Australian Maritime College

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6 September, 1990

The Secretary,
Fishing Industry Research and Development Council,
Department of Primary Industry,
Edmund Barton Building,
BARTON ACT. 2600

Dear Sir/Madam,

Final Report: FIRDC 89/112
"Fisheries Project for Post Graduate Students"

A list of suggested projects was presented to Graduate students enrolled in the Graduate Diploma of Applied Science (Fisheries Technology) course early in 1989. The list included locally-based projects and several remote ones compiled with the co-operation of institutions such as State and Federal Fisheries Agencies and the C.S.I.R.O. Seven students received assistance under this grant, the total being $3904-40. Details of expenditure are given in Attachment A.

All seven students submitted projects which were passed by the course examination committee. Summaries of the FIRDC supported projects are included in Attachment B. Copies of the complete reports can be made available on request.

The Postgraduate student project grant undoubtedly fulfills a valuable function in permitting students to select projects considered worthy of investigation by fisheries agencies remote from this College. FIRDC financial support is gratefully acknowledged.

A balance of $3095.60 from this grant is still held by the College and the second portion of the grant was not taken up. In view of the overall cut-back in FIRDTF funding for the 1990/90 financial year, the School is unable to maintain the past level of support for post graduate fisheries studies. This is occurring at a time when the School is expanding its graduate course offerings to include a Master of Applied Science (Fisheries), effective from 1991. It will be highly advantageous to "launch" the thesis component of this new course by extending to Masters students the established concept of providing travel assistance for applied fisheries research undertaken away from the School. Your Council is consequently requested to:

a) Approve the transfer of the unexpended portion of grant 89/112 to the 1990/91 budget year.
b) Approve expenditure of these funds for subsidising applied fisheries thesis research necessitating MAS (Fisheries) student travel to venues distant from the School.

Favourable consideration of these requests will be greatly appreciated and will play a significant role in helping to establish Australia's first Masters degree programme in Fisheries.

Yours faithfully,

J. H. Wallace
Head: School of Fisheries

ATTACHMENT A: EXPENDITURE UNDER FIRDC GRANT NO. 89/112

Student	Costs	Research Project Title	Co-operating Institution
L. Chapman	373-50	Identification and production of Sashimi quality finfish from Tasmanian waters.	AMC/CSIRO/ DPI-SFO
B. Cheshuk	767-30	Skipjack tuna - a review of the biology, methods of capture and the resource of skipjack tuna in the Australian Fishing Zone (AFZ)	AMC
K. Drummond	1039-10	Examination of separation strategies in trawl gear. Construction and trialling of a finfish separator device.	AMC/ Queensland Dept. of Primary Industry
G. Evans	24-00	Correlation of performance of a demersal trawl with flume tank model	AMC
C. Fell	1117-10	Transport of fresh fish from vessel to retail. A study of time-temperature relationships, storage and handling techniques.	Sydney Fish Markets/Fish Merchants Assoc.
J. Garvey	497-00	A preliminary study of the catch and utilization of albacore, Thunnus alalunga, by domestic east coast tuna longline fishermen	NSW Dept. of Agriculture and Fisheries
R. Hitolo	86-40	Preliminary investigation of growth, condition and mortality of the Japanese oyster Crassostrea gigas and the flat oyster Ostrea angasi in the Tamar River.	AMC
	$3904-40		

ATTACHMENT B: SUMMARIES FIRDC FUNDED PROJECTS

IDENTIFICATION AND PRODUCTION OF SASHIMI QUALITY FINFISH FROM TASMANIAN WATERS

L. Chapman

This project was undertaken to identify and evaluate potential Tasmanian finfish for the sashimi markets of Japan. To this end, 19 species were chosen. Selection consisted of: cross referencing Japanese and Tasmanian fish identification books; anecdotal information collected from a broad cross section of the fishing industry; and literature published for other states of Australia.

A total of 9 fishing methods currently practiced or showing potential for future use in Tasmania were examined. These methods were evaluated as to their effectiveness in capturing sashimi quality fish. For some active catching techniques, changes in gear usage were recommended which would increase this quality. In addition, proper onboard handling of the catch was highlighted as needing attention with respect to all catching methods.

The most efficient medium for initial chilling of product once landed was also evaluated. Experiments were conducted comparing drop in temperature among fish in ice, refrigerated sea water (RSW), and ice slurry. Ice slurry was found to be the most efficient medium reducing the temperature of a fish weighing 1.7 kg in 33 percent less time than the RSW or 66 percent faster than ice. This saving in time by use of ice slurry over other media is significant when producing a product of high quality.

A procedure of handling fish from capture through to packaging for airfreight is suggested. This is to emphasize the need for care to maintain quality of product at every stage of handling and processing. Through following the procedure as well as the recommendations presented in this report the potential for sashimi export trade from Tasmania to Japan is promising.

SKIPJACK TUNA: A REVIEW OF THE BIOLOGY, METHODS OF CAPTURE AND THE RESOURCE OF SKIPJACK TUNA IN THE AUSTRALIAN FISHING ZONE (AFZ)

B. Cheshuk

Skipjack tuna are a fast growing, highly fertile tuna that have a circumtropical distribution. Skipjack possess many favourable characteristics that are conducive to supporting major fisheries and are currently the subject of intensive fishing pressure in tropical waters world-wide.

A review of the distribution, biological chacteristics and the means of exploiting skipjack tuna is presented. The current status of the skipjack resource in Australian waters is examined in order to assess the potential for increasing fishing effort directed towards skipjack in the Australian Fishing Zone (AFZ).

The waters of the AFZ offer a suitable habitat for skipjack. However, the occurance and abundance of skipjack in Australian waters is highly variable over time and geographical location.

It is suggested that skipjack tuna does not have the potential to sustain a large scale fishery in the AFZ. The waters of southern NSW currently targets skipjack and has the best potential for a small scale fishery on a seasonal basis. Current evidence suggests that skipjack are too unreliable in the remainder of the AFZ to be considered a viable resource and may be the subject of fishing effort only as the opportunity arises and if a suitable market exists.

EXAMINATION OF SEPARATION STRATEGIES IN TRAWL GEAR AND CONSTRUCTION, TRIALING OF THE FINFISH SEPARATOR DEVICE.

K. Drummond

Separation strategies utilized throughout the world to reduce by-catch in prawn trawling operations were reviewed. Criteria for a technique to overcome by-catch problems in Australia's prawn fishery were established and options evaluated, after consideration was given to the potential facilities and resources available to the project. The finfish separator device (FSD) was selected and subsequently constructed. The completed FSD was subjected to trials both in the Australian Maritime College flume tank and at sea off the East Coast of Queensland.

Flume tank trials revealed that the FSD achieved a smooth hydrodynamic shape within the model net. It was also confirmed that the device provides the dual effects of accelerating the flow within the tapered mesh funnel, while producing a dramatic reduction where finfish are predicted to exhibit radial escape reactions.

Full scale sea trials found that the FSD performed well with regard to operational aspects, but were largely inconclusive in determining its effectiveness, due to a lack of control over sampling variables. During daylight tows finfish separation rates of up to 83% were achieved, but the summarized data showed 30% exclusion at a 95% confidence level. Insufficient data were obtained on finfish separation during night shots or for retention of Crustacean catches at any time of the day to draw valid conclusions on these aspects.

CORRELATION OF PERFORMANCE OF A DEMERSAL TRAWL WITH FLUME TANK MODEL.

G. Evans

A 1/10 scale model of the trawl was constructed and tested in the flume tank at the AMC, Tasmania. The scale model was evaluated for both geometrical and engineering performance.

It was found that the model gave results for drag well above those of the net, full scale until the drag was scaled with a Reynolds number correction factor. When this was applied the results fitted with the trawl data.

The trend of the model head line height with speed was similar to that obtained with sea trials with the full scale trawl, although model head line height was greater.

TRANSPORT OF FRESH FISH FROM VESSEL TO RETAIL. A STUDY OF TIME-TEMPERATURE RELATIONSHIPS, STORAGE AND HANDLING TECHNIQUE.

C. Fell

Chilling seafood to between -1°C and 4°C is the most effective method of maintaining fresh fish quality. This study was aimed at monitoring the temperatures of fish, immediately they were landed, up to the point of retail. "Equivalent Days on Ice (E.D.)" tables were used to determine the effects of elevated storage temperatures on the quality of product reaching retail outlets.

The bulk of this study was completed at the Sydney Fish Market where temperatures of fish were monitored. The catches from two vessels were monitored until retail, at which time E.D. was estimated. Two retail outlets, with differing atmosphere surroundings, were visited to determine whether there were significant temperature differences between product at the two outlets. Several domestic airlines and packaging manufacturers were visited to guage the extent of research into this area.

Results indicated that major problems were occurring throughout all transportation and marketing stages, but were most prominent on fishing vessels if fish are poorly iced. Poor icing at this stage, or any other stage in the transport of fresh fish, rapidly decreases the quality of the product. If fish are well iced, these problems are avoided, therefore enabling a greater percentage of the product to reach consumers in high quality. Other problems included contamination from dirty ice or overturned bins, poor packaging procedures for air shipment, and poor display techniques at retail outlets.

A PRELIMINARY STUDY OF THE CATCH AND UTILIZATION OF ALBACORE, THUNNUS ALALUNGA BY DOMESTIC EAST COAST TUNA LONGLINE FISHERMEN

J. Garvey

The albacore, *Thunnus alalunga*, is targeted by six commercial fisheries in the Pacific. It is only taken incidentally in commercial tuna operations in Australian waters.

Albacore is a significant by-catch of the east coast tuna longline fishery, which mainly targets yellowfin tuna, *Thunnua albacores*, for the Japanese and domestic sashimi market. This fishery operates in a seasonal manner, with activity concentrating along the south coast of NSW during summer and the north coast during winter.

The seasonality of albacore catches in this fishery was investigated by conducting interviews with longline fishermen along the NSW coast. The albacore seasonality was found to be similar to that of the seasonality of the fishery itself, however the albacore seasonality was more restricted. Differences in the albacore seasonality from different areas of the coast, plus evidence from the domestic longline logbook indicates that there may be a seasonal movement of albacore along the east coast of Australia.

The utilization of the albacore catch was also investigated by conducting interviews with the longline fishermen, Fishermen's Cooperative managers and retail managers at the Sydney Fish market. Most albacore caught on the northern and central coasts of NSW are sold at Sydney for relatively low prices. Lack of consumer awareness and poor quality of product are probably the causes for the low demand for albacore and the low prices. This demand could be increased by promotion of the product and by addressing the problems of quality.

This study suggests that increasing the market for the albacore by-catch of the domestic longline fishermen is possibly the best option for enhancing the utilization of albacore in Australian waters at the present time. Encouragement of an albacore fishery for canning purposes in Australia would not be advisable particularly considering the recent expansion of the albacore surface fisheries in the South Pacific.

PRELIMINARY INVESTIGATION OF GROWTH, CONDITION, AND MORTALITY OF THE JAPANESE OYSTER (*CRASSOSTREA GIGAS*) AND THE FLAT OYSTER (*OSTREA ANGASI*) IN THE TAMAR RIVER.

R. Hitolo

The Japanese oyster (*Crassostrea gigas*) and the flat or mud oyster (*Ostrea angasi*) were grown at two sites in the Tamar River. Three plastic milk trays containing both species were placed at each site. T
he trays were hung at 1.2m intervals, with the top tray 1.2m below the surface at high tide and exposed during low tide.

Growth rates recorded for both species at each site over the three month study period (July-October) were low which was expected for the time of the year (Winter-early Spring). Average weight increments from July to October for *C. gigas* (0.8/month) were higher than for *O. angasi* (0.2g/month) at both sites. Increments in length from July to September at both sites were about 2mm/month and 1mm/month for *C.gigas* and *O. angasi* respectively. From September to October (1 month) the growth in length of *C. gigas* increased to about 2.6mm/month at both sites. There was no concurrent increase in length increments for *O. angasi* over the same period. Statistical analyses of the data indicated that both depth and time has significant effects on growth (length and weight) of both species at each site.