

# National Report of JAPAN (2009)

National Research Institute of Far Seas Fisheries (NFIFSF),  
Fisheries Research Agency (FRA)

and

Fisheries Agency, Government of Japan

November, 2009

## 1. General Fisheries Statistics

### 1-1. Longline fishery

The latest available longline data is that of 2008 although it is preliminary.

#### 1-1-1. Fishing vessels

All Japanese longline vessels operating in the Indian Ocean have been the distant water category (120-500GRT). 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 vessel was relatively large in number (224-251) during 1995-1999, after when it decreased to less than 200 except for 228 in 2002. Although the number of vessel in 2007, 249 vessels, is still preliminary, it is the largest in the recent five years.

**Table 1. Number of Japanese vessels operated in the Indian Ocean. Data of 2007 and 2008 for longliner are preliminary.**

<b>Fleet/Year</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>
<b>Longliner</b>	<b>189</b>	<b>184</b>	<b>188</b>	<b>249</b>	<b>172</b>
<b>Purse seiner</b>	<b>1</b>	<b>1</b>	<b>3</b>	<b>3</b>	<b>3</b>

### 1-1-2. Fishing effort

The total fishing effort (the number of hooks) of Japanese longliners in the Indian Ocean has been kept in similar level since 1971, i.e. around 100 million hooks (Fig. 1). Percentage of effort used in this ocean in the total effort in all oceans fluctuated around 20% until 2003 after when it has been largely increasing from 20% in 2003 to 35% in 2006 and 2007 (Fig. 2). In this period of increasing effort in this Ocean, the effort in the Pacific Ocean decreased markedly while that in the Atlantic Ocean was relatively stable. In 2008, the percentage of effort in the Indian Ocean decreased to about 30% and that in Atlantic Ocean increased to 30 % from 22%.

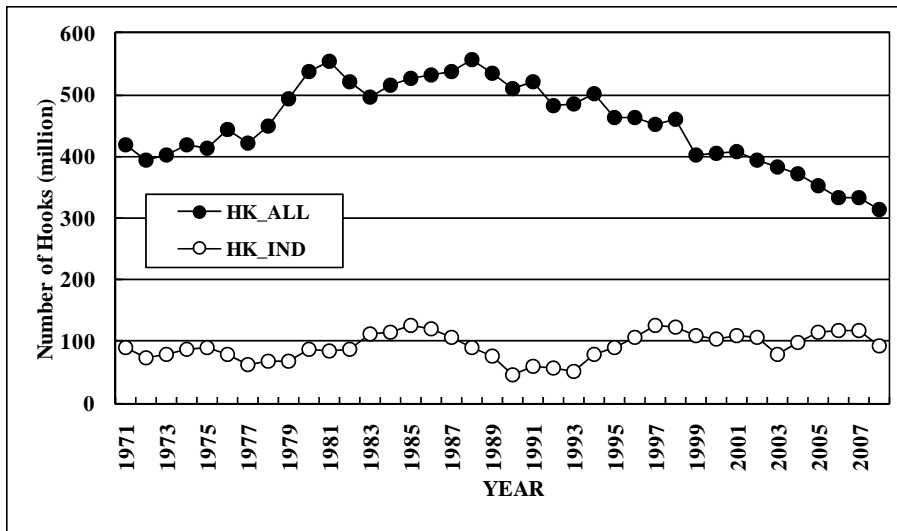


Fig. 1. Historical change in total Japanese longline effort in the all Oceans (solid circle) and the Indian Ocean (open circle)

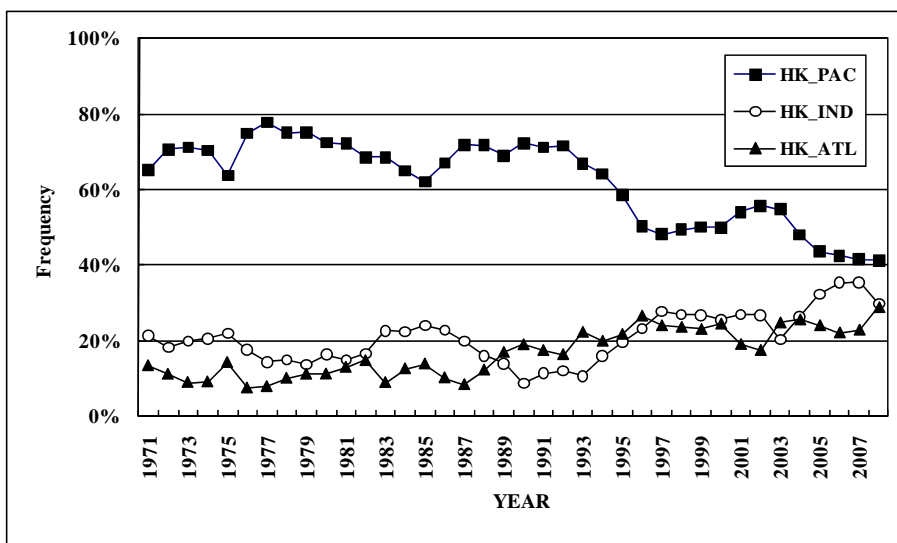


Fig.2. Historical change in the percentage of effort exerted into each Ocean basin.

Yearly distributions of longline effort from 2002 to 2007 are shown in Fig. 3. Although the geographical distributions of the effort are basically similar, the effort at African offshore area from off Somalia to off Cape Town and Tanzania seems relatively large and the effort in eastern Indian Ocean decreased in the latest four years (2004 and after) probably by aggregation of longliners due to high yellowfin catch (formation of good yellowfin fishing ground).

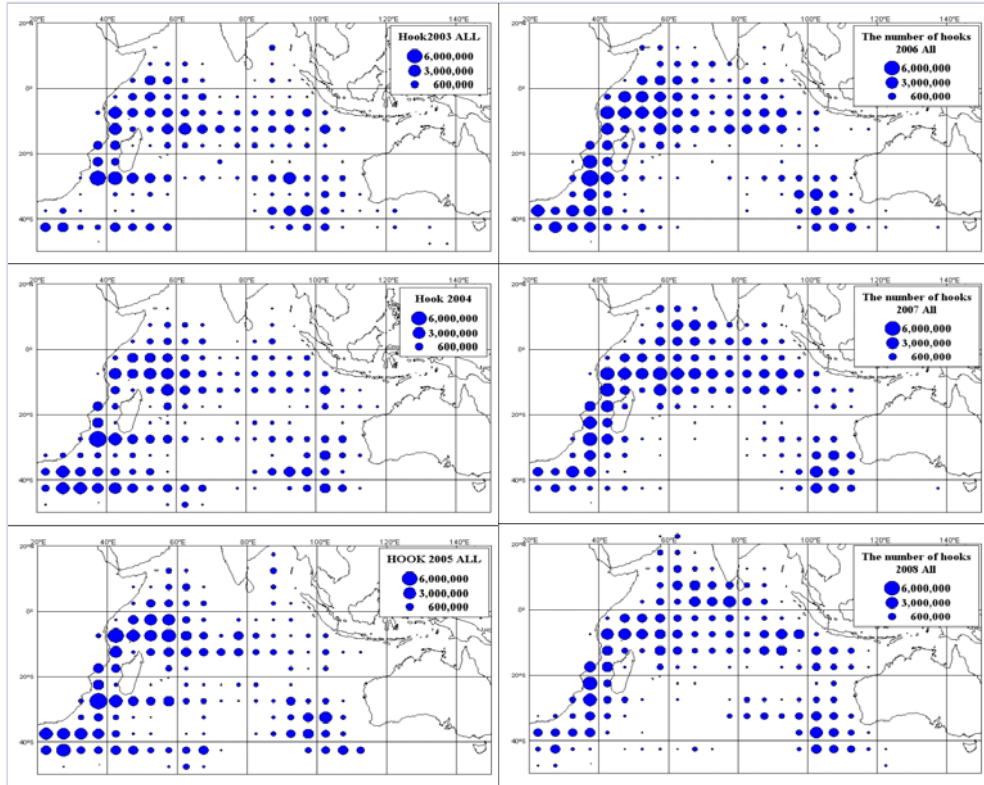


Fig. 3. Distributions of longline effort in the Indian Ocean from 2003 (left- up) to 2008 (right-down).

Historically, fishing effort exerted to each of eastern and western Indian Ocean has been the same level, that is, roughly 50% each until 2002 (Fig. 4). However, the effort in western Indian Ocean has been greater than 70% since 2003 and about 80% in 2004 through 2007. In 2008, it rapidly declined to 69%. Quarterly distributions of fishing effort in 2007 and 2008 are shown in Fig. 5.

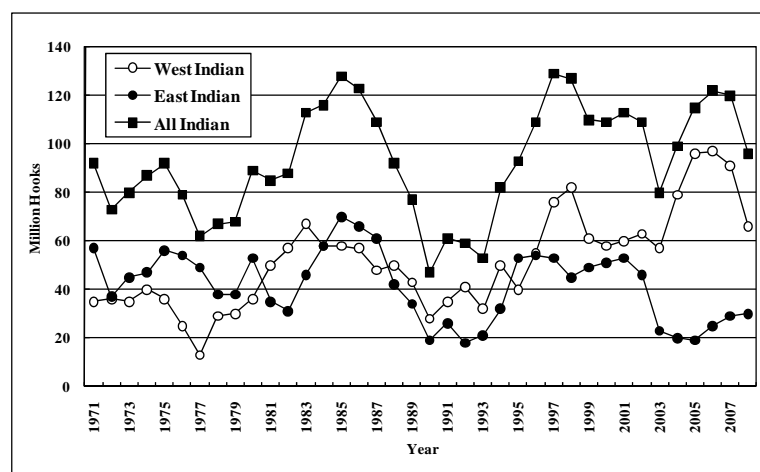


Fig.4. Historical change of effort exerted into each of West and East Indian Ocean.

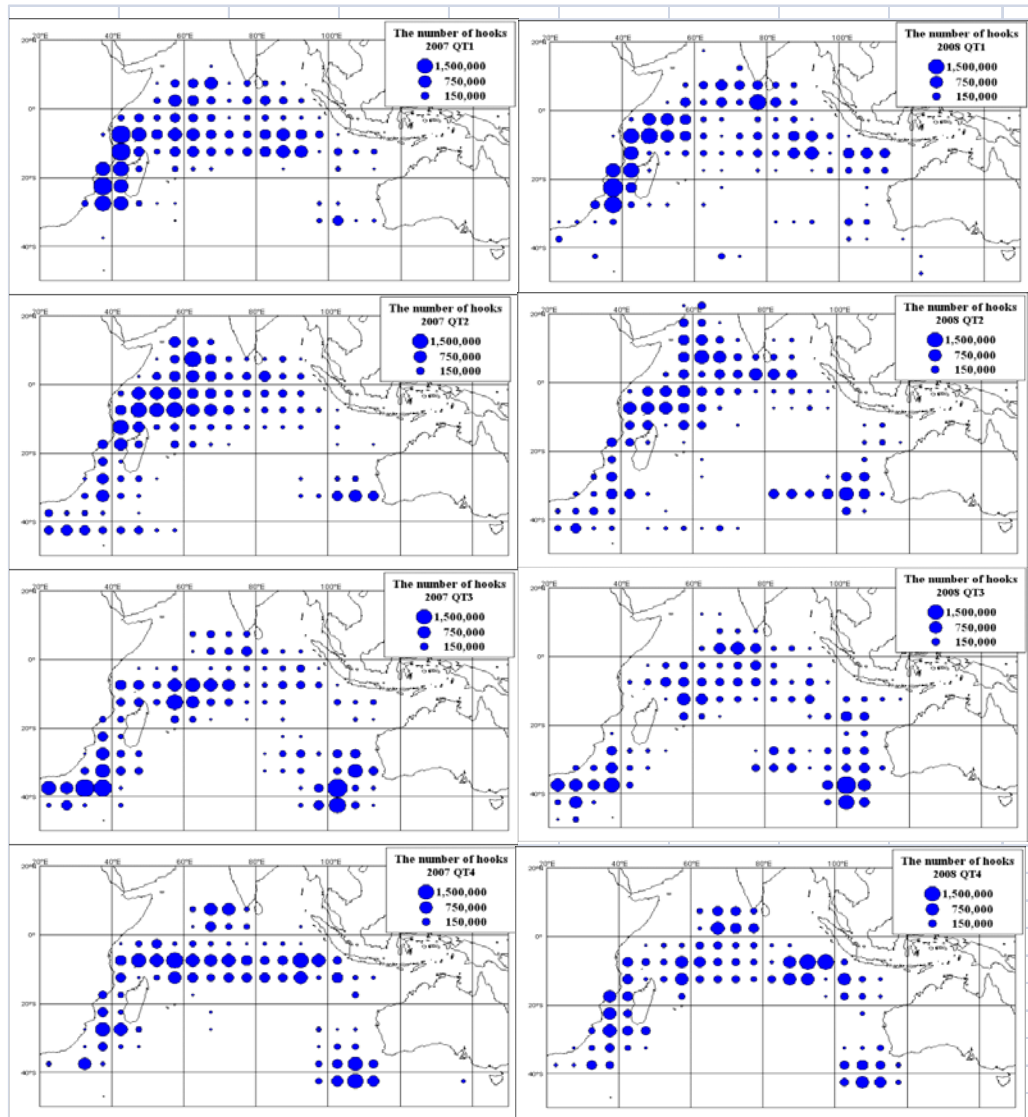


Fig. 5. Quarterly longline effort distributions in the Indian Ocean in 2007 (left) and 2008 (right).

### 1-1-3. Catch

Catch statistics in weight from 2004 to 2008 by Japanese longliners in the Indian Ocean is shown in Table 2 (Data of 2007 and 2008 are preliminary) and geographical quarterly distributions of catch in 2007 and 2008 for major tuna and billfish species are shown in Fig. 6 and Fig. 7, 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 2008 (2007) were 1,814MT (2,751MT) for southern bluefin, 5,332MT (5,264MT) for albacore, 14,202MT (18,168MT) for bigeye and 11,099MT (18,592MT) for yellowfin. It should be noted that the catch of yellowfin in 2008 decreased to about half of that in 2005 and 2006 in spite of that the catch of bigeye, albacore has been roughly same level during this period.

Table 2. Fishing effort and catch in weight (MT) by the Japanese longline fishery in the Indian Ocean (IOTC statistical area), 2004-2008. Data of 2007 and 2008 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
2004	32	98219	37271	4980	3605	10645	16034	1225	78	455	85	39	120
2005	37	113861	46598	6165	4079	12544	21492	1487	74	462	91	37	165
2006	38	118365	49643	3822	6198	13920	22310	1805	115	746	199	123	394
2007	37	117665	48689	2751	5264	18168	18592	2197	79	770	204	109	545
2008	29	94340	35668	1814	5332	14202	11099	1643	164	611	145	147	475

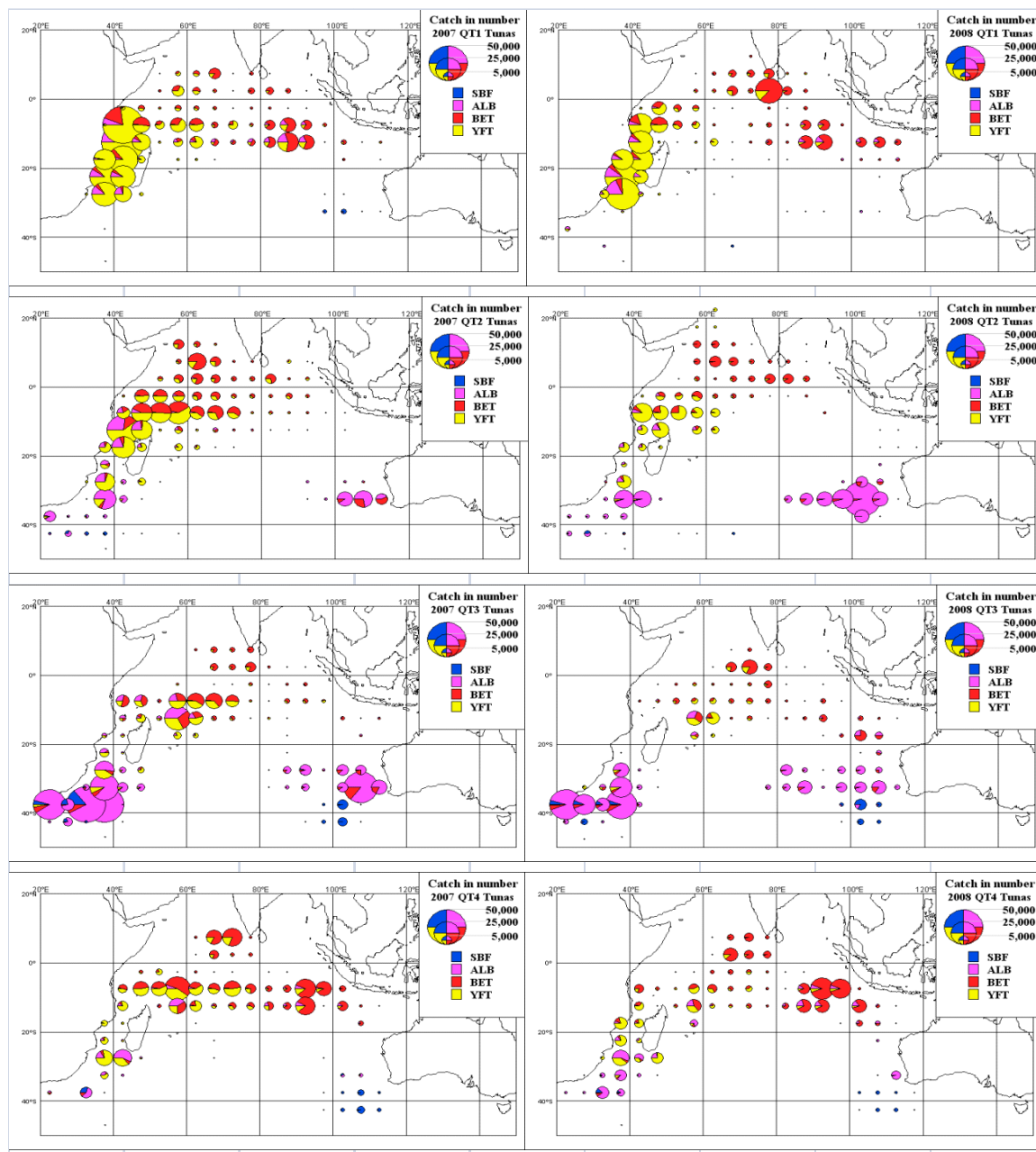
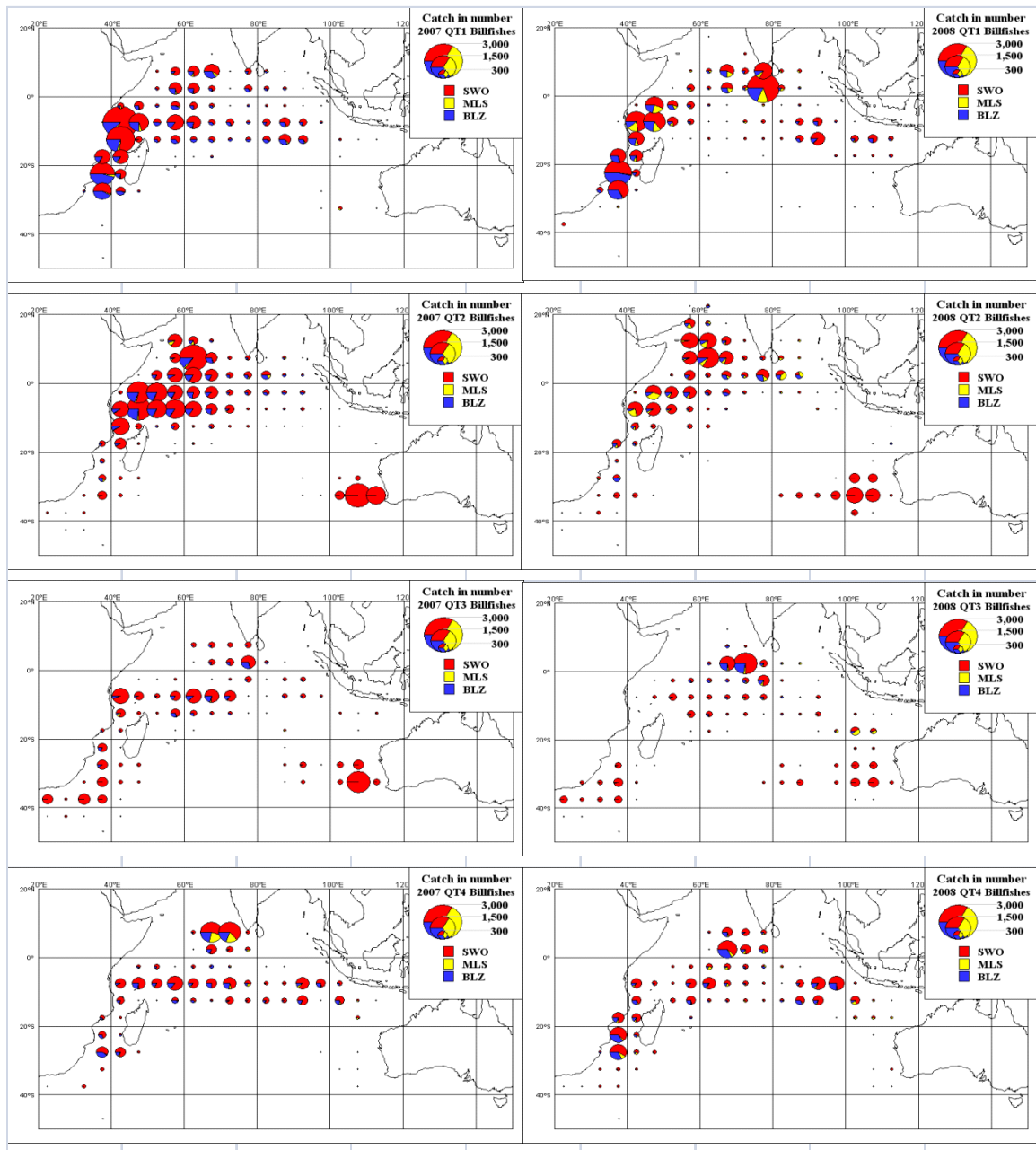


Fig. 6. Geographical quarterly distributions of catch in number of major tuna species caught by Japanese longline fishery in 2007 (left) and 2008 (right). SBF: southern bluefin, ALB: albacore, BET: bigeye, and YFT: yellowfin.



**Fig. 7. Geographical quarterly distributions of catch in number of major billfish species caught by Japanese longline fishery in 2007 (left) and 2008 (right). SWO: swordfish, MLS: striped marlin, and MLZ: Indo-Pacific blue marlin.**

In Fig. 8, historical change in species composition in the eastern and western Indian Ocean is shown. In the eastern Indian Ocean, the percentage of bigeye has increased and that of yellowfin which was about 30-40% in the total catch of tunas and billfishes excluding southern bluefin before 1991 has decreased to about 10% in recent five years. The opposite trend is observed in the western Indian Ocean where the ratio of yellowfin was around 30% before 1992 and it has increased to about 50% or more since 1999. 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 has been 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 region from Equator to 30°S where yellowfin is abundant, especially in the 1<sup>st</sup> and 3<sup>rd</sup> quarters (Fig. 5). By this shift of the distribution of density of fishing effort, total catch of tuna species in the western Indian Ocean from 2005 to 2007 was around 40,000 MT which is highest in the period from 1970 to 2008. This total catch in 2008 decreased remarkably to 25,000 MT, about the same level as that before 2005.

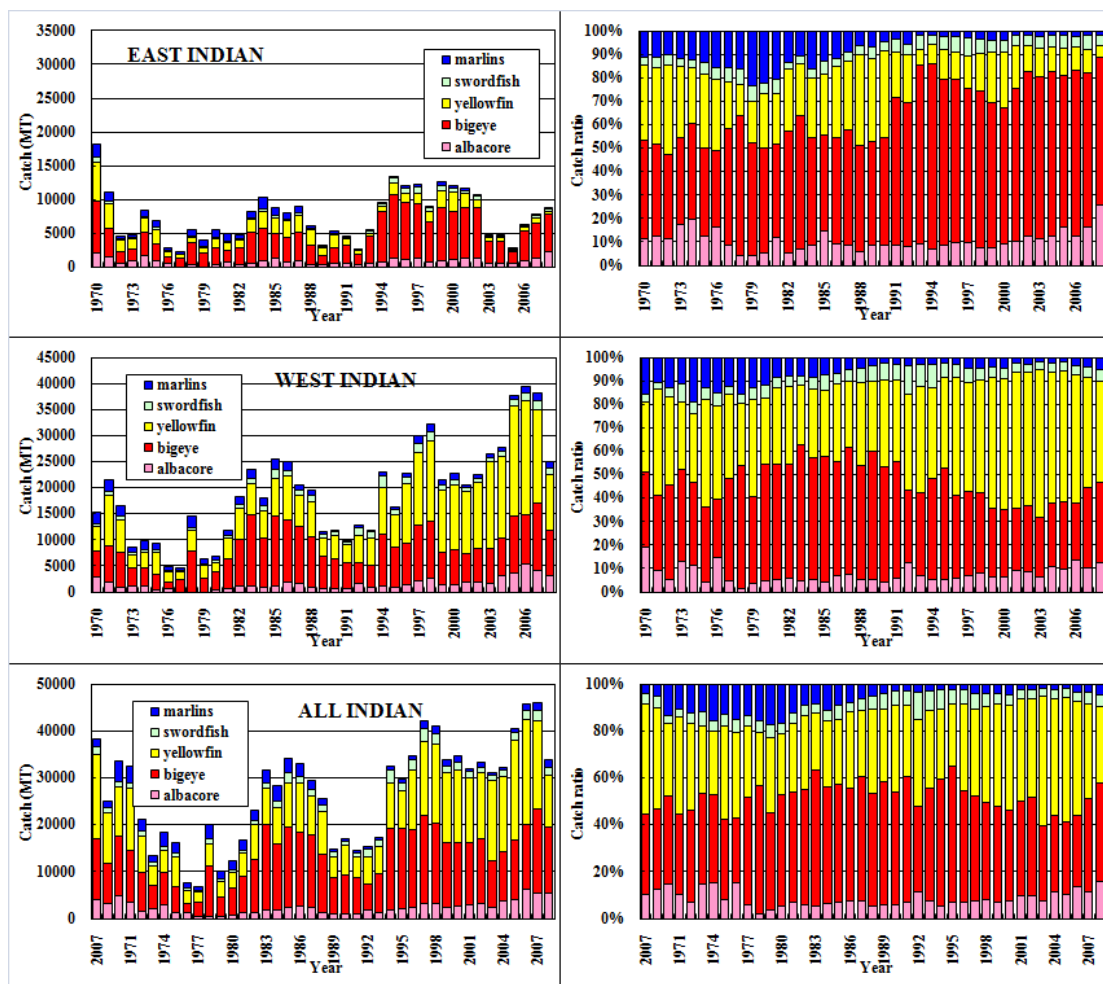


Fig. 8. Historical change of species composition of major tunas, swordfish and marlins in the Indian Ocean.

## 1-2. Purse Seine Fishery

The latest available data for Japanese purse seine fishery is that for 2008. The catch and effort data in 2008 is preliminary.

### 1-2-1. Fishing vessels

Japanese purse seine vessels operating in the Indian Ocean are 350-700 GRT class (700-1000 carrying capacity). 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 seiner retreated from the Indian Ocean in 2001 leaving only one vessel “Nippon-Marū”, the research vessel of Fisheries Research Agency (FRA).

**Table 1 (same table as in page 1). Number of Japanese vessels operated in the Indian Ocean. Data of 2007 and 2008 for longliners are preliminary.**

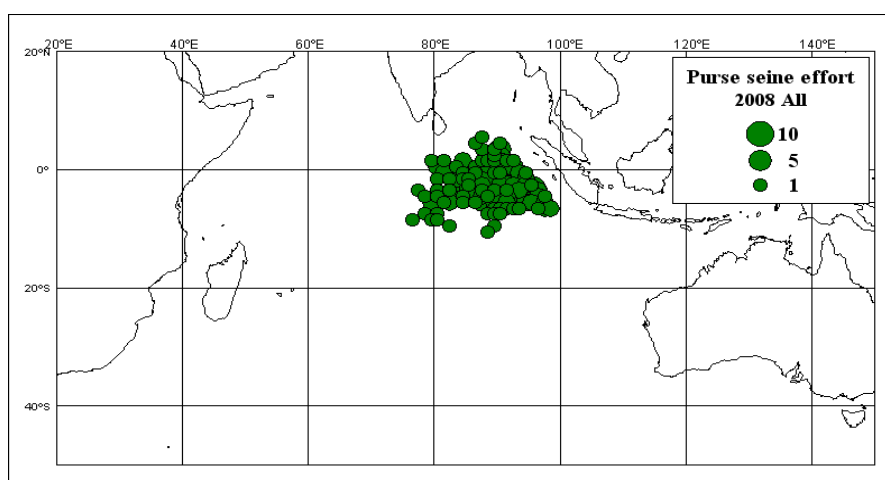
<b>Fleet/Year</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>
<b>Longliner</b>	<b>189</b>	<b>184</b>	<b>188</b>	<b>249</b>	<b>172</b>
<b>Purse seiner</b>	<b>1</b>	<b>1</b>	<b>3</b>	<b>3</b>	<b>3</b>

### 1-2-2. Fishing Effort

Total fishing effort (operation days + searching days) was 319 days in 2007 and 294 days in 2008 (Table 3). The value for 2008 is still preliminary. Geographical distribution of Japanese purse seine effort in 2008 was shown in Fig. 9.

**Table 3. Catch and effort statistics for the Japanese purse seine fishery in the Indian Ocean from 2004 to 2008.** The unit of catch and effort are metric ton and days (search and operation days), respectively.

<b>Year</b>	<b>Days F.</b>	<b>Total</b>	<b>SKJ</b>	<b>YFT</b>	<b>BET</b>
<b>2004</b>	<b>130</b>	<b>2310</b>	<b>1459</b>	<b>327</b>	<b>524</b>
<b>2005</b>	<b>182</b>	<b>4892</b>	<b>3149</b>	<b>894</b>	<b>849</b>
<b>2006</b>	<b>76</b>	<b>2795</b>	<b>1982</b>	<b>266</b>	<b>547</b>
<b>2007</b>	<b>319</b>	<b>6312</b>	<b>4362</b>	<b>963</b>	<b>987</b>
<b>2008</b>	<b>294</b>	<b>5317</b>	<b>3133</b>	<b>1175</b>	<b>1009</b>

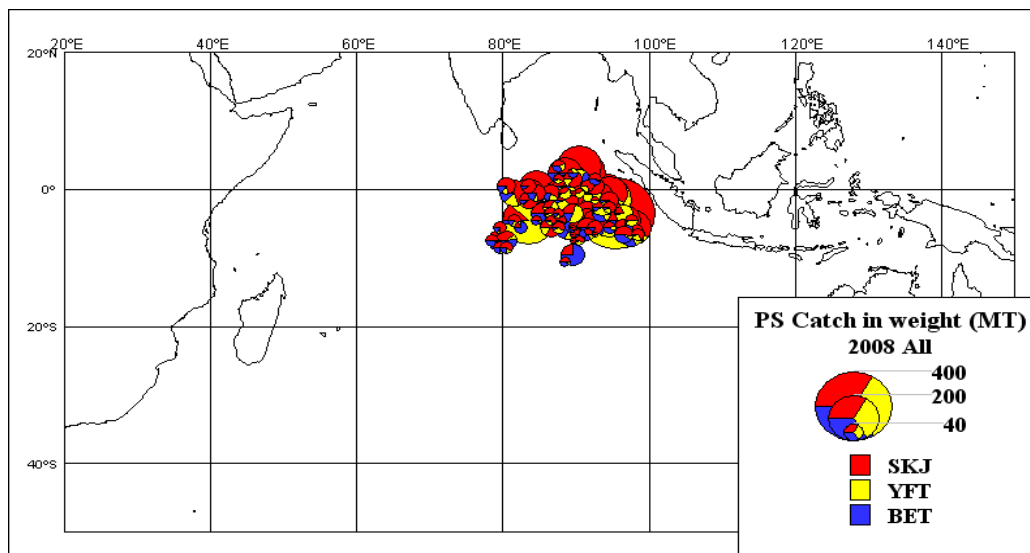


**Fig. 9. Distribution of Japanese purse seine effort (days) in the Indian Ocean in 2008.**



### 1-2-3. Catch

Catch in weight of skipjack, yellowfin and bigeye in 2008 (2007) was 3,133MT (4,362MT), 1,175MT (963MT) and 1,009MT (987MT), respectively. Geographical distribution of Japanese purse seine catch in 2008 is shown in Fig. 10.



**Fig. 10. Distribution of Japanese purse seine catch (MT) in the Indian Ocean in 2006.**

SKJ: skipjack, YFT: yellowfin, and BET: bigeye.

## 2. Progress on the implementation of recommendations of the Scientific Committee

Progress on the implementation of recommendations of the past Scientific Committees relating to Japan is as below:

### 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, tuna longline fishers have been collecting size data voluntary basis in the past. Collecting the size data is extra work loads for skippers who are already occupied by busy fishing operations with limited man powers.

For the Indian Ocean, the size data have been collected mainly by the high school training vessels off Java Island, Indonesia. For example as for bigeye tuna, its coverage of size data 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 in the Strait of Malacca. Under such situation, size data

sampled are limited to the particular waters and not from the whole area. Therefore, they are not effective for the stock assessments.

At this stage it is not anticipated to collect more size data under the current situation. To solve this problem Japan started to deploy observers in 2006.

## 2-2. Modification of log-sheet collection system

The owners of fishing vessels larger than or equal to 10 GRT are required to submit the log sheet on their operations and catch information to the Japanese government, by each cruise in three months after the cruise was finished. As the duration of one cruise for distant water longliners is long, sometimes longer than one year, it has been taken about two years to complete compiling statistics of longline fishery. Starting in August 2008, distant water longliners are required to submit it every ten days. It is expected that this change in submission rule of log-sheet would facilitate the compilation of tuna statistics.

## 2-3 Improvement to speed up to submit fisheries data to the IOTC

From August 1, 2008 Japan started to mandate all the long-distance longline vessels to submit the logbook data in quick manner by revising the current law.

## 2-4. Improvement of the CPUE standardization (2008-2009)

[2008]

One study has been accomplished, i.e., “Japanese longline CPUE for yellowfin tuna in the Indian Ocean up to 2007 standardized by GLM (IOTC-2008-WPTT10-19) by Okamoto *et al.* During the 10<sup>th</sup> tropical tuna working group (WPTT10) meeting in October 2008 in Thailand this Japanese CPUE played a key role in the stock assessments conducted by MULTIFAN-CL, SS2 PM and ASPM.

[2009]

Four studies (papers) have been made, i.e., (i) “Japanese longline CPUE for yellowfin tuna in the Indian Ocean up to 2008 standardized by Okamoto *et al.* (ii) “Japanese longline CPUE for bigeye tuna in the Indian Ocean up to 2008 standardized by Okamoto *et al.* and (iii) “Fine scale bigeye tuna CPUE standardization” by Satoh *et al.* During the 11<sup>th</sup> tropical tuna working group (WPTT11) meeting in October 2009 in Kenya. These three Japanese CPUE series played key roles in the stock assessments conducted by MULTIFAN-CL, SS3, PROFIT, ASPM, ASPIC and

PROCEAN. The last work is (iv) CPUE paper for swordfish by Nishida and Wang which was also used as the key CPUE data for its stock assessments by SS3, ASIA, ASPM and ASPIC in the 5<sup>th</sup> WPB in July in Seychelles.

### **3. Progress on national research programs currently in place**

#### **3-1. Tag and release research for tunas and skipjack in the eastern Indian Ocean.**

##### **3-1-1 JAMARC (Fisheries Research Agency) tagging by Nippon maru (2004-2006)**

[2004-2005]

Nippon-Maruru (JAMARC, Fisheries Research Agency) cooperated the IOTC tagging from 2004 to 2006 using the spaghetti tags provided by the IOTC in the eastern Indian Ocean. In 2004, 2005 and 2006 (until end of March), 214 (39 SKJ, 89 YFT and 86 BET), 368 (154 SKJ, 10 YFT and 204 BET), and 258 (99 SKJ, 48 YFT and 111 BET) fishes were tagged and released from her purse seine catch. After the new Nippon maru started her operation in the late 2006 no tagging has been conducted because it is very difficult to capture individual fish without damage as the new vessel does not have the skiff boat.

[2006]

Tagging on tunas by Nippon-Maruru has not been done since August 2006 due to technical reason (lack of skiff boat).

##### **3-1-2 Small-scale tagging activities based on the Japanese fund (2005-2009)**

###### **(1) Tagging experiments**

There have been tagging activities in 3 areas using the Japanese funds to the IOTC, i.e., in the waters off west Sumatra, in the waters around the Andaman Sea and in the Maldivian waters. 1 or 2 Japanese tagging staff from National Research Institute of Far Seas Fisheries (Asakawa, temporal survey staff and Nishida, scientist) have been participated in these tagging activities.

[Off West Sumatra (2006-2007)]

The tagging off western Sumatra was conducted in October- November, 2006, but due to the strong El Nino effect, tuna and skipjack were not caught at all due to the cold surface temperature. Thus the tagging was ceased in November after the first leg was over. Then in September, 2007, the

second and third legs were resumed. In the 5 days before ending the leg 3, it was stopped due to the large earthquake off southern Sumatra. In the 2<sup>nd</sup> and 3<sup>rd</sup> legs about 300 tags were released.

[Andaman Sea (2008)]

The tagging in Andaman waters were conducted from January 19 to February 28, 2008 based in the port of Barmananla, south of Port Blair City in the Andaman Islands. During this period, 28 tagging trips were achieved including 16 live-bait stockings and 18 separate tagging operations.

[Maldives (2007-2009)]

In 2007 the tagging in the Maldivian waters was held for 2 weeks in October 2007 and tagged 750 fish. One Japanese staff (Asakawa, temporal survey staff in the NRIFSF) participated. Due to the bad weather and oceanographic conditions, planned later tagging cruises in 2007-2008 were cancelled. During 2008-2009, the last tagging experiments were conducted from December, 2008-April, 2009.

(2) Workshops (2008-2009)

[2<sup>nd</sup> workshop (2008)]

The second workshop was held in May, 2008 Indonesia. The tagging activities off Sumatra, in the Andaman Sea and Maldives were reviewed, As a result, (a) tagging in the Andaman waters will not be conducted any more as it is expected that not enough fish could be released, (b) last tagging activities off Sumatra and Maldives will be implemented in the beginning of 2008 using the remaining fund.

[3<sup>rd</sup> workshop (2009)]

The third (final) workshop was held in May, 2009, Addu Atoll, Maldives in May 4-5, 2009. In this workshop the review of the past tagging experiments funded by Japan (2005-2009) were reviewed and recommendations for the future tagging activities were made.

### **3.2 Research cruises by Nippon maru (JAMARC, Fisheries Research Agency) (2007-2009)**

[2007]

Nippon-maruru conducted research cruises on bycatch mitigation of juvenile YFT and BET using large mesh nets, fishing grounds, biology and acoustics monitoring.

[2008-2009]

Nippon-Marū conducted research cruises in eastern Indian Ocean. The main part of the research is mitigating bycatch of juvenile tunas. Acoustic estimation of target species and size were studied. Data on the catch rate of smaller tuna by purse-seine were collected.

#### **4. Other relevant information.**

##### **4.1 IOTC-OFCF projects (2002-2009)**

The IOTC-OFCF joint project to improve tuna fisheries statistics in the IOTC water have been implemented for last 8 years (2002-2009). 2009 is the last year of this project. Besides two addition activities on capacity buildings for fisheries officers and scientists in the developing counties have been also implemented in the past 8 years by OFCF and NRIFSF staff, i.e., one month training course on tuna fisheries statistics in Japan and (ii) atlas project to create tuna fisheries and resources atlas in Indonesian, Thai, Maldives and Sri Lanka.

##### **4.2 Working papers (2008-2009) (16 papers and documents)**

Following documents were submitted and presented in the various IOTC meetings during 2008 to late 2009.

###### **(1) SC11 (Victoria, Seychelles) (November, 2008) (2 papers)**

National Report of JAPAN (2008) National Research Institute of Far Seas Fisheries (NFIFSF), Fisheries Research Agency (FRA) and Fisheries Agency, Government of Japan (IOTC-2008-SC11\_INF19)

Eddrisea, Nugroho, Fujiwara, Itoh and Nishida (2008): Atlas of Tuna Fisheries and Resources in Indonesia (Indian Ocean) (IOTC-2008-SC11\_INF06 hard copy only)

###### **(2) Third workshop on the tagging in the central & eastern Indian Ocean (Addu atoll, Maldives) (May, 2008) (2)**

Asakawa and Nishida (2009) Report of the tuna tagging cruise in Maldives funded by Japan (3<sup>rd</sup> leg) : 10pp.

Nishida(2009): Review on tuna tagging experiments in the eastern-central Indian Ocean for 30 years (1980-2009) and its future prospect.

#### 4.3 WPB (Working Party for Billfish) 7 (Victoria, Seychelles) (July, 2009) (4)

IOTC-2009-WPB-08 (Nishida and Wang) Estimation of the abundance index of swordfish (*X. gladius*) in the Indian Ocean based on the fine scale catch and effort data in the Japanese tuna longline fisheries (1980-2007)

IOTC-2009-WPB-09 (Nishida and Wang) Preliminary stock assessment of swordfish (*X. gladius*) in the Indian Ocean by the Age Structure Production Model (ASPM) (1952-2007)

IOTC-2009-WPB-11 (Wang and Nishida) Preliminary application of an age-structured assessment model to swordfish (*Xiphias gladius*) in the Indian Ocean

IOTC-2009-WPB-12 (Wang and Nishida) CPUE standardization of swordfish (*Xiphias gladius*) caught by Taiwanese longline fishery in the Indian Ocean for 1980-2007

#### 4.4 WPTT11 (Mombasa, Kenya) (October, 2009) (10)

Document	Title
IOTC-2009-WPTT-04	Application of Global Generalized Models to BET stocks". <i>E. Chassot, T. Nishida and A. Fonteneau</i>
IOTC-2009-WPTT-05	Japanese longline CPUE for bigeye tuna in the Indian Ocean up to 2008 standardized by GLM. <i>H. Okamoto, K. Satoh and H. Shono</i>
IOTC-2009-WPTT-06	Standardization of annual and quarterly CPUE for yellowfin tuna caught by Japanese longline fishery in the Indian Ocean up to 2008 using general linear model. <i>H. Okamoto, K. Satoh and H. Shono</i>
IOTC-2009-WPTT-18	BET fine scale STD CPUE. <i>K. Satoh, T. Nishida, H. Okamoto and H. Shono.</i>
IOTC-2009-WPTT-20	Updated stock assessment for bigeye tuna in the Indian Ocean up to 2008 using Stock Synthesis III (SS3). <i>H. Shono, K. Satoh, H. Okamoto and T. Nishida</i>
IOTC-2009-WPTT-25	<i>Development of the ADMB based ASPM software (final stage): Rademeyer and Nishida</i>
IOTC-2009-WPTT-26	Development of the Stock Trajectory (Kobe plot) software (initial stage): <i>Nishida, Matsuo and Itoh</i>
IOTC-2009-WPTT-27	BET SA by the ADMB based ASPM : <i>Nishida and Rademeyer</i>
IOTC-2009-WPTT-Inf04	Comparison between GLM and Spatial GLM : <i>Pereira, Leandro, Petrere and Nishida</i>
IOTC-2009-WPTT-Inf06	Review on tuna tagging experiments in the eastern-central Indian Ocean for 30 years (1980-2009) and its future prospect. <i>T. Nishida</i>

#### 4.6 SC12 (Victoria, Seychelles) (December, 2009) (2)

National Report of JAPAN (2009) National Research Institute of Far Seas Fisheries (NFIFSF), Fisheries Research Agency (FRA) and Fisheries Agency, Government of Japan (IOTC-2009-SC12\_INF07).

Jauharee, Fujiwara, Adam, Itoh, Nishida and Anderson (2009): Atlas of Tuna Fisheries and Resources in Maldives (IOTC-2009-SC12\_INF09 (hard copy only).

