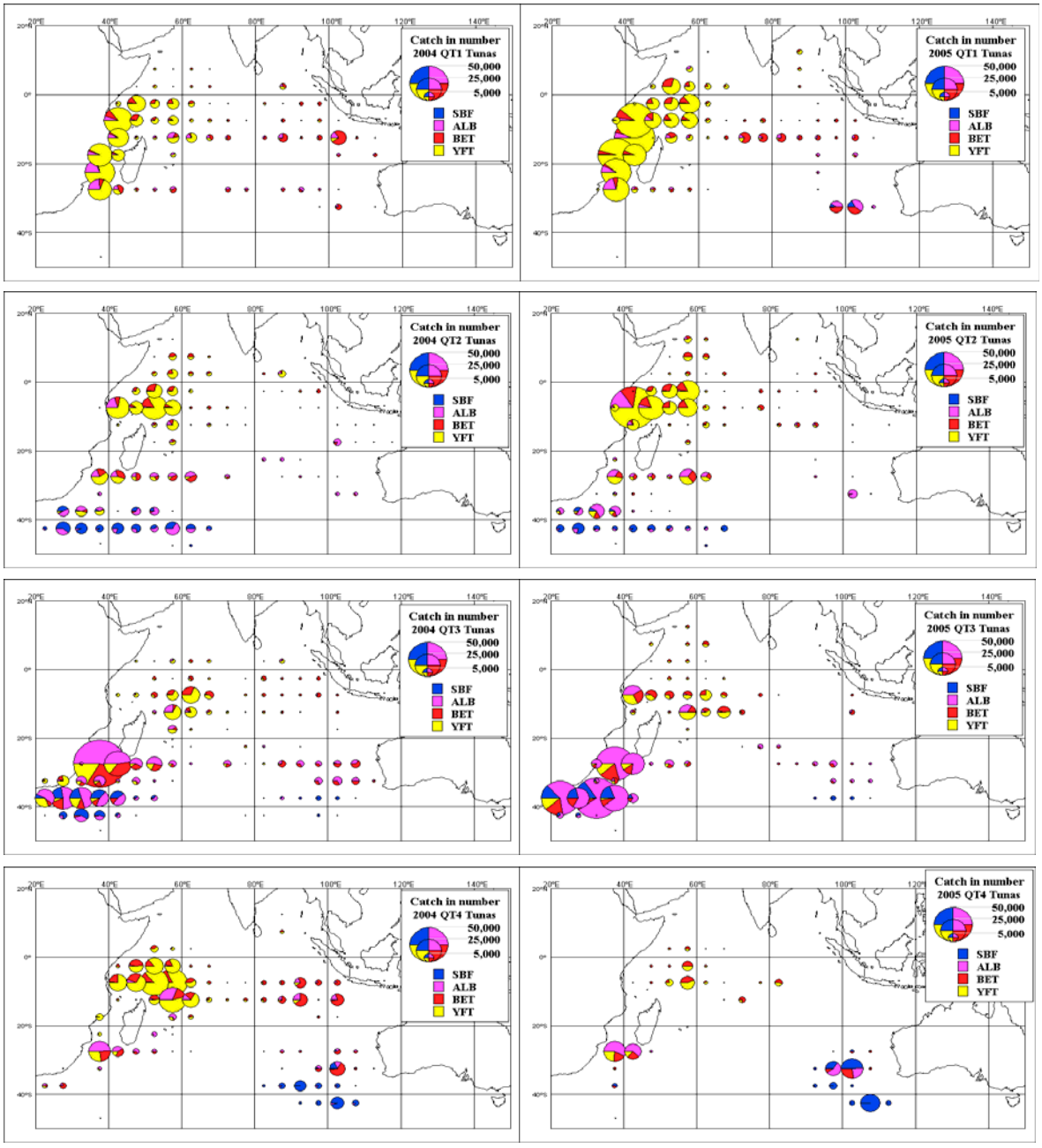
(3) Catch

Catch statistics in weight from 2001 to 2005 by Japanese longliners in the Indian Ocean is shown in Table 2 (2004 data is nearly completed and 2005 data are preliminary) and geographical distributions of quarterly catch in 2004 and 2005 for major tuna and billfish species are shown in Map 3 and Map 4 respectively**.** Total catch includes the catch of southern bluefin tuna, albacore, bigeye, yellowfin, swordfish, striped marlin, blue marlin, black marlin, sailfish, shortbill spearfish, and skipjack. Catches of each species in 2005 (2004) were 5,514MT (5,230MT) for southern bluefin, 3,349MT (3,588MT) for albacore, 8,685MT (10,610MT) for bigeye and 16,132MT (15,754MT) for yellowfin.

Table 2. Fishing effort and catch in weight (MT) by the Japanese longline fishery in the Indian Ocean (IOTC statistical area), 2001-2005.

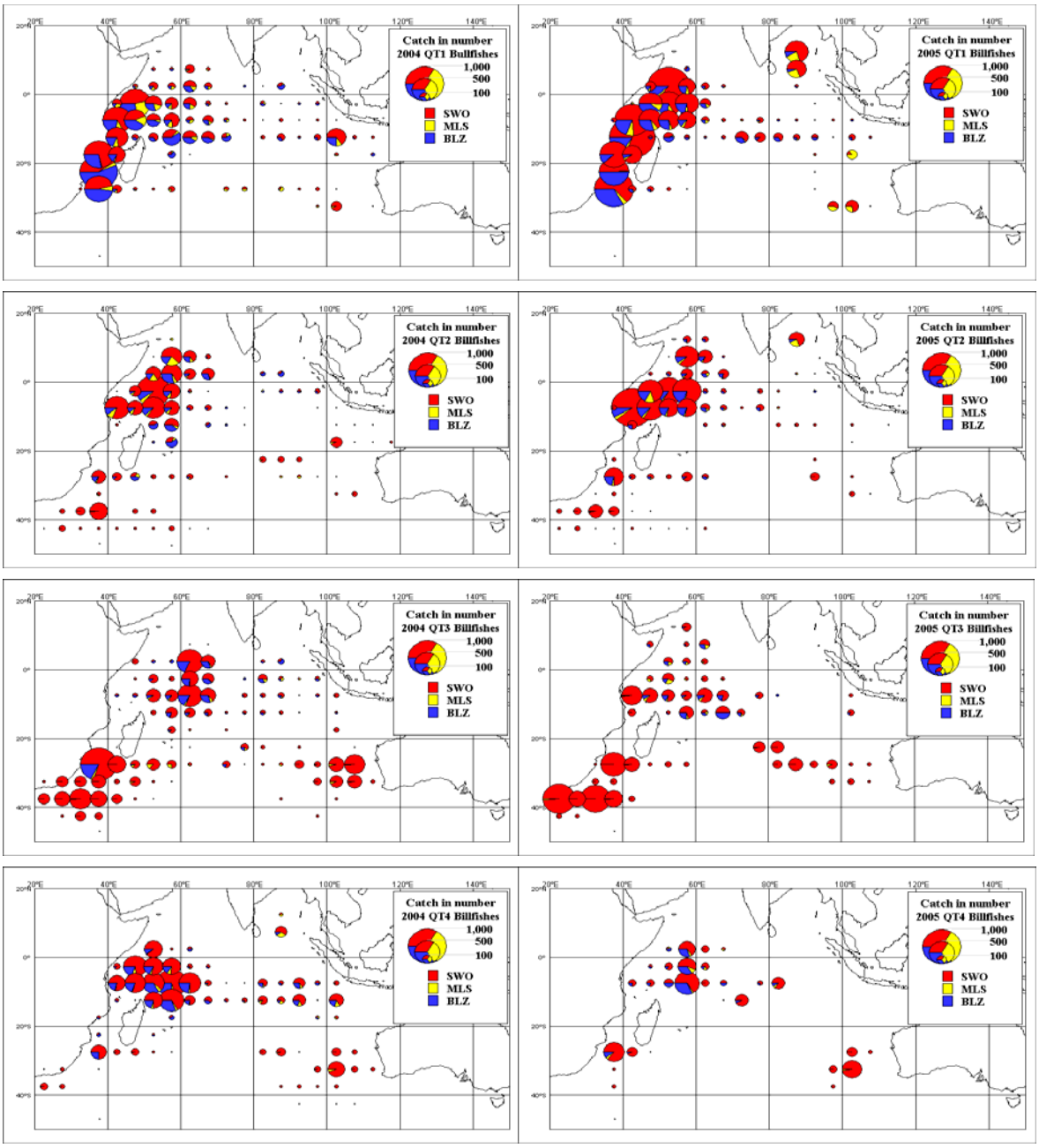
Data of 2004 and 2005 are preliminary. Sets and hooks are in thousand. "Total" includes skipjack catch.

Year	Sets	Hooks	Total	SBF	ALB	BET	YFT	SWO	MLS	BLZ	BLM	SPF	SFA
2001	36	109669	36866	4834	3033	13042	13941	1222	134	447	73	109	30
2002	35	105961	36402	3232	3216	13881	13932	1284	132	517	75	102	31
2003	26	79437	33654	2073	2272	10085	17502	1083	68	374	87	92	18
2004	33	98752	37190	5230	3588	10610	15754	1237	80	450	86	111	39
2005	27	83297	35503	5514	3349	8685	16132	1227	62	331	66	119	18



Map 3 Geographical distributions of quarterly catch in number of major tuna species caught by Japanese longline fishery in 2004 (left) and 2005 (right).

SBF: southern bluefin, ALB: albacore, BET: bigeye, and YFT: yellowfin.



Map 4 Geographical distributions of quarterly catch in number of major billfish species caught by Japanese longline fishery in 2004 (left) and 2005 (right).
SWO: swordfish, MLS: striped marlin, and MLZ: Indo-Pacific blue marlin.

In Fig. 4, trends in species composition in the eastern and western Indian Ocean are shown. In the eastern Indian Ocean, the percentage of bigeye has increased and that of yellowfin has become lower since around 1991. The opposite trend is observed in the western Indian Ocean where the ratio of yellowfin has increased steadily since early 1990s. As a result, the total catch in weight of yellowfin in the Indian Ocean has exceeded that of bigeye since 1999. The ratio of yellowfin catch in weight in the total of yellowfin and bigeye catch was larger than 60% since 2003. This high yellowfin ratio in recent years seems to be derived from decrease of fishing effort in the eastern Indian Ocean, and the concentration of the fishing effort at the African coastal waters from the Equator to 25˚S where yellowfin is abundant, especially in the 1st quarter (Map 2).

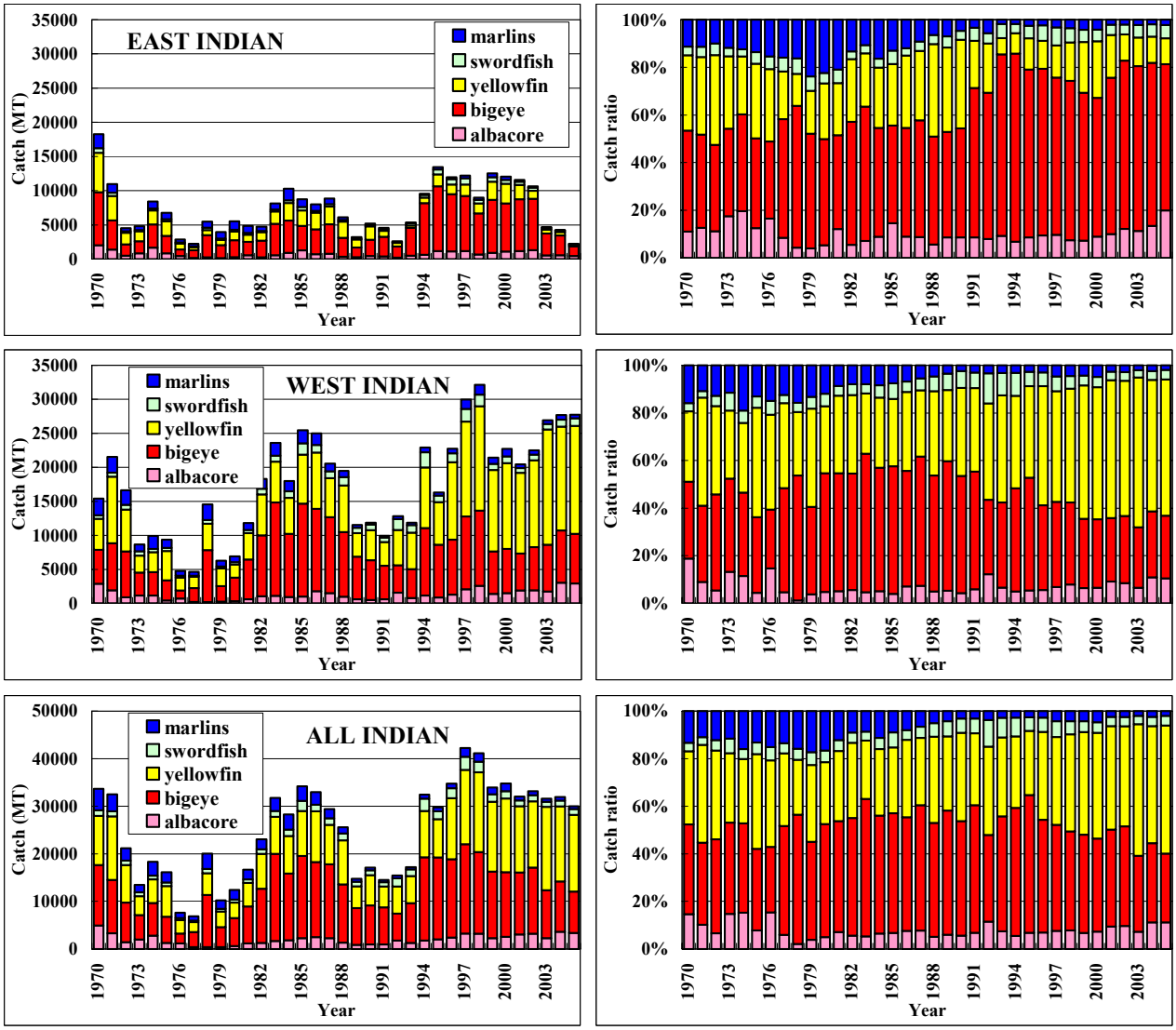


Fig. 4 Trends of species composition of major tunas, swordfish and marlins in the Indian Ocean (1970-2005).

1.2 Purse Seine Fishery

The latest available data for Japanese purse seine fishery is that for 2005. The catch and effort data in 2005 is preliminary.

(1) Fishing vessels

Japanese purse seine vessels operating in the Indian Ocean are 350-700 GRT class (700-1,000 carrying capacities). Change in the number of purse seine vessels in the latest five years is shown in Table 1. Although more than 10 Japanese purse seiners operated in 1991-1993, it decreased year by year and the last commercial purse seiners retreated from the Indian Ocean in 2001. Now, only Nippon-Maru, the research vessel of Fisheries Research Agency (FRA), is operating in this Ocean.

(2) Fishing Effort

Total fishing effort (operation days + searching days) was 130 days in 2004 and 163 days in 2005 (Table 3). Geographical distribution of Japanese purse seine effort in 2004 was shown in Map 5.

Table 3. Catch and effort statistics for the Japanese purse seine fishery in the Indian Ocean from 2001 to 2005.
The unit of catch and effort are metric ton and days (search and operation days), respectively.

Year	Days F.	Total	SKJ	YFT	BET
2001	262	3025	1830	603	592
2002	211	3031	1937	445	649
2003	228	3906	2443	651	812
2004	130	2310	1459	327	524
2005	163	4072	2562	747	763

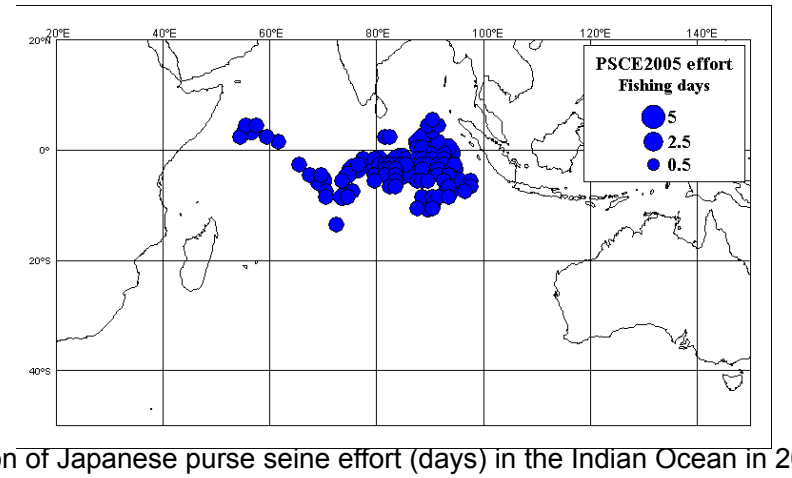


Fig. 9. Distribution of Japanese purse seine effort (days) in the Indian Ocean in 2005.

(3) Catch

Catch in weight of skipjack, yellowfin and bigeye in 2005 (2004) was 2,562MT (1,459MT), 747MT (327MT) and 763MT (524MT), respectively. Geographical distribution of Japanese purse seine catch of species compositions in 2005 is shown in Fig. 10.

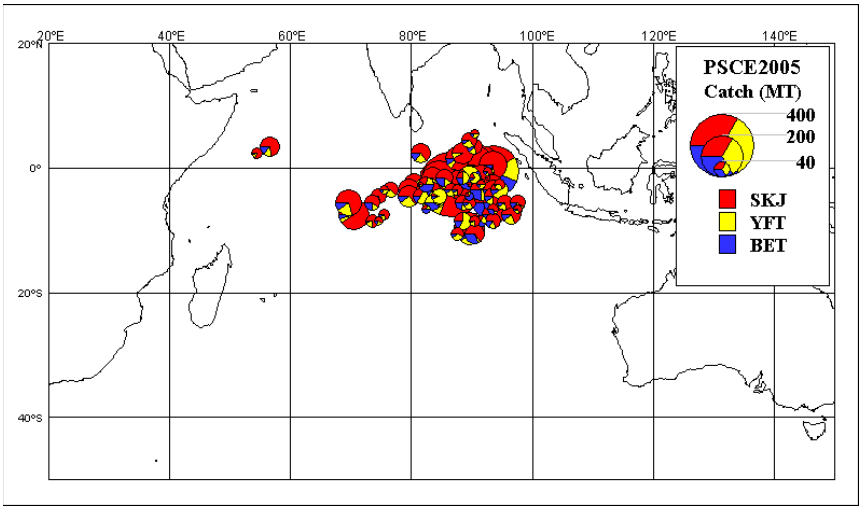


Fig. 10. Distribution of Japanese purse seine catches of species compositions (MT) in 2005.

2. Progress on the implementation of recommendations of the SC

2.1 Collection of more size data

Tuna longline fisheries industries in Japan have been collecting size data based on the request made by the Fisheries Agency of Japan. As it is not mandatory, the tuna longline fisheries have been collecting size data voluntary basis in the past. Collecting the size data is extra work loads for tuna longliner skippers who are already occupied by busy fishing operations with limited man powers.

In recent years, the size data have been collected mainly by the high school training vessels off Java Island, Indonesia. For example, the coverage of size data of bigeye tuna was 10-20% of the total catch in the Indian Ocean before 1992, but afterwards it sharply decreased to only a few percents. This is mainly because these training vessels shifted their operation to the Pacific Ocean due to the pirate problems. Under such situation, size data sampled are limited to the particular waters and not from the whole area. Therefore, they are not useful for the stock assessments.

In order to improve this situation from this year we allocated two longliners with one observer in each boat to the Indian Ocean in order to collect scientific data such as size information. These two boats were from more than 100 longliners assigned for the *Real Time Monitoring Program* (RTMP) for southern bluefin tuna. We plan to continue this arrangement next year and afterwards. These two longliners monitored 47 operations in the waters around the Mozambique Channel and off Somalia.

2.2 Search for the historical weight data

To solve the problem mentioned in the previous Section, it was suggested by the past IOTC SC to search historical weight data recorded by the skippers of the longline vessels. The situation is explained as follows:

Scientists in the Yaizu tuna fishing port branch of the NRIFSF(National Research Institute of Far Seas Fisheries) were collecting fishers' notes regarding their longline fishing operations from the middle of 1980's, which included individual fish weight (gilled and gutted). Such weight data had been entered to our database. However, these notes are confidential information of these fishers, hence scientists need to have trusts of fishers and need strong personal will and effort to get the data. Therefore, the amounts of these weight data depend on the personal efforts of the scientists. In recent years, collection of these kinds of data has become more difficult because all scientists

have been retired and they work as part timers to do the essential works. Under such circumstances, we can not expect to obtain similar amount of such weight data from the fishers' confidential notes without extra voluntary efforts made by scientists.

However, according to the Japanese tuna industry, they can contact with skippers and can get such historical confidential weight data on a voluntary basis and some efforts have already been done. As a result, some amount of bigeye size data have been collected through the Japanese tuna industry.

Besides the fishers' notes, it was informed that other sources of the historical fish weight data could be found from the sales slips at tuna fishing ports or the tuna fishing companies. But we realized that these data are not useful because of two reasons, i.e., (a) the weight data in the sale slips do not describe precise areas of the fish caught, but they indicate rather larger scale waters such as the eastern or the western Indian Ocean and (b) precise time such as month or season of the weight (catch) collected is not indicated. As a result, these weight data are not at a satisfactory level to be used for tuna resources analyses.

As a conclusion, the industries effort to get the historical confidential weight data from the skippers of the longliners seems to be only possible solution at this stage.

2.3 Improvement of the CPUE Standardization

Four relevant studies have been accomplished in past two years (2005-2006), i.e., (a) "Recent trend of Japanese longline fishery in the Indian Ocean with special reference to the targeting" (IOTC-WPTT-2005-11), (b) "Estimation of longline gear configuration using species composition in the operation of which the gear structure are already known" (IOTC-WPTT-2005-12), "Study on affect of Japanese tuna prices on targeting practices and CPUE of tuna longline fisheries" (IOTC-WPTT-2005-29) and "Short note on the Japanese longline gear configuration as a target index (IOTC-WPTT-2006-32).

2.4 Predation survey

The five years survey on the predation for the longline caught tuna and tuna like species have been completed using some 500 Japanese tuna longliners in three Oceans. The survey summary up to December, 2005 was reported at the 2006 WPTT8 meeting (IOTC-WPTT-2006-23). Table 4 shows the schedule of this survey and relevant activities. Two days workshop to review five years' activities on predation surveys will be organized by Japan and IOTC in 2007 after the 9th working party on Tropical Tuna and 2nd Working Party on Billfish.

3. Progress on national research programs currently in place

3.1 Tagging in the eastern Indian Ocean (NRIFSF)

(1) 2004

Tag and release research using Taikei-Maru No.2 was conducted in the eastern Indian Ocean from February to March 2004 by the scientists of NRIFSF of FRA as the contribution of Japan to the IOTTP (Indian Ocean Tuna Tagging Program). Pole and line, hand line and troll lines were used. A total of 606 fishes (572 skipjack, 11 yellowfin and 23 bigeye) was tagged and released. Detail results were reported at WPT in July, 2004 (IOTC-WPT-04-02).

(2) 2005-2006

There are two collaborative tagging plans in the eastern Indian Ocean using the Japanese funds, i.e., (a) waters off Sumatra by Japan, Australia, Indonesia and IOTC and (b) the waters around the Andaman Sea and the Nicobar Island by Japan, India and IOTC. These plans have been approved by respective Governments and also the IOTC and the Memorandum of Understanding (MOU) for these two areas were agreed and signed by relevant countries and IOTC in January, 2006. Then the initial workshop for the tagging was held in Padan, Indonesia in February, 2006 and it was agreed that the tagging in the waters off Sumatra will be implemented in the end of 2006.

3.2 Tagging in the Indian Ocean (JAMARC)

Nippon-Maru (JAMARC, Fisheries Research Agency) started the cooperation to the IOTC tagging project in 2004 when she conducted the experimental purse seine fisheries in the Indian Ocean. During 2004-2006 Nippon-Maru implemented tagging using the spaghetti tags provided by the IOTC. Table 4 shows number of tagged fish by species in 2004, 2005 and 2006 (as of August).

Table 4 Number of tagged fish by species in 2004, 2005 and 2006 by Nippon-maru (2004-2006)

	Skipjack	Yellowfin	Bigeye tuna	Total
2004	39	89	86	214
2005	154	10	204	368
2006(by August)	82	48	111	258

4. Other relevant information

Following documents were submitted and presented in the various IOTC meetings during 2005-2006.

4.1 2005 WPTT7 (Phuket, Thailand)

Title	Author	Document no.
Stock assessment of yellowfin tuna *(Thunnus albacares*) resources in the Indian Ocean by the age structured production model (ASPM) analyses.	T. Nishida, H. Shono.	IOTC-2005-WPTT-09,add1
Recent trend of Japanese longline fishery in the Indian Ocean with special reference to the targeting.	H. Okamoto.	IOTC-2005-WPTT-11
Estimation of longline gear configuration using species composition in the operations of which the gear structure are already known.	H. Okamoto, K. Yokawa, S-K. Chang	IOTC-2005-WPTT-12
Standardized CPUE for yellowfin tuna (*Thunnus albacares*) of the Japanese longline fishery in the Indian Ocean up to 2003 by generalized linear models (GLM (1960-2003).	H. Shono, H. Okamoto, T. Nishida.	IOTC-2005-WPTT-15
Did ecological anomalies cause 1993 and 2003－2004 high catches of yellowfin tuna (*Thunnus albacares*) in the western Indian Ocean? And – review of other possible causes (strong recruitments, high catchabilities and excess fishing efforts).	T. Nishida, H. Matsuura, Y. Shiba, M. Tanaka, M. Mohri. S-K. Chang.	IOTC-2005-WPTT-27
Report of the predation survey by the Japanese commercial tuna longline fisheries (September, 2000-December, 2004).	T. Nishida, Y. Shiba	IOTC-2005-WPTT-28
Study on affect of Japanese tuna prices on targeting practices and CPUE of tuna longline fisheries － Case study for yellowfin tuna (*Thunnus albacares*) & bigeye tuna (*Thunnus obesus*) in the Indian Ocean.	T. Nishida, A. Izawa, S-K. Chang.	IOTC-2005-WPTT-29
Incorporating spatial autocorrelation into the general linear model with an application to the yellowfin tuna (*Thunnus albacares*) longline CPUE data.	T. Nishida, D-G. Chen.	IOTC-2005-WPTT-INF02
Tuna price statistics in Japan.	T. Nishida, A. Izawa.	IOTC-2005-WPTT-INF03
On accuracy of the estimated fish school weights by sonar specialists.	H. Shono, T. Nishida.	IOTC-2005-WPTT-INF06

4.2 2005 (November) SC8 (Victoria, Seychelles)

Title	Author	Document no.
National report of Japan, 2004	NRIFSF Gov. of Japan	IOTC-2005-SC-INF04

4.3 2006 (March) WPB5 (Colombo, Sri Lanka)

Title	Author	Document no.
Stock assessment of swordfish (*Xiphias gladius*) in the Indian Ocean by A Stock-Production Model Incorporating Covariates(ASPIC).	T. Nishida, Y. Shiba	IOTC-2006-WPB-06
Standardization of swordfish(*Xihias gladius*)CPUE of the Japanese tuna longline fisheries in the Indian Ocean(1975-2004).	T. Nishida, S-P. Wang	IOTC-2006-WPB-07
CPUE standardization of Indian Ocean swordfish from Taiwanese longline fishery for Data up to 2003.	S-P. Wang, S-K.Chang, T. Nishida, S-L. Lin.	IOTC-2006-WPB-09

4.4 2006 (July) WPB8 (Victoria, Seychelles)

Title	Author	Document no.
Japanese longline CPUE for bigeye tuna in the Indian Ocean up to 2004 standardized by GLM applying gear material information in the model.	H. Okamoto.	IOTC-2006-WPTT-17
Preliminary stock assessment for bigeye tuna in the Indian Ocean using stock Synthesis II (SS2).	H. Shono.	IOTC-2006-WPTT-18,add1
Updated stock assessment of bigeye tuna (*Thunnus obesus*) resource in the Indian Ocean by the age structured production model(ASPM) analyses (1960-2004)	T. Nishida, H. Shono	IOTC-2006-WPTT-22,add1, add 2, add 3, add 4
Report of the predation survey by the Japanese commercial tuna longline fisheries.	T. Nishida, Y. Shiba	IOTC-2006-WPTT-23
Short note on the Japanese longline gear configuration as a targeting index.	H. Okamoto	IOTC-2006-WPTT-32
Folly and fantasy in the analysis of spatial catch rate data,	T. Nishida	IOTC-2006-WPTT-INF02
Workshop on Predation in tuna longline fisheries.	T. Nishida	IOTC-2006-WPTT-INF04
Species identification of swimming crabs fed by yellowfin tuna (YFT) during its high catch periods (2003-2004) in the western Indian Ocean.	T. Nishida, S. Fujiwara, S. Adam	IOTC-2006-WPTT-INF05

4.5 2006 (July) WPBy2 (Victoria, Seychelles)

Title	Author	Document no.
Japan's National Plan of Action for the Conservation and Management of Sharks.	Government of Japan	IOTC-2006-WPBy-07
Japan's National Plan of Action for Reducing Incidental Catch of Seabirds in Longline Fisheries. February 2001. (Partly revised in March 2005).	Fisheries Agency of Japan. Government of Japan	IOTC-2006-WPBy-08
Summary of Japanese activities for the management of pelagic sharks and for the mitigation of incidental catch of seabirds and se turtles in longline fishery.	M. Kiyota	IOTC-2006-WPBy-09