REPORT ON THE BIGEYE TUNA YEAR PROGRAM-ICCAT DEDICATED TAGGING OPERATIONS OFF SAO-TOME: 1ST JUNE-31ST AUGUST 2002

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ABSTRACT

This paper describes the Bigeye Tuna Year Program dedicated tagging operations in Sao Tome in June-August 2002.

RÉSUMÉ

Ce document décrit les opérations de marquage dans le cadre du Programme d'Année Thon obèse à Sao Tomé entre juin et août 2002.

RESUMEN

Este documento describe el Programa Año del Patudo dedicado a operaciones de marcado en Sao Tomé en junio y agosto de 2002.

1 INTRODUCTION

Tuna species abound extensively in the Atlantic Ocean and its conservation is of great importance for the rational exploitation of the fishery. In particular, the low incidence of the Bigeye tuna (*Thunnus obesus*) in the sub-region over the past decades has been of utmost concern to ICCAT.

ICCAT, the Commission responsible for the conservation of Atlantic tunas hence initiated a program on tagging of the Bigeye tuna (*Thunnus obesus*) in the Gulf of Guinea (Atlantic Ocean). Among the objectives of the program was to study the biology of the species, its migration pattern juvenile mortality, which are essential for proper assessment of stocks for appropriate management decisions.

As part of the on-going tagging program, the last of dedicated tagging off the South–East Atlantic spanning three months (June –August 2002) was carried out off Sao-Tome. The previous tagging in 2001 was executed in the months April-July 2001 off the same area (Equatorial region) in the Atlantic Ocean.

A Portuguese vessel MV Agriao was chartered by BETYP for the duration of the exercise. Permits for the entry and operations for the vessel were duly arranged for MV Agriao to fish and bait within the EEZ of Sao-Tome, Gabon and Ghana respectively.

The BETYP Coordinator Dr. Guillermo Fisch led the tagging cruise during the three month period. Also participating in the tagging program were scientists from Ghana (Messrs., Paul Bannerman (Team leader), Samuel Among, Daniel Ofori-Adu, and Joseph Attoh-Quarshie). An observer from the Directorate of Fisheries in Sao-Tome was also present on board.

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2 MATERIALS AND METHODS

Tagging operations were executed mainly in Quadrants 1 and 2 according to the ICCAT convention. Methodology for tagging are described in 'ICCAT's tagging manual -February 2000', prepared in order to standardize the collection of information within the activities of the Bigeye Tuna Year Program- BETYP. Tagging operations were duly carried out.

Spotting birds for fishing positions was generally done through the use of high-powered binoculars (7x50) whilst searching was done cruising at 7 to 7.5 knots. Also fishing positions were tracked by satellite imagery (forecasting positions) which were dependent on environmental and oceanographic parameters. The area of coverage for fishing activities spanned between Latitudes 1014'N-1040'S and Longitudes 5011'E-8003'E

The predominant bait species used for the exercise was the Flat sardine (*Sardinella maderensis*).

3 RESULTS

A total of 6798 tuna species were tagged during the 3 month period; June-August 2002 (**Table 1**) with 492 bigeye tunas representing 7.24%. This number of bigeye tagged was higher than that of the 2001 cruise by 160. The number of Skipjack and Yellowfin tagged were 4545 and 1761, respectively. All the relevant information and fish catch data were duly recorded on ICCAT Forms A, B and M respectively.

3.1 Warm period (June)

Climatic condition especially sea-surface temperature during the months of June (warm period) was in the range of 27.5-29.0^{0}C. Sea-surface temperatures observed on satellite imagery charts were rather high and did not provide accurate fishing analysis thus not favoring good catches of tunas within the North-East, North West and South West of the Isle. Cruises were however carried out between latitudes 0^{0}00N- 1^{0}14 N and towards the North West of the Island which yielded no fish within the period. Fishing off free-swimming schools of tunas during this period was observed in the south-east of the Island with few feeding birds seen. Predominant species tagged were the Skipjack (*Katsuwonus pelamis*) caught off mainly (008S-656E, 043S-754E, 020S-638E). Sizes of this species ranged between 42-65 cm and each weighing on average 3.6 kg.

3.2 Partly warm/cold (July)

The target species, the Bigeye (*Thunnus obesus*) started appearing early in July off 043S-754E approximately in the region 1^0 degree South-East of Sao Tome. Temperatures during the period ranged between 25.3-27.0^{0}C. These species were once again noted to be mainly associated with other species and floating objects as seen in the 2001 cruise. In this instance they were associated with logs and other tuna species namely the Yellowfin (*Thunnus albacores*) and Skipjack (*Katsuwonus pelamis*). For the rest of the month the species hardly appeared and most catches were free swimming of the Skipjack.

Bait species used during the period were not strong enough and hence did usually not last more than 3 days. They comprised 85-90% juvenile Sardinella of lengths 5-10.5 cm caught mainly off Gamboa and Isle of Cabras during the early hours of the day till about noon.

3.3 Cold period (August)

For the month of August (cold period), which culminated in showery rains and cloudy weather, increasing catches of the target species were made in the area South-East of Sao-Tome (within the 'Triangle'- Sao-Tome-Annobon-Cap Lopez) between latitude 0001S-1023S and longitude 5012E-6018E. Catch of the Bigeye species rose from 92 on the 1st August to 254 on the 2nd August; These

were the highest incidences of Bigeye tagged. Sea surface temperatures dropped to between 23.0^0C-25.0^0C from a high of 27.0^0C in July. During this period, all the Bigeye catches were associated with either FADs (ie log), Shark-whales (*Rhiniodon typus*), Green turtles (*Chelonia mydas*) and Bottlenose Dolphins (*Torsiops truncatus*). High concentrations of fish during the months of August were within the mixing zone, (East of the Equator near Cape Lopez). In this zone warmer waters of temperatures 27.0^0C –29.0^0C from the north, quadrant 1 form a boundary zone with offshore waters of temperatures 20.0^0C –22.0^0C from the south, quadrant2 as it moves with the equatorial current in the westerly direction. The Bigeye appeared more during the cold period and within the mixing zone. In all, 492 Bigeye species of size range 37-74 cm were measured with a modal class of 42 cm. Two modal classes (39 & 68 cm) were observed in length frequency analysis of the Skipjack species whilst the Yellowfin species recorded a modal length of 47 cm.

4 DISCUSSION

The percentage of Bigeye in this tagging program, confirms the sparse distribution and abundance of the species in the region over the past 2 decades. The mean percentage of catches of the Bigeye tunas in the past 2 decades in the Atlantic Ocean has been in the range 5% -17%. Mean percentage of the species in the past two dedicated tagging expeditions was 6.37%. Prior to this, mean percentage of Bigeye species tagged off Tema- Ghana between 1999-2000 was 15.03 %.

No free-swimming schools of Bigeye were observed and it can be assumed that their preferred habitat is mostly in association with floating objects (be it living creatures or dead shrubs).

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Table 1. BETYP tagging - AGRIAO11, June-August 2002.

Operation	Date	Position	Yellowfin	Skipjack	Bigeye	Total
1	14-Jun	003S-653E	0	159	0	159
2	15-Jun	023S-711E	6	380	0	386
3	22-Jun	008S-656E	0	547	0	547
4	26-Jun	024S-559E	0	118	0	118
5	3-Jul	043S-629E	0	87	0	87
6	3-Jul	132S-632E	31	5	12	48
7	5-Jul	043S-754E	105	252	34	391
8	11-Jul	011S-728E	2	2	3	7
9	11-Jul	032S-741E	1	7	0	8
10	11-Jul	036S-744E	195	130	1	326
11	12-Jul	008S-721E	3	0	0	3
12	17-Jul	015S-555E	0	154	0	154
13	17-Jul	019S-557E	0	145	0	145
14	17-Jul	045S-557E	2	41	0	43
15	18-Jul	028S-614E	0	135	0	135
16	18-Jul	020S-615E	0	66	0	66
17	18-Jul	016S-622E	241	52	0	293
18	20-Jul	023S-625E	0	22	0	22
19	20-Jul	019S-629E	0	8	0	8
20	20-Jul	020S-638E	0	231	0	231
21	23-Jul	026S-630E	0	186	0	186
22	23-Jul	034S-638E	0	207	0	207
23	24-Jul	029S-639E	0	4	0	4
24	25-Jul	045S-635E	0	1	0	1
25	31-Jul	121S-538E	0	317	0	317
26	1-Aug	120S-604E	56	173	92	321
27	1-Aug	117S-608E	3	364	0	367
28	2-Aug	050S-618E	119	140	242	501
29	2-Aug	042S-622E	364	6	12	382
30	7-Aug	135S-552E	0	46	0	46
31	8-Aug	124S-511E	0	19	0	19
32	8-Aug	123S-512E	517	159	71	747
33	9-Aug	045S-556E	0	27	0	27
34	22-Aug	133S-710E	0	25	0	25
35	22-Aug	132S-718E	69	220	1	290
36	22-Aug	130S-720E	47	7	24	78
37	23-Aug	023S-705E	0	39	0	39
38	23-Aug	018S-702E	0	64	0	64

	YELLOWFIN	SKIPJACK	BIGEYE	Total
Tagged	1761	4545	492	6798
%	25.9	66.9	7.2	100.0

	YELLOWFIN	SKIPJACK	BIGEYE	TOTAL
JUNE	6	1204	0	1210
JULY	580	2052	50	2682
AUG	1175	1289	442	2906
TOTAL	1761	4545	492	6798