OVERVIEW OF THE PLANNED ACTIVITIES ON THE EUROPEAN PURSE SEINE FLEETS IN THE INDIAN OCEAN IN 2003 IN RELATION WITH IOTC RECOMMENDATIONS: ONBOARD OBSERVERS AND TAGGING

By

R. Pianet [1], P. Pallares [2], A. Fonteneau [3], A. Delgado de Molina[4], I. Artetxe[5], H. Arrizabalaga [5] and J. Ariz[4]

ABSTRACT

The European Commission regulation (EC) No 1639/2001 of 25 July 2001 establishing the minimum and extended Community programmes for the collection of data in the fisheries sector includes estimation of discards for the main European fisheries. In order to apply this regulation, the European Union has developed a new system of funding based in multiyear national programs. The first program started in 2002 and will finish in 2006.

These national programs include sampling on biological data, research cruises, tagging projects as well as observer's programs to estimate discards and by catch. In the context of the European tuna fisheries, they are also planned in order to conform to the recommendations and regulations decided by the concerned regional organisation: IOTC, ICCAT and IATTC respectively for the Indian, Atlantic and eastern Pacific Oceans.

In this context France and Spain have developed two national programs that include tuna fisheries: one on the estimation of by-catch and discards, which funding is obtained, and the second on archival tagging on FAD associated tunas in 2003 which funding is highly probable but not yet obtained.

ESTIMATION OF BY-CATCH AND DISCARDS OF THE EUROPEAN PURSE SEINE FLEETS BY OBSERVER'S PROGRAMS

INTRODUCTION

Regarding the purse seine fisheries, observer's programs has been planned to obtain estimation of discards of tuna (yellowfin, skipjack, bigeye and small tuna) as well as information on by catch.

Observer programs

Tuna purse seine observer programs will start in 2003 for both Atlantic and Indian Oceans. In order to improve the results national resources have been put together into an overall project that include French and Spanish purse seine fleets in the Atlantic and Indian Oceans. The French IRD and the Spanish AZTI and IEO will be involved in this project.

The total number of observer's trips will be 46, 30 for the French fleet and 16 for the Spanish fleet. Overall coverage is close to 7%. By fleets France has a higher coverage (10%) than Spain (5%). The distribution of the observer trips by ocean has been done proportionally to the current activity of both fleets in each ocean, resulting in 14 trips in the Atlantic and 16 in the Indian for the French fleet and 7 and 9 for the Spanish fleet respectively. Nevertheless this estimation is preliminary and could be changed because the moratoria existing in the Atlantic, implies an extra observer coverage that could be incorporated into the overall discards project. Looking the numbers of observer trips during the previous Atlantic moratoria we can estimate a coverage of around 60 trips (15% in supply vessels and 85% in purse seiners) for the Spanish and associated fleet and closed to 34 trips for the French and associated fleet. This high coverage during the moratoria period could allow us to increase the observers coverage in the Indian Ocean.

Information from observers will include a general form on boat activities and environmental data, similar to that used in previous observer's projects (Delgado de Molina et al 1997), and a specific form on discards and by catch. Discards information include as high priority species composition and size distribution of tunas and estimation of catch and size by species of sharks, billfishes, mammals and turtles. Information on other species of by catch will have lower priority. Regarding

1 Centre de Recherche Halieutique Méditerranéenne et Tropicale de Sète
BP 171, 34 203 Sète cedex - France

2 IEO Corazón de María 8 Madrid, Spain

3 IRD Seychelles, BP 570 – Victoria, Seychelles

4 IEO Apartado 1373 Santa Cruz de Tenerife, Spain

5 AZTI Txatxarramendi ugartea z/g 48395 Sukarrieta (Bizkaia) Spain.

sharks and billfishes sex information will be also obtained by observers (as tuna sex information will be easier to obtain in canneries).

The form on boat activities has been designed to obtain detailed data of fishing on FADs. Considering the importance of this kind of fishing mode and taking into account the continuity of these observers programs, a specific FAD's form has been added to obtain detailed information on this particular issue. This form will be filled up every time a vessel meets a FAD at sea, and includes information on FADs characteristics and associated buoy, if present, as well as catches and boat activity related to FADs. This kind of information is fundamental to improve the current knowledge on this fishing mode. A sample of all forms are attached in the Annex I.

Assuming that most of discards are associated with FADs, the observer's trips will be conducted along the year and reinforced during the seasons with higher fishing activity on FADs, the Somalia and Mozambique Channel areas in the case of the Indian Ocean.

PROJECT *TAGFAD2003*: INDIAN OCEAN ARCHIVAL TAGGING 2003 ON FAD ASSOCIATED TUNAS

General scope

This tagging operation will be a "small scale tagging operation" planned within the framework of the large scale IOTC tagging program, highly recommended by the IOTC scientific committee for many years and approved by its Commission in 2001. The first tagging operations coordinated by the IOTC have been initiated in 2002, and large scale tagging are planned during 2003 and subsequent years. The IOTC tagging working group, in its June 2002 meeting, has been strongly recommending conducting tagging on tunas associated to FADs [6]. The EU scientists can only do this peculiar type of tagging as primarily the EU purse seiners use FADs.

This tagging will be conducted jointly by Spanish (IEO/AZTI) and French scientists (IRD) with the support of UK (Lowestoft) and Australian scientists (Hobart). Its goals will be primarily limited to provide a better understanding of the movement pattern and behaviour of medium and large size yellowfin and bigeye tunas associated to FADs in the Western Indian Ocean. This tagging would be the first opportunity for the EU tuna scientists to conduct an archival tagging program on tropical tunas, a promising technique. This will be possible owing to the full support of IOTC and thanks to the help from experts in this type of tagging.

This tagging will be conducted in active cooperation with the FADIO [7] project recently approved by DG Research, sharing widely the tagging platform, staff and various scientific goals concerning the local behaviour of tunas associated to drifting FADs.

This program targeting a better assessment of the effect of FADs on tuna stocks is obviously a fundamental responsibility for the EU countries that are fishing for tunas in the IO because of our massive use of FADs in this fishery.

Scientific goals

The massive use of FADs by purse seine fisheries (mainly EU fisheries) since the early nineties has introduced major changes in the exploitation of Indian Ocean tuna stocks and has been increasingly a source of concern among scientists. As nearly 70% of tunas caught by the EU purse seiners in the Indian Ocean are nowadays taken under FADs, there are serious converging facts and/or hypothesis which indicate that this massive use of FADs could be harmful and risky for a durable exploitation of Indian Ocean tuna stocks, mainly bigeye and yellowfin. Bigeye tuna is the more concerned species because of the recent large increase of juvenile bigeye catches taken in association with FADs (as well as a large increase of adults from the longline fishery) and the status of the stock is quite uncertain (IOTC, Tropical Tuna Working Party report, Victoria, June 2001). Small yellowfin are also increasingly taken at small sizes under FADs since 1996 (IOTC, Tropical Tuna Working Party report, Shanghai, June 2002). The association between tunas and FADs is a major behavioural characteristics, but surprisingly very little is still presently known on the behaviour of these species when they are associated with FADs. Among other uncertainties, their time of association with FADs, their vertical and horizontal movements in relation with the FADs, their feeding behaviour under and off FADs are still unknown in the Indian Ocean. The goals of this tagging program would be similar to the very successful IATTC tagging recently done around FADs since 2000 in the Eastern Pacific, well showing that the hourly depth behaviour of the tagged tuna do indicate when tunas were associated to a FAD, or if they were swimming freely.

Tagging methods and practical goals

All the tagging will be done only around the FADs, which are massively used by the EU purse seiners; the temporary access to

6 Fishing Aggregating Device : a natural or artificial object, known to aggregate tropical tunas, and largely used by most of the purse seiners to improve their catches, particularly in the Indian ocean

7 FADIO : Fishery aggregating devices as Instrumented Observatories of pelagic ecosystems

these FADs would be voluntarily given (free of charge) by the captains of selected EU purse seiners.

The present tagging program would have three levels of priorities and goals:

1. The first and main priority of this program will be to tag 200 medium yellowfin and bigeye (larger than 60 cm) using **internal archival tags**. The target would be to tag an equal number of yellowfin and bigeye. These tags will record depth, temperature and light (allowing to estimate positions after recoveries of the tags) and internal body temperature (allowing to know when tunas are feeding as a function of time). It is assumed that the parameters recorded by the archival tags will allow evaluating when each tuna was associated with a FAD or swimming freely. A good recovery rate of these tags can be expected, at least 25% or more, because of the large exploitation rate of the Indian Ocean bigeye and yellowfin stocks, at least at a local scale. The large scale publicity about tag recoveries planned by the IOTC and the attractive rewards offered for these recovered tags (500 €) should allow to identify a wide proportion of these recoveries. This would allow recovering at least 50 tunas, with probably a significant numbers of fishes recovered after several months at sea. The tagging done on southern bluefin and more recently on bigeye by the IATTC with this type of tags do show high recovery rates which indicate low tagging mortality.
2. The second priority will be to tag around FADs a significant number (maximum 200) of tunas (yellowfin, skipjack and bigeye, independently of their species and size), using **sonic tags**. The goal of these sonic tags will be to evaluate more precisely the behaviour of each tuna in relation with the FAD. This tagging will be conducted under the FADIO program recently accepted by the EU. The tagging vessel will be equipped with an ad hoc sound recorder equipment allowing to identify in real time the presence of several fish tagged. These tagged fishes will be followed during several days (during the main tagging operation targeting internal tags) in order to evaluate precisely their fidelity and behaviour in relation with the FAD where tunas were tagged.
3. The third priority would be to tag small tunas (from the three same species), on an opportunistic basis, using **dart tags**, as a function of practical free time left by priorities 1 and 2. One of the goal of this traditional tagging is to compare the recovery rate of dart and of archival tags.

It is also planned to collect and to analyse the stomach contents of FAD associated tunas caught during the program (on tunas that are not suitable to be tagged). These data will allow evaluating the feeding peculiarities of FAD associated tunas. This work will be part of the IRD THETIS program.

At the end of each tagging operation, the FAD will be either removed (the goal of this removal being to limit the risk of excessive short term recovery of tagged fishes) or left at sea, accepting the risk of having all tags recovered after a short time at liberty, but with an additional scientific information on the FAD association behaviour and on the tagging mortality.

This tagging would be done renting full time a supply vessel used by the EU purse seiners fleets to manage their FADs. As these boats are not equipped to carry live bait, all the tagging would be primarily planned using dead frozen bait which should easily allow to tag the limited number of tunas targeted by the program (priority one being 200 tunas, e.g. an average of only 3 tunas with an archival tag each fishing day). Furthermore, this tagging vessel will be equipped with auxiliary tanks set on their deck and allowing to carry a limited amount of live bait (using the Portuguese system used in Angola and in Azores) that could be obtained from coastal facilities providing live bait in Seychelles (IOTC project already planned), or from live bait taken at night around the FADs by the fishing vessel. The supply vessel should then be equipped with some additional fishing equipment allowing catching live bait at night around the FADs, possibly using light. If successful, this method could be of major interest for the IOTC tagging program.

The tagging vessel would be based in Victoria at a distance of about 500 nautical miles from the tagging zone (e.g. at about 2 days of travel time from Victoria port). Tagging would be conducted during 4 tagging cruises of 18 days each one, with stops in Victoria between each cruise.

Management and international cooperation planned

The program will be fully integrated into the large scale IOTC tagging program already recommended and approved by the IOTC. This tagging on FADs has been highly recommended by the IOTC, especially by its Tagging Working Party (Shanghai, June 2002). This tagging operation will be planned and conducted in close cooperation between the FADIO program (FAD as instrumented observatories of the pelagic ecosystems) which has been recently approved by the EU commission, keeping in mind that this tagging will be conducted in 2003 using the existing technology of modern tags (including the recent electronic tags developed with the support of the Lowestoft laboratory), when the FADIO project is targeting in the longer term the development of new technology (tags and recorders). As most of the EU scientists working on these two projects belong to the same research organizations (IEO, AZTI, IRD), this cooperation will be easy to develop, allowing a full cooperation during this 2003 tagging (first year of the FADIO project).

This tagging will be conducted independently of the IOTC, in terms of the handling of its budget and tagging operations, but it will fully use the IOTC framework, in its planning, in the choice and labelling of tags used, in the process of tag recoveries and analysis of data. Spanish and French scientists under EU full responsibility would conduct the tagging operations. A scientific technical support would be provided by scientists from the Lowestoft laboratory (UK) and from the Hobart laboratory

(Australia) regarding the use of archival tags. Scientists from these two countries have a wide experience in the making, setting and analysis of results provided by such tags. The IOTC would also provide an expert in the optimal placement of these tags. These cruises should also be opened as a training platform for technicians and scientists from IOTC countries interested to conduct similar archival tagging programs.

Calendar and operation planned

This programme is planned in a major FAD fishing zone and season, the so-called "Somalia area", between the Equator and south of 10°N, west of 60°East, during the period September-November 2003. Based on the analysis of fishery data, it appears that this area is a major one for the EU purse seine fleet. It should also be noted that FAD fishing in this area has been successful each year during this period with very little variability and that FAD fishing has always been the dominant fishing mode in this season and area (an average 90% of FAD associated catches in the strata).

An *ad hoc* Working Group will be organized among the concerned partners to plan the details of the tagging operation (early 2003). One of the scientists responsible of this FAD 2003 tagging will also participate to the first FADIO working group in order to ensure a full coordination between the two projects. This cooperation should allow to use the same tagging vessel and to tag tunas with archival tags (this program) and with sonic tags (FADIO).The final EU plan of this tagging programme will be presented, discussed and finalized during the IOTC Tagging Working Party planned in June 2003.

Budget

The total cost of the tagging operation is estimated to be of about 850.000 Euros, about 35% of this cost corresponding to the purchase of electronic tags and another 32% to the rental of the tagging vessel. This cost would be shared between the EU Commission, the two major countries participating to the program, Spain and France (using a combination of public and private funds obtained from the French and Spanish tuna boats owner associations) and the IOTC (tagging funds from various sources).

It is important to point out the special contribution of the Spanish and French tuna boat owners through their associations: ANABAC, OPAGAC and ORTHONGEL. From the beginning they have understood the need of conducting tagging in the Indian Ocean as the only way of assessing and managing the stocks of tropical tunas. Proofs of that have been their active participation in the WP of Tagging works and the strongly support of tagging projects in different forum. In particular their contribution to this project funding most of the electronic tags (111.000 €) is a clear proof of evidence.

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