

**Report of 2003/2004 results and proposal for 2004/2005 activities
on CCSBT tagging by Japan.**

**日本によるミナミマグロ標識放流の 2003/2004 調査活動報告
および 2004/2005 調査申請**

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要約

過去 2 年間と同様に、ケープ沖からの延縄船による標識放流試験を 2003 年 10 月から 12 月に実施した。合計 637 個体に通常標識を付けて放流し、そのうち 80 個体にはアーカイバルタグも装着した。航海を通じて取り込んだ魚の合計重量は 5,313kg と推定された。これまでの再捕は、2001 年放流魚では通常標識装着魚 10 尾、アーカイバルタグ装着魚 2 尾、2002 年放流魚では通常標識装着魚 1 尾、アーカイバルタグ装着魚 1 尾である。本文書には次回の標識放流計画も含めてある。

Summary

The pilot longline tagging program was conducted between October and December 2003 off Cape in the same way as in 2001 and 2002. Total of 637 fish were released with conventional tags. Eighty of them were also attached archival tags. Estimated total weight of fish retained during the cruise is 5,313 kg. Recapture reported is 10 fish with conventional tags and 2 fish with archival tags in 2001 released fish, and 1 fish with conventional tags and 1 fish with archival tag in 2002 released fish. Proposal for the next tagging cruise is also included in this paper.

1. Japanese activity for the CCSBT Tagging Program (SRP) in 2003/2004.

【Pilot longline tagging program】

Since 2001, Japan has been conducting tagging survey using longline vessels off Cape. Table 1 shows summary of the surveys for three years. In the 2003/2004 survey, the third year of the project, No21 Fukuryu-maru (409 ton), a commercial longline vessel usually working for southern bluefin tuna (SBT) fishery, was chartered. Total of 60 longline operations was conducted off Cape from 24 October to 31 December 2003. The area operated was 37-40S, 29-44E (Fig. 1). The number of hooks used in each operation was reduced to 2000 hooks, roughly two third of commercial operations in order to increase a survival rate of fish caught by reducing total gear soaking time. Two field technicians were on board to place tags on SBT. They also collected data on size and species caught and some biological samples including otoliths.

Tagging procedure followed to those developed and agreed at the Tagging Workshop held in

Canberra, October 2001. The standard CCSBT tags were used. Two tags were inserted in between pterygiophore at the base of the second dorsal fin from both sides of fish. It is recorded that fork length, date and time of capture, the side where the first tag to be placed, the side where the odd number tag to be placed, the tagger's name, and condition of fish including bleeding. The odd tag ID number was the smallest between the two tags placed on one fish.

All tag placements were conducted on deck. In the other words, all SBT caught were pulled up on deck before tagging. Usually, small size fish (roughly <90cmFL, 15 kg) were pulled up by grabbing a branch line by hand, and larger fish were pulled up with a help of a scooping net which was developed during the first cruise (CCSBT-SC/0209/21).

Among total of 857 SBT hooked, 637 SBT were tagged and released (Table 1). Two conventional tags were placed on each of 557 SBT among them. Remaining 80 SBT were placed one conventional tag and an archival tag on each individual. Archival tags (LTD2310: Lotek Wireless Inc.) were inserted into body cavities. To place two conventional tags for both sides of fish, it is necessary to turn around the fish. However, it seems to make any damage on stalk of archival tag, in addition difficulty to treat large individual, only one conventional tag was placed on one individual with archival tag. The tag numbers used ranged from 533888 to 537000, but for an individual with an archival tag was placed a tag used for IOTC bigeye tuna tagging by mistake (S02709). No pop-up archival tag was used in the survey.

Length frequency distributions of SBT are shown in Table 2 and Fig. 2. Fish hooked ranged from 63 to 167 cmFL with 119 cm FL in average. Tagged fish ranged from 63 to 167 cmFL with 120 cm FL in average. No substantial differences in tagging rate (a proportion of number of tagged fish to total number of fish hooked) were found among different size classes. The number of fish with archival tags are relatively even over the size range, which is following to the plan.

Total of 168 SBT were identified as not suitable for tagging. Two individuals were measured its length only due to whale/shark bites. Weights of them are estimated based on a length – weight relationship of remaining retained fish (Processed weight = $3.33 \times 10^{-5} \times \text{fork length}^{2.843}$). The processed weights are converted to whole weights by the factor 1.15. Then, total weight for fish retained is 5,313.0 kg (Table 3). This is the amount utilized for this program from the quota assigned for the SRP (Scientific Research Program) of the CCSBT.

【Tag recapture】

Eleven recaptures of fish tagged under the CCSBT tagging program have been reported until 31 July, 2004. Ten of these recaptures were with conventional tag. Of 10 fish with conventional tag, 2 fish were recaptured by Australian purse seiners and farmed for several months. The rest of the recaptured fish with conventional tag were caught by Japanese longliners. One report of the eleven recaptures was for fish with archival tag from a Japanese longline vessel.

The total number of recaptured SBT released during the Experimental Fishing Program between 1998 and 2000 is 26 (7 in 2000, 6 in 2001, 5 in 2002, 7 in 2003, and 1 in 2004). Twenty two of them were recaptured by Australian purse seine vessels and fish were farmed. Four fish were recaptured by Japanese longline vessels. The numbers of recaptured SBT released in the Recruitment Monitoring Program and reported via NRIFSF were 26 for conventional tags and 1 for archival tags since 1 November 2003.

Of 40 SBT released with archival tag in 2002, 1 SBT were recaptured and the tag were returned to NRIFSF. Time at liberty of this SBT was approximately 5 months. Data could be safely retrieved from the tag for the entire time at liberty. From preliminary analysis of these tag data combining with information from previously recovered archival tags (2 tags), we found: 1) Diving behavior of fish varies with time and space; 2) Fish frequently dives closely to 500m depth; 3) Location estimates of one tag show that fish moved from 40E (off Cape) to around 100E (South Indian) over 4 months, and then returned to about 30E over 4 months. In contrast, data of the other tags show that fish did not move far from waters around 40E. Further analyses of depth and temperature data and errors in location estimates are being processed.

2. Proposal for 2004/2005 activity.

Although it is premature to draw any conclusion, the retrieved archival tags data and tag recapture pattern up to now suggested separation of fish between off Cape area and Australian coast in a higher level than expected. All assessments conducted so far and the current CCSBT tagging program presume a complete mixing of SBT and violation of this hypothesis can induce substantial biases to stock estimates.

Simultaneous tag seeding from a wide area covering whole distributing area would be far more powerful to improve our understandings on global fish migration. The efforts to seed tags to middle to large size fish had now initiated along the Australian coast. New Zealand also proposed some tagging activities from their fleet in 2003 Scientific Committee. This rare opportunity should not be missed.

Unfortunately, we could not secure the fund to support a continuation of tag seeding from the chartered longline vessels for the 2004 Japanese fiscal year. Funding situation seems to be tightened even more for the future years. Considering a high priority of global tag seeding, we plan to conduct several feasibility surveys of alternative ways of tag seeding from the Japanese commercial longline vessels. Principle plan is to send field technicians to commercial vessels and seed tags to small size fish with an approval from a fishing master if fish condition is suitable for tagging. Only archival tags will be used. Price of released fish and potential loss due to additional time and labors required for tagging will be compensated. Right now, we are still seeking for collaborative vessels conducting this experiment and results will be reported to the 2005 Scientific Committee.

Table 1 Summary of the tagging surveys off Cape

Date is shown as yyyy/mm/dd.

Year	2001	2002	2003	Total
Vessel	Matsuei-maru 3	Fukuseki-maru 33	Fukuryu-maru 21	
1 st operation	2001/11/5	2002/10/20	2003/10/24	
Final operation	2002/1/14	2002/12/27	2003/12/31	
N_operation	62	61	60	183
Total hooks	93,000	91,500	118,300	302,800
Area operated	39-44S 23-48E	33-40S 30-44E	37-40S 29-44E	
SBT				
conventional tags only	329	273	557	1159
with archival tag	45	40	80	165
with PAT	7	5		12
retained	120	135	168	423
Total	501	453	805	1759
Nominal CPUE	5.39	4.95	6.80	5.81
Bigeye tuna tagged		33	145	178
Sharks tagged	104	153	110	367

Table 2 Length frequency distribution of SBT

FL(cm)	Conventional tags only	With archival tag	Retained	Total (Tag release rate)
60-64	1			1 (1.00)
65-69				0
70-74			1	1 (0.00)
75-79				0
80-84	1		1	2 (0.50)
85-89	2			2 (1.00)
90-94	12	1	3	16 (0.81)
95-99	32	5	14	51 (0.73)
100-104	33	5	11	49 (0.78)
105-109	29	5	11	45 (0.76)
110-114	63	8	22	93 (0.76)
115-119	101	6	26	133 (0.80)
120-124	112	8	32	152 (0.79)
125-129	76	8	19	103 (0.82)
130-134	43	11	10	64 (0.84)
135-139	20	4	2	26 (0.92)
140-144	14	9	4	27 (0.85)
145-149	7	3	4	14 (0.71)
150-154	5	3	2	10 (0.80)
155-159	3	3	1	7 (0.86)
160-164		1	1	2 (0.50)
165-169	2		3	5 (0.40)
Total	556¹	80	167²	803³ (0.79)

1: Length was not measured for one individual.

2: Length was not measured for two individuals.

3: Length was not measured for three individuals.

Table 3 The number and weight of SBT caught.

	Number	Processed weight	Whole weight ¹
Released with tags	637		
Retained and weighed	166	4560	5244.0
Retained but damaged	2	60.0 ²	69.0
N of fish retained	168		
W of all fish retained		4620	5313.0

1: Whole weight is 1.15 x processed weight.

2: Estimated by a length-weight relationship equation.

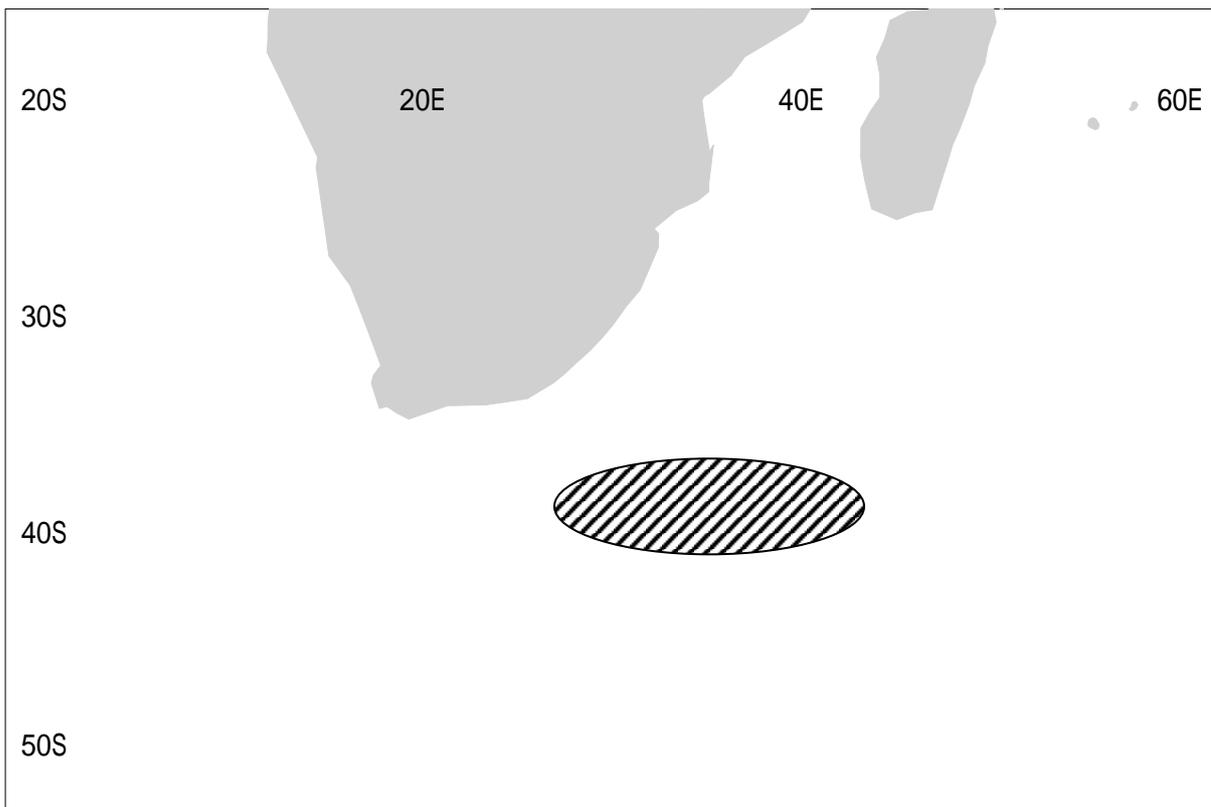


Fig. 1 The area longline operations were conducted.

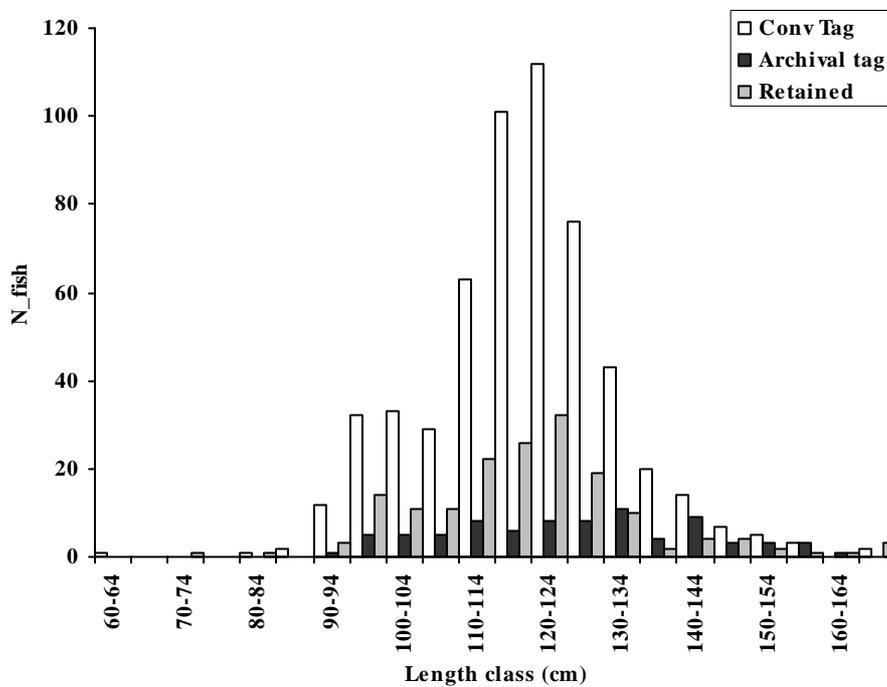


Fig. 2 Length frequency distribution of SBT caught in the tagging survey 2003.