

**ICCAT ATLANTIC-WIDE RESEARCH PROGRAMME FOR BLUEFIN TUNA (GBYP)
ACTIVITY REPORT FOR 2012 (EXTENSION OF PHASE 2 AND FIRST PART OF PHASE 3)**

1. Introduction

The Atlantic-wide Research Programme for Bluefin Tuna was officially adopted by SCRS and the ICCAT Commission in 2008, and it started officially at the end of 2009, with the objective to:

- a) Improve basic data collection, including fishery independent data;
- b) Improve understanding of key biological and ecological processes;
- c) Improve assessment models and provision of scientific advice on stock status.

The total budget of the programme was estimated at about 19 million Euros in six years, with the engagement of the European Community and some other Contracting Parties to contribute to this programme in 2009 and in the following years. The initial year had a budget of 750,000 Euros, the second phase had a total budget of 2,502,000 Euros (against the original figure of 5,845,000 Euros and a revised figure of 3,476,075 Euros), while the third phase had a budget of 1,925,000 Euros (against the original figure of 5,845,000 Euros and a revised figure of 4,417,980 Euros).

Phase 1 and Phase 2 activities were jointly committed by the European Community (80%), Canada, Croatia, Japan, Libya, Morocco, Norway, Turkey, United States of America, Chinese Taipei and the ICCAT Secretariat, while Phase 3 was joined also by China, Algeria, Korea and Tunisia. Several private entities provided funds or in kind support; the detailed list is available on <http://www.iccat.int/GBYP/en/Budget.htm>.

The GBYP activity will be supported by a twin programme carried out by NOAA-NMFS, which will focus the research activities on the western Atlantic Ocean.

2. Coordination activities

Phase 2 was extended for additional five months, up to May 21, 2012.

A second GBYP Operational Meeting on Tagging, Biological and Genetic Sampling and Analyses was organized in Madrid on April 17 & 18, 2012, during the extension period of Phase 2, for discussing all practical aspects concerning the final activities of Phase 2 and the final plans for Phase 3. A total of 28 scientists joined the meeting, which resulted in intense and productive discussions, useful for better defining all the operational details and clarifying some uncertainties.

During the entire Phase 2 it was necessary to issue eleven Calls for Tenders on various items and a total of 22 contracts were signed by the ICCAT Secretariat. A total of 23 deliverables (periodic reports) were produced in the framework of the EC Grant Agreement. During the first part of Phase 3, a total of 4 Calls for tenders were issued, providing 1 contract so far. The administrative and desk work behind these duties was quite important. In Phase 2 of GBYP, the coordination staff participated officially in 30 meetings in various countries.

The detailed report is available in document SCRS/2011/139.

3. Steering Committee

The members of the Steering Committee are the Chair of SCRS, Dr. Josu Santiago, the BFT-W Rapporteur, Dr. Clay Porch, the BFT-E Rapporteur, Dr. Jean-Marc Fromentin, the ICCAT Executive Secretary, Mr. Driss Meski, and an external expert, Dr. Tom Polacheck, who was duly contracted.

The activity of the Steering Committee included continuous and constant e-mail contacts with the GBYP coordination, which provided the necessary information. So far, the Steering Committee held six meetings in Phase 2 and in the first part of Phase 3 (June 27-July 1, 2011; September 29, 2011; 7-8 February 2012; 20-21 March 2012 and September 7, 2012), discussing various aspects of the programme, providing guidance and opinions.

4. Data mining and data recovery

The data mining and data recovery activity continued following the objectives recommended by the Steering Committee, with a particular focus on tuna trap data series. A complete overview is now available.

A very important amount of data, previously not included in the ICCAT database, was recovered, particularly for tuna trap series, which now start from 1509, including about 118,600 new records, related to about 948,000 tons of catches, about 23,226,000 bluefin tunas fished and about 103,000 fish sampled. With these data, GBYP is filling many of the existing gaps, but not all, extending the historical data series back in centuries. This fact labels the ICCAT bluefin tuna data base as the longest among those held by all other RFMOs. All data have been individually checked according to the ICCAT system and now they are ready for the normal procedure for including them in the ICCAT database.

In Phase 3, one Call for tenders was issued so far, focused on the Ottoman Archives and tuna trap data.

4.1 Symposium on Tuna Trap Fishery

The scientific papers and presentations at the Symposium are published on the special issue of the ICCAT Collective Volume of Scientific Papers, vol. LXVII, 2012.

5. Aerial surveys

5.1 Analysis for defining future needs for the aerial survey

The data analyses requested by the GBYP Steering Committee included also the evaluation and estimation of the basic requirements for allowing the ICCAT-GBYP Aerial Survey on Bluefin Spawning Aggregation to fully reach its objective, particularly considering that the aerial survey is able to provide trends, but it is necessary to have various years of data for getting reliable trends. The Steering Committee, also requested to extend the survey to the largest possible area. Beside the objective difficulties of this type of analyses, given the number of possible variables in nature, it was possible to identify several scenarios, following two different approaches: an extended survey of 100,000 km and a more extended survey of 200,000 km. The final report was provided on December 15, 2011.

Within the best possible scenario (20% recovery rate in the survey period and 15% CV), the number of survey required should be at least 5, while under the worse possible scenario taken into account (5% recovery rate and 27% CV) the minimum number of surveys required should be 13. Considering the strict management measures, the reduced fishing season, the sequence of recent years with strong recruitment, it would be possible that a reliable trend of abundance of bluefin tuna spawning biomass could be obtained after a minimum of 6 years of extensive aerial surveys¹.

The conclusion is that with the aerial survey methodology it is possible to collect data which are potentially useful for management. Those data, which could be considered more reliable than fishery data, can be used in the assessment models like other abundance indices (i.e.: CPUE).

5.2 Possibility of shifting the target to juvenile aggregations

The GBYP was requested by the Steering Committee to evaluate the possibility to shift from the aerial survey on spawning aggregations agreed so far by the Commission, to the aerial survey on juveniles. Due to the lack of specific budget item, the GBYP coordination provided a SWOT analysis to SCRS. Both approaches are useful, but the survey on spawners has much more strengths than that on juveniles, while opportunities are similar and weaknesses are higher for the juveniles.

6. Tagging

A second GBYP Operational Meeting on Tagging, Biological and Genetic Sampling and Analyses was organized in Madrid on April 17 & 18, 2012, during the extension period of Phase 2, with the participation of 28 scientists.

¹ Due to the current reduced budget and the possible continuation of similar budget constraints in future years, it would be reasonable to consider the possibility of alternating various GBYP activities, but always maintaining a minimum of aerial surveys consecutive for two year sets; under this scenario, if the assumed recovery rate will be confirmed, the CV might increase. This is to be taken into account when considering the various GBYP activities, their objectives and the balance between financial resources and expected results.

A sufficient number of conventional tags were acquired on time (a total of 35,000 single barb dart + 2,500 applicators, 22,000 double barb small darts + 9,300 applicators and 13,000 double barb big darts + 6,200 applicators); in addition, it was possible to buy 50 miniPATs and 50 internal archival tags

6.1 Conventional tagging activity

The tagging activity in Phase 2 was partly reported during the SCRS and the Commission meeting in 2011, because it was completed during the extension period. The tagging activity in Phase 2 faced several operational problems, mostly due to causes of “*force majeure*” (bad weather, lack of fish at the surface in the selected areas, fishery technical accidents, etc.), but also partly due to some mistakes in the strategy adopted by the taggers.

The tunas tagged in each area are as follows: 1278 in the Gulf of Biscay, including the opportunistic tagging by the sport fishers (38.9% double tagging), 1389 in the area of the Strait of Gibraltar (43.5% double tagging); 911 in the Western Mediterranean, including tagging when tunas were released from cages and the opportunistic tagging by sport fishers (28.7% double tagging), and 0 in the central Mediterranean Sea. In total, 4950 tags were implanted, on 3578 bluefin tunas (71.6% of the target or 79.5% of the target without 10% allowed contingency; with 38.1% double tagging, against a target of 40%).

The tagging activity in Phase 3 was defined by the Steering Committee on 7-8 February 2012 and then refined on 20-21 March 2012, adopting the strategy to use exclusively baitboat vessels and to have a tagging coordinator for following the field activities in real time and maintaining a continuous contact with the GBYP coordination. The Call for tenders was issued on March 26, 2012 and the contract was awarded on June 21, 2012, to another Spanish Consortium of nine entities.

Even in this second year the field activity had many problems, some of them related to delays in obtaining the permits for operating in waters of various CPCs. Furthermore, the vessels transferred to the Mediterranean for tagging had several problems, caused by “*force majeure*” (lack of juvenile concentrations in some areas, lack of fish at the surface, very little presence of bait, bad weather and technical troubles). At the moment on which this report was set-up, the tagging activity was completed even slightly over the target in the Bay of Biscay (3384 tagged fish against a target of 3350, with 41.3% double tagging), while only 83 tunas have been tagged so far in the Gulf of Lion (against a target of 3,200). The tagging activity in the central Mediterranean is currently starting, while tagging in the Strait of Gibraltar will start later.

6.2 Electronic tagging activity

The electronic tagging activity was not initially included in Phase 2 due to budgetary problems. Anyway, thanks to a positive opportunity and to the cooperation of several institutions, the tuna industry and WWF-MED Programme (the details are included in the detailed report), it was possible to carry out a first trial in a tuna trap in Morocco on May 2011. A total of 11 large tunas were tagged and several tags provided unexpected results and extremely interesting data.

Following this initial trial, it was decided to continue this activity during the last extension part of Phase 2, taking advantage of the good will and the cooperation of the Moroccan authorities, the tuna trap industry and the WWF-MedPO team. Another tagging experiment was carried out on May 2012, tagging 26 large and medium bluefin tuna pre-spawners, 12 tagged underwater and 14 tagged on board. The first provisional results are showing extremely interesting behaviours, among which one individual who entered into the Mediterranean possibly for spawning and then exit in the Atlantic, reaching directly Ireland and then the extreme North, between the Farøer Isles and Norway.

These first experiments demonstrate the high interest to tag pre-spawners tunas, implanting the tags possibly for much longer periods.

In Phase 3, during the conventional tagging activity, it was possible also to implant 13 internal archival tags and deploy 14 miniPATs. At the moment, one miniPAT had a premature detachment, while the others are still on the fish at sea.

6.3 Tag awareness and tag reporting campaign

According to the recommendations provided by the Steering Committee in all meetings, the GBYP started a tag awareness campaign, for the purpose of improving the tag recovery and reporting rates. This activity, which was

carried out by ICCAT and SCRS for all species since various years, needed to be strengthened and further improved, particularly after the beginning of the massive tagging activities by the GBYP.

Posters and stickers were translated in 12 languages (Arabic, Croatian, English, French, Greek, Japanese, Italian, Mandarin, Portuguese, Russian, Spanish and Turkish), and they were distributed capillary in the entire ICCAT Convention area. 11,030 posters and 13,300 stickers were distributed among all countries, entities and stakeholders and the full details, together with the local contacts are on <http://www.iccat.int/GBYP/en/AwCamp.asp>. Furthermore, an exclusive ICCAT-GBYP T-shirt was produced, to be used as tag reward or for promoting the tag awareness activities

The tagging awareness campaign is coupled by a tag rewarding campaign strongly recommended by the Steering Committee. It is also considered very important to provide immediate feedback to the tagging teams and the tag recovery person, informing both of them about the history of each tag.

For improving information and awareness about the tagging programme, ICCAT-GBYP is developing contacts with various stake-holders organizations and with journalists. Information on GBYP are now present on various web pages, while some articles on the press have been promoted. Recently, an article was published also on the EC journal "Fisheries and Aquaculture" (56, 2012), which usually reaches many stakeholders in several countries and which is translated into 23 different languages.

Meetings with ICCAT ROPs were also organised, for informing them about the ICCAT-GBYP tag recovery activity and for asking them to pay the maximum attention to tags when observing harvesting in cages or any fishing activity at sea.

A total of 14 conventional tags from Bluefin tunas have been reported to ICCAT.

7. Biological and genetic sampling and analyses

A second GBYP Operational Meeting on Tagging, Biological and Genetic Sampling and Analyses was organized in Madrid on April 17 & 18, 2012. A total of 28 scientists joined the meeting.

Taking into account that some areas and fisheries included in the "Biological Sampling Scheme" cannot be sampled due to logistic and security problems, the sampling activity under contract included a total of 1950 genetic samples, 1900 otoliths, 1900 spines and 600 gonads; the percentage of achievement was 68%, mostly due to the late beginning of the activity, which started after the main fishing season.

The plan for the analyses included 960 NGS-TS, 160 NGS-RRSG, 600 microchemical determinations, 810 age readings and 80 histological analyses; in this case, thanks to the extension of Phase 2, it was possible to have an achievement of 101,5%.

The first results, that can be considered preliminary, are very promising:

- genetic analyses shows that there are possibly several components of the eastern Bluefin tuna stock, but results need to be confirmed by a larger number of samples, extending the sampling to areas which have not been sampled;
- microchemistry analyses showed that stock components are well separated, with a very limited mixing, which disappear in the Mediterranean Sea; even in this case, additional samples and further refinements are necessary before having more solid results
- Age-length key (ALK) was improved, using most of the samples; a larger sample is essential for getting the proper correlations, that will result in an updated parameter for the stock assessment.
- Maturity: sampling must be extended in Phase 3, particularly during the normal spawning season.

The contract for conducting the activity in Phase 3 was awarded on June 6, 2012, to an International Consortium of twelve entities.

The first interim report shows that a total of 1,398 bluefin tuna have been sampled so far (39 larvae, 302 age 0, 409 juveniles, 175 medium tunas and 473 large tunas).

8. Modelling approaches

In Phase 3, the activity will include the Risk Assessment and two studies to Support the Stock Assessment (a:

Statistical conversion of catch-at-size to catch-at-age; b) Data Imputation). The first contract on Risk Assessment was award on September 19, 2012.

8.1 Risk analysis

The first paper deriving from the GBYP activity was peer reviewed and published on an international journal during the extension of Phase 3.

This action will be continued in Phase 3, with new and larger sets of interviews (during SCRS and the Commission meeting) and analyses.

8.2 Modeling approaches

During the extension of Phase 2, the contractor provided the final report for the development of a prototype of an alternative assessment and advice framework, involving an assessment method and a harvest control rule, designed to work in tandem which form the management procedure (MP) component of an MSE, was developed. The choice of prior distributions of parameters is driven primarily by the requirement for good management performance, rather than by prior beliefs about likely values. The conventional management reference points B_0 , B_{MSY} and F_{MSY} are used, but defined in a way such that they remain appropriate in the presence of possible regime changes. A simple harvest control rule is proposed: constant F when the stock is above B_{MSY} ; F linearly proportional to B/B_{MSY} when $B < B_{MSY}$. The harvest control rule is based on a notional unselective standard fishery. To convert the results to an actual TAC for a real mix of fisheries, weighting factors are determined for each fishery to relate the effect of a unit catch from each fishery to the effect of a unit catch from the notional standard fishery.

8.3 Further actions on modelling

The results of the Risk Analysis will be presented at the SCRS and used to inform discussion on the “Unquantified Uncertainties”. Where appropriate they may be used to specify what scenarios to include in any MSE work conducted in later phases. The MSE examples included many elements that would be important in building a robust advice framework taking advantage of new data and knowledge made available under the GBYP. These will have to be further developed in later Phases before they can be utilised in providing management advice. The preliminary MSE framework showed how the data and knowledge gained under the GBYP can be used to develop alternative robust advice frameworks. However, much work still needs to be conducted in later phases before such an advice framework can become operational.

9.0 Legal framework

The first period of activity revealed the absolute need to have specific provision for allowing the field research included in the programme adopted by the Commission. This problem, originally discussed at the early beginning of ICCAT-GBYP activities, was discussed again in 2011 by the Bluefin tuna Species Group and by the SCRS, presenting a specific recommendation to the Commission meeting.

ICCAT adopted the Rec. 11-06 in its meeting in Istanbul on November 2011, which allows for a “research mortality allowance” of 20 t for GBYP and for the use of any fishing gear in any month of the year in the ICCAT Convention area for GBYP research purposes. For implementing the recommendation, the ICCAT Secretariat released the Circular #2296 on May 22, 2012.

A total of 55 ICCAT-GBYP RMA certificates have been issued so far, using 3,217.7 kg of Bluefin tuna.

9. Cooperation with ROP

The GBYP coordination, together with the ICCAT Secretariat, is maintaining the contacts between the two consortiums in charge of the biological sampling and tagging and the ROP observers, for strengthening the cooperation and providing opportunities. The ROPs observers are also engaged for directly checking bluefin tuna at the harvesting for improving the tag recovery and reporting and for noticing any natural mark.

10. GBYP web page

The ICCAT-GBYP web page, which was created in the last part of Phase 1, is usually regularly updated with all documents produced by GBYP; in some cases, due to the huge workload, some sets of documents are posted all together. The updating also includes the budget page, where all contributions (monetary or in kind) are regularly listed, to ensure full transparency.

11. Following activities

The GBYP Steering Committee and the various GBYP meetings provided a list of recommendations on various issues; several of them are essential for fulfilling the duties. The various recommendations will be evaluated by the SCRS in September 2012 and then will be forward to the Commission.

In addition, GBYP considers essential better defining the following points:

- a) Evolution of the Atlantic-Wide Research Programme for Bluefin Tuna: according to the current situation, which demonstrated the impossibility to reach the funding level approved by the ICCAT Commission for the various years of the GBYP and, as a consequence, the impossibility to carry out the various activities as originally planned, a programme revision is now necessary, finding the right balance among funding possibilities, research needs and duration. The funding system shall be better defined and improved.
- b) Data recovery and data mining: a clarification “*pro veritate*” about the mandatory requirements and limits established by ICCAT regulations for providing Task II data is needed for better defining the future plans and avoiding unnecessary discussions, sometimes based on personal interpretations of the current rules.
- c) Aerial survey: the suspension caused by the impossibility for budget shortage to carry out this activity contemporary with other activities questioned also the objective, the strategy and the time frame; GBYP prepared SWOT analyses for providing the essential elements to SCRS.
- d) Tagging: the first year (Phase 2) can be regarded as a complex large scale experiment and the strategy adopted for Phase 3 will be used for testing a different strategy and approach. It is necessary to extend the tagging activities to other areas (such as the Eastern Mediterranean Sea), always considering the budget constraints and the permits issue. The tag awareness activity shall be firmly continued, improving media communication.
- e) Biological and genetic sampling and analyses: according to the current situation, it is clear that it is impossible to analyse all samples which have been collected (due to budget limits), while it is also clear that a wide sampling in the various areas is essential even if not always easy. A medium term strategy is needed.
- f) Modelling: new additional efforts should be devoted for finding the best approaches for using fishery independent data and innovative approaches for better quantify uncertainties.

The activities in Phase 4 will be defined by the SCRS.