
**INTERNATIONAL COMMISSION
for the
CONSERVATION of ATLANTIC TUNAS**

**R E P O R T
for biennial period, 1970-71
PART III
English version**

MADRID, SPAIN

1972

INTERNATIONAL COMMISSION FOR THE CONSERVATION OF ATLANTIC TUNAS

Member Countries (as of March 1, 1972)

Brazil, Canada, France, Ghana, Japan,
Korea, Morocco, Portugal, Senegal,
South Africa, Spain, U.S.A.

Chairman of Commission

Mr. F. MARCITLLACH GUAZO, Spain
(to December 7, 1971)
Mr. J. TOUYA, France
(from December 7, 1971)

First Vice-Chairman of Commission

Mr. J. N. N. ADJETEY, Ghana
(to December 7, 1971)
Dr. M. P. PAIVA, Brasil
(from December 7, 1971)

Second Vice-Chairman of Commission

Mr. J. TOUYA, France
(to December 7, 1971)
Mr. D. LAYACHI, Morocco
(from December 7, 1971)

Panel Membership (as of March 1, 1972)

Panel	Contracting Parties	Chairman
1	Brazil, Canada, France, Ghana, Japan, Korea, Morocco, Portugal, Spain, U.S.A.	U.S.A.
2	Canada, France, Japan, Korea, Morocco, Portugal, Spain, U.S.A.	Morocco
3	Brazil, Japan, South Africa, U.S.A.	Japan
4	Japan, Portugal, Spain, U.S.A.	Spain

Council (to December 7, 1971)

Chairman: SPAIN
First Vice-Chairman: GHANA
Second Vice-Chairman: FRANCE
Countries: BRAZIL, CANADA, JAPAN, MOROCCO,
PORTUGAL, SOUTH AFRICA, U.S.A.

Council (from December 7, 1971)

Chairman: FRANCE
First Vice-Chairman: BRAZIL
Second Vice-Chairman: MOROCCO
Countries: CANADA, GHANA, JAPAN, KOREA, PORTUGAL,
SOUTH AFRICA, SPAIN, U.S.A.

Standing Committees

Committees:

Committee on Research and Statistics (SCRS)

Committee on Finance and Administration (STACFAD)

Chairman

Mr. V. VALDEZ, Portugal

Dr. W. M. SPRULES, Canada

Secretariat

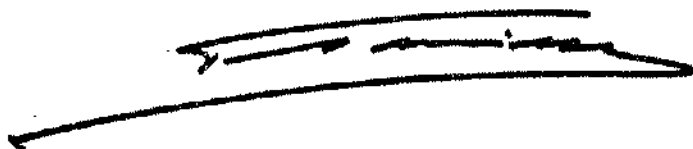
General Mola, 17, 28001 Madrid (Spain)
Executive Secretary: O. RODRÍGUEZ-MARTÍN
Assistant Executive Secretary: P. M. MIYAKE

LETTER OF TRANSMITTAL

The Chairman of the International Commission for the Conservation of Atlantic Tunas presents his compliments to the Member Governments to the Convention for the Conservation of Atlantic Tunas (Rio de Janeiro, May 14, 1966) and to the Delegates and Observers representing said Governments, and has the honor to transmit «Report for Biennial Period 1970-71 (Part III)», describing the activities of the Commission during the second half of said biennial period.

The volume contains reports of the Second Regular Meetings of the Commission held in December 1971, and of all the associated meetings of the Standing Committees and Sub-Committees. In addition, it contains a summary of the activities of the Secretariat, and National Reports on scientific activities related to tuna fisheries carried out by the various countries.

This Report has been drafted, circulated and is approved in compliance with Articles III (9) and IV (2) (d) of the Convention, and Rule 15 of the Statutes of the Commission. The Report is available in the three official languages of the Commission — English, French and Spanish.



F. MARCITLLACH
Chairman

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CHAPTER I

ADMINISTRATIVE REPORT 1971 *

COMM/71/10 (Amended)

1. New Members of the Commission

Korea

The Government of Korea ratified the Convention with the Director-General of the United Nations Food and Agriculture Organization on August 28, 1970. In accordance with Article XIV, paragraph 3 of the aforesaid Convention, a ratification is in force as of the date of its presentation. Therefore, as of the above date Korea became the 11th member of the International Commission for the Conservation of Atlantic Tunas.

At its own request and prior agreement in writing by member countries of the Commission, Korea will participate in Panel 1 and Panel 2 (See COMM/71/9).

Senegal

Under date of August 25, 1971 the Government of the Republic of Senegal deposited with the Director-General of the United Nations Food and Agriculture Organization its adherence to the International Convention for the Conservation of Atlantic Tunas. The Republic of Senegal has become a party to the Convention and the 12th member of the International Commission for the Conservation of Atlantic Tunas.

2. Meetings

Special Meeting of the Council

The Council held its First Special Meeting in Madrid, April 17-18, 1970. For details please see Report for Biennial Period 1970-71, Part I.

* Some modification was made to «Administrative Report» presented to the meetings.

First Regular Meeting of the Council

The First Regular Meeting of the Council was held in Madrid, November 16-20, 1970. Proceedings of the Council meetings appear in the 1970-1971 Biennial Report, Part II.

Standing Committee on Research and Statistics (SCRS)

The Standing Committee on Research and Statistics and the Sub-Committee on Stock Assessment met in Madrid, November 2-6 and 9-13, 1970, respectively. The Report of these meetings appears in the 1970-1971 Biennial Report, Part II.

Sub-Committee on Stock Identification

This Sub-Committee met in Lisbon, April 5-9, 1971. The Report of the meeting of this Sub-Committee appears in this volume as Appendix 4 to Annex 6 of the Proceedings of the Second Regular Meeting of the Commission.

3. Agreement on Seat (COMM/71/20)

At its First Regular Meeting the Council approved the Draft Agreement on the Commission in Spain and recommended that the Council propose to the Commission to approve the text of said Agreement and authorize the Chairman of the Commission to sign the Agreement in its behalf. Accordingly, the Executive Secretary submitted said proposal in writing to the member countries of the Commission, requesting their votes by mail in accordance with Article 9.8 of the Rules of Procedure.

All member countries of the Commission sent their written authorization, conferring full powers upon the Chairman of the Commission to sign the aforesaid Agreement with the Government of Spain.

On March 29, 1971 the ceremonies for signing of the Agreement were held at the Ministry of Foreign Affairs in Madrid. The Under Secretary of Foreign Affairs, H. E. Gabriel Fernández de Valderrama, signed in behalf of the Spanish Government, and H. E. Fernando Marcitllach Guazo, Chairman of the Commission, signed in its behalf.

The official ratification ceremony was held on October 28, 1971, and on that same date it became effective. It was published in the Official Gazette No. 275, November 17, 1971.

4. Scheme for International Inspection System

In order to implement the decision of the Council at its First Regular Meeting, the Secretariat addressed member countries of the Commission requesting the

viewpoints of their Governments as to how ICNAF-NEAFC international inspection procedures could be adopted for use by ICCAT.

Likewise, the Secretariat approached several international organizations requesting their current schemes on control measures. A compendium of these views and schemes was prepared for presentation at the Second Regular Meeting of the Commission as Document COMM/71/16, circulated on August 26, 1971.

5. Cooperation with other Organizations

The Report of the First Regular Meeting of the Council makes reference to ICCAT relationships with other organizations during 1970. Since then and within the framework of its essential activities (compilation of statistics, tagging projects, international inspection and enforcement system...) the Secretariat of the Commission has continued to maintain fruitful contact with various organizations. The scope of such relationships insofar as the principal cases, is given below:

United Nations Food and Agriculture Organization (FAO)

The ICCAT Secretariat has maintained constant contact with the Fisheries Department of FAO, sometimes on an official basis, and often through informal communication directly with experts and advisers.

Mr. R. I. Jackson represented FAO at the First Special Meeting of the Council, and Mr. Popper attended the First Regular Meeting of the Council. Likewise, distinguished advisers attended the meetings of SCRS and the Sub-Committees. The ICCAT Secretariat has been represented at various FAO meetings (COFI, IPFC, IOFC, CECAF...).

Among the many working relationships the Secretariat maintains with FAO, the following are of special importance:

- i) Cooperation in improving Atlantic tuna fishery statistics;
- ii) Preparing species identification cards for tunas and tuna-like species — a joint undertaking;
- iii) Cooperation with FAO Expert Panel on tunas in developing Atlantic international joint tuna tagging;
- iv) Furnishing ICCAT with computer programs on population analysis.

Document COMM/71/17 deals with ICCAT/FAO working relations referred to in Article XI (1) of the Convention.

Inter-American Tropical Tuna Commission (IATTC)

Since this is an organization with objectives somewhat similar to those of ICCAT, we have maintained close cooperation. ICCAT has profited from the broad experience of IATTC.

Dr. James Joseph, Director of Investigations of IATTC, attended the First Meeting of the SCRS. Dr. W. H. Bayliff was invited by ICCAT and attended the meeting of the Sub-Committee on Stock Identification (Lisbon, April 5-9, 1971) as an adviser.

The Executive Secretary of ICCAT attended the 23rd Annual Meeting of IATTC at San José, Costa Rica, and subsequently called at Commission headquarters in La Jolla, California.

IATTC provided some of the computer programs for population analysis being installed.

Further, in our efforts to carry out Commission tagging programs we have submitted a request to IATTC for 10,000 tuna tags, 3,000 needles and special tagging equipment; this has been provided at cost.

Coordinating Working Party on Atlantic Fishery Statistics (CWP)

«With regard to close cooperation with other international organizations in collecting statistics, the Council felt that ICCAT should be represented at the next CWP meeting by the Convenor of the Sub-Committee on Statistics (Dr. Hayasi), the Assistant Executive Secretary, and the Delegations from Portugal and France. The Executive Secretary was asked to ascertain the pertinent procedure for obtaining representation of ICCAT at CWP.» (Proceedings of the First Regular Meeting of the Council, Madrid, November 16-20, 1970.)

The ICCAT Secretariat informed the CWP Secretary of the decision made by the Council (12/21/70).

Under date of July 5, 1971 the Secretary of the CWP reported that during its 56th session (June 7-18, 1971), the FAO Council decided to: «authorize the participation of the International Commission for the Conservation of Atlantic Tunas (ICCAT) in the work of the Coordinating Working Party on Atlantic Fishery Statistics (CWP) and noted that the appointment by ICCAT of up to four experts to the CWP would not involve any cost to the Organization».

In the above context, communications were received from ICES (5/26/71) and ICNAF (8/12/71) signifying their pleasure with regard to ICCAT membership and welcoming it into the CWP.

ICCAT was represented by the delegation from Portugal as well as the Convenor of the Sub-Committee on Statistics and the Assistant Executive Secretary of the Commission at the 7th Meeting of the CWP held November 10-16, 1971, in Rome.

The following documents were submitted to the above meeting:

- i) Report on the ICCAT statistical program and publications;
- ii) Draft Field Manual for statistics and sampling;
- iii) Statistical Bulletin, Vol. 1.

International Council for the Exploration of the Sea (ICES)

The Secretariat maintains contact with this Organization and there is a mutual willingness to have close and effective cooperation. Mr. Tambs-Lyche, Secretary General of ICES, attended the First Regular Meeting of the Council, as well as the First Meeting of the SCRS.

International Commission for the Northwest Atlantic Fisheries (ICNAF)

North-East Atlantic Fisheries Commission (NEAFC)

International Pacific Salmon Fisheries Commission

International Pacific Halibut Commission

North Pacific Fur Seal Commission

International North Pacific Fisheries Commission (INPFC)

Japan-USSR Fisheries Commission on Northwestern Pacific

The Secretariat has maintained correspondence with the Commissions listed above on the subject of their respective international enforcement schemes. We have received from them the pertinent information, which appears in Document COMM/71/16.

Others

The Secretariat has also corresponded with the International Commission for Scientific Exploration of the Mediterranean Sea, the International Whaling Commission, Fisheries Division, OECD and numerous laboratories engaged in fisheries research, as also with several countries not members of the Commission, but fishing for tunas in the Atlantic.

6. Development of Research Program

National Research

According to Article IV of the Convention the Commission established a Standing Committee on Research and Statistics (SCRS), (Rule 13 of «Rules of Procedure»), where the scientists of each member nation can report, analyze, discuss and study research conducted by each nation. Among all the scientific reports presented at SCRS, National Reports are included in the Commission's Biennial Report.

Joint Tagging Program

The Sub-Committee on Stock Identification which met in Lisbon April 1, 1971, developed an international joint tagging program. As of the end of August 1971, it

had been reported to the Secretariat that five projects had been undertaken in accordance with this scheme.

These are:

1. South African tagging off Capetown -- mostly albacore;
2. French ORSTOM tagging off Central West Africa -- mostly yellowfin and skipjack;
3. Canada-U.S. joint tagging off northeast U.S. -- small bluefin;
4. Canada -- off Nova Scotia -- large bluefin;
5. France-U.S. joint tagging off West Africa.

At present Brazil is planning to conduct tagging on blackfin tuna off its coast.

The Sub-Committee requested that the Secretariat play a role in coordinating the above projects, publicizing the reward for recoveries of tags, paying rewards and encouraging tagging by new countries by supplying the materials needed for operation, etc. The Secretariat accordingly has been circulating notices of tag releases among nations where recoveries may be made. Also in cooperation with said Sub-Committee the Secretariat has prepared posters in eight languages for distribution among fisheries administrations and industries.* Availing itself of the generous offer made by IATTC, the Secretariat purchased from the latter at cost, the materials needed for tagging.

These are offered on a loan basis to anyone who wants to start tuna tagging. At the same time the Secretariat made arrangements with each country to the end that when tags are recovered the local fishery officers may pay the rewards to the fishermen on the spot. This will encourage recovery efforts. The Commission will subsequently effect reimbursement.

Installation of Computer Programs

During the First Regular Meeting of the Council it was decided to set up computer programs at the Secretariat for use during sessions of the Sub-Committee on Stock Assessment. Ten thousand dollars were allocated for this purpose and also to cover temporary employment of a programmer and/or scientist familiar with such programs, if required (Proceedings of said Council -- paragraph 16). The Secretariat made inquiry as to the availability of a computer in Madrid. After much negotiating with several firms, and considering the capability of computers available, we accepted the offer made by UNIVAC Sperry Rand, S. A., and signed a contract to use their 1106 computer. After consultation with all the scientists in this Sub-Committee and in cooperation with FAO, the Secretariat therefore picked up 15 programs which seemed to be most essential for population analyses. These were converted for use by the UNIVAC 1106 prior to the Commission's scientific meetings in November-December, 1971. The Secretariat also prepared

* The posters were widely distributed in early 1972.

a Manual for users of these programs for distributing among the scientists concerned.

Besides the above programs, a «UNIVAC STATISTICAL PACKAGE» of the programs is available.

Since all of the foregoing was arranged for by the Secretariat staff, it appears unnecessary for the time being to have a temporary programmer or scientist working on the project at headquarters. Together with UNIVAC's generous offer in its terms, and efforts of the Secretariat staff, we were able to save most of the amount budgeted for this project.

Sampling Manual

During the SCRS meetings and those of the Sub-Committee on Stock Assessment held in November 1970, the importance of establishing a statistical reporting and sampling system was repeatedly stressed.

Likewise, the necessity of setting up guidelines for same was emphasized. The Sub-Committee on Statistics was established at the same meetings to review the problem and developments. In cooperation with Dr. S. Hayasi, Convenor of said Sub-Committee, the Secretariat prepared a draft «Field Manual» (SCRS/71/12). The volume includes instructions for compiling and reporting fishery statistics, guidelines for sampling tunas and tuna-like species, descriptions and illustrations of each species concerned, and procedure when tagged fish are recovered.

The draft (prepared only in English for the time being except for the Introduction) was submitted at the CWP meetings held in Rome, November 10-16, and at the SCRS and Sub-Committee on Statistics, Madrid, November 1971. If all members of the Committees reach an agreement on an improved version of the draft, the Secretariat will proceed to print it in the three official languages.

7. Tuna Fisheries Statistics

During the SCRS meetings in 1970 an outline was set forth as Tasks 1 through 4, whereby the Secretariat will collect statistics from each national office (SCRS Report, 1970, Chapter 10). As the first year's activity, the Secretariat tried to accomplish Task 1 and part of Task 2. Progress has been reported periodically to members of the SCRS.

As far as Task 1 is concerned and thanks to the cooperativeness of several national offices, we were able to improve the statistics for various countries. However, a large part of the statistics must still be dependent on data collected by FAO or CWP. In this respect, the Assistant Executive Secretary travelled to the West African countries and requested cooperation in gathering better statistics. The trip was particularly useful in eliminating much of the double counting of catches made by flag country and by landing country. Most of the catches are now broken down by flag vessels.

Spanish statistics were improved a great deal with the cooperation of the Spanish Administration, Syndicate and industry.

All data collected or improved on along the lines of Task 1 are published in the Statistical Bulletin, Vol. 1 (COMM/71/19).

The Secretariat has received data outlined in Task 2 from Canada, France (part of the fishery), Japan and the U.S.A. Since the Japanese and French data are extensive and have already been published, the Secretariat has not reproduced them. Canadian and U.S. data were reproduced by the Secretariat and distributed at the meetings (not included in the Statistical Bulletin).

Special close cooperation with FAO and CWP on this subject has been discussed in respective sections.

8. Commission Publications

The following publications have been prepared in the three official languages :

Biennial Report

According to Article III (9) and Rule 15 of the Rules of Procedure, «every two years the Commission shall submit a report on its work and findings to all member countries of the Commission». Also, «at the end of each meeting, the report approved by the Commission will be submitted by the Executive Secretary to all member countries...».

Since the important part of the Biennial Report should be reports of all meetings held during the period, and since research activities by each country are too valuable to be withheld for publication until the end of a two-year period, pending a decision by the Commission the Secretariat tentatively decided to publish the Biennial Report in parts. In this way we hope to avoid a duplication of effort and the expense of publishing the reports of each meeting twice, and at the same time hope to make fresh scientific information available as soon as possible. This scheme should, however, be formally discussed during the Commission meetings.

According to this format the «Report of the First Special Meeting of the Council (Madrid, April 17-18, 1970)» (presented as COMM/71/14) will form Part I of the Report for Biennial Period, 1970-1971 ; Part II (presented as COMM/71/15), includes Administrative Report and Financial Statement for 1970, reports of all meetings held in the fall of 1970. Reports of the Second Regular Meeting of the Commission and all associated meetings form Part III (present volume).

Report of Sub-Committee on Stock Identification [presented as SCRS/71/4 (a) and (b)]

The Report of the First Meeting (Lisbon, April, 1970) has been prepared in a temporary format and was distributed in September. The report is included in the present volume.

Statistical Bulletin (presented as COMM/71/19, and SCRS/71/13)

As discussed in the preceding chapter, all data prepared along the lines of Task I are included in the Bulletin. Since data are constantly being improved and we wish to make distribution of same as soon as they become available, the Statistical Bulletin was prepared in the form of a binder. The first lot was distributed in September and the second in November 1971.

The Secretariat issued five Newsletters during 1971. These are prepared in a desire to keep those concerned informed at irregular intervals as to Secretariat activities. Our distribution is wide.

9. Secretariat Management*The Commission's Office Accommodation*

The premises have been provided by the Spanish Government; these cover 200 sq. m. at Calle General Mola No. 17, 7th floor, Madrid.

The office has been equipped with appropriate furniture, file cabinets, typewriters, photocopy, photoengraving and multigraph machines, and all other essential items. An inventory of the material was presented to the Second Regular Meeting of the Commission as Annex to Document COMM/71/13.

Secretariat Staff

Executive Secretary — O. RODRÍGUEZ-MARTÍN.

Assistant Executive Secretary — MAKOTO MIYAKE.

Administrative Assistant — JUAN ANTONIO FERNÁNDEZ (employed in 1971).

Selected for the position in view of his background, broad experience and knowledge of the three official languages of the Commission. Mr. Fernández has worked in the Secretariat on a temporary basis in the past, but he entered upon his full-time duties on September 1, 1971.

Tri-lingual Secretary — ANA MARÍA MINGOTE

Bi-lingual secretary — MARTHA SUSSMANN
Works half-day in the Secretariat.

Assistant Statistician — GAIL TIBBO (employed in 1971)

Works in the Secretariat on a temporary basis. She cooperates effectively with the Assistant Executive Secretary on statistics.

Messenger — AMADEO AGUILAR

Temporary translators, typists and other personnel.

Depending on the needs of the Secretariat, temporary services of translators, typists and other auxiliary personnel have been utilized.

Travel

Following suggestions of the Council at its First Regular Meeting:

The Executive Secretary attended the FAO Conference on Marine Pollution and its Effects on Living Resources and Fishing (Rome, December 9-18, 1970); the 23rd Annual Meeting of the Inter-American Tropical Tuna Commission (San José, Costa Rica, January 5-7, 1971), and availed himself of the opportunity to call at Commission headquarters in La Jolla. He also attended meetings of the FAO/COFI Fisheries Committee (Rome, April 15-21, 1971).

The Assistant Executive Secretary visited FAO headquarters in Rome, February 15-19 to discuss technical cooperation between the two organizations, particularly on the matter of statistics. He attended the Joint Meeting of the Special Committee on Tuna Management of the Indian Ocean Fisheries Commission (IPFC) and the Indo-Pacific Fisheries Council (IOFC) (Rome, April 21-24, 1971). He also represented ICCAT at the CWP meeting, October 10-16, Rome. He travelled to the following countries in order to request their cooperation in collecting fisheries statistics information: Morocco, the Canaries-Spain, Senegal, Sierra Leone, Ivory Coast, Ghana, South Africa and Angola-Portugal (May 9 - June 13, 1971); in conjunction with the above, he attended CINECA and CECAF meetings at Casablanca (Morocco).

The Executive Secretary and Assistant Executive Secretary attended the meeting of the Sub-Committee on Stock Identification in Lisbon, April 1971. They also visited Bermeo on the northern coast of Spain. The country's major tuna fleet is concentrated at the above port. The Commission officers met with shipowners to discuss the question of statistics.

At the beginning of October the Assistant Executive Secretary travelled to the United States and Canada to discuss various aspects of research. He reviewed with the scientists of those countries all statistical problems, sampling schemes, tagging projects and plans for furnishing the scientists with computer programs during the coming meetings.

Experience has proven that the foregoing travel is essential to enable direct contact with the fisheries administrations of the various countries, as well as contacts with scientists, industry and fishermen proper.

Staff Regulations

In compliance with the decision of the Council at its First Regular Meeting, the Secretariat prepared a draft of Secretariat Staff Regulations. It was presented to the Second Regular Meeting of the Commission as document COMM/71/11.

Assurity Bond

Following the recommendations of the Council at its First Regular Meeting, the Executive Secretary contacted the Compañía Española de Seguros de Crédito y Caución to consider the various options for insurance. After consultation with the Chairman of the Commission a contract for an Assurity Bond was taken with the aforesaid Company. This is for the sum of \$ 100,000 USA and covers the Executive Secretary and Assistant Executive Secretary.

O. Rodríguez-Martín

Executive Secretary

**SUMMARY
OF AUDITOR'S REPORT**

FINANCIAL STATEMENT OF THE COMMISSION FOR 1971

The 1970 financial year closed with a balance of \$ 31,661.49 in the Treasury, which was applied as follows:

- a) \$ 30,000.00, Special Appropriation for 1971
- b) \$ 1,661.49 to Working Capital Fund.

In accordance with Article 12 of the Financial Regulations, a summary of the Auditor's Report is attached, the full text of which was circulated to the Delegates on March 20, 1971.

**BALANCE SHEET AS OF DECEMBER 31, 1971, OF THE INTERNATIONAL COMMISSION
FOR THE CONSERVATION OF ATLANTIC TUNAS**

A S S E T S	L I A B I L I T I E S
<i>Available</i>	<i>Callable</i>
Banco Exterior de España, Checking Account 45,010.73	Pending payment, Chapter VIII of Estimated Expenses \$ 2,000.00
C/A in domestic pesetas 7,781.58	Ghana, balance in its favor 23.42
C/A in convertible pesetas 76,386.30	Total \$ 2,023.42
Cash on hand, pesetas 8,881.80	
At 66 ptas per \$ 93,049.68 \$ 1,409.84	<i>Transfers to other Periods</i>
Total \$ 46,420.57	To 1972 Period \$ 14,000.00
<i>Real Property</i>	To 1973 Period 16,000.00 \$ 30,000.00
Office equipment, installations and furniture	<i>Acquired Holdings</i>
Acquired in 1970 \$ 9,661.91	From 1970 Appropriation 9,813.47
Acquired in 1971 1,847.57	From 1971 Appropriation 1,847.57 \$ 11,661.04
Total \$ 11,509.48	<i>Working Capital Fund</i> \$ 14,397.15
Bonds 151.56 \$ 11,661.04	Total \$ 58,081.61
Total \$ 58,081.61	Undersecretariat of Merchant Marine of Spain, furniture ceded \$ 3,365.38
Furniture ceded by Undersecretariat of Merchant Marine of Spain \$ 3,365.38	

**ANALYSIS OF WORKING CAPITAL FUND BALANCE APPEARING
IN BALANCE SHEET OF DECEMBER 31, 1971**

Unobligated contributions

Korea, 1970	\$ 1,125.00	
Korea, 1971	6,580.00	\$ 7,705.00

Results of Estimated Expenses not applied to future years

1970 Appropriation	\$ 3,417.91	
1971 Appropriation	320.82	\$ 3,738.73

Interests from Checking Accounts

For 1970	\$ 16.76	
For 1971	2,378.00	\$ 2,394.76

Changes in exchange rates

In 1971		\$ 558.66
Total appearing in Balance		\$ 14,397.15

LIQUIDATION OF OBLIGATED INCOME FOR 1971 PERIOD

CONTRIBUTIONS OF MEMBER COUNTRIES TO 1971 BUDGET

<i>Member Country</i>	<i>Obligated</i>	<i>Date</i>	<i>Deposited</i>
Brazil	\$ 7,670.00	9/27	\$ 7,670.00
Canada	4,120.00	3/20	4,120.00
France	16,390.00	2/26	16,390.00
Ghana	3,620.00	7/22	3,620.00
Japan	14,520.00	3/27	14,520.00
Morocco	7,360.00	5/28	7,360.00
Portugal	10,110.00	5/25	10,110.00
Spain	20,040.00	4/19	20,040.00
South Africa	3,430.00	2/ 1	3,430.00
U. S. A.	12,740.00	4/ 3	12,740.00
Totals	\$ 100,000.00		\$ 100,000.00

Contributions Pending from Previous Period

Ghana (deposited 7/22)	\$ 2,890.00	
Spain (deposited 4/19)	8.18	\$ 2,898.18

Other unobligated receipts

Korea 1971 (deposited 10/20)		\$ 6,580.00
Surplus from Ghana contribution (7/22)		23.42

Checking Account interests

Dollar Account	\$ 2,318.02	
Convertible Peseta C/A	55.58	
Domestic Peseta C/A	4.40	\$ 2,378.00

Total receipts during 1971		111,879.60
On hand in Treasury 1/1/71		31,661.49
Total currency available 1971		\$ 143,541.09

LIQUIDATION OF ESTIMATED EXPENSES FOR 1971 PERIOD

<i>Headings</i>	<i>Budgeted</i>	<i>Expenditures for year</i>	<i>Equip- ment</i>	<i>Bonds</i>	<i>Balance</i>
1. Salaries, Allowances	\$ 58,000.00	\$ 52,696.42		\$ 52,696.42	\$ 5,303.58
2. Travel	10,000.00	5,088.22		5,088.22	4,911.78
3. Expenses — Meetings	15,000.00	14,662.24		14,662.24	337.76
4. Publications	5,000.00	3,756.02		3,756.02	1,243.98
5. Office Equipment	1,500.00		\$ 1,847.57	1,847.57	—347.57
6. General Operating Expenses	8,000.00	7,318.99		7,318.99	681.01
7. Miscellaneous expenses	2,500.00	1,324.27		1,324.27	1,175.73
8. Special Projects	30,000.00	12,985.45		12,985.45	17,014.55
Totals	\$ 130,000.00	\$ 97,831.61	\$ 1,847.57	\$ 99,679.18	\$ 30,320.82
Total contracted during 1971 Period		99,679.18			
Pending application to Heading 8		2,000.00			
Total expenditures 1971		97,679.18			

STATUS OF TREASURY AS OF DECEMBER 31, 1971

Liquidation of Estimated Income:	
Total income	\$ 143,541.09
Liquidation of Estimated Expenses:	
Total expenditures	\$ 97,679.18
BALANCE, December 31, 1971	<u>\$ 45,861.91</u>
Detail of Cash in Bank:	
Commission Cash on hand	Ptas. 8,881.80
In Banco Exterior de España:	
C/A 30-17672 A Domestic Ptas.	7,781.58
C/A 30-17329 F Convertible Ptas.	76,386.30
Total Ptas.	<u>93,049.68</u>
At official rate of 66 Ptas. per \$	\$ 1,409.84
C/A 30-31279 Q Banco Exterior	\$ 45,010.73
On hand in Bank, December 31	<u>\$ 46,420.57</u>
Balance in Budget Liquidation	\$ 45,861.91
Surplus in Treasury resulting from exchange rate	<u>\$ 558.66</u>
<i>Application of Treasury Balance as of December 31, 1971</i>	
In favor of Ghana	\$ 23.42
Pending from 1971 period	2,000.00
By decision of Dec. 2, 1971, Item 11, Agenda of Second Meeting of the Commission:	
Transfer to 1972 Period	14,000.00
Transfer to 1973 Period	16,000.00
From Working Capital Fund	14,397.15
	<u>\$ 46,420.57</u>

Madrid, January 31, 1972

Alejandro Oliver y Trujillo
Auditor

CHAPTER II

PROCEEDINGS OF THE SECOND REGULAR MEETING OF THE COMMISSION

Madrid, December 2-9, 1971

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Annex 3. — Reports of Panels
Annex 4. — Report of Working Group on International Inspection
Annex 5. — Report of Standing Committee on Finance and Administration
Annex 6. — Report of Standing Committee on Research and Statistics

Proceedings of First Plenary Session, December 2, 1971

Item 1: Opening

1. The Commission held its Second Regular Meeting at the Casa Sindical, Madrid, Spain, under the chairmanship of Mr. Marcitllach Guazo.

2. The Chairman welcomed the Delegates of member countries and Observers (see Annex 1 for List of Participants), and extended special greetings to Korea and Senegal, which have become members since the last Commission meeting. Particular thanks were expressed to FAO and to IATTC for their especially close cooperation. Mr. Valdez, the Chairman of the Standing Committee on Research and Statistics and all Convenors and participants in the scientific meetings were commended for the excellent work they had done during the previous two weeks.

Dr. Sprules was congratulated for his superior chairmanship of the Standing Committee on Finance and Administration. Favorable comment was made on the Secretariat's work and appreciation was expressed to it and to the management of Casa Sindical for their outstanding cooperation.

3. The FAO representative announced that Mr. R. I. Jackson had recently been appointed Deputy Director General of FAO and that Mr. F. E. Popper had succeeded to the position of Assistant Director General (Fisheries). The Chairman expressed satisfaction at these appointments and it was agreed that a congratulatory cable be sent to the above gentlemen.

Item 2: Adoption of Agenda and arrangements for the meeting

4. The Commission adopted the Agenda, attached as Annex 2. An earlier adjournment date was suggested and agreed upon in principle, with the understanding that the Proceedings of the last two sessions would be approved by mail.

Item 3: Admission of Observers

5. All Observers were admitted. (See Annex 1 for list.)

Item 4: Appointment of subsidiary bodies for the meetings

6. The Commission confirmed the Working Group on financial matters which was established at the First Regular Meeting of the Council. A Drafting Committee was appointed to review the Proceedings before these were presented at the Plenary Session and Mr. Bermejo (Spain), Mr. Lagarde (France) and Mr. Van Campen (U.S.A.) were assigned as its members. A Working Group was established to consider an International Inspection System. Brazil, France, Japan, Spain and the U.S.A. expressed a desire to serve as members of this Working Group and this was approved. Mr. Lagarde (France) was nominated Chairman.

7. The following Agenda Items were referred to the Standing Committee on Finance and Administration for its consideration: Items 5, 6, 7, 8, 9, 10, 11, 12 and 16.

It was also agreed that Items 13 and 14 might be referred to the above Committee after deliberation in the Plenary Session if any financial implications were involved.

*Item 17: Report of First Special Meeting of the Council
(Madrid, April 17-18, 1970)*

8. The Report (COMM/71/14) circulated in October 1970, was presented by the Executive Secretary and approved.

*Item 18: Report of First Regular Meeting of the Council
(Madrid, November 16-20, 1970)*

9. The Report (COMM/71/15) was presented by the Executive Secretary and approved.

Item 5: Review of Panel Members

10. Canada informed the Commission of its desire to become a member of Panel 1. Korea stated its wish to become a member of Panels 1 and 2. The above requests were unanimously approved.

Proceedings of Second Plenary Session, December 3, 1971

Item 5: Review of Panel Members (continued)

11. Brazil informed the Commission of its desire to withdraw from Panel 4 and this request was approved.

Item 19: Report of Standing Committee on Research and Statistics

12. Mr. Valdez, Chairman of the Standing Committee on Research and Statistics, submitted a report to the Commission (Annex 6) and gave a thorough explanation of its principal conclusions.

The Chairman and all participants in the Committee were congratulated for their excellent work and it was agreed that the report should be received. However, approval was postponed until it had been thoroughly studied.

Proceedings of Third Plenary Session, December 6, 1971 (morning)

Item 22: Relations with FAO

13. The Commission examined Document COMM/71/17, introduced by the Executive Secretary. It was noted that relations between FAO and the Commission had been established informally through an exchange of letters between the Director-General of FAO and the Chairman of the Commission, as recommended at the First Regular Meeting of the Council.

The FAO representative suggested that the formal relationship agreement provided for in the Convention might be negotiated and concluded. To achieve this, the Secretariat, in consultation with the Chairman, might prepare a draft of such an agreement in cooperation with FAO. This Agreement would be similar in content to the informal one now existing.

It was agreed that the Chairman of the Commission should draw up a draft of a formal agreement between FAO and ICCAT. FAO will collaborate in its preparation and the draft will be submitted to the Second Regular Meeting of the ICCAT Council (1972). The draft can then be submitted to FAO for approval prior to its June 1973 Council Meeting, subject to confirmation by the FAO Conference. Finally, the Agreement would be approved by the ICCAT Commission at its meeting scheduled for November 1973.

Item 23: Relations with other Organizations

14. The Commission reviewed Chapter 5 of the Administrative Report (COMM/71/10), and noted that relations between the Commission and other organizations are quite satisfactory. The Commission noted with pleasure that the Assistant Executive Secretary would attend the 1972 Annual Meeting of the Inter-American Tropical Tuna Commission as an Observer while he was in Asia carrying out his duties as they relate to statistics. The IATTC Meeting will be held in Tokyo, January 6-13, 1972.

Item 29: Other matters

15. A proposal was made by the Spanish delegate to establish a system whereby information on heavy metal contamination in tuna might be exchanged among member countries concerned. Following lengthy discussion it was agreed that the Secretariat should maintain contact with the World Health Organization and FAO Codex Alimentarius to obtain information for the benefit of the authorities of member countries on progress made in research on the subject.

Proceedings of Fourth Plenary Session, December 6, 1971 (afternoon)

Item 23: Relations with other organizations (continued)

16. The International Commission for Southeastern Atlantic Fisheries (ICSEAF) only recently came into being and, with regard to Articles III and XI of its Convention, some arrangement with ICCAT may be required in future to avoid duplication of effort.

Item 21: Reports of Panels

17. Reports of Panels 1, 2, 3 and 4 were submitted by their Chairmen or Rapporteurs, and all were approved. The reports are attached as Annex 3.

*Item 15: Measures for rendering effective the provisions of the Convention
(Joint Enforcement)*

18. The report of the Working Group on this subject was submitted by its Chairman, Mr. Lagarde. It was approved and is attached as Annex 4.

Item 13: Provisions for Conservation of Stocks

19. A proposal for conservation of yellowfin tuna stocks was made jointly by Brazil, France, Korea, Morocco, Portugal, South Africa and Spain.

20. Delegates of Canada, the United States of America and Japan questioned the procedure of presenting such proposals directly to the Commission rather than through the appropriate Panel. Article 8 of the Commission Convention was re-examined and the proposal was accepted. It was hoped, however, that this was a special case since the Report of the Standing Committee on Research and Statistics had not been available sufficiently in advance to permit detailed study prior to the Panel meetings. It was expected that in future such proposals would be presented through Panels.

21. The U.S. delegate proposed that a minimum size limit for bluefin tuna should also be considered at the time of the next Council meeting.

22. The Japanese delegate proposed that the Council should, at the same time, discuss other conservation measures in coordination with minimum size limit of fish. After lengthy discussion the joint proposal as amended was approved.

23. A delegation pointed out that the procedure for authorizing the Council to decide on the matter of conservation measures was acceptable only because almost all member countries participate in the Council at the present time, and expressed the hope that this would not establish a precedent.

24. The proposal thus modified and agreed upon is as follows:

The Commission:

«*Noting* further, that there is still an upward trend in the fishing effort on Stock Assessment, and endorsed by the Standing Committee on Research and Statistics with regard to the effects of the present level of fishing on the stocks of yellowfin in Atlantic,

«*Noting* further, that there is still an upward trend in the fishing effort on this species,

«*Realizing* that scientific investigations based on the data so far available have indicated that at the present level of fishing mortality the optimum

size at first capture of yellowfin can be calculated to be between 10 and 25 kg.

«*Taking into account* that in some countries in West Africa a size limit of 3.2 kg for yellowfin has been in force for several years in order to protect the smallest age-class,

«*Considering* the urgency for taking measures to protect small yellowfin on an interim basis,

«*Authorizes* the Council to recommend to the Contracting Parties that they prohibit landing of yellowfin weighing less than a minimum weight somewhere between 3.2 and 10 kg. However, in order to take into consideration the mixture of age-classes in stocks exploited, a certain tolerance will be acceptable upon initiative of the Contracting Parties, each of which will respectively stipulate, within reasonable limits, the catch percentage to be exempted from said prohibition, it being understood that such percentages shall be reported to the Commission,

«*Authorizes* the Council, if necessary, to take any other conservation measures, as also a decision on a minimum size limit for bluefin, somewhere between 3.2 and 10 kg.»

Item 20: Report of Standing Committee on Finance and Administration (STACFAD)

25. The Report (Annex 5) was presented by its Chairman, Dr. Sprules. It was reviewed with respect to Agenda Items 5 through 12, 14, 16, 27 and 28 of the Plenary Session and was adopted.

Item 5: Review of Panel Members (continued)

26. The STACFAD Report was reviewed. The Commission was satisfied that all changes in membership as proposed during the previous Plenary Session had been taken into account by STACFAD.

Item 6: Administrative Report

27. The Administrative Report (COMM/71/10) was reviewed and approved as recommended by STACFAD.

Item 7: Secretariat Staff Rules

28. The amended Staff Rules proposed by STACFAD were reviewed and approved.

Item 8: Auditor's Report (1970)

29. The Auditor's Report (COMM/71/12), and recommendations made by STACFAD were reviewed and approved. The Commission instructed the Secretariat to express appreciation to the Auditor for his excellent work.

Item 9: Financial Statement (1970-1971)

30. The Financial Report (COMM/71/13) and Inventory (Suppl. 1) were reviewed and approved along with the recommendations made by STACFAD.

The Commission took special note of furniture made available to the Commission by the Spanish Undersecretariat of the Merchant Marine and asked the Secretariat to convey its appreciation to the appropriate authorities.

Item 10: Review of Working Capital Fund

31. The STACFAD Report was reviewed and recommendations of the Committee on this matter were approved.

Item 11: Budget Estimate (1972-1973)

32. The Estimated Budget (COMM/71/8 and Suppl. 1) was reviewed together with modifications recommended by STACFAD (Section 10 and Appendix 4 to Annex 5, Committee Report).

The budget as modified by STACFAD was approved.

Item 12: Member Country Contributions (1972-1973)

33. In accordance with the total budget adopted under Item 11 and Atlantic tuna catch and canned product figures of member countries for 1969, a table showing the contribution required of each member country was presented to the Chairman of STACFAD (Appendix 6 to Annex 5). This table was reviewed and approved by the Commission.

Item 16: Type and priority of Commission publications

34. Documents COMM/71/2 and COMM/71/8 and recommendations by STACFAD with regard to Commission publications were reviewed and approved in their entirety.

Item 14: Facilitation of Research and Statistical Activities

35. In this respect the Commission approved recommendations by the Standing Committee on Research and Statistics and by the Standing Committee on Finance and Administration.

Proceedings of Fifth Plenary Session, December 7, 1971

Item 19: Report of Standing Committee on Research and Statistics (continued)

36. This Report (Annex 6) was thoroughly reviewed and approved by the Commission.

Item 27: Date and place of next meeting of the Council, and assignment of items for consideration by the Council

37. It was agreed that the next Council meeting should be held in Madrid for a period of approximately one week starting Wednesday, November 29, 1972. The list of items for assignment to the Council by the Commission as suggested by STACFAD (Appendix 5 to Annex 5) was reviewed and approved. Additionally, the Commission drew attention of the Council to special instructions of the former under Item 13. The Commission also authorized the Council to review certain alternative plans to be proposed for amending Article 12, paragraph 4 of the Rules of Procedure. These should be circulated by the Secretariat at least sixty days in advance of the Council meeting.

Item 28: Date and place of next meeting of the Commission

38. It was tentatively decided that the next meeting of the Commission would be held in Madrid for a period of approximately one week beginning on Wednesday, November 28, 1973.

Item 24: Election of Chairman of the Commission

39. Mr. Touya of France was unanimously elected Chairman of the Commission for the next biennium. In accepting the responsibility, Mr. Touya praised the work of his predecessor, Mr. Marcitllach, and emphasized the importance of the work of the Commission.

Item 25: Election of Vice Chairmen of the Commission

40. Brazil was unanimously elected First Vice-Chairman of the Commission.

41. Morocco was unanimously elected Second Vice-Chairman of the Commission.

Item 26: Election of Council Members

42. Canada, Ghana, Japan, Korea, Portugal, South Africa, Spain and the United States of America were elected members of the Council. The Chairman and Vice-Chairman of the Commission are also members of the Council.

Adjournment

43. In his closing remarks Mr. Marcitlach reviewed activities which culminated in signing the ICCAT Convention. He expressed his appreciation for the cooperation given him by the members and extended special thanks to FAO for its interest in and cooperation with the Commission.

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Annex 2

AGENDA

Procedures for Meeting

1. Opening of the Meeting.
2. Adoption of Agenda and arrangements for the Meeting.
3. Admission of Observers.
4. Appointment of subsidiary bodies for the Meeting.

Administration

5. Review of Panel members.
6. Administrative Report.
7. Secretariat Staff Rules.

Finances

8. Auditor's Report (1970).
9. Financial statement (1970-71).
10. Review of Working Capital Fund.
11. Budget estimate (1972-73).
12. Member country contributions (1972-73).

13. Provisions for conservation of stocks.
14. Facilitation of research and statistical activities.
15. Measures for rendering effective the Provisions of the Convention (Joint Enforcement).

Publications

16. Type and priority of Commission publications.

Reports to the Commission

17. Report of First Special Meeting of the Council (Madrid, April 17-18, 1970).
18. Report of First Regular Meeting of the Council (Madrid, November, 16-20, 1970).
19. Report of Standing Committee on Research and Statistics.
20. Report of Standing Committee on Finance and Administration.
21. Reports of Panels.

International Cooperation

22. Relations with FAO.
23. Relations with other organizations.

Appointments

24. Election of Chairman of the Commission.
25. Election of Vice-Chairmen of the Commission.
26. Election of Council members.
27. Date and place of next meeting of the Council and assignment of items for consideration by the Council.
28. Date and place of the next meeting of the Commission.

Other Matters

29. Other matters.

Adjournment

REPORTS OF MEETINGS OF PANELS

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- Report of Meeting of Panel 1
- Report of Meeting of Panel 2
- Report of Meeting of Panel 3
- Report of Meeting of Panel 4
- Appendix I. — Agenda for Panels 1, 2, 3 and 4

Report of Meeting of Panel 1, December 3, 1971, Madrid

1. *Opening*

The meeting was called to order by the Chairman, Mr. P. Roedel (USA).

2. *Adoption of Agenda*

The provisional agenda was adopted as circulated (Appendix 1 to Annex 3).

3. *Election of Rapporteur*

Dr. G. F. M. Smith (Canada) was elected Rapporteur.

4. *Panel Membership*

Panel 1 membership was noted by the Chairman as now being: Brazil, Canada, France, Ghana, Japan, Korea, Morocco, Portugal, Spain, U.S.A. Canada and Korea were welcomed as new members. All Panel member countries were represented except Ghana.

5. *Review of SCRS Report*

6. *Review of possible measures for stock conservation*

7. Need for research to be carried out

Items 5, 6 and 7 of the Agenda were treated together. The following views and recommendations were presented by the Delegations either as statements or in debate.

Canada

Interest was stated in the Report of the Committee on Research and Statistics, and concern was expressed regarding the present and future status of Atlantic yellowfin stock or stocks. The Sub-Committees on Statistics, Stock Identification, and Assessment have all indicated the need for better and more complete information in their respective fields. Recommendations have been put forward to fill these gaps and thus further the aims and objectives of this Commission. In essence five tasks in research and statistics have been outlined. Two of these are for improvement and wider coverage of statistics; one for sampling requirements, and two for fish species and stocks in particular.

It is suggested that a Working Group on Assessment meet in Abidjan in June, 1972. Canada wholeheartedly approves of these activities in support of Commission objectives and urges this Panel to support them before the Commission. It is only by such contributions that the status of the stocks can be evaluated and it can be ascertained whether or not there is a need for management procedures.

It should be especially noted that the Committee draws particular attention to the probable need in the near future for controlling the amount of fishing and size at first capture of yellowfin tuna.

Korea

The National Report of Korea is to be used as the statement to Panel 1.

Japan

Particular attention was drawn to Section 8 of the Report of the Standing Committee on Research and Statistics. It was noted that stock assessment at the current pace might be too late, in the rapidly developing yellowfin fishery, to reduce the fishing mortality of yellowfin by regulatory measures.

It was also noted that a variety of possible regulatory measures have been suggested in the SCRS Report. A suggestion was made that interested member countries subject such measures to critical examination as early as possible for the purpose of being prepared for regulatory measures. It was also suggested that a minimum size limit is one of the important regulatory measures.

France

France drew attention to the fact that the Ivory Coast already has a minimum size regulation but ICCAT has no regulation of any kind. France stressed that implementation of regulatory measures should not be delayed pending complete scientific proof or justification, but rather these should be instituted and then modified as experience and scientific information show to be desirable.

United States of America

The United States also expressed its concern that the proper steps be taken to prepare for conservation measures. It noted the statement by the Standing Committee on Research and Statistics that «implementation of any management scheme would require a statistical reporting system with much more up-to-date information on catches than is presently available».

It also drew attention to the possibilities noted by the Sub-Committee on Statistics for improving the reporting of catch statistics (Task 1) if one person were added to the Secretariat to compile data and to work with certain countries to solve data reporting problems.

The United States suggested that the Commission provide funds for 1972 for temporary employment of one biologist at the junior professional level to complete Task 1 statistics.

It also noted that the Secretariat will submit a report by June 1 on the feasibility of collecting Task 2 catch/effort statistics. Anticipating that work on Task 2 statistics will proceed, the United States suggested that the Commission provide funds in the biennial budget for continuation of the appointment in 1973 and authorize the Council at its 1972 meeting to convert this appointment to a permanent one, should it be advisable.

It suggested that the Secretariat and the Chairman of SCRS recommend a revised budget for the biennium so that part or all of the salary for this position be covered by funds presently allotted for statistics, computer work and tagging.

Morocco

Morocco drew attention to the fact that the African nations were not represented at this meeting, although regulatory measures would be of special interest to them. Economic development issues rank high with them. If, then, special development interests do not secure adequate attention from this Commission, they may have to protect themselves from the larger fishing nations by extension of their territorial seas.

France and Spain agreed with the view of Morocco that the Commission should take suitable action at an early date.

Brazil

Brazil stated that the extent of yellowfin fishing off the African coast was very important and it supports appropriate control measures on surface fishing off the African coast.

Japan

In reply to the U.S. statement supporting additional Secretariat staff to improve statistics, Japan stated that the main objective of the Panel was not an improvement of statistics but the recommendation of stock conservation measures. Japan doubted whether additional help would be needed for improving the work of the Secretariat as regards compilation of statistics.

United States of America

The U.S.A. agreed with Canada, France and Japan on the need to be ready for effective action through management schemes.

The U.S.A. further noted that a minimum size regulation would be largely ineffective or even wasteful if the schools of yellowfin contain large variations in size. Information is required on this point.

8. *Next Meeting*

After some discussion it was agreed that Panel 1 should meet at the time and place of the 1972 meeting of the ICCAT Council.

9. *Election of Chairman*

On motion from Brazil, Mr. Roedel (USA) was reelected for a further 2-year period.

10. *Other Matters*

11. *Adjournment*

The meeting was adjourned.

Report of Meeting of Panel 2, December 3, 1971, Madrid1. *Opening*

The meeting was called to order by the Executive Secretary since the Chairman (Morocco) was absent. Mr. Lagarde (France) was then elected as the provisional Chairman to convene the session.

2. *Adoption of Agenda*

The provisional agenda was adopted as circulated (Appendix 1 to Annex 3).

3. *Election of Rapporteur*

Dr. M. Miyake (Assistant Executive Secretary, ICCAT) was elected Rapporteur.

4. *Panel Membership*

Panel 2 membership was noted as now being: Canada, France, Japan, Korea, Morocco, Portugal, Spain and the United States of America. Morocco was absent.

5. *Review of SCRS Report.*6. *Review of possible measures for stock conservation.*7. *Need to conduct research*

Items 5, 6 and 7 of the Agenda were discussed. The Panel recognized the advice given it by the Standing Committee on Research and Statistics (SCRS) concerning the desirability of increasing the size at first capture in surface fisheries off New England and elsewhere. It also noted that a new Working Group had been formed on yellowfin and bluefin stock assessment and that this group would meet in Abidjan in June, 1972.

The hope was expressed that pertinent statistics could be improved and that the Working Group will be able to produce basic scientific information for regulatory action to be taken in order to meet SCRS recommendations.

8. *Next Meeting*

Recognizing the urgency of the problem and hoping that the Working Group will be successful when it meets in Abidjan, the Panel recommended to the

Commission that the next meeting of Panel 2 be held at the time of the Second Council Meeting, at the same place.

9. *Election of Chairman*

Morocco was reelected Chairman for the next biennial period.

10. *Other Matters.*

11. *Adjournment.*

Report of Meeting of Panel 3, December 3, 1971, Madrid

1. *Opening*

Panel 3 was called to order by the Chairman, Dr. T. Matsushita (Japan).

2. *Adoption of Agenda*

The proposed agenda was adopted (Appendix 1 to Annex 3).

3. *Election of Rapporteur*

Mr. N. L. Pease (U.S.A.) was elected Rapporteur.

4. *Panel Membership*

The existing Panel, composed of Brazil, Japan, South Africa and the United States was approved and no additions were proposed.

5. *Review of SCRS Report.*

6. *Review of possible measures for stock conservation.*

7. *Need to conduct research*

The Report of the Standing Committee on Research and Statistics was approved without comment. With regard to the need for research, the Japanese delegate suggested the Committee take careful consideration of the species in the area delineated for Panel 3. The United States concurred with the Japanese suggestion.

In his capacity as Chairman of the Standing Committee on Research and Statistics, Mr. Valdez stated that the more pressing problems with yellowfin and northern bluefin stocks precluded detailed work in the Panel 3 area. However, in subsequent meetings the Committee is prepared to delve more deeply into these problems. He also pointed out that some of the data available from other areas can be used by Panel 3 members.

8. *Next Meeting*

Japan recommended that the next Panel 3 meeting be held in conjunction with the next Commission meeting scheduled for 1973. This recommendation was approved.

9. *Election of Chairman*

The United States delegation nominated Japan for reelection as Chairman. South Africa seconded the motion and the nomination was approved.

10. *Other Matters.*

11. *Adjournment.*

Report of Meeting of Panel 4, December 3, 1971, Madrid

1. *Opening*

The meeting was called to order by the Chairman, Mr. H. P. Travassos (Brazil).

2. *Adoption of Agenda*

The provisional agenda was adopted as circulated (Appendix 1 to Annex 3).

3. *Election of Rapporteur*

Mr. V. Valdez (Portugal) was elected Rapporteur.

4. *Panel Membership*

Panel 4 membership was noted by the Chairman as now being: Brazil, Japan, Portugal, Spain and the United States of America. Brazil informed the Panel of its decision to withdraw therefrom as of January, 1972. This withdrawal was noted with regret. All Panel member countries were represented.

5. *Review of SCRS Report.*

6. *Review of possible measures for stock conservation.*

7. *Need for research to be carried out*

Items 5, 6 and 7 of the Agenda were treated together without clear distinction. It was pointed out and unanimously agreed, as already emphasized by the Sub-Committee on Stock Assessment in Section 3 of its Report (Appendix 3 to Annex 6), that data for Atlantic longline fisheries showed considerable declines in catch rates for blue and white marlins. The need for a detailed assessment was confirmed.

It also was brought to the attention of the Panel that there was a need for cooperative studies of blackfin tuna, even though it is one of the few under-exploited species.

8. *Date and place of next Panel meeting*

It was agreed that Panel 4 should meet at the time and place of the 1973 Commission Meeting.

9. *Election of Chairman*

On motion from Portugal, supported by the U.S.A. and Japan, Spain was unanimously elected Chairman of Panel 4 for next biennium.

10. *Other Matters.*

11. *Adjournment*

The meeting was adjourned.

Appendix 1 to Annex 3

Agenda for Panels 1, 2, 3 and 4

1. Opening
2. Adoption of Agenda
3. Election of Rapporteur
4. Review of Panel membership
5. Review of Report of Standing Committee on Research and Statistics
6. Review of possible measures for stock conservation.
7. Need for research to be carried out
8. Date and place of next Panel meeting
9. Election of Chairman
10. Other matters
11. Adjournment

Annex 4

REPORT OF THE WORKING GROUP ON INTERNATIONAL INSPECTION

1. The Working Group on International Inspection appointed at the First Plenary Session of the Second Meeting of the Commission met on December 4, 1971, under the chairmanship of Mr. Lagarde (France).

2. Representatives of Brazil, Spain, the U.S.A. and Japan attended as members of this Working Group; also present were representatives of Canada, Korea, Portugal and FAO.

3. Mr. Bermejo (Spain) was designated Rapporteur.

4. The Chairman alluded to the area for application of International Inspection and referred to Article IX, paragraph 3 of the Convention, which determines said area as the «Convention Area, except the territorial sea and other waters, if any, in which a State is entitled under international law to exercise jurisdiction over fisheries».

5. Immediately thereafter revision (as outlined in 6 to 10) was made of the text of the Scheme for International Control approved by ICNAF. (This was circulated as Document COMM/71/16.)

6. *Paragraphs 1, 2, 3, 7 and 9.* No comment.

7. *Paragraph 4.* The advisability was noted of reconsidering the wording and utilizing a terminology better suited to the type of control to be decided upon by the Commission.

8. *Paragraph 5.* The possibility was noted that a vessel might be excessively inspected and that provisions should be made to avoid such cases insofar as possible.

9. *Paragraphs 6 and 8.* The Japanese delegation submitted a proposal for amendment to each of these paragraphs. It was agreed to postpone final wording thereof.

10. *Paragraphs 10 to 13.* Considering that the wording of these paragraphs does not lend itself to such regulatory recommendations as it is foreseen that this Commission may make, it was decided to replace them in due course with other more appropriate ones.

11. The Working Group supports the general ICNAF scheme in principle, though it feels that some modifications should be made to the wording.

12. It was noted that inspection on the high seas may prove of little efficacy for the tuna fishery and that it might be more effective to carry out inspection at the place of landing or transshipment.

13. Reference was made to the difficulty of such port inspection since this would require an amendment to the Convention or signing of a new International Agreement in order to be able to carry out said inspection.

14. It was decided that the Working Group should meet again next year in conjunction with the Council to review proposals which might be made by the various delegations as a result of exchange of viewpoints during this meeting of the Working Group.

REPORT OF STANDING COMMITTEE ON FINANCE AND ADMINISTRATION (STACFAD)

Table of Contents

Report of the Standing Committee

Appendices :

1. Agenda
2. Table showing Panel Membership
3. Report of Working Party on Finance and Administration
4. Staff regulations (not contained in this Biennial Report)
5. Revised Budget for 1972-1973
6. List of items for assignment to the Council by the Commission
7. Table of contributions by member countries

1. *Introduction*

The Committee met in the Casa Sindical, Madrid, on December 2, 1971 and subsequent days under the chairmanship of Dr. W. Sprules.

A list of all participants, including observers, who attended the meetings is attached as Annex 1 to the Proceedings of the Commission Meetings.

After some discussion the Agenda, as outlined in Appendix 1 to Annex 5, was adopted.

The Secretariat was designated Rapporteur.

2. *Agenda Item 5: Report of Working Party on Finance and Administration.*

The Report of the above Working Party which was established at the First Regular Meeting of the Council and had met three days prior to the Committee, was submitted by its Rapporteur, the Executive Secretary, and is attached as Appendix 3 to Annex 5.

The Committee received and adopted the Report and expressed appreciation to the members of the Working Party for their valuable contribution.

3. *Agenda Item 4: Review of Panel Membership.*

Panel membership (COMM/71/9) was reviewed and the following changes noted:

- Canada joined Panel 1.
- Korea joined Panels 1 and 2.
- Brazil resigned from Panel 4.

A new summary table of current Panel membership is attached as Appendix 2 to Annex 5.

A review was made of Section 4 of the Report of the Working Party respecting procedures related to Panel membership. Recommendations of the Working Party with regard to possible amendment of the Rules of Procedure were accepted and recommended to the Commission for consideration.

4. *Item 6: Administrative Report.*

The Committee reviewed the Administrative Report (COMM/71/10) and recommended that it be approved by the Commission as submitted, with the understanding that the request contained therein to hire an additional staff member for the Secretariat should be considered when budget details were discussed under Agenda Item 11.

5. *Item 8: Auditor's Report (1970).*

The Auditor's Report (COMM/71/12) and section 8 of the Report of the Working Party were reviewed. The Auditor's Report was accepted and the Working Party recommended it to the Commission for adoption.

Appreciation was expressed to the Auditor for his very detailed and useful report.

It was agreed that if the format of the Auditor's Report is to continue as is, only the original Spanish version should be circulated in future, with a brief explanatory note in English and French. Should the form of the report be appreciably changed, a note explaining the new form will be prepared by the Secretariat and circulated in the above languages.

6. *Item 9: Financial Report (1970-1971)*

The Financial Report (COMM/71/13) and Inventory (COMM/71/13, Suppl. 1) were reviewed together with Section 9 of the Report of the Working Party. The Committee approved the above Reports and forwarded them together with its recommendation to the Commission.

7. *Item 10: Review of Working Capital Fund.*

Section 10 of the Report of the Working Party was reviewed. After some discussion a suggestion of the Working Party that the Working Capital Fund be maintained at a level of approximately 15 % of total annual budget was accepted in principle and it was recommended that the Commission approve this proposal. It was suggested that the goal of 15 % of the annual budget be achieved by adding the contribution of those countries which may become members of the Commission after the biennial budget is decided on, rather than making any special budgetary allocation at present.

8. *Item 13: Type of Commission publications and priorities.*

Section 16 of the Report of the Working Party, COMM/71/8, and Item 21 of COMM/71/2 were reviewed. The recommendations made by the Working Party were accepted and it was recommended that the Commission approve these. In addition, the Committee recommended that the Secretariat publish a volume including basic texts such as the Convention, Rules of Procedure, Financial Regulations and Agreement on Seat. The loose-leaf format for easy replacement of pages in event of changes in texts was suggested for such a publication.

9. *Item 7: Secretariat Staff Rules.*

A review was made of Section 7 of the Report of the Working Party and of the text of the Staff Rules amended by the Working Party. Minor revisions were made to Article 20. It was recommended that the Commission approve the Secretariat Staff Rules as attached.

10. *Item 11: Estimated Budget (1972-1973).*

The Estimated Budget appearing in COMM/71/8 and Suppl. 1 was reviewed together with Section 11 of the Report of the Working Party. The Committee also reviewed the Report of the Standing Committee on Research and Statistics (Annex 6) with respect to the following financial references regarding scientific work:

a) Possible financing of a special expert who may be invited to participate in the Working Group on yellowfin and bluefin stock assessment to be held in Abidjan in June, 1972.

It was agreed that the Secretariat would provide funds for the above from Chapter 2 (Travel) of the budget if this were required.

b) Recommendation to provide funds for joint tagging projects.

c) Recommendation to add one scientist to the Secretariat staff to work on improvement of statistics.

Items b) and c) were discussed jointly.

The U.S. delegates proposed that funds be provided during the 1972-1973 biennium for employing a biologist at the junior professional level (approximately P-1, UN salary scale) on a temporary basis to strengthen the statistical work in the Secretariat, with particular emphasis on improvement of data reporting procedures.

After some discussion the proposal was approved and certain funds originally included under «Miscellaneous Expenses» and «Coordination of Research» were reallocated to «Salaries, allowances, etc.». (See Appendix 4 to Annex 5.)

It was proposed and agreed that \$14,000 of the unexpended balance of the 1971 budget (estimated at approximately \$30,000 US) be allocated to the budget for 1972 and that the remaining \$16,000 be allocated to the 1973 budget in order to reduce sharp increase in country contributions for 1972 and 1973.

The new Budget proposed for 1972 and 1973 with the above modifications incorporated is attached as Appendix 4 to Annex 5. The Committee recommended to the Commission that the new Budget be adopted.

11. *Item 12: Contributions by countries (1972-1973)*

Data concerning Atlantic tuna catches and canning by member countries for the year 1969 (COMM/71/22) were presented by the Secretariat and reviewed by the Committee. The figures in this document were generally accepted. It was agreed that these figures would be used in calculating country contributions unless a country could provide more accurate statistics before calculation is made.

A table of contributions by member countries (Appendix 6 to Annex 5) was submitted at a later date. The Committee recommended that the Commission adopt this table.

12. *Item 14: Date and place of next meeting and assignment of items for consideration by the Council.*

It was decided that the next meeting of the Standing Committee on Finance and Administration should be held at the same time and place as the next Commission Meeting.

The Committee recommended to the Commission that the next Council Meeting should be held in Madrid for a period of approximately one week starting on Wednesday, November 29, 1972, and that the Standing Committee on Research and Statistics and other scientific Sub-Committees meet during the 10 days prior to the Council Meeting. The Committee recommended to the Commission that the next meeting of the Commission be held for a period of approximately one week beginning on Wednesday, November 28, 1973.

The items assigned to the Council by the Commission (Appendix 3 to Annex 6 of the Report of the First Meeting of the Commission, Dec. 1-6, 1969, Rome), were reviewed. It was agreed that with certain deletions and amendments this list of items could be used to outline assignments to the Council for its next meeting.

The Committee recommended that the items appearing in Appendix 6 of this Report be assigned to the Council. It was suggested that some revision of Item 10 might be required.

13. *Item 15: Other Matters.*

No other matters were suggested for discussion.

14. *Item 16: Election of Chairman.*

Dr. Sprules (Canada) was unanimously reelected Chairman for the next biennial period.

15. The Report was adopted.

16. The Chairman thanked all participants for their cooperation and expressed the appreciation of the Committee to the FAO representative for his valuable assistance.

17. *Item 17: Adjournment*

17. The meeting was adjourned.

Appendix 1 to Annex 5

**AGENDA FOR STANDING COMMITTEE ON FINANCE
AND ADMINISTRATION — DECEMBER 2-9, 1971**

1. Opening of the Meeting.
2. Adoption of the Agenda.
3. Election of Rapporteur.
4. Review of Panel membership.
5. Report of Working Party on Finance and Administration.
6. Administrative Report.
7. Secretariat Staff Rules.
8. Auditor's Report (1970).
9. Financial Report (1970-1971).
10. Review of Working Capital Fund.
11. Estimated Budget (1972-1973).
12. Contributions by countries (1972-1973).
13. Type of Commission publications and priorities.
14. Date and place of next meeting of the Council and of the Commission and assignment of items for consideration by the Council.
15. Others matters.
16. Election of Chairman.
17. Adjournment.

Appendix 2 to Annex 5

PANEL MEMBERSHIP (as of December 7, 1971)

<i>Countries</i>	<i>Panel 1</i>	<i>Panel 2</i>	<i>Panel 3</i>	<i>Panel 4</i>	<i>Total</i>
Brazil	×	—	×	—	2
Canada	×	×	—	—	2
France	×	×	—	—	2
Ghana	×	—	—	—	1
Japan	×	×	×	×	4
Korea	×	×	—	—	2
Morocco	×	×	—	—	2
Portugal	×	×	—	×	3
South Africa	—	—	×	—	1
Spain	×	×	—	×	3
United States of America	×	×	×	×	4
Total	10	8	4	4	26

<i>Panel</i>	<i>Member Countries</i>	<i>Chairman</i>
1	Brazil, Canada, France, Ghana, Japan, Korea, Morocco, Portugal, Spain, U. S. A.	U. S. A.
2	Canada, France, Japan, Korea, Morocco, Portugal, Spain, U. S. A.	Morocco
3	Brazil, Japan, South Africa, U. S. A.	Japan
4	Japan, Portugal, Spain, U. S. A.	Spain

Appendix 3 to Annex 5

REPORT OF WORKING PARTY ON FINANCE AND ADMINISTRATION

At its First Regular Meeting the Council decided that a small Working Party should meet prior to the regular meeting of the Commission in order to review problems of administration and finance in detail.

Dr. Sprules (Canada) was designated Chairman of the Party, of which Brazil, France, Japan, Morocco, Spain and a representative of FAO were also members.

This Working Party met in Madrid, at the Casa Sindical, on November 29, 30, and December 1, 1971.

1. *Opening of the Meeting.*

The meeting was presided over by the Chairman, Dr. Sprules (Canada) with representatives of Brazil, France, Japan and Spain in attendance.

Observers from Libya and Gabon also attended.

2. *Agenda.*

The Secretariat reported briefly on documents prepared for the sessions of the Commission and stated that a special Agenda for this Working Party had not been provided since it was understood that the Working Party would have to examine in some detail the items in the Agenda of the Standing Committee on Finance and Administration.

The Working Party decided to follow the Agenda of the Standing Committee on Finance and Administration.

3. *Election of Rapporteur.*

The Working Party decided that the Executive Secretary should serve as Rapporteur for the meeting.

7. *Draft Staff Regulations.*

The Executive Secretary reported that the text is based on United Nations Regulations and that all decisions taken at the First Regular Meeting of the Commission and First Special and First Regular Meetings of the Council had been taken into consideration.

It was decided to discuss the text of the Draft Regulations, article by article, and it was noted that the entire paper must be approved in the three official languages in order to avoid discrepancies due to translation.

The general content of the Draft Staff Regulations was accepted with minor modifications. However, consideration of Articles 1, 19, 20, 25 and 28 was postponed pending arrival of the FAO legal adviser.

The Working Party recommended that the Standing Committee on Finance and Administration approve the Draft Regulations submitted by the Secretariat with amendments introduced by the Working Party.

8. *Auditor's Report (COMM/71/12).*

The Working Party examined the Auditor's Report and found it to be excellent and highly detailed. It recommended that the Standing Committee on Finance and Administration approve same.

With respect to three suggestions made by the Auditor regarding amortization of office equipment (page 19 of the Report), the Working Party supported the third suggestion, namely «no amortization».

Since much of the Auditor's Report consists of tables and figures, the Working Party suggested that only the original Spanish version be circulated in future, with a brief explanatory note in the other official languages.

9. *Financial Report.*

The Executive Secretary presented the Financial Report (COMM/71/13) and Inventory (COMM/71/13, Suppl. 1).

The Working Party examined both documents in detail and checked the financial situation of the Commission as of October 31, 1971.

The Working Party agreed to recommend to the Standing Committee on Finance and Administration that it approve the Financial Report.

With regard to the new salary scheme of the United Nations, the Working Party agreed to recommend to the Standing Committee on Finance and Administration that this be applied retroactively to staff members of the Commission.

The inventory (COMM/71/13, Suppl. I) covering machines, furniture and equipment owned by the Commission was presented by the Secretariat. This paper was considered comprehensive and useful. The furniture made available to the Commission by the Spanish Undersecretariat of the Merchant Marine appears separately in the inventory. The Working Party suggested that appreciation be expressed to the Spanish Government.

10. *Review of Working Capital Fund.*

The Working Party noted the current status of the Working Capital Fund which, as indicated in the Financial Report, amounts to \$12,094.28.

It was considered that this Fund is very useful and that it should be maintained at a level approximating 15 % of the total annual budget.

6. *Administrative Report.*

The Working Party reviewed Document COMM/71/10 presented by the Executive Secretary.

Recognizing that brief summary reports have been included in the Newsletter when the Executive Secretary or Assistant Executive Secretary have attended international meetings in their official capacity, the Working Party confirmed that such brief reports should continue to be prepared and circulated to member countries.

Following certain observations it was recommended that the Standing Committee on Finance and Administration approve the Report as submitted.

11. *Estimated Budget 1972-1973.*

The Working Party examined the budget submitted by the Executive Secretary (COMM/71/8 and COMM/71/8 Suppl. 1) and found it acceptable in principle. It was proposed that Sub-Chapter 6—*Coordination of Research* be listed as a separate chapter.

The proposal to hire an additional clerk-stenographer was approved.

The Working Party recognized that the budget would have to be reexamined by the Standing Committee on Finance and Administration after receiving the Report of the Standing Committee on Research and Statistics which was expected to contain recommendations with financial implications.

12. *Contributions by countries 1972-1973.*

The Working Party recommended that a portion of the unexpended balance of the 1971 budget be transferred to the Working Capital Fund and that the remainder be reallocated to the 1972 and 1973 budgets in order to reduce the total amount and avoid a sharp increase in contributions by countries.

With regard to catch and canned product data to be used to estimate part of contributions by countries to the 1972 and 1973 budgets, and considering information submitted by the Assistant Executive Secretary, it was decided to use 1969 data compiled by the ICCAT Secretariat on the basis of information submitted by the representatives of national fisheries agencies and on FAO statistics.

4. *Review of Panel Membership.*

It was pointed out that the present Rules of Procedure (Art. 12, paragraph 4), do not provide an effective method whereby new member countries may be incorporated into Panels between Commission meetings.

The Working Party recommended to the Standing Committee on Finance and Administration that consideration be given to amending the above Article in the Rules of Procedure.

Since any proposal for amendment to these Rules requires 60 days advance notice, no action can be taken at present. It was suggested that the Secretariat study the matter and propose an amendment along such lines, submitting several alternatives at the next meeting of the Council. It was also suggested that an article should be provided whereby no member of a Panel may withdraw except at the time of a Regular Meeting of the Commission. This would avoid difficulties in connection with the budget.

16. Type and priority of Commission publications.

The Working Party stated its agreement with the proposal of the Secretariat regarding publications for the period 1972-1973. (COMM/71/2, Item 21, and COMM/71/8).

A number of problems relating to Commission publications were examined, such as:

- a) format and size;
- b) printing and quality of paper;
- c) number of copies for each language, and publication;
- d) distribution to official entities, libraries, laboratories, etc.;
- e) possibility of making them available to private concerns at cost price.

The Working Party assigned responsibility to the Secretariat for preparing a proposal on all of the above matters to be presented at the next meeting of the Council.

Further, the Working Party recommended that, as soon as possible, the Secretariat publish in a single volume the texts of the Convention, Rules of Procedure, Financial Regulations, and the Agreement on Seat.

Appendix 4 to Annex 5

REVISED BUDGET 1972-1973

	BUDGET (US \$)		
	1971	1972	1973
Contribution by member countries	100,000.00	130,000.00	135,000.00
Allocation of estimated unused balance from first fiscal period	30,000.00	14,000.00	16,000.00
TOTAL	130,000.00	144,000.00	151,000.00
<i>Chapter</i>			
1. Salaries, allowances, etc.	58,000.00	79,500.00	81,500.00
2. Travel	10,000.00	12,000.00	10,000.00
3. Expenses-meetings	15,000.00	16,000.00	17,000.00
4. Publications	5,000.00	11,000.00	15,000.00
5. Office equipment	1,500.00	2,000.00	2,000.00
6. General operating expenses ¹⁾	8,000.00	12,000.00	13,000.00
7. Miscellaneous expenses ²⁾	2,500.00	2,500.00	2,500.00
		135,000.00	141,000.00
8. Coordination of research ³⁾	*	9,000.00	10,000.00
* Special and Extraordinary Projects	30,000.00		
a) Tagging	10,000.00		
b) Statistics	10,000.00		
c) Computer programming	10,000.00		
<i>Notes:</i>		1972	1973
¹⁾ General Operating Expenses		\$ 12,000.00	\$ 13,000.00
Miscellaneous (char services, maintenance of office ma- chines, etc.)		400.00	1,400.00
Assurity Bond		2,000.00	2,000.00
Auditor		600.00	600.00
Office supplies		5,000.00	5,000.00
Communications		4,000.00	4,000.00
²⁾ Miscellaneous Expenses, Contingencies and unforeseen		2,500.00	2,500.00
³⁾ Coordination of Research		9,000.00	10,000.00
Supply of tags		2,000.00	2,000.00
Publicity for tag recoveries		1,000.00	1,000.00
Supplementary tagging materials		1,000.00	1,000.00
Rewards for tag recoveries		2,000.00	3,000.00
Computer services for statistical work		2,000.00	2,000.00
Work of Sub-Committees		1,000.00	1,000.00

**LIST OF ITEMS FOR ASSIGNMENT TO THE COUNCIL
BY THE COMMISSION**

1. Review the organization, staffing and operation of the Commission Secretariat.
2. Review the status of financial contributions by contracting parties.
3. Receive and review a suitably detailed report of the current state of Commission accounts.
4. Review the second half of the biennial budget, and authorize such reappportionment of amounts as may be appropriate and in accordance with Article X, paragraph 3, of the Convention.
5. Formulate proposals for the organization of the next Meeting of the Commission.
6. Review status of relationships with FAO, IATTC, ICES, and other international bodies, and make recommendations to the Commission.
7. Receive, review and report to the Commission the results of any meeting of the Standing Committee on Research and Statistics held prior to or in conjunction with a Council meeting, with particular reference to:
 - (i) matters relating to coordination of research, proposed scientific meetings and conservation;
 - (ii) status of statistical systems of the Commission, including submission to the Commission of an evaluation of such systems, together with any recommendations that may facilitate the organization of statistical systems.
8. Receive, review and report to the Commission the results of any meeting of other subsidiary bodies of the Commission.
9. Review plans for and status of publications of the Commission.
10. Review schemes of joint enforcement of regulatory measures developed by other Commissions and formulate appropriate recommendations for the Commission concerning the feasibility of such schemes for application by ICCAT.
- *11. Follow special instructions of the Commission under Item 13 of its Proceedings (December 1971, Madrid).
- *12. Review certain alternative plans to be proposed for amending Article 12, paragraph 4, of the Rules of Procedure which should be circulated by the Secretariat at least sixty days in advance of the Council Meeting.

* Not included when discussed by STACFAD. Added after the meeting by request of one delegate, so that the list can be used as a memorandum covering everything assigned to the Council.

Appendix 6 (I) to Annex 5

TABLE OF CONTRIBUTIONS BY MEMBER COUNTRIES FOR 1972

Total 1972 Budget	\$ 144,000.00
Unexpended balance of the 1971 allocated to 1972 Budget	14,000.00
Amount to be covered by contri- butions (total of column K)	130,000.00

Country	A No.	B %	C (thousand tons)	D	E	F %	G \$	H \$	I \$	J \$	K \$
Total	26	100.0	267.4	88.0	355.4	100.0	12,000	26,000	30,667	61,333	130,000
Brazil	2	7.89	4.1	0.1	4.2	1.18	1,000	2,000	2,420	724	6,144
Canada	2	7.89	5.9	1.4	7.3	2.05	1,000	2,000	2,420	1,257	6,677
France	2	7.89	47.7	30.0	77.7	21.86	1,000	2,000	2,420	13,407	18,827
Ghana	1	5.26	3.5	0	3.5	0.99	1,000	1,000	1,613	607	4,220
Japan	4	13.17	54.8	0	54.8	15.42	1,000	4,000	4,038	9,458	18,496
Korea	2	7.89	25.4	0	25.4	7.15	1,000	2,000	2,420	4,385	9,805
Morocco	2	7.89	15.1	2.2	17.3	4.87	1,000	2,000	2,420	2,987	8,407
Portugal	3	10.53	14.8	6.1	20.9	5.88	1,000	3,000	3,229	3,606	10,835
Senegal	0	2.63	1.0	0	1.0	0.28	1,000	0	807	172	1,979
South Africa	1	5.26	1.0	0	1.0	0.28	1,000	1,000	1,613	172	3,785
Spain	3	10.53	61.3	21.5	82.8	23.30	1,000	3,000	3,229	14,291	21,520
U. S. A.	4	13.17	32.8	26.7	59.5	16.74	1,000	4,000	4,038	10,267	19,305

A = Panel membership.

B = Percentage of payments for annual membership and Panel membership (G + H).

C = 1969 catch (live weight).

D = 1969 canned production (net product weight).

E = Total of C and D.

F = Percentage distribution of E.

G = Payment of \$1,000 annual membership contribution.

H = Payment of \$1,000 for each Panel membership.

I = 1/3 of \$92,000 (\$130,000 - 38,000); distributed percentagewise according to column B.

J = 2/3 of \$92,000 (\$130,000 - 38,000); distributed percentagewise according to column F.

K = Total of G, H, I and J.

Appendix 6(2) to Annex 5

TABLE OF CONTRIBUTIONS BY MEMBER COUNTRIES FOR 1973

Total 1973 Budget	\$ 151,000.00
Unexpended balance of the 1971 allocated to 1973 Budget	16,000.00
Amount to be covered by contri- butions (total of column K)	135,000.00

Country	A No.	B %	C (thousand tons)	D	E	F %	G \$	H \$	I \$	J \$	K \$
Total	26	100.0	267.4	88.0	355.4	100.0	12,000	26,000	32,333	64,667	135,000
Brazil	2	7.89	4.1	0.1	4.2	1.18	1,000	2,000	2,551	763	6,314
Canada	2	7.89	5.9	1.4	7.3	2.05	1,000	2,000	2,551	1,326	6,877
France	2	7.89	47.7	30.0	77.7	21.86	1,000	2,000	2,551	14,136	19,687
Ghana	1	5.26	3.5	0	3.5	0.99	1,000	1,000	1,701	640	4,341
Japan	4	13.17	54.8	0	54.8	15.42	1,000	4,000	4,258	9,972	19,230
Korea	2	7.89	25.4	0	25.4	7.15	1,000	2,000	2,551	4,624	10,175
Morocco	2	7.89	15.1	2.2	17.3	4.87	1,000	2,000	2,551	3,149	8,700
Portugal	3	10.53	14.8	6.1	20.9	5.88	1,000	3,000	3,405	3,802	11,207
Senegal	0	2.63	1.0	0	1.0	0.28	1,000	0	850	181	2,031
South Africa	1	5.26	1.0	0	1.0	0.28	1,000	1,000	1,701	181	3,882
Spain	3	10.53	61.3	21.5	82.8	23.30	1,000	3,000	3,405	15,068	22,473
U. S. A.	4	13.17	32.8	26.7	59.5	16.74	1,000	4,000	4,258	10,825	20,083

- A = Panel membership.
- B = Percentage of payments for annual membership and Panel membership (G + H).
- C = 1969 catch (live weight).
- D = 1969 canned production (net product weight).
- E = Total of C and D.
- F = Percentage distribution of E.
- G = Payment of \$ 1,000 annual membership contribution.
- H = Payment of \$ 1,000 for each Panel membership.
- I = 1/3 of \$ 97,000 (\$ 135,000 — 38,000); distributed percentagewise according to column B.
- J = 2/3 of \$ 97,000 (\$ 135,000 — 38,000); distributed percentagewise according to column F.
- K = Total of G, H, I and J.

**REPORT OF STANDING COMMITTEE
ON RESEARCH AND STATISTICS (SCRS) Madrid, 1971**

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TEXT	Report of the Standing Committee on Research and Statistics
APPENDIX 1	Agenda of the Standing Committee on Research and Statistics
APPENDIX 2	List of Documents presented
APPENDIX 3	Report of Sub-Committee on Stock Assessment
APPENDIX 4	Report of Sub-Committee on Stock Identification
APPENDIX 5	Report of Sub-Committee on Statistics

1. Introduction

The Committee met in the Casa Sindical, Madrid, on November 26, 1971 and subsequent days under the chairmanship of Mr. V. Valdez. Delegates from Brazil, Canada, France, Japan, Korea, Portugal, Spain and U.S.A., representatives from FAO, and observers from Libya, Gabon, IATTC, ICES and IPFC were present (see Annex 1). After some discussion the Agenda, as given in Appendix 1 to this Report, was adopted.

The Chairman nominated Drs. B. J. Rothschild and J. Gulland to be his Rapporteurs for items 1, 2, 3, 4, 5, 6, 7, 8, 14 and 15 and Mr. C. Champagnat and Dr. D. Sahrhage to be his Rapporteurs for the remaining items.

A list of documents submitted is attached as Appendix 2 to this Report.

2. Review of National Fisheries

The several countries reported on their research activities during the year. Most of these reports are in the form of documents which will appear later in this volume. A synopsis of the reported activities of each country follows.

U.S.A. (SCRS/71/17). The U.S. catch of bluefin by the east coast purse seine fishery increased from 1,226 metric tons in 1969 to 3,288 metric tons (provisional) in 1970. In the New England purse seine fishery the catch of bluefin per boat day by U.S. vessels for 1968, 1969 and 1970 was 7.2, 16.5 and 15.1 tons per boat day, respectively.

The yellowfin catch by U.S. vessels in the eastern tropical Atlantic declined from 17,394 tons in 1969 to 11,638 (provisional) metric tons in 1970. The apparent abundance of yellowfin tuna in the tropical Atlantic, as indicated by catch per effort by U.S. purse seine boats, declined each year since 1968. Age composition and length frequency distribution continued to be sampled during the year.

Tagging experiments on bluefin tuna and billfishes have been conducted in the northwest Atlantic. Also included was work on yellowfin tuna growth, length weight relation of several species of tunas, yield-per-recruit of yellowfin and size composition of catches of yellowfin tuna. An atlas of tuna and billfish distribution in the Atlantic was prepared. Historical trends in surface temperatures and other oceanographic features in the eastern tropical Atlantic are being studied. Various studies on the biology of albacore, the food habits of several tuna species, and the rearing of young tuna were completed.

Canada (SCRS/71/21). The status of swordfish and tuna fisheries was described. Canadian catches of swordfish in 1970 amounted to 4,812 metric tons, an increase of 11 percent over 1969. Termination of the swordfish fishery because of mercury contamination was reported. The total catch of tuna was about 2,400 metric tons, of which 1,600 tons were bluefin, 200 tons yellowfin and 600 tons skipjack. Research was also described. For swordfish this included collection of biometric data, completion of tag returns, the study of contamination and food habits. For tuna, bluefin size sampling and tagging programs were continued. Larval fish studies were also conducted.

Spain (SCRS/71/23). Albacore catches, which have been decreasing in past years, increased in 1971. Bluefin tuna catch declined slightly. The decline in bluefin tuna catches was greater in the Mediterranean. In the Canary Islands, catches of yellowfin tuna, bigeye and wahoo increased, but those for other species decreased. Fishing methods, vessel types, the most important species, and catch trend in recent years were described. Research on various aspects of tuna biology and tagging was also described.

Portugal (SCRS/71/19 and SCRS/71/51). Fisheries off the coasts of Continental Portugal and the Islands of Madeira and Azores were discussed in terms of the nature of the fisheries and the catches. Continental catches have revealed a progressive decline as well as elsewhere, but in other areas it is difficult to make conclusions on trends in exploitation status. Details on catches may be found in the documents.

Korea (SCRS/71/54). The report was received after the SCRS meeting. The status of the Korean tuna fishery in the Atlantic was described in terms of landings and number of fishing vessels. In 1970, the Korean longline fleet made its biggest catch (total 34,865 metric tons). Such an increase in catch should be attributed mostly to the larger number of boats operating in the Atlantic (57 boats in 1969, 105 boats in 1970). It was noted that a fish measurement program was expected to start.

Morocco. With the exception of trap fisheries along northern coasts, Moroccan tuna fisheries have been conducted only from time to time by small coastal sardine seiners. They are generally aided by baitboats.

A few experimental fisheries cruises were made in the past, but the very slight possibility of developing tuna fisheries in the Ibero-Moroccan Bay was demonstrated.

Brazil (SCRS/71/52). In recent years catches of tuna and tuna-like fishes have been around 4,500 tons per year. Studies on the biology and stock identification of blackfin tuna have been undertaken since 1964. Studies of age, growth and biometric variables have been proposed. Tagging and fishery technology studies are being initiated.

France (SCRS/71/49). The status of French tuna fisheries was described in terms of the magnitude of landings and the number and type of vessels. French tuna catches amounted to 37,600 metric tons in 1970. The yellowfin tuna catch (20,500 metric tons in 1970) has been declining since 1968 and that of albacore (5,500 metric tons in 1970) since 1967. Statistics of catch and effort data per month and 1° square area for albacore, yellowfin, skipjack and bigeye tunas were collected as well as length frequency data for these species.

Population dynamics studies were conducted on albacore and yellowfin, and growth curves have been calculated. For these species, a first approach was made in the estimation of mortality coefficients. Tagging programs have been continued on albacore and initiated for yellowfin and skipjack. In addition to tagging, studies on serology, parasitology, gonad maturation and distribution of larvae have been undertaken in view of stock identification.

Japan (SCRS/71/18). Work on compilation of catch statistics, environmental surveys, biological surveys and stock assessment was described. In addition, the decline in catch and effort for longline fishery was described. The longline effort has moved toward higher latitudes since 1968. The increase in longline effort in 1970 and 1971 was mostly oriented toward bigeye tuna. In the Gulf of Guinea 6 live-bait boats and 10 purse seiners fished for yellowfin and skipjack tuna during 1971.

South Africa (SCRS/71/24). The tuna fisheries of South Africa were reviewed reflecting total catches of less than 1,000 tons. Tagging cruises were undertaken.

Libya. Catches of bluefin were about 4,000 tons in 1964, but declined in recent years owing to the diversion of labor to the petroleum industry.

Gabon. No tuna fishery as yet.

3. Review of Recommendations Made at Last SCRS Meeting

Progress made in following the recommendations of 1970 Standing Committee on Research and Statistics.

(A) *Recommendations of the Sub-Committee on Stock Assessment*

General

«(1) Finding itself hampered by a lack of timeliness in the data at its disposal, the Sub-Committee was unable to investigate the state of stocks later than those of 1968 in detail and recommends that the Commission ensure that up-to-date and reliable statistical information is available in sufficient detail for use by all those concerned in stock assessment, and that the Standing Committee on Research and Statistics examine in detail the steps required to achieve this, e. g., through establishment of a data bank.»

Improvement is still required to provide timely data to the stock assessment groups. The Sub-Committee on Statistics recommended that timetables and assignment of responsibility be made for 1971 (See SCRS/71/6).

«(2) The Sub-Committee recommends that the Commission ensure that an historical study of Atlantic tuna statistics be undertaken in a more detailed manner than has been possible at the present meeting and that an agreed historical tabulation of such catch and effort statistics be prepared for future use.»

The Secretariat prepared and published the Statistical Bulletin (SCRS/71/13), which includes Task 1 historical statistics for most countries and Task 2 historical statistics for some countries.

Catch and effort statistics

«(3) Catch data for all tuna fisheries should be reported in such a way that time/location data are not lost and should be tabulated by 1° or, for longline, 5° squares; guidelines of the norms established by the FAO Panel for the Facilitation of Tuna Research should be followed in respect of all statistics reporting.»

Data complying satisfactorily with this recommendation were submitted by Canada, France, Japan and the U.S.A. (See SCRS/71/15).

«(4) Special attention should be directed towards eliminating double reporting of data by adherence to the principle that all landings are reported according to the country whose flag vessels make the catches.»

The Secretariat has solved many double reporting problems this past year, particularly with respect to data from West Africa.

«(5) Special attention should be directed towards obtaining spatial information currently and historically in Korean and Taiwanese longline fisheries.»

This recommendation was stated in view of the importance of these two fisheries. Total catches in fulfillment of Task 1 have been submitted and progress on Task 2 requirements was reported.

«(6) Special attention should be directed towards the specific composition of catches by some countries not reporting this information in a satisfactory manner.»

Progress was made in identifying the species composition of tropical tuna catches for some countries (See SCRS/71/13).

«(7) Special attention should be directed towards a recommendation of the allocation of reported albacore catches to the north and south hemispheres in longline fisheries.»

Information on the location of catch by 5° area is available from Japan, and is now in the process of being tabulated.

«(8) Conversion from dressed to live weights should be examined and reported for all fisheries. All data reported as live weights should give an indication of method of conversion. The Secretariat should arrange for the compilation and circulation of a report tabulating the conversion factors used.»

There are still serious problems. Conversion factors are available for only some species in some fisheries. The calculation of conversion factors is in progress in several national offices.

Catch sampling

«(9) General attention should be given in all tuna fisheries to collecting and reporting data both in terms of total numbers of fish and catch per unit effort, per each size-class of fish, according to an agreed distribution of size classes. Data should also be reported according to the recommendations of the Expert Panel for the Facilitation of Tuna Research.»

Several countries reported their statistical data in this manner or in such a form that the necessary calculations could be made.

«(10) Special attention should be directed by the Commission to obtained length frequency data from the Spanish and Azorean albacore fisheries, both currently and historically.»

No progress was reported.

«(11) Length frequency data should be sought from non-Japanese longline fisheries, to enable complete coverage to be maintained of all Atlantic longline fisheries.»

Canada submitted data for the swordfish fishery (SCRS/71/16).

«(12) Special attention should be given to obtaining catch sampling data for all bluefin fisheries, but especially to purse seine fisheries and for other small-fish fisheries in the Eastern Atlantic.»

Data on the New England fishery were submitted (SCRS/71/30). Additional data have been published by the ICES Working Party on bluefin for the eastern Atlantic.

«(13) A critical review and collection of new data, as appropriate, is required to solve the apparent paradoxes in the length/weight relationship, especially that for yellowfin.»

The work on length/weight relationship is essentially completed (CON/70/20 and SCRS/71/20).

«(14) A critical examination is required for all data on stock structure in Atlantic yellowfin, and special efforts are required to direct research along these lines; such research to utilize all relevant techniques, including tagging, biochemical methods, meristics, and parasite studies.»

The Sub-Committee on Stock Identification recommended tagging and other studies on yellowfin (SCRS/71/4 a), in April and some of the programs were carried out during the year (SCRS/71/4 b; SCRS/71/50).

«(15) It is necessary to reexamine the data on growth rates of yellowfin tuna in order to resolve the paradoxes found between scale-reading and modal progression methods.»

Problem solved by using observed length at age data rather than von Bertalanffy growth equation in the yield-per-recruit calculations. The results of growth studies are reported in SCRS/71/29 and SCRS/71/43.

«(16) A special effort should be made to resolve differences in interpretation of growth rates in early years of the albacore, especially with regard to settling the question of spawning dates.»

Studies on the interpretation of growth rates in early years of the albacore were reported, along with preliminary information on time of spawning (SCRS/71/34). There remain some questions with respect to spawning dates.

«(17) The Commission should initiate a study of billfish population dynamics, first, by encouraging a review of data on hand and its preliminary analysis prior to a subsequent meeting of the Sub-Committee on Stock Assessment, and secondly, by encouraging the pursuit of studies thus indicated to be relevant. Emphasis should probably just be placed upon swordfish and blue marlins.»

No progress reported.

«(18) More sophisticated yield-per-recruit models should be encouraged for yellowfin tuna using the data already on hand and those which will soon become available, and these models should include all forms of fishing gear.»

Substantial progress was reported in documents SCRS/71/18 and SCRS/71/27.

«(19) Data should be assembled for preliminary yield-per-recruit models for all bluefin fisheries, using various assumptions concerning relationships of the various fished stocks.»

Some progress was reported (SCRS/71/22).

(B) *Recommendations of the Council*

Regarding the Report of the Standing Committee on Research and Statistics (refer to COMM/71/15, Second Plenary Session, items 11 and 12).

- (8-10) The Sub-Committee on Stock Identification met in Lisbon in April to lay out tagging programs for several species, and some of these programs were initiated in 1971 (SCRS/71/4 (a) (b)).
- (11) The Statistical Bulletin was published. The Assistant Executive Secretary made trips to West Africa, North America, and Spanish ports to arrange for the submission of statistical information.
- (12) The Field Manual for statistics and sampling was produced in draft form (SCRS/71/12).
- (13) ICCAT was approved as a member of CWP and the Assistant Executive Secretary, the Convenor of the Sub-Committee on Statistics, and a representative of Portugal attended the CWP meeting in November 1971 (SCRS/71/10).
- (14) The Secretariat successfully assembled and tested computer programs for population analysis at Madrid without the requirement of additional personnel. A manual for using these programs was produced (SCRS/71/14).

In many fields considerable progress has been made, and the Committee commended the Secretariat on this progress. However, much remains to be done, and the Committee re-emphasizes the need to complete this work. Several of the more general recommendations in the above table were discussed under other items of the Committee's agenda, and are the subject of specific recommendations of the present meeting. In addition, the Committee drew attention to the fact that little progress has been made in certain items which are important to the work of the

Commission —specifically items (8), (10), (12) and (17) of the 1970 Sub-Committee on Stock Assessment Report— and *recommends* that the countries concerned take appropriate action to implement the terms of those previous recommendations.

4. Report of the Sub-Committee on Stock Identification

The Report of this Sub-Committee (Appendix 4) was presented by the Convenor (Dr. A. C. Jones). The Committee congratulated this Sub-Committee and its Convenor on its work, which included a special mid-term meeting. The Report of the Sub-Committee was adopted by the Committee. The recommendations of the Sub-Committee were endorsed, specifically that ICCAT supply 500 tags and an adequate number of needles to the Spanish Institute of Oceanography. Also, it was noted that tags and equipment were provided to South Africa and Brazil.

As regards the recommendation in Section VII of the Sub-Committee's report, which proposed the inclusion in the Commission's budget of funds for continuing support to national tagging programs, the Committee agreed that it would be desirable for the Commission to provide such funds on a more continuing basis, if possible at about the same level as approved for 1971 by the Council.

5. Report of the Sub-Committee on Stock Assessment

The report of this Sub-Committee (Appendix 3) was presented by the Convenor (Dr. J. C. Le Guen). In adopting this Report the Committee emphasized the importance of the studies of this Sub-Committee to the objectives of the Commission. It congratulated the Sub-Committee and its Convenor on the progress that had been achieved. The Committee endorsed the recommendation concerning the Working Party on yellowfin stock assessment, and *recommends* that this meeting should take place in Abidjan in June 1972. Dr. J. Le Guen was invited to be the Convenor, with C. Champagnat, A. Fonteneau, J. Gulland, S. Hayasi, J. Joseph, W. Lenarz, and B. Rothschild as members. The Committee noted the proposal by the Sub-Committee that the Commission might pay the expenses of an internationally recognized expert in the field of population dynamics to attend this meeting. It hoped that it would in fact be possible for the attendance of these experts to be paid for by their countries or organizations, and suggests that the Commission should address these countries or organizations to request that they facilitate their attendance. The Commission might, however, budget for paying, if necessary, for the attendance of not more than one expert.

The Committee also discussed the proposed working groups on bluefin tuna. It *recommends* that the proposal for a group to examine the most effective practical measures required to protect small fish should be drawn to the attention of the Commission and of Panel 2 for appropriate action.

6. Report of Sub-Committee on Statistics

The Convenor of the Sub-Committee on Statistics (Dr. Hayasi) presented the Sub-Committee Report (Appendix 5), which noted the considerable progress that had been made in compiling the basic information essential for the Commission to carry out its task. The Secretariat stated that the following countries had reported statistics in accordance with Task 1 (total catch by species) and Task 2 (detailed catch and effort data), respectively:

<i>Task 1</i>		<i>Task 2</i>
Argentina	Morocco	Canada
Canada	South Africa	France
France	Taiwan	Japan
Japan	U.S.A.	U.S.A.
Korea		

The Committee congratulated these countries and the Secretariat on these achievements, and hoped that those countries that had not as yet been able to supply the necessary information would do so in the near future.

In adopting the Report, the Committee thanked the Sub-Committee and its Convenor for its excellent work, and endorsed the recommendations made in this Report. It noted the suggestion that the Secretariat should be strengthened by one person to assist in compiling Task 1 statistics, and agreed to this proposal for consideration by the Commission.

7. Future Activities

The Standing Committee considered its future tasks. These are outlined in Table 1 and include the following activities which are urgently required:

- I Task 1 Statistics
- II Task 2 Statistics
- III Length sampling
- IV Yellowfin
- V Bluefin

TABLE I

	<i>Activity I Task 1 Statistics</i>	<i>Activity II Task 2 Statistics</i>	<i>Activity III Length Sampling</i>
IDENTIFICATION OF MAJOR PROBLEM(S)	Bring Task 1 statistics up to date and ensure that they are timely and accurate.	Develop plan for implementing Task 2 statistical development.	1. Lack of length sampling in certain fisheries (e. g. bluefin in central eastern Atlantic, albacore in longline). 2. Reporting system for summarized data (catch by age).
WHAT TASKS NEED TO BE UNDERTAKEN NEXT YEAR	1. Make Task 1 statistics accurate and timely.	1. Establish first year goals. 2. Identification of constraints against completion. 3. Alternative methods to eliminate constraints. 4. Costs of alternative methods.	1. Assure summarized size data (catch by age) for all main yellowfin fisheries, as laid out in Report of Sub-Committee on Statistics. 2. Encourage summary size data for all species and detailed size data for all species.
SPECIAL NEEDS	Special effort on part of Secretariat to obtain statistics from «problem countries».	Secretariat to develop and implement plan.	Special attention on Item 1, above.
WHAT SHOULD SECRETARIAT DO	Bring Task 1 up to date.	Produce background document on first year task.	1. Inform national offices and scientists of the requirements. 2. Prepare documents.
INTERIM TIME CHECKS TO SECRETARIAT AND CHAIRMAN OF SCRS	Quarterly Progress Report by Secretariat to Chairman of SCRS and interested parties for their evaluation.	Secretariat will submit background document to Chairman of SCRS and interested parties by April 15, 1972, and revised document by June 1, 1972.	Quarterly Report by Secretariat to Chairman of SCRS and interested parties for their evaluation.

<i>Activity IV Yellowfin Tuna</i>	<i>Activity V Bluefin Tuna</i>
Dynamics of yellowfin tuna on an Atlantic-wide basis.	Dynamics of bluefin tuna on an Atlantic-wide basis. Essentially same as IV but also need encouragement and plans for major tagging effort and improvement of collection of statistics in Bay of Biscay.
<p>1. Develop briefing document with catch and effort statistics, and estimates of population parameters and age distribution.</p> <p>2. Develop background document in two parts. A: Rationale of dynamics and regulation with special reference to Atlantic yellowfin tuna for benefit of administrators. B: Technical paper on assessment techniques that can be used for yellowfin problem (e. g., covering surface-longline dynamics, etc.).</p> <p>3. Small group should meet to provide assessment of yellowfin in terms of «optimal» catch and effort for the Atlantic Ocean.</p>	<p>1. Develop briefing document with catch and effort statistics, and estimates of population parameters and age distribution.</p> <p>2. Develop background document in two parts. A: Rationale of dynamics and regulation with special reference to bluefin tuna for benefit of administrators. B: Technical paper on assessment techniques that can be used for bluefin problem (e. g., covering surface-longline dynamics, etc.).</p> <p>3. Small group should meet to provide assessment of bluefin in terms of «optimal» catch and effort for the Atlantic Ocean.</p> <p>4. Small group should meet to design and implement tagging program in Bay of Biscay.</p>
<p>1. Need to have statistics updated.</p> <p>2. Need to produce briefing document.</p> <p>3. Need to have one or two experts compile background document.</p>	<p>1. Need to have statistics updated.</p> <p>2. Need to produce briefing document.</p> <p>3. Need to have one or two experts compile background document.</p> <p>4. Need to start special tagging effort and improve statistics in Bay of Biscay.</p>
<p>1. Medium for assembly of statistics.</p> <p>2. Facilitate documentation and meetings.</p>	<p>1. Medium for assembly of statistics.</p> <p>2. Facilitate documentation and meetings.</p>
<p>1. Le Guen has overall responsibility for assuring that reports are timely and adequate.</p> <p>2. Fonteneau has responsibility for submitting first draft of briefing document to all members of group on assessment of yellowfin and Chairman of SCRS by April 15, 1972. Blank spaces will be left for 1971 statistics, if not available in time. Final document following suggestions will be submitted to same parties by June 1, 1972, by Fonteneau.</p> <p>3. Lenarz has responsibility for submitting first draft of briefing document to all members of group on assessment of yellowfin and Chairman of SCRS by March 15, 1972. Revised version will be submitted to same parties by June 1, 1972.</p> <p>4. Group on assessment of yellowfin will meet in Abidjan during June, 1972, and will submit report of meeting to Chairman of SCRS by July 15, 1972.</p>	<p>1. Le Guen has overall responsibility for assuring that reports are timely and adequate.</p> <p>2. Lenarz has responsibility for submitting first draft of briefing document to all members of group on assessment of bluefin and Chairman of SCRS by June 1, 1972.</p> <p>3. Background document will be essentially same as that for yellowfin with a supplement on special problems of bluefin. Document will be submitted by Lenarz to all members of group and Chairman of SCRS by June 1, 1972.</p> <p>4. Group on assessment of bluefin is same as that for yellowfin; will meet at same time and place and will submit report of meeting to Chairman of SCRS by July 15, 1972.</p>

Note :

* Outline of briefing document for activity IV.

- I. Introduction.
- II. Summary of available statistics (Task II and length frequency).
 - A. Responsibility.
 1. Fleets of France, Senegal, and Ivory Coast : Fonteneau.
 2. Longline fleets : Hayasi with some assistance from Secretariat and possibly Joseph for fleets of Korca and Taiwan.
 3. Surface fleets of Japan : Hayasi.
 4. Surface fleets of Canada and the U.S.A. : Lenarz.
 5. Other surface fleets : Champagnat.
 - B. Form : As outlined on pages 8-10 of the Report of the Sub-Committee on Statistics (SCRS/71/6).
 - C. Priority : Years 1971, 1970, 1969, and others if possible.
- III. Summary of available Task I statistics : Responsibility : Secretariat.
- IV. Summary of literature on population parameters of yellowfin. Responsibility : Fonteneau.
- V. Preliminary work on standardization of effort. Responsibility : Fonteneau and Lenarz.
 - A. Objective is to convert effort by all types of gear to effort by a standard gear.
 - B. Methods :
 1. Ratio method used by IATTC.
 2. Maximum likelihood method described by Robson.
- VI. Stock structure of yellowfin.
 - A. Stock structure by eastern and western regions. Responsibility : Hayasi.
 - B. Stock structure by north and south regions off the west coast of Africa. Responsibility : Le Guen.
- VII. Variability of length composition of yellowfin and skipjack within and among samples taken from single sets of pure and mixed schools of those species. Responsibility : Le Guen and Hayasi.

** Members of Group on yellowfin and bluefin assessment :

Champagnat.
Fonteneau.
Gulland.
Hayasi.
Joseph.
Le Guen (Chairman).
Lenarz.
Rothschild.

*** Outline of briefing document for activity V.

- I. Introduction.
- II. Summary of available statistics (Task II and length frequency).
 - A. Responsibility : Lenarz.
 - B. Form : As outlined on pages 8-10 of the Report of the Sub-Committee on Statistics (SCRS/71/6).
 - C. Priority years : 1971, 1970, 1969 ; others if possible.
- III. Summary of available Task I statistics. Responsibility : Secretariat.
- IV. Summary of literature on population parameters of bluefin. Responsibility : Lenarz.
- V. Stock structure of bluefin. Responsibility : Hayasi, Jones and Mather.
- VI. Variability of length composition of bluefin and skipjack within and among samples taken from single sets of pure and mixed schools of these species. Responsibility : Mather

**** Members of Group on bluefin tagging in the Bay of Biscay :

Aloncle (Chairman).
Cendrero.
Dao.
Lima Dias.
Mather.

There was considerable discussion of this table which presented for each of these activities the identification of major problems; the tasks that need to be undertaken next year, special needs, what the Secretariat should do and interim time checks. The discussion concluded with everyone agreeing that the systematic approach outlined in the table was necessary to promote a greater correspondence between the recommendations and work accomplished during the year.

Since ICES has a Working Group on bluefin tuna, it is desirable that ICES and ICCAT coordinate research on bluefin. The Committee *recommends* that the Secretariat write as soon as possible to the General Secretary of ICES to inform him of relevant ICCAT activities and to invite ICES to arrange for the participation of one or more members of its Working Group on Bluefin Tuna in the ICCAT Group on tagging of bluefin in the Bay of Biscay.

The Committee also recommends that the Secretariat, when forwarding the Report of the Second Regular Meeting to Morocco, should draw special attention to planned activities on bluefin tuna tagging in the northeast Atlantic and encourage them to join actively in this program.

8. Management Measures

The Committee decided that, as part of its task of providing the Commission with the best scientific and technical information on which the Commission can make appropriate recommendations to achieve its objective, a number of general points should be drawn to the attention of the Commission and its Panels.

Many fisheries, including some of the Atlantic tuna fisheries, are developing very rapidly—possibly faster than assessments can be made in the traditional manner. Therefore, the Commission should be warned that it may need to take action rapidly.

A. ICCAT requirements

Based on the Report of Sub-Committee on Stock Assessment, the Commission should be advised that the following regulatory measures are likely to be desirable in the near future:

Bluefin: Increase in size at first capture.

Yellowfin: Increase in size at first capture.

Yellowfin: Reduction in fishing mortality.

A cursory examination of the statistics suggests that billfishes could also benefit from reduced fishing.

In discussing regulatory measures in the Atlantic fisheries for yellowfin and bluefin, it should be noted that a great variety of gear is used and none of them produce a significantly dominant portion of the catch.

B. *Available management techniques*

Although a number of techniques are available for regulating fisheries, not many of these are applicable to the tuna fisheries.

(i) *Control of size at first capture*

A technique that seems feasible at this moment is a limit to the size of fish that may be landed. There may be doubts as to whether the waste through discarding at sea of undersized fish which are mixed with larger fish might not be greater than any conservation benefit. An alternate means is to establish closed seasons and areas in which the undersized fish predominate. However, an intensive biological study would be required in order to determine if such an approach is feasible.

(ii) *Control of total fishing effort*

Possibilities include closed areas, closed seasons, limits on number of vessels, and catch quotas. Technical information is not adequate at present to evaluate the effectiveness of closed seasons and areas as regulatory measures. Limitation of fishing effort is another approach. This has merit in that, if established properly, it may not be necessary to adjust effort each year, nor to collect catch statistics on a current basis.

It is noted that a «limited entry» system has been considered among other alternatives for the longline fishery in the Indian Ocean which takes a major portion of the total catch of albacore, southern bluefin, yellowfin and bigeye (FAO Fish. Rep. No. 82). Catch quota regulations on yellowfin have been adopted successfully since 1966 for the surface fishery in the eastern Pacific. This system has stimulated the development of fisheries on yellowfin and skipjack in previously unexploited areas, as well as for skipjack within the region. In the Atlantic, yellowfin fishery catch quotas may create difficult problems with respect to the longline fishery which is not directed towards a single species. While no figure could yet be set for the yellowfin catch quota, if this were to be the type of regulation adopted by the Commission, it would likely be under the peak catch in 1969.

C. *Suggested action by the Commission*

While decisions on management action must be taken by the Commission, experience in other Commissions suggests that guidance by a scientific body would

be most useful. It seems that the problems that the Commission should be examining are:

- (i) the practical effect; e.g., of a minimum size limit throughout the yellowfin and bluefin fisheries (the experience of certain West African countries would be helpful here);
- (ii) (and more importantly) problems likely to be encountered in putting into effect any control on the total amount of fishing. As already noted in last year's report in connection with Step II, Task 4 statistics, implementation of any management schemes would require a statistical reporting system providing the Commission with much more up-to-date information on catches than is presently available.

There was considerable discussion of possible control of the size at first capture in the yellowfin fishery. The Sub-Committee on Stock Assessment estimated that at the present fishing mortality level the optimum size at first capture was 10-25 kg, but that many fish smaller than this were being caught in several fisheries. There seemed to be no way immediately applicable to all fisheries for preventing the capture (as opposed to the landing) of small yellowfin.

The Committee was informed that the Ivory Coast had enforced a 3.2 kg size limit, but that the Government of said country, concerned by the fact that ICCAT member countries fish very small yellowfin (1 kg), inquires whether these practices have any scientific basis. The Committee considers that catching such small fish is detrimental and that the Governments of the Congo, Ivory Coast and Senegal (the first two are not members of ICCAT) have taken a first step forward in adopting regulations which it is desirable be enforced by everyone.

D. *Advice to Panels*

The Committee would like to draw special attention of the various Panels to the following sections in the Report of the Sub-Committee on Stock Assessment:

- Panel 1. The section on yellowfin tuna, especially the probable need in the near future to control the amount of fishing, and the size at first capture.
- Panel 2. The section on bluefin tuna, especially the desirability of increasing the size at first capture in the surface fisheries off New England and elsewhere.

9. Report of the Fourth Session of the FAO Panel of Experts for the Facilitation of Tuna Research, La Jolla, California, November 8-12, 1971

The representative of FAO and Secretary of the FAO Tuna Panel gave a verbal report of the meeting and summarized in particular various recommendations made by the Panel which are directly relevant to ICCAT activities. He stressed that several of these recommendations were already discussed at the meetings of the ICCAT Sub-Committees and incorporated in their reports to SCRS. Special reference was made to the collaboration between FAO and ICCAT in the collection and improvement of catch and effort data, the preparation of Species Identification Sheets for Statistical Purposes, and the tagging of tunas and billfishes in the Atlantic and adjacent seas. The FAO Tuna Panel also considered the use of environmental data for tuna forecast systems and agreed that more emphasis should be given to this field in future research.

The FAO representative reported further that the Tuna Panel emphasized the need for a single body to coordinate research on tunas on a world-wide basis. In view of the absence of another adequate body, the Panel will make efforts to strengthen its role as a center for tuna research coordination. In this respect, the Panel recommended to FAO that representatives from tuna regulatory bodies such as ICCAT should be invited to its future sessions.

10. Environment

The Committee received reports on ongoing work in the fields of environmental research from the U.S.A. and France. The U.S. scientists are studying historical data and data collected on an opportunistic basis in the tropical Atlantic and found significant changes for the last ten years in sea surface temperatures and related fish distribution. A report on surface wind conditions in the eastern tropical Atlantic will be published soon by NOAA. Reference was also made to the joint U.S./Portuguese program carried out in the southeast Atlantic in 1968 which will result in the publication of an Atlas in 1972. It was reported that French scientists are describing hydro-climatic conditions of the Gulf of Guinea through the analysis of long-term series of surface oceanographic and biological data. Spain reported on investigations off northwest Africa related to primary production and distribution of fauna. Reference was made to the Cooperative Investigations of the northern part of the Eastern Central Atlantic (CINECA), executed by ICES in the waters between the Straits of Gibraltar and south of Dakar (10°N). The Committee agreed that, although no special research on tuna resources is foreseen as part of CINECA, the great amount of environmental and biological data to be expected would bring most valuable information for tuna research.

11. Presentation of Papers and Results of Research not Covered in other Items on the Agenda

No comments were made.

12. Relationship with other Bodies

The Secretariat reported on the contacts established by ICCAT with various international organizations concerned with fisheries research and management. Close collaboration has been continued with FAO and some of its regional fisheries bodies (IOFC, IPFC, GFCM). It was noted in particular that Sub-Committees on Tuna Management were established by both IOFC and IPFC which are concerned with similar tuna research and management problems in the Indian Ocean and the southwest Pacific. ICCAT is now also collaborating with FAO, ICES and ICNAF as a member of the Coordinating Working Party on Atlantic Fishery Statistics (CWP). The Secretariat reported also on relations with OECD, the International North Pacific Fisheries Commission and the International North Pacific Halibut Commission. Special thanks were expressed to the Inter-American Tropical Tuna Commission (IATTC) for their close collaboration.

The Observer from ICES referred to document SCRS/71/37 which contains a report on tuna research aspects (bluefin and albacore) discussed by the Southern Pelagic Fish Committee of ICES during the 59th Statutory Meeting in Helsinki, Finland, September-October 1971. It also includes information on the CINECA program, in particular on the two multiship surveys planned for February and August, 1973.

The Committee agreed that in view of the highly migratory behavior of tunas and the great mobility of modern fishing fleets, there is a strong need for further close collaboration between all bodies concerned. It was felt that would be particularly useful in view of the overall interest towards a world tuna management body.

13. Dissemination of Information

The Committee discussed the need for dissemination of scientific information and concluded that there were sufficient outlets for scientific papers available so that no special publication by ICCAT would be required for the time being. It was agreed that present ICCAT publications are adequate to meet the purpose, and that appropriate papers should be included in the Biennial Reports. Suggestions were also made that the Secretariat should, in consultation with the Chairman

of SCRS and, as far as possible, provide assistance in the translation of appropriate scientific publications, and that scientists should send reprints of their publications to the Secretariat for its library.

14. Other Matters

No matters were discussed.

15. Election of Officers

The Committee unanimously reelected Mr. V. Valdez (Portugal) as its Chairman for the next biennial period. It was decided that no Chairman of this Committee should be in office for more than two consecutive terms.

The Committee agreed that its three Sub-Committees should continue their work, and it unanimously reelected the Convenors of these Sub-Committees:

Sub-Committee on Stock Assessment: J. C. LE GUEN.

Sub-Committee on Stock Identification: A. C. JONES.

Sub-Committee on Statistics: S. HAYASI.

16. Date and Place of Next Meeting

The Committee agreed to hold its Third Meeting in 1972, during ten days immediately prior to the session of the Council.

17. Adoption of the Report and Recommendations

The Report of the SCRS meeting with recommendations was unanimously adopted after considerable discussion and with various amendments.

18. Adjournment

The Observer from IATTC expressed the appreciation of his Commission for having been invited to participate in the meeting and his hope for a continuation of close collaboration between ICCAT and IATTC.

The Chairman, with appreciation for the work of all concerned, adjourned the meeting.

Appendix 1 to Annex 6

**AGENDA FOR SECOND MEETING OF STANDING COMMITTEE
ON RESEARCH AND STATISTICS
November 26-30, 1971**

1. Opening of the Meeting.
2. Adoption of the Agenda and arrangements for the Meeting.
3. Admission of Observers.
4. Review of tuna fisheries and national research programs in each country.
5. Review of SCRS/70 recommendations.
6. Report of Sub-Committee on Statistics.
7. Report of Sub-Committee on Stock Identification.
8. Report of Sub-Committee on Stock Assessment.
9. Report of the Fourth Meeting of Experts for the Facilitation of Tuna Research ---
La Jolla, November 8-12.
10. Environment.
11. Presentation of papers and results of research not covered in other items on Agenda.
12. Relationship with other bodies.
General: ICES - FAO - ICSEAF - CECAF - CINECA - OECD - CARPAS -
ICNAF - NEAFC - IOFC - IPFC - IATTC - Tuna Conference, etc.
13. Dissemination of Information.
14. Future activities:
 - (a) of Sub-Committees,
 - (b) of Standing Committee.
15. Management measures:
 - (a) Identification of required measures.
 - (b) Scientific advice to Panels.
16. Other matters.
17. Election of Officers.
18. Date and place of next Meeting.
19. Adoption of Report and Recommendations.
20. Adjournment.

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SA, SI
- 1971b. Migrations du Germon du Nord-Est Atlantique. SCRS/71/39
SA, SI
- ANONYME.**
- 1971a. Les Mensurations d'Albacores (*Thunnus albacares*) et de Listaos (*Katsuwonus pelamis*) faites à Dakar, Abidjan et Pointe-Noire entre 1965 et 1970. Doc. Scient. Centre ORSTOM Pointe-Noire (11): 9 p., 49 tabl. SCRS/71/44
SA
- 1971b. La Pêche Thonière de Surface dans le Golfe de Guinée en 1970. Centre de Recherches Océanographiques, Abidjan. SCRS/71/42
SA
- 1971c. Statistiques de Pêche, Dakar, Abidjan, Pointe Noire, 1970. Office de la Recherche Scientifique et Technique Outre-Mer, Centre de Pointe-Noire (519): 55 pp. SCRS/71/46
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- ANONYMOUS.**
- 1971a. Surface Temperatures in the Eastern Tropical Atlantic Ocean, National Marine Fisheries Service, Southeast Fishery Center, Miami Laboratory. SCRS/71/40
SA
- 1971b. Japanese Research activities on tunas and tuna-like fishes in the Atlantic Ocean, 1970 (+6 supplementary figures). (Original in English.) SCRS/71/18
Activités de Recherches Japonaises sur les Thonidés et espèces voisines dans l'Atlantique, 1970. (Traduction effectuée par la Secretariat.)
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- BECKETT, J. S.**
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SA
- CHAMPAGNAT, C.**
1968. Les campagnes thonières de «Pêche Fraîche» à Dakar. Doc. ORSTOM CRO Dakar (15): 53 pp. SA
- CHAMPAGNAT, C et F. LHOMME.** SA
1970. La Pêche Thonière à Dakar de 1966 à 1969. Centre de Recherches Océanographiques de Dakar-Thiaroye (27): 24 pp.
- DAO, J. C.**
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SA, SI

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SA

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- 1971a. Portugal (Angola) Report to be submitted to SCRS at Second Regular Meeting of ICCAT, Madrid, 1971. Missao de Estudos Bioceanológicos e de Pescas de Angola. SCRS/71/51
- 1971b. Um estudo sobre a Pescaria de Albacora e de Gaiado com Isco Vivo em Angola. Missao de Estudos Bioceanológicos e de Pescas, Angola. Publ. Mimeo M. E. Bioceanol. Pescas, 3 (Ser. Biol. Pop. 1): 61 pp. SA

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Informe sobre pesquerías de túnidos en España. (Original en español.)

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- 1971b. Yield-per-recruit of Atlantic yellowfin tuna for multi-gear fisheries. NMFS. SCRS/71/27
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*Appendix 3 to Annex 6***REPORT OF SUB-COMMITTEE ON STOCK ASSESSMENT
(Madrid, November 1971)****1. Introduction**

The Sub-Committee on Stock Assessment met at the Casa Sindical in Madrid, November 18-20 and 24, 1971, convened by J. C. Le Guen (France). The Agenda is attached as Addendum 1. Documents presented at the meeting are listed as Appendix 2 to the SCRS report (Annex 6).

A considerable number of estimates of parameters used for stock assessment were presented at the meeting. The estimates are attached as Addendum 2 to this Report.

The following text summarizes discussions of the group.

2. Yellowfin (*Thunnus albacares*)**2.1. Fisheries**

Recent statistics of total catch of yellowfin in the Atlantic by country and type of gear for the years 1963-1970 are summarized in Table 1. The Sub-Committee stresses that the data for 1970 are still very incomplete, and there is even some doubt surrounding certain data for 1969. The present assessments are therefore far from being an up-to-date picture, and this should be borne in mind, especially in view of the fact that certain elements of the fishery are changing rapidly.

Many of the values in the table for the early years differ from those given in last year's report. This represents the results of enquiries made by the Secretariat staff, and underlines the need for the Secretariat to be actively engaged in the compilation of statistical data, particularly in respect of landings by vessels in countries other than that of their flag.

These preliminary data indicate that there was an appreciable drop in catches in 1970, after a sharp increase in 1969. This decrease was particularly noticeable in catches by the U.S. and French fleets, though the U.S. effort actually increased. Available catch per unit effort data are summarized in Table 2. In all the series the 1969 catch per unit effort was one of the lowest recorded, but, where data are available there was a further drop in 1970, indicating that the yellowfin stocks were generally, in 1970, at a relatively low apparent level. Preliminary

reports suggest that, except for some locally good fishing off Dakar, the fishery in 1971 was about the same as in 1970.

It was not possible to estimate very accurately the total amount of fishing on Atlantic yellowfin. A rough calculation based on the change in catch, and on average changes in catch per unit effort in various surface fisheries suggests that the total surface effort increased by about 20 % between 1969 and 1970.

Available information on the relative abundance of different age classes has been summarized in Table 3. This shows that the decline is most marked in the larger fish (especially for the U.S. purse seiners and the Pointe Noire bait boats). The recruitment, as estimated by the catch per unit effort of the youngest fish, has fluctuated with no obvious trend. The three different measures agree that recruitment was good in 1970 and in 1968, though there are differences in detail regarding the relative magnitude of recruitment in different years. It is possible that catch per unit effort of young fish in 1970 may be overestimated relative to other years because of the reduced availability of older fish, which may have caused relatively more effort to be directed towards young fish than in previous years.

2.2. *The effect of fishing*

The decline in overall abundance, and in the apparent abundance of older fish strongly suggests the effect of heavy fishing. The changes in age composition have been used by Pianet and Le Hir to give estimates of the fishing mortality in the stocks exploited by the Pointe Noire fishery, of $F = 0.95$ and $F = 0.81$ based on baitboat and purse seine data respectively.

A more direct assessment of the effect of fishing as concerns the longline fishery was presented by Hayasi. Following techniques used in previous reports, and employing the best available estimates of catch per unit effort, this was plotted against the estimated total effort in the longline fisheries (Japan, Korea and Taiwan). This plot is given in Figure 1. In the lower part the data has been replotted, to show the catch per unit effort as a function of the mean effort in the year of observation and the previous year. As already noted in previous reports, this figure shows clearly the decline in catch per unit effort with increased fishing effort by longline and surface gears. It also shows that the points after 1966 fall to an increasing extent below the points corresponding to the period before 1966. This is presumably an effect of increasing surface fishery.

As a rough guide to the magnitude of this reduction, it may be noted that the catch per unit effort in 1968 and 1969 was about half that in 1962 when the longline effort was about the same, suggesting that catches in the longline fishery have been approximately halved compared with those that would have occurred at the pre-1966 level of surface fishing. However, it should be noted that the catch rate prior to 1966 was presumably effected by the significant surface fishery prior to 1966.

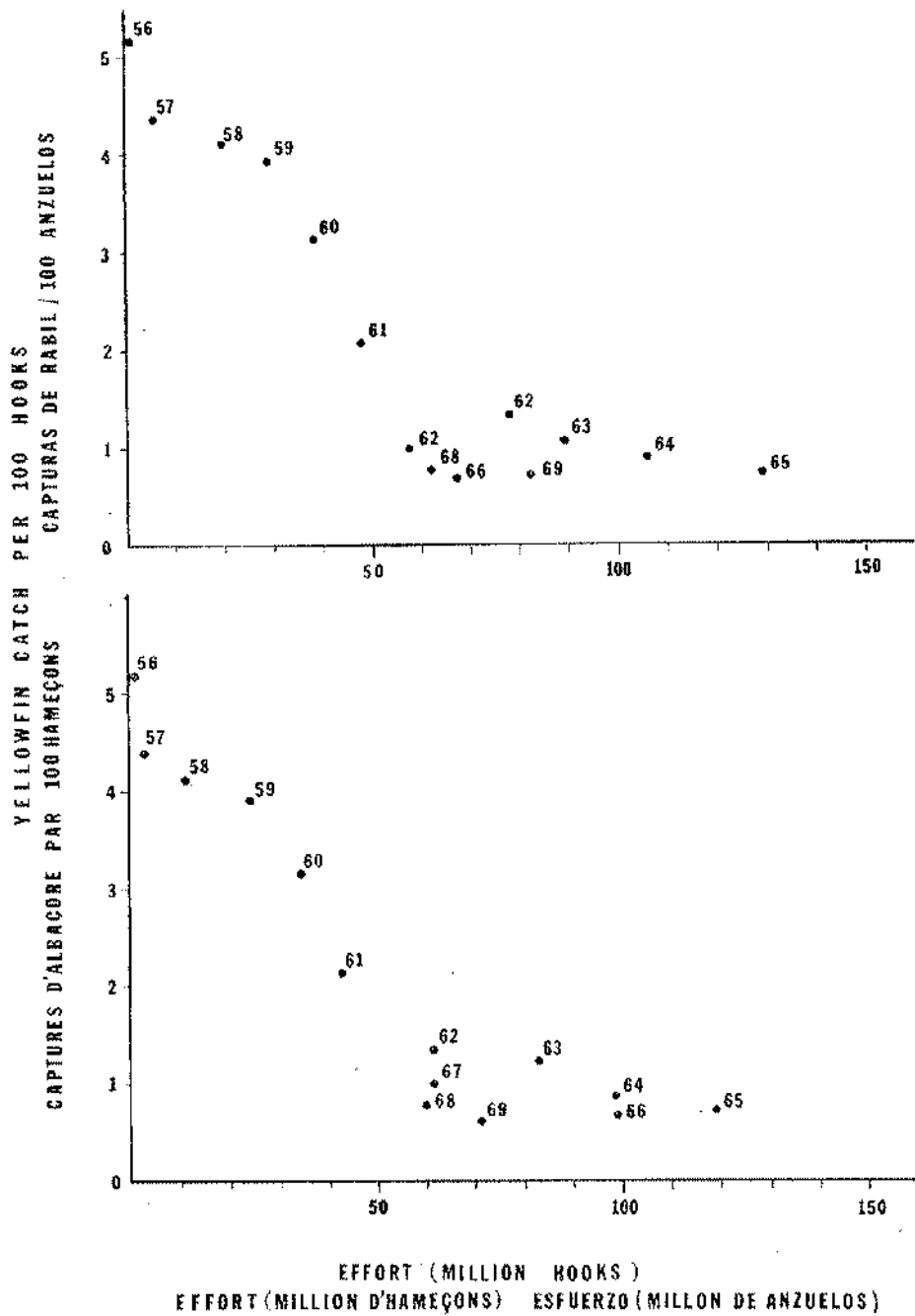


FIG. 1. Yellowfin catch per unit of effort in the longline fishery, as a function of the fishing effort in the same year (above), and of the average of efforts in that year and the previous year (below).

More detailed analyses of the longline data reported by Japanese scientists gave estimates (about 1.3) of the fishing mortality among the very large fish exploited by this fishery.

2.3. *Yield-per-recruit*

The results of a number of calculations of yield-per-recruit were presented to the meeting. Detailed conclusions from these calculations depend on the resolution of various uncertainties concerning growth pattern, natural mortality, fishing mortality at different ages, and size composition of catch. In such a complex fishery as the yellowfin in the Atlantic, in which different gears catch very different sizes of fish, it is certain that the fishing mortality will not be constant for all ages. However, calculations of the yield-per-recruit, using a constant fishing mortality, were used to give a first approximate guide to changes in yield-per-recruit with changes in age at first capture, or in fishing mortality.

The yield-per-recruit as a function of age at first capture is shown in Figure 2. Because of considerable doubt about the true value of fishing mortality, this is shown for three values of F (0.5, 1.0 and 1.5), within which range the true value almost certainly lies. For each value of F the curves have been drawn for three possible values of natural mortality ($M = 0.6, 0.8$ and 1.0). Shown in the diagram are the approximate ages of recruitment at present to the baitboat, large purse seine, and longline fisheries, as determined from French, U.S., and Japanese data respectively. Despite the range of values used, certain conclusions are valid for all situations considered. The first is that for the present fishing mortality, the optimum size at first capture is 10-25 kg. This is less than the age at recruitment to the longline fishery, and is greater than the age at actual recruitment at present to the baitboat and purse seine fishery. None of the fisheries fish at the optimum age. The total yield would be increased by concentrating fishing in those sections of the industry with an age at recruitment nearer to the optimum age. There is a difference between the fisheries as regards the need for regulation; the reduction in yield through using longlines is merely an opportunity foregone by using that gear, and it is to the advantage of other fishermen if those using longlines were to continue to do so rather than change to a gear with a smaller age at first capture. If fishing continues to increase, there will be further reductions in the abundance of larger fish. It is likely that this will encourage the diversion of effort towards the smaller sizes of fish, and lead to a reduction in the effective size at first capture. It may be noted that so far as longlines are concerned, the technological characteristics of the gear seem to prevent the size at first capture from falling below the optimum, as estimated above.

The yield-per-recruit was also expressed as a function of the fishing mortality. The results are shown in Figure 2, for two values of the age at first capture (1.5 years, or about 3.5 kg, and 2 years, or 13 kg), and for the same three values of natural mortality. For the lower value of age at first capture (which possibly

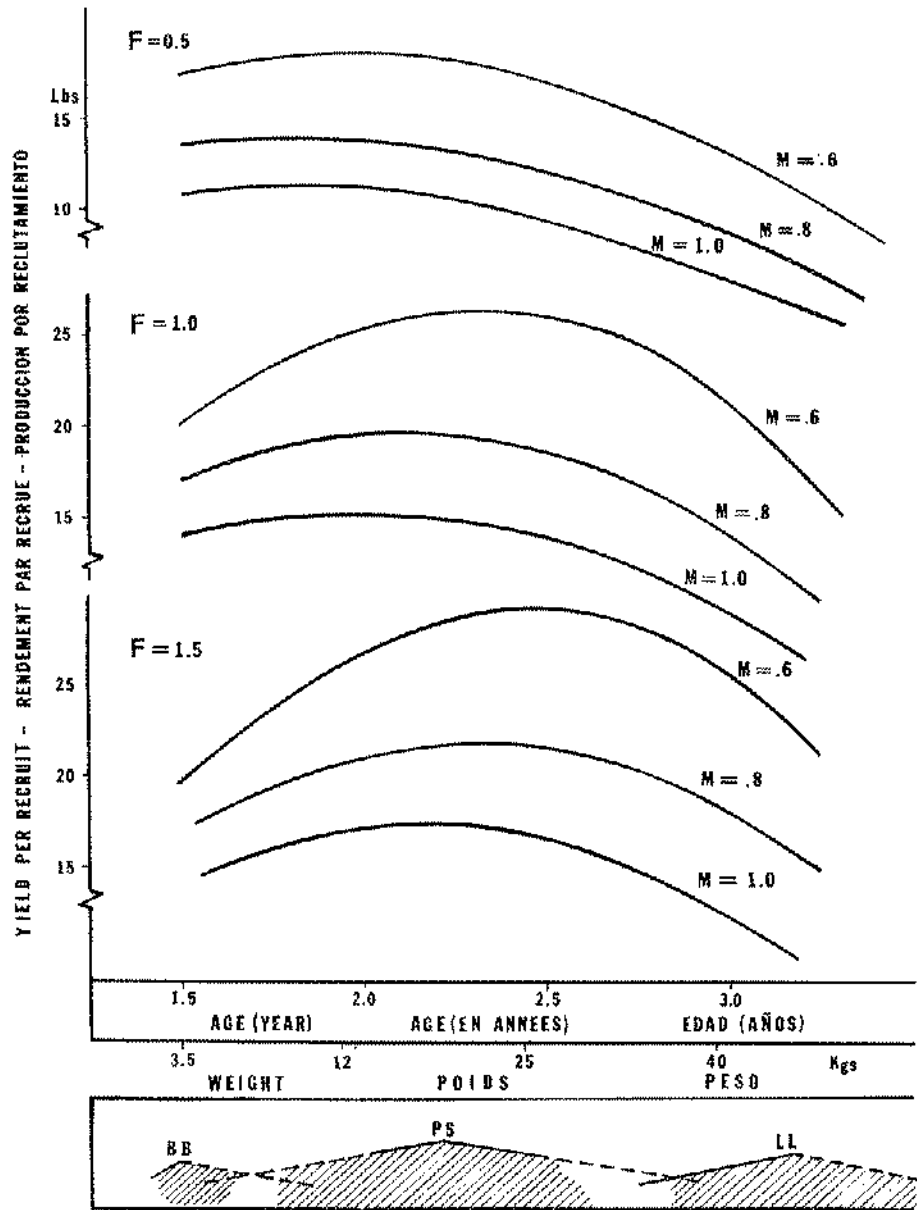


FIG. 2. Yield-per-recruit of yellowfin tuna as a function of age or size at first capture, showing the approximate sizes at first capture under 1968-70 conditions, for bait-boats (BB), large purse seiners (PS) and longliners (LL).

more nearly corresponds to the true present situation), the yield-per-recruit has a maximum in the range $F = 1.0-1.5$, depending on the value of natural mortality. It is likely that the fishing mortality is already in this range. Therefore, it is possible that the fishery has reached the stage where any further increase in fishing (assuming the same pattern of fishing mortality with age) will lead to a decrease in the yield-per-recruit.

It is also possible that increasing fishing effort will still give some increase in yield-per-recruit. However, this increase will probably be small, and would require a disproportionate increase in the amount of fishing. Also, while the yield-per-recruit might increase, less can be said with any confidence concerning changes in recruitment, and therefore in total yield. It is certain that further increases in effort will additionally decrease the abundance of the adult spawning stock, which is already small compared with that occurring in the period before fishing started. It is possible because of the reduction in spawning stock that recruitment will decrease, possibly to an extent that could lead to a very serious decline in total catch.

2.4. Discussion

While data available to the Sub-Committee gave a much poorer coverage of the fisheries than is desirable and there was not time at the meeting to analyze the available data in detail, it appears fairly clear that the yellowfin fishery in the Atlantic is approaching or may even have reached, the point where control of the amount of fishing and/or size of fish caught is desirable. The Sub-Committee therefore strongly *recommends* that the SCRS take early steps to give serious consideration to the practical action that would be required to control the amount of fishing, or minimum size of fish caught. In making these recommendations the Sub-Committee recognizes that even if immediate action is initiated by the Committee it will require some considerable effort to develop and implement actual control on the fishery. By that time much better assessments of the state of yellowfin stocks will be available, including reasonable quantitative estimates of the annual catch that should be taken to achieve the prescribed objectives of the Commission.

2.5. Future Activities

As suggested above, considerable work is needed to provide better advice to the Commission. The first group of activities concerns basic data. This is discussed in more detail in the Report of the Sub-Committee on Statistics. While detailed data for some segments of the fishery were among the best existing anywhere, they often take a long time to be collected and reported to the Commission, and also are not always summarized in a form readily usable during Sub-Committee sessions. It is suggested that standard forms for reporting summary data be pre-

pared. At the other extreme for other segments of the industry even the basic data on total catch is missing or unreliable. Urgent action by the Standing Committee on Research and Statistics is needed to improve the situation.

The other group of action concerns analysis of the data. While a number of useful analyses of individual parts of the total fishery have been made by national laboratories it is clear that in such a complex fishery as the Atlantic yellowfin, such individual analyses will give only an incomplete, and possibly misleading, picture of what is happening. To an even greater extent than in the North Atlantic, where international working groups are a standard feature of any assessment, it is necessary for the complete data to be studied as a whole by a group of individual experts, experienced in stock assessment and in the individual fisheries. It is also clear that the present arrangement, whereby the Sub-Committee on Stock Assessment meets once a year immediately before the Council or Commission meeting, does not serve the purpose. Some problems are identified, but due to lack of time and partly also to the comparatively large number of people present, most of whom are not directly concerned in stock assessment work, it is not possible to carry through every analysis in detail.

The Sub-Committee therefore recommends that arrangements be made for an early meeting of stock assessment experts to study, for an adequate period, the present state of the yellowfin fishery. This group should comprise only a small number of scientists, primarily those directly concerned with yellowfin assessment. It might, however, be helpful in view of the complexities of the fishery, if the group were strengthened by one or more scientists, with good ability and experience in stock assessment, though not necessarily in Atlantic yellowfin.

The Committee should take appropriate action to facilitate the attendance of such an expert at the meeting. This action might include payment of all expenses of the expert by the Commission.

3. Bluefin Tuna (*Thunnus thynnus*)

3.1. *The Fisheries*

The fisheries on bluefin fall into two groups — fisheries on young fish, up to about 5 years old or 50 kg in weight (in the Bay of Biscay, off New England, and apparently also off northwest Africa), and fisheries mainly on older fish, 100 kg and upwards, or up to 15 years old or more (the trap fisheries of North Africa and southern Europe, the fisheries off western Norway and in the northern North Sea, and the longline fisheries and in the open sea).

The striking feature of the fisheries on large tuna has been the very sharp decline in catches since about 1960 (Table 4), which has involved the disappearance of the German and Danish fisheries. The Portuguese trap fishery caught only one large tuna through September 1971.

The French fishery on young fish has also declined, but there has been a large increase in catch in the northwest Atlantic, leading to an increase in the total catch of young bluefin (Table 4).

Bluefin tuna fisheries in southern Spain during 1971 have declined to less than half the figure for the previous year: low in itself. However, tuna caught were of a larger size than those caught in 1970.

3.2. *Effect of Fishing*

Tagging experiments have shown that the local fishing rate on the stock in the New England fishery is very high. No quantitative estimates have been made as yet of the effect of this fishery on the various fisheries on large tuna. Precise assessment of this effect will depend on the possible separation of stocks, and of the magnitude of other groups of young bluefin tuna in the Atlantic. The only other group of young bluefin known at present is the group available to the Bay of Biscay fishery. Some returns of fish tagged off New England have shown that the European fisheries are certainly not completely independent of the New England fishery. There is some suggestion that the decline in the fishery on large fish is due to the increase in the small-fish fishery.

It appears that the immediate cause of the decline in the northeast Atlantic is the failure of any strong year-class to recruit to the large fish fishery since the year-class of 1957. Though age-composition data is not available for the sports fishery for giant bluefin in the northwest Atlantic, it seems that in this fishery too, there has recently been poor recruitment and it now depends only on relatively older extremely large fish rather than on extremely large and moderately large fish as in past years.

3.3. *Changes in size at first capture*

Bluefin tuna are fast growing fish with probably a relatively low natural mortality compared with other tuna. There is therefore likely to be advantage in avoiding the capture of small bluefin tuna, and in allowing them to grow to a larger size. The biomass of a year-class is likely to double in the second year of life, and increase by a similar amount in the third and fourth year. The optimum size at first capture in the New England fishery can be estimated by Allen's method.

$$W_r = E\bar{W}$$

where E is the exploitation rate, i.e., the proportion of fish which will at some time be caught. Using this formula suggests that the catch in this fishery would be increased if the capture of fish less than 4.5-7 kg could be avoided. (See Addendum 3.)

So far as the North Atlantic bluefin fishery as a whole is concerned, this is a minimum value of the optimum size at first capture. It only takes into account possible later recaptures in the New England fishery, and not possible increased catches of large fish in other fisheries. For the present, no estimate has been made of the optimum size at first capture in the bluefin fisheries as a whole.

It may be noted, as mentioned in last year's report, that in addition to the small bluefin caught in the New England and Bay of Biscay fisheries, some quantities of very small bluefin are apparently caught off northwest Africa. Better information is urgently needed about these catches, which while in total weight may not be very great, may include a very large number of fish.

It appears that there would be appreciable benefits if capture of these fish, and of any other small bluefin of sizes up to at least 5 kg can be avoided.

However, it is not clear how capture of very small fish can be prevented in the New England fishery, without impeding the fishery on rather larger fish. For instance, the imposition of a size limit might result only in the discarding at sea of small fish, few of which would survive. This would be of no conservation value. The Sub-Committee, therefore, recommends that a working group be established to examine the most effective practical measures required to protect the small fish, which might include examination of the necessary enforcement procedures. The Sub-Committee also recommends a more detailed assessment of bluefin stocks, including estimation of the optimum size at first capture, and of the effects on the different fisheries of the protection of small fish of various sizes. This might well be carried out by a small working group.

The Sub-Committee received anecdotal evidence that significant quantities of very small (< 1 kg) bluefin are being caught off the northwest coast of Africa. The Sub-Committee notes that the size of fish is obviously below the optimum and that ICCAT should take action to document this fishery by insuring collection of catch and size composition statistics.

4. Albacore (*Thunnus alalunga*)

Statistics on the albacore fishery were presented by France, Spain and Japan. France noted that their catches declined in recent years with the exception of 1971. The decline was attributed to a decline in effort and in catch per effort. Spain noted that effort in its northern fisheries has remained stable in recent years, while effort has tripled in the Canary Islands regions. Japan noted that their statistics for longline fleet in the entire Atlantic revealed no trends in catch per effort since 1962. Total catch for the Atlantic is shown in Table 5.

France presented several studies on the biology of albacore. Analysis of scale readings revealed two types of growth. In the first case the first ring is formed at 27 cm; in the second case the first ring is formed at 33 cm. Growth between formations of rings is similar after the first ring is formed. The two groups of fish

appear to be mixed in the fishery. Japan noted that French estimates of growth are similar to those made by Japanese and U.S. scientists for albacore from the Pacific. Estimates of total mortality rates of albacore were presented by France. The estimate of Z was about 1.2. An attempt to estimate M was unsuccessful.

The Sub-Committee *recommends* that data from the longline fisheries be presented by region as recommended at the last meeting, and notes that there is need to improve collection of data on effort and size composition from the surface fishery in the eastern Atlantic before it will be possible to adequately assess the status of the stocks.

5. Other Species

5.1. *Little Tunny (Euthynnus alletteratus)*

It was noted that little tunny appear to be very abundant and underexploited off the coast of western Africa and that an excellent canned product can be produced from the species. The Sub-Committee suggests that industry should investigate the possibility of developing a market for the species.

5.2. *Skipjack (Katsuwonus pelamis)*

Catch, effort and size composition statistics were presented. Total catch statistics for the Atlantic are shown in Table 6. It was noted that effort statistics may not be very meaningful for the French fishery because the primary goal of the vessels involved in the fishery is the capture of yellowfin. Until recently there has been little demand for skipjack captured by French vessels. It was suggested that the potential yield from the Atlantic may be estimated in a very crude fashion from yield per area experienced in the Pacific fisheries.

5.3. *Bigeye (Thunnus obesus)*

Japan presented catch and effort statistics for their longline fishery. Catch per effort has remained stable since 1962. Effort increased in 1970 and 1971. France noted that with the exception of a brief period during 1968 in the Pointe Noire region, most bigeye landed by their vessels have been caught in the Dakar region.

The Sub-Committee makes no recommendation concerning this species.

5.4. *Swordfish (Xiphias gladius)*

Catch and effort and average size statistics on the swordfish fishery were presented by Canada. Catch per effort has declined since the beginning of the fishery. Average weight also declined. The fishery essentially has been eliminated by the mercury problem. The U.S. fishery was also been greatly reduced by the same problem.

The Sub-Committee noted that good data on catch per effort and size composition were available for this fishery. It recommends that a detailed assessment should be made, using these data, so that if a reopening of the fishery became likely, detailed proposals for its management could be made; e.g., on desirable catch or optimum number of vessels, before re-development of the fishery takes place.

5.5. *Blue Marlin (Makaira nigricans) and White Marlin (Tetrapturus albidus)*

The Sub-Committee noted that catch per effort of these species shows a marked decline since 1962 for the Japanese longline fishery. However, there is some question as to the validity of estimates of effort, because of significant changes in geographic and seasonal distribution of effort.

The Sub-Committee recommends that an attempt be made to develop a standardized measure of effort for the fishery.

**Table 1. Total catches of yellowfin tuna from the Atlantic
(in thousand metric tons, live weight) — 1963-1970**

	1963	1964	1965	1966	1967	1968	1969	1970 *
<i>Longline fisheries</i>								
Argentina	0.1	0.1	0.1	0.0	0.1	0.2	0.1	0.0
Taiwan	0.4	0.3	0.1	0.9	2.3	6.8	10.0	7.2
Cuba	1.7	0.9	0.8	0.8	3.0	1.9	1.6	1.6
Japan	37.7	35.1	36.6	22.1	12.8	13.9	9.8	6.6
Korea **	—	—	—	—	—	2.0	5.2	11.5
Venezuela	3.1	1.9	1.8	2.1	2.1	1.2	1.6	1.4
Subtotal	43.0	38.3	39.4	25.9	20.3	26.0	28.3	28.3
<i>Surface fisheries</i>								
Canada	—	—	0.0	0.6	0.7	0.7	0.9	0.2
France	21.8	21.4	16.8	18.8	20.8	26.5	36.6	20.5
Ivory Coast	—	—	—	—	—	—	—	0.5
Japan	0.9	2.6	2.4	5.3	6.5	7.9	6.8 *	5.0
Portugal (Angola)	4.4	4.5	2.8	2.4	1.6	1.6	1.0	0.1
Senegal . . . . .	...	...	...	1.3	1.0	0.7	0.5	3.5
Spain	1.2	0.9	1.5	6.0	2.8	4.0	5.3	6.4
U. S. A.	0.2	0.1	—	—	1.0	6.1	18.2	11.6
Subtotal	28.5	29.5	23.5	34.4	34.4	47.5	69.3	47.8
<i>Others</i>								
Ghana . . . . .	...	...	1.0	1.0	1.0	1.0	1.0	...
South Africa	0.0	0.2	...	...	...	...	...	...
Subtotal	0.0	0.2	1.0	1.0	1.0	1.0	1.0	...
TOTAL	71.5	68.0	63.9	61.3	55.7	74.5	98.6	76.1

* Provisional.

** Dressed weight.

Table 2. Catch (in weight unless specified) per unit of effort for yellowfin tuna in the Atlantic

YEAR	JAPAN <i>Longline</i>	U. S. A. <i>Purse seine</i>	PORTUGAL <i>(Angola)</i>	FRANCE		
				<i>(Pointe Noire)</i> B. B.	<i>Small P.S.</i>	<i>(Dakar)</i> Small B.B.
	(1)	(2)	(4)	(3)	(3)	(3)
1970		4.4	0,0	1.5	2.0	?
1969	0.72	12.0	0.7	1.8	3.5	0.80
1968	0.82	25.7 *	0.6	3.4	4.6	0.91
1967	1.01	8.4 *	0.4	3.3	4.3	0.60
1966	0.69		0.8	3.1	4.3	1.30
1965	0.76		0.7	2.5	1.7	
1964	0.90		1.5	3.0		
1963	1.13		1.2			
1962	1.39					
1961	2.16					

(1) No. of fish/adjusted 100 hooks.

(2) Catch (short tons) per days fishing (class 6 boat).

(3) Catch (metric tons) per days at sea.

(4) Index calculated from relative fishing power of different boats. Entry for 1968 referred to 1968/69 season.

* Effort too low to be meaningful.

**Table 3. Estimates of catches per unit of effort of different ages of yellowfin
(Data from SCRS/71/27)**

a) Numbers per day fishery by U. S. seiners

	<i>1968</i>	<i>1969</i>	<i>1970</i>
0	—	2.5	11.2
1	366.3	18.2	244.6
2	138.1	101.6	26.6
3	197.8	100.6	20.2
4	137.6	64.6	14.8
5	31.6	10.0	8.2
6	0.9	—	0.2

b) Mean of monthly numbers per day — Pointe Noire baitboats
(data from Pianet and Le Hir)

	<i>1967</i>	<i>1968</i>	<i>1969</i>	<i>1970</i>
1	155	257	100	457
2	117	23	40	5
3	6	8	2	—
4+	27	38	6	—

c) Mean of monthly numbers per day — Pointe Noire purse seiners
(data from Pianet and Le Hir)

	<i>1967</i>	<i>1968</i>	<i>1969</i>	<i>1970</i>
1	55	76	51	74
2	125	5	69	3
3	14	22	11	10
4+	5	63	34	30

Table 4. Summary (by regions) of Atlantic bluefin tuna catch (in thousand metric tons, live weight) — 1957-1970

	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970
NORTHERN EUROPE														
Norway	5.0	3.6	2.5	3.3	8.0	8.2	0.2	1.5	2.5	1.0	1.9	0.7	0.9	0.4
Denmark	0.6	0.3	0.8	0.0	0.2	0.2	0.0	0.1	0.0	0.0	0.0	0.0	0.0	—
Germany	1.3	0.5	1.0	0.4	0.3	0.2	0.0	0.0	0.0	0.0	—	0.0	0.0	0.0
Sweden	0.1	0.0	0.0	—	0.0	0.0	0.0	0.0	...	...	0.0	0.0	—	0.0
Subtotal	7.0	4.4	4.3	3.7	8.5	8.6	0.2	1.6	2.5	1.0	1.9	0.7	0.9	0.4
SPAIN & PORTUGAL (Traps)														
Spanish traps	9.2	8.0	4.8	5.7	4.7	4.7	1.9	2.5	3.3	1.4	3.0	1.1	1.8	...
Portuguese traps ⁵	0.8	0.7	0.9	0.9	1.6	0.8	0.4	0.4	0.1	0.2	0.2	0.1	0.4	0.0
Subtotal	10.0	8.7	5.7	6.6	6.3	5.5	2.3	2.9	3.4	1.6	3.2	1.2	2.2	0.0
MEDITERRANEAN COUNTRIES														
Algeria . . . . .	...	0.4	0.6	0.3	0.0	...	0.0	0.0	0.0	0.1	0.2	0.1	0.2	0.1
Greece ⁷	0.5	0.7	0.7	...	1.1	1.0	...	0.6	0.7	0.5	0.6	0.5	...	0.5
Italy . . . . .	...	3.7	2.1	1.4	2.0	2.0	2.4	2.5	2.1	1.7	4.0	3.4	5.5	3.4
Libya . . . . .	...	...	...	...	...	...	...	0.4	0.6	0.7	0.8	1.0	2.9	3.0
Malta ⁹	0.1	0.1	0.1	0.1	0.1	0.0	1.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0
Tunisia . . . . .	...	...	...	...	...	...	...	0.5	0.8	0.6	...	...	...	0.7
Turkey	0.8	0.4	0.5	0.3	0.3	0.2	0.1	0.0	0.1	0.1	1.5	0.3	...	0.4
Yugoslavia	0.4	0.4	0.2	0.1	0.1	0.1	0.3	0.3	0.1	0.2	0.3	0.2	0.3	0.0
Subtotal	1.8	5.7	4.2	2.2	3.6	3.3	2.9	4.4	4.5	4.0	7.5	5.6	8.9	8.1
OTHER COUNTRIES														
Morocco ¹	4.5	10.5	5.0	6.0	2.3	1.6	2.4	2.3	1.9	1.8	1.4	0.8	0.1	0.3
Traps														
Others	...	—	...	...	—	—	1.5	2.1	1.0	1.8	2.0	0.5	0.7	0.4
Argentina . . . . .	...	—	...	...	—	—	0.3	0.2	0.1	0.1	0.1	0.0	0.0	...
Canada	0.0	0.0	0.1	0.0	0.1	0.2	0.7	1.0	0.7	0.3	0.4	0.4	0.6	1.6
Taiwan ¹¹	—	—	—	—	—	—	—	—	—	0.0	0.0	0.1	0.2	0.1
Cuba ² . . . . .	...	—	...	...	...	...	...	...	0.1	0.5	2.4	1.4	0.5	0.2
France . . . . .	...	2.0	2.4	0.8	2.0	1.7	1.2	1.7	1.4	2.8	2.0	1.8	1.5	1.8
Japan ⁸	0.1	0.0	0.3	0.8	0.6	3.7	7.8	12.6	9.6	2.9	0.9	0.4	0.8	4.4
South Africa . . . . .	...	...	...	...	...	...	0.4 ³	0.2 ³	...	...	...	...	...	...
Spain	5.6	5.8	4.2	4.0	2.1	10.9	8.9	5.7	7.9	7.3	7.6	7.6	9.7	8.4 ⁸
United States ¹⁰	0.5	1.1	1.3	0.6	1.1	4.0	5.7	4.9	3.2	1.2	2.3	0.6	1.2	3.3
Subtotal	10.7	19.4	13.3	12.2	8.2	22.1	28.9	30.7	25.9	18.7	19.1	13.6	15.3	20.5
TOTAL	29.5	38.2	27.5	24.7	26.6	39.5	38.3	39.6	36.3	25.3	31.7	21.1	27.3	29.0

1. For early years, Moroccan catch is not broken down by gear.
 2. Up to and including 1964, the Cuban bluefin catch is included with yellowfin.
 3. Includes uncategorized species.

4. Included in albacore.
 5. Includes other species. Other fisheries catch unknown quantities of bluefin.
 6. Catch by traps included with catch by other gear.

7. Includes frigate mackerel.
 8. Includes southern bluefin.
 9. Up to 1964, albacore is included.
 10. Includes landings in Puerto Rico.
 11. Dressed weight.

**Table 5. Total catches of albacore tuna from the Atlantic
(in thousand metric tons, live weight) — 1963-1970**

<i>Country</i>	<i>1963</i>	<i>1964</i>	<i>1965</i>	<i>1966</i>	<i>1967</i>	<i>1968</i>	<i>1969</i>	<i>1970 *</i>
Argentina	1.5	1.5	1.1	0.8	0.7	1.3	0.4	0.5
Brazil	2.4	1.4	0.6	0.4	0.7	0.7	...	0.5
Taiwan	0.0	0.1	0.1	0.2	1.8	8.7	11.5	11.9
France **	14.2	17.3	13.8	11.9	13.5	11.6	8.3	5.5
Grenada	0.1	0.1	0.1	0.1	0.1	...	...	0.1
Japan	29.7	39.5	42.6	26.9	12.5	15.2	11.0	11.4
Korea ** . . . . .	...	0.5	1.0	6.7	10.3	7.3	16.0	10.0
Portugal	—	1.9	5.8	1.0	6.3	0.9	3.3	3.3
Spain	28.5	28.5	29.6	26.4	34.1	24.6	22.5	23.6
South Africa	0.4	0.5	0.0	0.0	0.0	0.0	0.0	...
Venezuela . . . . .	...	...	...	...	...	0.6	0.8	0.5
Yugoslavia . . . . .	...	0.0	0.0	0.0	0.0	0.0	0.2	0.1
TOTAL	76.8	91.3	94.7	74.4	80.0	70.9	74.0	67.4

* Provisional.

** These are dressed weight, not live weight.

**Table 6. Total catches of skipjack tuna from the Atlantic
(in thousand metric tons, live weight) — 1963-1970**

<i>Country</i>	<i>1963</i>	<i>1964</i>	<i>1965</i>	<i>1966</i>	<i>1967</i>	<i>1968</i>	<i>1969</i>	<i>1970 *</i>
Brazil	0.3	0.4	0.5	0.7	1.5	0.8	...	0.4
Canada	0.0	0.4	0.0	—	0.6	1.0	0.1	0.6
Taiwan	—	—	—	—	0.0	0.0	0.0	...
Cuba	0.7	0.7	1.0	1.0	1.1	1.6	1.2	1.8
France	0.5	0.4	12.1	19.1	12.3	15.2	8.7	10.0
Japan	9.2	3.1	8.1	5.8	5.9	13.6	5.9	7.5
Morocco	0.0	0.0	3.2	1.5	0.9	0.9	0.1	0.9
Portugal (Angola)	3.3	3.5	6.4	6.3	8.3	10.6	4.6	0.6
Senegal . . . . .	...	...	...	0.5	0.5	0.6	0.2	1.3
Spain	1.4	4.5	9.5	18.5	13.6	19.1	13.4	14.9
United States	3.0	4.0	0.1	0.0	0.5	3.2	3.8	10.7
TOTAL	18.4	17.0	40.9	53.4	45.2	66.6	38.0	48.7

* Provisional.

*Addendum 1 to
Appendix 3 to Annex 6*

**Agenda for Sub-Committee on Stock Assessment (sCSA)
Madrid, November 18-20 and 24**

1. Opening of the Meeting.
2. Adoption of Agenda and arrangements for the Meeting.
3. Yellowfin tuna (*Thunnus albacares*)
 - 3.1. Examination of data available on yellowfin tuna.
 - 3.2. Evaluation of yellowfin stock conditions.
4. Albacore (*Thunnus alalunga*)
 - 4.1. Examination of data available on albacore.
 - 4.2. Evaluation of albacore stock conditions.
5. Bigeye tuna (*Thunnus obesus*)
 - 5.1. Examination of data available on bigeye tuna.
 - 5.2. Evaluation of bigeye stock conditions.
6. Skipjack (*Katsuwonus pelamis*)
 - 6.1. Examination of data available on skipjack.
 - 6.2. Evaluation of skipjack stock conditions.
7. Other tunas and billfishes.
8. Any other matters.
9. Future activity of the Sub-Committee.
10. Election of Officers.
11. Date and place of next Meeting.
12. Adoption of Report and Recommendations.
13. Adjournment.

*Addendum 2 to
Appendix 3 to Annex 6*

Estimates of Population parameters

YELLOWFIN TUNA

<i>Source</i>	<i>K</i>	<i>L_∞</i> (<i>m</i>)	<i>t₀</i> (<i>month</i>)	<i>M</i>	<i>F</i>	<i>Z</i>
SAKAGAWA, 1971	0.035	194.8				
LE GUEN, 1971 ⁽¹⁾	0.0319	191.7	6.25			
PIANET et LE HIR, 1971				<i>M_c</i> = 2.61 ⁽³⁾ <i>M_s</i> = 1.50	0.88 ⁽²⁾	<i>Z_c</i> = 3.56 <i>Z_s</i> = 2.31
HAYASI, 1970				0.8	0 to 2.8 ⁽⁵⁾	
LENARZ, 1971				0.8 1.0		

- (1) Improved estimates of average growth of yellowfin in surface fisheries in Gulf of Guinea during 1967-1968.
- (2) Pointe Noire population — average factors obtained with regard to French fishery with pole-and-line and small purse seiners.
- (3) *M_c* = apparent natural mortality rate estimated on basis of results obtained from pole-and-line fishery.
M_s = apparent natural mortality rate estimated on basis of results from seiners.
- (4) Values utilized.
- (5) Fishing mortality resulting from longline fisheries 1957-1966.

BLUEFIN TUNA

Source	K	L_{∞} (m)	t_0 (month)	M	F	Z
RODRÍGUEZ-RODA, 1970	0.09	355.84	-0.89			
ROBINS, 1963	0.14	220	0			
YUKINAWA, 1970 ⁽¹⁾ . .				0.2 0.6 to 1.0 ⁽²⁾		

(1) Southern bluefin.

(2) 0.2 from 3 to 7 years -- 0.6 to 1.0 for older fish.

ALBACORE

Source	K	L_{∞} (m)	t_0 (month)	M	F	Z
BARD, 1971	0.175	144.5	1.98			
DAO et BARD, 1971 . . .				0.2 ⁽¹⁾		1.2
BEARDSLEY, 1970 ⁽³⁾ . .						1.40 ⁽²⁾

(1) Estimated natural mortality rate.

(2) Not including the value for 1968 (0.43).

(3) Paper presented at last meeting.

*Addendum 3 to
Appendix 3 to Annex 6*

Estimating of optimum size in the New England bluefin fishery

The calculations used in estimating the optimum size are set out in the table. The numbers at each age have been estimated as the sum of the percentage in each year, 1962-1971, and are set out in the third column. These have been multiplied by the mean weight at age to give the index of total weight of fish caught in each age group (fourth column). These numbers and weights have been summed (fifth and sixth columns) to give the total numbers and weights of fish of each age and older. These are then used to calculate the average weight (\bar{W}) of fish equal to or older than any given age. Finally, the ratio W/\bar{W} is calculated. This ratio can then be compared with the exploitation rate E to determine whether or not the release of fish of a given age would lead to an increase in total yield.

For example, the average weight of fish in the New England catches 2 years old and older is 45.4 lbs., while the weight of 2-year-old fish was only 22 lbs. The total weight caught would therefore be increased if the exploitation rate, E , is greater than $22/45.4 = 0.48$; for each fish of 22 lbs. released, a weight E times 45.4 would be caught, giving an increase if $E > 0.48$. It will be seen that the critical value of E as measured by W/\bar{W} increases with age. The present exploitation rate in the New England fishery, as judged from the results of the tagging experiments, is 0.25-0.30. This estimate is not corrected for loss of tags. The optimum age at first capture, so far as this fishery is concerned, is therefore rather greater than one year, or about 5 kg.

It should be stressed that these calculations make no allowance for possible captures outside the New England fisheries. Certainly some will take place, which would increase both the average weight and, to a small extent, the exploitation rate. The above estimate is therefore a lower limit to the optimum size at first capture, so far as the Atlantic bluefin fishery as a whole.

This emphasizes the need to understand the stock structure of bluefin tuna in the North Atlantic. Since fishing on larger bluefin is much more intense on the eastern than on the western side, it may be that, if the fish on each side are to a large degree separate, raising the age at first capture in the New England fishery would not increase the yield of the larger tuna, and the above estimate of the optimum size at first capture for the New England fishery would apply also when considering the fishery as a whole. On the other hand, if mixing is high and the exploitation rate among the big fish is large, then optimum size at first capture, considering the fishery as a whole, might be considerably higher.

**Example of calculation of optimum size at first capture of bluefin tuna
in the New England fishery**

<i>Age</i>	<i>Weight lbs.</i>	<i>N</i>	<i>NW</i>	ΣN	ΣNW	\bar{W}	W/\bar{W}
I	9	142	1278	199	42234	42.2	0.213
II	22	353	7766	857	40956	47.8	0.484
III	45	252	11340	504	33190	65.8	0.684
IV	70	146	10220	252	21850	86.7	0.808
V	100	77	7700	106	11630	109.7	0.912
VI	130	21	2730	29	3930	135.5	0.960
VII+	(150)	8	1200	8	1200	150	1.0

Appendix 4 to Annex 6

**REPORT OF SUB-COMMITTEE ON STOCK IDENTIFICATION
(Lisbon, April 1971)**

I. Introduction

The Sub-Committee on Stock Identification met in the library of the Centro de Bioceanologia e Pescas - J.L.U., Restelo, Lisbon, April 5-9, 1971. The meeting was under the chairmanship of Dr. A. C. Jones, and Mr. S. N. Tibbo acted as Rapporteur. Members from Brazil, Canada, France, Portugal, Spain, and the United States of America and participants from FAO, IATTC, and ICCAT headquarters were present.

Mr. Vasco Valdez, Chairman of the Standing Committee on Research and Statistics, welcomed the assembly and pointed out that under its terms of reference the Sub-Committee was obligated to further the solutions of stock identification problems for the different species of tunas and tuna-like fishes in the Atlantic Ocean and adjacent seas. He further noted that particular emphasis and immediate priorities should be placed on the development of tagging programs, including species priorities, types of tags to be used, methods of application, design of experiments for measuring dispersion and mortality and the publicity and reward systems required for tag recovery.

A list of working papers tabled for and considered during the meeting is contained in Addendum 2.

II. Agenda

The Convenor (Dr. Jones) thanked the host country for making arrangements for the meeting and presented a draft agenda which, after minor modifications, was adopted (Addendum 1). He pointed out that stock identification was basic to stock assessment. He further noted that tagging, meristic, morphometric, parasite and biochemical techniques should all be considered, but that the ICCAT Council had asked the Sub-Committee mainly to consider tagging at its first meeting.

III. Purpose of Meeting

The Convenor outlined the objectives of the meeting under four general headings:

- (a) To identify the problems of stock identification of Atlantic tunas and billfishes in order of priority.
- (b) To encourage and foster the continuation of national tagging programs.
- (c) To plan and expedite certain tagging programs; and
- (d) To organize an exchange of information on tag types and tagging techniques in current use.

IV. Name of Sub-Committee

There was some discussion of the name (Sub-Committee on Subpopulation Identification) which had originally been ascribed to this Sub-Committee by the Standing Committee on Research and Statistics. It was unanimously agreed that:

- «Sub-Committee on Stock Identification»
- «Sous-Comité pour l'Identification des Stocks»
- «Sub-Comité de Identificación de Stocks»

was a more accurate description of the purpose and responsibilities of the Sub-Committee than the name which had been suggested originally, and it is recommended to SCRS that the name be changed as indicated.

V. Present Status of Tagging

As background information the Convenor requested that member countries indicate their past experiences and future plans for tagging tunas. Reports were as follows:

France. Two ISTEP research vessel cruises are planned for 1971. The first (May 23 to July 9) will be carried out near the Azores. The program will include tagging and studies of parasites with emphasis on albacore. The second cruise (August 16 to October 1) will include areas northwest of Cape Finisterre, Bay of Biscay and West Ireland. As many albacore and bluefin as possible will be tagged with WHOI «H» type tags (Akyüz 1970, p. 85) for large albacore and IATTC type tags (Akyüz 1970, p. 71) for small albacore.

The ORSTOM program has set a target of 2,000 yellowfin and skipjack tagged by personnel of the Dakar, Abidjan, and Point Noire laboratories in 1971; the IATTC type tags will be used exclusively.

Spain. The Instituto de Investigaciones Pesqueras in Cádiz has been involved with tagging programs since 1960 and concerned with possible relationships between Atlantic and Mediterranean bluefin. During this period 312 individuals were tagged and 19 recaptures were made. All of the fish were over 200 cm long when tagged. Hydrostatic, Floy IA, and WHOI tags (Akyüz 1970, pp. 53-58) have been used, but the metal dart tag is now preferred. The program for 1971 is uncertain because of anticipated difficulties in obtaining fish to tag. The possible availability of purse seiners and personnel for yellowfin and skipjack tagging off the west African coast from Freetown to Abidjan was indicated.

Portugal. The tuna research program for 1971 includes albacore tagging early in the year and yellowfin tagging late in the year. Portugal would like these operations to be coordinated with ICCAT sponsored tagging programs. The 1971 targets are 250 to 500 fish in each of these areas (Azores, Angola, Gulf of Guinea). In 1972 it is proposed to tag 3,000 fish. Tagging would include skipjack and bigeye.

Brazil. Brazil has neither a large scale fishery nor research program for tuna. There is a seasonal fishery for blackfin tuna off the northeast coast of Brazil. The present fishery is mainly within Brazilian territorial seas, but cooperative tagging programs with other countries can be arranged through ICCAT. The development of a tagging program for other tunas in Brazil will be influenced by the recommendations of the ICCAT Sub-Committee on Stock Identification, and assistance in the form of expert advice will be required.

Canada. Continuation and expansion of a cooperative program with sport fishermen to tag large bluefin is anticipated. Small bluefin off the coast of New Jersey will be tagged on an opportunistic basis and such tagging may include skipjack. Yellowfin tagging in the Gulf of Guinea is possible, but unlikely. The tagging of swordfish and longline-caught tunas off the coast of Nova Scotia is uncertain at present.

United States of America. It is expected that personnel from the National Marine Fisheries Service (NMFS) will be available for tagging yellowfin in the eastern Atlantic. Tags and funds to pay for fish are available, but assistance is required if tagging is to be done from baitboats as recommended by the Sub-Committee. The ongoing program of the Woods Hole Oceanographic Institution in the northwest Atlantic will include mainly bluefin tuna and white marlin, but other species also will be tagged. Most of the effort will be on sport-caught fish.

Experiments to compare (a) return rates for free-swimming fish vs hook-and-line or net-caught fish and (b) relative effectiveness of different types of tags are contemplated.

VI. Coordinated National Programs 1971

A. *Yellowfin.* The U.S.A., France, and Portugal agreed to carry out a cooperative tagging program off the west coast of Africa during 1971. Tagging will be done chiefly from baitboats, but also (opportunistically) from purse seiners. The U.S.A. offered to provide additional funds and personnel and France expects to have baitboats and a research vessel available for the operation. Many of the details are pending. Skipjack will also be tagged, if available. There is a possibility of Spanish and Canadian contributions to the program.

B. *Albacore.* France (ISTPM) has plans for a study of albacore populations in the Azores area using parasites as a biological tag and for tagging off the Bay of Biscay. Portugal offered to participate in this program in the vicinity of the Azores with boats and personnel for tagging and biological observations. It was pointed out that most French tags are returned by Spanish fishermen and there is a need for more publicity for all tagging programs.

C. *Bluefin.* Canada and the U.S.A. will attempt to arrange a large scale tag testing project using small bluefin in the northwest Atlantic. Details of the extent of cooperation are not yet known, but it is tentatively planned to tag from purse seine vessels during the late summer months. France agreed to support this program by doing a similar kind of tagging in the eastern Atlantic (alternate use of nylon and metal dart tags).

D. *Blackfin.* Brazil expressed an interest in a cooperative program to tag blackfin off the northeast coast of South America and requested cooperation from ICAAT member countries.

VII. Description of Tag Types and Tagging Techniques

Reports on the tag types and tagging methods currently in use by their respective organizations were presented by Dr. W. H. Bayliff and Mr. F. J. Mather, III.

A. *General* (Bayliff)

It was pointed out that tagging techniques continue to improve as a result of experimentation with new methods. It is desirable to standardize tag types and tagging techniques in order to be able to compare the results of tagging done at different times and places, but this should not be done at the expense of failing to develop better procedures. Methods that work best for one area, species or type of gear may not work for another area, species or type of gear, and tags that are best for one species may not be best for another species.

The returns for yellowfin tuna are significantly higher when the fish are double tagged. This has proved to be the case for several large experiments carried out in both warm and cool water, so there is little doubt that this species should be double tagged. The returns for skipjack have been slightly higher for single-tagged fish, so a tentative decision was made to single tag this species from now on.

It was pointed out that tuna, while in the process of being tagged, usually cease to struggle if their eyes are covered.

B. *Baitboat and Purse Seine* (Bayliff)

The methods of baitboat tagging employed by IATTC have been summarized by Fink (1965) (Document 10). The principal change effected since then has been that the holder for needles and unused tags is no longer attached to the cradle, but kept a short distance from it so that fish are not accidentally dropped on top of it.

Purse seine tagging has been carried out successfully by IATTC for yellowfin but not for skipjack (Document 9). The tagging is conducted aboard the seine skiff, one tagging crew working in the bow when the tagging is opportunistic and one tagging crew working also in the stern when the vessel is chartered. On chartered trips each crew consists of about three fishermen and one or two research workers. The tagging is always done by a research worker, so if a tagging team consists of only one research worker or if the second research worker does not record, the tagger must use a tape recorder to record pertinent information. The fish are removed from the net by hand by a man standing in a rack suspended from the side of the skiff or with a dipnet by a man standing in the skiff. The fish are held on a naugehyde-covered foam plastic pad while they are being tagged. This pad has marks on it for measuring the fish. About 200 to 500 fish can be

tagged per set on chartered cruises and about 5 to 50 fish per set on opportunistic cruises. The returns are highest for fish released after the shortest periods of confinement in the net, and tagging should usually be terminated after about 30 to 40 minutes. The fish released during the first 10 minutes of tagging appear to be about as viable as those tagged from baitboats.

C. *Hook-and-line and purse seine* (Mather)

Woods Hole Oceanographic Institution has marked several species of tunas and billfishes over a wide range of sizes. Fish have been tagged after capture by several methods: purse seine, rod and reel, trolling, and longline.

Several tag types have been used, and a gradual improvement of tag design and construction appears to have resulted. Many of the fish, including nearly all of the billfishes and large tunas, were tagged by cooperating sport fishermen with equipment furnished by WHOL. Hook-and-line catches, except for some fish weighing less than 8 kg are tagged in the water alongside the boat. The leader (wire connecting line to hook) is grasped at a position forward of the tagger while the boat is going slowly ahead. The fish is carefully pulled into a position alongside the boat, but still in the water, and the tag, on an applicator at the end of a handle of convenient length, is inserted into it. The fish is released by cutting the leader. The larger the fish and the smaller the boat, the easier it is to tag in the water. Billfishes are preferably tagged in the «hump» behind the head and just below the anterior part of the dorsal fin. Tunas are tagged in the dorsal region below the second dorsal fin. The tag is inserted with dart pointing in a direction somewhat toward the head of the fish, if possible.

Stainless steel dart tags have proved more practical than nylon dart tags for tagging fish in the water, and also appear to be shed less rapidly. Tunas caught by purse seine are usually removed from the water with dipnets and tagged in the seine skiff.

Return rates for small bluefin caught after capture by rod and reel have been remarkably high, but those for billfishes and large bluefin tuna caught by this method have been low. This is probably a result of tagging mortality as well as high natural mortality relative to fishing mortality. Experiments to compare tag types and to evaluate the harpooning of tags into free-swimming fish (large tunas and billfishes) are considered important.

VIII. Development of Tagging Programs

To facilitate the development of tagging programs the Convenor established the following working parties to consider needs for the various species. The leaders' names appear first.

- a) Yellowfin. Messrs. JONES, LETACONNOUX, VALDEZ, and BAYLIFF.
- b) Bluefin. Messrs. TIBBO, MATHER, LIMA DÍAS, RODRÍGUEZ-RODA, ALONCLE, and BAYLIFF.
- c) Albacore. Messrs. LETCONNOUX, LIMA DÍAS, RODRÍGUEZ-RODA, and ALONCLE.
- d) Billfish. Messrs. MATHER, TIBBO, VALDEZ, and RODRÍGUEZ-RODA.
- e) Skipjack. Messrs. ROSADO, JONES, PAIVA, and BAYLIFF.
- f) Blackfin. Messrs. PAIVA, MATHER, and BAYLIFF.

The reports of the above working parties follow.

A. Report of the Working Party on Yellowfin Tuna Tagging

1. Introduction

In 1969 the total catch of yellowfin tuna for the Atlantic Ocean was 70,900 metric tons, of which 23,700 tons were taken by longline and 46,500 tons by surface gear (purse seine and live bait) (ICCAT/CON/70/39, App. 5, p. 13).

A concern of the Commission is the maximum sustainable yield in the Atlantic Ocean. The 1970 Report of the ICCAT Sub-Committee on Stock Assessment stated that «the Atlantic yellowfin may be divided into a number of more or less independent groups — which would complicate the study of the effect of fishing on these groups. More studies are needed, and tagging would be particularly useful» (ICCAT/CON/70/39, App. 5, p. 2).

We outline below a proposed program to be recommended for adoption by ICCAT which has as its goal the definition of yellowfin tuna stocks in the Atlantic. This program suggests that the tagging method be used, but we point out that the principal concern is that of stock definition and we plan at a later time to submit recommendations for studies of the stock structure of yellowfin, utilizing techniques other than tagging.

2. General plan

We recommend that yellowfin tuna be tagged in the surface fisheries in the eastern tropical Atlantic. (Tagging of longline-caught fish is generally unsuccessful because of low catch rates and poor condition of the fish at capture.) Tagging should begin in 1971. We believe that the results from the first two years of tagging should be used to formulate hypotheses on stock structure of this species which can be tested by future tagging experiments or by other methods.

3. *Tagging platforms*

The surface fishery for yellowfin in the eastern Atlantic is presently carried out both by baitboats and purse seiners. The approximate numbers of vessels believed to participate in the fisheries are 28 baitboats and 70 seiners.

Tagging should be carried out from both types of vessels to obtain representative coverage. At the start of the program we believe it is more desirable to give priority to tagging from baitboats, since it appears that with a given effort more fish can be tagged from baitboats than from purse seiners (Fink and Bayliff 1970, p. 12). Fink and Bayliff also point out that, in terms of cost per fish tagged, paying for the fish tagged from baitboats (and thereby having access to the most desirable fishing spot on the vessel or having a commercial fisherman catch the fish for tagging) is more efficient than opportunistic tagging (where the scientific team catch their own fish).^{*} Another advantage to tagging bait-caught fish is their better survival compared to seine-caught fish (16.7 per cent return compared to 3.3 per cent return in comparable experiments; Fink and Bayliff 1970, p. 13), although survival of seine-caught fish tagged in the first 10 minutes of tagging is comparable to that of bait-caught fish (Document 9).

Some countries may have access only to seiners and may therefore elect to tag from these vessels.

4. *Tags to be released*

In the first two years of the program, tagged yellowfin should be released throughout the eastern Atlantic surface fishery to determine:

- (a) General migration patterns.
- (b) Stock structure.
- (c) Seasonal and areal pattern of recruitment to the longline fishery.

IATTC and received only one tag return from the longline fishery of a yellowfin tuna originally caught by surface gear. It may be necessary to tag large numbers of fish to answer this question.

We propose that 4,000-6,000 tags be released in the first year and 10,000 in the second year to provide a sufficient number of returns on which to base conclusions. These suggested numbers are based in part on an expected return rate of 10-20 per cent (IATTC, personal communication).

Fish under about 100 cm (44 pounds) can be tagged fairly easily from seiners and fish under about 85 cm (25 pounds) can be tagged fairly easily from baitboats (IATTC). We expect that the majority of fish tagged from baitboats in the Atlantic will be less than 25 pounds.

^{*} On opportunistic cruises tagging is incidental to the regular fishing operation, whereas on chartered cruises there is sole or exclusive use of the vessel or the fishermen are paid for the fish released.

Based on tagging experience by IATTC, the expected number of fish tagged might be:

Type of vessel	Expected tagging rate (tagged fish released per man day)	Expected number of tagged fish released ¹
Baitboat (opportunistic)	6.9	1,260
Baitboat (charter)	51.6	9,360
Baitboat (charter)	(20) ²	(3,600)
Seiner (opportunistic)	12.5	2,250

1. 90 boat days, 2 taggers per boat.

2. We have selected the expected rate of 20 for planning and budgeting this program.

The particular areas and seasons in which yellowfin are released are not critical to the initial goal of determining stock structure and migration.

Tagging effort should be where and when the most fish can be tagged but also should be dispersed as much as feasible in space and time. Principal fishing seasons appear to be:

- (a) U.S. and Canadian seiners have operated mainly June to November.
- (b) French seiners and baitboats have operated at different seasons in different areas:
 - Point Noire. May to October or November (Marcille and Poinard 1970).
 - Abidjan. October to June (Baudin-Laurencin and Robert 1970).
 - Dakar. October or November to May or June (Champagnat 1968).
- (c) Portuguese boats have operated in:
 - Angola (Benguela) (primarily skipjack). Mid-September or October to late April or May.
 - Other areas. Information on Portuguese fisheries in other areas was not available at the time of the meeting.
- (d) Japanese purse seiners and baitboats have operated on yellowfin mostly in the latter half of the year in the Gulf of Guinea.
- (e) Spanish purse seiners and baitboats have operated mostly from March through December from Freetown to Abidjan.

5. Tagging methods

Tagging methods used for yellowfin are reported in detail in Document 9 for seiners and Document 10 for baitboats. These two reports are useful guides to procedures.

a) Tag Type

(1) The tag used by IATTC (Akyüz 1970, p. 71) is recommended at this time as the standard tag to be used in ICCAT tagging programs for yellowfin tuna, because of its long-term use and experience with Pacific yellowfin. In some cases and for some species tags with stainless steel dart heads (Akyüz 1970, pp. 83, 85) have shown longer retention and thus higher rates of return than tags with the nylon dart heads. We recommend that an experiment to compare these two types of tags on yellowfin tuna be carried out in the second year of the tagging program.

(2) Double tagging should be used to increase the probability of return. We propose that yellowfin tuna be tagged (a) with two nylon dart-head tags or (b) alternate fish be tagged with two nylon dart-head tags and with two tags of a different type for comparison. The additional time and expense represented by double tagging is probably more than repaid in terms of the additional number of returns from a given number of fish tagged.

b) Recovery data

(1) A standard form for reporting recovery data should be adopted.

(2) The information on the area and date of capture of the fish or where the tag was found, the species of fish and its length should be forwarded to the return address listed on the tag.

B. Report of the Working Party on Bluefin Tuna Tagging

1. Introduction

The commercial fishery for bluefin tuna (*Thunnus thynnus*) is comparatively small, with annual landings (1964-68) ranging from 20,000 to 36,000 metric tons or from 5 to 10 percent of the total catch of tuna-like fishes in the Atlantic Ocean and adjacent seas. Nevertheless, the fishery is of considerable importance in some areas such as Norway, Bay of Biscay, Mediterranean Sea, southern Atlantic coasts of Spain and Portugal, northwest coast of Africa, and northeast coast of U.S.A.

The bluefin stock as a whole is probably small, although accurate assessment is impossible at present. There is convincing evidence that the group of bluefin off New England is small and heavily exploited. Less is known about the group or groups which support larger fisheries in Europe, but available evidence indicates that these groups are also small and heavily exploited.

The most successful tuna tagging programs to date have been concerned with bluefin, and the results show substantial movements north and south along the North American and European coasts and in both directions across the Atlantic.

There is, however, a need for additional information on the various groups and their relationships to each other. The Standing Committee on Research and Statistics in its 1970 Report (ICCAT/CON/70/39, App. 5, p. 7) states that «It seems obvious... that either there is a single stock of bluefin in the whole Atlantic or that there are several stocks with a high degree of mixing between them.»

2. General plans

It is recommended that present national programs for tagging bluefin tuna be continued and that additional work be undertaken with the support of ICCAT. Priorities should be placed on the Mediterranean Sea and the Atlantic area adjacent to it, the Caribbean Sea and the New England coast.

It is also recommended that an experiment on comparison of tags, which may be useful for all tuna tagging programs, be carried out on small bluefin.

3. Operations

a) For stock identification purposes it is proposed to tag: (a) 500 small bluefin each year in three areas: Bay of Biscay, Mediterranean Sea, and Atlantic coast of Morocco, (b) 200 small and 100 large bluefin in the Bahamas area, (c) 200 large bluefin off the coasts of Canada and northeast U.S.A., and (d) 100 large bluefin off the south Atlantic coast of Spain.

b) For tag comparison experiments it will be necessary to tag 1,000 small bluefin, and it is desirable to have this done as early in the program as possible. It is suggested that the experiment be carried out off the coast of New England during the summer of 1971. Details of the project and its purposes are as follows:

Evaluation of tag types

Data on the returns of fish tagged with two types of tags can be used to evaluate the relative effectiveness of the tags and to estimate tag shedding rates and mortality due to tagging.

Relative mortality plus shedding

About 1,000 fish should be tagged, the first with two type-A tags, the second with two type-B tags, and so on. About 300 to 400 returns should result and this should be more than sufficient to determine which of the two types of tags gives greater overall returns.

Relative shedding

Some of the fish in the previous experiment will be returned with two tags and some with one. Comparison of ratios of the former to the latter

for the two types of tags should establish which type is less susceptible to shedding.

True shedding

The true rates of types 1 and 2 shedding for the type of tag which is chosen can be estimated best from large numbers of returns (say 500 to 3,000) from double-tagged fish. Data from several years of tagging can be combined for this purpose.

True mortality

The rates of types 1 and 2 mortality due to tagging can theoretically be determined by a method used by Joseph and Calkins (1969) for skipjack in the eastern Pacific Ocean.

Tags and tagging methods

For all large bluefin tagging it is recommended that stainless steel dart tags similar to the WHOI «H» type be used exclusively.

For small bluefin either nylon or stainless steel darts can be used pending the results of a tag testing experiment.

Experience with tagging longline-caught fish has been disappointing; tagging such fish is not recommended. The best returns from large fish have been from those caught in traps or seines. Tagging by sport fishermen has been much more successful for small bluefin than for large bluefin.

A method for tagging free-swimming bluefin has recently been developed (Document 13) and should be tested whenever there is an opportunity to do so.

4. Budget

No special budget for bluefin tagging is suggested. In some cases national budgets may be inadequate, and ICCAT might be requested to support the program.

C. Report of the Working Party on Albacore Tagging

During recent years total catches of albacore in the Atlantic varied between 77,000 and 85,000 tons annually, about half coming from the surface fisheries in the northeast Atlantic.

This part of the catch, which consists mainly of fish between 50 and 80 cm long, is taken from June to November by Spain, France, and Portugal. A decrease in the catch per unit effort has been observed in recent years.

Although the tagging programs undertaken for this species are too limited to provide data on fishing mortality, the Working Party recommends their continuation and extension off the European coast, and if possible in other parts of the Atlantic where surface fisheries exist. This, in the first stage, will permit the collection of information on the distribution of the different stocks and the possible relationships between them.

In a second stage, it would be desirable to plan a large-scale experiment off the Bay of Biscay and the Iberian Peninsula.

For 1971 France (ISTPM) plans two operations: one cruise of «La Pelagia» in May and June in the Azores area for the study of the number of stomach parasites and for collecting data on the populations which had already been indicated by such a technique, and a second cruise in August and September east of 18°W longitude for tagging as many fish as possible from the fishery. If circumstances are favorable, 400 albacore are expected to be tagged.

Portugal (IBM and CBP) plans to collaborate in the above program, particularly by tagging in the vicinity of the Azores (250 to 500 fish) and collecting samples of stomachs for the study of parasites.

D. Report of the Working Party on Billfish Tagging

1. Introduction

Billfish are widely distributed over the Atlantic and adjacent seas, but little is known about the identity of the stocks. Tagging has been carried out in the western North Atlantic, mainly through the cooperation of sport fishermen, but there has been some tagging of swordfish (*Xiphias gladius*) in the commercial fishery.

The average weight of swordfish caught in the northwestern Atlantic declined alarmingly after the initiation of longline fishing, and tagging seemed important. However in 1971, fishing for swordfish was discontinued; hence it seems impracticable to tag swordfish now.

Considerable progress has been made in studying migrations of white marlin (*Tetrapturus albidus*) and Atlantic sailfish (*Istiophorus platypterus*) through tagging by cooperating sport fishermen, and a few returns have been obtained for blue marlin (*Makaira nigricans*). An annual migratory pattern has been found for the stock of white marlin which occurs in summer off the east coast of the U.S.A. between Cape Hatteras and Cape Cod. During other seasons, this stock is in southern waters and evidently mixes with other stocks about which less is known. All tagging and returns for Atlantic billfishes have been north of the Equator and west of 35°W longitude. There are several apparently separate stocks of billfishes in the remainder of the Atlantic.

The billfishes are of considerable importance to some local and high seas commercial fisheries, and also to many sport fisheries.

2. Operations

The present status of fisheries and priorities does not seem to justify the expenditure of ICCAT funds for actually tagging billfishes. On the other hand, it is suggested that ICCAT encourage the tagging of billfishes by sport fishermen, particularly in regard to developing tagging programs in new areas, and make every effort to encourage the return of tags with recapture data for billfishes as well as tunas. ICCAT should also encourage experiments with the new technique of harpooning tags into free-swimming billfishes.

Tagging should be carried out from sport fishing boats with tags issued to fishermen, captains, or boat owners. Useful intermediary contacts for this are fishing club and fishing tournament officials, International Game Fish Association representatives, fishing fleet operators, dockmasters, and other outstanding persons in the various sport fishing groups.

The most effective tag for this purpose is the type H tag (Akyüz 1970, p. 85). Fish should be tagged in the water, bringing them gradually alongside the boat as it moves slowly ahead. They should be released by cutting the leader as close to the hook as possible.

3. Coordination

ICCAT should coordinate and encourage billfish tagging by (1) finding new areas where tagging would be possible, (2) attempting to interest leading persons in these areas in tagging, and (3) interrogating local fishermen directly or through questionnaires in regard to their willingness to cooperate. Such areas include: several of the Caribbean islands, Rio de Janeiro, Brazil, some localities on the west coast of Portugal and on the Atlantic coast of Morocco, and possibly some localities in the Mediterranean. ICCAT representatives should maintain interest in the program by contacting local leaders periodically, reporting results of the program and reminding them of its importance. They should encourage them to secure the prompt and accurate reporting of taggings, and return of recovered tags.

The Working Party does not recommend expenditure of ICCAT funds for billfish tagging. It does recommend, however, that ICCAT:

- a) Send a letter of appreciation to leading sport fishermen and fishing clubs for their cooperation in tagging billfishes and for the results obtained to date and urge these sport fishermen to continue and increase their tagging of billfishes.
- b) Encourage tagging of billfishes by sport fishermen in any new areas where it is feasible.
- c) Include billfishes with tunas in any general publicity, posters, etc., to encourage the return of tags with recapture data.

E. Report of the Working Party on Skipjack Tuna Tagging

1. General plan

It is recommended that skipjack tuna be tagged in the baitboat fisheries of the eastern tropical Atlantic. Skipjack is the major species in the catch of the Japanese baitboat fishery in the Gulf of Guinea (7,000 to 20,000 tons) and the Portuguese baitboat fishery in Angola (12,000 tons). Skipjack also are caught in the seine fisheries of France, Spain, Canada, and the U.S.A. in this area. Although small, the Angola fishery offers special interest because it is not unusual for zero-age-group skipjack (34 cm long or smaller) to be caught and also because it seems to be on the southern fringe of the distribution of this species along the coast of Africa.

Skipjack should also be tagged opportunistically whenever they are caught during tagging operations for other species, mainly yellowfin. Conversely, yellowfin should be tagged opportunistically whenever caught in skipjack tagging operations.

2. Tagging platforms

The tagging at Angola should be carried out from chartered local baitboats by teams based at Benguela and Maçammedes. Since these two tuna fishing centers are about 400 miles apart and have, as a rule, different fishing seasons, it is impossible to say in advance which will be the better area. Tagging in Angola should be carried out October through January, as these are the peak months of the fishery.

3. Tags to be released

It is recommended that about 6,000 skipjack be tagged in the first year and 10,000 in the second year. We suggest that approximately two-thirds of these fish be tagged from Japanese and one-third from Angola baitboats.

4. Tagging methods

Skipjack should be single tagged rather than double tagged, as IATTC has obtained higher returns per fish tagged by the former method. Nylon dart tags (Akyüz 1970, p. 71) will be used initially, as this type of tag has been used successfully on skipjack by IATTC and other organizations. Skipjack should be tagged «under the arm» of the fishermen, as this technique seems to be less harmful to the fish.

5. Conclusion

It is difficult to assess at this stage the cost and success of these operations. We recommend, however, that a pilot experiment be carried out in Angola as

soon as possible to observe both the reactions of the tuna schools when tagged fish are released, and also to assess the level of cooperation from the local fishermen. Tags for this pilot operation could be obtained from ICCAT.

F. Report of the Working Party on Blackfin Tuna Tagging

1. Introduction

Blackfin tuna are fished primarily near Cuba and near Rio Grande do Norte State, Brazil. In addition, this species is caught by research vessels and sport fishermen in the western Atlantic, from Cape Hatteras to Rio de Janeiro.

Blackfin tuna appear to be an important potential resource in coastal waters of the entire western tropical Atlantic. This justifies research on this species.

2. General plan

It is recommended that blackfin tuna be tagged in Brazil and in northern areas mainly around Cuba to determine whether there is interchange of fish between these two areas and also to learn something about migrations within each of these areas.

3. Tagging platforms

The fishing in Brazil is pursued by about 60 small sailboats, each of which catches an average of about five fish per day from October to December (about 300 fish per season), using trolling lines during the daytime. The fish range from about 40 to 70 cm in length and 3.5 to 7.0 kg in weight.

If two of these boats are used for tagging throughout one season, 500 fish can easily be tagged. As fishing in Cuba is pursued all year around, it is hoped that at least the same quantity of fish might be tagged by the Centro de Investigaciones Pesqueras in Cuba. Also, research vessels of the Caribbean Fisheries Development Project of FAO and sport fishermen operating in the area of blackfin tuna distribution should be requested to tag this species on an opportunistic basis.

4. Tagging methods

Since little is known about tagging of blackfin tuna, it is recommended that the fish be alternately single and double tagged. This procedure should result in useful information concerning the best method of tagging, even if the results in regard to migration are of limited value. The exact methods of tagging will be determined by experience, but it is recommended that in Brazil attempts be made to tag the fish under water, using a rack attached to the side of the boat.

IX. Role of the ICCAT Secretariat in Tagging Programs

It is the understanding of the Sub-Committee that most tagging programs will be national responsibilities. However, the Commission can play an important role in coordinating such programs and it is therefore recommended that the Secretariat:

A. Purchase and maintain a supply of tags that can be used by member countries for special tagging experiments and for which it is not practical to obtain their own supply. (Details of sources and costs of tags are contained in SCRS/71/4a, Appendix IV.) Maintain a list of the serial letters used by the various national agencies for tuna and billfish tags, so that, insofar as possible, the serial letters are not duplicated.

B. Purchase and maintain a supply of basic equipment used in tagging from both baitboats and seiners; this equipment would be available for loan to member countries.

C. Establish a fiscal accounting system to enable the transfer of funds between countries. This system should allow one country to charge the expenses of buying fish for tagging or other expenses against funds obligated for those purposes by another country.

D. Publicize tagging experiments in the following ways:

- 1) Circulate information at periodic intervals on the various tagging experiments that are planned or are in progress. The Secretariat should ask member countries to submit promptly information on tagging experiments planned or completed.
- 2) Arrange for the printing of reward posters and notices and their distribution to national agencies and tagging correspondents. (Recommendations of an ad hoc working group are contained in SCRS/71/4 (a) Appendix V.)
- 3) Conduct an annual lottery using tag numbers submitted to the Secretariat.

E. Pay rewards as recommended in the guidelines established by the Sub-Committee.

X. Tag Rewards

The Sub-Committee recommends the following concerning payment of tag rewards:

A. That, if possible, a standard amount of reward (U.S. \$2 or closest even amount of local currency equivalent) be paid by all member countries for returned tags. In any event the amount of a tuna tag reward paid by a country should be uniform within that country.

B. That the amount of the reward should not be placed on the tag.

C. That all rewards will be paid by the countries to whom the recoveries are reported, regardless of the agency that released the tags or the nationality of the reporters.

D. That the ICCAT Secretariat make the necessary arrangements with non-member countries to insure that fishermen and other persons who return tags will be paid at once by their agencies. A standard reward is preferred but it is recognized that this will not always be possible. If necessary, the rewards paid by said agencies may be reimbursed later by ICCAT.

E. That for recoveries which are sent directly to ICCAT, Madrid, the standard reward be paid by ICCAT.

F. That if the total amount of recovery rewards paid by one country exceeds the budget allocated by that country for this purpose, and reasonably based on its own tagging program, ICCAT will reimburse said country for the additional amount.

G. That a further incentive for the return of tags be provided by arranging for an annual lottery of U.S. \$300 to be conducted by the ICCAT Secretariat from among eligible tags turned in during the calendar year preceding the drawing.

XI. Recommended Budget

It is recommended that the \$10,000 allocated by the Council at its 1970 meeting for the support of tagging programs be used as follows:

Tags	10,000 at \$100/m	\$ 1,000
Tagging equipment		
Tagging needles	3,000 at \$ 0.333	\$ 1,000
Cradles	5 at \$ 60	\$ 300
Dipnets	5 at \$ 85	\$ 425
Pads	5 at \$ 25	\$ 125
Shipping		\$ 500
Posters and Notices		\$ 1,000
Travel expenses of IATTC Advisor		\$ 1,000
Rewards		
Tag rewards paid by ICCAT	\$2,000	
Lottery	\$ 300	\$ 2,300
Contingences		\$ 2,350
		<u>\$10,000</u>

The Sub-Committee noted the high cost of tuna tagging experiments, especially the charter of vessels and the purchase of fish. This should be brought to the attention of member countries for consideration in setting up national budgets for tagging.

The Sub-Committee considers that continued support by ICCAT will be essential for the success of national tagging programs and recommends that an amount of U.S. \$ 10,000 be included annually in the budget.

XII. Future Work of the Sub-Committee

A. General

The Sub-Committee believes that work on stock identification of Atlantic tunas and billfishes will need to continue for the foreseeable future and recommends to the Commission that it encourage member countries to continue tagging and to expand their studies using biochemical techniques, early life history, morphometrics, and biological tags.

It was suggested that a 2-day meeting of the Sub-Committee be held prior to the next meeting of the Standing Committee on Research and Statistics to review progress in tagging and to have an expert lead a discussion on the use of biochemical techniques for stock identification. The recommended dates for this meeting

are November 23 and 24, 1971. In the interim, members of the Sub-Committee are requested to submit to the Convenor information on, and references to, studies either completed or in progress in these areas (biochemical genetics, morphometrics, and biological tags).

B. Relation to FAO Working Party on Tuna Tagging in the Atlantic and Adjacent Seas

Dr. D. Sahrhage, Secretary of the FAO Panel of Experts for the Facilitation of Tuna Research, pointed out that since ICCAT now has a Sub-Committee on Stock Identification, the activities of the FAO Working Party on Tuna Tagging in the Atlantic and Adjacent Seas could be incorporated into the former group. Accordingly, arrangements would be made by the FAO tuna panel to disband its Working Party on Tuna Tagging. He also stated that the revised report of the Working Party on Tuna Tagging in the Atlantic Ocean and Adjacent Seas (Document 7) prepared by its convenor, Mr. Mather, would be published in final form by FAO.

The Sub-Committee decided to form a group of tagging correspondents from member countries and to invite tagging correspondents from non-member countries to participate. These correspondents would assist the Sub-Committee in its work and keep the Commission informed of tagging activities. Mr. Mather agreed to be the leader of this group for the first year.

The common interest in tuna stock studies by ICCAT and by the FAO Panel of Experts on the Facilitation of Tuna Research was noted and it was recommended that ICCAT establish and maintain communication with the Secretariat of the Panel and the appropriate Working Parties.

XIII. Conclusion

The report was approved and the meeting adjourned.

*Addendum 1 to
Appendix 4 to Annex 6*

**Agenda for Sub-Committee on Stock Identification (sCSI)
Lisbon, April 5-9, 1971)**

1. Opening of the Session:
Welcome speech by the Chairman of SCRS/ICCAT.
Introductory remarks -- Convenor.
2. Adoption of Agenda and arrangements for the Session.
3. Decision on the Sub-Committee's name.
4. Confirmation of officers.
5. Admission of Observers.
6. Interim Report of the Working Party on Tuna Tagging in the Atlantic and Adjacent Seas, FAO Expert Panel on the Facilitation of Tuna Research.
7. Discussion of proposed national tagging programs for 1971.
8. Description of tag types and tagging techniques:
 - a. IATTC - Dr. Bayliff.
 - b. WHOI - Mr. Mather.
9. Coordinated national programs 1971.
10. Role of ICCAT in tagging programs.
11. Development of tagging programs to recommend to the Commission -- Working groups:
 - a. Yellowfin tuna.
 - b. Bluefin tuna.
 - c. Albacore.
 - d. Billfish.
 - e. Skipjack tuna.
 - f. Blackfin tuna.
12. Recommendation for expenditure of ICCAT funds for tagging.
13. Future work of the Sub-Committee:
 - a. Identification of stock problems and development of research programs.
 - b. Relation to FAO Working Party on Tuna Tagging in the Atlantic and Adjacent Seas.
14. Time and place of next meeting.
15. Approval of Report of Sub-Committee.
16. Adjournment.

*Addendum 2 to
Appendix 4 to Annex 6*

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SUB-COMMITTEE ON STOCK IDENTIFICATION.

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**SUPPLEMENTARY REPORT OF SUB-COMMITTEE ON STOCK IDENTIFICATION
(Madrid, November 1971)**

I. Introduction

The Sub-Committee on Stock Identification met at Casa Sindical, Madrid, on November 22, 1971. The Convenor, Dr. A. C. Jones, welcomed the assembly and noted that the Sub-Committee had met earlier this year and had discharged most of its current responsibilities. The purposes of the present meeting, therefore, were to review the report of the previous meeting, to record progress that had been made in carrying out recommendations contained in the report and to examine future needs of the Standing Committee on Research and Statistics (SCRS) as related to the identification of stocks of tunas and tuna-like fishes.

II. General

So far as the work of the Commission is concerned, the major importance of stock identification studies lies in their relevance to stock assessment. Therefore, priorities for stock identification should be set in close association with assessment studies. Stocks studies are likely to be particularly important when fishing is concentrated in comparatively restricted parts of the total area of distribution of the species. If fishing is spread fairly uniformly over the whole area, stock separation is likely to be less important. The effect of fishing on each stock may be similar and the assessment of the effect of fishing and of the results of management measures may be much the same whether assessments are made for each stock separately or for the fishery as a whole.

Stocks may be identified with a variety of techniques, e.g. tagging, serology and biochemistry, parasites, morphometrics and general life history information. Some techniques, such as tagging, may also give information on mortality and growth, if the experiments are properly designed. The experience of IATTC in stock studies was noted. These studies are being carried out for the purpose of identifying subpopulations (of yellowfin) for purposes of management and for establishing mixing rates among these subpopulations. Tagging has given valuable information on mixing rates between areas. Genetic distinction between fish in

these different areas has been studied using (originally) blood group systems and (more recently) transferrin and esterase systems. Because of the magnitude of the sampling problems in using these systems, a recent effort has been directed toward utilizing morphometric differences, if they exist, between genetic stocks, expanding sampling capabilities with respect to the estimation of mixing rates.

Recognizing the necessity of having information on a stock-by-stock basis, the Sub-Committee *recommended* that studies on stocks of tunas and tuna-like fishes in the Atlantic be planned in consideration of:

- 1) the requirements for each species for stock information in relation to management problems, and
- 2) the possibility of obtaining information on other aspects of the biology, such as mortality and growth, from tagging studies.

III. Review of Report

The Convenor reviewed the report of the Lisbon meeting, pointing out that under its terms of reference the Sub-Committee was obligated to give priority to tagging studies. It was noted, however, that the identification of unit stocks is a basic requirement for assessment purposes and all available techniques, including biochemical methods, morphometrics, parasites and general life histories should be used. Hypotheses of stock separation should be set up, refined and examined with these techniques.

The Report of the Lisbon meeting was approved, with the additional *recommendation* that 500 small bluefin tuna be tagged each year in the northwestern Atlantic to study the effects of fishing on this stock and to explore its relationship to bluefin stocks in the eastern Atlantic.

IV. Progress on Studies

Substantial progress in the development of tagging programs and programs employing other techniques for stock identification was reported by member countries and details are contained in the various national reports.

Yellowfin

The Sub-Committee received several reports of current studies on the structure of yellowfin stocks in the Atlantic. Hypotheses on yellowfin stocks taken by surface fisheries in the eastern tropical Atlantic are based on length frequency distribution, spawning periods deduced from gonad development, seasonal occurrence of larvae and the presence of specific parasites (chiefly helminthes). Apparently it is pos-

sible to separate stocks exploited in the south (Pointe Noire region) from those in the north (Senegal-Mauritania) at least up to the ages of 3 or 4 years. The situation appears to be more complex in the central region.

The Sub-Committee strongly *recommended* that current tagging and other programs be continued and expanded in this area to provide the information necessary for assessment of these stocks.

The Sub-Committee was informed that Mr. Baudin-Laurencin of ORSTOM, Abidjan, would like to examine parasitized yellowfin from the western Atlantic. Dr. R. Cressy of the U.S. National Museum, offered to identify parasitic copepods. The offer of assistance from these scientists is greatly appreciated by the Sub-Committee.

Bluefin

It was recorded at the Lisbon meeting that in view of convincing evidence that bluefin stocks in the North Atlantic are small and heavily exploited, there was an urgent need for additional information on the identity of bluefin stocks, especially to determine whether there is a single stock or several with a high degree of mixing between them. It was therefore recommended that current national programs be continued and that additional programs be implemented.

Progress was made towards implementing the recommendation that 1,000 small bluefin be alternately double tagged with two tag types. In a joint U.S.-Canadian experiment, 575 fish were tagged in this manner and 34 of them have already been recaptured.

Dr. Joseph brought to the attention of the Sub-Committee the following recommendation from the recent (Nov. 8-12) meeting of the FAO Panel of Experts for the Facilitation of Tuna Research:

«In view of the importance of the Bay of Biscay as the only major fishing ground for young bluefin tuna (2.5-50 kg) in the eastern Atlantic, and the general decline of the eastern Atlantic bluefin fisheries, the Panel strongly *recommended* that tagging of small bluefin in the Bay of Biscay be resumed on a large scale and on a continuing basis. The Panel *noted* that this action is also needed to obtain better knowledge of interaction between the northwestern Atlantic and Bay of Biscay stocks of young bluefin tuna.»

The Sub-Committee considered this recommendation and supported it strongly, although it may be difficult to implement in 1972. It was observed that small bluefin tuna were also available both in the Atlantic and Mediterranean in the south of Spain and off the coasts of Morocco and that tagging projects should be carried on there as well.

Albacore

There is an increasing amount of information, chiefly from size composition, scale and parasite studies, that there are separate stocks of albacore in the Atlantic.

Northern and southern populations can be separated at about 10°N on the basis of size composition. In the northeastern part of the Atlantic, the population in the vicinity of the Azores has more parasites and different mean sizes for the age groups than the stocks fished off the Bay of Biscay and the Iberian Peninsula. There is also evidence that there are three unit stocks within the latter areas. Tagging off the coast of Portugal has demonstrated migrations northward and into the Bay of Biscay as the season progresses; studies of catch statistics confirm the tagging results. These «stocks» may represent only ecological units, since no genetic differences have yet been demonstrated in preliminary analyses of serum esterases.

Other species

At this meeting there was insufficient time for discussion of tagging and other techniques for identifying stocks of other species of tunas and tuna-like fishes. These species were considered at the previous meeting.

V. Future Activities

Several member countries announced their intention to carry out tagging projects in 1972 and it appears that cooperative arrangements can be made for at least some of these activities.

Bluefin tagging will include a continuation of the joint U.S.-Canada program in the northwestern Atlantic to compare retention rates of the two tag types.

Tagging of yellowfin (and skipjack) in the eastern tropical Atlantic is planned as a cooperative effort by France, Portugal, U.S.A. and Canada.

France and Portugal expect to carry out a joint tagging program on albacore in the Azores and Bay of Biscay regions.

Brazil plans to tag blackfin and is also interested in tagging programs which will examine possible relationships between yellowfin stocks on both sides of the Atlantic.

The Sub-Committee considered a request from the Spanish Institute of Oceanography that the ICCAT Secretariat provide 500 tags and an adequate supply of needles for opportunistic tagging of albacore, bluefin and yellowfin in the Canary Islands area and albacore and bluefin in the Bay of Biscay. The Sub-Committee recommended that this request be approved.

Dr. Sahrhage reported that the FAO Working Party on Tuna Tagging in the Atlantic Ocean and Adjacent Seas had completed its work and has now been disbanded. Reference was made to a decision of the Lisbon meeting that the Sub-Committee form a group of tagging correspondents from member countries under the leadership of Mr. F. Mather, who agreed to continue as leader of this group and requested assistance from the Secretariat.

VI. Secretariat Role in Tagging Programs

The ICCAT Secretariat is playing an important role in coordinating national and joint tagging programs. Tags and tagging equipment have been purchased and are available on request to countries requiring them. Information on tagging experiments has already been circulated to areas where tag recoveries may be made and posters announcing the payment of rewards and an annual lottery for tag returns are being printed in eight languages. Arrangements are also being made for prompt payment of rewards to fishermen to encourage the return of tags.

The Sub-Committee *recommended* that the annual lottery be held on March 1 each year and that in preparation for it all tag returns received in the previous calendar year be reported to the Secretariat by February 15.

The Secretariat was asked to prepare a suitable form for reporting release and recovery data on tagging. Requested information should include tag number and type, species, size, date, location and gear.

The problem of reward payments was discussed at some length and it was generally agreed that rewards should be paid by the country recovering the tagged fish, since the ICCAT Secretariat has only limited funds for this purpose.

The Sub-Committee expressed its appreciation to the Secretariat for its efforts in support of tagging programs.

VII. Budget

The Sub-Committee anticipated a continuing need for funds to support national tagging programs in some areas and strongly *recommended* that these be provided in the next biennial budget.

*Addendum 1 to Supplement to
Appendix 4 to Annex 6*

**Agenda for Sub-Committee on Stock Identification (sCSI)
Madrid, November 22 and 25, 1971**

1. Opening of the Meeting.
2. Adoption of Agenda and arrangements for the Meeting.
3. Confirmation of Officers — Admission of Observers.
4. Review and approval of Report of Sub-Committee Meeting, April 5-9, 1971.
5. National Reports on stock identification studies
 - 5.1. Summary of 1971 activities (tagging and other studies of stock identification).
 - 5.2. Discussion of hypotheses of stock identity for various species.
6. ICCAT Secretariat Report on ICCAT support to stock identification studies.
7. Review of techniques other than tagging used in identification of fish stocks and application to tuna and billfish problems
 - 7.1. Requirements for stock studies in tuna fisheries.
 - 7.2. Review of stock studies of I.A.T.T.C.
 - 7.3. Studies by Spain.
 - 7.4. Studies by France.
 - 7.5. Future meetings of interest.
8. Future research on tuna and billfish stock identification.
9. Election of Officers.
10. Date and place of next Meeting.
11. Adoption of Report of Sub-Committee Meeting, November 22 and 25, 1971.
12. Adjournment.

REPORT OF SUB-COMMITTEE ON STATISTICS
(Madrid, November 1971)

I. Introduction

The Sub-Committee on Statistics met in the Casa Sindical, Madrid, November 23-25, 1971, under the chairmanship of Dr. S. Hayasi. Delegates from Brazil, Canada, France, Japan, Korea, Portugal, Spain and the United States of America, representatives from FAO, and Observers from Gabon, Libya, IATTC, and ICES were present. After being welcomed by the Chairman, the Agenda as set out in Addendum 1 was adopted.

At its First Regular Meeting, the Council directed that priority should be given to the compilation and publication of statistics (COMM/71/15 Item 12:11). The Commission's statistical and sampling program was laid out in the 1970 Report of the Standing Committee on Research and Statistics (SCRS). At that time it was pointed out that accurate, reliable, comprehensive and up-to-date statistics and adequate sampling information are essential to the Commission's work and that it is the responsibility of the Commission and the Secretariat to ensure that these data are available. If the statistics fall short of the required standard, the Secretariat, with the help of the Standing Committee on Research and Statistics, should take active steps to ensure their improvement.

II. General

The Sub-Committee reviewed the progress that had been made in the past years in collecting and compiling statistics. It commended the Secretariat on completion and publication of the Statistical Bulletin (SCRS/71/13). A summary table from this Bulletin appears as Table 1 of this Report. The Sub-Committee, however, expressed concern that the statistical and sampling information which was submitted to the Secretariat does not fully meet the requirements of the Commission. In particular, it noted deficiencies in the adequacy, accuracy, and timeliness of some of the statistics which were submitted, and noted that already the work of the Sub-Committee on Stock Assessment has been considerably hampered by the unavailability of adequate statistical and sampling information.

The minimum data necessary to make assessments of the stocks are those classified as Task 1 (annual catch by species, flag vessel, gear and total number of vessels by type). Additional data are classified as Task 2 (catch, with corresponding amount of effort) and are necessary for more precise assessment of the stocks.

The Sub-Committee noted difficulties encountered by the Secretariat during 1971 in collecting statistics even to fulfill Task 1. Recognizing the inadequacies of the present statistical data for stock assessment and realizing the need for more complete information for this purpose, the Sub-Committee *recommended* that the Secretariat suggest how the statistics can be improved, perhaps even to the extent of providing additional financial support or personnel for the Secretariat. The plan should point out what specific accomplishments could be made in the next year and how these accomplishments would enhance the goals of the Commission. The Secretariat subsequently reported that it anticipated that Task 1 statistics for 1970 could be completed in a satisfactory manner with the addition of one person to compile the data and to visit various national statistical offices to assist them in obtaining and summarizing the required data. The Sub-Committee also *recommended* to SCRS that all national offices again be requested to fulfill the requisites laid out in Task 1 as early as possible and also establish statistical systems through which data fulfilling Task 2 would be collected. The Sub-Committee asked what specifically could be done to help member countries meet the goals of Task 1 and some elements of Task 2 by the 1972 meeting. The Sub-Committee *recommended* that it would be helpful to:

1. Request each country to name a correspondent for statistics, to be responsible for submitting statistical and sampling data for his country to the Secretariat.
2. Request each country to submit statistics as early as possible in the year following the catch, even though the figures are provisional and will later be revised.
3. Request the Secretariat to work cooperatively with FAO, where FAO technical experts in certain countries may assist with the problem of improving statistics.

The Sub-Committee expressed the desire that statistics for 1971 catches be available in time for stock assessment to be made and presented at the 1972 Council meeting. Since the assessment group may meet in advance of the Council meeting next year, it *suggested* that the Secretariat immediately circulate statistical forms to member countries and ask them to submit preliminary estimates of 1971 catches by the required date.

Three principal documents submitted to the Sub-Committee (Statistical Bulletin, draft Field Manual and Report of the Coordinating Working Party (CWP) meeting) were discussed.

III. Statistics

The Statistical Bulletin is the most complete tabulation available on Atlantic tuna fishery statistics, but, as noted above, it is still incomplete in that not all countries have reported their catches by species and gear. The country representatives were requested to supply the Secretariat with data and corrections to the Bulletin as early as possible so that Task 1 can be fulfilled. Detailed statistics in fulfillment of Task 2 were received from only four countries. These are reported in SCRS/71/15, except for two countries which had previously published these data.

It was decided that ICCAT should publish summaries of detailed catch statistics of each country, but not the detailed statistics themselves where they had already been published. Countries were asked to provide summary data along with their detailed reports to ICCAT. Offers from non-member countries to report their tuna catches were gratefully received and the Secretariat was instructed to supply these countries with the necessary forms.

In reporting statistics, member countries were asked to pay particular attention to reporting catches by flag country, in order to avoid double reporting of catches. Also, it was noted that nominal catch figures are preferred to landing figures, but in either case the time period should be that which is applicable to the unit (i.e., catch per calendar year or landing per calendar year).

The draft edition of the Field Manual was reviewed and the Convenor and Assistant Executive Secretary were thanked for their contribution in preparing the Manual. The Sub-Committee requested that countries submit comments by January 31, 1972, so that the Manual can be completed and published. It was also suggested that, before publication, the Manual be reviewed with the Convenor of the Working Party on Tuna Taxonomy of the FAO Panel of Experts for the Facilitation of Tuna Research and with the Editor of the FAO Species Identification Sheets. Species Identification Sheets included in the Manual are compatible with those being prepared by FAO for other species and will include information on the identification of juvenile tunas. Interest was expressed in the identification of tuna eggs and larvae; this subject will be covered in FAO Species Synopses which are presently being prepared for tunas and billfishes and in reports by the FAO Panel of Experts, Working Party on Tuna Eggs, Larvae and Juveniles.

The Report of the CWP Meeting, November 10-16 was discussed. ICCAT is now a member of this group. Problems of reporting tuna catches are different from the usual problems dealt with by CWP for demersal species. Nevertheless, statistical reporting systems for tuna should be designed in cooperation with CWP, so that the reporting of catches will be as easy and accurate as possible for those countries which report catches to both CWP and ICCAT.

A statistical form designed by ICCAT will be used in 1972. The success of

this form will be evaluated and reported to CWP; this may be of help in designing a general form suitable for pelagic species.

The International Commission for the Southeast Atlantic Fisheries (ICSEAF) has come into existence and will likely hold its first meeting in early 1972. The Sub-Committee realized that ICSEAF will need to consider fishery statistics problems and suggested to the Standing Committee on Research and Statistics that ICCAT extend its approval for ICSEAF to join CWP if it so wishes.

Appreciation was expressed to FAO for their cooperation and assistance with statistical problems. FAO was requested to transmit copies of tuna statistics to ICCAT as soon as received, in order to expedite processing of the data.

IV. Sampling

Sampling data on size composition of catch was submitted by four countries. These are reported in SCRS/71/16, except for one country which had previously published these data.

Sampling procedures as outlined in Part 2 of the Field Manual were discussed. Countries were requested to submit their comments by January 31, 1972. It was pointed out that the Manual includes suggested forms for reporting sampling data. Where countries have already established forms for these purposes, these will generally be satisfactory.

The representative from FAO advised the Sub-Committee that FAO has established a Fishery Data Center which will archive biological data. The Sub-Committee agreed that exchange of data inventories between ICCAT and the Center would be mutually advantageous.

The Convenor appointed an ad hoc working group to consider the problem of handling sampling data by automatic processing. The working group reported that there will be three types of data the Secretariat has to handle:

1. Catch and fleet data forwarded under Task 1. The problem is not how to process it, but how to obtain it. Since the matter has been discussed in the full meeting of the Sub-Committee on Statistics, no further discussion is needed.

2. Catch and effort data submitted under Task 2. Countries are requested to send in catch and effort data summarized by month and then by year for large areas corresponding to fisheries, e.g., Pointe Noire baitboats, Bay of Biscay trolling. In the case of longline fisheries, the catch (and effort) for albacore should be reported by regions south and north, divided at 10° north. Besides these summaries, catch and effort data required under Task 2 should be reported by each national office in the form presented in Appendix 1 of Draft Field Manual (SCRS/71/12). When the data under this heading is submitted to the Secretariat in published form, the Secretariat is requested to circulate lists of publications among scientists concerned. In the event that unpublished data are submitted, they

should be duplicated and made available to all scientists concerned until the volume of such data becomes so bulky that further action is required. Each national office has to indicate which data must be kept confidential so that the private affairs of business enterprises will not be disclosed.

3. Length composition data. Countries are requested to report length composition according to the form presented in Appendix 3-4 of the Field Manual. Some slight modification to the form was requested; it should include number of samples, total weight of samples, total weight of catches of which samples are representative and weighting factor for the corresponding catch.

Each country is requested to send to the Secretariat in addition to the detailed data, as specified in Appendix 3-4 of the Manual, estimates of total number of fish caught or landed (preferably caught) by month and then by year, by size groups of fish and by major fisheries (by gear and by area). Whether the data represents catch or landing should be clearly specified. In the case of longline fishery, quarterly summaries are requested instead of monthly summaries.

The data submitted by form 3-4 should be reported in the unit in which actual fish are measured. However, in reporting summarized data they should be converted to the upper jaw-fork length in case of tuna, and lower jaw-fork length in case of billfishes.

Data reported by form 3-4 should be kept at the Secretariat as a reference for the Working Group on Stock Assessment. Summarized data should be reproduced and circulated among scientists.

In reporting data, priority will be given to data from recent years, i.e., 1970-1971, and then data from back years will be requested.

As the deadline for reporting data it was decided that it should be received one month before the meeting of the small Working Group on yellowfin.

The Working Party noted that some of the gear categories agreed on at the last SCRS meeting should be further divided, if necessary, in certain individual fisheries. This is left to the national offices which are more familiar with the fisheries concerned.

Table 1. Total catches of Atlantic tunas and tuna-like fishes, by species, 1963-1970

	1963	1964	1965	1966	1967	1968	1969	1970 *
TOTAL	317.3	321.4	374.9	333.3	352.6	367.8	356.3	394.7
Bluefin	42.6	40.2	37.7	25.4	31.7	21.1	27.6	29.7
Yellowfin	71.5	68.0	63.9	61.3	55.7	74.5	98.6	76.1
Albacore	76.8	91.3	94.7	74.4	80.0	70.9	74.0	67.4
Bigeye	14.9	20.3	31.4	21.0	13.9	18.5	22.8	21.3
Little tuna	4.1	1.8	3.8	3.4	4.0	3.4	3.5	8.1
Spanish mackerel	11.5	11.7	12.4	13.1	12.7	15.7	14.7	11.7
Skipjack	18.4	17.0	40.9	53.4	45.2	66.6	38.0	48.7
Bonito	30.6	20.9	33.8	30.3	51.3	32.3	10.2	69.0
Frigate mackerel	7.9	6.9	9.4	7.3	11.6	8.6	15.9	19.8
Billfishes	12.4	13.2	14.0	9.0	4.9	6.6	6.2	5.6
Swordfish	12.0	13.8	12.6	11.6	12.6	13.0	14.9	15.3
Various tuna-like species	14.6	16.3	20.3	23.1	29.0	36.6	29.9	22.0

* Provisional figures.

*Addendum 1 to
Appendix 5 to Annex 6*

Agenda for Sub-Committee on Statistics (sCStats)

Madrid, November 23 and 25, 1971

1. Opening of the Meeting.
2. Adoption of Agenda and arrangements for the Meeting.
3. Present status of establishment of statistical system and presentation of total Atlantic tuna catch statistics.
4. Discussion on improvement of statistical systems.
5. Present status of sampling surveys.
6. Presentation of compiled length data.
7. Discussion on identification and standard and local names of tunas.
8. Examination of draft guidelines for sampling.
9. Future work of the Sub-Committee.
10. Other matters.
11. Election of Officers.
12. Date and place of next Meeting.
13. Adoption of Report and Recommendations.
14. Adjournment.

CHAPTER III

NATIONAL REPORTS

BRAZILIAN NATIONAL REPORT *

by

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1. Initial considerations

The fishery for tunas and tuna-like species in Brazil in recent years, is not particularly organized industrially and this is reflected in the small catches recorded.

The yield from such fishery is a result of seasonal and artisan catches along the coast, along with occasional catches made by modern fishing vessels.

Meanwhile, there is an acute national interest in developing tuna exploitation along the Brazilian coast, the initial goal being 30,000 tons per year, a figure which should be realized as soon as possible.

The Government of the Federal Republic of Brazil, through its development organizations and under the guidance of the «Superintendencia do Desenvolvimento da Pesca» currently encourages the preparation and establishment of projects destined to the industrial exploitation of tunas and tuna-like species under the auspices of modern fisheries legislation. Official grants and fiscal incentives are included.

The participation of friendly countries in said projects within competent Brazilian legislation is not only feasible but desirable looking to early achievement of the primary objective.

2. Recent Statistics

Brazilian production of tunas and tuna-like species during the year 1969-1970 as shown in Table I reached annual totals of 4,126 and 4,750 tons, respectively.

* Original Report in Spanish.

Sports fisheries effected in the Rio de Janeiro area during the 1969-1970 season recorded the capture of 263 tunas and tuna-like species, weighing 7,741 kilograms; corresponding values for 1970-1971 to date have been 276 fish weighing a total of 6,781 kilograms (Table 2).

Regarding canning, albacore is being canned on a small scale, 96 tons having been processed in 1969. Data for 1970 are not yet available.

3. Research Being Conducted and/or Planned

Research on tunas and tuna-like species in recent years has had slight development due to the current situation of our tuna exploitations. However, there are permanent research programs on the biology and fishery of blackfin tuna.

With respect to blackfin tuna, most of the research is being conducted by the «Instituto de Biología Marinha» at the Federal University, Rio Grande do Norte. These were initiated in 1964.

With the participation of research institutions in northeast Brazil and the support of the «Superintendencia do Desenvolvimento da Pesca» and the International Commission for the Conservation of Atlantic Tunas, we have initiated a tagging program along the coast of the State of Rio Grande do Norte. This involves blackfin tuna and we adhere to recommendations made by the Sub-Committee on Stock Identification held in April 1971.

Besides the above research it is our intention to reach conclusions during 1972 on age and growth of the species and to this end will use as a basis the annuli on vertebrae. We also plan to make a comparison of biometric parameters, etc., among several areas in the western Atlantic.

Table 1. Brazilian yield of tunas and tuna-like species 1969-70
(Unit = 1 metric ton)

<i>Species</i>	<i>1969</i>	<i>1970</i>
Tunas ⁽¹⁾	445	686
Bonito ⁽²⁾	432	419
Marlins ⁽³⁾	41	92
Sailfish	27	21
Swordfish	151	135
Others ⁽⁴⁾	3,032	3,397
Total	4,126	4,750

Sources: Equipo Técnico de Estadísticas Agrícolas. Ministerio de Agricultura.

(1) Bluefin, yellowfin, albacore, bigeye and blackfin tuna.

(2) Atlantic little tunny and skipjack.

(3) Black marlin, blue marlin and white marlin.

(4) Bonito, frigate mackerel, wahoo and king mackerel.

Table 2. Sports fisheries for tunas and tuna-like species during 1969-70 and 1970-71 seasons in the Rio de Janeiro area

<i>Species</i>	<i>1969-1970</i>		<i>1970-1971</i>	
	<i>No. of fish</i>	<i>Kg</i>	<i>No. of fish</i>	<i>Kg</i>
Bluefin	4	111	3	40
Yellowfin	10	350	55	665
Blue marlin	7	1,018	12	1,175
White marlin	3	103	2	73
Sailfish	226	5,982	185	4,607
Wahoo	6	145	10	177
Atlantic little tunny	7	32	9	46
Total	263	7,741	276	6,781

Source: Rio de Janeiro Yacht Club.

CANADIAN RESEARCH ACTIVITIES ON TUNAS AND TUNA-LIKE FISHES IN THE ATLANTIC OCEAN, 1970-71 *

by

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Canadian research on tunas and tuna-like fishes is concerned chiefly with general life histories, behaviour and stock assessment. Until recently most of the available manpower and financial resources were devoted to studies of swordfish, but since the abandonment of the swordfish fishery early in 1971, more attention has been given to tunas, especially bluefin in the northwest Atlantic.

A. Status of the Fisheries

1. *Swordfish*

Swordfish landings during 1970 amounted to 4812 metric tons round weight — an increase of about 11% over the 4328 metric tons landed in 1969. This reversed the downward trend in catches which started in 1964 and was due, at least in part, to greater effort and higher catch rates in the more easterly parts of the fishing area. Catches east of 50°W longitude in the region of the Grand Banks appear to have doubled in 1970. The average size of the fish was, however, smaller than in any previous year, presumably a result of a greater proportion of the total catch being made in the warmer water associated with the Gulf Stream. The larger sizes of swordfish tend to occur in colder (less than 17°C) waters.

2. *Tuna*

Canadian catches of tuna in the Atlantic during 1970 amounted to approximately 2440 metric tons round weight. Included in this total are 1160 tons of small bluefin and 400 tons of skipjack caught by purse-seiners off the east coast of the United States. Purse seining in the Gulf of Guinea accounted for 230 tons

* Original Report in English.

of yellowfin and 225 tons of skipjack. Longlines, trap nets and harpoons combined took 275 tons of mixed species that were chiefly bluefin but included some bigeye and yellowfin. An estimated 150 tons of bluefin were caught by sport fishermen, although more than 50 per cent of the total number caught (533) were released without being boated — most of them having been tagged.

B. Special Research Studies

1. *Swordfish*

Size sampling of swordfish landings was continued at a high level. Altogether 13,839 individual weights were obtained and this represents about 15 % of the total number landed during the year. Analysis of the 1970 size data show that the average weight continued to fall and was 88.4 lb (40.1 kg) dressed. In 1963, the first full year of longlining, the comparable mean weight was 172 lb (78 kg). Part of the decrease in size can be attributed to an expansion of the fishing area but the possibility of overfishing should not be ignored.

Preliminary tagging results (13 recaptures) suggest that swordfish return to the same area of the continental shelf each year and tend to remain there all summer. The results also show a tenfold greater return rate for fish harpoon-tagged while swimming free compared to fish tagged and released from longlines. A total of 74 swordfish were tagged and released during 1970; 40 large fish tagged by harpoon during a research cruise and 34 small fish which were voluntarily tagged and released from longlines by commercial swordfishermen. In 1971, 6 longline-caught fish have been tagged and released to date.

During the latter part of 1971 a new swordfish research program was initiated. It is designed to study the distribution and amounts of mercury in the organs and flesh of swordfish from different areas and at different times of the year, and to provide information on the mechanism of contamination by examining their food and physical environment. Samples of all species collected in field operations are being examined for mercury and other contaminants (other metals, PCB's and fuel oil). It is expected that collections will include yellowfin, bluefin, bigeye and albacore, about 10 species of sharks, various other large pelagic predator species and a number of forage fishes. At the time of writing two cruises have been completed and a third is in progress. No results are available as yet.

Studies of the food and feeding habits of swordfish are being continued by examining stomachs of specimens caught during cruises referred to in the preceding paragraph.

Since mackerel is used as bait but also occurs naturally its importance in the diet of swordfish is uncertain. If mackerel are disregarded, the food items which occur in most stomachs and in the largest volumes are barracudinas (*Paralepis* sp.), redfish (*Sebastes* sp.) and lanternfish (*Myctophidae*).

2. *Tuna*

Purse seined tuna are sampled for size distribution at the single Canadian cannery on a weekly basis. During 1970, 1915 bluefin and 1116 skipjack from the West Atlantic and 441 yellowfin and 513 skipjack from the East Atlantic (Gulf of Guinea) were measured.

Bluefin size data show that the 1969 year-class was strong in the New Jersey fishery during August, with the 1967 year-class dominating September landings. The 1966 year-class apparently did not contribute to the fishery, although some older fish were caught.

Large (over 200 kg) bluefin have been increasingly abundant in the more northern parts of the range, including the Gulf of St. Lawrence, at least to the Gaspé peninsula. This may be associated with warmer than average surface water (0.5-1.5°C above the mean) particularly during the summer warming period. Such early warming may be important in determining the distribution of bluefin forage species and hence the subsequent occurrence of this predator species.

Continuation of a sonic tagging program in cooperation with the Woods Hole Oceanographic Institution, resulted in eight large bluefin being tagged with sonic transmitters capable of telemetering water and body temperatures. Seven of these fish were followed for up to 56 hours and 130 miles, all but one leaving the bay where they were tagged. Data demonstrating regulation of body temperature were collected.

A program was initiated in 1971 in co-operation with the Woods Hole Oceanographic Institution to study retention rates and resulting tagging mortality of the two tag types in regular use. The two types were the single barbed nylon tag used by Inter-American Tropical Tuna Commission, and the stainless steel dart used by Woods Hole Oceanographic Institution and the Fisheries Research Board of Canada. Initial plans to tag 1,000 small bluefin alternately with two tags of each type were frustrated by a sporadic purse seine fishery off New Jersey. A total of 575 bluefin (mostly 1 or 2 years old) were double tagged and 4 single tagged. Recaptures to date are approximately 8 per cent of releases.

3. *Larval studies*

Plankton collections which were made in February and March 1970 along cruise lines from Cape Hatteras to Cuba and return, were examined during the summer of 1971. Most (162) of the collections were made at the surface, and altogether there were 201 tows at 54 localities. Identification of fish species is still incomplete but some preliminary results are available.

Myctophids, Exocoetids, Carangids, Mugilids and Coryphaenids, in that order, dominated the collections both in terms of overall numbers and frequency of occurrence. Myctophids, for example, were taken at 35 of the 50 stations and in

nearly half of the tows. Altogether 60 families of fishes are represented in the collection.

Scombrids were collected at 21 stations and in 51 tows but seldom was there more than a single individual in any tow. Frigate mackerel (*Auxis thazard*) occurred most frequently, followed by skipjack (*Katsuwonus pelamis*), little tuna (*Euthynnus alletteratus*) and yellowfin (*Thunnus albacares*) in that order. Swordfish were taken at 7 stations and in 15 tows. Altogether there were 25 individual swordfish ranging in total length from 5.5 to 91.5 mm. Unidentified istiophorids were taken at 2 stations and in 4 tows.

1970 FRENCH RESEARCH REPORT *

by

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Status of Fisheries in France

Some 39,000 tons of tuna were caught by French vessels operating in the North-East and Central East regions of the Atlantic, from ports of the Bay of Biscay and African ports.

A particularly significant drop can be observed for albacore and yellowfin as compared with average catches in former years, the highest catch figures for which were reported in 1967 and 1968, respectively.

<i>(In 1000 tons)</i>	<i>1966</i>	<i>1967</i>	<i>1968</i>	<i>1969</i>	<i>1970</i>
Albacore	14.3	16.6	14.3	10.0	6.6
Yellowfin	18.8	20.8	29.3	26.0	20.6
Skipjack	6.2	4.8	12.5	7.7	10.0
Bigeye	—	—	—	1.0	0.7
Tuna	1.6	1.0	0.6	0.6	0.8

The tropical fishing cruises started off poorly and results on the whole were below last year's, in spite of higher skipjack catches which in this year represent one third of total catch. However, what should be noted above all, with reference to albacore, is the decrease in catches per vessel and the fact that catches include a growing proportion of fish weighing less than 5 kg.

Albacore fishing was extremely poor in 1970, with a 10,000 ton drop as compared with 1967. This can be explained by the following two factors:

* Original report in French.

- a) Decline in the number of vessels engaged in such seasonal fishing, from 600 in 1958-1960, to 240-250 at present.

	1966	1967	1968	1969	1970
No. of trolling vessels	368	328	380	313	212
Tons unloaded	10.6	12.4	11.9	8.2	4.6
No. of bait-boats	102	86	80	33	54
Tons unloaded	3.7	4.2	2.4	1.8	2.0

- b) Reduced number of cruises particularly significant early in the season (maximum catches generally reported for June and July) as shown in the following statistics for Brittany-Vendée:

	No. of cruises	Fish caught per cruise
1967	1,453	9.5 tons
1968	1,411	8.6 tons
1969	1,020	8.6 tons
1970	657	8.0 tons

Research

Research was continued at ORSTOM African laboratories for tropical tuna, at CNEXO with the «Ludovic-Pierre» patrol boat throughout all of its albacore cruises, and at ISTPM with the vessel «La Pélagie», from June 3 to July 6, and from August 6 to September 14, following the schedule established last year by the Standing Committee on Research and Statistics.

ORSTOM research on yellowfin continues at the Dakar, Abidjan and Pointe Noire laboratories. This research relates to the following:

- Analysis of fishing areas, yield and size composition for Dakar (1965-1969), Pointe Noire (1970), and south of the Gulf of Guinea (1964-1970).
- Research on parasites in yellowfin has revealed the existence of sub-population.
- Monthly statistics on surface fisheries (catch and effort) per fishing day and 1° square.
- Tagging in the Dakar area (50 yellowfin and 250 skipjack).
- Tuna catch composition (29,000 measurements).

These studies will allow a better understanding of the dynamics of yellowfin stocks, for which a critical study was made on parameters in the growth equation.

A better understanding will also thus be provided as regards population and movements of the three major fisheries of Dakar, Abidjan and Pointe Noire, since the study of parasites seems to confirm the existence of three distinct ecological stocks and further, tagging should provide information as to their movements.

Research on albacore can be summarized as follows:

- Location of areas of concentration from June to October, depending on surface conditions and small and large scale variations (ISTPM and CNEXO).
- Stock composition by utilizing more than 15,000 measurements taken aboard research vessels and on live-bait or trolling tuna fishing vessels (CNEXO and ISTPM).
- Studies on growth and mortality (CNEXO).
- Stock identification by serological analysis with 610 samples (CNEXO).
- Sampling of stomach content (540 samples) to enable research on feeding habits and behavior, and also to identify populations by the presence of the parasite *Hirudinella fusca* (ISTPM).
- Tagging (524) to study migrations (ISTPM).
- Mercury content based on two samples (ISTPM).

Pursuant to these studies an analysis was made on French albacore yield for the three main age groups encountered, for 1968, 1969 and 1970. However, the interpretation of these data on abundance of fish by age groups is rendered difficult by the variations observed in seasonal distribution of fish and in the duration of fishing cruises. The catch per unit effort index indicates, nevertheless and with the exception of 1970, a decrease which coincides with the other data mentioned above.

The total instantaneous mortality rate has been estimated at 1.02; this appears to be rather high. Growth studies have been conducted. However, if the parameters which were determined concur with results obtained in the Central Atlantic, the study of modal length and of sizes calculated on the basis of scales would seem to indicate a certain heterogeneity in stock composition. This heterogeneity has not been supported by serological analyses, but is indicated by frequency of occurrence of parasite *Hirudinella fusca* which varies between areas.

The analysis of 45 recaptures out of 1,919 tags released since 1967 shows a northward migration of fish off the Portuguese coast, and a return by way of the Bay of Biscay, but also suggests the existence of other migratory patterns off the Bay of Biscay. This problem is most probably related to that of identification of populations which might be composed of albacore stocks in the northeastern Atlantic.

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JAPANESE FISHERIES AND RESEARCH ACTIVITIES ON TUNAS AND TUNA-LIKE FISHES IN THE ATLANTIC OCEAN, 1970 *

by

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1. Review of Japanese Tuna Fisheries in the Atlantic Ocean, 1969

The Report (Anonymous, 1970) was presented at the First Regular Meeting of the ICCAT Council to review the progress of Japanese tuna fisheries in the Atlantic Ocean. According to the Report, longline is still the major gear utilized by the Japanese fleet in recent years for tuna catches, although longliner activity has been declining in the Atlantic. Changes in distribution of fishing grounds and in priority of species were also noted.

The aforementioned trends in fisheries were apparent throughout 1969. Fishing effort in terms of number of boats and total tuna catch in live weight of longline fishery were the lowest recorded since 1960 and 1959, respectively (Table 1).

Despite a lesser number of boats, effort in terms of number of hooks remained at 30 million as in the three preceding years. This suggests that due to decrease in catch per set each boat remained at the fishing grounds longer than in previous years. Catch records in terms of number of fish indicated a sharp decline with regard to yellowfin and albacore to only 242,000 and 390,000, respectively. On the other hand, the bigeye tuna catch increased to 264,000; some 30 % over that of the previous year (Fig. 1). Effort data also indicated a further expansion of fishing grounds toward higher latitudinal waters, especially south of 35°S (Fig. 2). Not only a decrease in yellowfin abundance, but also the recent increased demand for bigeye and southern bluefin tuna in domestic markets might have caused such changes in the operations of the Japanese longline fleet.

* Original Report in English.

II. Japanese Tuna Research in the Atlantic Ocean, 1970

1. *Compilation of Catch Statistics*

The Statistics and Survey Division, Ministry of Agriculture and Forestry, is in charge of collecting, compiling and publishing all Japanese commercial catch data including those on tuna longline and pole-and-line fisheries. Statistics on tuna fisheries up to 1969 have been officially reported to ICCAT as well as to other international organizations such as FAO. In addition, the Fisheries Agency has carried out similar statistical surveys on tuna purse seining in the Gulf of Guinea. These combined statistics will meet the requirements of Task 1 as defined at the first SCRS meeting.

The Fisheries Agency and the regional fisheries research laboratories have continuously collected detailed catch records from major fisheries. Surveys on tuna longline, pole-and-line and purse seine fisheries will provide useful data for Task 2. The statistical yearbooks for such detailed data are available only for longline fishery for 1963 and subsequent years (up to 1969) at present.

Beginning in 1972, results from all the above surveys will be compiled by time of catch rather than by time of landing.

1.1. *General statistics*

In May 1971, the Statistics and Survey Division published Japan's total fishery production in 1970. Breakdown by species and gear will be provided by the end of 1971.

1.2. *Detailed statistics*

1.2.1. Longline fishery.

The yearbook for 1969 longline statistics was published in March 1971. Data for 1970 are now being processed, and the 1970 yearbook will be published early in 1972.

1.2.2. Surface fishery.

Logbooks have recently been collected from pole-and-line boats, including those operating in the Gulf of Guinea. The data are compiled by month in terms of live weight in metric tons for catch and of number of poles for effort. The 1969 yearbook will be published early in 1972.

Purse seiners, including those operating in the Gulf of Guinea, submitted their logbooks to the Fisheries Agency. In 1970 the catch and effort statistics for 1967

and 1968 were compiled by $1^{\circ} \times 1^{\circ}$ squares and by month, in terms of live weight of 0.1 metric tons and number of days at sea. The manuscripts have been prepared but not yet published.

2. Environmental Survey

2.1. Cruises

Temperature and salinity data were taken from the equatorial and south Atlantic during the following four research cruises.

1. *Azuma Maru No. 37*. South Atlantic (Fig. 3). December 26, 1969-February 2, 1970.
2. *Shoyo Maru*. Caribbean Sea and Gulf of Mexico (Fig. 4). December 23, 1969-January 14, 1970.
3. *Shoyo Maru*. Waters along southwestern Africa (Fig. 5). December 5-26, 1970.
4. *Shoyo Maru*. Central Atlantic (Fig. 5). December 30, 1970-January 16, 1971.

2.2. Observation in the southwestern Atlantic

An analysis was made of temperature and salinity data obtained October 1968 through March 1969 by *Shoyo Maru*, and from May 1969 through February 1970 by *Azuma Maru No. 37*, which cruised the southern Atlantic. Major findings were:

1. The Brazil Current was intensified in August 1969, and then the southern convergence with the Falkland Current shifted southward by a few more degrees than usual (Fig. 6).
2. In the coastal area, cold waters of the Falkland Current spread over warm water of the Brazil Current July through September, 1969 (Fig. 7).

3. Biological Survey

3.1. Compilation of length data

Compiled in 1970 were length composition data on tunas and billfishes taken in 1969 and reported to the Far Seas Fisheries Research Laboratory by the end of August, 1970. However, compilation does not include some yellowfin, bigeye, albacore and skipjack data taken in 1969. In 1970, not only current data but some for preceding years were collected in cooperation with the Kanagawa Prefectural

Fisheries Experimental Station and the Federation of Japan Tuna Fishermen's Cooperative Associations.

3.2. *Collection of Material*

R. V. Shoyo Maru collected the following biological samples during the research cruises in the Atlantic (Figs. 1, 2 and 3):

1. Plankton including fish larvae by horizontal and oblique hauls.
2. Blood samples as well as morphometric measurement of yellowfin tuna.

4. *Stock Assessment and related studies*

After preliminary simulation studies (e.g. Suda, 1970, Hayasi and Kikawa, 1970 a, b), major stock assessment effort was made on collection of material and data, and reexamination of available information.

4.1. *Occurrence of larval tunas in the Atlantic Ocean*

No albacore larvae were obtained by the *R. V. Shoyo Maru*. In the Caribbean Sea, early 1970, a number of larvae presumably of bigeye tuna were present. However, since it is difficult to separate the bigeye larvae from those of blackfin tuna, it is not yet certain that bigeye tuna actively spawn there and there. Other larvae collected at the time were yellowfin tuna, skipjack and frigate mackerel (Fig. 8).

Identification and counting are now being continued on samples taken on subsequent cruises.

4.2. *Preference of longliners for particular species and localities* (Shiohama, 1971)

«Mobility» is one of the outstanding characteristics of the tuna longline fishery, which often makes it difficult to predict flow of the fishing effort for planning efficient regulatory measures. This is the first approach to the difficulty. Major points of interest are:

1. During early years of gradual expansion from 1956 to 1961, the effort was concentrated in equatorial waters. The fishermen's interest seems to have been in expansion toward higher latitude waters during the period of rapid growth from 1962 to 1965. Since then, effort as a whole has decreased drastically but increased somewhat in the higher latitudinal waters of both the northern and southern hemispheres.
2. The shift of effort indicates change in the preference of fishermen for different species. Year-to-year changes of effectiveness factors indicate that

the fishing effort was concentrated exclusively on yellowfin tuna at first, and then shifted gradually to albacore. During the recent decreasing period the fishing effort was directed equally towards yellowfin, albacore and bigeye tunas.

4.3. *Comparative study of growth parameters of yellowfin tuna in the Pacific*
(Suzuki, 1971)

A review of papers on growth of yellowfin tuna in the Pacific revealed that the analyses of length composition data gave higher coefficients and lower asymptote lengths than scale readings.

4.4. *Urgent needs for rational management of yellowfin fisheries*

Longline statistics indicate that yellowfin stocks have decreased more markedly than albacore stock, while no decrease was evident in bigeye stock (Fig. 9). The decrease in yellowfin stock is attributed not only to longline fishing but also to a sharp increase in surface catch of individuals younger than those taken by longline (Fig. 10).

In 1970 and 1971, even the surface yellowfin catch decreased. There arises a question whether or not the level of recruitment to all yellowfin stocks has been maintained despite the recent growth of fisheries. Therefore, action needs to be taken at the earliest opportunity, for the sake of wisdom with a view discouraging the rapid increase of fishing effort on this species. At the same time, it is required to accelerate studies of assessment of yellowfin stock.

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* In Japanese without English title. English translation is given in parentheses.

Table 1. Annual amount ^{a)} of effort ^{b)} and catch ^{c)} of the Japanese tuna fisheries in the Atlantic Ocean, 1957-1969 ^{d)}

Year	Longline		Live-bait		Purse seine		Subtotal ^{e)} of surface catch	Total ^{e)} catch
	E	C	E	C	E	C		
1957	26	16						16
1958	51	31						31
1959	62	51						51
1960	88	68						68
1961	88	69						69
1962	106	95	(5)	3			3	97
1963	123	109	(5)	6			6	114
1964	182	121	(6)	5	1	0	6	127
1965	209	137	(6)	9	1	4	13	150
1966	156	83	6	7	3	7	13	96
1967	65	40	6	8	4	8	16	55
1968	71	45	6	12	7	16	28	72
1969	63	38	6	9	7	8 ^{f)}	17	55

Notes:

- a) Data from the Statistics and Survey Division of the Japanese Ministry of Agriculture and Forestry, except effort data of live-bait fleet 1962 to 1965, and entire catch and effort data of purse seine fleet under experimental license.
- b) Unit of effort is number of boats except for two-boat purse seiners, where effort is in number of groups composed of two catchers and several carriers.
- c) Unit of catch is metric tons of total of bluefin, albacore, yellowfin, bigeye, swordfish, blue marlin, white marlin, sailfish, skipjack and frigate mackerel.
- d) There are minor changes of figures for 1959 to 1967 from those compiled in the last year (ICCAT/CON/70/9).
- e) Totals and subtotals do not always agree with items because of rounding.
- f) Catch of purse seine fleet in 1969 is not conclusive.

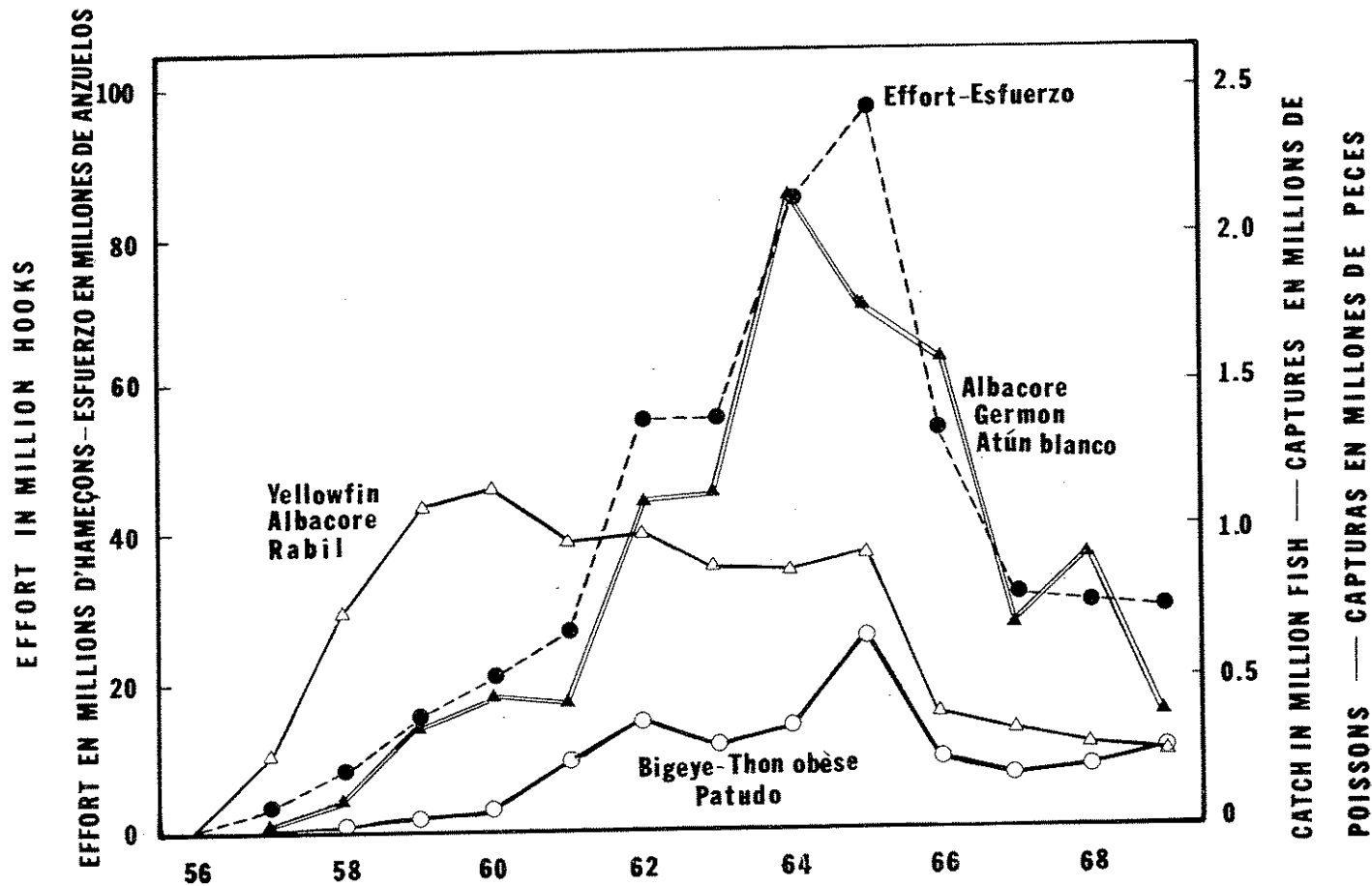


FIG. 1. Amount of effort (in number of hooks) and catch of yellow fin tuna, albacore and bigeye tuna (in number of fish) in the Japanese longline fishery, Atlantic Ocean, 1969. Data from Shiohama et al. (1965) and Fisheries Agency of Japan (1963-1971).

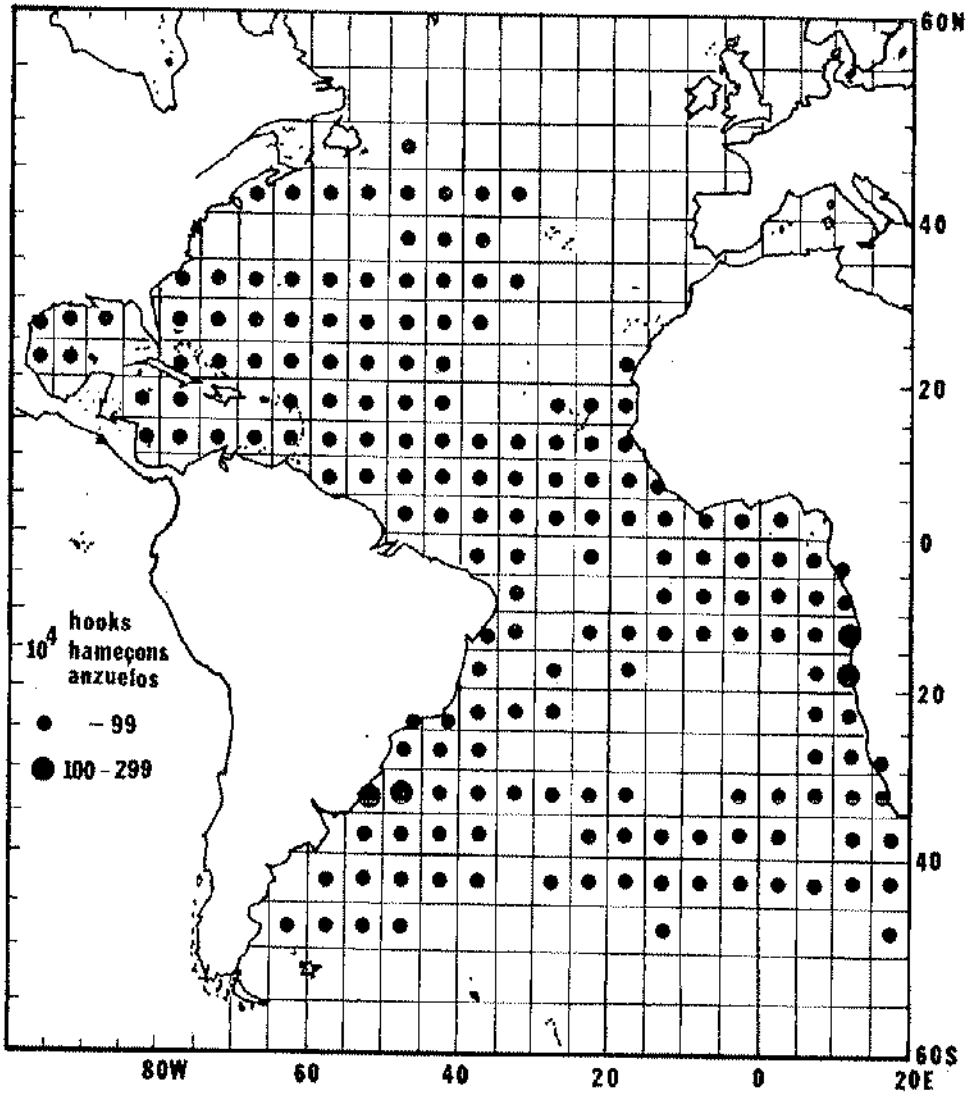


FIG. 2. Number of hooks used by Japanese longline fishery in each 5-degree square, 1969. After Fisheries Agency of Japan (1971).

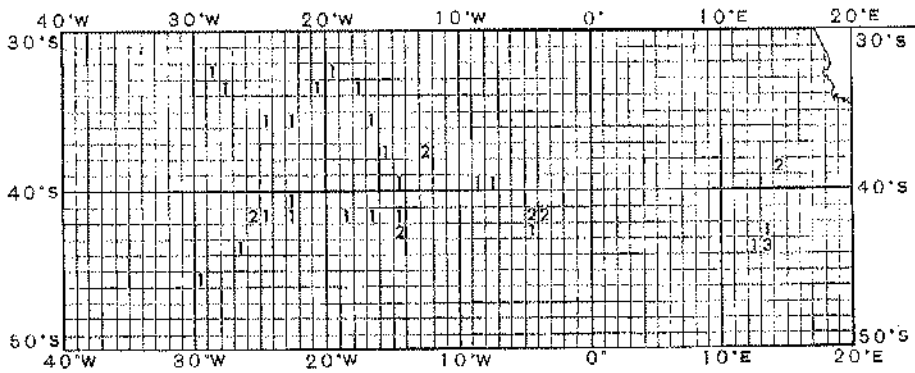


FIG. 3. Distribution of stations in a cruise of *Azuma Maru No. 37*, December 26, 1969 to February 2, 1970. Unpublished record of the Federation of Japan Tuna Fishermen's Associations.

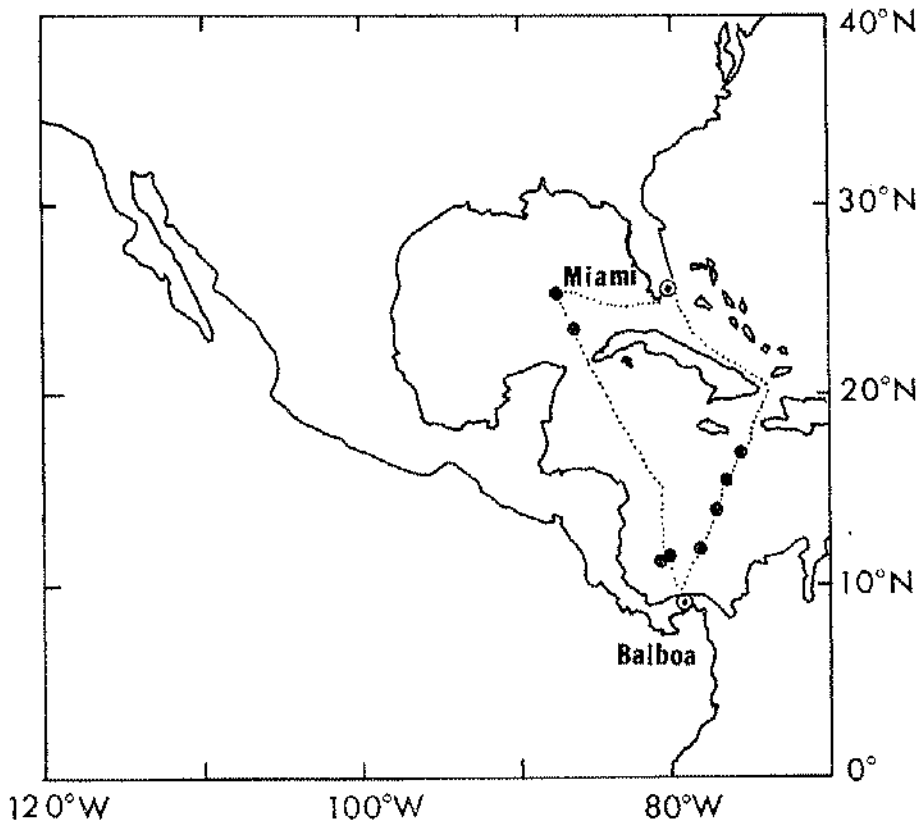


FIG. 4. Route of *R. V. Shoyo Maru*, in the eastern Pacific and western Atlantic, 1969-1970. After *Suisancho Chosakenkyubu* (1970).

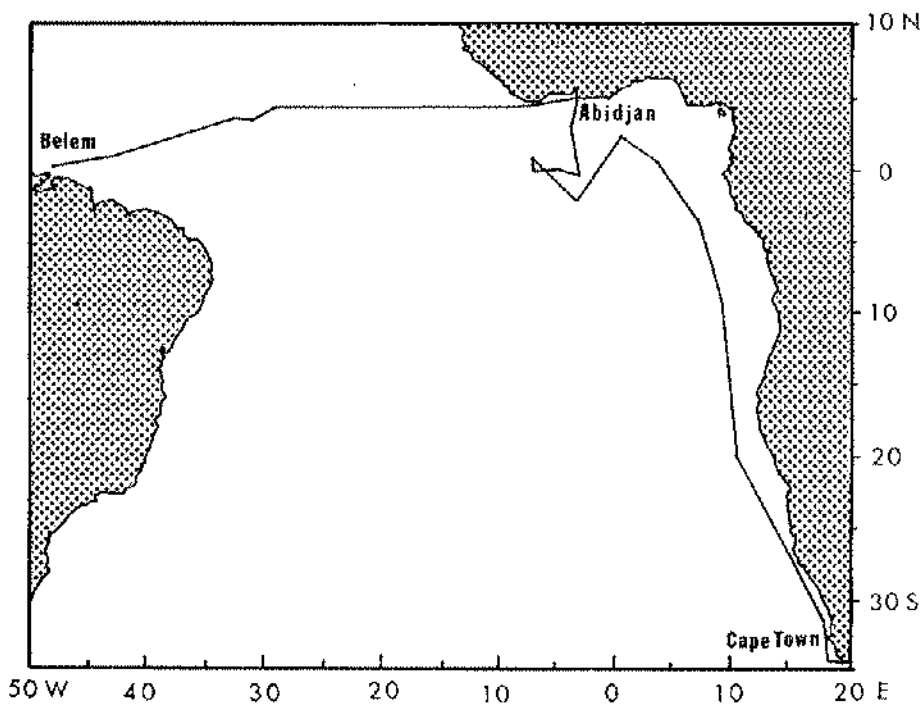


FIG. 5. Route of R. V. Shoyo Maru in the Atlantic, 1970-1971.
After Suisancho Chosakenkyubu (1971).

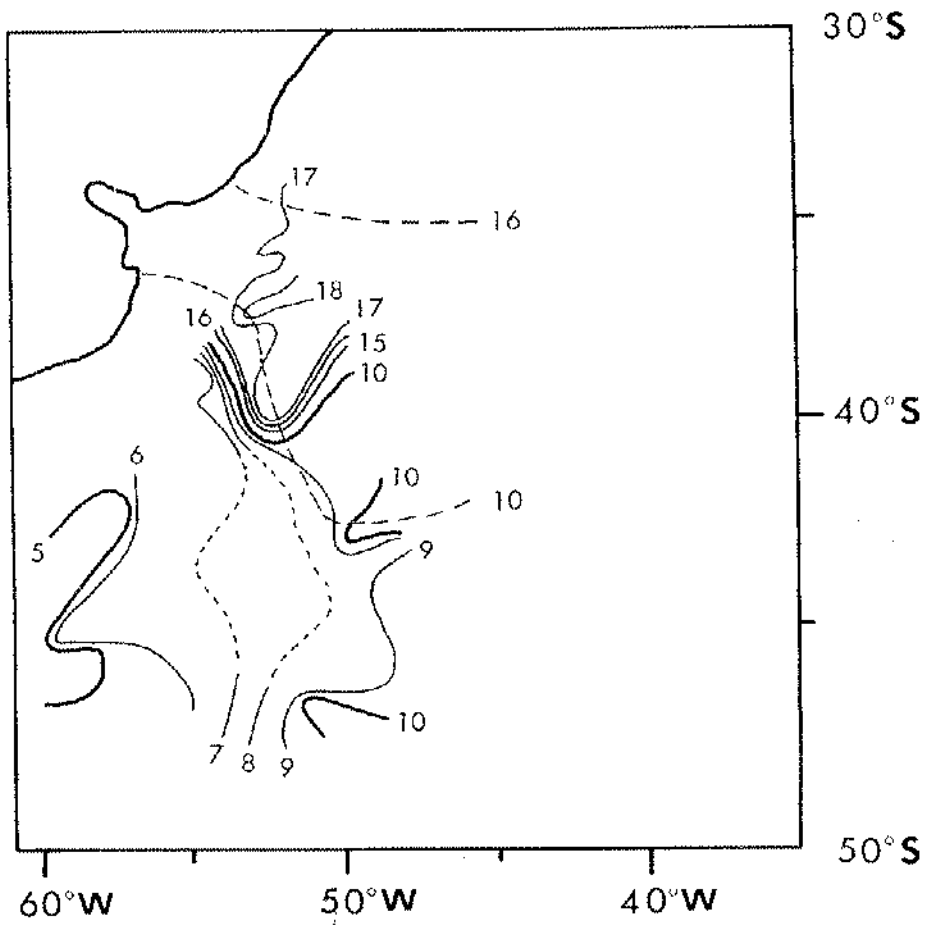


FIG. 6. Surface temperature in August 1969 (solid curves), compared with average isotherms. Unpublished data from Oceanography Section, Far Seas Fisheries Research Laboratory.

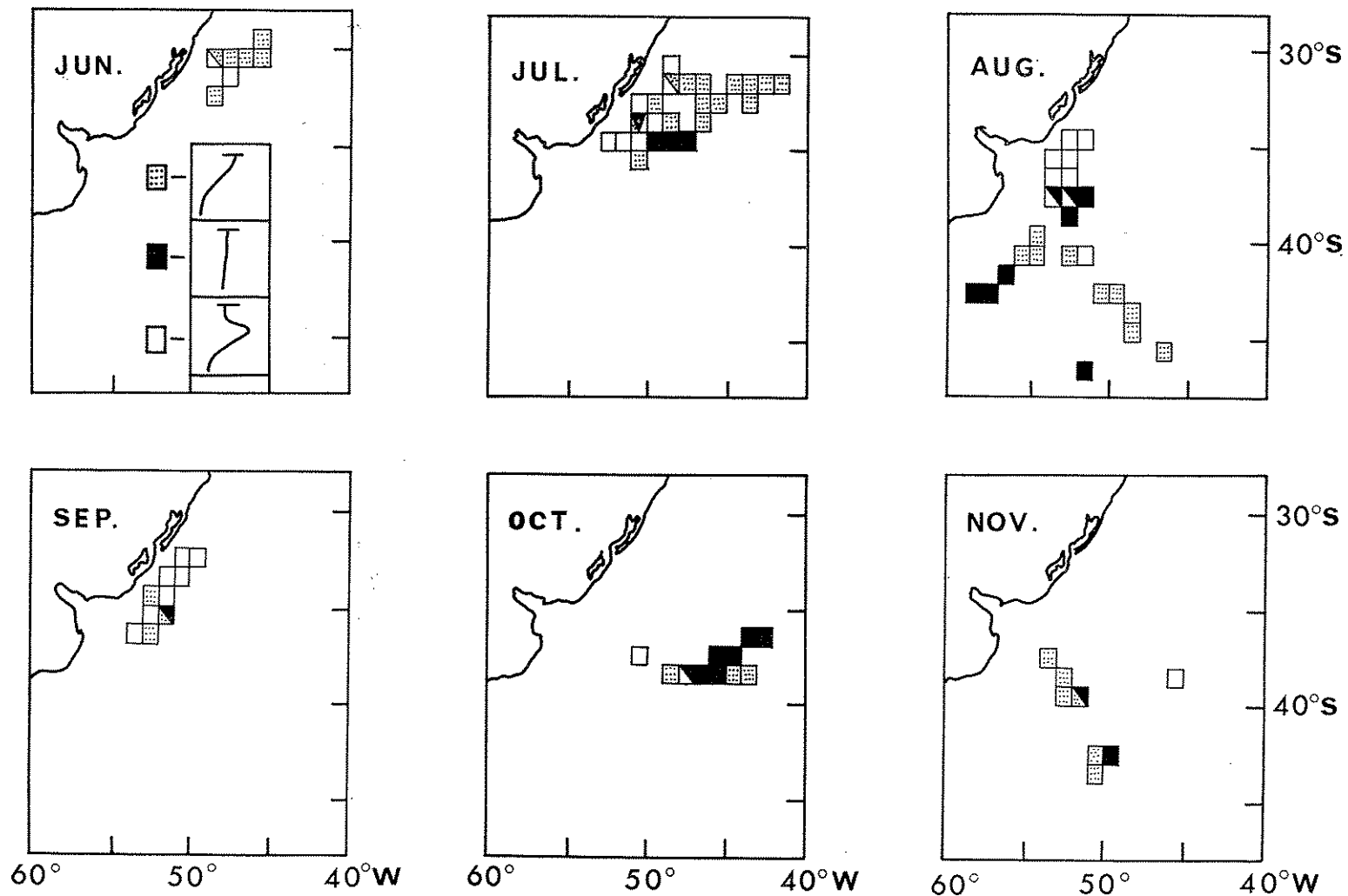


FIG. 7. Temperature inversion observed in cruises of *Azuma Maru* No. 37 for each 1°-latitude-longitude square, June to November. Unpublished data from Oceanography Section, Far Seas Fisheries Research Laboratory.

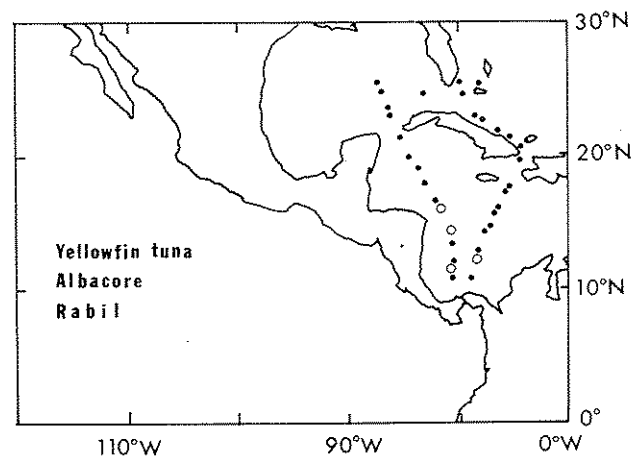
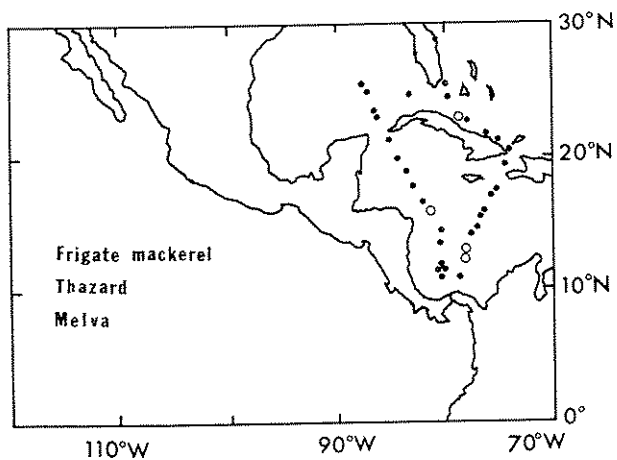
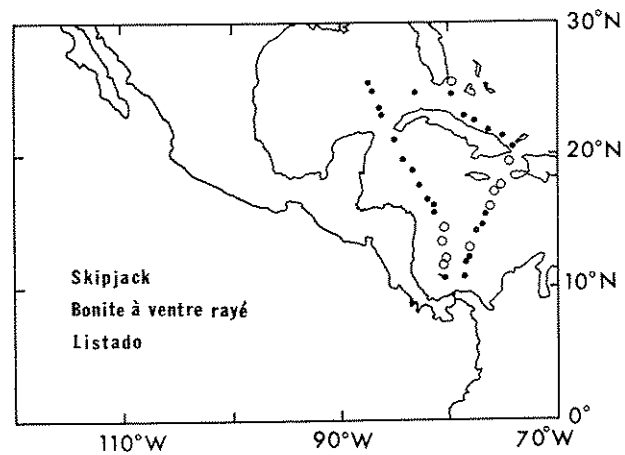
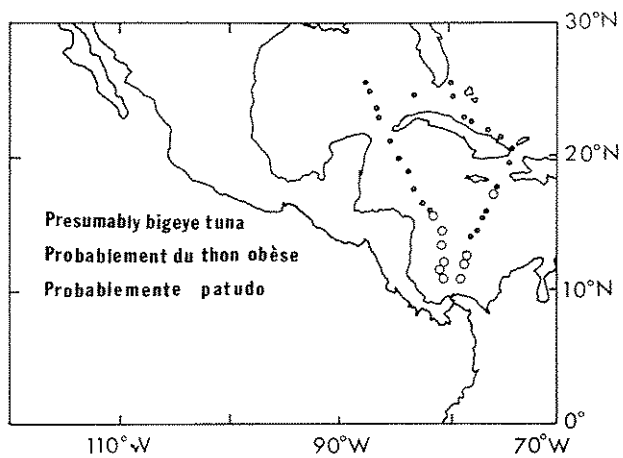


FIG. 8. Successful stations for collecting tuna larvae (bold dots) during cruises of *R. V. Shoyo Maru*, 1969-1970.
 After *Suisancho Chosakenkyubu* (1970).

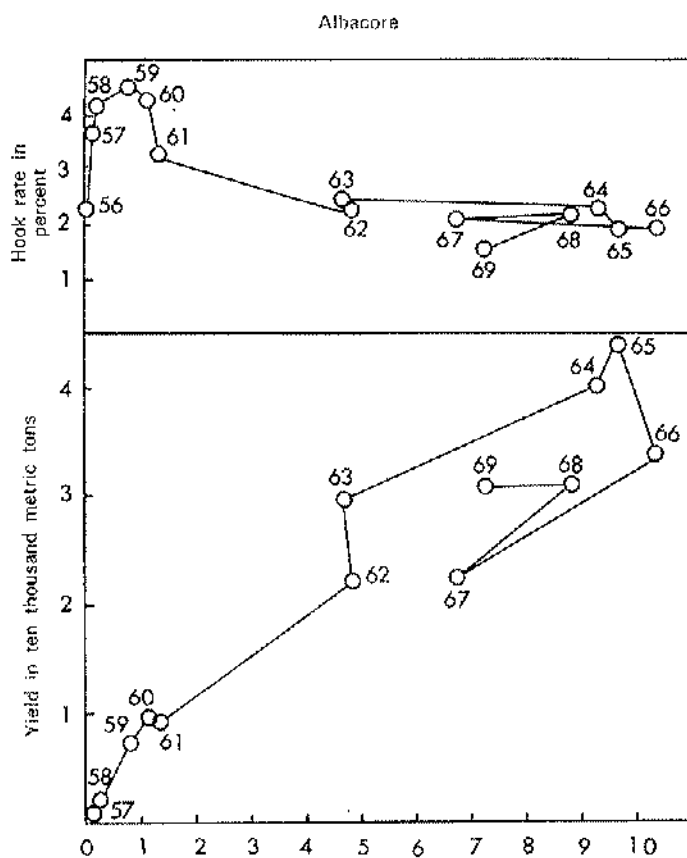


FIG. 9. Hook rate and yield of albacore, bigeye tuna and yellowfin tuna plotted against the effective effort in the Atlantic long-line fishery, 1957-1969. Data from FAO (1971), Hayasi *et al.* (1970), ICCAT (1971) and Shiohama (1971).

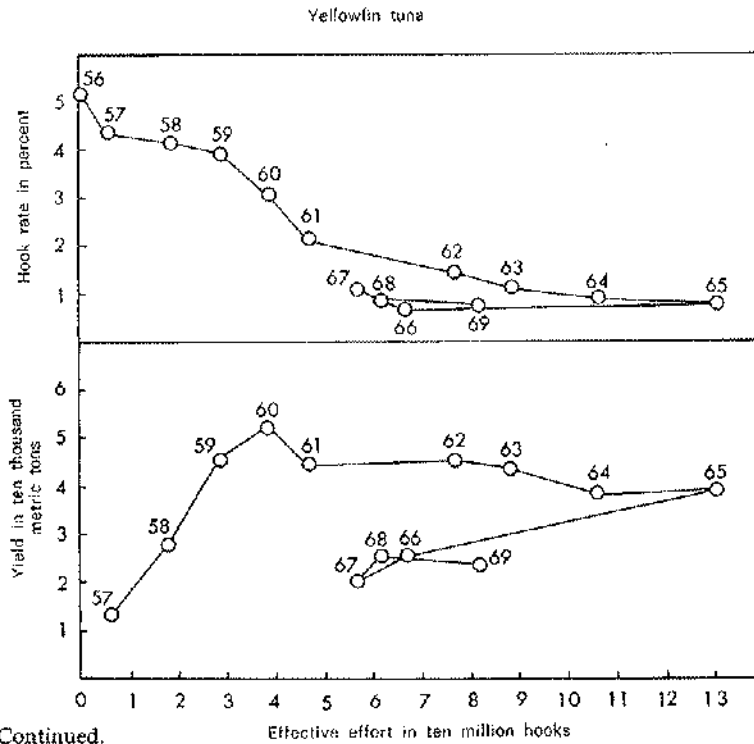
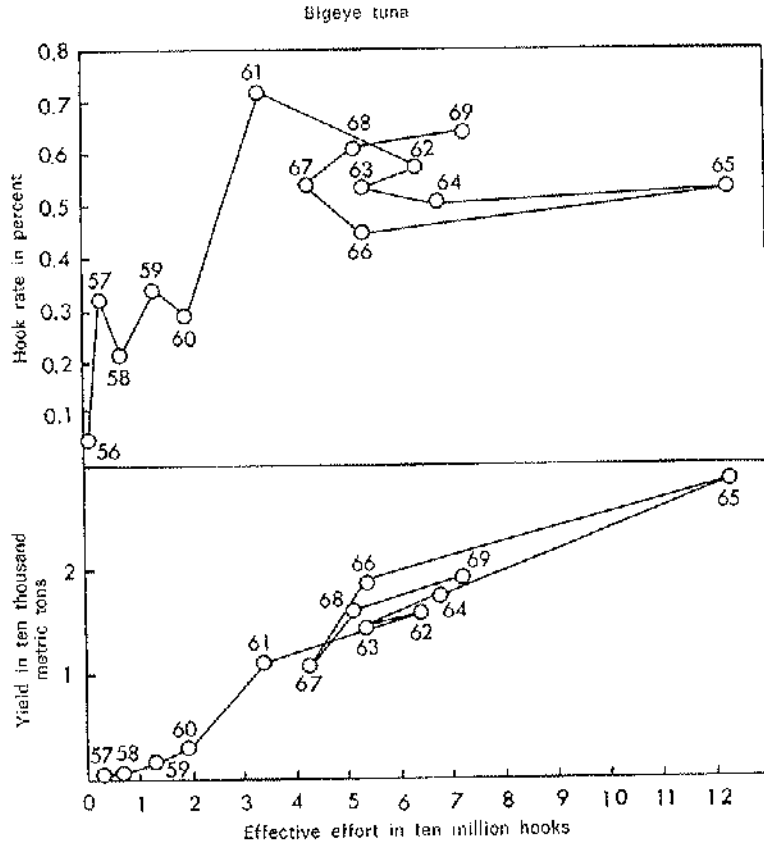


FIG. 9. Continued.

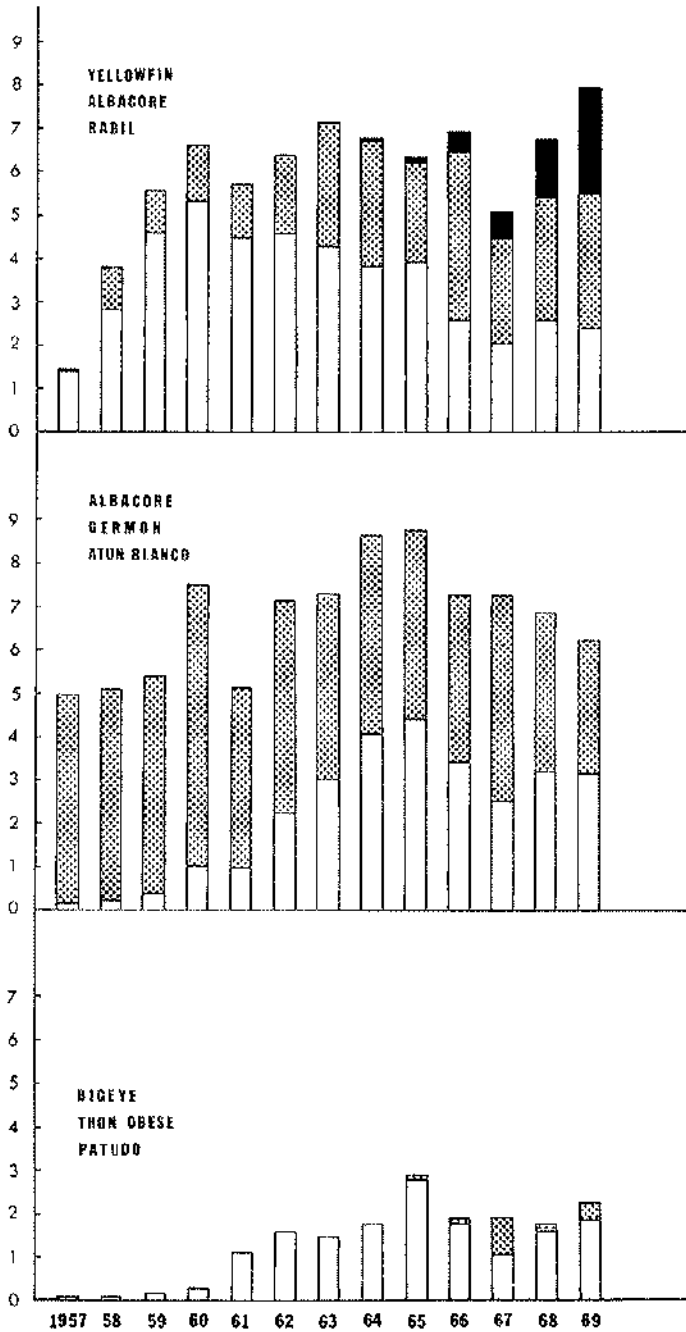


FIG. 10. Yield of yellowfin tuna, albacore and bigeye tuna by longline (blank), live-bait and small purse seine (dotted) and large purse seine (black) fisheries in the Atlantic Ocean, 1957-1969. Data from FAO (1971), Hayasi *et al.* (1970) and ICCAT (1971).

KOREAN TUNA FISHERY IN THE ATLANTIC OCEAN *

by

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1. Status of the Fishery

Fishing Fleets

Korean tuna fishing in the Atlantic Ocean started with commercial fishing operations conducted by a 370 gross ton tuna longliner. Since the fishing venture was successful, the Korean tuna fishing fleets have been expanded year by year in that area. In 1967, the number of tuna longliners amounted to 46 vessels. Since then and until 1969, there were no significant changes. In 1970, due to the movement of tuna longliners from the Indian and the Pacific Oceans to the Atlantic, the number of fishing vessels was increased to 105.

	1967	1968	1969	1970
No. of boats	46	34	57	105
Total G/T	16,224	12,624	18,699	34,910

Composition of the fishing fleets in 1970 was complicated. As in the table below, the 200-300 G/T vessels are predominant and the 300-400 G/T class category constitutes the second largest portion of the fleets.

<i>Size class</i>	<i>No. of vessels</i>
150 - 200 G/T	14
201 - 300 »	52
301 - 400 »	21
401 - 500 »	4
501 - 650 »	14
	105

* Original Report in English.

Total Catches by Species, 1968-1970

Tuna catches in 1970 amounted to 34,865 metric tons, an increase of 37.3 % over 1969. The catch consisted of albacore, yellowfin and bigeye tunas and others. Total catches, by year and by species, are shown in the following table:

	<i>Albacore</i>	<i>Yellowfin</i>	<i>Bigeye</i>	<i>Others</i>	<i>Total</i>
1968	7,285	1,957	227	3,155	12,624
1969	16,030	5,157	1,601	2,617	25,405
1970	10,041	11,506	4,079	9,239	34,865

Fishing Bases

Korean tuna fishing vessels are based at certain foreign fishing ports in the Atlantic Ocean. These are: Freetown, Tema, St. Martin, Abidjan, Montevideo, Tenerife and Las Palmas. The following table shows distribution of tuna longliners by foreign fishing bases in 1970:

<i>Name of the base</i>	<i>No. of boats</i>	<i>Total gross tons</i>
Freetown	11	2,563
Tema	23	6,570
St. Martin	6	1,670
Abidjan	15	3,803
Montevideo	2	432
Tenerife	2	940
Las Palmas	46	18,932
TOTAL	105	34,910

2. Research and Statistics

Fish Catch Report

Korean fish-catch statistics are collected through reports submitted by tuna fishing companies. This system was established according to the Fisheries Law. All masters of tuna fishing vessels are obligated to prepare daily fish-catch reports whenever conducting fishing operations. Upon completion of a trip the master sends the fish-catch report to his main office for submission to the Office of Fisheries.

The Fisheries Research and Development Agency, Office of Fisheries, compiles and analyzes the reports by fishing area and size class of vessels, and calculates catch per unit effort, etc.

Measurement Survey on Body Length

In order to contribute to scientific research on tunas, the Office of Fisheries had planned to carry out measurement surveys on tuna body length in 1971. According to this plan, 50 tuna longliners were selected to make tuna measurements in the Pacific, Indian and Atlantic Oceans.

All captains of vessels selected to conduct sampling will take measurements of tuna body length three times monthly while at sea engaged in fishing operations. At each time 30 fish will be measured.

3. Future Projects

In order to make a contribution to the worldwide scientific survey on fishing grounds and to ascertain the possibility for trial fishing in the under-exploited areas, the government plans to conduct fishing ground surveys over the next five-year period (1972-1976) (see following table). The Government also plans to build a 1,000 G/T-class research vessel in Japan for active participation in international surveys on deep-sea fishing grounds. This research vessel will initiate operations in 1972. When this project shall have been carried out, the five year survey program may be changed to some extent.

<i>Year</i>	<i>Survey subject</i>	<i>Area</i>
1972	Skipjack Pole Fishing Trawling	Mid-West Pacific North Pacific
1973	Skipjack Pole Fishing Gill Netting Purse Seining, Trawling	Mid-West Pacific Indian Ocean North-West Atlantic Mid-East Atlantic
1974	Skipjack Pole Fishing Tuna Purse Seining Shrimp Trawling Trawling, Gill Netting	Mid-West Pacific Indian Ocean South-East Pacific South-West Atlantic North Pacific
1975	Skipjack Pole Fishing Trawling Shrimp Trawling Tuna Purse Seining Tuna Longlining	South Pacific South Atlantic Indian Ocean Indian Ocean Atlantic
1976	Skipjack Pole Fishing Tuna Purse Seining Tuna Longlining Shrimp Trawling Trawling	South Pacific South-West Atlantic Indian Ocean Indian Ocean South-West Atlantic

TUNA FISHERIES IN MOROCCO
Status at the Beginning of 1971 *

by
M. LAMBOEUF

Concentrating mainly on the fishery for sardines, of which species it is one of the world's major producers, Morocco has relegated the commercial fishery for tunas to second place in recent years.

With the exception of traps installed in the northern zone, tuna fishing has until now been of an artisan and even occasional nature. Skipjack, bluefin and other species are caught by trolling, live bait or seines. At times during the autumn, when oceanographic conditions are favorable, sardine fishermen from the central area (Safi, Essaouira, Agadir), temporarily set aside normal activities and engage in fishing medium sized tunas. These fishermen do relatively well considering that they have practically no specialized gear and generally do not exceed a distance of 30 miles. Their cruises last one day only.

1. Tunas in Moroccan Waters — List of Species

<i>Latin name</i>	<i>Common name in Morocco</i>	<i>French name</i>	<i>English name</i>
<i>Auxis thazard</i>	Melva	Auxide	Frigate mackerel
<i>Euthynnus alletteratus</i>	Bonite	Thonine	Atlantic little tuna
<i>Thunnus albacares</i>	Albacore	Albacore	Yellowfin tuna
<i>Katsuwonus pelamis</i>	Listao	Bonite à ventre rayé	Skipjack
<i>Thunnus thynnus</i>	Thon rouge	Thon rouge	Bluefin
<i>Thunnus alalunga</i>	Germon	Germon	Albacore
<i>Sarda sarda</i>	Sarda	Bonite à dos rayé	Atlantic bonito
<i>Thunnus obesus</i>	Patudo	Thon obèse	Bigeye tuna
<i>Orcynopsis unicolor</i>	Palomette		Plain bonito

* Original Report in French.

The importance of species in Moroccan waters varies depending on the area. Bluefin are found the year round in several stages of growth and together with skipjack represent the greater part of catches, while plain bonito is found only south of Agadir where the fishery for this species has expanded greatly in recent years. This is the northernmost location at which yellowfin, a tropical water species, are to be found.

2. Presence of and Fishery for Tunas in the Atlantic off Morocco

Bluefin can be found the year round at varying distances from Moroccan coasts.

Said species reaches the coastal waters, that is to say, less than 50 miles from the shore, in three different stages, depending on age, physical condition and local oceanographic conditions:

- immature stage (juvenile fishes),
- spawning migration (adults),
- feeding dispersion (medium size fishes).

2.1. Trap fishery

Bluefin tunas making spawning migrations toward the Mediterranean approach the Moroccan coast toward the end of April or early in May. This migration lasts until early in July.

The fish reach the coast at the area between Cape Espartel and the Deep off Rabat.

There are three traps in the Larache area and one at Cape Espartel (see map). The two traps in the M'diq area of the Mediterranean catch returning tuna as they exit after spawning there. Most of the catches by such traps are frigate mackerel.

The other trap in the Agadir area catches bonito, skipjack, plain bonito and frigate mackerel, rather than bluefin.

Excluding the Bou-Irden trap at Agadir which does not catch bluefin, the species composition of catches by northern sector installations (Atlantic and Mediterranean) is as follows:

<i>Traps</i>	<i>Bluefin</i>	<i>Frigate mackerel</i>	<i>Bonito</i>
Atlantic	90 %	3 %	7 %
Mediterranean	1 %	98 %	—

The following table shows annual production in tons from 1961 to 1968 by each trap:

NORTH ATLANTIC

	1961	1962	1963	1964	1965	1966	1967	1968
Cape Espartel	452	1,454	1,001	447	795	617	801	504
Pointe Noire	433	733	329	727	534	400	520	172
Los Cenizosos	484	760	816	646	504	489	—	—
Garifa	152	1,107	349	589	811	280	328	109
Kenitra	603	1,151	395	1,105	447	366	—	—

MEDITERRANEAN

	1961	1962	1963	1964	1965	1966	1967	1968
Prince	448	256	884	414	637	370	443	666
Cape Noire	—	150	216	—	—	—	—	—
Grand Total	2,582	5,611	3,990	3,928	3,728	2,522	2,092	1,451

2.2. *Catches by sardine vessels*

This fishery occurs during autumn in the central area of Safi and Essaouira.

Seines are employed, aided insofar as possible by baitboats. It appears that the presence of the latter decisively contributes to the success of this type of fishery.

When the fish approach the coast there is abundant food and they do not generally surface to feed on natural bait. Baitboats, however, which for the most part are low tonnage, old sardine vessels converted for this type of fishery, manage to get the fish to surface and to keep them long enough for the seiner to set the nets in the water and surround the school before it submerges again. Lacking a baitboat, it is frequently the case that the tuna are frightened, they submerge and escape from the net.

Tuna fishery is carried out only occasionally in the central sector, when favorable oceanographic conditions occur and there is a need for more specialized gear since most vessels currently in use are slow and the nets too small in length and height.

3. *Research Conducted in Morocco*

Mr. H. Aloncle, a researcher from the Moroccan Maritime Fisheries Institute, has engaged for several years in the study of tunas in the «Ibero-Moroccan» area.

He has succeeded in reaching the present level of research making certain observations and formulating an hypothesis on the biology of bluefin tuna, the principal species.

Mr. Aloncle has also participated in an experimental fisheries cruise. The results of this work were published in Bulletin No. 12 of the Moroccan Maritime Fisheries Institute dated December 1964, and No. 14 of July 1966. We quote the conclusions drawn from the experimental cruise:

«Results of the experimental cruise of the "Danguy" for the purpose of discovering new possibilities for tuna fishery in the Ibero-Moroccan Bay have been negative.

»We cannot hope to fish, judging from a few specimens found in the area of the Madeira archipelago or in the vicinity of Cape Bojador, all the more so since weather conditions were found to be frequently unfavorable.

«Autumn fisheries in the central sector will, until further orders, continue to be supplementary activities for fishermen normally engaged in trawling or sardine catches.»

4. Catches

Tuna catches in Morocco since 1963 (in metric tons, live weight)

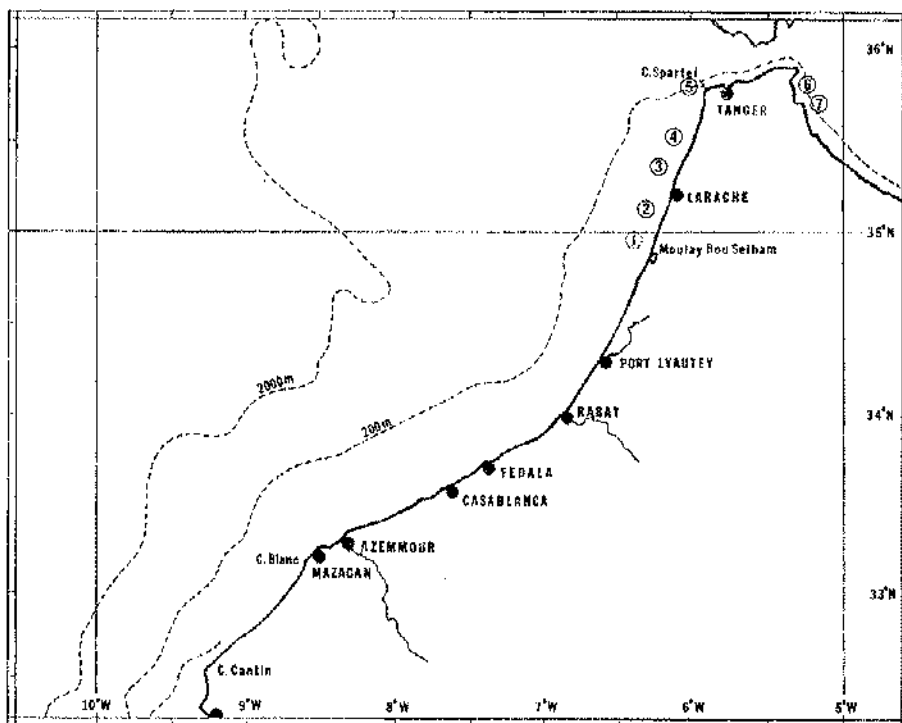
	1963	1964	1965	1966	1967	1968	1969
Bluefin	4,456	4,484	2,962	3,393	3,425	1,092	736
Skipjack	3,261	2,141	3,149	1,475	940	850	145
Little tuna	913	466	552	1,042	884	801	718
Frigate mackerel	1,601	1,537	1,762	787	1,187	925	588
Bonito	108	33	161	18	—	—	—
Grand Total	10,339	8,661	8,586	6,715	6,436	3,668	2,187

These catches are broken down by gear as follows:

Traps	3,986	4,437	4,186	2,875	2,222	1,513	259
Tuna boats	6,353	4,224	4,400	3,840	4,214	2,155	1,928

We now observe a phenomenon: steady decline in total catches since 1963 as regards traps and fisheries at sea. This decline renders useless any estimate of average annual production.

We note, however, that no continuing effort has been made to date by the researchers and tuna fisheries, since sardine fisheries carried out by the same vessels have always enjoyed a priority. It is therefore not possible to ascertain whether the decline in catches by tuna boats is due to decreased resources or to a reduction in fishing effort. There are no data at present in respect to the latter. Nonetheless, to have such data is of prime importance if the problem is to be duly clarified.



TRAPS IN NORTHERN MOROCCO:

- | | |
|------------------------------|-----------------|
| 1. Kenitra (closed in 1966). | 5. Cap Spartel. |
| 2. Punta Negra. | 6. Principe. |
| 3. Los Cenizosos. | 7. Cabo-Negro. |
| 4. Garifa. | |

PORTUGUESE NATIONAL REPORT

1. Considerations on tuna fisheries off the coast of Continental Portugal and the Islands of Madeira and the Azores between 1961 and 1970 *

by

MANUEL LIMA DIAS **

and

YVONNE FERREIRA BARRACA **

1. Introduction

This Report relates to the current status of tuna fisheries in Continental Portugal and also adjacent islands (Archipelago of Madeira and the Azores).

Types of fishing gear more generally utilized will also be indicated, as well as the status of fisheries in recent years (1961-1970), and certain statistical data of interest.

While the data at hand does not fully meet our needs for a broader picture of tuna fishery in Portugal and the Islands, it has served, nonetheless, to enable us to visualize what tuna fisheries have been like on the Continent, the Azores and Madeira, particularly during the past ten years.

We also provide a view in retrospect, covering development of catches. This not only permits an evaluation of total catches, but it is also possible to establish comparisons. In the same manner, a similar criterion has been adopted for value of catches in thousands of escudos (100 escudos are approximately equivalent to \$ 3.50 U.S.).

2. Fishing Gear

For many years the main method for fishing tuna on the Continent has been with traps which certain enterprises install regularly in waters off the southern coast of the country. Their installation depends on several factors, the principal ones being the direction followed by schools of fish and location of the coastline with regard to the trap area.

It can be stated that these traps are the principal system for tuna fisheries in Continental Portuguese waters, since the percentage of catches on the north and west coasts carried out by small fishing vessels with pole-and-line have always

* Original Report in Portuguese.

** Instituto de Biologia Marítima, Lisbon, Portugal.

been of lesser importance and steadily decline each year. Those catches still made correspond only to a very limited number of fish, all of them small in size, and in national statistics they are not sufficient for making a truly detailed study on population, especially insofar as the various commercial types of populations broken down by size and weight category.

As has been previously stated, fishing in the north and central areas is effected by angling gears from small boats which also frequently engage in fishing for other species.

Tuna fishery off the Islands of Madeira and the Azores is effected in a different manner. In medium and small size boats, the «vara de salto», pole-and-line methods are utilized with plain hooks or hooks provided with «barbelas», depending on the size of the fish it is desired to catch. The numerous boats of the island have varying features which can be divided into two principal types: small and medium tuna boats, similar to California tuna clippers. In either case, the search for schools of fish follows no specialized technique. Fishing is based somewhat on the empirical knowledge of experts and captains whose experience is similarly an important factor.

Three tuna freezer boats were built in Portugal in 1968 for purse seine fishery. Having a total length of 38 meters, an 865 HP engine, 380 tons, and 325 cu.m. freezing capacity, these vessels have been utilized solely for fishery off the south of Angola where yields are much higher. A trial cruise was made in waters off the Island of Madeira which revealed that such units would not be profitable enough in the Atlantic region. The number of vessels engaged in tuna fisheries off Madeira and the Azores, as also that for traps south of the Continent, is given in the following chart for the years 1961-1970. We have been unable to obtain data on vessels engaged in this fishery in the central and northern areas of the Continent, since in most cases their activities are channelled to other fisheries and only sporadically do they catch tunas. There are, therefore, several types of vessels somewhat difficult to enumerate.

<i>Year</i>	<i>Madeira</i>	<i>Azores</i>	<i>Total</i>	<i>No. of traps southern area of Continent</i>
1961	42	82	124	5
1962	40	90	130	5
1963	40	72	112	5
1964	48	72	120	5
1965	48	77	125	5
1966	47	75	122	3
1967	44	75	119	3
1968	44	62	106	2
1969	46	63	109	2
1970	37	48	85	2

3. Species Caught

Various *scombriformes* species included in the generic term «tunas» can be caught off the coasts of Continental Portugal, Madeira and the Azores. It is not always easy to digest statistics relating to populations or catches, since extensive use of common names shows that several of these relate to the same species or to a common denomination which is at times employed to make reference to several species. Thus, for example, «albacore», when referring to *Thunnus thynnus* (weight varying between 30 and 49 kg), is also employed to designate other species such as *Thunnus obesus*, *Thunnus albacora* and *Thunnus alalunga*, etc. and *Thunnus alalunga*.

Commercial terms are also widely utilized on the Continent, more so than in the islands, depending on the size and weight of the fish. However, all of these terms are used indistinctly for any species, several of them frequently being included in one.

There follow some of those more frequently used:

Atum	90 kg specimen or larger
Atuarro	Specimen weighing between 50 and 89 kg
Albacore	Specimen weighing between 30 and 49 kg
Cachorreta	Specimen weighing 30 kg or less

4. Tuna Catches between 1961 and 1970

In our efforts to obtain an estimate of tuna catches on the continental Portuguese, Madeira and Azores coasts, we consider that insofar as the Continent, the coast is divided into three areas corresponding to as many national statistics divisions — North zone, from Caminha to Figueira da Foz; West zone, from Figueira da Foz to Sines, and South zone from Sines to Vila Real de Santo Antonio.

5. General Considerations

a) Continental catches have revealed a progressive decline along the entire coast in recent years and we do not yet have data which will permit a satisfactory explanation.

b) Trap catches to the south of the continent have until lately been the best economically, not only because of the size of fish caught, but also because of volume of the fishery.

Fisheries in the islands have always been higher than those of the continent. Progressive declines have also been noted, this resulting in a virtual standstill of fishery activities which had previously been so profitable.

c) Available statistics on catches and yields relative to fisheries off the continent clearly reveal a situation we can consider critical which deteriorates with every passing year.

d) Catches in waters of the islands of Madeira and the Azores do not allow a conclusion to be reached as to exploitation tendencies, since statistics available reveal fluctuations from one year to another which are difficult to interpret. However, we can state that total catches in the islands (pole-and-line fishery) have always been higher than those of the continent.

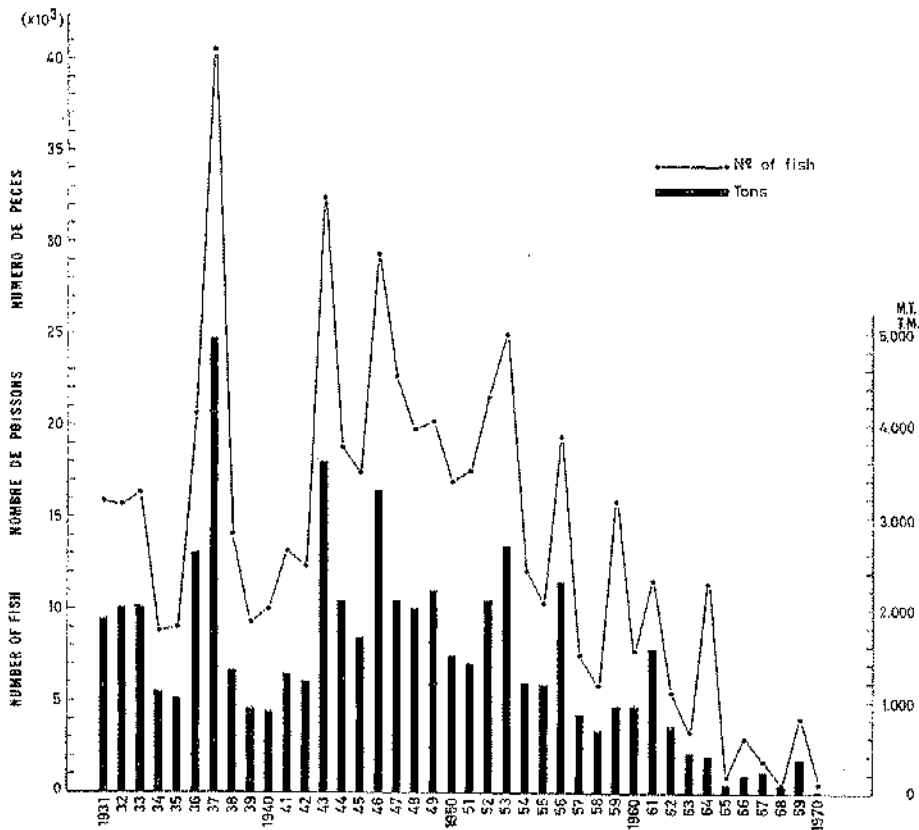


FIG. 1. Portuguese catches by traps on the South Coast of the Continent (1931-1970).

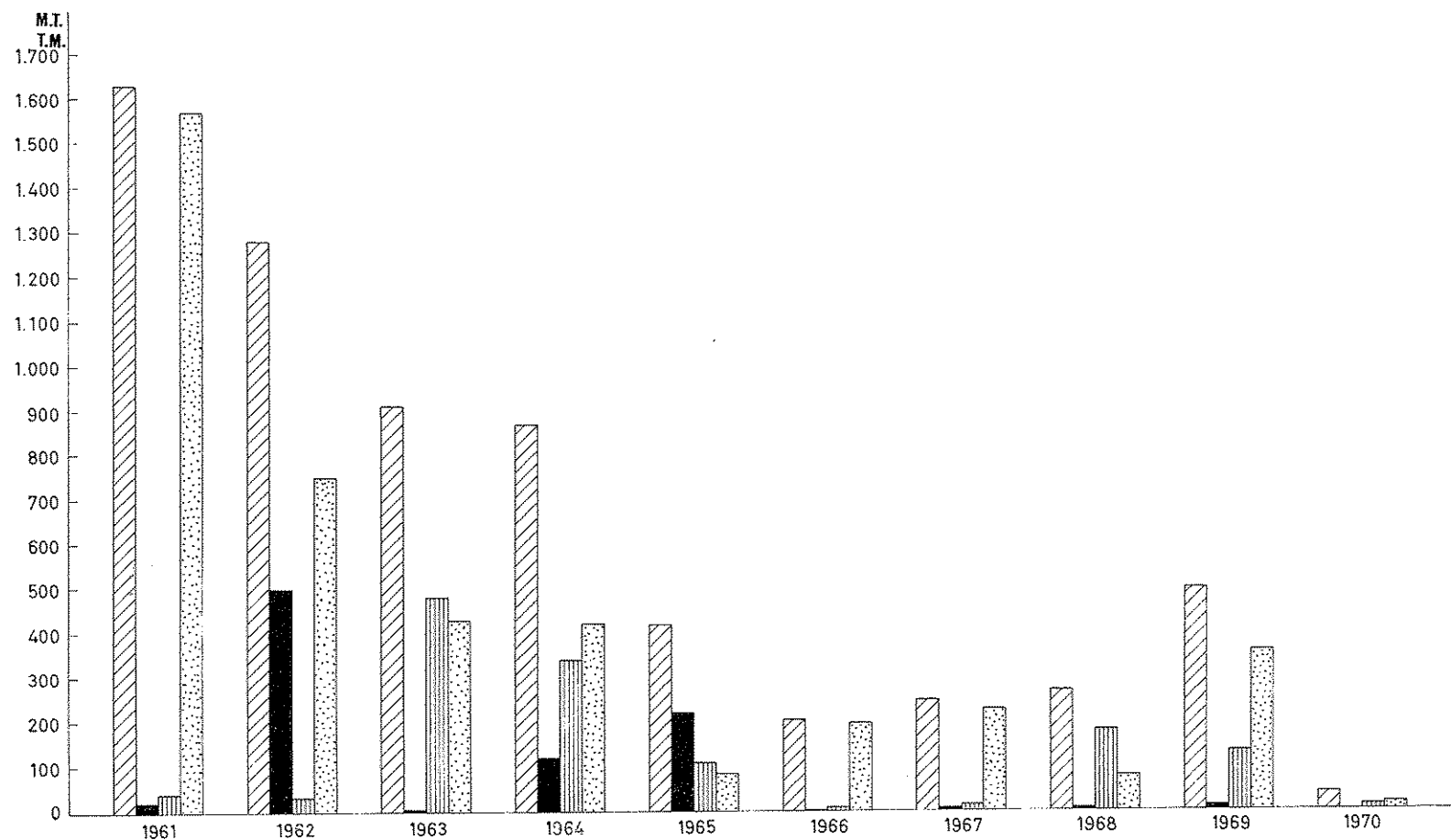


FIG. 2. Continental Portuguese tuna fisheries (1961-1970). Histograms for each year represent (from left to right):

1. Total catches.
2. North Coast catches, line fishery (from Caminha to Figueira da Foz).
3. West Coast catches, line fishery (from Figueira da Foz to Sines).
4. South Coast catches, by traps (from to V. R. S. António).

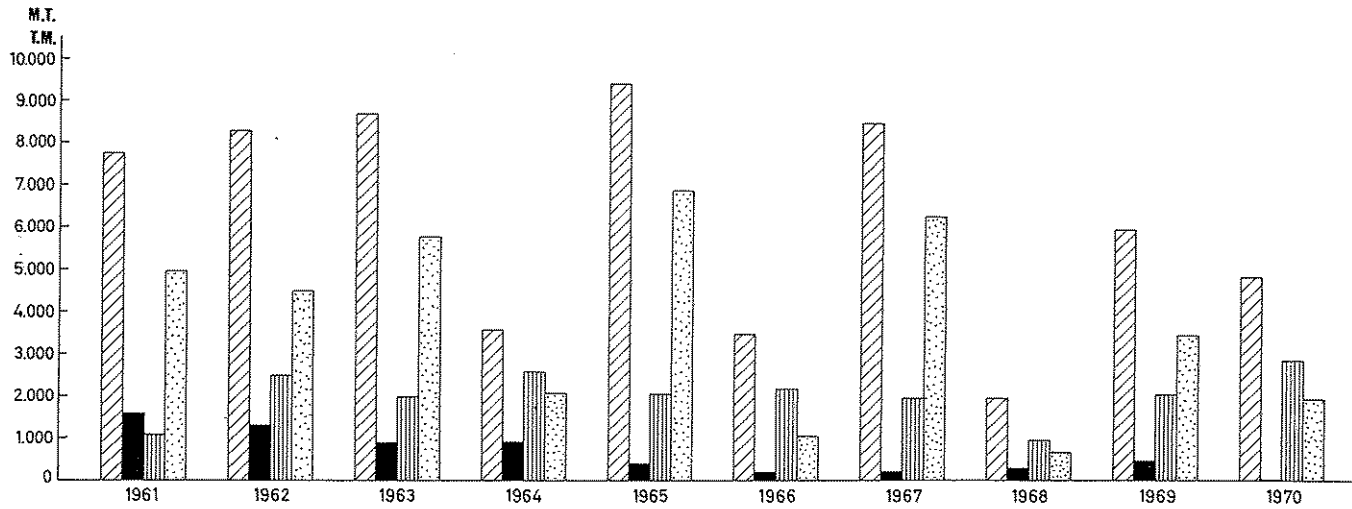


FIG. 3. Total catches of Portuguese tuna fisheries from Continental coast (traps and line fisheries) and Açores and Madeira (line fishery). Histograms for each year represent (from left to right):

1. Total catches,
2. Continental catches,
3. Madeira, and
4. Açores.

e) Briefly referring to the principal methods and gears utilized on the continent and in the islands, we have given statistics on catches and value of fisheries for the period 1961-1970, and fishing effort in the islands stated in number of active vessels, also for the same period. With respect to catches to the south of the continent (traps), which until recently were the most valuable financially, and fisheries, totals are likewise given for the period 1961-1970.

f) Research programs conducted by our Institute on fisheries and tuna biology have been limited in recent years to statistical recording of catches and values, as also obtention of working elements to enable us to ascertain the causes for the current fisheries crisis. The availability in future of a research vessel will allow us to extend our activities to waters off the islands of Madeira and the Azores, where tuna fisheries continue to be important.

g) In the field of international cooperation, the Instituto de Biologia Maritima has also considered Portuguese cooperation, mainly as regards programs carried out by ICCAT in the areas of Madeira and the Azores.

II. Tuna Fisheries in Angola *

by

J. M. DE CAMPOS ROSADO **

1. Review of Tuna Fisheries

Yellowfin and skipjack are caught by small baitboats, 12-20 meters long, operating in the littoral within a narrow strip along the coast about 40 miles wide and 200 miles long. Little tuna, bonito and frigate mackerel are caught by traps.

Information on the catch of yellowfin and skipjack, and on the number of baitboats in the years 1963 through 1970, as evaluated by the author is attached as Table 1. Catch and effort statistics on the other tunas caught by traps have not yet been evaluated, but catch of little tuna, bonito and frigate mackerel may represent about 60 % of the total tuna catch in Angola.

The baitboat fishery

Baitboat fishing is seasonal, September-October to April-May when environmental conditions in the littoral are favorable to immigration of yellowfin and

* Original in English.

** Missao Estudos Bioceanologicos e Pescas, Lobito, Angola.

Table 1. Effort (1000 fishing days) and catch (1000 metric tons — round) for Portugal - Angola baitboats, 1963 - 1970

<i>Year</i>	<i>Effort</i>	<i>Yellowfin</i>	<i>Skipjack</i>	<i>Total</i>
1963	3,634	4.4	3.3	7.7
1964	3,057	4.5	3.5	8.0
1965	3,849	2.8	6.4	9.2
1966	2,920	2.4	6.3	8.7
1967	4,295	1.6	8.3	9.9
1968	2,777	1.6	10.6	12.2
1969	1,472	1.0	4.6	5.7
1970	2,124	0.1	0.6	0.8

skipjack. There are thus good and bad fishing seasons apparently depending on such conditions. The last two seasons, 1969-1970 and 1970-1971, were very poor. Baitboat fishermen switched to other tunas, mainly little tuna.

As long as the baitboat fishery in Angola remains in the littoral, the trend in respect to total catch and in species composition is unpredictable because it depends on abundance of the respective populations and their migration to Angolan coastal waters.

The number of small 12-20 meter baitboats put to sea increases every year. The tendency is to increase their engine power and the resultant greater speed possible enables them to cover a larger area during each fishing day. New enterprises based on larger baitboats are being established in Angola. It is probable that in the next couple of years Angolan baitboats may fish north of the Congo River.

2. Review of Research Programs

2.1. Two sampling programs of yellowfin and skipjack are currently being carried out.

(i) To evaluate progression of modal length

A constant weight of 200 kilograms of skipjack and, when available, an equal weight of yellowfin is sampled daily for fork length measurements at each of the three Angola tuna fishing centers, Benguela, Lucira and Moçâmedes. Fork length is measured according to MARR & SCHAEFFER (1949) and at the next centimeter above.

(ii) *To identify sub-populations by morphometric characters*

During the 1970-1971 fishing season a sampling program was set up for body dimensions, weight, sex ratio and stage of maturity. The morphometric characters used are those defined by YANG, NOSE & HIYAMA (1969). Stage of sexual maturity was classified according to ORANGE (1961) and by comparing the gonads with preserved specimens made available by Dr. Albert Jones, NMFS, U.S.A.

Due to erratic and scarce landings neither program yielded sufficient information.

It is hoped to carry on with these programs as soon as the present tuna fishing starts.

- 2.2. It is also planned to set up small pilot experiments for tagging skipjack, yellowfin and bigeye, as recommended at the meeting of the Sub-Committee on Stock Identification held in Lisbon in April 1971.

SOUTH AFRICAN NATIONAL REPORT *

by

G. H. STANDER

Division of Sea Fisheries
Cape Town, South Africa

Review of tuna fisheries in South Africa

The years 1970 and 1971 have been marked by no change with respect to tuna fishing by South Africa. Apart from the limited catches made by sport fishermen, small landings of tuna were sporadically made by commercial vessels. In both years the estimated total catch was well below 1,000 tons.

Review of national research programs on tuna

The tuna research program for 1971 made provision for two tagging cruises. The first of these was conducted near Cape Town during June. Use was made of the longline method for capturing specimens and nine albacore and two yellow-fin tuna were marked. No tagged fish have been recovered to date. Although the cruise was rather disappointing, valuable experience was nevertheless gained.

A further tagging cruise is being planned for November or December 1971 and fish will be caught by trolling. Judging by the experience of sport fishermen operating off the Cape of Good Hope, we are more confident of the success of the proposed project.

Although our research program for 1972 has not yet been finalized, it is likely that further efforts will be made to tag tuna, possibly with alternative methods of capture.

* Original Report in English.

SPANISH NATIONAL REPORT *

I. Report on Tuna Fisheries

by

ORESTES CENDRERO **

and

C. GARCIA CABRERA **

Fishing methods

Several methods for fishing tunas are employed along the Spanish littoral. These may be summarized as follows:

Cantabrian: Pole-and-line and trolling with live-bait—some of the large tuna boats based at Bermeo which operate in African waters employ purse seines.

Mediterranean: Traps, pole-and-line, trolling and seine.

South Atlantic: Same.

Canaries: Pole-and-line, seines, trolling, harpoons and longlines with few hooks.

Sahara coast: Longlines, pole-and-line, trolling, purse seines, special fixed traps and large mesh gillnets.

Type of vessel utilized

Non-specialized vessels generally engage in this fishery in the Cantabrian, and during the off-season for tunas they catch other pelagic or demersal species. Almost all of the fleet (except the large Bermeo tuna boats with engines over 500 HP and more than 50 gross tons) is composed of 12 to 25 gross ton vessels with 60 to 200 HP engines and 15 to 20 meters long. Their crews number between 8 and 15-20. All boats have live-bait tanks, the bait usually being anchovy.

* Original Report in Spanish.

** Instituto Español de Oceanografía.

There are four refrigerating tuna boats in the Canaries, with an average gross tonnage of 400. These are modern vessels with a total of 1642 G.T. (overall for the four), 3886 HP and the crews total 80.

Artisan-type vessels with some ten registry G.T. and crews of four or five are utilized in this area, particularly in Tenerife and Gomera. The vessels are generally some 12 meters long, have live-bait tanks and open decks. There are some 60 such vessels and they render good service. Each vessel has a 50-120 HP engine. They always fish with pole and line or rods and on occasion with purse seines.

Most important species

<i>Common Name</i>	<i>Scientific Name</i>	<i>Fishing Area</i>
Skipjack	<i>Euthynnus (Katsuwonus) pelamis</i>	Canaries, Cantabrian
Albacore	<i>Thunnus alalunga</i>	Canaries, Cantabrian
Bonito	<i>Sarda sarda</i>	Mediterranean, South Atlantic
Atlantic little tuna	<i>Euthynnus alletteratus</i>	Canaries, Mediterranean
Frigate mackerel	<i>Auxis thazard</i>	Canaries, Mediterranean
Yellowfin	<i>Thunnus albacares</i>	Canaries, Africa
Bigeye	<i>Thunnus obesus</i>	Canaries, Africa
Wahoo	<i>Acanthocybium solandri</i>	Canaries, Africa
Plain bonito	<i>Orcynopsis unicolor</i>	Sahara coast
King mackerel	<i>Scomberomorus maculatus</i>	Sahara coast
Bluefin	<i>Thunnus thynnus</i>	Mediterranean, Canaries

Albacore is the basis for Cantabrian and Galician fisheries. Bluefin, bonito, frigate mackerel and Atlantic little tuna are mostly caught in the Mediterranean and South Atlantic. Yellowfin, bigeye, wahoo and albacore are caught in the Canaries. Plain bonito and king mackerel, as also yellowfin and bigeye are caught in Sahara waters and off the coast of Central Africa.

Development of catches in recent years

A decline in albacore (*Thunnus alalunga*) catches in all areas of national fisheries has been evident in recent years. However, fish have been abundant in 1971, and overall catches of the species have increased with respect to the three or four preceding years.

Bluefin tuna (*Thunnus thynnus*) have declined slightly; more so in the Mediterranean.

Catches of yellowfin, bigeye and wahoo have increased in the Canaries. This has compensated for the decline in other species.

Research activities in Canaries and the Cantabrian

A study of the serology of tunas, biology of the various species, changes in fishing gear and period of immigration and emigration of various populations in the archipelago has also been undertaken at the Canaries Laboratory of the Instituto Español de Oceanografía.

Continued research on tuna biology, migration, fishing methods, improvement of vessels and tagging, as also the study of serology, will proceed in the Canaries. With regard to migrations, particular attention will be devoted to the study of species common to the Canaries and the Antilles.

Beginning in the spring and summer, fisheries oceanographic research will be conducted in the Cantabrian. This will be coordinated with the Maritime Fisheries Institute of France. It will also be endeavored to initiate an albacore tagging program.

II. Research on Bluefin Tuna (*Thunnus thynnus* L.) in Spain during the years 1970-71

by

JULIO RODRIGUEZ-RODA *

Our research is based on catches obtained in traps located on the south Atlantic coast, the one in Barbate waters having been the subject of particular attention, since it catches bluefin tuna and other scombridae May through August included. This is in contrast to other traps which fish for one or two months only.

Along with bluefin tuna, the traps mainly catch the following species: Atlantic little tuna (*Luthynnus alletteratus*), bonito (*Sarda sarda*), and frigate mackerel (*Auxis thazard*). Some swordfish (*Xiphias gladius*) and white marlin (*Tetrapturus albidus*) are also caught.

We measure tunas with calipers and use the zoological length (= fork).

Yield

Data covering a period of 35 years (1929-1963) revealed that trap yields fluctuated over periods of 6 or 7 years (RODRÍGUEZ-RODA, 1966), and that the yield

* Instituto de Investigaciones Pesqueras, Cádiz.

from the principal one at Barbate which catches about 60 % of the total, fluctuated between one and three thousand metric tons during the mentioned four months of fishery. However, beginning in 1966 this yield has declined; particularly since 1968 it may be said that the situation is catastrophic insofar as total yields.

Production of Bluefin Tuna from traps in the South of Spain, in metric tons

Year	Total	Yield per trap			
		Barbate	Sancti-Petri	Tarifa	La Línea
1966	1,400.9	703.7	506.5	152.3	38.4
1967	3,009.6	1,835.7	767.1	338.3	68.5
1968	1,138.0	819.3	230.9	87.8	...
1969	1,633.5	1,072.7	390.5	146.3	24.0
1970	1,513.0	1,007.7	308.8	122.0	74.5
1971	616.1	327.4	232.9	46.7	9.1

Traps being a stationary gear, they catch only bluefin entering them when conditions as to temperature and turbulence of the water are favorable (RODRÍGUEZ-RODA, 1970). Therefore, poor catches can often be due to adverse oceanographic conditions prevailing in the area of fishery which inhibit entry of the bluefin tuna, rather than a lack of fish.

The attached chart shows annual trap yields beginning in 1966.

Size and age in fishery

Two age groups of bluefin predominated in 1970. Those 9 years old (200-205 cm) of the 1961 year class, and those 12 years old (230-235 cm) of the 1958 year class. There is also a small group of 7-year-olds (170-175 cm) of the 1963 year class.

In 1971 we mainly found three age groups: 14-year-olds (250-255 cm) of the 1957 year class, 13-year-olds (235-240 cm) of the 1958 year class, and 10-year-olds (210-215 cm) of the 1961 year class. A small group of 5-year-olds (145-150 cm) of the 1966 year class is also noted.

It should be emphasized that we have placed particular stress on recording the 1958 year class since 1966, as shown in our work cited in the bibliography.

*Hematological and biochemical studies **

Bluefin tuna caught by traps in southern Spain were sampled for the purpose of studying populations in relation to age, sex and reproduction status. The results of such studies are summarized in GUTIÉRREZ (1967, 1970 and 1971).

* Summarized by ICCAT Secretariat from paper submitted to SCRS, 1971, by M. GUTIÉRREZ (SCRS/71/26).

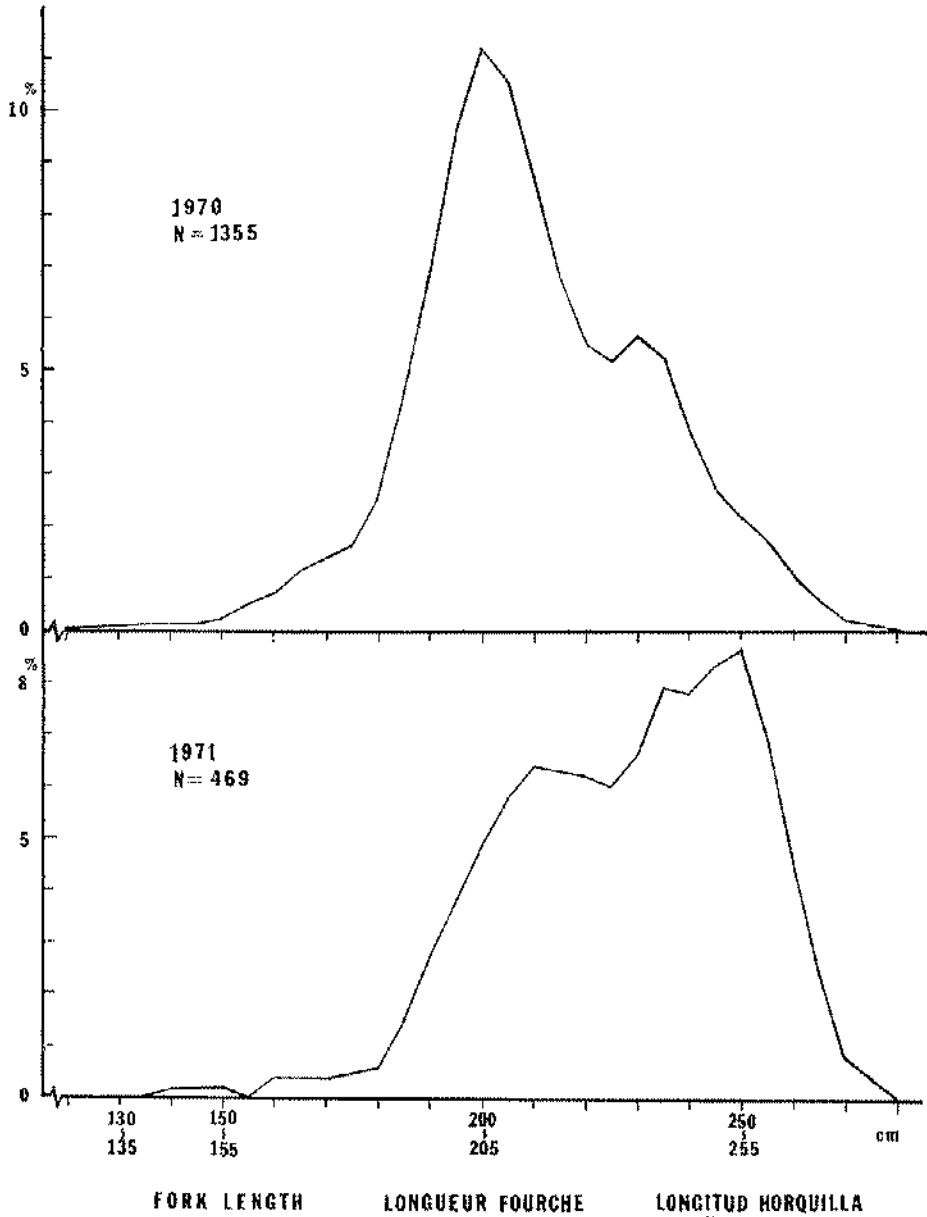


FIG. 1.— Size frequencies in smoothing averages of Barbate bluefin for 1970 and 1971.

Certain changes in physiochemical characteristics of the blood were noted in samples from post-spawning specimens. Also, five types of erythrocytes were isolated by three types of bean extracts.

Electrophoretic studies were applied on crystalline protein; several components were identified in three different layers of the crystalline. The values for these components varied between layers. It was also noted that some specimens lack certain components and/or are duplicated in a given layer of the crystalline.

Electrophoretic studies applied on hemoglobin and mioproteins showed some independent patterns, regardless of sex, which may be useful in future sub-population studies.

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NATIONAL REPORT OF UNITED STATES OF AMERICA *

by

WILLIAM H. LENARZ, ALBERT C. JONES

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and

FRANK J. MATHER III

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I. Summary of U. S. Research Activities in 1971

Woods Hole Oceanographic Institution

Atlantic tunas and billfishes have been studied by the Woods Hole Oceanographic Institution since 1950. Studies have included tagging, morphometrics and meristics, age and growth of bluefin, and monitoring of the fishery for small bluefin (less than 120 kg) off the east coast of the United States.

Tagging in 1971 included an experiment to compare two types of tuna tags — plastic dart tags (Type D) and stainless steel dart tags (Type H). As of September 14, 1971, nearly 600 bluefin tuna had been alternately double tagged with tags of these types. Canada, the U.S. National Marine Fisheries Service, and the Woods Hole Oceanographic Institution carried out the project jointly. The returns of tagged bluefin in the years 1962-1970 are shown in table 1. Most tagged fish were returned within 18 months, and the average rate of return during the second season at liberty was about 10 per cent. Also in 1971 over 600 white marlin and 800 sailfish were tagged through the cooperation of sport fishermen.

The catch of the purse seine fishery off the east coast of the United States continued to be sampled for lengths of fish and the age composition of the catch was estimated from the length frequencies. The catches of the fishery in the years 1962-1970 were dominated by 2 and 3-year-old fish (table 2). The average age decreased from 1962 to 1966 but increased thereafter. Generally, few fish older than 5 years were captured in this fishery. Landings from this fishery increased

* Original Report in English.

from 1969 to 1970, as shown in table 4 of the *Review of Tuna Fisheries of the United States in the Atlantic Ocean*. Landings in 1971 are expected to be of the same order as 1970.

Fishery-Oceanography Center, NMFS, La Jolla, California

Studies on Atlantic tunas at the Fishery-Oceanography Center began in October 1970. These studies have been limited to those necessary to develop models of population dynamics of Atlantic tunas. Personnel assigned to these studies increased from half time of one biologist in 1970 to two biologists and one technician in June 1971. Field work has been limited to sampling tuna landed by U.S. vessels at west African ports and transshipped to Europe. The Inter-American Tropical Tuna Commission has contracted to supply Atlantic catch and effort statistics from the U.S. fleet based in California and Puerto Rico and to sample catches of Atlantic tuna landed at ports in these areas.

During the past year most of the research effort has been devoted to surface and longline fisheries in the tropical Atlantic Ocean, because of the declining catch rate of yellowfin experienced in these fisheries. Several studies on these fisheries have been conducted: growth of yellowfin, length-weight relationships of several species, comparison of Pacific and Atlantic yellowfin fisheries, yield per recruit of yellowfin, and age composition of yellowfin catch. Results of these studies will be submitted in separate reports.

Southeast Fishery Center, NMFS, Miami, Florida

Studies on Atlantic tunas at the Miami Laboratory began in the early 1960's. Since October 1970, when population dynamics work was transferred to La Jolla, studies have been directed to the biology and environmental relationships of the stocks.

During 1971 a number of reports were completed or neared completion and new activities related to the redirected assignments of the laboratory were begun. These studies included:

1. An atlas of the distribution of tunas and billfishes. Basic data for the atlas was from various Japanese publications and covered some 482 million hooks and catches of 11 million albacore, 9 million yellowfin, and 5 million other tunas and billfishes of various species in the Atlantic from 1956 to 1968. Results are presented in a series of density contour plots showing the quarterly distribution of each of 10 species or groups of species.

2. An analysis of historical trends in the surface temperature of the Gulf of Guinea. A report in preparation shows a long-term decrease of temperature of about 2.5°C from 1956 to 1968. These data averaged by month and 5° square also are being used to study seasonal cycles, year-to-year fluctuations, patterns of short term disturbances and the geographic variation of all these. Recent data,

averaged by 1° squares and by 15-day intervals, are being used to trace the position of thermal boundaries and coastal upwelling regions.

3. Research on Atlantic albacore, including a completed report on population dynamics and an ongoing study of maturation, seasonal spawning, and fecundity from gonads collected for 2 years at tuna canneries in Puerto Rico.

4. Several completed studies on the food of yellowfin, bluefin, and skipjack tunas in various parts of the Atlantic.

5. Laboratory rearing from egg to juvenile of frigate mackerel (*Auxis* sp.) and little tunny (*Euthynnus alleteratus*) and study of the seasonal distribution of juvenile bluefin tuna and other scombrids off Florida.

6. Completion of the vertical and horizontal sections of temperature, salinity, oxygen, phosphate, and sigma-t for the report with Portugal on Joint Investigations of the South Eastern Tropical Atlantic (JISETA) that were carried out in 1968. Completion of an atlas of surface winds by month and 2° square for the Gulf of Guinea, based on historical data.

II. A Review of Tuna Fisheries of the United States in the Atlantic Ocean, 1971

United States landings of tuna and tuna-like fishes from the Atlantic Ocean in 1970 were at about the same level as in recent years (Table 3). As was pointed out in last year's report, U.S. tuna catches began to increase in the early 1960's, when purse seiners started to harvest small bluefin and skipjack off the east coast of the United States during the summer. Catch and effort statistics for this fishery for 1962-1970, collected by F. Mather, are shown in table 4. There was an upward trend in the catch per boat day in 1969 and 1970, but the significance of the trend has not been determined.

The U.S. purse seine fishery in the eastern tropical Atlantic increased in 1969 and 1970 compared to 1967 and 1968, which were the first years of a regular fishery by U.S. boats in this area. Some fishing had been conducted by U.S. vessels in this area as early as 1958. The vessels in this fishery, part of the U.S. fleet which normally fishes in the eastern tropical Pacific, fished west African waters in the summer and fall of these years. Statistics for this fishery are shown in tables 5 and 6. Fishing effort in 1971 is expected to be less than in 1970. The catch per fishing day for yellowfin tuna decreased from 10.91 to 4.02 (m tons/day) from 1969 to 1970, while that for skipjack tuna increased from 2.44 to 5.06. A detailed report on catch and effort statistics for this fishery has been submitted to ICCAT.

Catches of bonito and little tunny have been mainly by traps fished off the east coast of the United States south of Cape Cod; the general decline in catches is probably due to a reduction of effort caused by economic reasons. Swordfish are harvested by longline and harpoon. This fishery was greatly reduced in 1971 because of the mercury content found in swordfish.

Table 1. Tag returns from bluefin tuna in percent of release by months at large
(Source: F. Mather)

Months at large	Y e a r o f r e t u r n								
	1962	1963	1964	1965	1966	1967	1968	1969	1970
0 - 5.9	0	24.1	20.4	9.0	9.6	14.2	32.4	2.4	10.9
6.0 - 17.9	1.3	5.2	6.9	6.7	2.0	14.0	8.1	6.2	24.2
18.0 - 29.9	6.7	2.0	0	0	0	1.9	1.1	2.1	3.1
30.0 - 41.9	0	0	1.3	0	0	0	0	0.1	2.1

Table 2. Estimated age composition (percent) of catch by U.S. east coast fishery
on small bluefin, 1962-1970 (Source: F. Mather)

Age	Y e a r								
	1962	1963	1964	1965	1966	1967	1968	1969	1970
I	1	10	17	17	70	9	2	1	7
II	6	10	19	55	25	60	63	40	29
III	7	27	27	16	5	15	34	47	55
IV	61	21	13	1	...	11	1	8	3
V	20	20	15	8	...	5	...	4	5
VI	1	9	9	1	...	...	...	...	1
VII	1	1	1	2	...	...	...	...	...
VIII	1	1	...	1	...	...	...	...	...
Average age	4.1	3.7	3.2	2.4	1.4	2.4	2.3	2.7	2.7
Sample size	3044	5586	2318	1079	3734	1466	946	816	8967

Table 3. United States Atlantic tuna catches¹ since 1945 (in metric tons)

Year	S p e c i e s ²							Total
	Bluefin	Bonito	Little tunny	Yellow-fin	Skipjack	Swordfish ₄	Unclass	
1945	626	300	132	—	—	1,280	—	2,338
1946	537	236	155	—	—	891	—	1,819
1947	493	100	300	—	—	735	—	1,628
1948	1,359	61	273	—	—	447	—	2,140
1949	1,242	65	331	—	—	438	—	2,076
1950	575	56	134	—	—	413	—	1,178
1951	799	26	168	158	—	92	—	1,243
1952	256	35	339	—	—	137	—	767
1953	882	84	31	—	—	110	—	1,107
1954	647	133	32	7	—	156	—	975
1955	407	68	48	—	—	161	—	684
1956	208	32	40	151	—	223	—	654
1957	454	42	15	202	—	367	—	1,180
1958	1,123	27	6	284	—	710	—	2,150
1959	1,278	113	81	111	—	690	—	2,273
1960	637	80	7	—	—	459	—	1,183
1961	1,074	63	1	—	—	409	—	1,547
1962	3,969	78	7	17	463	424	—	4,958
1963	5,672	96	5	207	2,995	1,250	5	10,230
1964	4,882	29	2	126	3,980	1,384	56	10,459
1965	3,184	83	10	—	64	1,226	114	4,681
1966	1,238	56	21	—	39	616	4	1,974
1967	2,319	22	7	977	489	474	10	4,298
1968	635	43	—	6,104	3,219	274	113	10,388
1969	1,226	98	7	17,394	5,712	171	1	24,609
1970 ³	3,288	81	115	11,638	10,736	246	—	26,104

1. Includes catches by U. S. vessels landed at Puerto Rico and outside U. S.; does not include catches from other oceans landed at Puerto Rico. Does not include sport catches or catches of species other than those listed. Does not include more than 3,500 tons caught by U. S. vessels in the eastern tropical Atlantic in 1958-63.
2. Bluefin, *Thunnus thynnus*; bonito, *Sarda sarda* (probably includes varying quantities of other small tunas); little tunny, *Euthynnus alletteratus*; yellowfin, *T. albacares*; skipjack, *Katsuwonus pelamis*; swordfish, *Xiphias gladius*.
3. Provisional.
4. Data for 1969 and 1970 and all data on swordfish catches are official statistics prepared by the Statistics and Market News Division of the National Marine Fisheries Service.

Table 4. Catch and effort statistics of bluefin tuna less than 120 kg by the purse seine fishery of the east coast of the United States between Cape Hatteras, North Carolina, and Cape Ann, Massachusetts, by year.

(Catches include fish landed by U.S. and Canadian vessels)

<i>Years</i>	1962	1963	1964	1965	1966	1967	1968	1969	1970
M. tons caught	3065	5382	5593	2699	794	2319	608	1568	4228
M. tons/boat day	9.1	8.6	6.2	6.6	4.3	12.4	7.2	16.5	15.1
No. of boats	7	18	21	13	6	11	5	4	8

Table 5. Description of U.S. vessels that participated in the tropical Atlantic purse seine fishery for yellowfin and skipjack tunas, 1967-1970 (Source: IATTC)

<i>Year</i>	<i>No. of vessels</i>	<i>Flag</i>	<i>S. Class</i>
1967	3	U. S.	≥ 401 short tons
1968	8	U. S.	≥ 401 short tons
1969	1	U. S.	301-400 short tons
	21	U. S.	≥ 401 short tons
1970	22	U. S.	≥ 401 short tons

Table 6. Catch and effort statistics for yellowfin and skipjack tunas landed by the international purse seine fleet fishing in the tropical Atlantic Ocean 1967-1970 and reporting their catches to IATTC (Source: IATTC)

<i>Year</i>	<i>Effort (fishing days)</i>	<i>Catch yellowfin (M. tons)</i>	<i>Catch skipjack (M. tons)</i>	<i>Catch yellowfin/effort (M. tons/fishing days)</i>	<i>Catch skipjack/effort (M. tons/fishing days)</i>
1967	129	978	473	7.58	3.67
1968	266	6,198	3,192	23.30	12.00
1969	1,818	19,845	4,441	10.91	2.44
1970	2,255	9,065	11,423	4.02	5.06

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