

RESOLUTION BY ICCAT ESTABLISHING A PILOT PROJECT TO TEST THE USE OF STEREOSCOPIC CAMERAS DURING FIRST TRANSFER AND THE AUTOMATION OF VIDEO FOOTAGE ANALYSIS

TAKING INTO ACCOUNT that ICCAT has adopted the *Recommendation by ICCAT amending the Recommendation 18-02 establishing a multi-annual management plan for eastern Atlantic and Mediterranean bluefin tuna* (Rec. 19-04);

NOTING that at the Meeting of the ICCAT Working Group on Bluefin Tuna Control and Traceability Measures held in March 2020, the Working Group identified several aspects of the control of live bluefin tuna that would benefit from being strengthened;

NOTING that monitoring and control of the live bluefin fishery is largely based on video recordings of the various transfer and caging operations of live bluefin tuna that take place underwater and that improved control of this aspect could have an important impact on the overall control of the fishery;

RECALLING that new technologies have advanced greatly over the last few years and these technologies can make monitoring more effective and efficient;

CONSIDERING the establishment of a Pilot Project the use of a stereoscopic camera during first transfers and the automation of video footage analysis, could allow to solve important challenges faced by the control of this fishery, improve the accuracy of estimates of fish caught and greatly reduce the workload and cost for the authorities involved in its control;

THE INTERNATIONAL COMMISSION FOR THE
CONSERVATION OF ATLANTIC TUNAS RESOLVES THAT:

Pilot Project objective

1. The general objective of the Pilot Project is to test available technology and evaluate its added value in improving the monitoring and control on the recording and analysis of videos of transfers and caging operations taking place in the bluefin tuna fishery that is intended for fattening farms.
2. In particular the Pilot Project would have a double objective:
 - a) to test whether the available stereoscopic cameras, in combination with conventional cameras where appropriate, can be used during the first transfers from purse seine vessels or traps to towing cages;
 - b) to test the use of available software and artificial intelligence for the automatic analysis of the video footages, to automatically determine the number of individuals and its weight.
3. The duration of the Pilot Project should be one year, with the possibility of extending it for a further year.
4. The Pilot Project would be considered as a testing phase and the information collected in it may only be used to achieve the objectives of the project, but in no case for control or enforcement purposes.

Participation and Points of Contact

5. Contracting Parties with purse seiner vessels or traps operating under their flag are encouraged to participate in the Pilot Project and facilitate the implementation on selected vessels or traps under their flag. Any other Contracting Party with an interest in the fishery is also welcome to participate in the Pilot Project.
6. Contracting Parties participating in the Pilot Project should submit to the Executive Secretary the following information:
 - a) National authority responsible for the purse seine vessel or trap and its monitoring and control, and;
 - b) Designated point(s) of contact within that authority with control responsibilities for liaison on the Project, including name, telephone, fax numbers, and e-mail address.
7. A Technical Steering Group should be set up to oversee the implementation of the Pilot Project. The Technical Steering Group should be composed at least, by representative(s) of the ICCAT Secretariat and the flag Contracting Parties of the catching vessels and traps included in the Pilot Project. Any other Contracting Parties with an interest in the fishery may also participate in the Steering Group. The Steering Group should be coordinated by the Chair of the Working Group on Bluefin Tuna Control and Traceability Measures, set up by ICCAT Resolution 19-15.
8. The Technical Steering Group should monitor the Project's progress, the fulfilment of its objectives, set out the conclusions of the project and make recommendations based on these conclusions. They should be available for consultation and online meetings. The Steering Group should regulate its own procedures.
9. Contracting Parties participating in the Pilot Project should communicate and collaborate with each other and with the selected company(ies) in order to facilitate the implementation of the Pilot Project.

Implementation of the Pilot Project

10. The ICCAT Secretariat, with the assistance of the Technical Steering Group, should identify a company(ies) entrusted to make the technology available and test it in the field. Two different companies can be identified to meet each of the two objectives mentioned in point 2 above. The minimum technical standards in **Appendix 1** should be included in the tender specifications when selecting the company(ies).
11. In the selection of the company(ies), consideration will be given at least to the fact that:
 - a) the company(ies) possesses or has access to the technology to complete the assigned objective(s);
 - b) the company's experience in the development and use of such technologies, preferably in the bluefin tuna fishery;
 - c) the user-friendliness of the proposed hardware and software, its operability in real conditions, its accuracy or the functionalities offered in the software that can facilitate and improve the required tasks.
12. The flag CPCs of catching vessels and traps should identify the purse seine vessels and traps that could participate in the Pilot Project and ensure that they cooperate during the project.
13. For the purposes of the objective mentioned in point 2 a) the selected company should ensure that the system is tested under real conditions. For this purpose, the company must have the availability and capability to embark on some of the patrol vessels that are deployed for the control of the bluefin tuna fishing campaign.

14. In the implementation of the Pilot Project the selected company(ies) should ensure that it follows the requirements and minimum technical standards set out in **Appendix 1**.

Reporting

15. The company in charge of the implementation of the project objective mentioned in point 2 a) should draw up a report on the tests with stereoscopic cameras, including detailed results of the tests performed, possible challenges encountered and conclusions. The company in charge of the implementation of the project objective mentioned in point 2 b) should draw up a report on the video footage analysed, including comparisons of video analysis using manual and automatic methods, and conclusions. The detailed content of the reports and the reporting period will be developed by the Technical Steering Group.
16. The ICCAT Secretariat should keep all Contracting Parties updated on the progress of the project and should distribute the progress reports drawn up by the contractor and analyst and the possible evaluations of the Steering Group.
17. The Technical Steering Group should draw up a final report with the conclusions on the functioning of the Pilot Project, its effectiveness and accuracy.

Minimum technical standards for the implementation of the Pilot Project

1. List of minimum tasks and conditions for the implementation of the Pilot Project

1.1 Objective 1. Use of stereoscopic cameras during first transfers

The tasks to be carried for the implementation of the objective set out in point 2 a) of the Resolution will have as their main mission to:

- a) test whether the available stereoscopic cameras in combination with conventional cameras where appropriate, allow the successful recording of videos of the first transfers in real conditions;
- b) test the accuracy in determining the number of individuals and their average size and compare it with that obtained by current means.

In the implementation of the objective set out in point 2 a) of the Resolution, the following minimum conditions should be covered by the company in charge of the implementation of the Project:

- be in possession of the necessary hardware and software to be able to record videos of bluefin tuna transfers and determine the number of individuals and their average size;
- have the technology (stereoscopic camera) that meets the necessary operating conditions to record first transfer videos in real conditions.

The tasks to be performed would include at least:

- test the system on at least two transfers in each of the following scenarios:
 - first transfer from a purse seiner to a transport cage in the Mediterranean;
 - first transfer from a trap to a transport cage;
 - first transfer from a purse seiner to a transport cage in the Adriatic;
 - transfer between two farm or transport cages under controlled conditions (i.e., the number of individuals and their average size is known, the operation can be repeated, if necessary, the transfer is recorded with the three types of cameras, conventional camera, stereoscopic camera currently used at caging and, if relevant, the new stereoscopic camera being tested, ...).
- compare the results of the number of individuals with those obtained from recording the transfer with a conventional camera, including assessing the time invested, the ease and accuracy of counting the number of individuals;
- compare the average length results of the transferred individuals with those obtained after the analysis of the stereoscopic camera video of the caged fish (for cases where there are no additional transfers after the first transfer), including assessing the time invested, the ease and accuracy of measure the bluefin tuna individuals.

In the recording of transfer videos, the company should consider the minimum standards set out in Annex 8 of the *Recommendation by ICCAT amending the Recommendation 21-08 establishing a multi-annual management plan for bluefin tuna in the eastern Atlantic and the Mediterranean* (Rec. 22-08). For the determination of the average size of the transferred bluefin tuna individuals the system has to offer at least the same accuracy as the system currently used according to the specifications in Annex 9 of ICCAT Rec. 22-08.

The list of tasks mentioned above is without prejudice to possible changes that may be introduced as a result of technical discussions between the Technical Steering Group and the company in charge of the implementation of the Project, and provided that these changes do not entail a significant increase in the time or resources to be assumed by the company.

1.2 Objective 2. Automatic analysis of the video footages, to automatically determine the number of individuals and its weight

The tasks to be carried for the implementation of the objective set out in point 2 b) of the Resolution will have as their main mission to:

- a) provide the necessary software to make an automatic analysis (counting of the number of individuals and estimation of the average size) of the video records from conventional and/or stereoscopic cameras;
- b) achieve a precision in the counting of the number of individuals and estimation of the average size that is at least as high as that achieved with the current means.

In relation to the implementation of the objective set out in point 2 b) of the Resolution, the following minimum conditions should be covered by the company in charge of the implementation of the Project:

- be in possession of the necessary software to be able to automatically determine the number of bluefin tuna individuals and its average size for transfers and caging operations recorded with conventional and/or stereoscopic camera;
- where possible, ensure that the software provided can be used in situ (i.e., at sea) and without the need for an internet connection;
- ensure that the result of the automatic video analysis offers an accuracy that is at least as good as that obtained with current means.

For testing the proposed software, three different data sources should be used:

- a) results obtained using the proposed software;
- b) results obtained using conventional means;
- c) results obtained by the authorities when they are available.

The tasks to be performed would include at least:

- analyze, using the proposed software for automatic counting, at least four videos of transfers in the Mediterranean recorded with a conventional camera;
- analyze, using the proposed software for automatic counting, at least four videos of transfers in the Adriatic recorded with a conventional camera;
- analyze (determine the number of individuals and their average size), using the proposed software for automatic counting and measurement, at least four videos of caging operations in the Mediterranean recorded with a stereoscopic camera, in combination with conventional cameras where appropriate;
- analyze (determine the number of individuals and their average size), using the proposed software for automatic counting at least four videos of caging operation in the Adriatic recorded with a stereoscopic camera, in combination with conventional cameras where appropriate;
- determine, using conventional means, the number of individuals and in the case of stereoscopic camera videos, the average size, of the transfers and caging operations analyzed in the previous cases;

- use results obtained by the control authorities, in the case of stereoscopic camera videos and in the case of transfers when these are available;
- make comparisons of the results using the three different sources, report the detailed results and draw conclusions.

The list of tasks mentioned above is without prejudice to possible changes that may be introduced as a result of technical discussions between the Technical Steering Group and the company in charge of the implementation of the project, and provided that these changes do not entail a significant increase in the time or resources to be assumed by the company.