

## Report of the Small Tunas Year Programme (SMTYP)

### Programme objectives

The status of small tuna stocks in the ICCAT Convention area is generally unknown. Nevertheless, these species have a high socio-economic relevance for a considerable number of local communities at the regional level, which depend on landings of these species for their livelihoods.

Fisheries statistics and biological data, which can provide a basis for assessing these resources and thus providing the Commission with appropriate scientific advice for their sustainable exploitation, are generally incomplete and not updated for these species.

The ICCAT Small Tunas Year Programme (SMTYP) was adopted by the SCRS in 2011 and approved by ICCAT during its 2012 annual meeting in Agadir (Morocco). The main objectives of the programme are recovery of historical series of Task 1 and Task 2 data, collecting the available biological data, and conducting biological studies, mainly on growth, maturity and stock structure for the main species of small tunas.

This programme has a wide geographical sampling coverage:

1. Mediterranean and Black Sea: bullet tuna, Atlantic bonito, little tunny and plain bonito;
2. West Africa: Atlantic bonito, little tunny tuna, West African Spanish mackerel, frigate tuna, wahoo;
3. Caribbean Sea and Southwest Atlantic: blackfin tuna, wahoo, king mackerel and Spanish mackerel and dolphinfish.

The SMTYP collected biological samples aiming at describing the growth, maturity and stock structure on these three small tunas species in 2018 and 2019. In 2019, results on stock structure of two of the three species (Atlantic bonito (BON) and little tunny (LTA)) were provided and samples for growth and maturity were considered mostly satisfactory for the areas and species. In 2020, sampling priority was given to fill specific gaps necessary to obtain the growth and maturity parameters for LTA and BON from geographical areas that the Small Tunas Species Group identified as of high priority. This activity was heavily impacted due to the COVID-19, which has precluded most of the field and laboratory work to be carried out. However, considering the three proposed objectives, promising results were obtained.

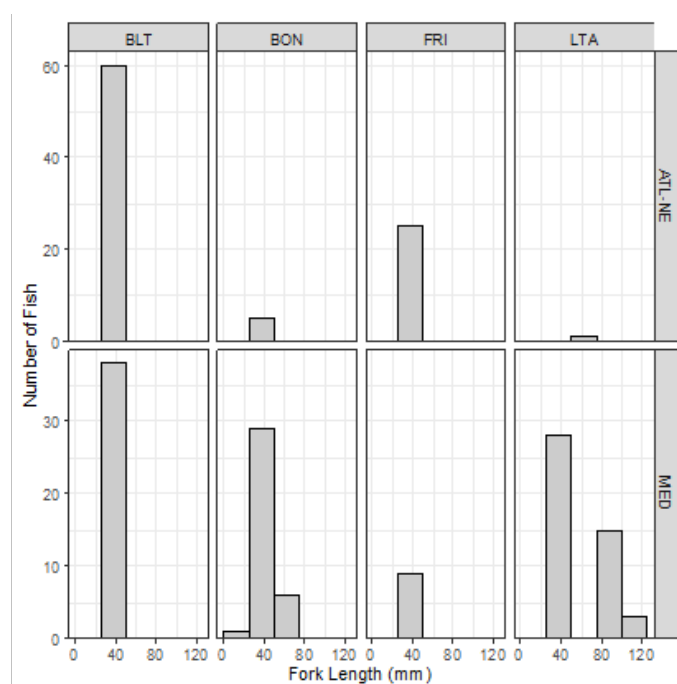
**Objective 1** - A total of 374 individuals were collected: 145 of BON, 139 of LTA and 90 wahoo (WAH) (**Table 1**). Initial target size classes were only accomplished for BON in the Mediterranean. Small individuals are still needed from the Northeast Atlantic, as well as from the Southeast Atlantic as no samples were obtained (**Figure 1**). For LTA there was also a shortage for all target sizes.

**Objective 2** - A preliminary analysis of the relationship between section spine diameter (mm) and fish size (fork length (FL), cm), showed that the area effects (Northeast Atlantic, Mediterranean and Southeast Atlantic) for LTA were significant. No differences were observed between areas for BON. At this stage, no preliminary growth models were fit by area due to the low number of processed samples, particularly considering that the models have to be investigated at stock level. For WAH, for which preliminary results were required within the current contract for the Southwest Atlantic, from the 277 otoliths sampled for annual growth analysis, 157 slides were prepared (56%), 35 were already cut (13%), and 87 were embedded to be cut (31%). For the daily growth analysis, we have prepared 5 samples from an expected number of 75 otoliths, which corresponds to 6% of the overall available sampled specimens. Concerning the reproductive parameters, a total of 420 BON were used for the preliminary analysis of  $L_{50}$  using microscopic staging, and 876 fish were used for the preliminary analysis of  $L_{50}$  and spawning season combining macroscopic and microscopic data, considering the ICCAT area and the stocks units proposed within the frame of the project.  $L_{50}$  were estimated with confidence for only for the Mediterranean area. For the other areas, no estimates could be developed giving the narrow range of the size classes available. Concerning LTA, the analysis has been completed and readings of more than 250 LTA for all ICCAT areas being carried out.

**Objective 3** - For BON, the new samples from the Morocco area showed no genetic differentiation, suggesting a genetic temporal stability for this area, and the hypothesis provided in the previous contract of a Northeast Atlantic boundary is maintained. The population genetic analysis of WAH presents a scenario of homogeneous distribution of genetic variation, which is expected in a species with high migratory potential and large effective population size.

**Table 1.** Summary of the number of samples collected within the SMTYP by region and species in 2020/21, within the short-term contract for ICCAT SMTYP for the biological samples collection for growth, maturity and genetics studies: LTA (*Euthynnus alletteratus*), BON (*Sarda sarda*) and WAH (*Acanthocybium solandri*).

Area	Country	BON	LTA	WAH	Total overall
ATL-NE	Mauritania	12			12
	Morocco	20			20
	Senegal	66			66
	Spain	2	2		4
<b>ATL-NE Total</b>		<b>100</b>	<b>2</b>		<b>102</b>
ATL-SE	Côte d'Ivoire		30		30
	Gabon		76		76
<b>ATL-SE Total</b>			<b>106</b>		<b>106</b>
ATL-SW	Brazil			90	90
<b>ATL-SW Total</b>				<b>90</b>	<b>90</b>
MED	Malta		7		7
	Spain	19	4		23
	Tunisie	26	20		46
<b>MED Total</b>		<b>45</b>	<b>31</b>		<b>76</b>
<b>Total overall</b>		<b>145</b>	<b>139</b>	<b>90</b>	<b>374</b>



**Figure 1.** Histogram by size classes (fork length) for bullet tuna (BLT), BON, frigate (FRI), and LTA by sampled regions.

### Activities developed in 2022/2023

In 2020, the main gaps of sampling for BON and LTA were covered, and the results related to the growth and maturity parameters were preliminary provided for all areas. Preliminary growth parameters for WAH were also provided. However, given the problems with the pandemic, there are still ongoing analysis and size gaps for the three species to be filled, hence the parameters were not yet fully estimated. Therefore, the SMTYP shall fill the size gaps and conclude the analysis of growth and reproduction for LTA, BON and WAH and, to prioritize similar studies for other species given their socio-economic importance, for the new cycle of the programme. Among the small tunas species, frigate (FRI) *Auxis thazard* and bullet tuna (BLT) *Auxis rochei*, were identified of special interest, namely on what concerns the stock structure.

Hence, during the period 2021-2022, the Group plans included: i) conducting additional sampling aiming to fill the specific gaps of the biological samples for estimating the growth and maturity parameters of BON, LTA, and WAH (**Table 2**); ii) collecting samples for FRI and BLT in the Atlantic Ocean and the Mediterranean Sea for stock structure studies; iii) determining the growth and reproduction parameters for BON, LTA, and WAH; iv) refining the stock structure analysis for WAH, BON, and LTA and determinate the stock structure analysis for FRI and BLT; and, v) investigating genetic species differentiation between FRI and BLT.

### Activities planned for 2022-2023

The ICCAT Secretariat launched in April 2023 a call for tenders with the aim of implementing the main activities scheduled within SMTYP in 2023. The main objective of this call was to: a) provide final results of the growth, maturity and the stock structure for Atlantic bonito *Sarda sarda* (BON), little tunny *Euthynnus alletteratus* (LTA) and wahoo *Acanthocybium solandri* (WAH); b) present refined analysis results on stock structure for WAH, BON, LTA, and results for frigate tuna *Auxis thazard* (FRI) and bullet tuna *A. rochei* (BLT) in the Atlantic and the Mediterranean Sea. As a result, the Secretariat awarded a new contract to a consortium with a number of institutions, including 9 CPCs to carry out the tasks aforementioned until the end of September 2023. A new contract shall be awarded in fall 2023 to continue the 2023 activities and carried out the activities planned for 2024.

**Table 2.** Detailed information on sampling targets by species, size classes and regions to be carried out by species for 2021-2022 under the ICCAT SMTYP.

<i>Species</i>	<i>Research line</i>	<i>Area</i>	<i>CPCs involved</i>	<i>Target size classes and desirable number of samples (in brackets)</i>
Frigate (FRI)	Stock Structure	NE Atlantic	Senegal, EU-Spain, EU-Portugal, Morocco	All (100)
		SE Atlantic	Côte d'Ivoire, Gabon, EU-Spain	All (100)
		SW Atlantic	Brazil	All (100)
Bullet tuna (BLT)	Stock Structure	NE Atlantic	Senegal, EU-Spain, EU-Portugal, Morocco	All (100)
		SE Atlantic	Côte d'Ivoire, Gabon, EU-Spain	All (100)
		SW Atlantic	Brazil	All (100)
		Med	Tunisia, EU-Spain, EU-Malta, Algeria	All (100)
Wahoo (WAH)	Aging and growth, reproduction	NE Atlantic	Senegal, EU-Spain, EU-Portugal, Morocco	< 70 cm (10) and > 140 cm (10)
		SE Atlantic	Côte d'Ivoire, Gabon, EU-Spain	< 70 cm (20) and > 140 cm (15)
		SW	Brazil	< 70 cm (15) and > 140 cm (15)
Little tunny (LTA)	Aging and growth and reproduction	NE Atlantic	Senegal, EU-Spain, EU-Portugal, Morocco	> 60 cm (15)
		SE Atlantic	Côte d'Ivoire, Gabon, EU-Spain	> 60 cm (20)
		Med	Tunisia, EU-Spain, EU-Malta, Algeria	≥ 60 cm (20)
Atlantic Bonito (BON)	Aging and growth and reproduction	NE Atlantic	Senegal, EU-Spain, EU-Portugal, Morocco	≤ 40 cm (5) and > 60 cm (20)
		SE Atlantic	Côte d'Ivoire, Gabon, EU-Spain	≤ 35 cm (20) and > 60 cm (10)
		Med	Tunisia, EU-Spain, EU-Malta, Algeria	≥ 60 cm (15)

Nevertheless, as in previous years, these objectives cannot be achieved with the single financial support of ICCAT and will only be possible through additional external funding that hopefully will be made available by the significant voluntary contribution provided by ICCAT CPCs, as it has been specifically the case of the European Union.

**Table 3** lists those responsible for coordinating the analysis and Institutions where samples will be stored are identified.

**Table 3.** Scientist responsible for coordinating the analysis and Institutions where samples will be stored.

<i>Analysis</i>	<i>Institution</i>	<i>Country</i>	<i>Coordinator</i>
Growth	Instituto Português do Mar e da Atmosfera (IPMA)	EU-Portugal	P. Lino and Rubén Muñoz Lechuga
Reproduction	Instituto Español de Oceanografía (IEO), Málaga	EU-Spain	D. Macías, S. Saber and J.M. Ortiz
Stock structure	University of Girona	EU-Spain	J. Viñas

### Expenditures in 2022 and 2023

The total expenditures within SMTYP in 2018, 2019, 2020 and 2021 amounted to €52,917, €60,000, €97,694 and €50,000, respectively. The effective expenditures for that period were of €37,183, €44,531, €91,167 and €33,467 respectively.

In 2022 and 2023 to implement the main activities planned in the framework of SMTYP, the total budget of provided by ICCAT amounted to €71,000 and €52,500, respectively.

The detailed fund available for SMTYP during 2022 and 2023 and respective expenditures as of 11 September 2023 are detailed in the table below.

<i>Component</i>	<i>2022</i>		<i>2023</i>	
	<i>Budget (€)</i>	<i>Exp. (€)</i>	<i>Budget (€)</i>	<i>Exp. (€)</i>
Reproductive studies	12,500	4,600	7,500	-
Genetics	10,000	3,200	7,500	-
Age and growth	12,500	2,400	7,500	-
Sample collection and shipping	10,000	4,320	10,000	-
Other studies (new chapter of ICCAT Manual)	1,000		-	-
Workshops/meetings	25,000	26,202.18	20,000	-
<b>TOTAL</b>	<b>71,000</b>	<b>40,722.18</b>	<b>52,500</b>	<b>-</b>