SOME COMMENTS AND INSTRUCTIONS FOR TUNA TAGGING IN SMALL-SCALE FISHERIES[1]

by

Jean-Pierre Hallier[2]

1. EQUIPMENTS

1.1. Tagging platform

For large-scale tagging programs on board baitboat, the tagger will need to be in a very comfortable position in order to tag many fish during long periods of time. Therefore the tagger must stand up with a tagging cradle at his level (Figure 1).

Figure 1 : Tagging cradle

For small-scale tagging, often the size of the boat will not permit the use of such tagging cradle: lack of room on board and boat's motion too important will not permit a standing position. In this case, it is necessary to use a tagging mattress that can either be set on deck or on the cover of fish holds and the tagger will stand on his knees (Figure 8).

The mattress uses for the Oman tagging operations is a vinyl mattress measuring approximately 115 x 72 x 5 cm, filled with a foam pad and marked in whole cm for measurement purposes (Figure 8). The mattress is constructed of tough but smooth vinyl material with a nylon zipper in one side to allow removal and cleaning of the foam pad. Six sturdy nylon straps are sewn into the corners and midway along the long axis to allow the unit to be easily secured to the vessel during heavy seas or to tie the unit up to drain and dry between uses.

---

[1] Document based on « IOTC Tuna Tagging Consultancy in Seychelles » by D. Itano and J-P. Hallier

[2] IRD, UR109 (Thetis), C.R.H.M.T B.P. 171 34 203 – Sete, France Tel : (33) 4 99 57 32 38, Fax : (33) 4 99 57 32 95 E-mail : hallier@mpl.ird.fr

Figure 2. Tagging on tagging mattress.

Ideally, close cell foam is used inside which does not soak up blood or odours, but regular cushion foam can be used if the volume of tagging is not high. The mattress needs to be slippery by keeping it wet for the fish can slip easily on it.
The mattress is easily stored and moved to various locations on the vessels and adequately cushioned the fish while allowing an easy surface upon which to measure the fish.
In order to measure tagged tunas, centimetre measurements are draw with permanent marker on the mattress. The size of the fish need to be read very easily and quickly therefore the measurements need to be redrawn every time they tend to fade out. Bars every 5 cm and 10 cm have to be longer than in-between cm and the lengths must be written in large numbers easily visible. A tape measure should be used periodically to check that the measurements on the mattress are correct, or if not, that proper correction factors are applied to release data.

1.2. Other equipments

- Spaghetti or conventional tags with their applicator (Figure 3)
- Tag magazine to store tags in their applicators (Figure 4)
- A piece of dark cloth (black is better)
- Wool gloves
- Bleach to clean the applicators after their use
- Pencils 2B
- Permanent marker to draw the measurements on the mattress
- A tape measure to check the measurements
- Plastic data board or a tape recorder to record tagging data
- Forms to record tagging data

Figure 3 : Conventional (« spaghetti ») plastic dart tag in and outside their applicator.

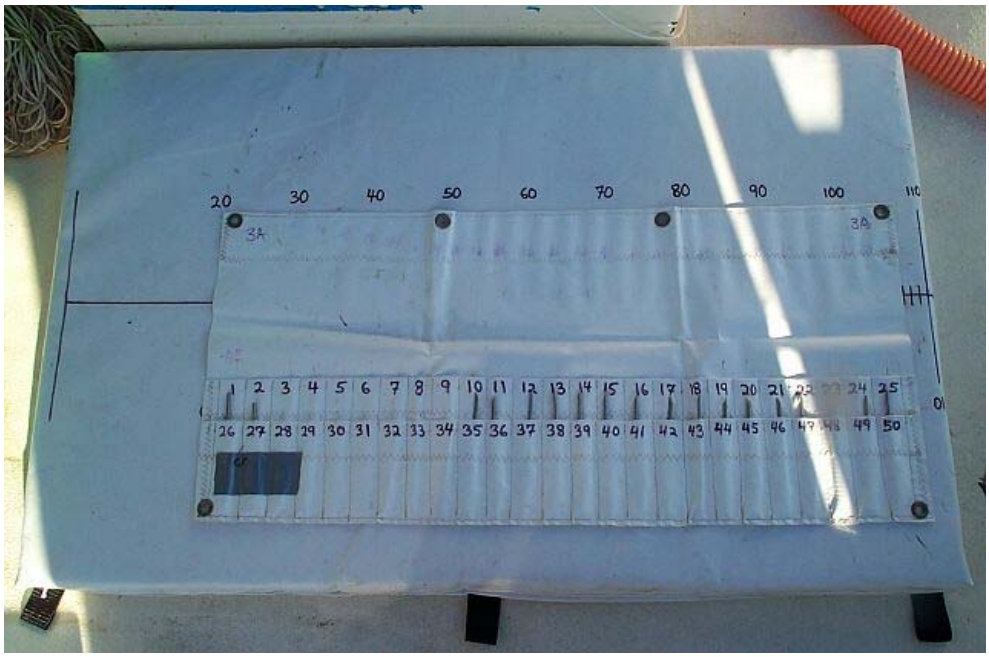

Figure 4. Tag magazine, numbered 1 – 50 laying on top of the tagging mattress

Even if the tagging rate on small artisanal vessel is never fast, it is necessary to prepare and to store in advance tags in their applicators. During this study mission, tags are stored in flat vinyl tag magazines. These were designed by the Hawaii Tuna Tagging Project that had adapted them for use on small fishing vessels in cramped conditions. The tags are stored in paired vinyl magazines measuring 35 x 88 cm, each one having fifty slots for loaded applicators in two rows (Figure 4). The first magazine is numbered 01 – 50 while the second is numbered 51 – 00. These vinyl tag magazines worked very well on small vessels to securely hold and organize tags and applicators ready for tagging in a safe, secure pouch. The magazines can be kept to the side during tagging and are not as dangerous as tag blocks where loaded applicators are exposed in an upright position. Also, the tag magazines can be secured to a vertical surface for rapid access.

The piece of dark cloth is set upon the tuna eye to calm it down. Bigeye is generally quite calm but yellowfin is more vigourous and the use of the dark cloth is often efficient in calming down the fish. Skipjack are extremely lively and the effect of the cloth is quite variable.

Gloves in wool are generally better: they are soft on the fish skin and the person can keep his touch sense. They should be well cleaned between each tagging period to avoid skin infection.

After each tagging period used applicator must be cleaned in a water and bleach solution in order to disinfect them for future use.

When writing on a wet plastic data board, it is better to use a 2B pencil. After the tagging period and once data have been transcript, pencil writing is remove by using a rubber or cleaning powder.

2. TAGGING

2.1. Tagging area

2.1.1. Conventional or spaghetti dart tag

Conventional plastic dart tags used by IOTC were manufactured by Hallprint Pty. of Australia (Figure 3). The tags have a white vinyl single bard point joined to a 13 cm yellow streamer for a total length of 14.8 cm. The tag legend bore a sequential four digit number in the AA series (ie AA 0142) near the tag head and tag end with the legend "IOTC VICTORIA SEYCHELLES – REWARD" in black lettering.

Tags are placed below the second dorsal fin so that the tag head and barb passed transversely through the dorsal musculature to anchor securely behind the second dorsal fin pterygiophores (fin ray supports) (Figures 5 & 6). The tag should be placed at an angle lower than 45° with the body of the fish in order to minimize the tag resistance to water flow.

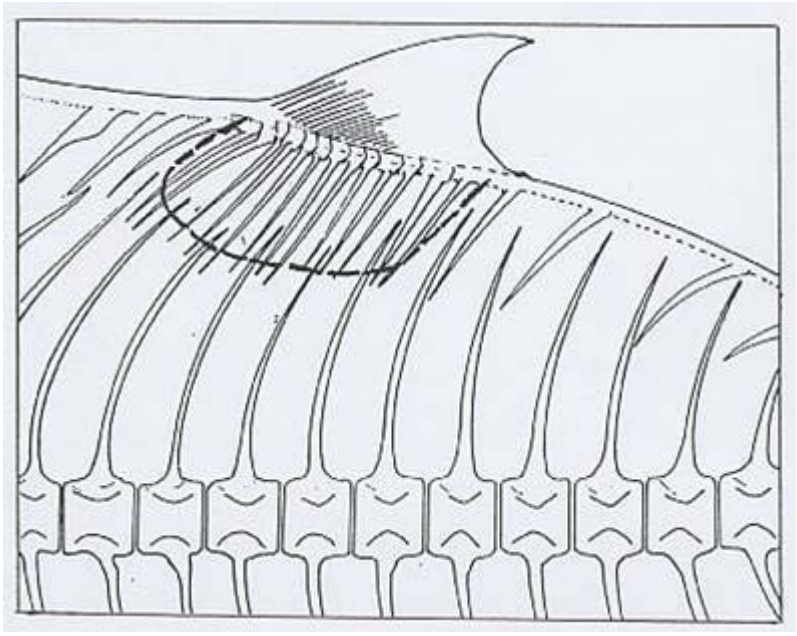

Figure 5 : Area where to set the tag onto the fish

A properly placed conventional tag should feel very secure in place and should not be able to be pulled free without a great deal of force. Normally, a well-placed tag can support the weight of small tuna and will stretch or break before being pulled free from a larger fish.

Most importantly, standardized criteria for tag releases should be adopted throughout the tag release phase. There is no doubt that tuna can survive serious injury, but not all will and it is necessary to set some minimum criteria for fish condition. Each release should be as similar to the next as possible, although basic differences may be noted due to different capture gear types, tagger effects, etc.

Figure 6 : Where to set the tag onto the fish

During tagging cruises, the fish condition criteria would reject any fish for tagging that had hooking damage to the eye, gills, or showed significant arterial bleeding or significant jaw damage. The term "significant" is admittedly subjective so some means to better define these categories may be necessary. However, some tag releases are "better" than others, and the condition of fish on release should be noted and recorded in the database. During these cruises, a condition factor of "0" was assigned for a good/normal condition fish while a condition factor of "1" indicates some problem that is not so serious as to reject the fish for tagging but notes the fish is not perfect.

2.1.2. Double tagging

Double tagging is accomplished by placing tags on different sides of the fish, one in front of the other so there is no danger of severing the first tag when the second applicator and tag is inserted (Figure 7).

Figure 7. Double tagged bigeye tuna. Note staggering of tags to avoid cutting each other.

Serially numbered tags should be used and it is best to adopt a convention where even numbered tags are placed first on one side and the odd numbered tag is opposite, or vice versa. The idea is that subsequent analysis may wish to examine differential tag shedding by placement order or side of fish by tagger. Individual taggers should be required to release a minimum number of double-tagged fish by species and size range as determined by those conducting the tag recapture analysis to examine differential tag shedding effects.

3. DATA RECORDING

3.1. Data recording system

Data are recorded manually by pencil on plastic data boards. Manual data recording is possible when a small number of fish are tagged and personnel to record data are available. During tagging cruises when the fish are being landed at a high rate or the tagger is working independently, a mechanized means to record data is desirable.

Recent tagging programs have adopted the use of mini-cassette tape recorders to record tag release data, such as the one shown in Figure 8. For maximum efficiency and to minimize the chances of data loss, the following criteria should be followed. Tape recorders should be simple "one touch recording" type and as sturdy as possible, lacking added features such as integrated AM/FM radios, voice activated recording systems or other extraneous features that may interfere with voice recording. Units with large, clear front windows that allow the viewing of the tape in motion during recording and a clearly visible tape counter are preferred. Pause buttons should be deactivated with vinyl tape so the unit can not be paused accidentally and the volume control should be taped to maximum. Tapes should be pre-recorded with music or some sound other than tag data which will alert the tagger if his unit accidentally switches from the "Record" mode to "Play" mode. Audio tapes should be normal bias, 90 minute tapes clearly labeled with an "A" side and "B" side and an individual identifying number.

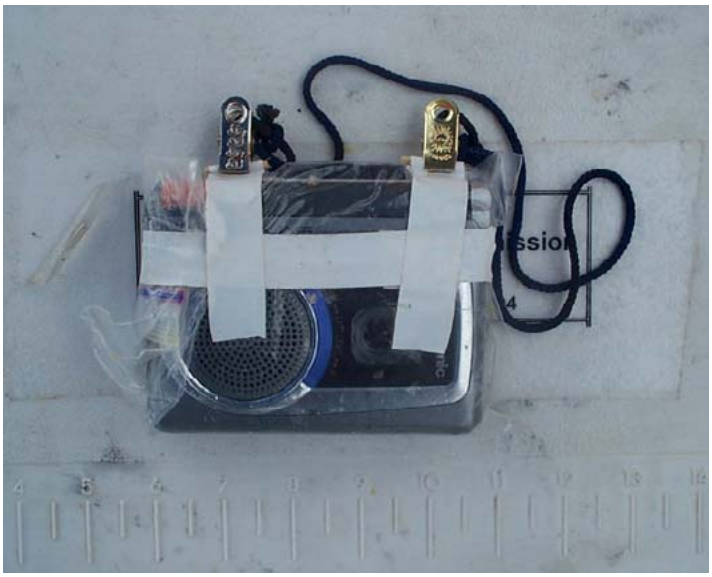

Figure 8. Mini cassette recorder in plastic bag and neck strap ready for data recording.

Each tagger should have two tape recorder units with fresh AA alkaline batteries ready for use in Ziploc plastic bags taped shut and rigged for wearing around the neck. Sound will easily

pass through the plastic bag while protecting the unit from water damage. A third unit should be available as a backup and all three recorders clearly marked with the tagger name and in some way to differentiate one unit from the other, ie KNB #1, KNB #2, KNB #3.

3.2. Data recording system

Data recorded on writing board or on tape include the date, tag number, fish species, fork length to the nearest cm, time of capture, location in latitude and longitude, tagger and fish condition. During tagging operations, the entire tag number is noted periodically, but only the last two digits need be recorded most of the time to allow faster operations.
The convention in database recording used by the South Pacific Commission was to designate each tagger by three initials, ie Kevin N. Bailey = KNB.

Data need to be enter into computer file as soon as possible. If this cannot be done after each tagging trip, then it is necessary to transcript data recorded on writing boards or on tapes onto a dedicated form. An example of the type of form to be used is proposed; it is derived from a from used in ICCAT (Atlantic ocean). The second right hand side of the form is to enter recapture data.
To the list of data to record other data need to be added such as : data to identify the tagging cruise, the gear used to catch the tagged fish, the type of tag used, the fishing operation number.
Security codes attached to sizes and weigths as well as state of the fish or square code are important information that should be collected. They will be used while processing the data. Most of these codes are giving informations on how accurate data are and what degree of confidence is attached to them. For instance, according to the security codes for sizes and weights, one will know how accurate these data are. For recaptured fish, these codes will be related to the code for the discovery place as a fish not properly measured will have for its size a security code 1. Square code will give a precision on the recapture position. And maybe a similar code could be used for the recapture date. However, when the exact day is not know, the value 0 can be coded for the day. If the month is not kown, then even the month will be coded 0.

Sète, 8th January 2003

FORM M : DATA ON TAGGING AND RECAPTURE

TAGGING DATA																						RECAPTURE DATA																					
BOAT - CRUISE				TAG & SPECIES			DATE			POSITION					FISH - FISHING								DATE				POSITION					FISH								BOAT		PORT
											LAT		LONG														LAT		LONG														
COUNTRY (IOTC Code)	CRUISE N°	= (Boat Code + Serial N°)	GEAR	TAG TYPE	SPECIES (IOTC Code)	TAG N°	YEAR	MONTH	DAY	QUADRANT	DEGREES	MINUTES	DEGREES	MINUTES	SIZE FL (cm)	SECURITY CODE	WEIGHT (1/10 Kg)	SECURITY CODE	OPERATION N°	STATE of the FISH	SPECIES (IOTC Code)	YEAR	MONTH	DAY	SQUARE CODE	QUADRANT	DEGREES	MINUTES	DEGREES	MINUTES	SIZE FL (1/10 cm)	SECURITY CODE	WEIGHT (1/10 Kg)	SECURITY CODE	AGE (Month)	SEX	DISCOVERY PLACE	COUNTRY (IOTC Code)	BOAT CODE (IOTC)	DISCOVERY PORT
1	2		3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40

Description of the form M coding system

Type of data	Data name	Explanation and codes
Tagging	tcou	Boat country code (1= France, 4= Spain, etc…)
Tagging	tbot	Boat code
Tagging	tcru	Cruise Number
Tagging	tgear	Fishing gear (1= baitboat)
Tagging	ttyp	Tag's type (2 = conventional, 7 = Betyp, 8 = conventional + tetracycline injection)
Tagging	tsp	Tagged species (1 = Yellowfin, 2 = Skipjack, 3 = Bigeye, 5 = Kawakawa, 9 = Mahi-mahi)
Tagging	Tagnb	Tag Number
Tagging	ty	year
Tagging	tm	month
Tagging	td	day
Tagging	tq	CWP square
Tagging	tlatd	latitude in degrees
Tagging	tlatm	latitude in minutes
Tagging	tlond	longitude in degrees
Tagging	tlonm	longitude in minutes
Tagging	tfl	Fork Length size in cm
Tagging	tsecfl	Security code on size (1 = estimated, 2 = measured)
Tagging	twt	weight in 1/10 kg
Tagging	tsecwt	Security code on weight (1 = estimated, 2 = measured)
Tagging	fop	Fishing operation number
Tagging	stat	State of the fish (0 = properly tagged and fish in good condition, 1 = not so well tagged and/or a lesser fish condition, 2 = still less good, 3 = even worst)
recapture	rsp	Species at recapture
recapture	ry	year
recapture	rm	month
recapture	rd	day
recapture	rsq	Precision on the recapture position (1 = in a 1° x 1° square, 2 = in a 2° x 2° square, 5 = in a bigger square)
recapture	rq	CWP square
recapture	rlatd	latitude in degrees
recapture	rlatm	latitude in minutes
recapture	rlond	longitude in degrees
recapture	rlonm	longitude in minutes
recapture	rfl	Fork length size in cm
recapture	rsecfl	Security code on size (1 = estimated, 2 = measured)
recapture	rwt	weight in 1/10 kg
recapture	rsecwt	Security code on weight (1 = estimated, 2 = measured)
recapture	rage	age
recapture	rsex	sex
recapture	rdis	Discovery place (1 = found on boat deck and properly measured, 2 = found on boat deck and estimated size, 3 = found while unloading and properly measured, 4 = found while unloading and estimated size, 5 = found while transshiping and properly measured, 6 = found while transsphiping and estimated size, 7 = found in cannery and properly measured, 8 = found in cannery and estimated size)
recapture	rcou	Boat country code (1= France, 2= Senegal, etc…)
recapture	rgear	fishing gear (1= baitboat, 2 = canne, 6 = purse seiner)
recapture	rbot	code du bateau
recapture	rport	Port code