Review on tuna tagging experiments in the eastern-central Indian Ocean for 30 years (1980-2009) and its future prospect

What are the effective tagging methods there?

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The first tuna tagging experiment in the eastern-central Indian Ocean started in 1980 by the Nippon maru (JAMARC: Japan Marine Resources Research Center). Since then various tagging activities have been implemented in last 30 years (1980-2009) (Table 1). In 30 years more than 68,000 fish were tagged and released (Table 1).

At the occasion of this third tagging workshop on the small scale tagging programs and also for the 3 decadal tagging activities in the eastern and central Indian Ocean, reviews and future prospects for the tagging experiments are made.

Submitted to the third IOTC tagging workshop on the small scale tagging activities in the eastern (and central) Indian Ocean (Equator Village, Gan Island, Addu Atoll, Maldives), May 4-5, 2009.

Table 1 Summary of the activities of the tagging experiments for 30 years (1980-2009) in the eastern and central Indian Ocean (numbers indicate no of fish tagged and released. Some are rough figures)

year	AGENCY	Note	Activities						
			SEAFDEC	Based on the Japanese domestic budgets		(a)-(c) & (f) (2005-2009) funded by JAPAN (US$ 0.95 mil) (d) (1990) funded by JAPAN (US$ 0.20 mil?) (e) (1993-1995) funded by World Bank (US$ 0.40 mil?)			
				JAMARC Nippon -maru(*)	NRIFSF (Taikei maru 2)	(a) India (Andaman)	(b) Indonesia (Sumatra)	(c) India (Lakshadweep)	Maldives
1980	IPTP			100					
1981				37					
1982				299					
1983				318					
1984				422					
1985				221					
1986				769					
1987				1,201					
1988				1,043					
1989				1,832					
1990				3,233					(d) 9,941 (6 months)
1991				1,980					
1992				1,713					
1993				1,901					(e) 7,777 (8 months)
1994				1,130					
1995				1,816					
1996	IOTC			970					
1997				626					
1998				399					
1999				384					
2000				325					
2001				(?)					
2002				(?)					
2003			1,000 (2 months)	(?)					
2004		Tsunami (EIO) (Dec)	1,400 (1 month)	(?)	601 (1 month) (Feb-Mar)				
2005		MoU		(?)		Cancelled due to Tsunami		4,958 (4 months)	
2006		[1st WS] Dipole: cold SST (EIO)		No tagging activities by new Nippon maru (**)			0 (1 month) (no tags due to cold SST)		
2007		Earth -quake (Sumatra)					726 (2 months) (affected by earthquake)		(f) 9,000 (2 months)
2008		[2nd WS] (May)				1,332 (2 months)	Canceled as not effective boats are available.		(f) 5,000 (3 months)
2009		[3rd WS] (May)				2nd WS did not recommend			(f) 6,000 (2 months)
(a) No of fish tagged & released (grand total=68,444)			2,400	20,719	601	1,322	726	4,958	37,718
(b) Total months			3	42	1	2	3	4	21
(c) = (a)/(b) Ave no fish/mo			800	493	601	661	242	1,240	1,796
Area in the Indian Ocean			Eastern IO					Central IO	
Overall average no of fish tagged & released /mo			577					1,518	

(*) For some years, fish were tagged and released in the western Indian Ocean. It is assumed that the tagging activities were spent for 2 months/year.

(**) After the new Nippon-maru launched in Oct., 2006, there were no tagging activities because it was very difficult to capture fish for tagging without damage as the new vessel does not have the skiff boat. In the past, skippers of the skiff boat could catch, tag and release fish effectively without damages at the time when they hauled the PS nets. When the new Nippon maru launched JAMARC staff tried to catch fish by a small dip net from the PS nets without using the skiff boat, but fish caught were too weak and not possible to tag.

(1) Reviews (refer to Table 1)

Effectiveness

Tagging in the CIO (central Indian Ocean) is roughly 3 times more effective than in the EIO (eastern Indian Ocean) in terms of number of tagged and released fish, i.e., 577 fish/mo in the EIO vs. 1,518 in the CIO in average. This is because in the EIO densities of tuna schools are much less (not highly aggregated) comparing to those in CIO. Similar observation has been experienced in Japanese PS fisheries. This suggests that the tagging in the EIO is less effective and less cost &b time effective than those in the CIO.

Live bait and boats (see Pictures on page 5)

In the CIO (Maldives and Lakshadweep, India), live baits for the tagging experiments are more abundant than in the EIO (Sumatra, Indonesia and Andaman, India). Furthermore, in the EIO, tagging activities have been limited due to the limited capacity of the bait tank (storage) in the boats used for the tagging. In the CIO, boats have large bait tanks (storage) to implement tagging effectively. An additional critical problem in the EIO is that suitable tagging boats were not available locally, thus boats need to be brought from other areas. This is another factor to limit the tagging activities in the EIO.

Natural disasters

In the past 5 years in the EIO, there have been occasional natural disasters such as Tsunami, earthquakes and domination of the cold waters due to the Indian Dipole phenomena that seriously affected and limited the tagging activities. On the other hand, in the CIO, such natural disasters have been relatively less thus tagging activities were not affected seriously.

(2) Future prospect

Tagging area

Based on the reviews, it is clearly understood that tagging experiments are not suitable in coastal waters in the EIO due to many negative factors (effectiveness, natural disaster, lack of live baits and good boats). Thus, the future the tagging activities need to concentrated more in the CIO.

However the tagging in the EIO is still needed to have the global picture of the migration of tuna and other relevant and important issues. To implement this objective, we also need the tagging in the future using the RV such as Nippon maru, SEAFDEC etc or charter boats such as No 2 Taikei maru in the past because tagging by these boats are more effective than those in the local boats used in Sumatra and Andaman. When large boats are used it was suggested that milkfish was effective alternative baits if common live baits were not available.

Data base

In the WIO more than 160,000n fish are tagged. Together with 68,000 fish from EIO+CIO, total more than 228,000 fish have been tagged and released. For this important information taking a lot of funds, man powers and time, we need to build the effective global tagging database for the future. Fortunately IOTC Secretariat is now working hard on this task and hope that it is available soon

Future activities and final remarks

Looking at the global situation of the funding for the tagging activities in the Atlantic, the Pacific and the Indian Ocean, there are 10-20 years cycles needed for RFMO to get the funds. In this connection in the IO, probably we will not get funds for next 10-15 years as we just completed tagging activities in the whole IO. But once we made the good database, analyses and recommendations and if we realize the importance of the tagging and need to resume the activities, we may speed up the 10-15 years cycle and may need to start searching the funds in 5-10 years later.

Vessels used in the tagging activities in the EIO and CIO

SMALL BOATS (LESS THAN 50 G. TONS)	LARGE BOATS (MORE THAN 300 G. TONS)
	
2 boats used in the tagging in Andaman	No 2 Taikei maru used in the eastern IO tagging
	
KM Mandala 02 used in the Sumatra tagging	R/V SEAFEC used in the tagging in the EIO.
	
Mas dhoni used for the Maldive tagging	Nippon maru used for the tagging in the IO

The most enjoyable and happiest moment just right after the very last tagged SKJ was released in the morning of April 30 of the Leg 4 trip in the 2008/2009 tagging cruises in Maldives. It is concurrently the moment of the end of 5 years' IOTC's EIO & CIO tagging programs funded by Japan. In the EIO and CIO nearly 70,000 tagged TUNA & SKJ have been released in past 30 years (1980-2009). So, this historical moment also means the celebration time right after when the very last tagged fish (some 70,000 th) was released in past 3 decades in the CIO and EIO, which involved many people, time and budgets.