

## **ICCAT GBYP 2019/09-b**

Atlantic-Wide Research Programme for Bluefin Tuna

(GBYP PHASE 9)

# ***Growth in Farms Study***

AquaBioTech Limited

## **Deliverable 5: Final Report**

December 2019



This project is co-funded  
by the European Union

## 1. Executive Summary

As part of the requirements of the contract: “Short-term contract for BFT growth in farms study (ICCAT GBYP 2019/09-b) of the Atlantic-wide research programme for bluefin tuna (ICCAT GBYP Phase 9)”, the following is the final report of the project (Deliverable 5).

The farm in which the trial is being carried out is MFF Ltd (ATEU1MLT00004) located in the South East Aquaculture Zone of Malta (approximately 6 km off the coast). Three catches of BFT (2nd, 4th and 5th of June) were placed into the same cage during three cagings (24th, 20th, 18th of June respectively). The Trial Cage is EU.MLT.004MFF (70m diameter, 35m deep).

The full details of the three catches and subsequent cagings are:

- eBCD No. TN19900004-LT01; catch date 2<sup>nd</sup> June 2019; coordinates: 34-29N/13-57E; caging date: 24-06-2019.
- eBCD No. TN19900008; catch date 4<sup>th</sup> June 2019; coordinates: 34-45N/13-56E; caging date 20 June 2019.
- eBCD No TN19900011-LT01; catch date: 5<sup>th</sup> June 2019; coordinates: 35-17N/13-41E; caging date 18 June 2019.

Analysis of the stereocamera footage of each of the cagings was completed with a total of 2736 fish counted and an overall average SFL of 202.77cm and (calculated) RWT of 154.90kg. Another stereocamera footage was carried out in the cage on the 10th of September and the analysis of this footage was completed (600 fish measured). A pre-harvest stereocamera footage in the cage was also taken on the 27<sup>th</sup> September 2019 and has also been analysed (600 fish).

Harvesting of the fish in the experimental cage was carried out between the 1st of October and the 12th of October 2019. A total of 2580 fish were harvested during the harvesting operations, leaving 156 fish as carryover to be harvested in 2020. There were no mortalities between caging and harvesting.

## 2. Summary of Stereocamera analysis of Caged BFT

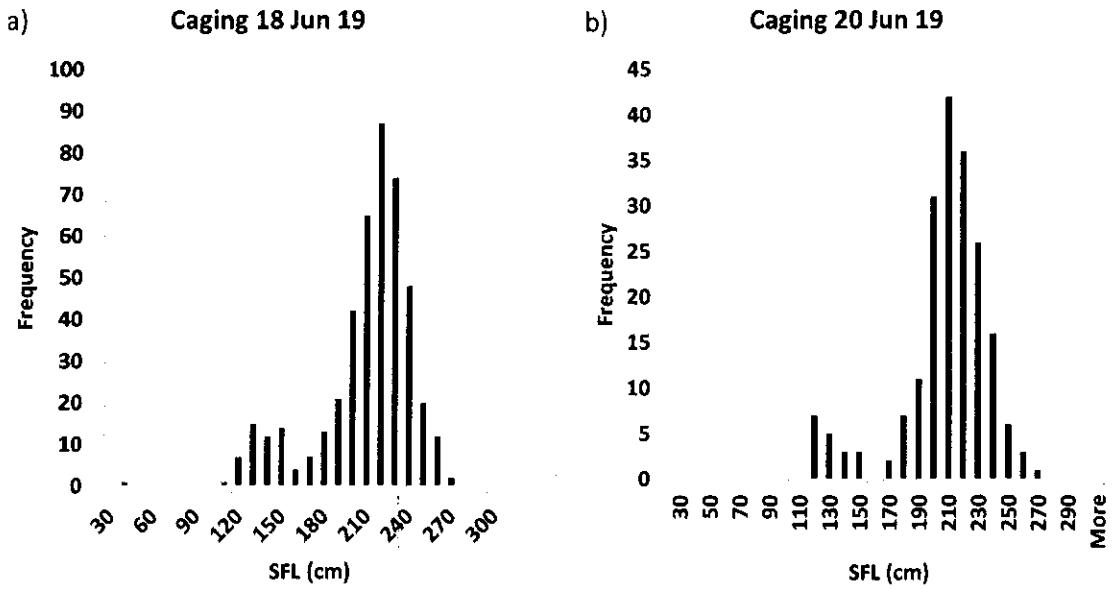
Three footages of the cagings making up the BFT in the experimental Cage 4 were provided for analysis. In the case of each caging, the number of fish being caged and a minimum of 20% sample for the purpose of SFL determination was carried out twice following recommendations detailed in detailed in Annex 8 and Annex 9 of the ICCAT Rec. 17-07 (<https://www.iccat.int/Documents/Recs/compendiopdf-e/2017-07-e.pdf>).

**Table 1** summarises the overall results of the two separate determinations and the overall average.

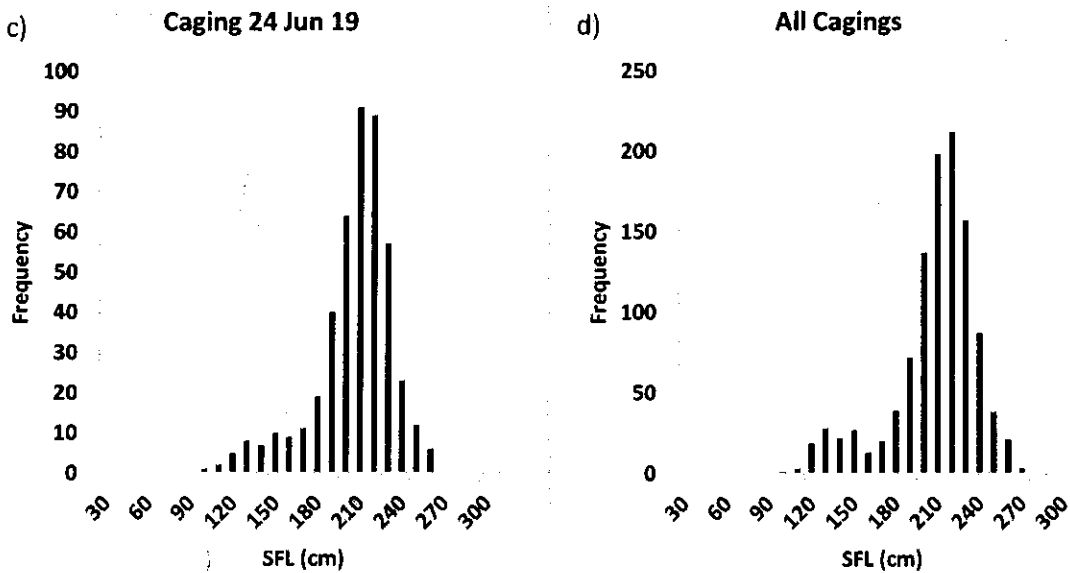
**Table 1.** Results of analysis of the stereocamera footage of the three cagings of the fish in the trial cage.

Caging Date	1 <sup>st</sup> Reading		2 <sup>nd</sup> Reading		Both	
	No. of Fish	Av. SFL (cm)	No. of Fish	Av. SFL (cm)	Overall Av. No. Fish	Overall Av. SFL (cm)
18-Jun-19	1105	203.11	1111	206.36	1108	204.75
20-Jun-19	495	206.27	495	199.01	495	202.62
24-Jun-19	1132	202.82	1134	198.97	1133	200.90
All	2732	204.00	2740	201.98	2736	202.77

The distribution of SFLs in each of the cagings and of the whole population in the trial cage at the time of caging are presented in **Figure 1**.



**Figure 1.** SFL of BFT caged into experimental cage. a) Fish caged on 18<sup>th</sup> June 2019; b) Fish caged on 20<sup>th</sup> June 2019.



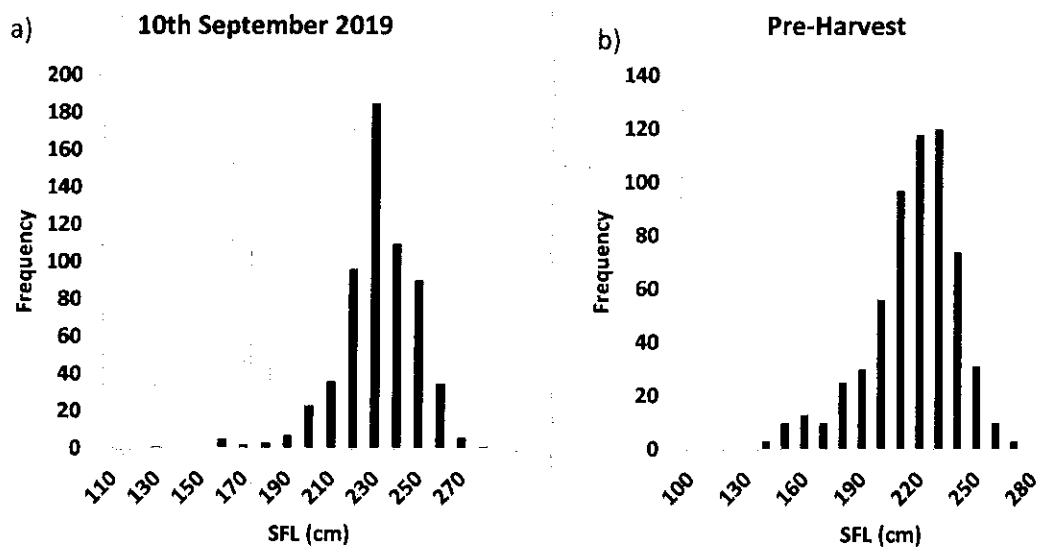
**Figure 1 (continued).** SFL of BFT caged into experimental cage. c) Fish caged on 24<sup>th</sup> June 2019; d) All fish caged.

The overall average SFL of the whole cage after final caging was 202.77cm. Using the ICCAT L-W relationship, the total RWT caged was 423,797kg.

### 3. Summary of Stereocamera prior to harvesting

A stereocamera footage was taken of the fish in the experimental cage (not as part of a transfer) on 10<sup>th</sup> September 2019. The stereocamera footage was carried out by deploying a diver with the stereocamera down the side of the cage towards the bottom of the cage and then up again towards the surface. The total duration of the footage from which measurements was taken varied between 14 and 15 minutes on both dates.

600 fish were measured from the footage and the SFL distribution is provided in **Figure 2a**. An additional pre-harvest stereocamera footage (not as part of a transfer) was taken on the 27<sup>th</sup> of September 2019; 600 fish were measured and the SFL distribution is provided in **Figure 2b**.



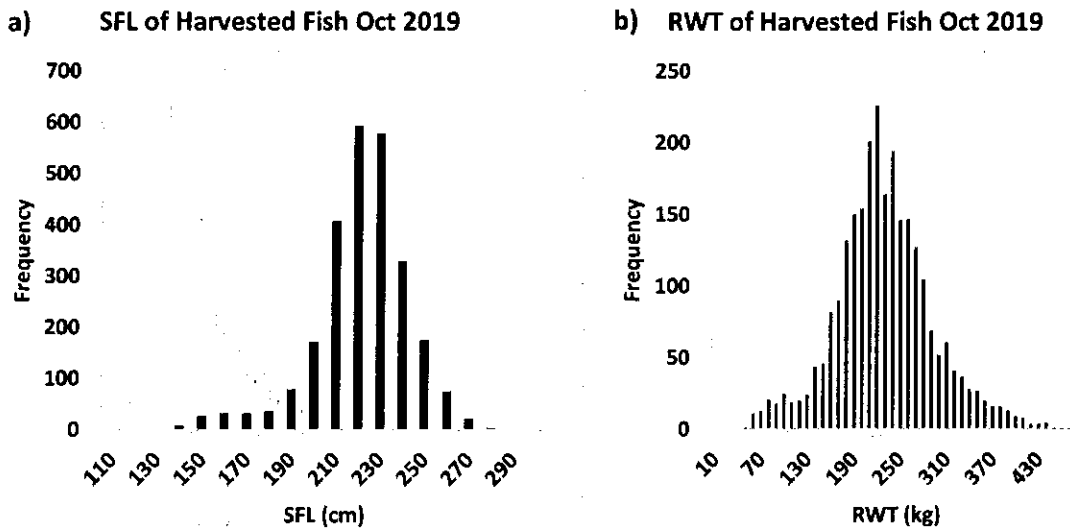
**Figure 2.** SFL of BFT in experimental cage. a) 10<sup>th</sup> September 2019; b) Pre-harvest.

On the 1<sup>st</sup> of October 2019, harvesting of the cage was started, and the SFL and RWT of all harvested fish were recorded individually. The last day of harvesting was on the 12<sup>th</sup> of October 2019.

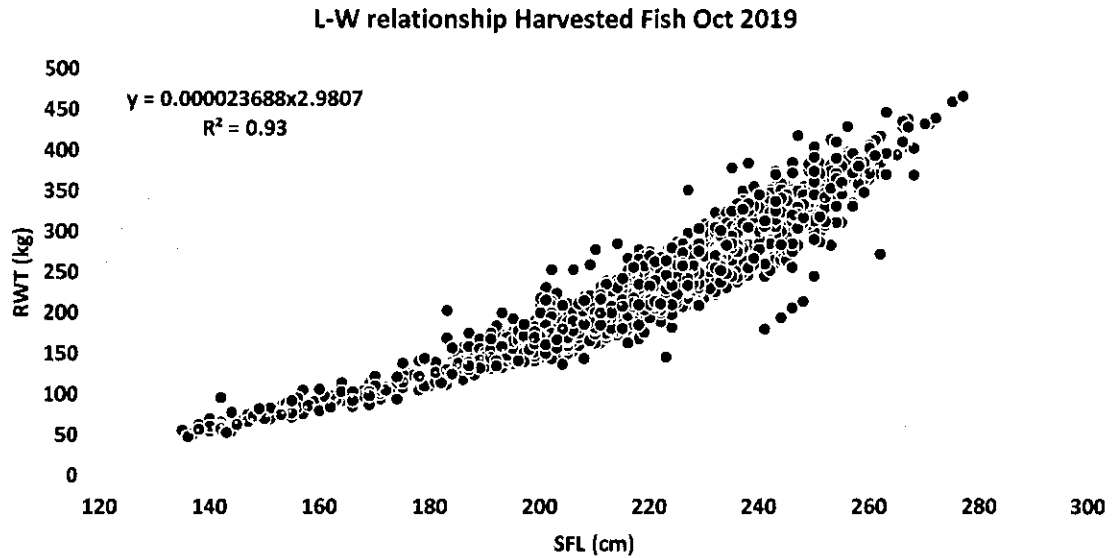
The RWT and SFL of the harvested fish were recorded individually as per standard GBYP procedures (SAMPLING PROTOCOLS FOR THE GBYP BIOLOGICAL SAMPLING; Last revised: 18 July 2018 ([https://www.iccat.int/GBYP/Docs/Biological\\_Studies\\_Phase\\_8\\_Sampling\\_Protocol.pdf](https://www.iccat.int/GBYP/Docs/Biological_Studies_Phase_8_Sampling_Protocol.pdf))).

A total of 2580 fish were harvested from the experimental cage during these harvesting operations. 156 fish remain in the cage as carryover and will be harvested during the 2020 harvesting season.

The distribution of SFLs and RWTs of harvested fish are shown in **Figures 3a** and **b** respectively. The corresponding L-W relationship of the harvested fish is presented in **Figure 4**.



**Figure 3.** SFL and RWT distributions of harvested fish (a and b respectively) of October 2019 harvested fish from the trial cage.



**Figure 4.** L-W relationship of harvested fish (a and b respectively) of October 2019 harvested fish from the trial cage.

The average SFL at harvest was 217.21cm and the average RWT was 225.84kg.

#### 4. Additional Information

The temperature of the water during the trial was recorded regularly. Salinity was 38ppt. The bait fish intake was also recorded when feeding took place. The average temperatures and the total bait fish fed to the BFT are summarised in **Table 2**.

**Table 2.** Summary of average water temperature and bait fish fed to the BFT during the months of July, August and September 2019.

	Temp (°C)	Herring (kg)	Mackerel (kg)	Sardines (kg)	Other Fish (kg)
<b>July 2019</b>	27.1	187,500	37,950	86,350	
<b>August 2019</b>	26.7	393,150			
<b>September 2019<sup>1</sup></b>	26.7	264,600			3,750
<b>October 2019</b>	26.6	19,550	600		3,600
<b>November 2019</b>	21.7	7,250	16,300		
<b>December 2019<sup>1</sup></b>	19.2		2,200		

1. Until 17<sup>th</sup> December 2019

Additional data will be collected as the trial continues with the carryover fish into 2020.

The stereocamera footage and the corresponding SFL measurements for all time points indicated above are available as well as water temperature measurements and bait feeding quantities.

This work was carried out under the provision of the ICCAT Atlantic Wide Research Programme for Bluefin Tuna (GBYP), funded by the European Union, by several ICCAT CPCs, the ICCAT Secretariat and by other entities (see: <https://www.iccat.int/GBYP/en/Overview.asp>). The contents of this paper do not necessarily reflect the point of view of ICCAT or of the other funders, which have not responsibility about them, neither do they necessarily reflect the views of the funders and in no ways anticipate the Commission's future policy in this area.



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