National Report - JAPAN 2003

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

December, 2003

1. General Fisheries Statistics

1-1. Longline fishery

The latest available longline data is that of 2002 although the data of 2002 is quite preliminary. All catch and effort statistics were compiled using logbook data.

1-1-1. Fishing vessels

Japanese longline fishery is classified into three categories (coastal, offshore and distant water) according to the license and boat size (coastal: less than 20 gross tonnage (GRT), offshore: 10-120GRT, and distant 120-500GRT). Basically, longline vessels of distant water category have been operated in the Indian Ocean. Since some offshore longliners are also allowed their operations in this Ocean, there is no operation by them recently. In the last fifteen years, the number of vessels operated in this Ocean was around 180-250 vessels per year. Although it was relatively large in number (224-251) during 1995-1998, it decreased to 223 in 1999 from 242 in 1998, and has been less than 200 thereafter (Table 1). This decrease is considered to be caused by the 20% reduction of Japanese longline fleet achieved in 1999.

1-1-2. Fishing effort

Total fishing effort (the number of hooks) by Japanese longliners (including offshore and distant water longliners) in the Indian Oceans, which was about 125 million hooks in 1997 and 1998, and decreased to 100–110 million in 1999 through 2002 according to the decrease of vessels. In the latest five years, the fishing effort used in this Ocean in the total has been relatively stable around 27% (Fig. 2).

Yearly and quarterly distributions of the longline effort in Indian Ocean are shown in Fig. 3 and 4 for 2001 and 2002, respectively. The seasonal pattern of longline operation has been more or less the same in recent years.

1-1-3. Catch

Information on catch in weight from 1998 to 2002 caught by Japanese longliners in the Indian Ocean was shown in Table 2 (Data of 2002 is preliminary), and geographical distributions of catch in 2001 and 2002 for major species were shown in Fig. 5. Total catch includes the catch for southern bluefin tuna, albacore, bigeye, yellowfin, swordfish, striped marlin, blue marlin, black marlin, sailfish, shortbill spearfish, and skipjack. Catch for each species in 2002 (2001) was 3,139 (4,850MT) for southern bluefin, 3,182MT (3,006MT) for albacore, 13,955MT (12,779MT) for bigeye and 15,162MT (14,029MT) for yellowfin. As pointed out by Matsumoto et al. (2000), the proportion of yellowfin in the total catch has been increasing in recent years, and exceeded that of bigeye since 1999.

1-2. Purse Seine Fishery

The latest available data for Japanese purse seine fishery is those for 2002. The catch and effort data in 2002 is preliminary.

1-2-1. Fishing vessels

Japanese purse seine vessels in the Indian Ocean are 350-700 GRT class (700-1000 carrying capacity). Change in the number of purse seine vessel in the latest five years was shown in Table 1. 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. Now, merely Nippon-Maru, the research vessel of Fisheries Research Agency, is operating in this Ocean.

1-2-2. Fishing Effort

Total fishing effort (operation days + searching days), which was 2393 days in 1992, decreased drastically to 262 days in 2001 and 134 days in 2002 (Table 3). Geographical distribution of Japanese purse seine effort in 2001 was shown in Fig. 6.

1-2-3. Catch

Catch in weight of skipjack, yellowfin and bigeye in 2002 (2001) was 1,160MT (1,830MT), 182MT (603MT) and 328MT (592MT), respectively.

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:

(1) Collection of more size data

Tuna longline fisheries industries in Japan have been collecting size data voluntary basis in the past. In recent years, they can collect the data only when there are requests due to regulations of the fisheries management and it is not possible for them to collect size data in other situation. This is because it has been extra work loads for them to collect size data and they could not do it as a routine wok under busy fishing operations by limited man powers. Thus, it will be not anticipated to be able to collect more size data unless special requests to the industries. The situations are likely similar to Japan in the other longline fishing nations such as in Taiwan and Korea.

(1) Search for the historical weight data

Scientists in our Yaizu-port Research Section has been collecting fishers' notes regarding their longline fishing operations from the middle of 1980's, which included fish weights without gills and guts. Such weights data had been entered to our database. However these notes are confidential information, hence scientists need to have reliable relations with fishers and need strong personal will and effort to get the data. This is because it is not the routine work, but its is rather voluntary basis work. Hence, the amounts of these weight data depend on the personal efforts of the scientists. In recent years, the amounts of the data have been decreasing because of less effort. Under such circumstances, we can not expect to obtain such weight data from the fishers' confidential notes without extra voluntary basis efforts made by scientists.

Likewise, such fishers' notes are likely available in the Taiwanese and Korean longliners. If scientists try to collect not only from Japan but also from such countries, we might be able to get considerable amounts of past weight data. Although, as mentioned, these notes are top -secret information, thus scientists collecting such data need reliable relationships with the fishers and they also need great personal efforts. For these reasons, collecting such data is not easily achieved.

Besides the fishers' notes, other sources of the historical fish weight data can be found 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 data collected, 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) is not indicated. As a result, these weight data are not at a satisfactory level to be used for tuna resources analyses. Hence, collecting these data seems to be useless.

As a conclusion, it does not seem to be a feasible task for us to collect historical weight data.

(3) Tagging in the eastern Indian Ocean

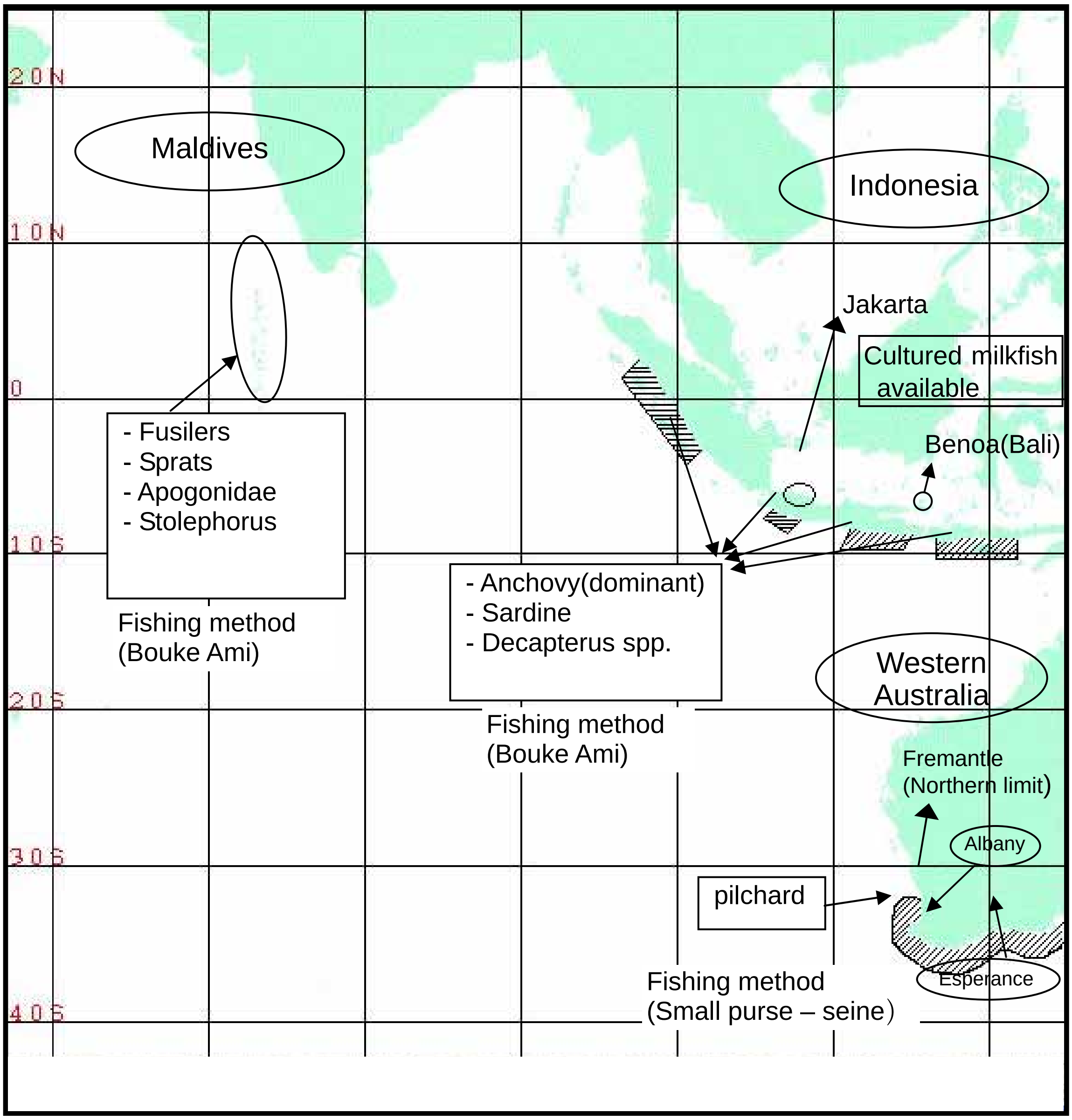
We plan to carry out the tagging experiment in the eastern Indian Ocean from February to March to confirm if it is feasible. Detail information is described in Section 3.2 of this report and also in IOTC/WPT/03/12 (*Provisional plan on tuna tagging experiments in the eastern Indian Ocean by Japan by National Research Institute of Far Seas Fisheries*).

(4) Investigation of the status of the live bait for the tagging experiments

The availability of milk fish to be used for the live bait in the Japanese tagging experiment in the eastern Indian Ocean was investigated. Detail information is available also in IOTC/WPT/03/12, which is quoted as below:

> *Availability of live bait is the key issue to achieve the successful tagging experiments using the pole & line and the troll line fishing methods. Milkfish (Chanos chanos) is considered to be the most effective live bait because it is known that milkfish can live even in the extreme environmental conditions, i.e., waters under euryhalin (0 – 158 ‰), high temperature (20 to 33 ºC) and low dissolved oxygen concentration (1mg/L as the minimum level). According to the live bait company in Japan, live milkfish (around 5 cm for the tuna tagging experiments) can be supplied at Makurasaki-city, Kyushu, southern part of Japan, Benoa (Bali) or Makassar (Celebes) in Indonesia. The cost of the live milkfish for four weeks (2x two weeks) cruises in FY2003 is estimated to be around $10,000 (150,000 fishes) if one live fish cost were around Japanese 8 yen (or US 6-7 cents).*

The status of the live bait for the tagging experiments in the central and eastern Indian Ocean (Indonesia, Western Australia and Maldives) was also investigated and reported in IOTC/WPT/03/Inf3 (*Current situation of live baits for the tuna tagging experiments in the central-eastern Indian Ocean:- Maldives, Indonesia and Western Australia – by Nishida, Gafa, Waheed and Totterdell*). The map next page describes the situation.



In addition, the status in Sri Lanka was also investigated when the 2nd IOTC-OFCF mission (RE: country report project) dispatched to Sri Lanka in September, 2003, which is quoted from the mission report as below:

> *Also, although having indirect information to the Country Report, the Mission identified the following item with regard to live bait fishing related to the IOTC tagging project. Some of species of live bait available in Sri Lanka are the same as those in the Maldives. Because live bait can be obtained (although the*

obtainable amount is small) and because availability of the baits vary by season (monsoon) and areas (east, west coast etc), it will be necessary to contact Dr (Mrs) Amarasiri (NARA), the coordinator of the IOTC tagging project in Sri Lanka, in order to obtain live bait in advance for the IOTC tagging operations.

(5) Continuation of the predation survey

The predation survey has been progressed in three Oceans since September using some 450 Japanese tuna Longliners belonging to the Japan Tuna Federation, which will be terminated in August, 2005. The progress report to date is available in IOTC/SC/03/__ .

(6) Improvement of the CPUE Standardization

The habitat based yellowfin tuna CPUE standardization of the Japan longline fisheries was attempted. Details are described in IOTC/WPTT/03/5, i.e., *Comparative study on Japanese tuna longline CPUE standardization of yellowfin tuna (Thunnus albacares) in the Indian Ocean based on two methods - General Linear Model (GLM) and Habitat-Based Model (HBM)/GLM combined - (1958-2001) by Nishida, Bigelow and Marsac,* which summary is provided as below:

> *We attempted to compare results of two methods to standardize yellowfin tuna CPUE of Japanese tuna longline fisheries, i.e., General Linear Model (GLM) and Habitat-based Model (HBM)/GLM combined approach. In the CPUE standardization for the Indian Ocean tropical tuna (yellowfin and bigeye) in the past, the GLM has been primarily used. Although the HBM approach has been developed and applied mainly for billfishes, in recent years the HBM has also been applied for the tropical tuna in the Pacific Ocean. As the HBM approach takes into account actual depths of habitat and gear deployed into the model, it may provide a more realistic and reliable CPUE standardization. Thus, as a first attempt using the HBM/GLM for the Indian Ocean tropical tuna, we shall evaluate results produced by the two approaches, then we shall discuss the feasibility whether the HBM/GLM approach can be recommended for future CPUE standardizations. As a first step, we use minimum information (depth distribution of longline gear and vertical distribution of yellowfin tuna) to carry out a fundamental HBM/GLM without considering specific oceanographic data such as shear current, depth specific temperature and oxygen. As the HBM/GLM combined approach was resulted to be more effective than the GLM approach, we further discussed the research needs to conduct more practical and accurate HBS/GLM analyses in the future.*

In addition, the joint research works with a Taiwanese scientist to separate the Taiwanese longline gear into the regular and the deep type was conducted and reported in IOTC/WPTT/02/19, i.e., *Some considerations to separate Taiwanese regular and deep longliners by Lee and Nishida.*

3. Progress on national research programs currently in place

3-1 Study on behavior of small tunas aggregated around FAD

Diurnal vertical and horizontal movement of small tunas and skipjack around FAD is observed simultaneously by using ultra-sonic coded transmitters. This research is conducted in the tropical region of the West Pacific Ocean by Shoyo-Maru in November 2003.

The final objective of this research is to find alternative methods for reducing the catch of juvenile bigeye and yellowfin tunas by the purse-seine fishery.

3-2 Tag and release research for tunas and skipjack in the eastern Indian Ocean.

Tag and release research using No.2 Taikei-Maru will be achieved in the eastern Indian Ocean from February to March 2004. Fishing gears to catch the fishes to be tagged will be pole and line, hand line and trolling. The number of fish to be tagged is expected around two thousand in total.

This research will be planed and achieved by the scientists of NRIFSF (National Research Institute of Far Seas Fisheries) of FRA (Fisheries Research Agency) as the contribution of Japan to the IOTTP (Indian Ocean Tuna Tagging Program).

3-3 Tag and release research for southern bluefin and bigeye off Cape Town

Tag and release research using chartered longline vessel, No.21 Fukuryu-Maru is on going off Cape Town during the period from October to December in 2003. Since the main target species of this research is southern bluefin tuna, tagging on bigeye tuna is also conducted. Until now, as of 18th November, 122 sub-adult bigeye tunas (average weight is about 25kg) were tagged and released at South-East off Cape Town, 39°S-41°S and 30°E-40°E. This research is conducted by FRA.

4. Other relevant information.

None

Table 1. Number of Japanese boats operated in the Indian Ocean. Data of 2002 for longliner and 2001 for longliner and purse seiner are preliminary.

Fleet/Year	1998	1999	2000	2001	2002
Longliner	**242**	**223**	**192**	**196**	**185**
Purse seiner	**4**	**3**	**2**	**2**	**1**

Table 2. Fishing effort and catch in weight (MT) by the Japanese longline fishery in the Indian Ocean (IOTC statistical area), 1998-2001. **Data of 2002 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
1998	**42**	**123977**	**46930**	**5780**	**3214**	**17125**	**16803**	**2241**	**273**	**1173**	**170**	**131**	**15**
1999	**37**	**107521**	**38968**	**5032**	**2283**	**13997**	**14662**	**1538**	**282**	**794**	**187**	**124**	**66**
2000	**35**	**102982**	**38416**	**3632**	**2567**	**13558**	**15475**	**1569**	**337**	**949**	**142**	**155**	**29**
2001	**36**	**108534**	**36689**	**4850**	**3006**	**12779**	**14029**	**1225**	**135**	**450**	**73**	**110**	**30**
2002	**36**	**110166**	**37777**	**3139**	**3182**	**13955**	**15162**	**1378**	**150**	**587**	**83**	**107**	**33**

Table 3. Catch and effort statistics for the Japanese purse seine fishery in the Indian Ocean. The unit of catch and effort are metric ton and days (search and operation days), respectively. **Data of 2002 is preliminary**.

Year	Days F.	Total	SKJ	YFT	BET
1998	**701**	**8612**	**5748**	**1949**	**915**
1999	**483**	**6988**	**4588**	**1501**	**899**
2000	**321**	**4032**	**2332**	**953**	**747**
2001	**262**	**3025**	**1830**	**603**	**592**
2002	**134**	**1671**	**1161**	**182**	**328**

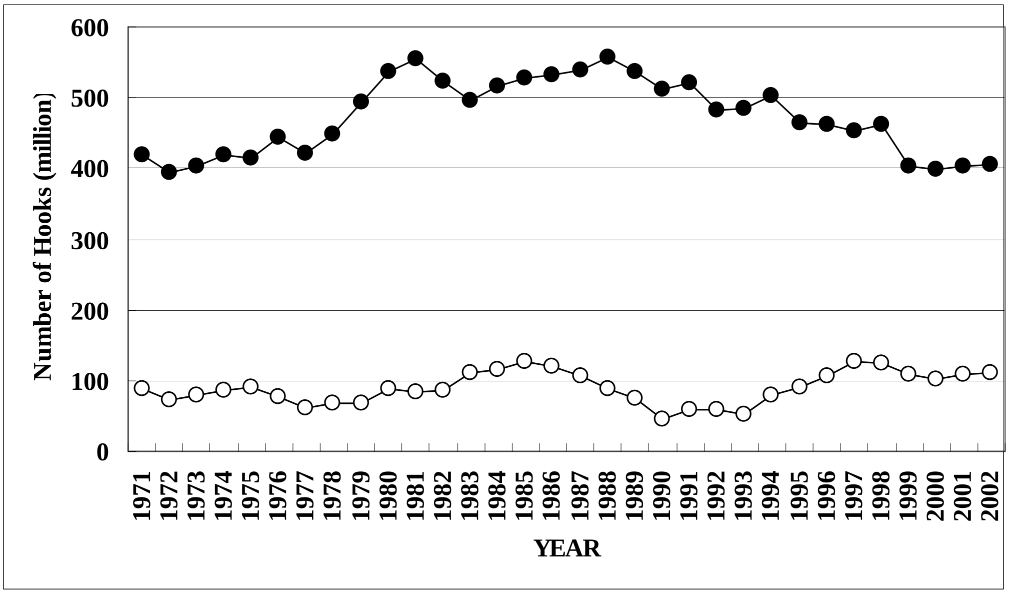


Fig. 1. Historical change in total Japanese longline effort in the all Oceans (solid circle) and the Indian Ocean (open circle)

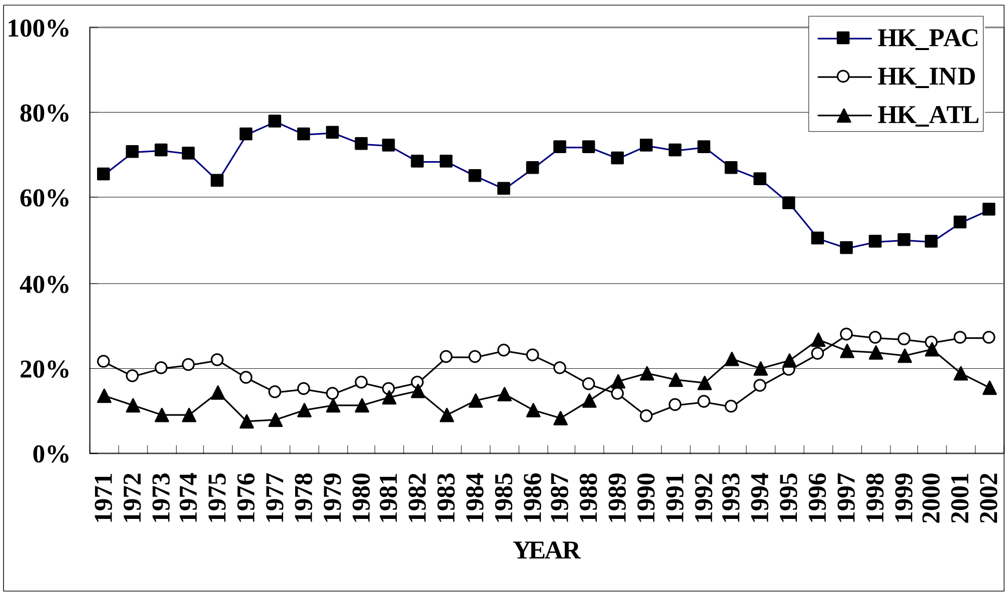


Fig.2. Historical change in the percentage of effort exerted into each Ocean basin.

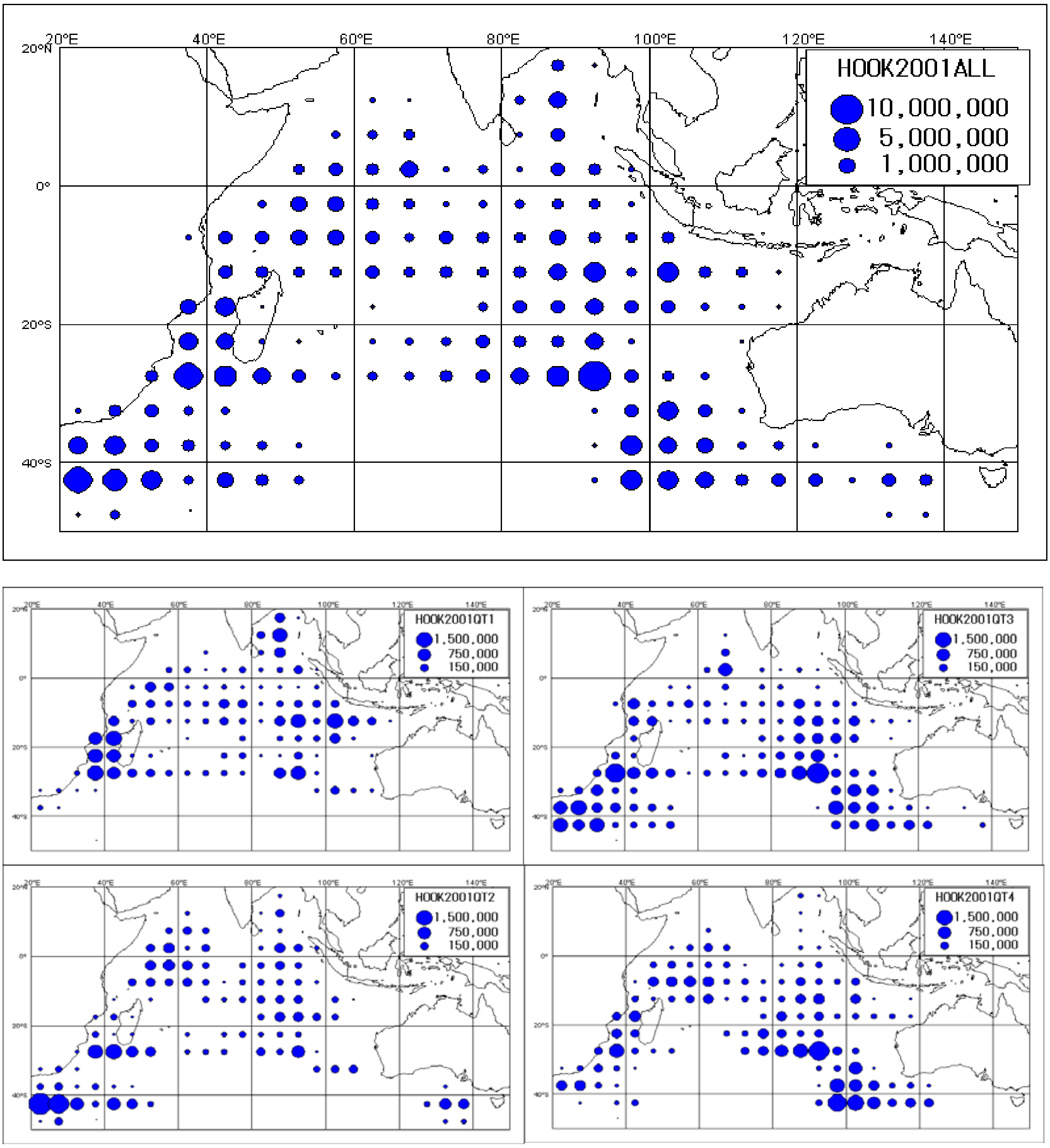


Fig. 3. Yearly and quarterly Longline effort distribution in the Indian Ocean in 2001.

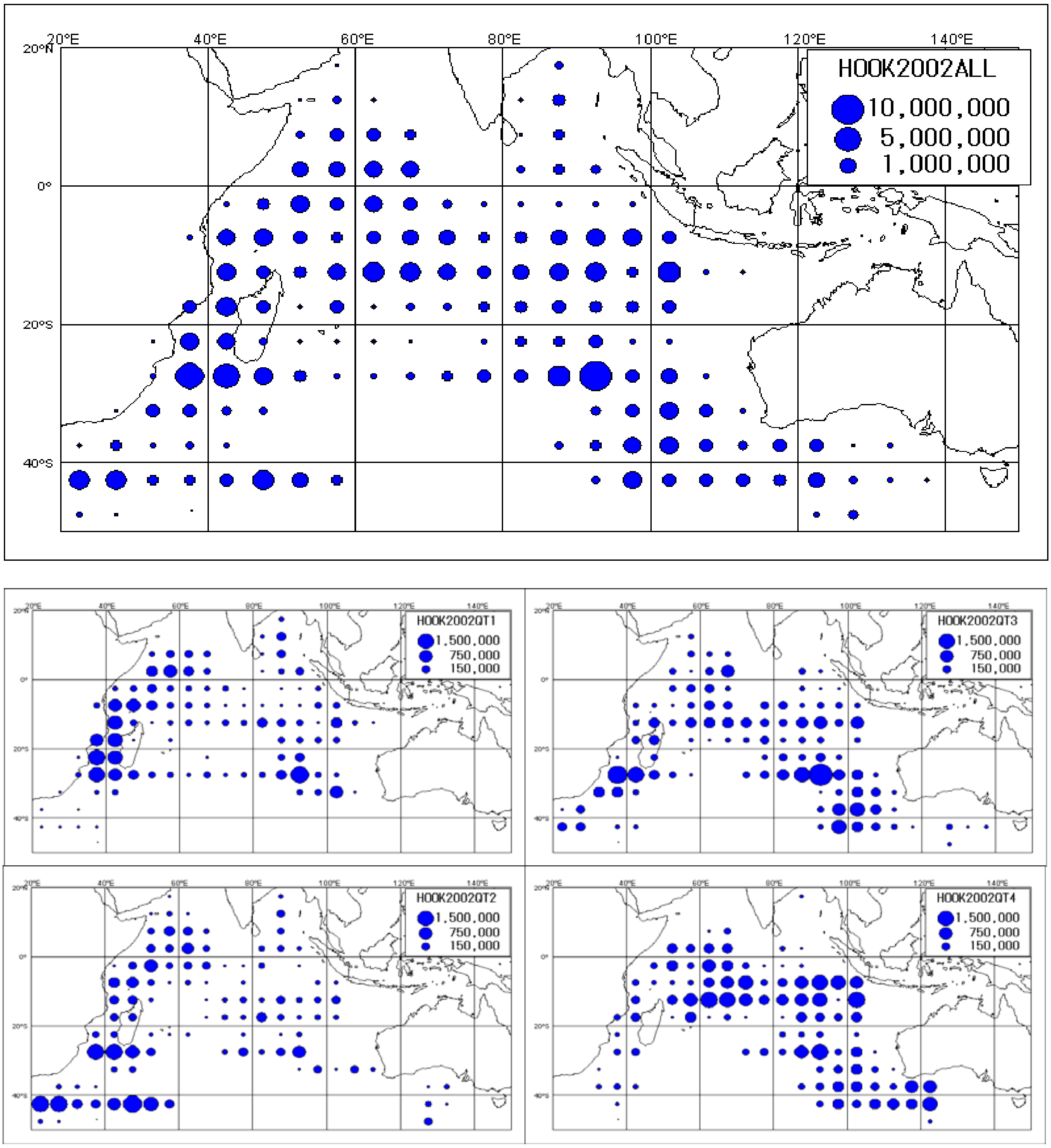


Fig. 4. Yearly and quarterly Longline effort distribution in the Indian Ocean in 2002.

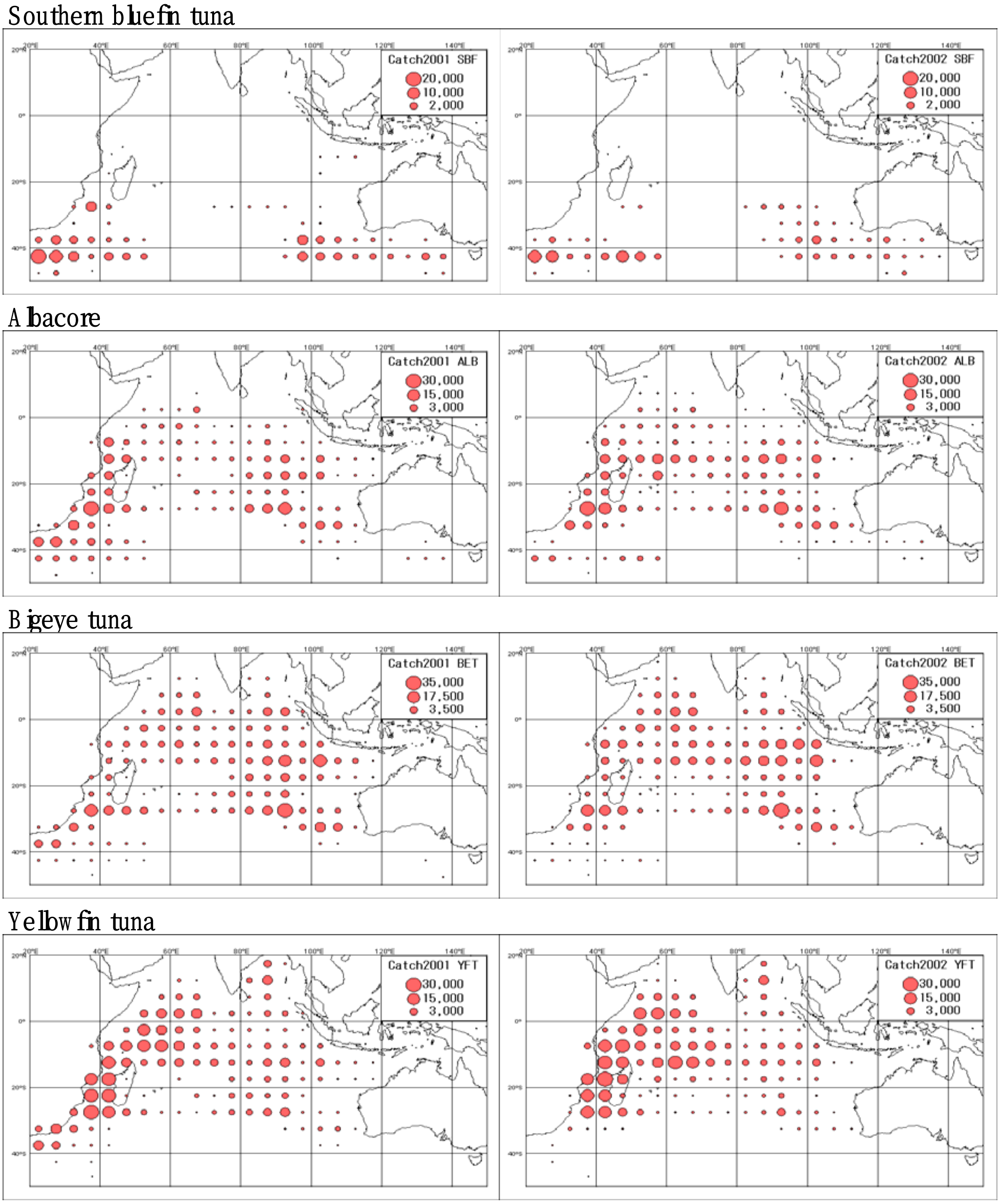
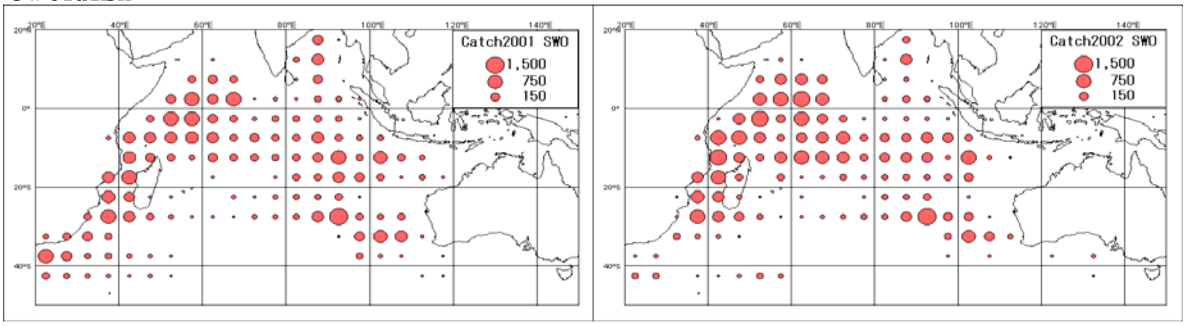
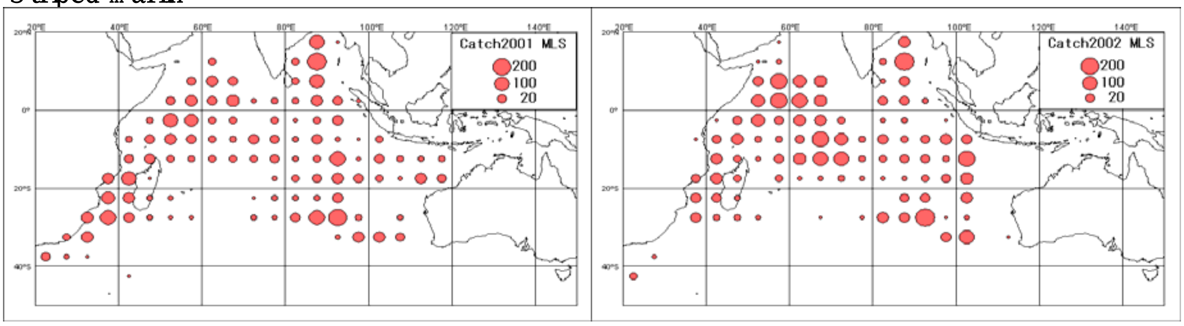


Fig. 5. Geographical distributions of catch in number of major species caught by longline fishery in 2001 (left) and 2002 (right).

Swordfish



Striped marlin



Blue marlin

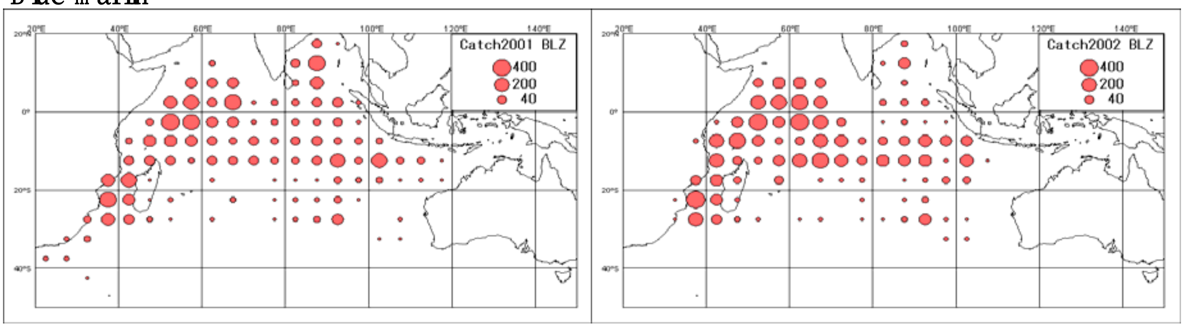


Fig. 5. continued.

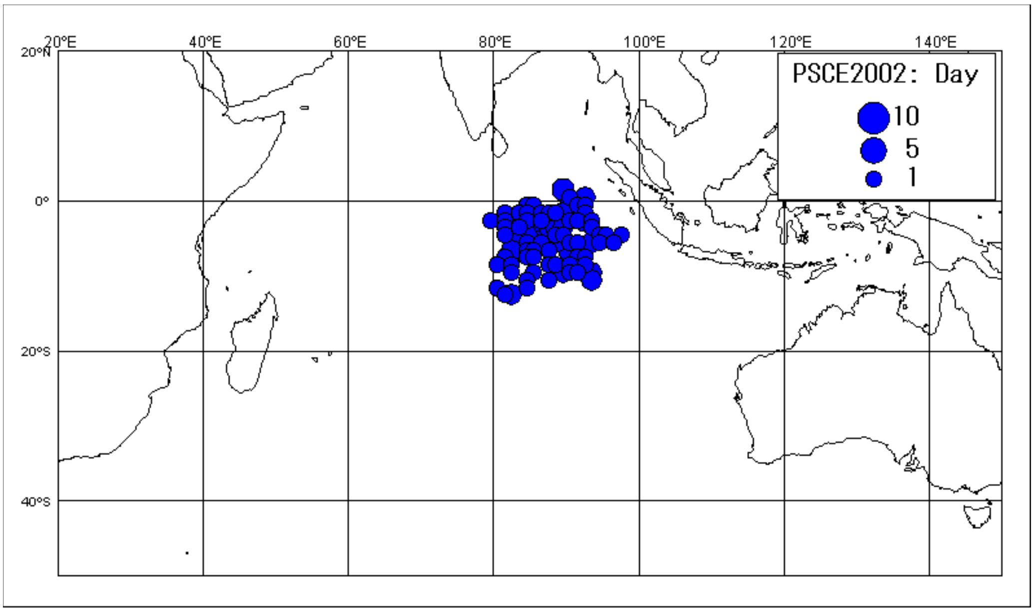


Fig. 6. Distribution of Japanese purse seine effort (days) in the Indian Ocean in 2002.