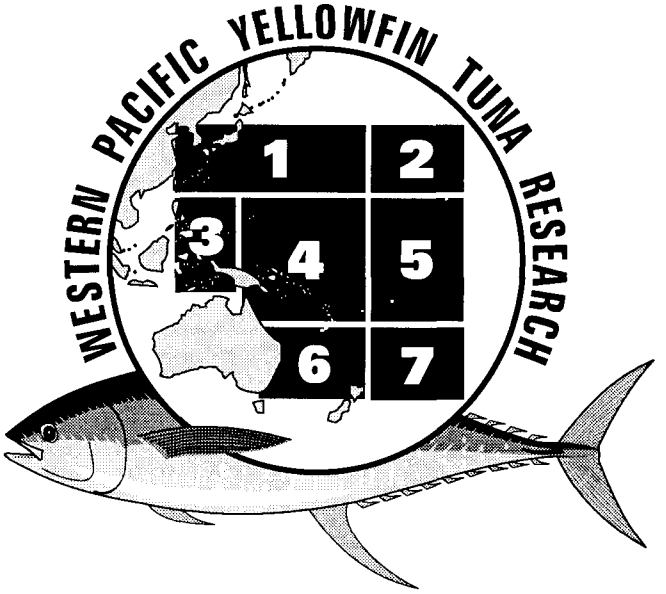
Report of the Sixth Meeting of the Western Pacific Yellowfin Tuna Research Group

Noumea
New Caledonia
July 23, 1996



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PREFACE

The Western Pacific Yellowfin Tuna Research Group (WPYRG) is an informal organization of scientists and fisheries officers studying the population biology of yellowfin tuna, *Thunnus albacares*, and monitoring fisheries exploiting this species in the central and western Pacific Ocean. The Group was organized in 1990 in response to concerns about expanding fisheries and significantly increasing catches of yellowfin tuna from the western Pacific. The Group's purpose is to exchange information and data, plan and cooperate in collaborative research projects, foster a common understanding of the condition of the yellowfin tuna stock, and offer scientific advice on fishery management issues. In 1995 the changes of the Group were expanded to include bigeye tuna, *T. obesus*, and skipjack tuna, *Katsumonus pelamis*, issues as they affect the yellowfin tuna fisheries monitored by the WPYRG. Meetings held to date:

First meeting --	June 20-21, 1991, Port Vila, Vanuatu (Host: Vanuatu Fisheries Department)
Second meeting --	June 17-24, 1992, Honolulu, Hawaii, U.S.A. (Host: U.S. National Marine Fisheries Service)
Third meeting --	June 21-23, 1993, Pohnpei, Federated States of Micronesia (Host: Micronesian Maritime Authority)
Fourth meeting --	August 9-11, 1994, Koror, Republic of Palau (Host: Palau Maritime Authority)
Fifth meeting --	August 21-23, 1995, Noumea, New Caledonia (Host: South Pacific Commission)
Sixth meeting --	July 23, 1996, Noumea, New Caledonia (Host: South Pacific Commission)

Organizations sponsoring participating scientists and fisheries officers are:

AIMS . . . . . Australian Institute of Marine Science, Australia

BFAR . . . . . Bureau of Fisheries and Aquatic Resources, Philippines

BRR . . . . . Bureau of Rural Research, Australia

CSIRO . . . . . Commonwealth Scientific and Industrial Organization, Australia

DF . . . . . Department of Fisheries, Vanuatu

DFMR. . . . . Department of Fisheries and Marine Resources, Papua New Guinea

DMWR. . . . . Department of Marine and Wildlife Resources, American Samoa

EVAAM . . . . Etablissement pour la Valorisation des Activités Aquacoles et Maritimes, French Polynesia

FAO . . . . . Food and Agriculture Organization of the United Nations, Italy

FFA. . . . . Forum Fisheries Agency, Solomon Islands

FFD. . . . . Fiji Fisheries Division, Fiji

MAF . . . . . Ministry of Agriculture and Fisheries, Solomon Islands

MENRD . . . . Ministry of Environmental and Natural Resources Development, Kiribati

MF . . . . . Ministry of Fisheries, Tonga

MMA . . . . . Micronesian Maritime Authority, Federated States of Micronesia

MRD. . . . . Ministry of Resources and Development, Marshall Islands

NFRDA. . . . . National Fisheries Research and Development Agency, Korea

NIWAR . . . . National Institute of Water and Atmospheric Research, New Zealand

NMFS. . . . . National Marine Fisheries Service, United States

NRIFSF . . . . National Research Institute of Far Seas Fisheries, Japan

NTU . . . . . National Taiwan University, Republic of China (Taiwan)

PMA . . . . . Palau Maritime Authority, Palau

RIMF . . . . . Research Institute for Marine Fisheries, Indonesia

SPC. . . . . South Pacific Commission, New Caledonia

STMMPM . . Service Territorial de la Marine Marchande et des Peches Maritimes, New Caledonia

UH. . . . . University of Hawaii, United States

WPFCC . . . . Western Pacific Fisheries Consultative Committee, Philippines

WPRFMC . . Western Pacific Regional Fisheries Management Council, United States

Naozumi Miyabe, Acting Chairperson, WPYRG
Shimizu, Japan

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1.0. INTRODUCTION

The Western Pacific Yellowfin Research Group (WPYRG) was formed in 1990 to promote collaborative research and to provide fisheries management advice on yellowfin tuna, *Thunnus albacares*, and its fisheries in the western and central Pacific Ocean. In its first four years the WPYRG provided advice on key fishery management questions, including safe levels of exploitation and yield for the yellowfin tuna stock, the level of interaction between commercial purse seine and longline fishing gears, and factors contributing to local depletion (WPYRG4 1994). Since 1995 the WPYRG has also considered bigeye tuna, *T. obesus*, which is a valuable species to the longline fisheries of the region. Bigeye tuna is targeted by longline and is a bycatch of purse seine operations targeting skipjack tuna, *Katsuwonus pelamis*, and yellowfin tuna.

The sixth meeting of the WPYRG was held on the campus of the South Pacific Commission (SPC), Nouméa, New Caledonia, following the ninth meeting of the *Standing Committee on Tuna and Billfish* (SCTB) and the *Technical Consultation on the Collection and Exchange of Fisheries Data, Tuna Research and Stock Assessment.* Convening of the WPYRG in Noumea was uncertain until the last minute, so attendance was limited (Attachment 1) and the meeting was limited to a half day compared to past meetings which had spanned two or three days.

The WPYRG chair, Sachiko Tsuji, was unable to attend the meeting and relayed apologies citing other commitments. Her colleague, Naozumi Miyabe, who was present, agreed to chair WPYRG6, with Peter Ward as rapporteur.

A brief agenda was developed for the meeting. The agenda consisted of (1) status of the WPYRG5 report; (2) assignment of tasks for the 1996-97 work plan; (3) research reports; and (4) other business.

2.0. STATUS OF THE WPYRG5 REPORT

Gary Sakagawa distributed a draft of the report of the fifth meeting of the WPYRG, held in 1995. Participants were asked to provide comments and amendments to Gary Sakagawa by August 31, 1996. A final report will be published soon after and distributed to participants.

3.0. CATCH AND EFFORT DATA

The yellowfin tuna catch in the western and central Pacific declined from an estimated 398,000 metric ton (t) in 1993 to 347,000 t in 1995. Catch and effort tables were not updated for 1996 at the meeting and are not included in this report. The next WPYRG meeting will develop catch and effort tables for 1995, as well as for 1996.

4.0. WORK PLAN FOR 1996-97

WPYRG6 reviewed action items listed in Section 7 of the WPYRG5 report (Future Direction for the WPYRG) and noted that they continued to be relevant and should be pursued. The Group, therefore, adopted the list and added additional tasks and assignments. The revised list is as follows:

4.1. Assignments for Data Base Tasks

(1) Collect information on fishing gear changes and modifications (with particular reference to longline fisheries where significant changes are occurring).

WPYRG5 identified longlining as an area where significant changes in fishing gear were occurring. Data correspondents are to collect information on modifications to the fishing gear used by fleets to catch yellowfin tuna and bigeye tuna in the central-western Pacific and include it with their data submission in 1997. Lead: Data correspondents; Coordination: Al Coan.

(2) Examine the effects of gear modifications on species composition and efficiency.

This task is to examine the effects of gear modifications on species composition and efficiency. This should include results of research underway by the National Research Institute of Far Seas Fisheries (NRIFSF) on the effects of monofilament longline gear on catch composition and efficiency. A progress report of this research, particularly on hook depth using a new data logger, was provided by Hiroaki Okamoto (see Section 5). Lead: Data correspondents; Hiroaki Okamoto; Coordination: Al Coan.

(3) Include French Polynesian catches in the WPYRG database, and footnote to indicate catches that are partially from outside the study area.

French Polynesia is to add catches to the WPYRG database, indicating catches taken in fringe areas outside the WPYRG study area. Lead: Stephen Yen, Arsene Stein; Coordination: Al Coan.

(4) Identify and footnote catches in the database that include catches taken in areas adjacent to the study area.

For 1997 data submissions, data correspondents are to indicate catches taken in "fringe areas" outside the WPYRG study area. Lead: Data correspondents; Coordination: Al Coan.

(5) Include estimates of percentage of coverage of catch data, and estimates of discards and cannery rejects in the catch database.

Estimates of data coverage rates for some fleets are available in the draft of the SPC Tuna Fishery Yearbook, 1995, and Working Paper 2 tabled at SCTB9 (Review of data held by the SPC Oceanic Fisheries Programme). Data correspondents are requested to report coverage levels for past and present data submissions. Lead: Data correspondents; Coordination: Al Coan.

(6) Determine availability and status of length-frequency data sets from agencies and create a catalogue of the information.

Available length-frequency data were identified in a SCTB9 Working Paper 2 (Review of data held by the SPC Oceanic Fisheries Programme). Data correspondents are asked to check the lists and provide information on any other data sets not listed. Lead: Data correspondents; Coordination: Tim Lawson.

(7) Through observer programs, obtain reports on changes and developments in tuna fisheries monitored by the programs. (These reports should also be submitted to SCTB.)

Information from observers is useful in understanding rapid developments in the fisheries. Data correspondents are requested to provide summary reports of changes and developments in tuna fisheries that are monitored by observers. Lead: Peter Sharples, Karl Staisch, Naozumi Miyabe, Jang Uk Lee.

(8) Compare length-frequency for U.S. purse seine catches collected by port sampling and on-board observers.

The level of bias in length-frequency data from port samplers and on-board observers is unknown. A study comparing length-frequency data collected through port sampling and by on-board observer programs from the U.S. purse seine fishing was designed to investigate this matter. Results of this study should be made available in 1997. Lead: Al Coan

(9) Collect data on length-frequency of bigeye tuna caught in all fisheries.

Collection of length-frequency data for bigeye tuna from all tuna fleets is encouraged. Lead: Data correspondents; Coordination: Al Coan.

4.2. Assignments for Biological Studies

(1) Compile data from historical records, research cruises, etc., and estimate bigeye tuna catches by the surface fisheries.

Data is required to estimate the bigéye tuna catches in surface fisheries, where in most cases bigeye tuna is included in reported yellowfin tuna catches. Data sources include historical records and research cruises, as well as port sampling and observer programmes. Data correspondents need to provide information for use in estimating the amount of bigeye tuna in surface fisheries catches reported as "yellowfin tuna." Lead: Data correspondents; Coordination: Al Coan.

(2) Collect data on bigeye tuna catches of vessels fishing around anchored fish aggregating devices (FADs) in the Solomon Islands.

The Solomon Islands purse seine fishery primarily relies on fishing around anchored FADs. The species composition of the catch is of interest for comparison with catches from other fisheries in the region. Concentrated focus on collecting species composition is required. Lead: Sylvester Diake.

(3) Complete studies on yellowfin tuna reproductive biology.

Dr. John Sibert informed the group that a progress report of a study which is currently underway by David Itano should be available in December. An up-dated report should be provided for the next meeting. Lead: David Itano.

(4) Investigate age determination of yellowfin tuna with otoliths.

Early attempts to determine central-western Pacific age of yellowfin tuna from hard parts were largely inconclusive. New attempts are being made by SPC. Lead: Patrick Lehodey.

(5) Report on the bigeye tuna stock structure investigation using DNA.

A pilot study using DNA is underway (SCTB9, Working Paper 2). Results are expected soon and will be reported at the Bigeye Symposium in December 1996. The report should be made available at the next meeting. Lead: Bob Ward, Peter Grewe.

(6) Report on the results of a survey to be executed in 1996 by the Tohoku National Fisheries Research Institute on the distribution and abundance of larval and young skipjack tuna in the western Pacific.

Miki Ogura reported on the results of a 1992-95 survey in the EEZs of Palau and the FSM. The survey is to be repeated in 1996. Results of this survey should be available for discussion at the next meeting. Lead: Miki Ogura.

4.3. Assignments for Stock Assessment Studies.

(1) Conduct a study on fisheries interaction and the effects of oceanography on catchability of tuna and billfish in the Coral Sea. Lead: David Williams.

(2) Undertake a study on the effects of environmental factors on the catches of juvenile yellowfin tuna by purse seine fisheries.

Environmental factors, such as the El Niño, influence fishing strategies and success in purse seine fisheries. Working Paper 2 (SCTB9) includes a summary of relevant work that is underway at SPC. Although the study focuses on catches of skipjack tuna, it could be expanded to include catches of juvenile yellowfin tuna. Progress of this study should be reported at the next meeting. Lead: Michel Bertignac, Patrick Lehodey.

(3) Continue with the next phase in the development of the yellowfin tuna assessment model, taking into account suggestions of the Group (see Section 5.1 of WPYRG5).

Development of the Regionalised Age Structured Catch at Length at Age Estimation model (RASCLE) is progressing with spatial structure being implemented. The Pelagic Fisheries Research Programme (PFRP) of the University of Hawaii had provided funding for the two-year project. Working Paper 2 (SCTB9) outlines progress in this work.

A mid-project workshop of the project design team was planned for October or November 1996 in Honolulu. The results of that workshop meeting, as well as latest progress with the model development should be presented at the next WPYRG meeting. Lead: John Hampton, John Sibert, Pierre Kleiber, Naozumi Miyabe, Tom Polacheck.

5.0. RESEARCH REPORTS

Research reports were not expected at this meeting because of the late notice of the meeting. However, three progress reports were submitted and they were reviewed by the Group.

The first report was by Hiroaki Okamoto who described the results of hook depth and hooking time for longline gear deployed on a 1996 research cruise in the eastern Pacific. This study is on-going and was described in detailed last year (WPYRG5). During the cruise, different longline gear materials were tested as well as different set configurations. Fishing depths of hooks with monofilament line did not conform to depths predicted by theoretical models; instead, the hook depths were strongly affected by oceanographic conditions. A new re-usable depth record was tested and found to work well.

Miki Ogura presented the second report on results of a series of surveys conducted from 1992 to 1995 and designed to measure the abundance of juvenile and young skipjack tuna in the waters of Palau, Federated States of Micronesia, and the Northern Mariana Islands. This study is also on-going. A high speed midwater trawl was towed at 4-5 knots. Skipjack tuna were usually distinguished from other tunas caught in the net. DNA signature with electrophoresis technique were used for the identification of *Thunnus* species. A total of 6,143 skipjack tuna and 1,209 *Thunnus* species were caught; about 90% of the *Thunnus* species were yellowfin tuna and the remainder almost exclusively bigeye tuna. Virtually all of the skipjack tuna was less than 50 mm fork length. There was a strong diurnal pattern in the distribution and vulnerability of young tunas at several stations, but no consistent pattern between stations. Another survey will be conducted in 1996 to collect more detailed oceanographic data.

In the discussion, it was pointed out that the sampling area should be extended northwards and tows made deeper. Recent studies by SPC that couple oceanographic information with skipjack tuna catches indicate that the area north of Guam in the Northern Mariana Islands is important for skipjack tuna recruitment; this area was not sampled by the survey. Oceanographic models indicate that advection extends to a depth of about 100 m in the survey area. Consequently, young skipjack tuna could be concentrated deeper than the surface layer which was sampled.

The final report was by John Hampton on progress with development of the integrated assessment model, RASCLE. A detailed progress report was presented on RASCLE at the previous SCTB meeting. He noted the significant progress made. In particular, bottle-necks in computations within the model were solved to make the model run more efficiently. The length (age)-based structure was improved and accommodations made for multiple cohorts recruiting during a year. Progress is also being made in adding the crucial spatial structure to the model. A meeting of experts

is planned for later this year to review progress and to assist in advancing the technology (see section on Work Plan for 1996-97).

6.0. OTHER BUSINESS

6.1. Species

The group confirmed that its terms of reference include bigeye tuna, as well as yellowfin tuna because both species are taken by the same fisheries. In the future, other pelagic species might also be considered if they are associated with yellowfin tuna and involved in related fisheries management issues.

6.2. Chair

Chairmanship of the WPYRG is held *ex officio* for a three-year period. The group noted that the current chair, Sachiko Tsuji, had been unable to attend the meeting and has commitments over the next 12 months which may hamper her involvement in monitoring the work plan and organizing the next meeting. The Group nominated Gary Sakagawa and he agreed to serve as a "reserve chair," taking on responsibility for organizing the work plan and organizing the next meeting if requested by Dr. Tsuji.

6.3. Next Meeting

The Group agreed that, to reduce costs, it prefers to hold meetings in conjunction with SCTB. Tony Lewis indicated that arrangements for the next SCTB meeting are uncertain and will be developed in the months ahead. SPC subsequently confirmed that the SCTB and WPYRG meetings are planned for 16-20 June 1997 in Fiji.

ATTACHMENT 1:

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