ICCAT/GBYP 08/2018

TAGGING PROGRAMME 2018

ATLANTIC WIDE RESEARCH PROGRAMME ON BLUEFIN TUNA (ICCAT GBYP – PHASE 8)

Electronic tagging of adult bluefin tunas in Portuguese traps in the eastern Atlantic Ocean

DELIVERABLE 4:

Final Report

Prepared by:

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Contractor: **Sub-contractor (scientific):**

28 December 2018

Contents

1. Executive summary

One of the major research tasks of the ICCAT Atlantic wide Research Programme on Bluefin Tuna (GBYP) is to carry out a large, wide and intensive scientific tagging programme. In 2018, ICCAT/GBYP made a particular call for carrying out field tagging activities in the Portuguese tuna traps, where bluefin tuna moving into the Atlantic after spawning can be tagged. After this call, a proposal was made by Tunipex (contractor) and IPMA (scientific sub-contractor), which was accepted by ICCAT to fulfill the required work.

The Tunipex tuna trap, where the tagging operations took place, is located about two and a half nautical miles from the coast of the Algarve, between about 20-60m depth. The central location of the trap is at: Lat= 37,01332 (North); Long= -7,71035 (West). The tags used were Wildlife Computers miniPATs with an intra-muscular tag applicator, and were pre-programmed by ICCAT/GBYP. The bluefin tunas were tagged by experienced divers directly underwater using a long pole (10 fish) and onboard the Tunipex ship by IPMA scientific staff (20 fish). All miniPATS attached onboard were secured with an intra-muscular double attachment. During the tagging operations, each tagging pole also had a fixed underwater camera. Opportunistic conventional tagging was carried out on other bluefin tuna from the same school.

The tagging took place on the 13th of August 2018, and it was possible to successfully deploy 30 miniPAT tags. All tagged bluefin tuna were adults with estimated round weights (RWT) ranging between 34 and 240 kg (average = 114.3kg, SD = 59.3). After conversion, the estimated stretched fork length (SFL) ranged between 120 and 236 cm (average = 177.3 cm, SD = 33.3). Additionally, a total of 30 conventional tags were deployed on other 30 bluefin tuna (single tagged) from the same school. The estimated RWT of the conventionally tagged specimens ranged between 60 and 240 kg (average = 122.3kg, SD = 39.6). After conversion, the estimated SFL of the conventionally tagged specimens ranged between 146 and 236 cm (average = 184.8 cm, SD = 21.3). All tagging data were recorded and transmitted to ICCAT in the appropriate ICCAT tagging forms. It was not possible to collect tissue samples from the tagged fish due to security limitations related with the taggers while performing the operation, as well as to limit as

much as possible the handling of the fish while tagging and increasing therefore the expected survivorship.

In conclusion, the tag deployment process was carried out successfully according to the ICCAT call and the contractor proposal. We also provide some additional recommendations, specifically in terms of onboard tagging operations, that may be considered for adjusting the tagging strategy on future phases of the ICCAT/GBYP tagging project.

2. Background

One of the major research tasks under the ICCAT Atlantic wide Research Programme on Bluefin Tuna (GBYP) is to carry out a large, wide and intensive scientific tagging programme to address several important biological and ecological topics regarding Atlantic bluefin tuna as well as to possibly provide independent estimates of abundance and/or fishing mortality rates. In 2018, ICCAT/GBYP made a particular call for carrying out the third part of the field tagging activities in 2018. Following the recommendation by the GBYP Steering Committee, the call was limited to electronic tagging focusing the attention on particular areas. One of the priority areas requested was the Portuguese traps, where bluefin tuna moving into the Atlantic after spawning can be tagged (Part B of the planned tagging activities).

Given the importance of the bluefin tuna as a marine resource (Fromentin & Powers, 2005) and captures in the Algarve tuna traps, particularly in the Tunipex tuna trap, catches and biological data have been recorded since 1998 in a strait collaboration between IPMA and Tunipex. Between 2010 and 2018, six papers were presented to the ICCAT SCRS describing the bluefin catches on this trap in terms of number, weight and size frequency distribution (Lino et al., 2016, 2017; Santos & Coelho, 2011; Santos et al., 2011, 2014, 2015).

Following the call made in GBYP - Phase 8 - Tagging Programme 2018, a proposal was presented and accepted by Tunipex (contractor) and IPMA (scientific sub-contractor) to fulfill the required work tagging adult bluefin tunas in Portuguese traps in the eastern Atlantic Ocean.

3. Objectives

The objective of this document is to provide the **Deliverable 4** (Final Report) of the Project ICCAT/GBYP - Phase 8 - Tagging Programme 2018 for Item b) Electronic tagging of adult bluefin tunas in Portuguese traps in the eastern Atlantic Ocean. The details included in this Report, as requested in the call for tender and in the detailed proposal submitted, include the following:

I. Scientific report (this report) containing:

a) Full description of the work carried out for the tagging activities in the various areas, with the total number of tagged tunas and specification of any double tagged tuna;

b) Detailed description of the methodology and protocols;

c) Maps of the areas in which the tagging was carried out;

d) Detailed tables with the definitive number of tagged specimens by area, size composition and type of tag (miniPATs or miniPATs + conventional spaghetti tag);

e) Copy of the data input worksheets from the ICCAT tagging database;

f) Possible recommendations for adjusting the tagging strategy for conventional tagging in future Phases of ICCAT GBYP;

g) Executive Summary.

II. A PowerPoint presentation of the main results.

III: Copy of the databases in the ICCAT format, specifically:

a) TG01-CnvEleTSurv: Summary of tagging activities (campaigns & others) [Form-A]; contained in file: "TG01-CnvEleTSurv_PRT_GBYP8_FINAL.XLS".

b) TG02-CnvTReRc: Conventional Tag release-recovery data (Version: v11). Contained in file: "TG02-CnvTReRc_PRT_GBYP8_FINAL .XLS".

c) TG03-EleTReRc: Electronic Tagging Release - Recovery Information (Version: v11). Contained in file: "TG03-EleTReRc_PRT_GBYP8_FINAL.XLS".

4. Detailed description of the methodology

4.1. Description, mapping and scheme of the tuna trap for the tagging operations

Traditional tuna traps are composed by a complex net system that leads the individuals through a maze so they may be trapped and captured (Costa 2000; Leite et al., 1986). Those nets are a fixed and passive fishing gear that stays at sea during a certain period of the year, during the migratory route of the bluefin tunas.

The bluefin tuna were tagged in a Portuguese trap in the eastern Atlantic Ocean, specifically in the Tunipex tuna trap operating in the Algarve region, Southern Portugal (**Fig. 1**). The tuna trap is located about two and a half nautical miles away from the coast line of the Algarve, and between about 20-60m depth. The central location of the trap is at: Lat=37.01332 (North); Long= -7.71035 (West).

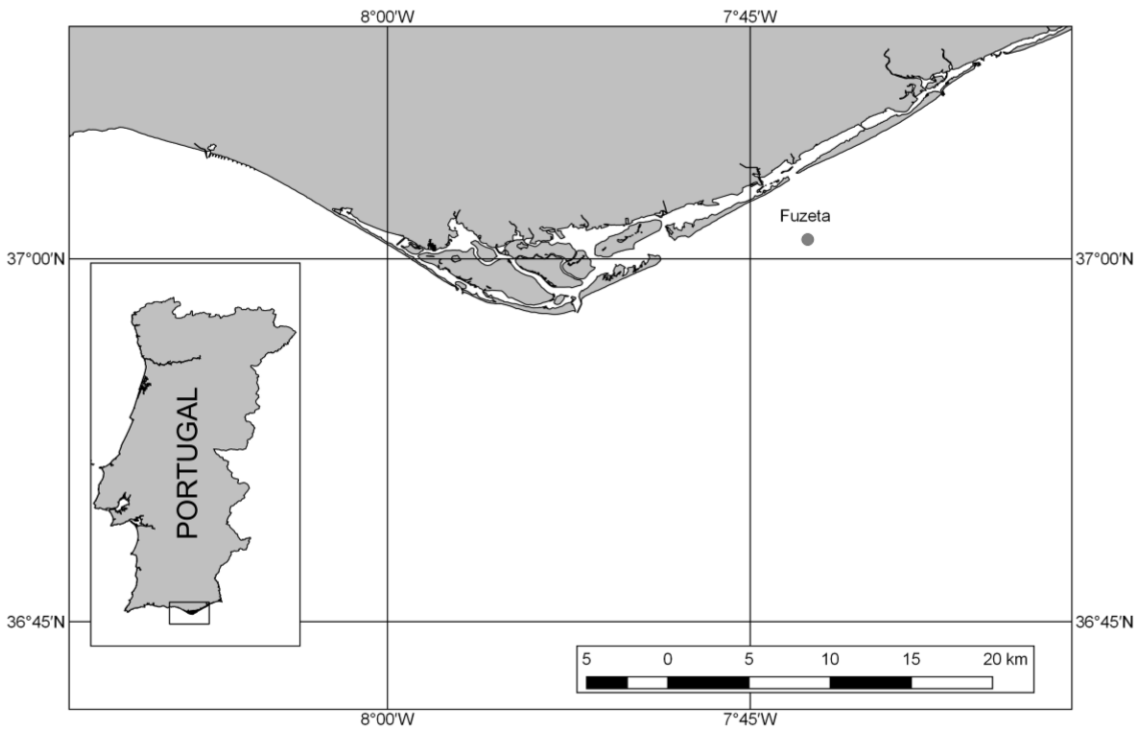

Fig. 1. Location of the Tunipex tuna trap in the Algarve, Southern Portugal (NE Atlantic).

In terms of operational scheme, the Tunipex set net consists of 2 leading nets, a playground net, an ascending slope net, a box net and two crawl nets (**Fig. 2**). When the tunas encounter the leading nets they move along those nets and end up entering the set net. The area where the tuna first enter the set net is called the playground net, which is a large space surrounded by nets. This is a large space that allows the fish to swim in a calmer and less stressful manner for some time. On the opposite side of the playground area there is a device called the ascending slope net which has the role of preventing the fish from escaping the set net. This is an open channel, that is not completely closed and allows the fish to swim freely between the playground area, but without exiting the set net. The next and final stage is to move the fish into the box net, where the tunas are captured. To catch the fish in the box net, the fishermen hoist the box net up. If necessary, some fish are moved to the crawl nets temporally, due to operational adjustments (**Fig. 2**).

The contractor, Tunipex, was available to perform all tagging operations as described above. The time frame for the activities was set up to a maximum of 2 weeks immediately after the quota closure of the tuna trap fisheries in Portugal. After the quota was reached, the tuna trap remained operational for the extra time until a bluefin tuna school of sufficient size entered the trap. This allowed for the tagging of bluefin tunas that spent relatively little time (few days) in the trap.

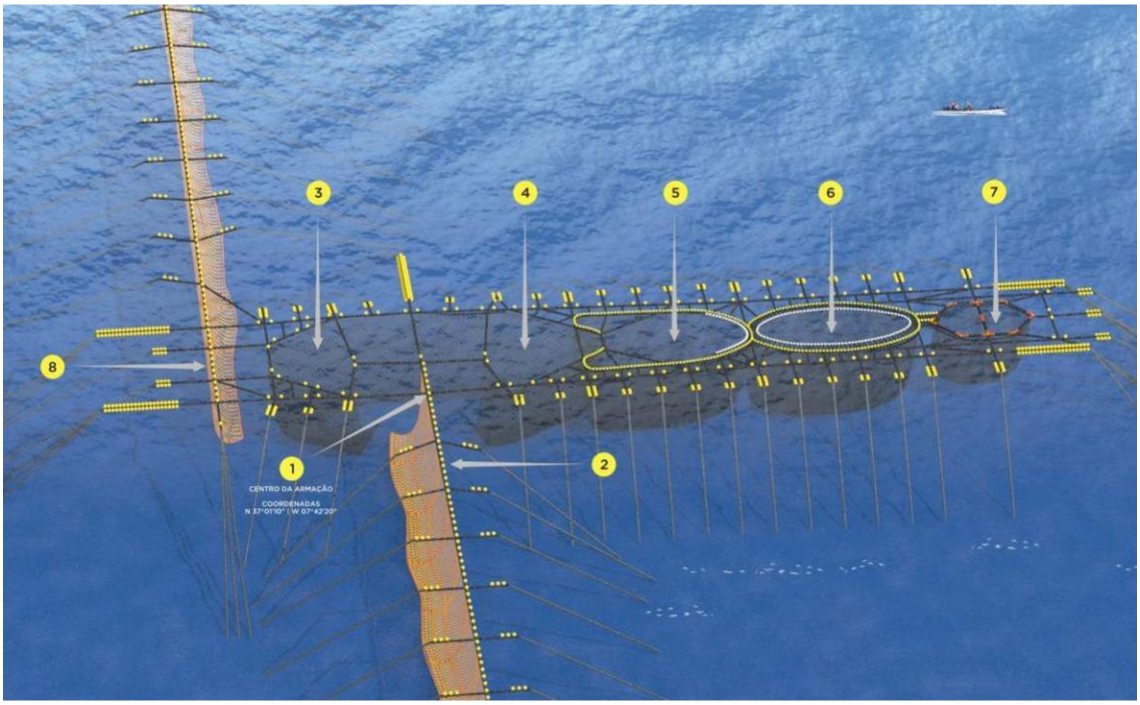

Fig. 2. Scheme of the Tunipex tuna trap in the Algarve, Southern Portugal (NE Atlantic), with details of the entrance and center of the trap (1), leading nets (2 and 8), playground net (3), ascending slope net (4), box net (5) and crawls (6 and 7).

4.2. Satellite tagging operations and logistics

As specified in the detailed proposal that was submitted and detailed in Deliverable 1, the tagging coordinator for the project was Mr. Alfredo Poço (Tunipex). Mr. Alfredo Poço has more than 20 years experience on the daily handling operations of tuna traps and performing regular dives in the traps, and has also considerable experience tagging bluefin tuna, as well as other species like sharks, in the tuna traps.

The tagging protocol adopted for deploying the satellite tags was the specified in the call for tenders and in the detailed proposal. In general, the methodology for tagging followed Mariani et al (2015) with the improvements reported in SCRS/2015/181.

The tags were Wildlife Computers miniPATs with an intra-muscular tag applicator that were provided already rigged by ICCAT/GBYP. The tags were pre-programmed by ICCAT/GBYP in stand-by state, ready to be deployed.

For the tagging logistics and operations, the contractor Tunipex used its 2 main boats (length 22m, 800hp) and the 2 smaller boats (length 7m, 160hp). Those are the boats used in the regular tuna trap operations, and were used to provide assistance during the tagging operations to the trap operators, divers and the IPMA (sub-contractor) personnel that were present.

All divers were hired personnel by the tuna trap that have substantial work experience in the regular work (including underwater) of the tuna trap operations. Several additional divers were underwater at all times to perform assistance during the operations (**Fig. 3**). For collecting underwater imaging during the tagging operations, both tagging poles used (two) were equipped with fixed underwater GoPro cameras (**Fig. 4**).

Fig. 3. Divers (taggers and assistants) preparing for the tagging operations. This operation was taking place in the box net, where around 30 tunas were isolated from the rest of the school during tagging.

Fig. 4. The tagging coordinator, Mr. Alfredo Poço, handling to a diver the underwater tagging pole with a satellite tag ready to be deployed. A GoPro camera is attached to the pole.

4.3. Conventional tagging

Opportunistic tagging was carried out on other fish from the same school as the satellite tagged fish, but not on the same fish in order to avoid additional stress on the satellite tagged tuna, therefore increasing the expected post-release survivorship. Single tagging was planned and carried out, with the use of single barb tags. All tags and applicators were provided by ICCAT/GBYP.

Tagging for conventional tags used the same protocol as the satellite tagging, with the tags rigged at the extreme of long tagging poles and the tagging taking place underwater by experienced divers.

4.4. Biological sampling

Biological sampling was not carried out during the tagging activities due to security limitations of the taggers while performing the tagging operation. Additionally, attempting to collect biological samples from fish while being tagged would increase the time of the process and could result in additional port-release mortality.

4.5. Data recording and reporting

While tagging, the divers estimated the specimen weights that were properly recorded. As mentioned before, the divers are extremely experienced personnel that have substantial work experience in the regular trap operation work, and are used to underwater estimate weights of the fish in the tuna traps with very good accuracy. The specimen sizes (SFL - strait fork length) were then converted from RDW using the Rodriguez-Marin (2015) equations, in this case specifically for eastern bluefin tuna for the month of August, that are included in the ICCAT manual Appendix 4-III (ICCAT, 2006-2016).

All data, including the serial and PTT numbers of each tag, the size/weight estimate of each specimen, the condition/injuries of the specimens, and other notes (e.g., sea surface temperature, cloud coverage, wind speed, etc) were properly recorded. All data were recorded in the appropriate ICCAT tagging forms. Specifically, the survey summary data were reported in file template "TG01-CnvEleTSurv.xlsx", the electronic/satellite tagging were reported using file template "TG03-EleTReRc.xlsx" and the additional conventional tags deployed were reported using file template "TG02-CnvTReRc.xlsx".

5. Full description of the work carried out

5.1. Satellite tagging

A total of 30 satellite pop-up tags (miniPATS from Wildlife Computers) were sent by ICCAT to the sub-contractor (IPMA) for deployment in adult bluefin tuna (> 30 kg). All tags were programmed by ICCAT and ready for deployment.

The bluefin tuna traps quota in Portugal closed on August 1st, and after that period the Tunipex prepared the tuna trap for the tagging operations, which took several days while in stand-by for the tagging activities.

A large school with an estimated size of 300 specimens entered the trap during the week of 6-10 August, remaining in the playground net area. The following days were devoted by Tunipex for the preparation of the tagging activities, that would take place in the box net. Specifically, the box net was divided into two separated areas, in order to have the tunas to be tagged in a separate and quiet environment, therefore avoiding any additional stress and possible mortality events. The tagging operation took place on the 13th of August, when 30 randomly selected specimens were separated from the main school and lead into the subdivision area of the box net, for the satellite tagging operations. This allowed for a very quiet and non-stressful environmental for the tunas that were therefore swimming in a much slower manner and easier to tag successfully. After tagging, the satellite tagged tunas were placed with the remaining school in the main area of the box net, and released together with the entire school.

According to the tagging protocol proposed, ten (10) tunas were tagged by divers directly underwater using a long pole (Fig. 5). In addition, twenty (20) fish to be tagged with miniPAT were captured individually by the trap divers, carried onboard on a wet stretcher (Fig. 6) and tagged with an intra-muscular tag applicator and secured with an intra-muscular double attachment.

Tagging extremely active tunas onboard was a difficult task. Attaching the miniPATs and the double attachment while holding the fish was intensive (Fig. 7) and to avoid additional mortality double tagging with conventional tags was not carried out. Likewise, attempting to collect biological sampling during this process was also not possible. It was the scientific staff decision not to cause additional injuries to the fish that could results in mortality while tagging or post-release mortality events. Further, there were also logistic issues for conventional tagging those fish, as it would imply turning the fish to tag on the opposite side of the satellite tag, which could cause damage and/or release of the satellite tags.

Fish tagged onboard were measured to the nearest 5cm with a tape and the length converted to weight using the Rodriguez-Marin (2015) equation (eastern bluefin tuna for August).

All tagged bluefin tuna were adults with estimated round weights (RWT) ranging between 34 kg and 240 kg (average = 114.3kg, SD = 59.3). After conversion, the estimated stretched fork length (SFL) ranged between 120 and 236 cm (average = 177.3 cm, SD = 33.3). The summarized information on the tagged specimens is presented in **Table 1** (section 5.4) of this report. The detailed information is provided in the ICCAT electronic tagging reporting forms.

Fig. 5. Tagging a bluefin tuna underwater. It is possible to see the diver preparing for deployment of the satellite tag using the long pole with the rigged satellite tag at the end, and a GoPro camera fixed in the tagging pole. This image is captured from another GoPro camera operated by another diver.

Fig. 6. Tagging a bluefin tuna onboard. Fish were individually captured and hauled in a wet stretcher. Dark wet towels were used to cover the fish head and eyes during the entire operation.

Fig. 7. Tagging a bluefin tuna onboard. IPMA researcher inserting the tag with the intra-muscular tag applicator with help from one member of the crew.

5.2. Conventional tagging

A total of 30 conventional tags (single tagging with single barb tags) were deployed on 30 bluefin tuna specimens (**Fig. 8**). As explained previously, those specimens tagged with conventional tags were specimens from the same school as the satellite tagged fish, but not the same fish in order to avoid additional stress on the satellite tagged tuna.

In the first few fish that were satellite tagged, we also tried to deploy conventional tags, as was originally planned. At that moment we considered that the best would be to place the conventional tags in the same overall place that the satellite tags, but on the other side of the fish. This caused the fish having to be rotated, that could release or damage the satellite tag, while adding much stress for the fish and risk of increased post-tagging/ post-release mortality. Dr. Coelho (IPMA-Portugal), that was in charge of the scientific operations, assumes full responsibility for the decision not to make such attempt, as in this case it was considered that the risk of added tuna mortality due to increased handling was too high. At the time we did not consider the possibility of deploying the conventional tags on the same side as the satellite tags. This is possible, but because of the double anchor of the satellite tags those are extended over a relatively long distance along the side of the tuna body. To also deploy a conventional tag on the same side, it would have to be deployed either in a very forward position, so that in its full extension the conventional tag does not interfere with the satellite tag first anchor, or in a very posterior position closer to the caudal peduncle, after the satellite tag second anchor. Another possibility is to put in alongside the satellite tag, but there is a risk of the conventional tag touching and causing some interference with the satellite tag, either in the anchors and attachment or with the tag itself. For those reasons, and as mentioned previously, we did not consider the possibility to deploy the conventional tags on the same side as the satellite tag. If ICCAT/GBYP wishes and believes this is a reasonable place to put such tags, we can do that for future tagging of bluefin tuna.

Still with regards to this, a much better option for the future might be to have the unique identifiers for the conventional tags in the tether that connects the first anchor of the satellite tag (the main tether). This means that once the satellite tag is released, the tether would still remain in the fish and should work as a conventional tag. The only difference being that the conventional tags used by ICCAT/GBYP have traditionally used either single or double barb anchors, while in this case it would still have the same Domeier anchor as used in the satellite tag. We have added a note in the future recommendations with this point, to be considered by ICCAT/GBYP in the future.

For the fish tagged with conventional tags underwater, specimen sizes were estimated underwater by the divers and are reported in detail in the respective ICCAT conventional tag reporting forms. In summary, the estimated RWT of the conventionally tagged specimens ranged between 60 and 240 kg (average = 122.3kg, SD = 39.6). After conversion of the individual weights to sizes (RDW-SFL) with the Rodriguez-Marin (2015) equation (eastern bluefin tuna for August), the estimated SFL of the conventional tagged specimens ranged between 146 and 236 cm (average = 184.8 cm, SD = 21.3). The summarized information on the tagged specimens is presented in **Table 1** (section 5.4) of this report. The detailed information is provided in the ICCAT conventional tagging reporting forms.

Fig. 8. Tagging additional bluefin tuna with conventional tags (single tagging with single barb tag).

5.3. Biological sampling

For safety reasons, as well as to not further increase the fish stress during the tagging operation, it was not possible to collect biological samples from the tagged fish.

The equipment and storage (non-denatured Ethanol 96%, in 5ml tubes, to be labeled according to the labeling codes used in GBYP) were prepared but sample collection was not possible. Tagging extremely active tunas onboard was a difficult task. Attaching the miniPATs and the double attachment while holding the fish did not allow extracting any tissue in a secure way (Fig. 9), which could have caused safety issues for the taggers as well as additional stress to the fish. It was the scientific staff decision not to collect tissue.

We note that both the fishing and scientific crews that performed this operation are very experienced and also routinely take fin clips samples of fish, not only tunas but many other species, including for example large sharks that have to be handled very carefully. However, taking fin clips of specimens that are captured, for example, from longline or rod and reel gears is not the same as in this case with fish that are live and very active in tuna traps or farms. Fish captured in other fishing gears are often tired (sometimes dying), while these tunas from the fish traps or farms are very strong, not tired in any way, and therefore extremely active. Even when rotated with the belly up and with the eyes covered, as is routinely done to have the fish more calm, those tunas can still be very active and dangerous to handle. And especially trying to take fin clips from those very active and very strong tunas while they are being handled to deploy the satellite tags can be very complicated, especially in our case as we were using double anchors for the satellite tags, which is an even more time consuming operation. This means that the additional handling to take such biological samples is more complex and the additional time needed can increase the tuna stress and eventual mortality, either while tagging or later due to post-tagging/post-release mortality. Additionally, we were concerned that some of the fish while being tagged strongly threshed the caudal peduncle and caudal fin. This was not easy to predict, as some of the tuna were quiet for a few moments and then very suddenly started to thresh the caudal fins that are extremely strong in those large bluefin tuna. This was a safety concern for the crew that was handling the fish, as being hit by the caudal fin of a tuna with several hundred kilograms can be extremely dangerous. The scientific responsible for the operation (Dr. Rui Coelho, IPMA-Portugal) made a decision on that moment that the risk both for the tuna and for the crew handling the fish were too high, and that the priority should be to deploy the satellite tags in the best possible conditions, with a low risk of mortality for the tunas and minimizing any risk for the crew. Dr. Coelho assumes full responsibility for this decision, and strongly emphasizes that the safety of the operations at all times always has to be the first priority of any scientific operation.

Fig. 9. Five members of the crew are holding down the fish and securing the tail while the IPMA researcher inserts the double attachment

5.4. Detailed tables with the definitive number of tagged specimens by area, size composition and type of tag

The summarized information of the definitive numbers of tagged specimens by tag type and size class is shown bellow in **Table 1** and **Fig 14**.

Table 1: Detailed table with the definitive number of tagged specimens by size composition (10 cm SFL size classes) and type of tag. All specimens were tagged in the Tunipex tuna trap in Southern Portugal, NE Atlantic (Lat: 37.01332 North, Long: 7.71035 West).

Size Class (10cm FL)	Sattelite (miniPAT)	Conventional (single dart)	Total
120	2		2
130	2		2
140	2	3	5
150	4		4
160	2	5	7
170	3	1	4
180	2	9	11
190	7	5	12
210	2	4	6
220	1	2	3
230	3	1	4
Total	**30**	**30**	**60**

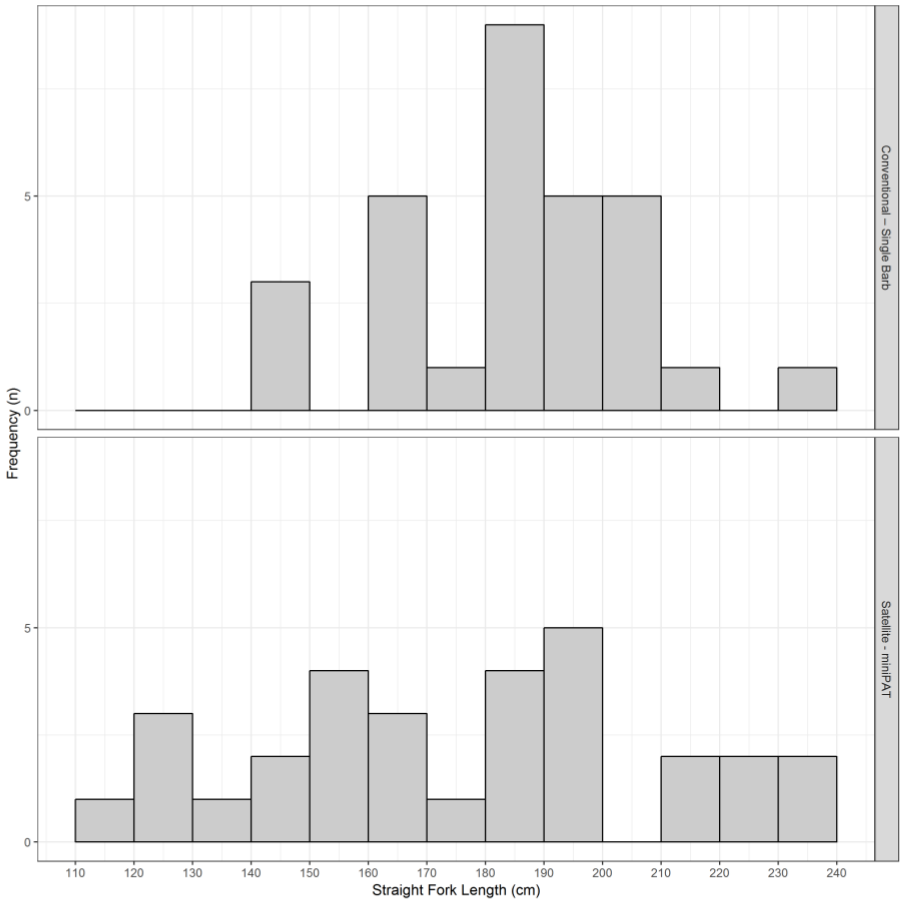

Fig. 10. Size distribution of the definitive number of BFT specimens tagged, by size composition (10 cm SFL size classes) and type of tag. All specimens were tagged in the Tunipex tuna trap in Southern Portugal, NE Atlantic (Lat: 37.01332 North, Long: 7.71035 West).

6. Data input worksheets from the ICCAT tagging database

As specified in the detailed description of the methods, all data was recorded during the field mission and is reported to ICCAT in the appropriate ICCAT tagging forms. Specifically, the followign files were provided to the ICCAT Secretary:

- TG01-CnvEleTSurv_PRT_GBYP6_FINAL.xlsx: Summary of tagging activities (campaigns & others) [Form-A].
- TG02-CnvTReRc_PRT_GBYP6_FINAL.xlsx: Conventional Tag release-recovery data (Version: v11).
- TG03-EleTReRc_PRT_GBYP6_FINAL.xlsx: Electronic Tagging Release - Recovery Information (Version: v11).

7. Recommendations for adjusting the tagging strategy for future phases of ICCAT GBYP

Underwater *vs* onboard tagging: We believe that the method previously used (underwater tagging) is appropriate, as it allows for an efficient and fast tagging process, with low stress for the tagged specimens and in producing no mortality events during tagging. Onboard tagging produced instant mortality on one specimen (see Scientific Mortality Declaration in Annex I). Based on the current experiment, onboard tagging is quite stressful, time and resource consuming and does not seem to provide significantly better results (preliminary results show that retention is similar and mortality after release is higher).

Tissue collection: genetic samples could possibly be collected using a puncture even for underwater tagging. This is a working hypothesis and needs to be validated.

Conventional tag ID in the satellite tag tether: one option to be considered and possibly tested in the future would be to have the unique identifiers for the conventional tags in the tether that connects the first anchor of the satellite tag (the main tether). This means that once the satellite tag is released, the tether would still remain in the fish and should work as a conventional tag. The fact that the anchor in this case would still be the same Domeier anchor used in the satellite tag (and not the commonly used single or double barb anchors) should be validated.

Methods exchange: a workshop including scientists with previous tagging experience could allow for the improvement of methods and equipment.

8. Acknowledgements

The authors would like to thank all the staff from Tunipex and in particular to the divers for the underwater tagging of the fish and handling the live tunas for onboard tagging.

The authors would also like to thank researchers Daniela Rosa and Catarina C. Santos for their assistance during tagging.

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10. Annexes

Annex I

Annex 1

ATLANTIC-WIDE RESEARCH PROGRAMME FOR BLUEFIN TUNA (ICCAT-GBYP)

REPORT FOR GBYP RESEARCH MORTALITY ALLOWANCE (Rec. 11-06)

GBYP LOGBOOK - RMA

1. Date: 13/August/2018	2. Document number: (allocated by ICCAT-GBYP)
3. Entity in charge of the research activity: IPMA/ TUNIPEX	4. Research activity: GBYP - satellite tagging Portugal
Address: IPMA. Av 5 Outubro s/n, 8700 OLHÃO	Telephone No. (including that of the scientist responsible for the activity): +351962671094 (RUI COELHO) IPMA
Country: PORTUGAL	E-mail: rpcoelho@ipma.pt

Vessel or trap name:	Flag:	Vessel or trap ID number:
TUNIPEX	PORTUGAL	ATEU2PRT00001

5. Catch area (geographical description):	6. Location (latitude-longitude):
South PORTUGAL (NE Atlantic)	37,0194N / 7,7056 W

7. DESCRIPTION OF THE MORTALITY INDUCED

Gear	Number of fish	Length (cm)	Round weight (kg)	Final destination*
TRAP	1	1,80 cm	75 Kg	Crew personal consumption
TOTAL	1	1,80cm	75 Kg	

Name and position of the scientist on board:	Signature:
RUI COELHO (IPMA) (Research Biologist)	[signature]
Name of Captain of the vessel/trap:	Signature
[signature]	[signature]

The form MUST be delivered to ICCAT by e-mail (gbyp@iccat.int) or fax (+34 91 415 2612) within a maximum of 24 hours of the research mortality event

* Dead bluefin tuna derived from a GBYP research activity cannot be sold on the market or traded under any circumstances. The mortality report shall distinguish between dead fish discarded at sea, fish for crew's personal consumption and fish for scientific purposes.