National Report of Japan

Overview of Researches on Ecologically Related Species in Japanese SBT Longline Fishery, 2003-2005

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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.

Regarding the incidental capture of sea birds, tori-pole was used voluntarily by the fishermen in the early 1990s, and the Government of Japan has introduced a mandatory measure for SBT longliners to use Tori Line 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 established National Plans of Action in 2001 and has 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, 1998-2005, was almost same as the distribution of major fishing grounds mentioned above. High fishing season for each area has a general pattern due to voluntary 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.

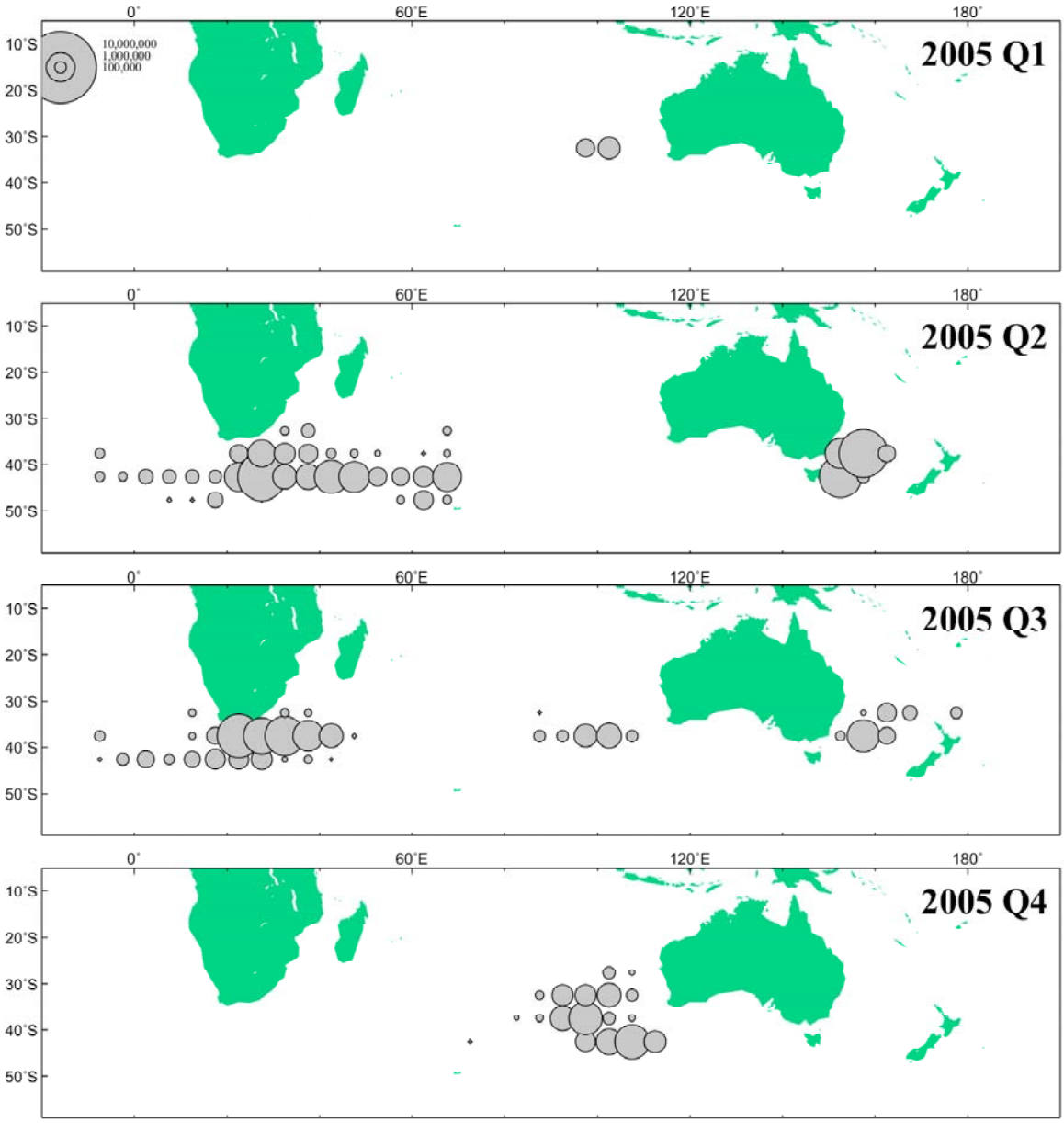

Fig. 1. Number of fishing hooks used in Japanese RTMP vessels by quarter and 5x5 degrees square in 2005.

Table 1. Number and coverage of fishing vessels and hooks observed in the Japanese RTMP observer program in 2005.

Area	Month	No. vessels observed	No. all vessels	Rate of observed vessels	No. hooks observed (x1000)	No. all hooks (x1000)	Rate of observed hooks
Area 4&7	3					36	0.00%
	4		43	0.00%		1,828	0.00%
	5	3	43	6.98%	107	3,202	3.36%
	6	3	43	6.98%	164	3,202	5.13%
	7		33	0.00%		2,046	0.00%
	8		1	0.00%		245	0.00%
Area 8	5		43	0.00%		1,887	0.00%
	6		10	0.00%		38	0.00%
	9		31	0.00%		1,610	0.00%
	10	1	43	2.33%	5	1,993	0.27%
	11	5	48	10.42%	206	2,363	8.73%
	12	5	48	10.42%	152	1,420	10.68%
Area 9	5	4	95	4.21%	268	5,495	4.89%
	6	8	111	7.21%	375	7,275	5.15%
	7	8	112	7.14%	596	7,737	7.70%
	8	8	108	7.41%	264	3,516	7.52%
Area 4&7	Total	3	43	6.98%	272	10,522	2.58%
Area 8	Total	5	83	6.02%	363	9,310	3.90%
Area 9	Total	8	114	7.02%	1,503	24,023	6.26%
Area 4,7,8,9	Total	16	161	9.94%	2,138	43,855	4.88%
Total		16	162	9.88%	2,296	47,343	4.85%

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 was 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 implemented a 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 2005, 16 fishing vessels and 2296,000 hooks were observed. Coverage of observation was 9.9 % for vessels and 4.9 % for hooks (Table 1). The total cost of the scientific observer program was US$395,000 in 2005. In general, the observation effort was allocated in proportion to the fishing effort for each area and season (CCSBT-ERS/0707/Info09).

4. Seabird

Fourteen species of seabirds were recorded through the RTMP observer program in 2005. The average incidental catch rate of seabirds in the RTMP fishing vessels in 2005 was estimated at 0.055/1,000 hooks (95% CI: 0.036-0.074). Annual total catch of seabirds in 2005 was estimated at 2,339 (95% CI: 1,548-3,160). Incidental catch rates of seabirds in Japanese high-sea SBT longline fishery has been showing decreasing trends since 2000 （Fig. 2, CCSBT-ERS/0707/14）.

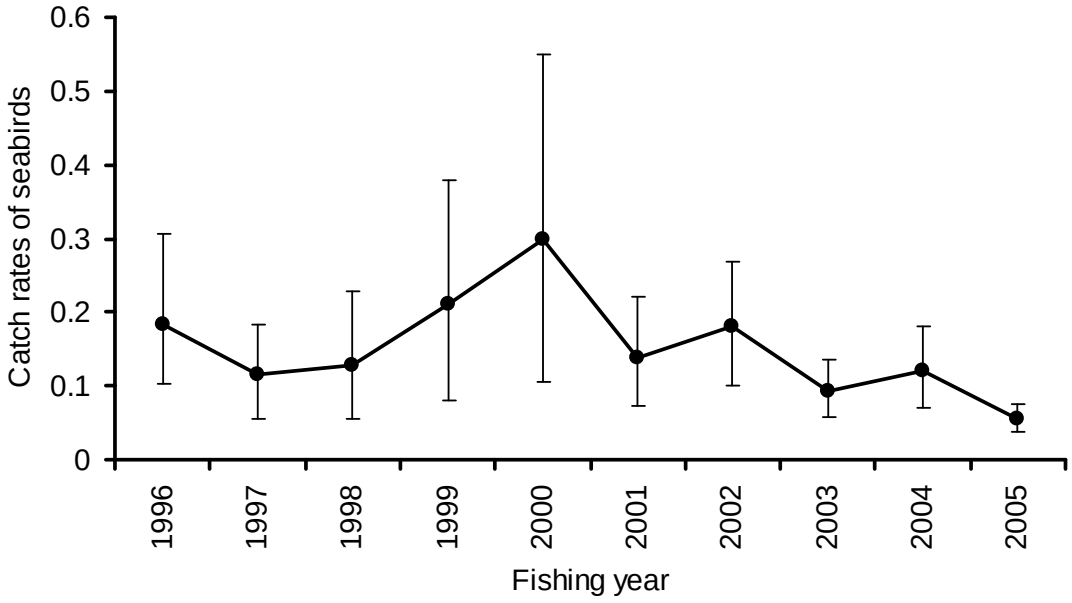

Fig. 2. Annual trends in incidental catch rates of seabirds in the Japanese RTMP for 1996-2005 fishing years. Vertical bars indicate 95% confidence intervals.

5. Other Non-target Fish

Eleven species of elasmobranchs were reported by the RTMP observers in 2005. The CPUEs for blue shark, porbeagle and shortfin mako shark were standardized using the observer data from 1992 to 2004. Three different models for CPUE standardization were compared to assess the effect of many zero values in shark catch data. The negative binominal model and the delta-lognormal model showed better performance in standardizing CPUEs with many zero-catch data than the conventional CPUE lognormal model. The standardized CPUEs of the three shark species seem to be stable with annual fluctuation and do not show any trend of long-term increase or decrease (Fig. 3, CCSBT/ERS/0707/15).

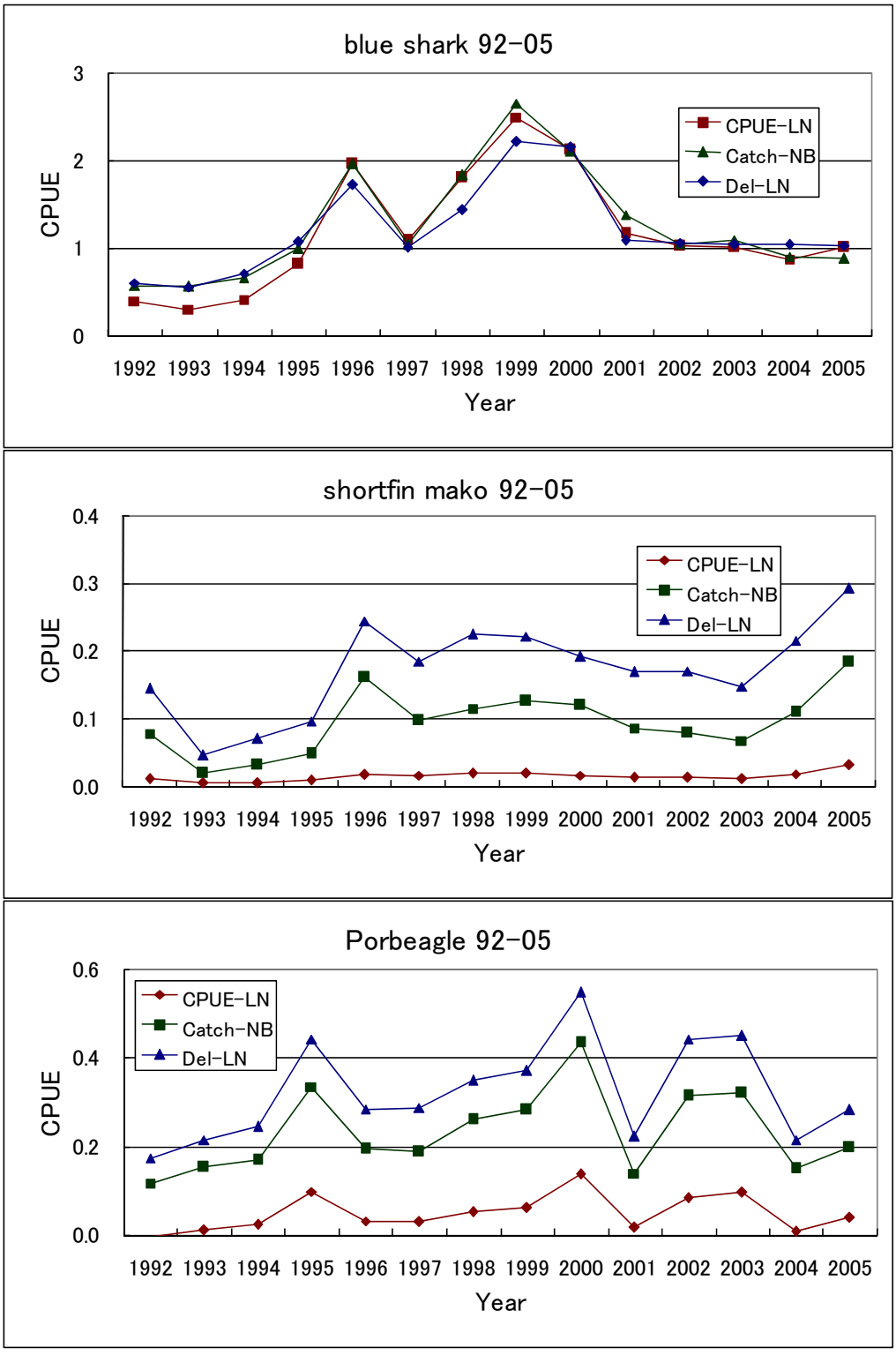

Fig. 3. Annual trends in CPUEs of blue, short-fin mako shark and porbeagle standardized using three different models (CPUE lognormal model, CATCH negative binomial, and Delta-lognormal models) for 1992-2005.

Many teleosts were caught by longline fishery other than 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 in 2005. Butterfly tuna, escoler, oilfish, opah, lancetfishe, sunfish and pomfrets were the major components of teleost catch (other than tuna and billfish) recorded in the in the high sea longline fishery (CCSBT-ERS/0707/Info09).

6. Marine Mammal and Marine Reptile

No marine mammals and reptiles were recorded in the RTMP observer program in 2005.

7. Mitigation Measures to Minimize Seabird and Other Species Bycatch

Current Measures

Mandatory measures (Tori pole):

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 take 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 (bird scaring line) is a seabird deterrent device, in which a line with threatening streamers is drawn from a pole installed at the end of a ship. Poles and lines of CCSBT/ERSWG standard type are recommended, but fishing vessels have modified the configuration of a streamer line so that it would fit the size and shape of the vessels and the methods of fishing operations. Seabird avoidance effects of Tori-poles used in the commercial vessels were analyzed using the data collected by onboard scientific observers. Statistical analysis of the Tori Line parameters suggested that, among the Tori Line configurations currently used in Japanese RTMP commercial fishing vessels, length of the line had significant effect on the performance of Tori-poles rather than the material and structure of streamers (CCSBT-ERS/0707/16).

Monitoring System and the situation of deployment:

The Government of Japan is taking necessary measures to enforce and monitor the level of compliance for mandatory use of Tori Lines 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, including information on proportion of fleet using the 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 Lines.

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

Most of Japanese tuna longline vessels use automatic bait casting machines (BCMs),

which have an effect to decrease the incidental catch of seabirds by avoiding propeller turbulence, increasing sinking rates of baited hooks, and casting baited hooks constantly below the Tori Line. In 2005, 94 % (15/16) of observed fishing vessels were equipped with BCMs.

Improvement of sinking rates of baited hooks is achieved by the use of weighted branch lines and of thawed bait. Branch lines can be weighted either by attaching lead weights to the nylon leader or by inserting heavy nylon cord in the branch line. It is difficult to assess the detail of fishing gear because gear information is subject to intellectual property right of fishermen. At least two observed vessels used lead-cored branch lines in 2005. Bait condition was recorded by onboard observers during line setting. Of the 565 observed fishing operations, partially-thawed bait was used in 63.0 %, and fully-thawed bait was used in 37.0%.

Observed vessels took the strategic offal control to keep seabirds away from the vessels temporarily by casting the retained offal and used bait to the side opposite to that of throwing the lines in case many seabirds gathered around the vessel.

Measures under Development/Testing

Feasibility experiments of side-setting method in reducing incidental catch of seabirds are conducted by FRA using a large-sized longline research vessel (54m, 450GT) in the North Pacific. Two sets of line setting equipment were installed at the end and side of the vessel, and the performance of stern setting and side setting was compared. Preliminary analysis of the results indicated that side-setting improved sinking rates of baited hooks and reduced bait taking activity of seabirds. Cost effectiveness, and practicality and safety of fishing operations should be evaluated carefully before introducing the method to commercial fishery.

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. FRA is conducting surveys on the effects of circle hooks on catch rates of sea turtles, tuna and shark. Under the contract with FRA, Hokkaido University is conducting research to explore ideal hook shape to reduce incidental mortality of sea turtles in longline fishery. De-hooking devices and sea turtle handling manuals are developed to improve post-hooking survival of sea turtles. The Ever-lasting Nature (ELNA) and FRA conducts leatherback turtle survey in Irian Jaya, Indonesia to monitor the trends in nest number and hutching success, and to assess the factors affecting sea turtle populations around the nesting beaches.

8. Public Relations and Education Activities

1) Fisheries Agency of Japan had developed the national plans of action for seabirds and sharks according to the FAO international plans of action. 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, Fisheries Agency of Japan conducted assessment of implementation of these two national plans and revised the national plan for seabirds in 2005.

2) Educational materials, including booklets pamphlets, video program (DVD/VHS), cartoons were prepared by FRA, the Global Guardian Trust (GGT), and the Organization for the Promotion of Responsible Tuna Fisheries (OPRT), and are distributed to fishermen and other parties related to fishing industry to explain the importance of reducing incidental take of seabirds and sea turtles.

- Identification guide for sharks, seabirds and sea turtles
- Booklets and leaflets that illustrate methods for avoiding incidental take and appropriate handling of seabirds and sea turtles;
- A guide book which summarizes the NPOA-Seabirds and NPOA-Sharks.
- A cartoon book, “For the Future of Tuna Fisheries and Seabirds” which outlines the issue of incidental take in an easily understandable manner.
- A video program (VHS and DVD) which explain mitigation measures to reduce longline interactions with seabirds and sea turtles.

3) Under the government contract and with the cooperation of FRA and tuna fishing industries, GGT hold seminars for fishers to explain the NPOA-Seabirds and Sharks and draft guidelines for sea turtles. Instructions on mitigation techniques of incidental catch of seabirds and sea turtles, handling methods for rescuing live-caught birds and turtles, and promotion of full utilization of sharks are given in the seminar. OPRT undertakes a grant program to promote the use of mitigation measures to reduce incidental mortality of sea turtles and seabirds in Japanese longline fishery. They support the use of circle hooks and distribute de-hooking devices and educational materials for commercial fishermen.

4) GGT and FRA conduct an educational program for teachers and students of fishery high schools. They hold seminar in fishery high schools and gave lecture on the conservation and management of marine ecosystems. The research and training vessels of the fishery high schools and the local governments participate in the tuna resources survey and bycatch mitigation experiments.

Education

Crew training, especially ship masters

The Federation of Japan Tuna Fisheries Co-operative Associations has hold seminars for crew members, ship masters and ship owners in fishing ports (i.e. Kesenmuna). Also, the Federation of Japan Tuna Fisheries Co-operative Associations has distributed brochures on bycatch mitigation to Japanese longliners at foreign ports (i.e. Cape Town). The Federation of Japan Tuna Fisheries Co-operative Associations will continue this effort.

Observers

Fifteen observers were trained and dispatched to the 16 commercial fishing vessels. Prior to the detachment to commercial vessels, all the observers took a training course on survey procedure, species identification, and safety ensuring. A debriefing session was held after the observer had returned to Japan to ensure data quality and to improve practicality and safety of the future program (CCSBT-ERS/0707/Info09).

9. Information on other ERS (non-bycatch)

Food habits of southern bluefin tuna and other teleost fishes were examined using stomach content samples collected by scientific observers onboard Japanese RTMP longline vessels. Up to now, 3113 SBT stomachs samples, mainly collected in the areas 1, 2, 4, 7, 8 and 9, were analyzed. Cephalopods (55% in wet weight) and fish (41% ww) were the major components of the SBT diet followed by crustaceans (1% ww). The diet composition was constant among different size classes of SBT from 80 to 190+ cm FL. Geographical differences in the amount and composition of SBT diet were found. The ratio of total stomach contents relative to SBT body weight was higher in the western areas than in the eastern areas: 0.43 % in area 9, and 0.11 % in area 4. The ratio of cephalopods in stomach contents was also higher in the western areas (Fig. 4, CCSBT-ERS/0707/17). Diet composition of bigeye tuna was similar to that of SBT, but that yellowfin and albacore had slightly different diet composition. Accumulation and analysis of SBT diet data collected

from different fisheries in different areas would help to understand the feeding ecology of SBT over the entire life history, and to clarify the relation between food environment and SBT population dynamics.

10. Others

No other information.

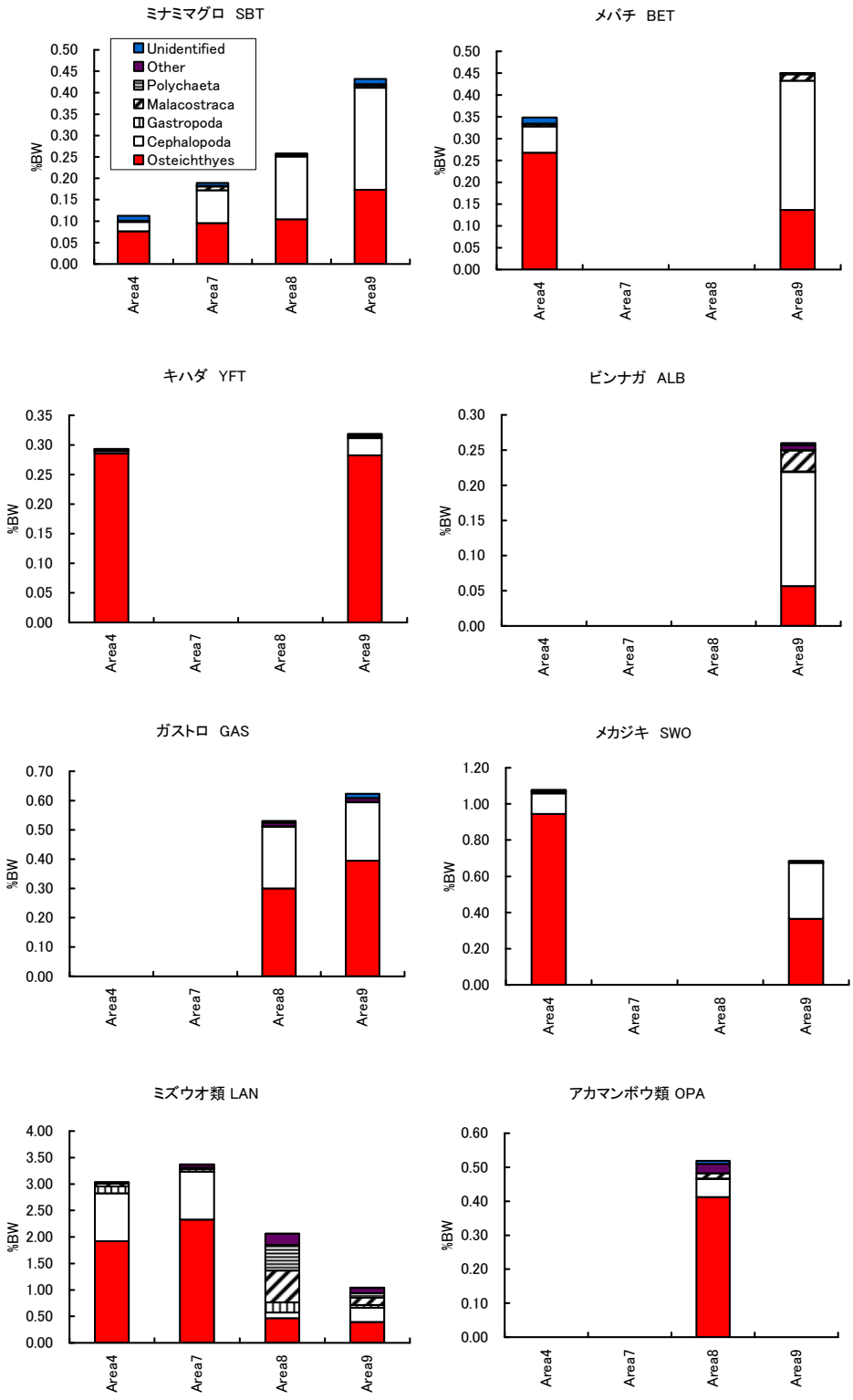

Fig. 4. Geographical variation in the amount and composition of stomach contents (percent wet weight of prey items per body weight of predators, %BW) for six fish species.