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Report of Japanese scientific observer activities for southern bluefin tuna fishery in 2019

日本のミナミマグロ漁業での科学オブザーバの 2019 年の活動報告

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要約

本文書ではミナミマグロを対象とした日本延縄船に対する科学オブザーバ計画について、2019 年調査の結果を報告する。主要な CCSBT 統計海区（4-9 海区）において 20 隻に科学オブザーバを配乗した。調査カバー率は隻数で 23.0%、使用釣鈎数で 22.0%、ミナミマグロ漁獲尾数で 18.0%であり、オブザーバが実際に観察した時間を考慮すると使用鈎数で 17.6%であった。オブザーバが記録したミナミマグロの体長と、RTMP で漁業者から報告された漁獲体長とは概ね一致した。オブザーバは乗船中にミナミマグロからの耳石 246 個体分、筋肉 289 個体分を含む各種の生物標本を採取した。オブザーバはミナミマグロ 3 個体分の CCSBT 通常標識を回収した。

Summary

This document summarizes activities of Japanese scientific observer program for southern bluefin tuna (SBT) in 2019. Scientific observers were dispatched in 20 vessels that operated in the main CCSBT statistical areas (area 4－9). Observer coverages were 23.0% in the number of vessels, 22.0% in the number of hooks used, and 18.0% in the number of SBT caught. When taking into account of the actual observation time during hauling, the coverage in the number of hooks observed were estimated as 17.6%. The length frequency distributions of SBT reported by the observers and those reported from all vessels in RTMP were generally consistent to each other. Observers collected various biological samples including otolith from 246 SBT and muscle tissue from 289 SBT. Observers retrieved CCSBT conventional tags from three SBT individuals.

1. 科学オブザーバ活動の概要　Overview of the scientific observer program

みなみまぐろ漁場における日本の科学オブザーバ調査は、1992 年からほぼ同一の調査方法で実施してきた。オブザーバは Table 1 に示すように、ミナミマグロおよび生態関連種の生物調査や、気象・漁具・海鳥混獲回避手段の利用状況等に関する情報を収集する。調査項目には優先順位が付けられており、時間が限られているときには重要な項目だけを調査する。調査項目の優先順位は年により異なる場合がある。オブザーバは、各大洋でミナミマグロを主要な漁獲対象として操業する遠洋延縄漁船からランダムに選定された漁船に派遣される。2006 年以降のミナミマグロ漁業は、漁期規制の撤廃、燃費の高騰、および IQ 制の導入により、各船の操業計画が流動的となっている（CCSBT-ESC/1208/34）。ミナミマグロ漁獲枠を持つ船に一定期間オブザーバを派遣しても、その船の年間を通した操業戦略上の都合により、オブザーバの乗船中にミナミマグロ漁場での操業を行わない場合がある。

オブザーバの派遣人数は、当初は 10～18 名/年であったが、予算上の制約により 2007 年以降のオブザーバ派遣人数は 7 名/年程度に留まってきた。これを改善するため、2010 年以降はインドネシア人調査員を加えてオブザーバを増員した。

Japanese scientific observer program of longline fishery for SBT has been performed systematically in a consistent method since 1992. In this program, scientific observers collect biological data and samples from SBT and ecologically related species during the hauling operations. They also collect information about the fishing operations (e.g., fishing configuration, weather and sea conditions, mitigation measures used to reduce incidental take of seabirds). Table 1 summarizes the research items of the observers. When they are busy and have little time to complete all the research items (because of the severe sea, weather, and/or fishing conditions), observers reduce their research activities in accordance with the established priorities. This priority levels differ depending on the fishing year. Scientific observers were sent to the vessels which were chosen at random from all of authorized Japanese commercial longline vessels targeting SBT in each ocean. Since 2006, annual operational patterns and schedule of Japanese vessels targeting SBT have been possibly affected by introduction of the individual quota (IQ) system, abolishing of the seasonal area closure, and drastic/temporal increase of fuel price (CCSBT-ESC/1208/34). Thus, there are difficulties to deploy the observers for a specific period toward the SBT fishing trips in a timely manner; some vessels with SBT quota do not operate in SBT fishing grounds during the period that observers are on-board because of their fishing strategy.

Japan had regularly deployed 10-18 observers per year in the early period of the program, although the program was forced to reduce the number of observers by budgetary restrictions. In 2007-2009, only seven observers were deployed to the vessel operated in the SBT fishing grounds per year. Since 2010, the number of observers has increased with the employment of Indonesian researchers.

2. 科学オブザーバの訓練　Observer Training

オブザーバは派遣される前に講習会にて訓練を受ける。2019 年にはミナミマグロを含む遠洋延縄操業用の講習会を 6 回開催し、オブザーバ候補者に対し、調査方法、記録方法、および安全確保について

講習を行った。講習では実物の魚を用いて調査方法や生物サンプルの採取方法の実習も行なった。オブザーバは、調査航海終了後に、乗船中の調査活動について報告をした。

Before cruises, scientific observer candidates have to take a training seminar. The training seminars for high sea seas tuna longliners including targeting SBT were held six times in 2019. In the training seminars, the candidates brushed up their knowledge and skills on research methods, recording procedures and safety. It also included practical training using the actual tuna to measure the fish size and to collect the biological samples. After returning from the cruises, observers reported their research activities in the debriefing.

3. 科学オブザーバのデザインとカバー率　Design and coverage

2019 年に主要な CCSBT 統計海区（海区 4-9）で操業を行った漁船に 20 名のオブザーバを配乗した。4 名は初めての調査航海であり、16 名が過去にミナミマグロまたはマグロ類を対象とした延縄操業船での科学オブザーバ活動の実績を有していた。対象調査船における乗船日数は合計 1,349 日であった。旅程を含めた雇用期間は 2,097 日であった。

海域ごと、月ごとの隻数・努力量（釣鈎数）・SBT の漁獲尾数について、全体に占めるカバー率を計算した。比較には、CCSBT へ提出したデータ（隻数、努力量、および漁獲尾数）を用いた。2019 年の 4 海区から 9 海区でのカバー率は、隻数で 23.0%、使用釣鈎数で 22.0%、ミナミマグロ漁獲尾数で 18.0%であった(Table 2)。

オブザーバは、食事の休憩や天候等の要因により操業を観察しない場合がある。2019 年にオブザーバが実際に観察した鈎数の割合は総使用鈎数の 80.0%であった。したがって、オブザーバが実際に観察した延縄努力量に基づくカバー率は、22.0%×80.0%=17.6%と計算された。

Scientific observers were dispatched in 20 vessels that operated in the main CCSBT statistical areas (area 4－9). Sixteen observers had experiences of scientific observer activities for SBT or other tunas, and it was the first research for remaining four observers. The total number of days on-boarded was 1,349. The total number of days employment including travel duration was 2,907.

We calculated observer coverage between January and December in area 4-9 (calendar year). The data reported from the fishermen (the denominator for coverage calculation) were based on the RTMP and/or the logbook which were submitted in the CCSBT data exchange. Observer coverages were 23.0% in the number of vessels, 22.0% in the number of hooks used, and 18.0% in the number of SBT caught (Table 2).

Scientific observers did not observe whole of the hauling operations because of rest for meal, rough weather condition, and other reasons. The observers actually monitored 80.0% of all hauling time in 2019. Thus, the coverage of effort which was actually observed by the observers was calculated as 17.8% (22.0% x 0.800).

4. 収集データ　Observer data collected

4～9 海区において、オブザーバが記録した硬骨魚類、サメ類、海鳥類、その他のリストを Table3～5 に示す。オブザーバによる生物の種査定の一部については、後日、オブザーバが撮影した写真に基づ

いて国際水産資源研究所の専門家が確認している。オブザーバが体長を測定した種別個体数を海域･月別に Table 6 に示す。合計 53,649 個体の魚類の体長を測定し、このうちミナミマグロは 21,506 個体であった。オブザーバは乗船中に耳石、筋肉などの生物標本を収集し、性別を判定した（Table 7）。ミナミマグロについては耳石を 246 個体、筋肉を 289 個体から採取した。

観察されたミナミマグロの体長組成を海域ごとに Fig.1 に示す。RTMP による日本延縄船全船によるミナミマグロ全漁獲個体数の体長組成と比較した。オブザーバが観察した体長分布と、全操業船から報告された体長分布とは類似していた。詳細にみると 4 海区と 8 海区で違いが見られ、オブザーバが乗船した場合の方がわずかに大型であった。

Table 3-5 summarize the number of animals observed, by teleosts, sharks, and seabird and others. Some of them were identified its more detailed taxonomic classification later in the laboratory by specialists in the National Research Institute of Far Seas Fisheries based on photographs which scientific observers took on-board. Table 6 summarizes the number of individuals of which body length were measured by the observers by area and month. A total of 53,649 fish were length measured, including 21,506 SBT. Biological samples collected, as well as sex identified, were summarized by species, area and month in Table 7. Otoliths were collected from 246 SBT and muscle tissue were collected from 289 SBT.

Fig. 1 shows length frequency of SBT from observers comparing to those from RTMP by area. The length frequency distributions of the observer data and RTMP data were generally similar to each other. In detail, there were differences in the length frequencies in Area 4 and Area 8, in which size of observed were slightly larger.

5. 標識魚の再捕　Tag return monitoring

調査を通じて回収した CCSBT 通常標識（通常標識）は、3 個体分（3 本）であった。

Scientific observers collected 3 conventional tags of CCSBT from 3 recaptured SBT.

6. 科学オブザーバ事業の問題点　Problem experienced

日本の延縄漁船はコスト削減のために洋上補給し、ほとんど寄港しないため、一部のオブザーバは対象調査船への配乗時に補給船を利用した洋上転船を行った。しかし、洋上転船には天候次第で大きな危険を伴う等の問題点が指摘されている。

Japanese commercial longline vessels rarely come into ports because of cost-cutting; thus, some observers were forced to transfer from supply vessels to fishing vessels on high seas. Transfer on high seas is risky, and magnitude of risk is depending on the weather conditions.

Reference

Itoh, T. 2012 Change in operation pattern of Japanese SBT longliners in 2011 resulting from the introduction of the individual quota system in 2006. CCSBT-ESC/1208/34

Table 1. Research items of observers in Japanese SBT longline observer program.

Item	Records
Data collection during line setting	- Location (start and end points of line setting) - Time (start and end times of line setting) - Weather and sea condition - Gear configuration - Bait types used - Use of mitigation measures to reduce incidental take of seabirds - Number of seabirds around the vessel
Data and sample collection during line hauling	- Location (start and end points of line hauling) - Time
(for animals caught by longline)	- Body length - Body weight - Life status - Sex - Photographing (especially for seabirds)
(as biological sampling)	- Otolith (for the age estimation of SBT) - Vertebrae (for the age estimation of tagged sharks) - Muscle tissue (for the genetic and isotope research of SBT, other fishes, and the bycatch species including seabirds)
(as tag recapture)	- Tag recovery for SBT, sharks, and others.

Table 2. Observer coverage in Japanese SBT longline observer program in 2019.

Area	Month	Number of vessels			Number of hooks used (x1000)			Number of SBT retained		
		Observed	All vessels	Cover rate	Observed	All vessels	Cover rate	Observed	All vessels	Cover rate
Area 4	3	0	1	0.0%	0	12	0.0%	0	0	0.0%
	4	0	3	0.0%	0	13	0.0%	0	1	0.0%
	5	2	9	22.2%	18	187	9.8%	0	3,765	0.0%
	7	4	21	19.0%	102	581	17.6%	756	6,565	11.5%
Area 5	5	0	0	0.0%	0	0	0.0%	0	0	0.0%
	6	0	3	0.0%	0	30	0.0%	0	0	0.0%
	7	1	7	14.3%	59	460	12.8%	0	0	0.0%
	8	1	4	25.0%	40	138	28.8%	0	0	0.0%
Area 7	3	3	10	30.0%	78	189	41.2%	211	395	53.4%
	4	6	23	26.1%	392	1,540	25.5%	1,279	5,482	23.3%
	5	6	26	23.1%	485	2,052	23.6%	5,405	26,255	20.6%
	6	1	10	10.0%	8	180	4.7%	72	1,638	4.4%
Area 8	4	3	9	33.3%	53	236	22.6%	0	15	0.0%
	5	3	11	27.3%	62	193	32.0%	0	30	0.0%
	7	1	12	8.3%	18	187	9.6%	52	702	7.4%
	8	2	17	11.8%	160	1,395	11.5%	1,108	13,658	8.1%
	9	1	10	10.0%	6	168	3.8%	39	1,638	2.4%
	11	0	1	0.0%	0	75	0.0%	0	1,079	0.0%
	12	0	0	0.0%	0	70	0.0%	0	429	0.0%
Area 9	3	3	9	33.3%	59	224	26.5%	438	1,115	39.3%
	4	7	30	23.3%	423	1,928	21.9%	4,249	22,741	18.7%
	5	8	30	26.7%	571	2,003	28.5%	4,704	16,770	28.1%
	6	6	22	27.3%	276	967	28.5%	1,514	6,316	24.0%
	7	1	11	9.1%	87	365	23.7%	185	2,290	8.1%
	8	1	9	11.1%	23	83	28.1%	25	289	8.7%
Area 4	Jan-Dec	5	24	20.8%	121	793	15.2%	756	10,331	7.3%
Area 5	Jan-Dec	1	7	14.3%	99	628	15.7%	0	0	0.0%
Area 7	Jan-Dec	6	26	23.1%	964	3,961	24.3%	6,967	33,770	20.6%
Area 8	Jan-Dec	4	21	19.0%	300	2,324	12.9%	1,199	17,551	6.8%
Area 9	Jan-Dec	10	39	25.6%	1,438	5,571	25.8%	11,115	49,521	22.4%
Area 4-Area 9	Jan-Dec	20	87	23.0%	2,921	13,277	22.0%	20,037	111,173	18.0%

Table 3. Number of teleost fish recorded by the Japanese SBT longline observer program in 2019 in CCSBT statistical area 4-9.

種名	Species	N
ミナミマグロ	*Thunnus maccoyii*	22,124
ビンナガ	*Thunnus alalunga*	9,865
メバチ	*Thunnus obesus*	334
キハダ	*Thunnus albacares*	97
メカジキ	*Xiphias gladius*	267
ガストロ	*Gasterochisma melampus*	4,055
ミズウオ類	*Alepisaurus spp.*	926
アカマンボウ	*Lamprididae*	1,195
シマガツオ類	*Brama spp.*	4,757
アブラソコムツ	*Lepidocybium flavobrunneum*	647
バラムツ	*Ruvettus pretiosus*	471
その他魚類	Other teleosts	843

Table 4. Number of sharks recorded by the Japanese SBT longline observer program in 2019 in CCSBT statistical area 4-9.

種名	Species	N
ヨシキリザメ	*Prionace glauca*	9,205
アオザメ	*Isurus oxyrinchus*	270
ニシネズミザメ	*Lamna nasus*	2,310
その他	Other elasmobranches	882

Table 5. Number of seabirds and the other animals recorded by the Japanese SBT longline observer program in 2019 in CCSBT statistical area 4-9.

種名	Species	N
大型アホウドリ類	Large albatrosses	95
暗色アホウドリ類	Dark colored albatrosses	91
その他のアホウドリ類	Mollymawks and other albatrosses	1,343
ミズナギドリ類	Giant petrels	455
その他の海鳥	Other birds	15
海亀類	Sea turtles	1
鰭脚類	Pinnipedia	5
ハクジラ類	Odontoceti	1

Table 6. Number of individuals its length measured under the Japanese SBT longline observer program in 2019.

Area	Month	SBT	ALB	BET	YFT	SWO	BUK	other	Sharks	Total
4	5		292	7	6	8		17	18	348
	6	862	937	11	9	35	4	451	262	2,571
	Total	862	1,229	18	15	43	4	468	280	2,919
5	7		887	72	11	6		74	15	1,065
	8		311	96	19	2		44	32	504
	Total		1,198	168	30	8		118	47	1,569
7	3	213	237			2		49	91	592
	4	1,318	1,222			49	1	461	784	3,835
	5	5,930	2,184			120	5	1,131	1,151	10,521
	6	74	42			1		1	5	123
	Total	7,535	3,685			172	6	1,642	2,031	15,071
8	4	42	1,090	1		7	44	182	403	1,769
	5	13	1,357	6		14	32	315	406	2,143
	7	57	1				48	14	143	263
	8	1,453	7				304	148	1,155	3,067
	9	89					11	15	15	130
	Total	1,654	2,455	7		21	439	674	2,122	7,372
9	3	528	285	104	1	2	38	253	566	1,777
	4	4,422	113				752	923	2,058	8,268
	5	4,734	610	33	50	8	1,707	1,526	1,932	10,600
	6	1,566	14				704	1,239	1,397	4,920
	7	180					198	389	214	981
	8	25					100	33	14	172
	Total	11,455	1,022	137	51	10	3,499	4,363	6,181	26,718
Total		21,506	9,589	330	96	254	3,948	7,265	10,661	53,649

Species code is shown in Table 7.

Table 7. Number of individuals its biological samples collected and sex identified in the Japanese SBT longline observer program in 2019.

種名	Species code	Species	Otolith	Muscle	Sex
ミナミマグロ	SBT	Southern bluefin tuna	246	289	20575
ビンナガ	ALB	Albacore		114	220
メバチ	BET	Bigeye tuna	18	19	270
キハダ	YFT	Yellowfin tuna	29	29	96
メカジキ	SWO	Swordfish		65	144
ガストロ	BUK	Butterfly kingfish		81	3795
その他魚類	other	Other teleosts		24	1288
サメ類	Sharks	Elasmobranches		53	11097
海鳥	Birds	Seabirds		208	

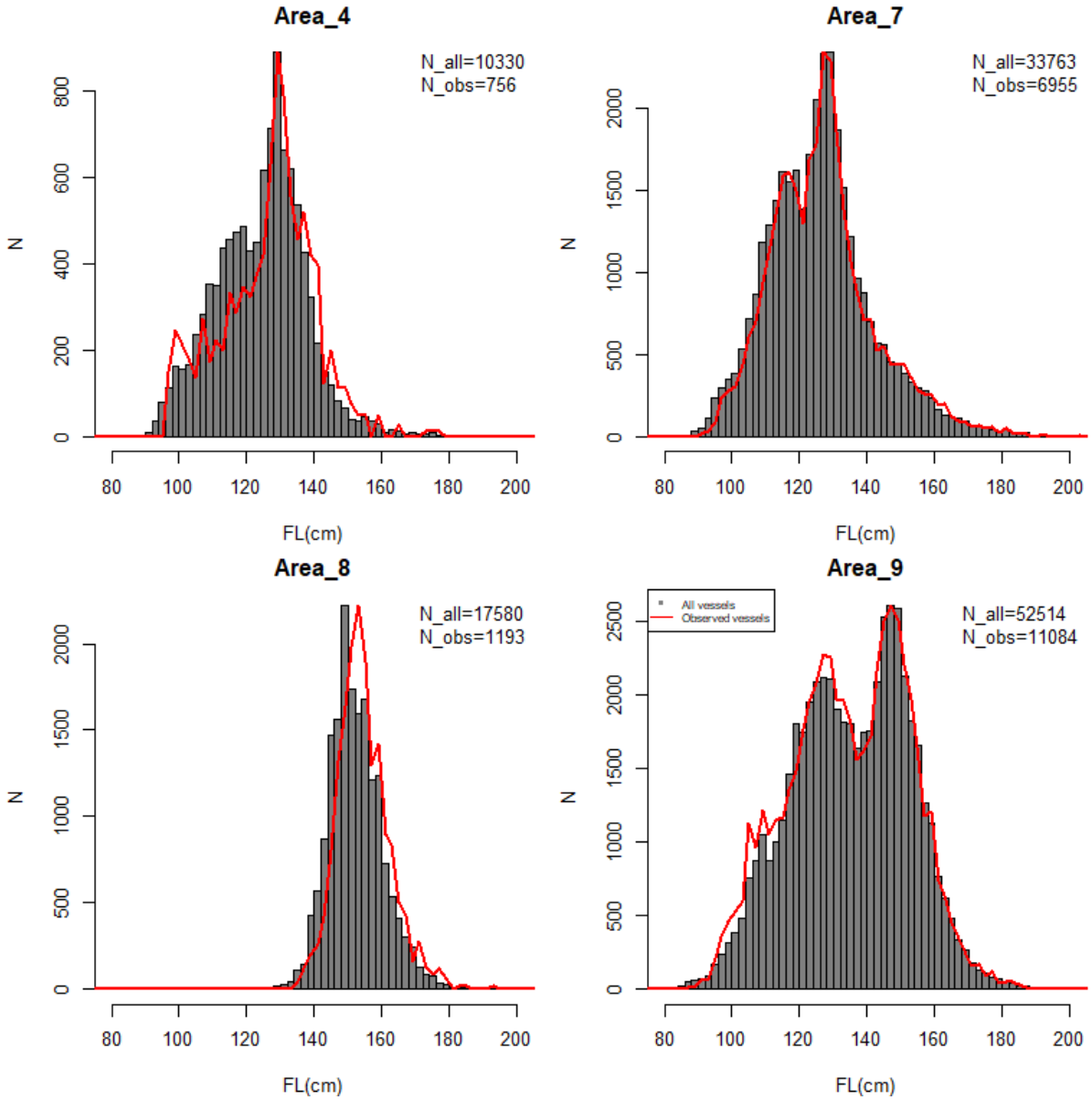

Fig. 1. Length frequency distribution of SBT retained by area in the Japanese SBT longline observer program in 2019.

Bars are from data in all vessels, red lines are from observed data.