

## PROPOSAL OF ATLANTIC BLUEFIN TUNA LARVAL SURVEY

## 1. VESSEL TO BE USED

- NAME OF VESSEL	Shoyo maru (Code JDRD)
- TYPE OF VESSEL	Research vessel of Fisheries Agency of Japan
- NAME OF CAPTAIN	Kan'ichi YAMANAKA
- LIST OF CREW MEMBERS	Shown in APPENDIX 1
- LIST OF ALL PASSENGERS	To be decided
- SIZE OF VESSEL	Length -- 65.00 m Breadth -- 11.00 m Draught -- 5.60 m
- MOTIVE POWER	Diesel engine : 2,000ps x 2
- DETAILS OF RADIO INFORMATION	Shown in APPENDIX 2

## 2. ITINERARY OF THE CRUISE AND SHIP'S AGENTS

- ITINERARY OF CRUISE	Mar. 17 (Thu), 1994 -- Lv. Tokyo; Mar. 28 (Mon), 1994 -- Ar. Honolulu (U.S.A.); Apr. 01 (Fri), 1994 -- Lv. Honolulu (U.S.A.); Apr. 25 (Mon), 1994 -- Ar. Miami (U.S.A.); Apr. 29 (Fri), 1994 -- Lv. Miami (U.S.A.); May 20 (Fri), 1994 -- Ar. Freeport (The Bahamas); May 24 (Tue), 1994 -- Lv. Freeport (The Bahamas); Jun. 13 (Mon), 1994 -- Ar. Palma de Mallorca (Spain); Jun. 17 (Fri), 1994 -- Lv. Palma de Mallorca (Spain); Jul. 04 (Mon), 1994 -- Ar. Palermo (Italy); Jul. 08 (Fri), 1994 -- Lv. Palermo (Italy); Jul. 22 (Fri), 1994 -- Ar. Taranto (Italy); Jul. 26 (Tue), 1994 -- Lv. Taranto (Italy); Aug. 12 (Fri), 1994 -- Ar. Piraeus (Greece); Aug. 16 (Tue), 1994 -- Lv. Piraeus (Greece); Sep. 06 (Tue), 1994 -- Ar. Pinang (Malaysia); Sep. 10 (Sat), 1994 -- Lv. Pinang (Malaysia); Sep. 21 (Wed), 1994 -- Ar. Tokyo.
- NAME OF AGENTS	To be decided.

## 3. RESEARCH PROPOSAL

- PROPOSED PERIOD	Commencing on 20 April 1994 and terminating on 20 August 1994.
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## - OBJECTIVE

For the stock management and assessment purpose, the two stocks hypothesis has been generally accepted for bluefin tuna in the Atlantic, though this is still under a vigorous debate. Two separate spawning areas, the Mediterranean and the Gulf of Mexico, are acknowledged corresponding to the eastern and western stocks, respectively. These two spawning grounds show several significant differences in biological characteristics including the minimum size of maturity, and the length and season of spawning period. The preliminary comparison of productivity also reveals the difference as much as two times between the eastern and western Atlantic, while the direct comparison could not be made because of the differences in sampling schemes.

The current proposal plans to compare the productivity and genetic structure of these two spawning grounds primarily for addressing to the stock structure problem. All research activities will be made in a collaboration with coastal nations under the Bluefin Year Program (BYP), established at the ICCAT SCRS in 1990.

## - RESEARCH PLANS

a) Examination of genetic structures of two spawning grounds :

Eggs and larvae collected at each spawning ground should represent a genetic structure of each reproductive unit. We will examine how far those two stocks are separated genetically by examining mt-DNA of larvae collected. At the same time, this information will provide a solid basis when estimating a mixing rate of fish with different origin in a commercial catch.

b) Calibration of efficiency of sampling procedures :

The eastern and western sides of the Atlantic apply slightly different procedures and devices to collect tuna eggs and larvae. Without direct comparison, it is extremely difficult to compare these results quantitatively. By using our vessel as a common scale, the efficiencies of larval collection will be compared and standardized between the eastern and western sides of the Atlantic.

c) Comparison of productivity between two spawning grounds :

After standardizing the efficiencies, the historical data as well as data collected during the proposed survey will be analyzed to reveal the differences of spawning potentials and survivals between two spawning grounds.

d) Systematic survey on larval distribution in the Mediterranean :

In the Eastern Atlantic tuna spawning ground, the Mediterranean, the information on tuna spawning has been obtained from several opportunistic larval surveys. We plan to conduct an intensive and systematic survey which covers the entire Mediterranean in collaboration with the EEC and GFCM nations to investigate the larval distribution and productivity of tunas.

e) Effect of environmental factors :

During a survey, surface salinity and temperature, and current profile will be monitored continuously. In addition, CTD casts up to 200 to 1000 m will be made at selected stations. These data will be used to examine an influence of oceanographic environmental factors on distribution, physiological condition, and survival of tuna larvae.

- SURVEY STRATEGIES

a) Western Atlantic :

The scientists and crews from both NMFS SEFSC (National Marine Fisheries Service, South East Fishery Science Center, USA) and NRIFSF (National Research Institute of Far Seas Fisheries, Japan) will meet in Miami immediately in prior to the initiation of collaborative cruise to discuss detailed research activities during the cruise and to develop mutual understandings.

The US and Japanese will exchange one set of collecting gear and at least one scientist to observe the each other's operation. The regular US grid will be followed by both boats simultaneously and both US and Japanese methods will be deployed by each boat at every regular station. The whole regular grid is expected to be covered within 18 days. In order to obtain a finer scale information of tuna larvae distribution, the Japanese boat will deploy BONGO oblique tows up to 75 m every 15 min. in between the regular stations.

In a case when a good patchiness of tuna larvae is found along a course, both boats will stay at that point and deploy both US and Japanese methods repeatedly at least for one whole day. This will help to increase the number of positive stations available for catchability comparison with minimum time required.

The high-resolutional satellite imageries will be provided to both US and Japanese vessels in regular way to help to detect larval patchiness as efficiently as possible.

b) Eastern Atlantic :

The Italian vessel funded by the EEC will be available for the systematic larval collection in the Mediterranean in addition to the proposed Japanese vessel. The Italian and Japanese vessels will explore the Mediterranean Sea starting at the same time from the eastern end of Atlantic and from the Gibraltar Strait, respectively.

Both boats will meet in the southern Tyrrhenian Sea, which is supposed to be a center of tuna spawning activity, for the calibration of sampling procedures. The inter-calibration will be made by sampling in the same area simultaneously with two boats during two to three days. At least, one scientist will be exchanged during this joint activity to observe each other operation. However, the sampling gears will not be exchanged, since both using basically the same device and same procedure.

The Aegean Sea will be covered by the R/V from the Institute of Marine Biology of Crete, Greece. The Faculty of Aquatic Products of the University of Istanbul, Turkey, also plans to explore the Aegean Sea and Eastern Mediterranean Sea. Furthermore, the Faculty is seeking the possibility to explore the Black Sea and the Sea of Marmora.

The identification of tuna larvae will be validated and standardized beforehand by circulating a sample which contains mixture of tuna species and comparing the identifications among concerning scientists.

c) Others :

Materials collected at each station will be preserved in an alcohol for one side of Bongo and in a 4% of neutralized formalin for the other. The alcohol preserved materials will be used for a genetic analysis as well as otolith aging. The formalin preserved samples will be used for

quantitative analysis and physiological examination of larvae.

- SURVEY AREA

Preliminary survey area are shown in APPENDIX 3 and 4.

- SAMPLING GEAR AND SCIENTIFIC EQUIPMENT

Ichthyoplankton survey : Opening BONGO-type plankton net  
(mesh size : 0.5mm, 0.3mm, and 0.1mm,  
mouth diameter : 70 cm);  
Electronic Plankton Counting and Sizing System  
(EPCS);  
Drogue connected with radio buoy;  
Ultrasonic Biotelemetry System.  
Echo-sounder (28 KHz).

Oceanographic observation : Conductivity-Temperature-Depth measuring system  
(CTD);  
Expendable Bathothermograph (XBT);  
Acoustic Doppler Current Profiler (ADCP).

NO RADIO-ACTIVE NOR HAZARDOUS SUBSTANCE ON BOARD

- SPONSORING INSTITUTION

NAME : National Research Institute of Far Seas Fisheries  
ADDRESS : 5-7-1 Ordo, Shimizu, 424 JAPAN  
PHONE : +81-543-34-0715  
FAX : +81-543-35-9642  
TELEX : 03965689 FARSEA J  
DIRECTOR : Dr. Jun ITOH

- PERSON IN CHARGE FOR THIS PROPOSAL

Dr. Sachiko TSUJI (Section Chief)  
Dr. Ziro SUZUKI (Division Leader)  
Pelagic Fish Resources Division  
National Research Institute of Far Seas Fisheries

4. OTHERS

- Two beds will be available at any time during a cruise for scientists who are interested in participating to research activities on board.

- This is a collaborative research activities under the BYP of ICCAT. The applying institute keeps close contact with the scientific organizations concerning in bluefin larval research in the Atlantic, with the assistance of the following coordinators representing western and eastern Atlantic:

Dr. Steve C. TURNER  
National Marine Fisheries Service  
Southeast Fisheries Science Center  
U.S.A.

PHONE : 305-3614-482  
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Dr. Corrado PICCINETTI  
Laboratorio Biologia Marina e Pesca  
Università di Bologna (Fano)  
Italy

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FAX : 0721-801654

- The following records and survey results will be provided to all concerning parties as soon as they become available. Accessibility to the other materials can be discussed on collaborative basis on request:

- a) Navigation record;
- b) Preliminary survey report; and
- c) Final survey report.

- The preliminary results will be reported in the 1995 ICCAT meeting. The final results are planned to be reported to ICCAT SCRS meetings as well as to be published in an appropriate scientific magazines in a collaboration with the other participants of the project.

## APPENDIX 1

## CREW LIST

	FAMILY NAME	GIVEN NAME	POSITION	BIRTH DATE	SEX	NAT.	BIRTH PLACE	MARINER'S NUMBER
1	YAMANAKA	KANICHI	Master	Feb.14,'38	M	JAPAN	Tokyo	Tokyo1 6547-4
2	KAWAUCHI	JUNJI	Chief Officer	Jul.12,'47	M	JAPAN	Kanagawa	Tokyo 48004-2
3	FUNATO	KENJI	1st Officer	Jun.30,'50	M	JAPAN	Ehime	Yokohama 36717-2
4	TOISHI	SEIJI	2nd Officer	Oct.08,'55	M	JAPAN	Kanagawa	Tokyo 51082-2
5	KAITANI	HISATAKA	Sr 3rd Officer	Apr.03,'60	M	JAPAN	Iwate	Tokyo 52734
6	SAEKI	TOMOKO	Jr 3rd Officer	Oct.30,'59	F	JAPAN	Tokyo	Shimonoseki 39829
7	MIURA	KOKI	Chief Engineer	Jan.14,'35	M	JAPAN	Kanagawa	Yokohama 18139-4
8	MAEDA	AKINORI	1st Engineer	Aug.31,'53	M	JAPAN	Chiba	Tokyo 33919-2
9	SAWAI	TOSHIKI	2nd Engineer	Jul.22,'58	M	JAPAN	Aichi	Tokyo 50090-2
10	MURAKI	HARUMITSU	3rd Engineer	Jan.04,'61	M	JAPAN	Mie	Yokohama 54219
11	KURAMOCHI	MASAO	Chief Operator	Mar.27,'50	M	JAPAN	Ibaragi	Tokyo 32641-2
12	OHGIRI	SEIJI	2nd Operator	Aug.07,'64	M	JAPAN	Ishikawa	Noto 1923
13	ISHIZUKA	KATUZO	Purser	Mar.25,'45	M	JAPAN	Chiba	Tokyo 46346-2
14	IKEDA	TAKESHI	Medical Officer	Sep.08,'58	M	JAPAN	Wakayama	Tokyo 55797
15	HONMA	KINJI	Boatswain	Jul.05,'35	M	JAPAN	Niigata	Niigata 10707-2
16	OTOTANI	NOBUYA	Deck Store Keeper	Mar.10,'38	M	JAPAN	Kagawa	Tokyo 16025-4
17	KOMATSU	MITSUO	Deck Store Keeper	Dec.11,'40	M	JAPAN	Miyagi	Tokyo 46228-2
18	NOZAWA	SHOJI	Quarter Master	Apr.23,'45	M	JAPAN	Chiba	Ohfunato 2739-3
19	YAMAGUCHI	KIKUO	Quarter Master	Dec.28,'50	M	JAPAN	Chiba	Tokyo 32332-2
20	KOIZUMI	FUSANORI	Quarter Master	Oct.05,'53	M	JAPAN	Shimane	Saigo 2013-2
21	SUZUKI	AKIRA	Quarter Master	May 26,'53	M	JAPAN	Tokyo	Tokyo 33920-2
22	KURONUMA	YOSHIYUKI	Quarter Master	Apr.13,'55	M	JAPAN	Miyagi	Otaru 14197-2
23	OGAWA	MITSUAKI	Quarter Master	Nov.06,'57	M	JAPAN	Kagoshima	Tokyo 48181-2
24	UMEDA	HIDEKI	Sailor	Jun.07,'67	M	JAPAN	Kumamoto	Ushibuka 6972
25	GOMA	YUTAKA	No.1 Oiler	Apr.07,'33	M	JAPAN	Kanagawa	Tokyo 8819-4
26	YAMASHITA	KENJU	Engine Store Keeper	Oct.10,'38	M	JAPAN	Miyagi	Kobe 28791-4
27	KIRIU	KUMAO	Engine Store Keeper	May 01,'35	M	JAPAN	Saitama	Tokyo 11037-4
28	YABE	TADAHIRO	Oiler	Aug.21,'41	M	JAPAN	Tokyo	Yokohama 20278-4
29	YOSHIDA	KATSUMI	Oiler	Sep.03,'45	M	JAPAN	Saga	Tokyo 25198-3
30	YOSHIDA	SHIGERU	Oiler	Mar.23,'48	M	JAPAN	Chiba	Tokyo 8527-3
31	KOIZUMI	HIROYUKI	Oiler	Sep.29,'53	M	JAPAN	Shimane	Saigo 1992-2
32	HAGA	MAKOTO	Oiler	Jan.03,'71	M	JAPAN	Fukushima	Kushiro 14352
33	KOYAMA	ISAMU	Chief Steward	Mar.09,'37	M	JAPAN	Chiba	Tateyama 2940-3
34	OGAWARA	KEIICHI	Chief Cook	May.08,'53	M	JAPAN	Niigata	Tokyo 35412-2
35	MAEYAMA	YOSHIYUKI	Cook	Jul.31,'53	M	JAPAN	Kagoshima	Kagoshima 13243-3
36	JYUMONJI	HIROYUKI	Steward	Aug.10,'57	M	JAPAN	Miyagi	Hachinohe 36770-2
37	SHIBATA	SHINJI	Steward	May 07,'60	M	JAPAN	Chiba	Kushiro 12603-2

RADIO FREQUENCIES LIST

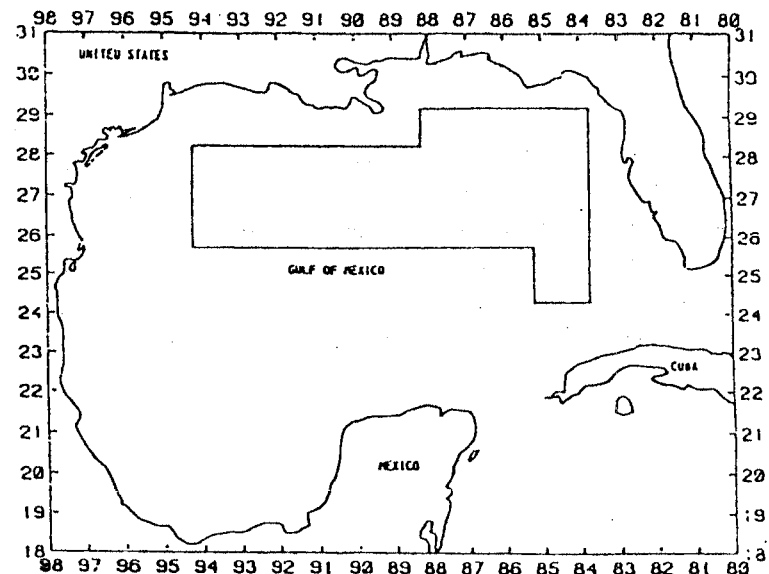
Wave	Frequencies	Power
MF :A1A	410 425 432 454 468 480 500 512 (KHz)	400W
MHF:A1A	2007.5 2030 2070 2075 2091 2115 2457 3317.5 3612.5 (KHz)	500W
MHF:J3E	2028.5 2130 2150 2182 2340.5 2394.5 2543.5 2575 2638 2785 3302 3739 (KHz)	50W
HF :A1A	4-22MHz(T1 U2 V1 V2 V3 07 48 51 53) [Series of 4184(T1) 4186(U2) 4182(V1) 4183(V2) 4185(V3) 4196.5(07) 4194.5(07) 4191(48) 4189(51) 4201.5(53) KHz]	1KW
HF :J3E	4-25MHz(52) [Series of 4201(52) KHz] 4-16MHz(49) [Series of 4200(49) KHz] 4 8-22MHz(61 62 66 67) [Series of 4083(61) 4137(62) 4140(66) 4116(67) KHz] 4-22MHz(63) [Series of 4125(63) KHz] 4134 6200 8240 12242 16432 (KHz)	1.2KW
VHF:F3E	150MHz(ch. 1-14 16 18-28 60-69 71-74 77-88) 158.17 158.57 159.21 MHz	20W

RADAR

Frequencies	Pulse Length	Power
3050MHz	0.08µs 1.0µs	60KW
9375MHz	0.08µs 1.0µs	50KW

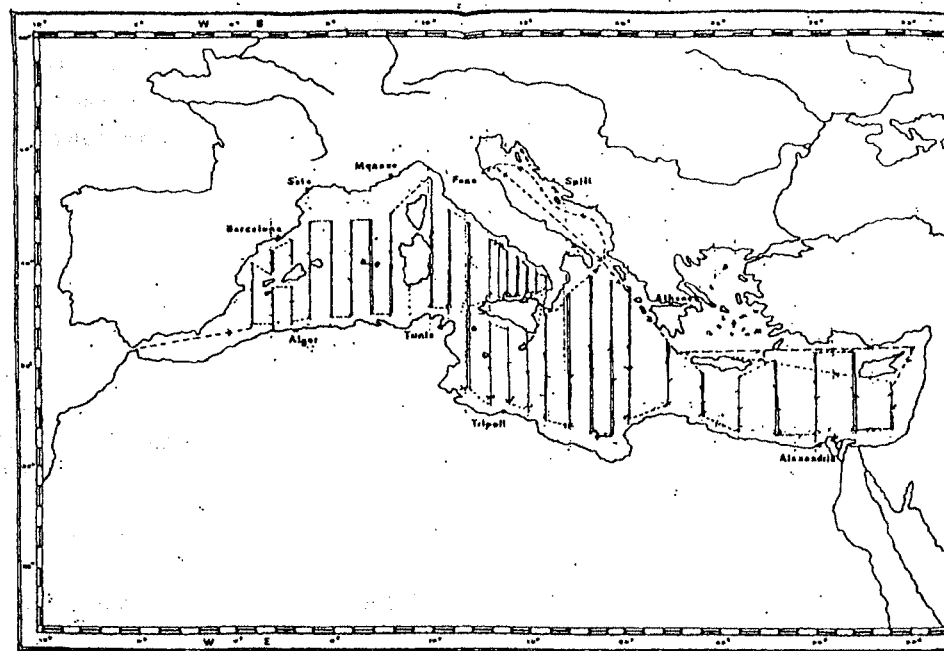
SONAR

	Frequencies	Power
Deep-Sea Echo Sounder	12KHz	5KW
Echo Sounder	200KHz	500W
Color Scanning Sonar	28.45KHz	100.150Vpp
Fish Echo Sounder	28KHz, 200KHz	10KW
Color Doppler Sonar	130KHz	550Vpp
Acoustic Doppler Current Profiler	75KHz	850Vpp



Preliminary survey area for the western Atlantic.

APPENDIX 4



Mediterranean survey on Bluefin Tuna eggs and larvae distribution: preliminary hypothesis of a survey line. The Shoyo-maru will start from the Western Mediterranean Sea (Balearic Isles) and the European vessel from the Eastern Mediterranean Sea.