

Report of Japanese scientific observer activities for southern bluefin tuna fishery in 2017

日本のミナミマグロ漁業での科学オブザーバの 2017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、2017年調査の暫定的結果を報告する。主要な CCSBT 統計海区（4-9 海区）において 12 隻に科学オブザーバーを配乗した。調査カバー率は、隻数で 13.6%、使用釣鉤数で 12.6%、ミナミマグロ漁獲尾数で 12.6%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釣鉤数で 10.6%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 251 個体分、筋肉 392 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 preliminary results of Japanese scientific observer program for southern bluefin tuna (SBT) in 2017. Scientific observers were dispatched in 12 vessels that operated in the main CCSBT statistical areas (area 4–9). Observer coverages were 13.6% in the number of vessels, 12.6% in the number of hooks used, and 12.6% 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 10.6%. 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 251 SBT and muscle tissue from 392 SBT. Observers retrieved CCSBT conventional tags from 3 SBT individuals.

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

みなまぐろ漁場における日本の科学オブザーバ調査は、1992年からは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、その船の年間を通じ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。なお、2014年まではインドネシア人オブザーバには耳石や胃内容物などの生物サンプルの採集を指示していなかったが、インドネシア人オブザーバの配乗比率の増加と調査能力の向上に伴い、2015年より一部のインドネシア人オブザーバにサンプル採取を指示している。

Japanese scientific observer program of longline fishery for the southern bluefin tuna (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. Collection of biological samples (otolith and muscle) had not been included in the direction to Indonesian researchers by 2014, however it has

been ordered to a part of selected Indonesian researchers since 2015, along with increasing the ratio of trips with Indonesian researchers and improvement of their research skill.

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。2017年には4回の講習会を開催し、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 SBT fishery were held 4 times in 2017. 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

2017年に主要なCCSBT統計海区(海区4-9)で操業を行った漁船に12名のオブザーバを配乗した。全員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。ミナミマグロを対象とした操業を観察したオブザーバの雇用日数(日本出国から帰国まで)は合計1237日、対象調査船における乗船日数は合計785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。2017年の4海区から9海区でのカバー率は、隻数で13.6%、使用釣鈎数で12.6%、ミナミマグロ漁獲尾数で12.6%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。2017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84.7%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、 $12.6\% \times 84.7\% = 10.6\%$ と計算された。

Scientific observers were dispatched in 12 vessels that operated in the main CCSBT statistical areas (area 4-9). All observers had experiences of scientific observer activities for SBT or other tunas. The total number of days employed was 1237 while the total number of days on-boarded was 785.

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 13.6% in the number of vessels, 12.6% in the number of hooks used, and 12.6% 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 84.7% of all hauling time in 2017. Thus, the

coverage of effort which was actually observed by the observers was calculated as 10.6% (12.6% x 0.847).

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 35,983 個体の生物の体長を測定し、このうちミナミマグロは 10,684 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 251 個体、筋肉を 392 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、オブザーバー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 35,983 individuals were length measured, including 10,684 SBT. Biological samples collected, as well as sex identified, were summarized by species, area and month in Table 7. Otoliths were collected from 251 SBT and muscle tissue were collected from 392 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 隻から 3 個体分 (4 本) であった。

Scientific observers collected 4 conventional tags of CCSBT from 3 recaptured SBT on 3 vessels.

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	<ul style="list-style-type: none"> - 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	<ul style="list-style-type: none"> - Location (start and end points of line hauling) - Time
(for animals caught by longline)	<ul style="list-style-type: none"> - Body length - Body weight - Life status - Sex - Photographing (especially for seabirds)
(as biological sampling)	<ul style="list-style-type: none"> - 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)	<ul style="list-style-type: none"> - Tag recovery for SBT, sharks, and others.

Table 2. Observer coverage in Japanese SBT longline observer program in 2017.

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	2	0	0.0%	24		0.0%	0		
	4	3	0	0.0%	16		0.0%	6		0.0%
	5	11	2	18.2%	300	30	10.1%	1,300	124	9.5%
	6	13	2	15.4%	499	83	16.6%	1,695	437	25.8%
	7	1	0	0.0%	48		0.0%	0		
	8	1	0	0.0%	29		0.0%	0		
Area 5	6	6	0	0.0%	113		0.0%	0		
	7	8	0	0.0%	301		0.0%	24		0.0%
	8	6	0	0.0%	335		0.0%	79		0.0%
	9	1	0	0.0%	25		0.0%	0		
Area 7	3	16	3	18.8%	457	68	14.8%	1,001	100	10.0%
	4	24	4	16.7%	2,090	333	15.9%	10,784	1,541	14.3%
	5	25	4	16.0%	1,978	340	17.2%	11,418	1,837	16.1%
	6	17	4	23.5%	334	33	10.0%	4,182	310	7.4%
Area 8	3	4	0	0.0%	57		0.0%	0		
	4	16	0	0.0%	882		0.0%	4		0.0%
	5	18	1	5.6%	562	3	0.6%	8		0.0%
	6	2	1	50.0%	24	14	56.4%	0		
	7	8	0	0.0%	35		0.0%	92		0.0%
	8	20	1	5.0%	1,838	95	5.2%	10,381	315	3.0%
	9	17	1	5.9%	475	53	11.2%	4,068	285	7.0%
Area 9	3	2	0	0.0%	21		0.0%	182		0.0%
	4	25	4	16.0%	1,233	94	7.6%	10,700	571	5.3%
	5	37	7	18.9%	2,137	479	22.4%	15,122	2,946	19.5%
	6	31	6	19.4%	1,202	254	21.1%	9,057	1,790	19.8%
	7	15	2	13.3%	436	78	18.0%	3,293	282	8.6%
	8	3	0	0.0%	67		0.0%	241		0.0%
	9	2	0	0.0%	36		0.0%	18		0.0%
	10	2	0	0.0%	35		0.0%	51		0.0%
Area 4	Jan-Dec	18	2	11.1%	917	113	12.3%	3,001	561	18.7%
Area 5	Jan-Dec	8	0	0.0%	774	0	0.0%	103	0	0.0%
Area 7	Jan-Dec	26	4	15.4%	4,859	775	15.9%	27,385	3,788	13.8%
Area 8	Jan-Dec	22	1	4.5%	3,873	166	4.3%	14,553	600	4.1%
Area 9	Jan-Dec	40	7	17.5%	5,168	906	17.5%	38,664	5,589	14.5%
Area 4-	Jan-Dec	88	12	13.6%	15,590	1,959	12.6%	83,706	10,538	12.6%

Table 3. Number of teleost fish recorded by the Japanese SBT longline observer program in 2017 in CCSBT statistical area 4-9.

種名	Species	N
ミナミマグロ	<i>Thunnus maccoyii</i>	10,834
ガストロ	<i>Gasterochisma melampus</i>	4,868
ビンナガ	<i>Thunnus alalunga</i>	6,360
キハダ	<i>Thunnus albacares</i>	19
メバチ	<i>Thunnus obesus</i>	152
カツオ	<i>Katsuwonus pelamis</i>	18
マカジキ	<i>Tetrapturus audax</i>	11
メカジキ	<i>Xiphias gladius</i>	132
ミズウオ類	<i>Alepisaurus spp.</i>	431
アカマンボウ	<i>Lamprididae</i>	463
シマガツオ類	<i>Brama spp.</i>	5,078
クロタチカマス科	<i>Gamphylidae</i>	42
アブラソコムツ	<i>Lepidocybium flavobrunneum</i>	257
バラムツ	<i>Ruvettus pretiosus</i>	446
マンボウ	<i>Mola mola</i>	86
その他魚類	Other fish	344

Table 4. Number of sharks recorded by the Japanese SBT longline observer program in 2017 in CCSBT statistical area 4-9.

種名	Species	N
ヨシキリザメ	<i>Prionace glauca</i>	5,312
アオザメ	<i>Isurus oxyrinchus</i>	127
ニシネズミザメ	<i>Lamna nasus</i>	1,128
その他	Other elasmobranches	846

Table 5. Number of seabirds and the other animals recorded by the Japanese SBT longline observer program in 2017 in CCSBT statistical area 4-9.

種名	Species	N
大型アホウドリ類	Large albatrosses	22
暗色アホウドリ類	Dark coloured albatrosses	1
その他のアホウドリ類	Other albatrosses	182
種不明アホウドリ類	Unidentified albatrosses	138
その他の海鳥	Other petrels	329
ミズナギドリ類	Other seabirds	51
種不明海鳥類	Large albatrosses	6
ウミガメ類	Turtles	1

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

分類	Name	Area 4			Area 7			Area 8					Area 9				Total			
		May	Jun	Total	Mar	Apr	May	Jun	Total	May	Jun	Aug	Sep	Total	Apr	May	Jun	Jul	Total	
ミナミマグロ	Southern bluefin tuna	124	438	562	99	1,543	1,831	309	3,782		2	441	350	793	571	2,909	1,784	283	5,547	10,684
メバチ	Bigeye tuna	3	38	41		7	87	2	96	7	3			10		3	1		4	151
キハダ	Yellowfin tuna		10	10			9		9											19
ビンナガ	Albacore	102	461	563	308	1,414	3,586	82	5,390	76	188	26	11	301		3	47		50	6,304
カツオ	Skipjack tuna		9	9		1	8		9											18
ガストロ	Butterfly tuna					2	9	1	12		10	132	64	206	289	2,212	1,636	394	4,531	4,749
メカジキ	Swordfish	8	22	30	3	26	53	6	88	1	9	2		12			1		1	131
マカジキ	Striped marlin		1	1		1	9		10											11
その他魚類	Other teleosts	78	115	193	93	485	978	96	1,652	22	76	101	56	255	388	2,355	1,308	275	4,326	6,426
軟骨魚類	Sharks	32	138	170	83	481	714	100	1,378	5	58	1,104	245	1,412	318	1,969	1,409	126	3,822	6,782
海鳥	Seabirds	3	54	57	4	125	52	19	200			9	2	11	27	206	161	45	439	707
総計	Total	350	1,286	1,636	590	4,085	7,336	615	12,626	111	346	1,815	728	3,000	1,593	9,657	6,347	1,123	18,720	35,982

Table 7. Number of individuals its biological samples collected and sex identified in the Japanese SBT longline observer program in 2017.

種名	Species	Otolith	Muscle	Sex
ミナミマグロ	Southern bluefin tuna	251	392	9,998
メバチ	Bigeye tuna	30	38	150
キハダ	Yellowfin tuna	4	6	19
ビンナガ	Albacore		140	144
カツオ	Skipjack tuna		1	
ガストロ	Butterfly tuna		73	4,545
メカジキ	Swordfish		17	112
マカジキ	Striped marlin		2	11
その他魚類	Other teleosts		125	926
サメ類	Elasmobranches		1	6,722
海鳥	Seabirds		42	

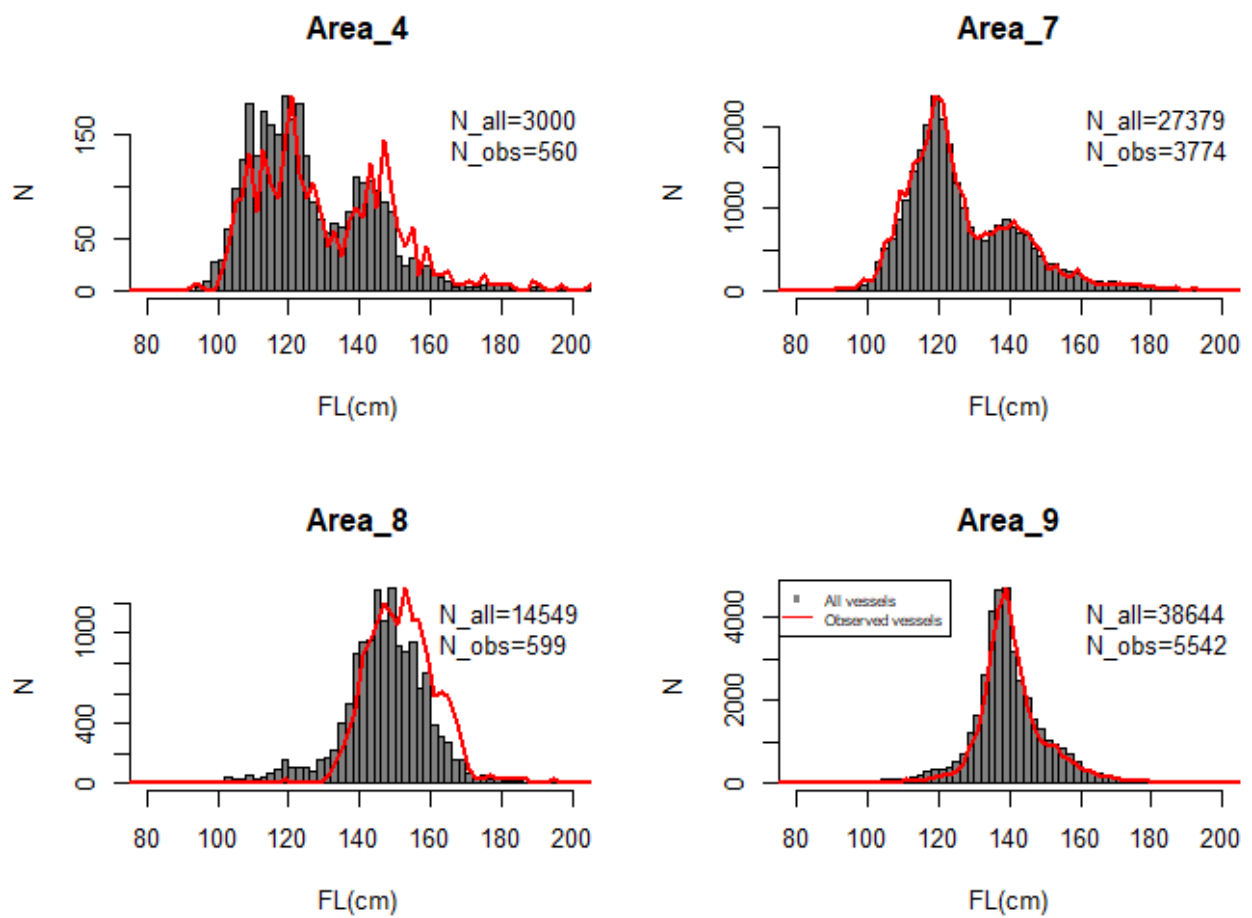


Fig. 1. Length frequency distribution of SBT by area in the Japanese SBT longline observer program in 2017.

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