

**REPORT OF THE  
FIFTH SOUTHEAST ASIA TUNA  
CONFERENCE**

**General Santos City, Philippines  
1 - 4 September, 1992**

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INDO-PACIFIC TUNA DEVELOPMENT AND MANAGEMENT  
PROGRAMME (IPTP)

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## Table of Contents

1. INTRODUCTION	2
2. ADOPTION OF THE AGENDA AND ARRANGEMENTS FOR THE MEETING	2
3. REVIEW OF NATIONAL FISHERIES AND RESEARCH PROGRAMMES	2
I. Indonesia	2
II. Malaysia	3
III. Thailand	4
IV. Philippines	4
V. Recent research activities in Japan.	5
VI. FAO Involvement in Tuna Fisheries	6
4. PRESENTATION OF EXPERIENCE AND RESEARCH PAPERS	6
I. Results of the 2nd meeting of the western Pacific Yellowfin Tuna Research Group	6
II. Preliminary results of the tuna tagging programme conducted by the South Pacific Commission	7
III. The skipjack fishery of southern Philippines	7
IV. The exploratory tuna fishing trials conducted by Thailand in the Andaman Sea	7
V. The Identification of Juvenile Tunas using Mitochondrial DNA	8
5. JUVENILE STAGES OF TUNA, SEERFISH AND BILLFISH	8
I. The incidence of juvenile small tunas in the Thai fisheries of the South China Sea	8
II. Juvenile skipjack growth in South Philippines	9
III. Some Aspects On Longtail And Kawakawa In Malaysia.	9
IV. The BFAR/IPTP Tuna Tagging Programme in the Philippines	9
6. ANY OTHER MATTERS	10
I. Institutional arrangements for data collection on tunas in the Southeast Asia region.	10
II. The Collaborative Programme on Interactions of Pacific Tunas	11
7. ARRANGEMENTS FOR THE NEXT MEETING OF SEATC	11
8. CONCLUSIONS AND RECOMMENDATIONS	11
9. CLOSING OF THE CONFERENCE	12
Annex I	
LIST OF PARTICIPANTS	i
Annex II	
Welcoming Address of Undersecretary Joemari D. Gerochito the opening of the Fifth Southeast Asian Tuna Conference General Santos City, Philippines September 1-4, 1992	VI

## **1. INTRODUCTION**

The Fifth Southeast Asia Tuna Conference was held at the invitation of the Government of the Philippines from the 1<sup>st</sup> to the 4<sup>th</sup> September 1992 in the Phela Grande Hotel, General Santos City. 24 participants and 46 observers from Indonesia, Malaysia, Philippines and Thailand, Japan, the USA., SEAFDEC, SPC and FAO took part in the proceedings (Annex I).

Following opening remarks by Director Alejandro I. Yadao and a welcoming address from the mayor of General Santos City, Hon. Adelbert Antonino, the Director of the BFAR, Mr. Guillermo L. Morales introduced the delegates. The Programme Coordinator of IPTP, Mr. David Ardill, thanked the Government of the Philippines on behalf of Dr. Edouard Saouma, Director General of FAO, for hosting the Conference, and informed the participants and guests of the rationale for the Conference.

The Assistant Director of Agriculture for Region XI, Mr. Dennis B. Araullo introduced the keynote speaker, the Hon. Joemari D. Gerochi, Undersecretary for Agriculture, who formally opened the meeting. The keynote speech is included as Annex II.

The closing remarks were made by Dr. Ernesto Salazar, President of the South Cotabato Purse Seiner's Association.

## **2. ADOPTION OF THE AGENDA AND ARRANGEMENTS FOR THE MEETING**

Attorney Reuben A. Ganaden, representing the host country, was unanimously elected chairman of the Fifth Southeast Asia Tuna Conference.

Mr. Ardill proposed that the status reports of the fisheries should be discussed during the afternoon and that the reviews of experience and research papers as well as those on the juvenile stages of tunas would be discussed the following day. This would leave the entire morning on Thursday to discuss the important matter of which organizations should assume the responsibility for the yellowfin and skipjack fisheries statistics of the Philippines and Indonesia and the small tuna fisheries statistics of ASEAN countries following the creation of the Indian Ocean Tuna Commission and the termination of IPTP. Other matters to be discussed included a presentation of the TUNET activities, in particular the projects proposed for the region on interactions between tuna fisheries.

## **3. REVIEW OF NATIONAL FISHERIES AND RESEARCH PROGRAMMES**

### **I Indonesia**

Mr. Merta presented the status report of the tuna fisheries on Indonesia. The tuna fishery is one of the leading fisheries in Indonesia. The annual production was about 15% of the total marine fish production and is increasing by about 8% annually. Exports of tuna products have also increased by about 23.7% by volume and 42.6% by value. About 76% of the tuna were landed in East Indonesian waters and only 24% in West Indonesian waters (FAO Statistical areas No. 71 and 57 respectively).

Tunas and tuna-like fishes are exploited by various gears. Pole-and-line and handline fisheries have developed in East Indonesian waters only, particularly through the NES system. Tuna longline fishing is spread throughout Indonesian waters. In Banda Aceh, artisanal fishing is by means of purse seines, while gillnets and seine nets are used in Pelabuhan Ratu. Troll lines are used by small scale fishermen in Padang and Bali.

The highest catch for gillnets in Pelabuhan Ratu attained about 900t in 1988, decreasing to only 143t in 1990 and 200t in 1991. The catch and effort for troll lines in West Sumatra (Padang) increased remarkably in 1991 from an average of over 2,400t to more than 12,000t. The CPUE decreased from 1988 to 1990 and started increasing again in 1991.

The number of longline boats operating in Indonesian waters increased rapidly from less than 50 in 1985 to 874 in 1989, the size of the boats ranging from 30 to 200 GT. Since 1990, some of the longline boats, mainly from Taiwan and based in Bali, have been using live milkfish (*Chanos chanos*) as bait. The hook rates have increased 2-5 times in comparison with the use of frozen milkfish. Using livebait, more yellowfin and southern bluefin tuna and less bigeye were caught.

The production of tuna, skipjack and tuna-like fishes is still dominated by the small scale fishery which contributes about 80% of the total tuna landings.

Catch, effort and CPUE of 30 GT pole-and-line vessels owned by the state enterprise in Ambon decreased from 575t in 1990 to 115t in 1991, while they increased from 3,769t in 1990 to 6,408t in 1991 in Sorong and from 1,499t to 1,653t in Bitung.

The catch of purse seiners operated in Biak increased from 8,612t in 1988 to nearly 12,000t in 1990 and dropped steeply in 1991 to about 7,000t in 1991. A joint venture was established in North Sulawesi between an Indonesian company and a Filipino company from General Santos. This joint venture company exploits tuna in the Indonesian EEZ in the Sulawesi Sea, using the Philippine purse seine. Their operations are associated with about 200 payaos (FADs) which were deployed over the EEZ waters in North Sulawesi. The catch and effort of purse seine gear in Banda Aceh increased from 1,827t in 1990 to 2,280t in 1991, the catch being dominated by skipjack. The catch and effort of artisanal purse seines in Prigi also increased from 617t in 1990 to 877t in 1991.

The highest catch for the NES system was in Irian Jaya and the lowest in Maluku.

The Research Institute for Marine Fisheries has conducted extensive research in tuna fisheries since 1978. At selected landing sites, sampling for catch by species, effort and bait is carried out by local staff. Biological sampling is carried out by scientists when visiting the sites.

Indonesia has conducted a tagging programme since 1983. The number of skipjack and yellowfin released was 10,247 fish, including 889 yellowfin. Skipjack and yellowfin recaptures amount 380 and 13 respectively, for a recapture rate of 3.8%. Yellowfin released ranged from 21 to 70 cm, with most of the fish between 27-52 cm. Skipjack released ranged from 25 to 60 cm, with the majority in the 41-54 cm size range. This project will be continued this year with a tagging target of 2,500 fish in East Indonesian waters.

In response to a question regarding the use of payaos, Mr. Merta was of the opinion that in areas with high concentrations of artisanal fishermen, the deployment of offshore payaos should be restricted, as there was evidence of

declining catches by artisanal fishermen off the North coast of Sulawesi after the deployment in the area of 200 offshore payaos by a Filipino/Indonesian purse seining joint-venture. There was little information on the tuna fisheries of Natuna Island. In response to a query on the evolution of tuna fisheries, it was stated that the Government policy of encouraging foreign participation in the EEZ was stimulating rapid development of offshore tuna fisheries. The Nucleus Estate System (NES) was developed by a state fishing company to assist small-scale fisheries by deploying payaos, providing supplies such as fuel, ice and livebait, as well as credit for repairs of equipment. In return, the small-scale fishermen sold their catch to the state fishing company, greatly increasing its total production in recent years. It was reported that there was a similar private system in the Philippines, whereby the fishing companies give financial support to handline fishermen who in return sell their catch to the company.

## II Malaysia

Mr. Richard gave the status report of the tuna fishery of Malaysia. The tuna fishery in Malaysia is still an artisanal activity, with marginal inputs from the commercial sector. In the past years, there has been a decline in the total tuna landings. However, a large potential yield of tuna is thought to exist in the coastal as well as in the offshore waters within the EEZ of Malaysia.

A significant development is the effective use of payos to aggregate tuna as well as tuna-like species in deep waters. A fishing harbour has been established in Penang to cater for landings of oceanic tuna by foreign fishing vessels. In Sarawak, rapid development has occurred in the exploration for oceanic tuna and a skipjack processing factory is in the process of being established.

Generally, data collection has improved, with the number of boats sampled increasing and the information on length frequency, catch and effort entered into a dBase IV programme. To cover a vast area of sampling, 3 new stations were established, in Mukah, Miri and Penang.

Some of the difficulties encountered in sampling all landings include the immediate auctioning or exporting of fish upon landing, as well as the determination of the fishing grounds and fishing effort.

The catch and effort trend shows that the total annual landings at Pulau Kambing have decreased steadily. The number of boats landing has also decreased.

The research activities carried out this year include the launching of a second tuna tagging programme in Terengganu waters. A tagging programme is also being carried out off Sarawak and is still in progress.

In the ensuing discussions, it was pointed out that there was a direct relationship between catch and number of boat landings, with a pronounced decline in tuna landings at Terengganu since 1987. The decline in boats could have resulted from boats moving to other ports. There has been a decline in the numbers of troll landings and boat numbers along the East coast of Peninsular Malaysia in recent years. The participants were informed that the exploitation rates (E) given in the report were based on data collected at Terengganu rather than on the total catch of kawakawa from the region. The danger of using this method was stressed, as the exploitation rate (E) could include fishing (F) and natural mortalities (M), as well as emigration if the data does not cover the entire stock. IPTP has recently noted a sharp cutoff, well below length infinity, in length frequency distributions of longtail tuna for the Thai fisheries. This suggests high emigration of longtail tuna out

of the fisheries. Mr. Lui suggested that the longtail tuna were probably more migratory than kawakawa, and the difference in exploitation rates between the kawakawa stocks of the South China Sea coasts of Thailand and Malaysia and those off Sarawak are probably indicative of the status of these respective stocks.

### III Thailand

The status report for the tuna fisheries of Thailand was presented by Mr. Somsak. Purse seine and drift gillnet are the major fishing gears for tuna fishing in Thailand. The five major tuna species are longtail, kawakawa, frigate, bullet and skipjack tuna. The total tuna landing in the Gulf have increased year by year from 1970 to 1990. Longtail tuna account for 62% of the tuna catch from the Gulf of Thailand. Only 25% of the canning industry demand is met from domestic production, the remainder coming from imports. A few tuna purse seiners from the Gulf of Thailand have moved to the West coast and have been experimenting with new fishing methods and gears.

### IV Philippines

Mr. Barut gave a brief outline of the recent developments in the Philippine tuna fishery. Tuna are still the most important fish as far as marine fishery resources of the country are concerned. Production has increased for the past two years from 302,244t in 1989 to 313,371 and 339,074t in 1990 and 1991 respectively. In the Philippine Fishery Statistics, commercial and municipal catches are those landed by fishing vessels of over or under 3 gross tons.

Of the 21 species of tuna and tuna-like fish known to occur in Philippine waters, 6 are exploited commercially: yellowfin, bigeye, skipjack, frigate, bullet and eastern little tunas.

The major gear used in capturing tunas are purse seines, ringnets and hook-and-line (handlines) for the commercial sector, and handlines for the municipal sector.

Region IX is the most productive, with a total landed catch of 100,463t, followed by Region XI, with 62,756t and the National Capital Region (NCR) with 34,665t.

Japan was the major importer of frozen tuna and tuna fillets for 1990, importing 7,011,053kg and 691,397kg of each category.

In response to a query, Mr. Barut stated that 99-100% of tunas were juvenile in ringnet/purse seine catches, assuming 70-80cm and 45cm as length at first maturity for yellowfin and skipjack, respectively. A suggestion was made that the countries of the region should come to a consensus on more rational exploitation of the tuna resources to ensure continued production in the future. A participant advised caution in implementing any management regimes without sound scientific evidence demonstrating that the stocks are being impacted by the removal of juveniles. It could be that natural mortality is so high that most individuals do not reach maturity. Hopefully, the tagging programme being currently executed by BFAR/SPC will give a better understanding of the status of the skipjack and yellowfin stocks in the Philippines.

Mr. Barut admitted that the recent increasing skipjack and yellowfin landings resulted from the inclusion of fish captured in extra-territorial waters, as the present statistical collection system does not register the location of capture. The BFAR tuna sampling programme obtains fishing ground information from boat owners, so

that it may be possible to determine the proportion of landings from within and outside the EEZ.

## **V. Recent research activities in Japan.**

Research activities concerning tunas and tuna fisheries during the last couple of years were briefly reviewed by Dr. Tsuji. Currently, there is a two years delay before official longline catch and effort statistics become available for stock assessment. Two projects have been started to reduce this delay and to improve the accuracy of the information about fishing activities. The first is the development of a system to utilize satellite communications to report on log-sheet information. Vessels under this system will automatically transfer their log-sheet information together with their location as determined by GPS on daily basis. The second is a Real Time Monitoring Program (RTMP) for commercial exploitation of southern bluefin tuna by longliners. Twelve boats selected for the programme are required to report their catch and effort and the size and sex of all southern bluefin caught on daily basis. The programme started in 1991 was successful, and will be extended to include assignment of several observers to collect more detailed information on fishing activities as well as biological samples including gonads, otoliths, and scales.

The programme to collect information on the juvenile northern bluefin catch was started in 1992. Field officers were placed in most of the major landing sites for juvenile tunas through cooperation from prefectural institutes. In response to the increased concern on this problem, prefectural survey vessels and training vessels operating longlines were also requested as from this year to report the number and size of any by-catch, including birds, marine mammals, turtles and sharks.

Although the National Research Institute of Far Seas Fisheries maintains its efforts to monitor the stock status of tunas in the world, several new research activities have been developed, especially to improve the understanding of biological aspects of tunas. These include the application of genetic techniques for species and stock identification, histological analysis for reproductive study and egg and larval surveys for analysing survival mechanisms, as well as developing new techniques to estimate parental biomass from egg or larval abundance for tunas.

The success of natural spawning of bluefin and yellowfin tunas in captivity has been announced this year as a first time historical event. Since rearing and fattening of juvenile tunas in net cages is already established on a commercial basis, this can provide a big step towards the culture of tunas.

## **VI FAO Involvement in Tuna Fisheries**

In his presentation, Dr. Majkowski concentrated on FAO's scientific activities related to tuna and tuna-like species, explaining that they also include those associated with (i) institutional arrangements for fisheries research and management, (ii) international liaison, (iii) legal matters and (iv) aspects of fishing, processing and marketing. Some of these activities are part of Regular Programme based at FAO Headquarters and the remainder is associated with projects like the Indo-Pacific Tuna Fisheries Development and Management Programme based in Colombo, Sri Lanka, "Cooperative Research on Interactions of Pacific Tuna Fisheries" based at FAO HQ in Rome, or the recently terminated Regional Fishery Support Programme in Suva Fiji. In terms of geographical distribution, FAO's activities concentrate on the Indian and Pacific oceans because of needs of developing countries in those oceans. The FAO HQ activities include (i) promotion of methods for data collection processing, analysis and research in general for the purpose of provision of fisheries management advice, (ii) promotion of rational



exploitation and conservation, (iii) review of status of research and tuna stock, (iv) formulation of project, (v) monitoring and supervision of their operation and (vi) provision of technical support. FAO also assists in solving broad issues that are difficult to be solved by regional bodies because of their broader scope. These issues include at present driftnet fishing on high seas, by-catches and fishing on high seas in general. The last issue will be addressed at the Technical Consultation on High Seas Fishing to be held in Rome in September, 7 to 15, 1992.

#### **4. PRESENTATION OF EXPERIENCE AND RESEARCH PAPERS**

##### **I. Results of the 2<sup>nd</sup> meeting of the western Pacific Yellowfin Tuna Research Group**

Dr. Gary Sakagawa introduced this paper. The second meeting of the Western Pacific Yellowfin Tuna Research Group was held in Honolulu, Hawaii, June 17-24 1992, with participation from scientists and fisheries officers conducting research on yellowfin tunas of the Central-Western Pacific Ocean or having an interest in management of the resource. The meeting objectives were to assemble a comprehensive database for conducting a stock assessment and to outline requirements for conducting that assessment.

Among the several conclusions and recommendations resulting from that meeting were:

- (1) Collection programmes for yellowfin tuna fishery statistics have not done an adequate job of providing the required data for assessment purposes; the Group, therefore, recommended that data collection programmes be strengthened, particularly in the collection of length-frequency samples, logbook and set type data for purse seiners.
- (2) Available data appear to indicate that yellowfin tuna spawn year-round but with major spawning seasons of November-April in the western tropical Pacific and March-September in the central-western part of the tropical Pacific. The group recommended that this be verified with a well-designed study utilizing both longline and surface fishery-caught fish because of its significance in hypotheses of age determination on the stock structure of the population.
- (3) Inadequate sampling by fisheries statistics has resulted in a high level of missing data and information for constructing a reliable catch-at-age table for 1970-90. The Group therefore recommended that age-based assessment methods not be used, but that tagging- and CPUE-based assessment methods be used instead.

One of the participants expressed concern about the ability of scientists to make progress with tuna research without knowing the ages of yellowfin tuna caught. Dr. Sakagawa explained that the growth rate of yellowfin is approximately known, but the variability of lengths-at-a given age makes the determination of ages from lengths difficult. He clarified that there is still a need to collect length-frequencies for studies other than age-structured assessments, like for example, yield-per-recruit analyses.

## **II. Preliminary results of the tuna tagging programme conducted by the South Pacific Commission**

Dr. Hampton presented the preliminary results of the analysis of data from the SPC Regional Tuna Tagging Project. The purpose was to provide information on the status of skipjack and yellowfin stocks of the western tropical Pacific (WTP). The results indicate that both species are relatively lightly exploited, with only about 10-20% of the total mortality being due to fishing. This is in spite of current catch levels of approximately 800,000t for skipjack and 400,000t for yellowfin. It therefore appears that the catches of both species, on the broad scale of the WTP, can be further increased without creating biological problems. The levels to which catches can be safely increased is the subject of ongoing analyses.

Dr. Hampton was asked if he had attempted to estimate optimum harvest rate (H) and optimum catch, which would be of interest to the industry. The Commission was informed that simulations have been performed which showed the population to remain robust with increased fishing effort. However, he was unwilling to extrapolate too much beyond the limits of the data. A suggestion was made that catches be allowed to increase and tagging experiments be conducted at different levels of exploitation for better estimates of potential catch. There were no indications of biological parameters limiting increased production. However, there may be economic factors which could limit production.

## **III. The skipjack fishery of southern Philippines**

Ms. Arce presented this report by J. Morón. Skipjack tuna accounted for an average of 22% of the total tuna landings from 1977 to 1990. Catch of this species in relation to other species was reviewed for the 4 landing sites monitored by the tuna sampling programme of the Bureau of Fisheries and Aquatic Resources. Effort, catch and catch rates of ringnets and purse seines were determined by quarter for the period from 1980 to 1989. Length-frequency distributions are given to show the general size of skipjack captured by the ringnet, purse seine, handline and troll line fisheries at the 4 sampling sites.

A comment was made that high catches were generally associated with low effort, followed by low catches and high effort for ringnetters at General Santos. This is indicative of rapid industry response to increased catches and may result from competition due to excessive fishing effort. Another participant noted the increasing effort and catch at this site. This has resulted from the shifting of vessels to the Moro Gulf from other areas and an increase in effectiveness of ringnetters and especially of purse seiners during this period. Ringnetters generally operate in shallower depths and the purse seiners in more offshore areas.

A suggestion was made for information to be collected regarding the frequency of sets and numbers of payaos as a measure of effort. The detailed species composition of payao catches should also be collected to better document changes in the fishery. The best opportunity to assess the status of stocks may be from the tuna tagging programme presently being conducted by BFAR and SPC. The full cooperation of industry in recovering tagged fish is essential to ensure successful completion of this programme.

## **IV. The exploratory tuna fishing trials conducted by Thailand in the Andaman Sea**

The report on the results of skipjack and yellowfin surveys in the Andaman Sea by two research vessels using a tuna purse seine and longline was presented

by Mr. Pokapunt. The surveys were conducted during the period of January to May, from 1988 to 1992. Small-sized tuna are concentrated in the southern area rather than in the North. As the surveys were limited to the five months of the northeast monsoon season, the availability of tunas in the southwest monsoon is unknown.

## V. The Identification of Juvenile Tunas using Mitochondrial DNA

Dr. Chow gave a presentation of his study to identify tuna species with mitochondrial DNA. The polymerase chain reaction (PCR) is a relatively novel biochemical technique which can enzymatically copy a double strand DNA fragment to sufficient quantities for intensive DNA analyses. He used PCR to amplify three domains of mitochondrial DNA (mtDNA) of tuna, followed by restriction fragment length polymorphism (RFLP) to attempt to establish the degree of polymorphism within and between seven species of the genus *Thunnus*. The three domains of mtDNA were ATPase-CO III, cytochrome b and 2S1rRNA genes, and the sizes of each DNA fragment amplified were 940, 350 and 450 bp, respectively. Since by using 15 restriction endonucleases identical restriction profiles for 12SrNA fragments were observed between species, no further effort were attempted to analyze this gene. In contrast, RFLP was observed within and between species in both of ATPase-CO-III and gene fragments.

For the cytochrome b gene fragment, Atlantic northern bluefin showed restriction profiles distinct from all other species in Dde I, Hinf I and Mbo I enzyme digestions. Identical restriction profiles were observed for Pacific northern bluefin and albacore, while they were distinct from other species in Hae III and Rsa I digestions. The ECO NI enzyme had a restriction site only in yellowfin. Bigeye, blackfin, longtail and southern bluefin presented identical restriction profiles in all enzymes examined.

For the AtPase-CO III gene fragment, blackfin and longtail could be identified by Hinc II and FNU4HI enzyme digestions. Atlantic bluefin was again distinct from others in Rsa I and Sau 96I digestions. Bigeye also had its own restriction profile in the Rsa I digestion. Pacific northern bluefin and albacore were distinct from other species in Sau 96I and Scr FI enzyme digestions, but only in Pacific northern bluefin was no restriction site for Tag I enzyme found.

RFLPs within species were found in Pacific bluefin and yellowfin on Rsa I digestion of cytochrome b and on Dde I digestion of ATPase-CO III gene fragments, respectively.

Thus, sub-species or species status between Atlantic and Pacific bluefin was reconfirmed and all *Thunnus* species examined may be identified by means of restriction fragment analysis of PCR-amplified DNA fragments using a minimum of six endonucleases.

Further analyses on inter- and intra- specific polymorphism are now underway, not only for developing simpler species identification techniques but also for the assessment of genetic stock structure.

In response to a query regarding the use of this technique to differentiate between stocks, Dr. Chow said that this had not yet been investigated. In order to estimate a percentage error in identifying tuna species with this method, the range of intra-specific variations should be examined, and this is now under way. He found the mitochondrial DNA of yellowfin to be highly polymorphic, so this technique might be useful in identifying stocks. He was contemplating such a study and requested assistance from participants in obtaining samples.

## **5. JUVENILE STAGES OF TUNA, SEERFISH AND BILLFISH**

### **I. The incidence of juvenile small tunas in the Thai fisheries of the South China Sea**

This paper was presented by Mr. Yesaki. It reviewed the incidence of juvenile small tunas (longtail, kawakawa and frigate) by fishing gears and areas in the Gulf of Thailand and contiguous South China Sea. The catches of juvenile fish were highest for kawakawa and lowest for longtail. Luring purse seine catches had the highest proportion of juvenile small tunas and drift gillnet the lowest. Juvenile small tuna catches were higher in the Gulf of Thailand than in the South China Sea. Recruitment of juveniles was higher during the latter half of the year. Four to nine recruitment pulses per year were identified for the 3 years under discussion.

A comment was made that the drift gillnet catches were relatively selective in respect to capture of other species. It was noted that there were some juvenile kawakawa captured by drift gillnets, but no longtail. This was attributed to the higher availability of kawakawa in the areas fished by drift gillnets. A participant pointed out that the periodicity in numbers of juveniles by weekly intervals could result from fishing patterns, especially for luring purse seiners which are fished in conjunction with lights and are more effective when there is no moon.

### **II. Juvenile skipjack growth in South Philippines**

Mr. Yesaki introduced this paper in the absence of the author, Mr. J. Morón. This study was based on the analysis of length-frequency distributions of skipjack taken at General Santos. Length frequencies were grouped by 1 cm and weekly intervals. The Bhattacharya routine of the ELEFAN programme was used to identify normal distributions in length-frequency distributions. Three modal progressions were used for analysis of growth. Growth rates of skipjack in the 20 to 36 cm interval ranged from 3.6 to 4.5 cm per month and averaged 4.1 cm per month. A regression of mean length versus estimated age gave a growth rate of 3.9 cm per month. The same incremental data were entered into 4 software programmes for further estimates of growth. Growth rates obtained from these programmes ranged from 3.4 to 3.8 cm per month for fish in the 20 to 36 cm interval.

### **III. Some Aspects On Longtail And Kawakawa In Malaysia.**

Mr. Rajah Bidin presented this paper. Longtail tuna and kawakawa are the dominant species among neritic tunas found in Malaysia. The observed tuna landings have increased from 10,000t in the seventies to nearly 30,000t in the late eighties. However, tuna landings then decreased from 26,641t in 1988 to 17,812t in 1990. In 1991, the tuna landing increased again to 28,000t. The fish are considered to be juveniles, with mean length of 35.5cm and 34.3cm respectively for longtail and kawakawa.

The asymptotic length estimated for kawakawa was 87.0cm whilst that longtail was 73.5cm. The asymptotic length for longtail is lower than that of kawakawa, possibly because the larger sizes of longtail tuna were not sampled enough for purpose of the length-frequency analysis.

The length-weight relationships derived for longtail and kawakawa were:

$$W = 0.0069L^{3.2400} \text{ for longtail and}$$

$$W = 0.0126L^{3.1014} \text{ for kawakawa}$$

Results also show that the male kawakawa attain first maturity at 39.3cm, whilst the female are mature at 48.0cm. The corresponding sizes for male and female longtail are 43.2cm and 47.8cm respectively.

Only 5.3% of the tuna caught off the East coast of Peninsular Malaysia are found to be free-swimming. Some 60% of the schools of longtail observed were also free-swimming.

#### **IV. The BFAR/IPTP Tuna Tagging Programme in the Philippines**

Mr. Barut presented this paper. The Philippine tuna tagging programme started in September 1988. This was the result of a study conducted by tagging specialists contracted by the Indo-Pacific Tuna Development and Management programme (IPTP). The study covers the feasibility of using purse seine/ringnet caught tuna for tagging experiments, since the Philippines do not use pole-and-line, which is the most suitable gear for capturing tunas for tagging.

The first tagging experiment was a success so that by the 2nd tagging experiment, two trainees each from Indonesia and Thailand were accommodated. Two tagging specialists from Japan assisted/supervised the first and second tagging experiments. From 1988 to 1991 eight tagging experiments were conducted. All were conducted in the Moro Gulf, except for the sixth experiment which was conducted in the South China Sea.

In the course of the eight tagging experiments, 5,879 skipjack, 4,603 yellowfin and 241 bigeye tunas were tagged for a total of 10,723 fish. The smallest yellowfin tuna tagged was 19 cm and the largest was 56 cm. For the skipjack, the smallest was also 19 cm and the largest was 45 cm. The bigeye tuna tagged ranged from 20 cm to 49 cm.

Of the 10,723 tunas tagged, 196 (about 1.83%) were recovered. The breakdown of recoveries is as follows: 83 yellowfin, 109 skipjack, and 4 bigeye.

A comment was made by industry representatives to the effect that sufficient publicity had not been given to ongoing and past tagging experiments, which could result in the non-return of tags.

#### **6. ANY OTHER MATTERS**

##### **I. Institutional arrangements for data collection on tunas in the Southeast Asia region.**

This item was introduced by the Programme Coordinator of IPTP. Participants were informed of the status of the creation of the Indian Ocean Tuna Commission (IOTC). The text drafted by the Conference held in FAO Headquarters, Rome, 22-26 June, 1992, will be submitted to the FAO Council in November 1992 for approval, then to the FAO Conference in November 1993 for ratification. The next step will be to hold a Diplomatic Conference for its adoption by potential member states. The IOTC will enter into force following ratification by ten states.

With the establishment of the IOTC, the technical functions in the collection and analysis of data on tunas and tuna fisheries and the provision of support to participating countries at present undertaken by IPTP will be taken over by this organization. As the area of competence of IOTC will be limited to FAO Statistical Areas 51 and 57, all activities related to the Pacific Ocean seabords of the Southeast Asia countries participating in IPTP will cease.

Within two to three years, therefore, unless alternative arrangements are made, there may be no mechanism to maintain the databases on the tunas of this region. This situation is exacerbated by the fact that none of the Southeast Asian countries have contributed to Phases III or IV of ITP, such that ITP activities in this region are being totally funded through contributions from the states having interests in the Indian Ocean.

This matter was raised at the last Tripartite Review Meeting of ITP, held in Rome on 24 June, 1992. A suggestion was made at that time that a possible mechanism might be for SEAFDEC to undertake the ITP functions relative to the Gulf of Thailand and South China Sea, which mainly concern stocks of neritic tunas, and that the activities concerning the mainly oceanic species of the Pacific coast of Indonesia and of the Philippines be undertaken through some arrangement with the South Pacific Commission. It was noted that SEAFDEC had recently established a fourth department, namely the Marine Fisheries Development and Management Department, with headquarters in Malaysia. Furthermore, SPC has activities related to tuna tagging in the waters of Indonesia and the Philippines.

Mr. Ardill's presentation was followed by considerable discussion on the next steps for finding a solution. The participants concluded that the best approach would be for ITP to officially alert national fisheries administrations of the South East Asia region as well as international organizations, such as SPC, WPFCC, and SEAFDEC. Also, ITP should prepare a background document on the possible options, outlining functions, required level of support and current costs. The document should also stress the need for long-term commitments for collection and compilation of fisheries statistics for the South East Asia region and the need for coordination among agencies involved, especially for the oceanic species that are far-ranging.

During the discussion, SPC, SEAFDEC and WPFCC representatives expressed an interest in assuming the responsibilities, provided their members agreed and funding could be secured. They will bring the matter to the attention of their members at the earliest convenience.

## **II. The Collaborative Programme on Interactions of Pacific Tunas**

Dr. Majkowski explained that the ultimate objective of project: "Cooperative Research on Interactions of Pacific Tuna Fisheries" is to enhance the capacity of countries involved or potentially involved in tuna fishing, especially developing countries, to scientifically address problems of fisheries interactions. The specific objectives of this project involve improvement, in (i) data collection and processing, (ii) data analysis, (iii) methods for studying tuna fisheries interactions and (iv) communication among fisheries scientists studying tuna fisheries interactions. The donor for the project is Japan, and contributions to the project have been provided in kind by several institutions and numerous scientists. In the first year of operation, the administrative and logistic arrangements for the project were made through the FAO/UNDP Regional Fisheries Support Programme based in Suva, Fiji while technical matters were handled by FAO HQ. Because this Programme has been terminated this year, FAO HQ is entirely responsible for the operation of the project. In 1991, the First FAO Expert Consultation on Interactions of Pacific Tuna Fisheries was hosted by SPC in collaboration with ORSTOM in Nouméa, New Caledonia. The preparatory work for that Consultation was carried out by ten working groups, being part of a network TUNET, which was created by the project. In 1991, a research proposal on movement of skipjack in the western Pacific was implemented. This year, eight additional proposals have been prepared. These are being reviewed and



evaluated by experts. Three of these proposals as well as the one already being implemented are of direct relevance to Southeast Asia. They involve (i) a study on misidentification of juvenile bigeye, (ii) an examination of interactions between Indonesian and Philippines fisheries and (iii) the preparation of a bibliography on tagging.

Dr. Majkowski noted that TUNET was being coordinated by FAO HQ and includes regular circulars containing information on progress of projects and other general information. Dr. Majkowski announced that anyone interested in being included in TUNET should contact him.

## **7. ARRANGEMENTS FOR THE NEXT MEETING OF SEATC**

The arrangements for the next meeting of the Conference were discussed. For budgetary reasons, IPTP will not be in a position to organise the next Conference in 1993, but could do so in 1994 if the Programme is extended. This was judged satisfactory by participants as the number of countries and scientists involved did not justify an annual event. Furthermore, by 1994, the results of the tagging experiments being conducted in Philippines, Indonesia and Malaysia should be sufficiently advanced for results to be reported.

The participants from Malaysia expressed the interest of their country to host the next meeting, provided funding and the approval of the Government were secured.

## **8. CONCLUSIONS AND RECOMMENDATIONS**

Considering the enormous value in financial, employment and nutritional terms of tuna fisheries, processing and support industries to the countries of the Southeast Asia Region.

Taking into account the fact that IPTP activities in maintaining databases on the tunas and tuna fisheries and in support of sampling schemes, data analysis, coordination and the provision of fora for the discussion of scientific and technical issues related to tuna on the Pacific Ocean seaboard of the Southeast Asia region are likely to cease within the next two to three years, the Conference **recommends** that the Governments of the countries concerned:

1. Explore as a **matter of urgency** the options for long-term activities in relation to the management of shared stocks of tuna in this area, in particular those connected with the maintenance of databases on the catches and fisheries for tuna and tuna-like species and of related biological information. These options could include those discussed in the Conference, possibly involving SEAFDEC, WPFCC and SPC.
2. Where alternative sources of funding are not available, undertake the responsibility within their regular budget for the sampling programmes initiated by IPTP.

The Conference **furthermore requests** IPTP to conduct a study on the technical and financial implications involved in the options discussed, for submission to the Governments, SEAFDEC, WPFCC and SPC.

The Philippines private sector was well represented at the Conference and was encouraged to participate in the discussions. Representatives included members from the canneries and producers (handline, ring-net and purse seine

fishermen), who provided valuable information and comments on a range of topics from observations on factors controlling quality of canned tuna to concerns for the high catch of juvenile fish in the Philippines fishery. Concern was also expressed that the tuna fisheries of Philippines and Indonesia be managed in a responsible and coordinated manner.

The Conference **recommends** that a high level of participation by private sector representatives should be encouraged for future South East Asia Tuna Conferences.

## **9. CLOSING OF THE CONFERENCE**

The Conference was closed under the Chairmanship of Director Alejandro I. Yadao. Mr. Lui, speaking on behalf of the participants, expressed the appreciation of all present to IPTP for having organised the Conference. The Programme Coordinator of IPTP thanked the organizers, in particular Mr. Noel Barut, for the smooth running of the Conference, and congratulated the Industry participants for their exceptional level of interest and of openness in collaborating with the scientists. In closing the Conference, the Chairman expressed the desire that further meetings of this type be organised.



## Annex I

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## Annex II

Welcoming Address  
of  
Undersecretary Joemari D. Gerochi  
to the opening of the  
Fifth Southeast Asian Tuna Conference  
General Santos City, Philippines  
September 1-4, 1992

On behalf of the Secretary of Agriculture, the Honorable Roberto S. Sebastian, and the Honorable Adel Antonino, Mayor of General Santos City, I wish to extend a very warm welcome to all participants and guests to the Fifth Southeast Asian Tuna Conference. I am sure that you will find General Santos City a pleasant and peaceful city. General Santos City was chosen as the venue of your Conference presumably to underscore its importance as a major tuna landing site and to bring you within sight of the Moro Gulf, the principal tuna grounds of the Philippines. I trust that this place will live up to your expectation of being interesting and relevant to the topics of discussion of this Conference.

We take pride that it was also a conference hosted by the Philippines in 1987 that gave birth to the "Southeast Asian Tuna Conference". It was in that Conference that the decision was reached to henceforth call the formal presentation of research results the "Southeast Asian Tuna Conference". In the five years of its history, the Southeast Asian Tuna Conference has indeed kept to this objective of providing the region's scientists with the opportunity to present and discuss current tuna research findings and the status of tuna fisheries in each country.

From a quick reading of the proceeding of your past conferences, I find the Southeast Asian Tuna Conference unique among the many regional conferences on fisheries in having a long-term agenda. This has made the Southeast Asian Tuna Conference focus on recommendations made in 1987. This agenda has also served to guide the research programmes for the member countries which included the conduct of tuna sampling programmes; the establishment of computer system for data processing to facilitate comparative studies in the region; the development of tuna tagging protocols; the conduct of training courses for data collection, data analysis, computer operation, tagging techniques and tuna biology. The proceedings of the succeeding Southeast Asian Tuna Conferences indicate that the research programmes of member countries have adhered closely to this agenda.

The special attention to tuna research, for which we reiterate our appreciation to the FAO for setting up the Indo-Pacific Tuna Development and Management Programme, has resulted in a mass of information and research findings so necessary to get a better understanding of the tuna resources in the southeast Asian waters as well as in the western Pacific and the Indian Ocean.

We are particularly pleased to inform this gathering of tuna scientists that in line with the tuna research agenda of the Southeast Asia Tuna Conference, the Philippines has an on-going tuna research study. We wish to cite the assistance and collaboration of scientists from South Pacific Commission in this study. The finding from the research project should add significantly to the volume of information on tuna resources.

The accomplishments of the Southeast Asian Tuna Conference are indeed commendable. May I venture further to share with you my impression that there is a missing link in the work on tuna. And this missing link is the tie-up of research findings to policies. This is probably a result of the marginal participation of policy makers in technical conferences such as the Southeast Asian Tuna Conference and the absence of a mechanism for providing opportunity for discussion between policy-makers and scientists on the implications of research results on tuna management policies. If I may raise two questions: shouldn't the Agenda of the Southeast Asian Tuna Conference include policy research? And shouldn't scientists also become advocates for policies? After all, the scientists gathered here have a paramount edge when it comes to knowledge of the tuna resources.

I hope that this meeting will provide a forum for exchange of ideas that will lead to policy formulation.

Lastly, I hope that this exchange of views will result to better management of this particular resources - the Tuna fisheries for the benefit of the region.

Thank you.

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