National Report of Japan

Overview of Researches on Ecologically Related Species in Japanese SBT Longline Fishery, 2003-2004

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1. Introduction

Japanese fleet is using only longline gear to catch southern bluefin tuna. Since 1952, Japanese longline operation has started in the Indian Ocean, although southern bluefin tuna was sub-target species for the longline fishery targeting yellowfin and bigeye tuna during the early stage of fishery. This is because of the fact that southern bluefin tuna in the tropical region were mostly spent with low meat quality so fishermen did not target it. Further south fishing grounds in the temperate waters for this species were developed in the late 1950s and 1960s. In addition, the innovation of super cold freezer has accelerated demand of “sashimi” grade southern bluefin tuna meat to the Japanese market. Recently the number of fishing vessels targeting southern bluefin tuna is decreasing continuously due to the strong regulation for stock management and government policy to reduce number of longline vessels several times done in the past.

Although varieties of animals were encountered in the Japanese southern bluefin tuna fishery, some of them were dominated in the catch. Such species were butterfly tuna, albacore, bigeye tuna, swordfish, lancet fishes, moon fish, pomfrets, oil fish, escolar and ocean sun fish for the teleosts. Regarding elasmobranchs, velvet dogfish, shortfin mako shark, porbeagle, blue shark and pelagic stingray were dominated. For the incidental capture of albatross, tori-pole was used voluntarily by the fishermen in the early 1990s, and to use tori pole has become a mandate of the CCSBT since 1997. Research effort to modify tori-pole and develop alternative methods possibly avoiding incidental capture of seabirds continued. According to the international plans of action for reducing incidental catch of seabirds in longline fisheries and for the conservation and management of sharks, Japan has developed national plans of action and has been promoting mitigation of incidental take of seabirds and management of pelagic sharks.

2. Review of SBT Fisheries

Fleet size and distribution

The number of fishing vessels has been decreasing since the peak of about 300 in 1985. The number of vessels ranged 205-168 in the past five years and 168 in 2002. Fisheries Agency of Japan had reduced number of vessels by 69 in 1981, 100 in 1982 and 132 in 1998. Vessel reduction policy in 1998 would influence further decline of number of vessels after then. Recent fishing grounds were off Cape of Good Hope (Area 9), southern Indian Ocean (Area 8) and water near Tasmania Island (Area 4, 7). The vessels were operating at Area 4, 7 and 8 in the second quarter, and Area 9 in the third quarter.

Distribution of Catch and Effort

General distribution of southern bluefin tuna and effort in the recent years, 1998-2004, was almost same as the distribution of major fishing grounds mentioned above. High fishing season for each area has a general pattern due to voluntarily regulation of fishing effort; Area 4 May-July, Area 5 April-June, Area 8 September-December, Area 9 May-July. The area 8 is used in the late fishing season, therefore the amount of fishing effort in the area varied depending on the remaining quota for the fishing year.

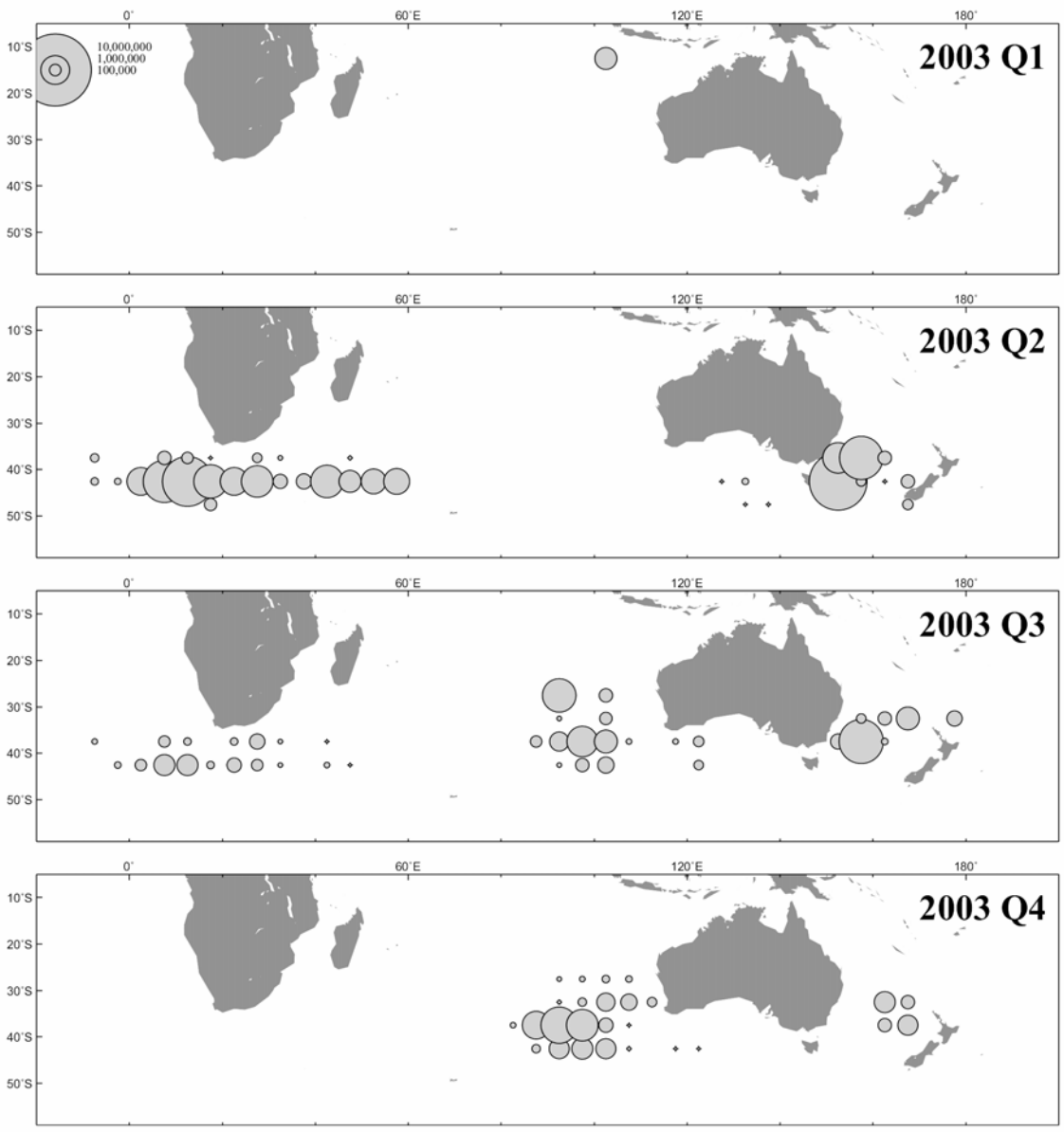

Fig.1. Number of Hooks by quarter and 5x5 degrees square in 2003.

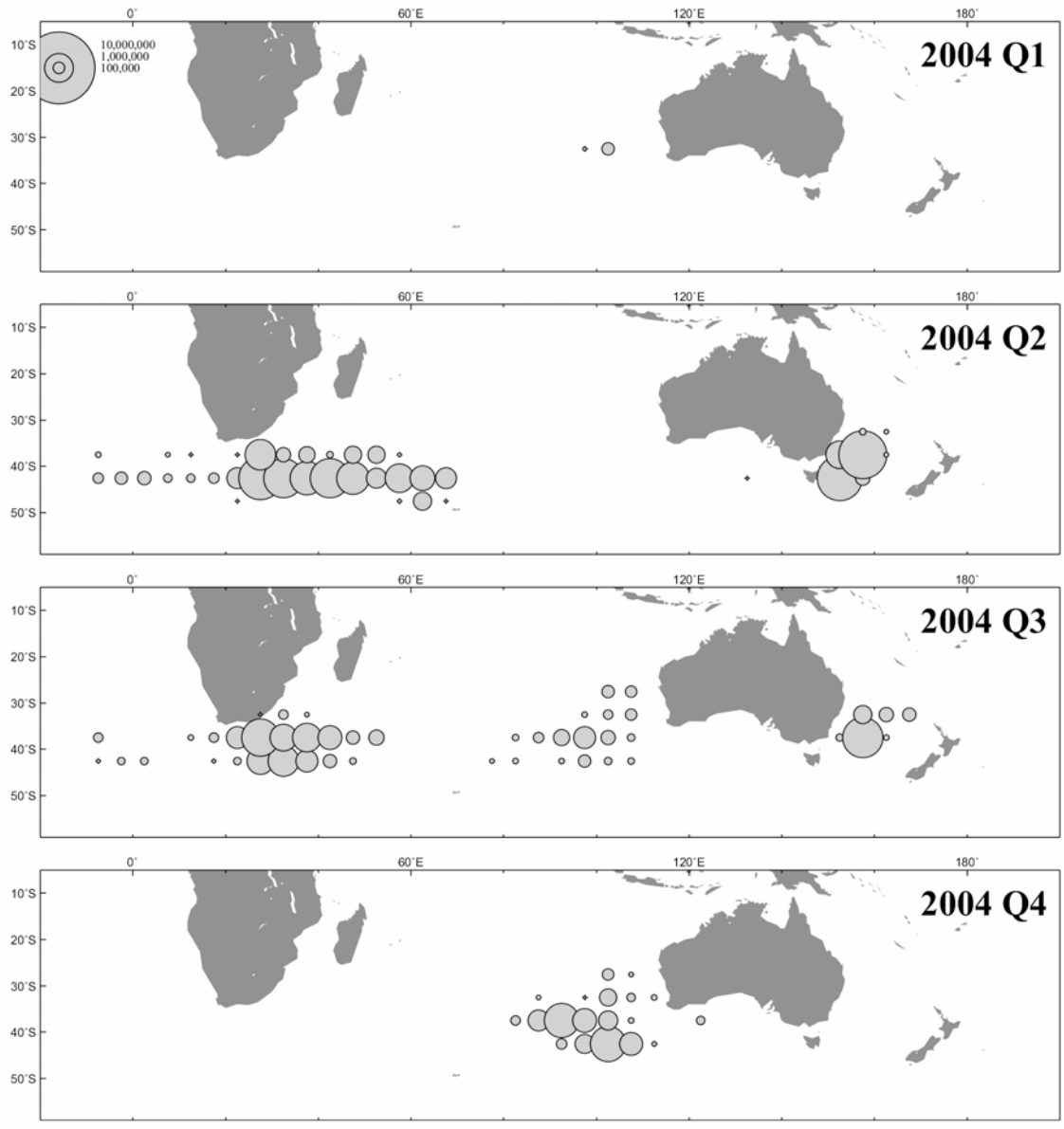

Fig.2. Number of Hooks by quarter and 5x5 degrees square in 2004.

3. Fisheries Monitoring for Each Fleet

Since 1991, Fisheries Agency of Japan has carried out Real Time Monitoring Program (RTMP) to monitor the catch of southern bluefin tuna. The number of vessels monitored by the program were 12-15 during 1991-1994 and all the vessels operating southern bluefin tuna fishing ground since 1995. Each vessel sends daily reports including fishing position, effort, and catch by species in number and weight by FAX to the Fisheries Agency. The information is recorded into computer file in a short period.

Since 1992, Japan has conducted scientific observer program on southern bluefin tuna fishery and collected information including fishing position, effort, catch by target and non-target species, biological information, incidental catch of seabirds, etc. In 2003 and 2004,

15 cruises for each year and 663 and 677 operations were observed, respectively. Coverage of observation was 7.1-6.4 % for cruises and 4.9-4.4 % for operations (Table 1). Basically the observation effort was distributed in proportion to the fishing effort for each area and season. However, in the 3rd quarter of 2003, the observation effort concentrated in the area 4 and did not cover the area 9 (CCSBT-ERS/0602/Info08). To implement the scientific observer program, the Fisheries Agency Japan spent US$345,000 in 2003 and US$339,000 in 2004. Details of the observer costs are described in CCSBT-ESC/0509/37.

Table 1. Number and coverage of cruises, sets and hooks observed in the Japanese RTMP observer program in 2003-2004.

Year	Observed Number			Coverage		
	cruises	sets	hooks	cruises	sets	hooks
2003	15	663	1,678,573	7.1%	4.9%	4.2%
2004	15	677	1,685,856	6.4%	4.4%	3.8%

The effect of blue-dyed bait and Tori-pole streamer for the reduction of incidental take of seabirds was examined in an experimental fishing operations off South Africa in 2003 in (CCSBT-ERS/0402/11).

4. Seabird

Seventeen species of seabirds were recorded through the scientific observer program in 2003-2004. Catch rates of seabirds estimated for strata defined by fishing season and area ranged 0.018-0.207. Average catch rates was estimated at 0.093 and 0.121 for 2003 and 2004, respectively. Annual total number of seabirds incidentally caught by Japanese high-sea SBT longline vessels was estimated at 3,630 and 5,104 for these years. Although higher numbers were calculated for 1999-2000 due to biased observer coverage in these years, the estimates for 2003-2004 were slightly lower than the level for 2001-2002. These results suggest that incidental take of seabirds in Japanese high-sea SBT longline fishery has been around 4,000-9,000 birds/year since 1996（Fig. 3, CCSBT-ERS/0602/Info10）.

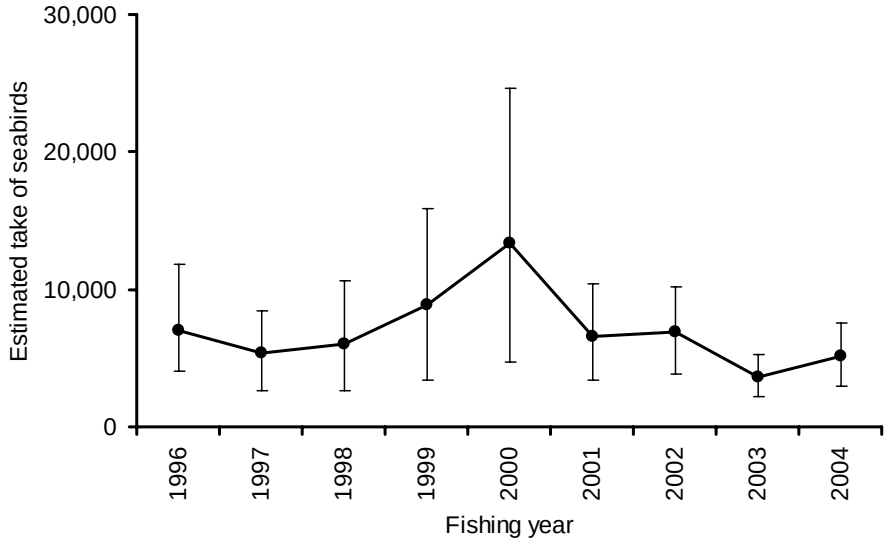

Fig. 3. Annual changes in estimated incidental take of seabirds in the Japanese RTMP for 1996-2000 fishing years. Vertical bars indicate 95% confidence intervals. Estimates for 1996-2004 were re-calculated based on the revised data and method.

5. Other Non-target Fish

Seventeen species of elasmobranchs were reported by scientific observer program of southern bluefin tuna fishery. Blue shark was most dominant occupying about 71-74% of elasmobranch catch observed, followed by porbeagle (19-12%). Velvet dogfish, shortfin mako shark, thresher sharks and pelagic stingray were also much caught. The standardized CPUE for blue shark, porbeagle and shortfin mako shark were calculated using the RTMP and EFP observer data from 1992 to 2004. There were not the drastic changes of CPUE for the three species during this period (Fig. 4, CCSBT/ERS/0602/15).

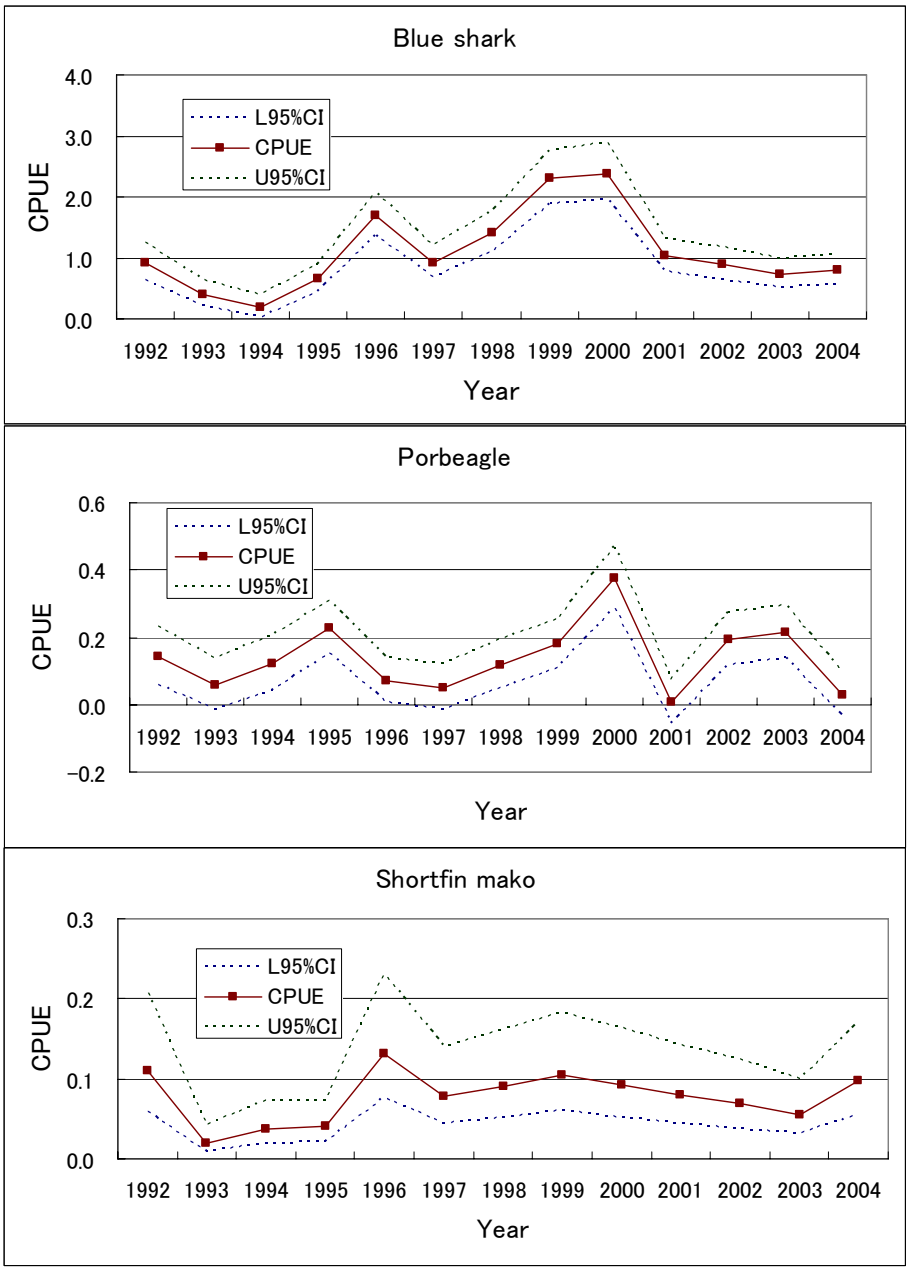

Fig. 4. Standardized CPUEs and 95% confidence intervals for three shark species obtained from Japanese observer data

In the RTMP and EFP observer program, 2,844 sharks of 9 species were released with tags by the research vessels and scientific observers in about 8 years until 2005. Blue shark was the most dominant species occupying 79% of sharks tagged, followed by porbeagle (16%). Seventeen tags, 15 blue sharks and 2 porbeagles, were recaptured. Ratio of recapture was 0.6 %. The longest time at liberty is 1105 days and the longest migration is 3400 km, both of them were blue sharks (CCSBT-ERS/0602/16). The number of the recaptured sharks is not enough to make clear the migration pattern and the population structure. So it is necessary to increase the number of tagged sharks.

Many teleosts were caught by longline fishery except for tunas and billfishes in the SBT fishing ground. Forty-one species of teleost fish including tuna and billfish were identified in the RTMP observer data from 2003 to 2004. Butterfly tuna, escoler, oilfish, opah, lancetfishe, sunfish and pomfrets were the major components of teleost catch (except tuna and billfish) recorded in the in the high sea longline fishery (CCSBT-ERS/0602/Info08).

6. Marine Mammal and Marine Reptile

One loggerhead sea turtle and one toothed whale were recorded through the Japanese scientific observer program in 2003-2004. Both individuals were released alive (CCSBT-ERS/0602/Info08). Incidental capture of marine mammal and marine reptile occurred at a negligible level in the Japanese high-sea SBT longline fishery. There is not enough number of observations for the appropriate statistical estimation of the total incidental catch for these animals.

7. Mitigation Measures to Minimize Seabird and Other Species Bycatch

Current Measures

Mandatory measures (Tori Line)

The Government of Japan has introduced a mandatory measure for tuna longliners to use Tori Line while targeting southern bluefin tuna as the terms of conditions of license to avoid incidental catch of seabirds since 1997. Any violation of this condition is subject to punishment. The Government of Japan makes this mandatory measure known to every fisherman by specifying in the license.

Tori Line is the device of drawing lines (150-200m) with threatening streamers from poles standing at the end of ships. The same streamer as the standard type of CCSBT/ERS is recommended, but each vessel use their own types of streamer which are adapted to the shape of vessels or the methods of operations. The effects of avoiding incidental catch of seabirds were not same by vessels. The best method to gain much effect is to set the streamer just above the baits thrown on the sea surface by adjusting the length and angle of the pole.

Monitoring System and the situation of deployment

The Government of Japan is taking necessary measures to enforce and monitor the mandatory usage of Tori Line including dispatch of enforcement vessels to the fishing areas, and deployment of observers on board of operating vessels. The observers boarding are changed annually.

Voluntary Measures

In February 2001, the Government of Japan developed “Japan’s National Plan of Action for reducing incidental catch of seabirds in longline fisheries” in accordance with “International Plan of Action for reducing incidental catch of seabirds in longline fisheries” of FAO, in which Fisheries Agency of Japan instructed every fishermen to voluntarily carry out night line-setting, use of weighted branch line or cone to ensure speedy precipitation of bait, use of automatic bait casting machines and use of properly defrozen bait in addition to the mandatory requirement for fishing vessel to use Tori Line.

Most vessels conduct the night setting partially by starting line setting before sunrise.

A lot of Japanese tuna longline vessels use automatic bait casting machines, which have effect to decrease the incidental catch of seabirds by avoiding irregular stream and sinking baits quickly as well as casting baits just under the Tori Line. In 2003-2004, 96.3% of vessels (26/27) which had observers equipped that kind of machines.

There are two methods to sink the baits quickly, which are the use of weighted branch lines and of thawed bait. Regarding weighed branch lines, two methods exist. One is to attach lead weights to the nylon leader and the other is to use the heavy nylon cord in between nylon leader and branch line. It was difficult to research in detail because fishing masters modified the modes of branch lines and wanted to keep them in secret. At least two vessels used lead weights attached near the fishing hooks. Use of thawed bait is another method to improve the sinking rate of baited hooks. In 909 operations observed, partially-thawed bait was used in 641 operations (70.5 %), and fully-thawed bait was used in 38 operations. (29.4%).

There observed three vessels which took the strategic offal control to lead seabirds to the far place from vessels temporarily by casting the remaining baits to the side opposite to that of throwing the lines in case of many seabirds gathering. A water-jet device was used in a vessel to repel seabirds from baited hooks during line setting (Fig. 5).

Fig. 5. A water-jet device used on a commercial fishing vessel observed in 2003.

Measures under Development/Testing

The effect of blue-dyed bait and Tori-pole streamer for the reduction of incidental take of seabirds by the Japanese Southern Bluefin Tuna longline fisheries was examined in 2003. The side effect of blue-dyed bait on the catch rates of target fish was also examined. Use of blue-dyed reduced the incidental take of seabirds. The mitigation effect was strengthened when blue-dyed bait was coupled with a Tori-pole streamer. The catch rates of tuna with the blue-dyed bait were not significantly changed as compared to that with non-dyed bait. The combination of the blue-dyed bait and the Tori-pole streamer could dramatically reduce the incidental take of seabirds by tuna longline fisheries (Figs. 6, 7, CCSBT/ERS/0602/6).

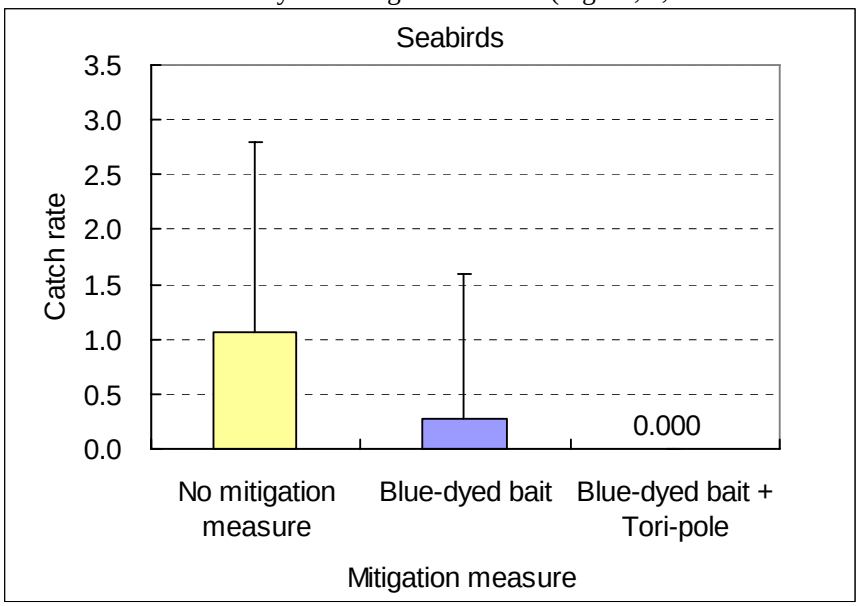

Fig. 6. Catch rates (number of catch/1,000 hooks) of seabirds using no mitigation measure blue-dyed bait, or blue-dyed bait and Tori-pole in experimental longline operations off South Africa in 2003

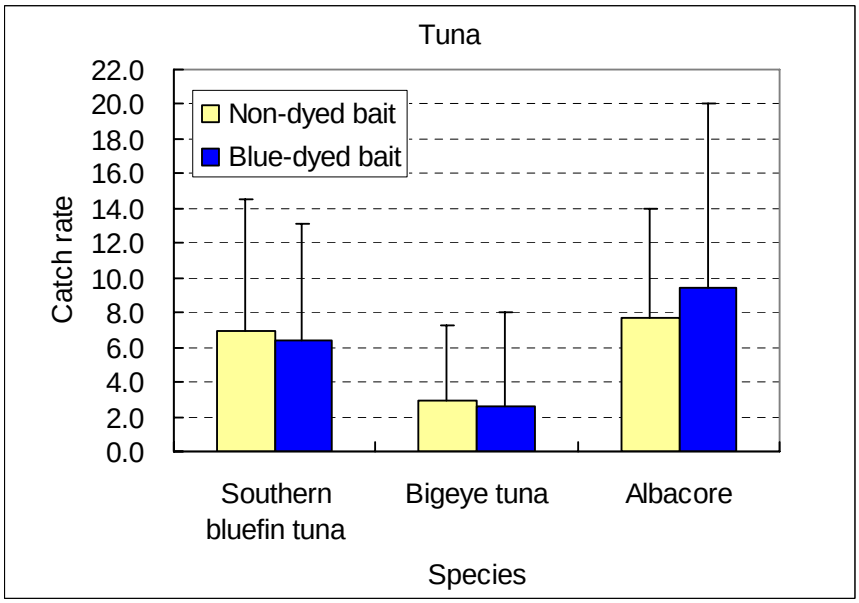

Fig. 7. Comparison of catch rates (number of catch/1,000 hooks) of tuna between blue-dyed bait and non-dyed bait in experimental longline operations off South Africa in 2003.

8. Public Relations and Education Activities

1) The Organization for the Promotion of Responsible Tuna Fisheries (OPRT), with support from the Japan Fisheries Agency and US Western Pacific Regional Fishery Management Council, hosted the Third International Fishers' Forum (IFF3) in Yokohama, Japan, July 25-29, 2005. IFF3 aimed to facilitate identification, discussion, planning and implementation of effective practices and approaches to abate seabird and sea turtle bycatch in longline fisheries. IFF3 provided an important opportunity for fishermen and scientists to meet to exchange ideas and identify solutions to priority management and conservation issues. IFF3 adopted the Yokohama declaration (CCSBT-ERS/0602/13).

2) Fisheries Agency of Japan developed the National Plans of Action (NOPA) for seabirds and sharks according to the FAO International Plans of Action (IPOA). These plans were notified by Fisheries Agency of Japan to the fishermen in the rural area through the local governments and the fishermen's organizations. Furthermore, the Fisheries Agency of Japan conducted assessment on the implementation of these two NPOAs (for seabirds and sharks) and submitted reports on the assessment to the 26th FAO COFI (Committee on Fisheries) in March 2005. (CCSBT-ERS/0602/Info09, 10, 11).

3) Educational materials, including booklets pamphlets, video program (DVD/VHS), cartoons were distributed to fishermen and other parties related to fishing industry to explain the importance of avoiding incidental take of seabirds and to improve species identification of seabirds and other bycatch species (CCSBT-ERS/0602/14). Furthermore, in cooperation with the Fisheries Agency of Japan and the National Research Institute of Far Seas Fisheries, local fisheries organizations held seminars for fishermen to provide the fishermen with opportunities for education by and open discussion with governmental officials and scientists. The educational materials were distributed at such seminars.

4) Mitigation measures to reduce incidental take of sea turtles in longline fishery have been developed and experimented in Japan according to the FAO guidelines to reduce sea turtle mortality in fishing operations.

5) Lectures were given to teachers at fisheries-related high schools in which students engaged in training of tuna longline fisheries. Explanation of mitigation techniques, accurate data collection, and species-identification method was given at the lectures.

9. Information on other ERS (non-bycatch)

Feeding ecology of southern bluefin tuna was investigated based on stomach samples collected by scientific observers from Japanese longline vessels. Up to now, stomachs from 2259 individuals, which mainly came from areas 1, 2, 4, 7, 8 and 9 were analyzed. Most of the wet weight compositions were made by Cephalopoda (49%) and Osteichthyes (45%) regardless of size of southern bluefin tuna or area caught. However, some differences by area were found. In the Area 4 and Area 7, many Crustacea individuals occurred, though with little contribution to wet weight, and smaller ratio of Osteichthyes and larger ratio of Cephalopoda than those in the Area 8 and Area 9.

Stomach contents were compared among species (yellowfin tuna T. albacares, bigeye tuna T. obesus, butterfly tuna Gasterochisma melampus, lancetfishes Alepisaurus spp.) caught by the same longline vessels that caught southern bluefin tuna in the Area 9. Osteichthyes were dominated in yellowfin tuna. Comparing to southern bluefin tuna, ratios of Cephalopoda and Crustacea were larger in bigeye tuna. Cephalopoda and Osteichthyes were dominated in butterfly tuna as same as in southern bluefin tuna. Prey composition of lancetfishes were quite different to other species (Fig. 8, CCSBT-ERS/0602/12).

10. Others

FAO developed the Guidelines to reduce sea turtle mortality in fishing operations. The Fisheries Agency Japan contributed to the completion of the guidelines. The Fisheries Agency of Japan also conducts research on reducing sea turtle bycatch.

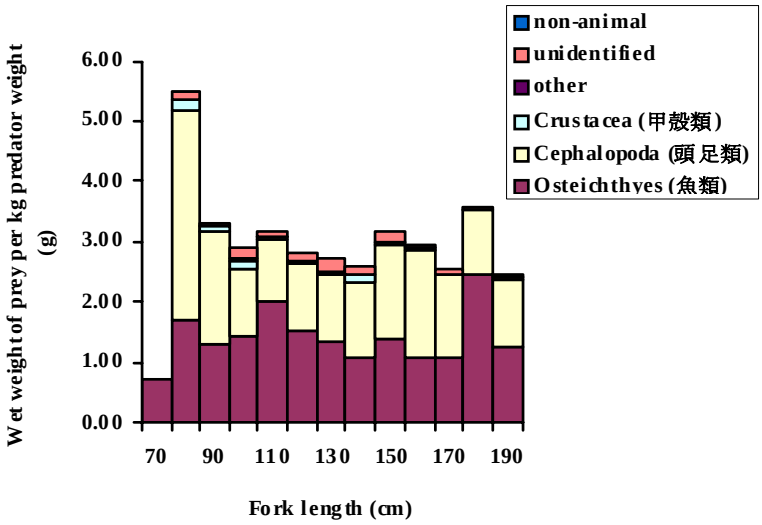

Fig. 8. Weight composition of prey categories in stomach of southern bluefin tuna for each 10 cm fork length class.